Feb. 23, 1943. H. J. MARLOWE 2,311,899

THERAPEUTIC ART

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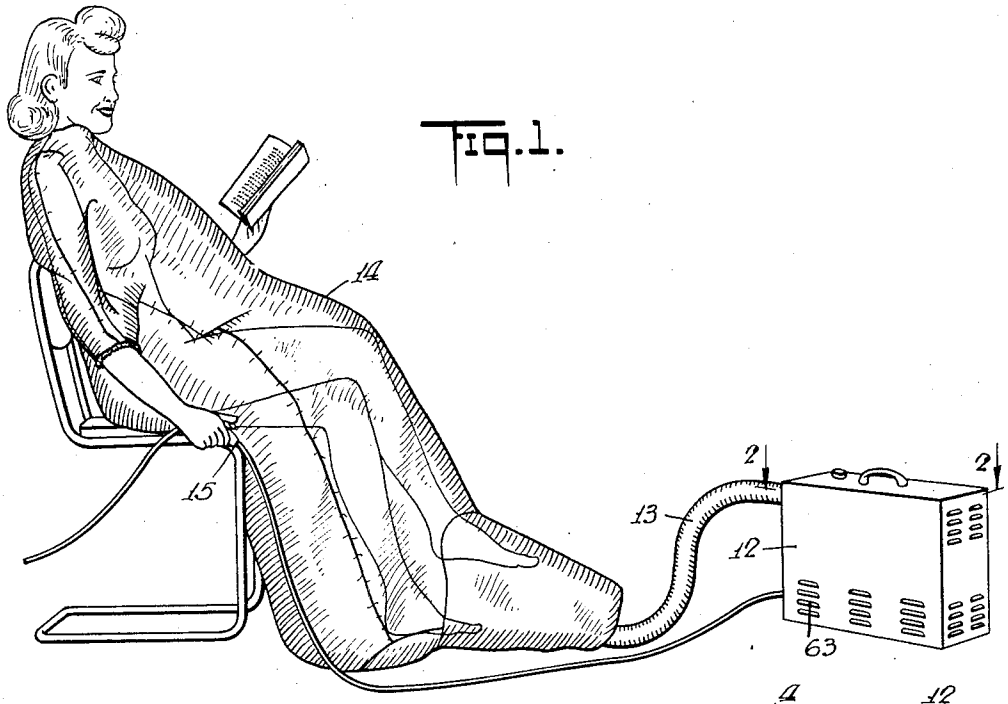


Fig. 1.

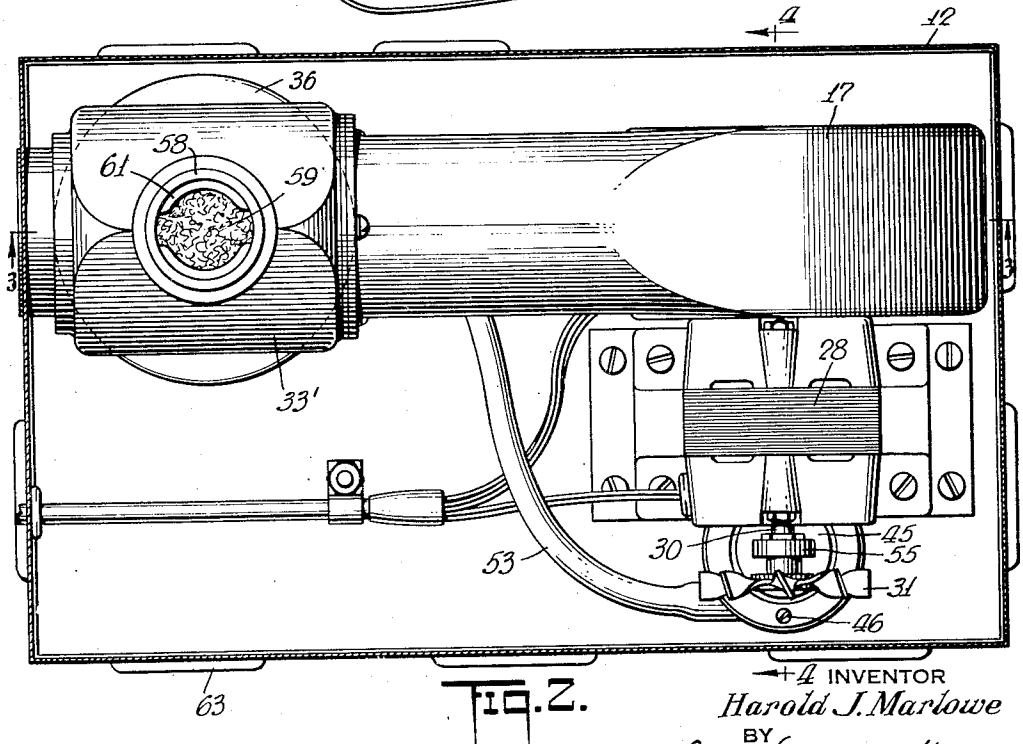


Fig. 2.

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Fig. 3.

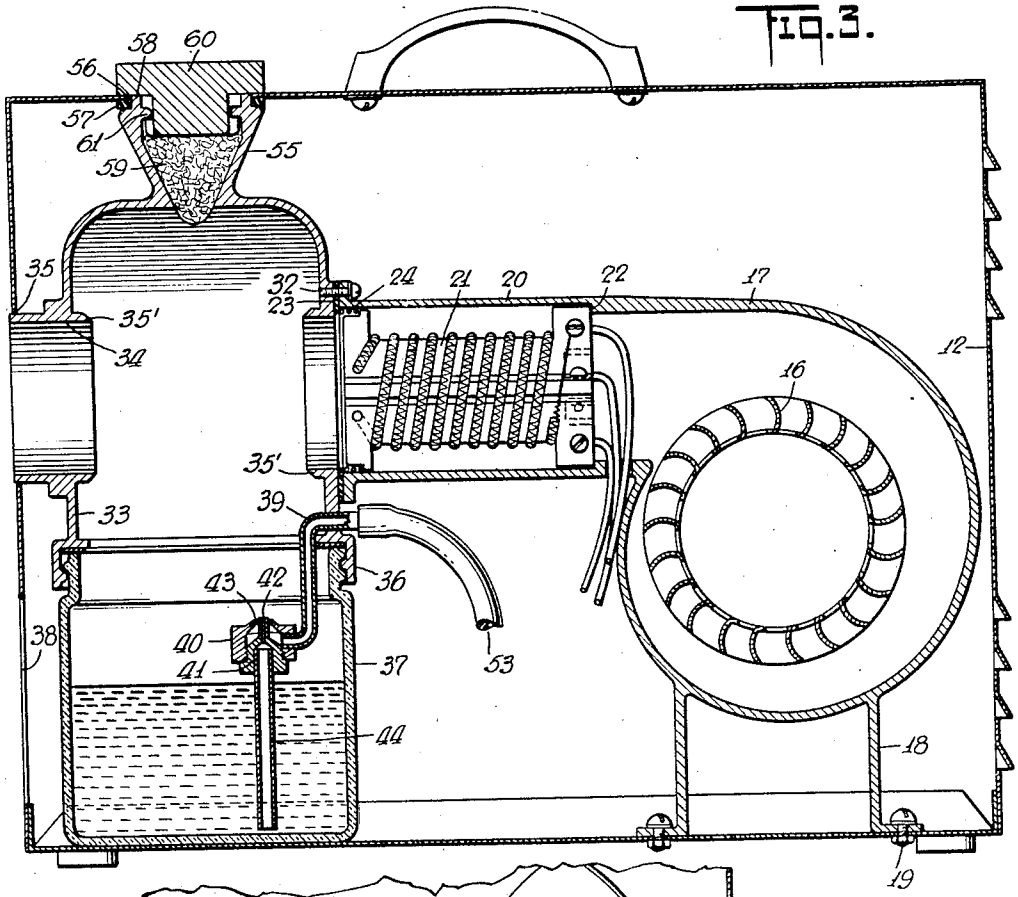
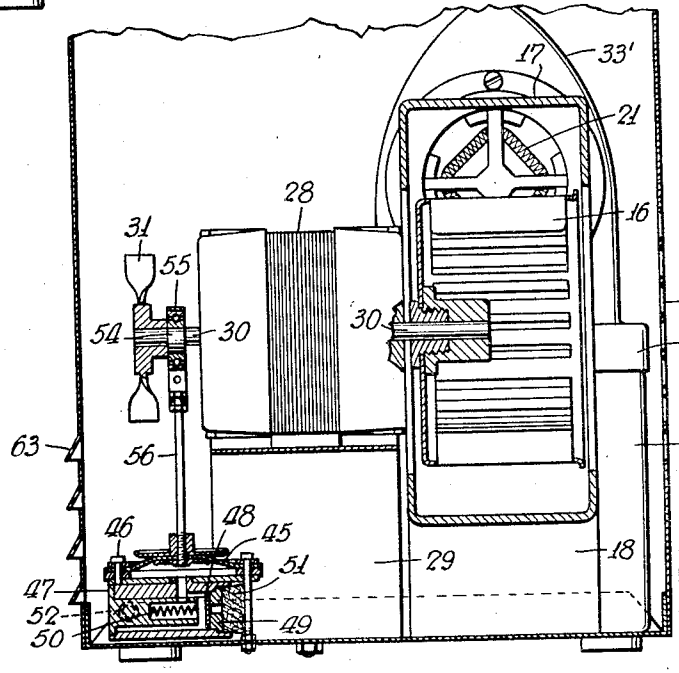


Fig. 4.



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FIG. 5.

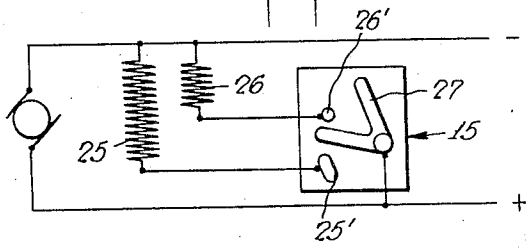


FIG. 6.

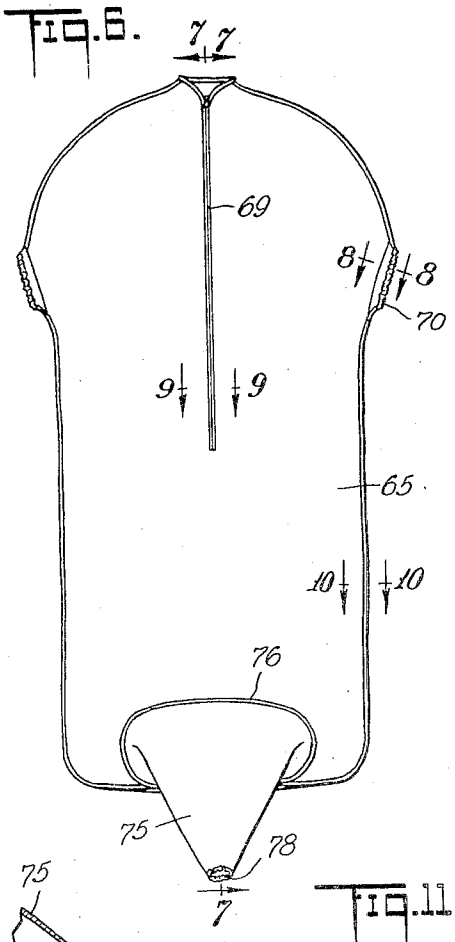


FIG. 7.

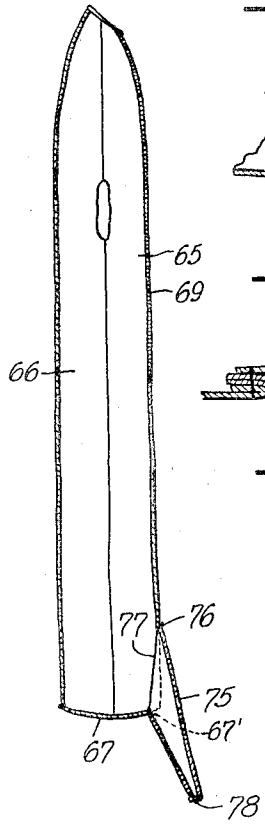


FIG. 8.

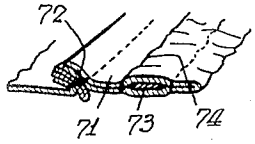


FIG. 9.

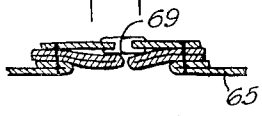


FIG. 10.

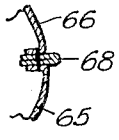
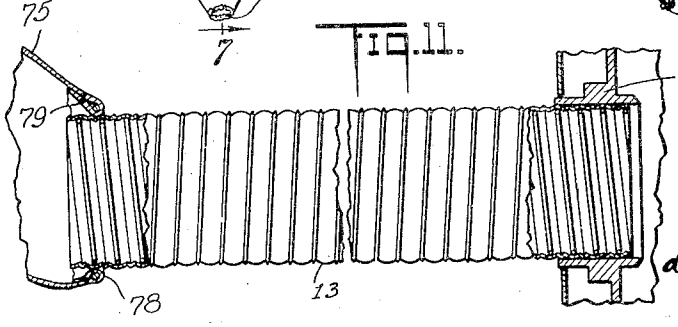


FIG. 11.



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UNITED STATES PATENT OFFICE

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THERAPEUTIC ART

Harold J. Marlowe, New York, N. Y., assignor to Reduc-O-Matic Inc., New York, N. Y., a corporation of Delaware

Application November 6, 1941, Serial No. 417,983

15 Claims. (Cl. 4—164)

The present invention relates to the therapeutic art, more especially to equipment and methods designed to induce perspiration for promoting health and reducing weight and if desired also for applying oil or medicament to the open pores for the purpose of alleviating or curing certain ailments.

It is among the objects of the invention to provide the therapeutic effect of a steam bath in the home without resort to steam cabinets or the like, but with the use of convenient portable equipment of low cost and small bulk that assures a gradual increase in the heating effect from room temperature to the required high temperature of 120 to 140 degrees F., or more, and the consequent elimination of the shock commonly incurred in stepping from the room into a hot steam chamber.

Another object is to provide equipment of the above type that affords a continuous rapid flow of heated air over the body of the user at the desired temperature and humidity, while leaving the person free to stand, sit or recline with the head exposed to room temperature and with free use of the hands, likewise so exposed.

Another object is to provide equipment of the above type which may be safely used by any person and readily controlled by the user for varying effects, and which is substantially proof against hazards resulting from carelessness or inattention.

In general, the invention involves the use of a unit in the form of a portable case, operated from an ordinary electric outlet, and effective to blow heated air into an ample flexible bag enclosing the body of the user.

The portable case desirably encloses air heating, moistening and propelling equipment, including a motor-driven air blower, in the air duct of which is enclosed an electric heater. Water spray in desired amount may be forcefully injected into the air stream, desirably from a jar of water in the case, having an associated atomizer, a pump driven from the motor actuating the atomizer for the purpose.

The flexible bag for enclosing the person to be treated is sufficiently vented either through the mesh of the fabric or through vent-holes near the collar, or, if desired, by loose fit at the collar, to permit escape of air through the inflated walls thereof in the continued operation of the device. Scorching of the body at localized regions is avoided by the absence of baffles, traps, pockets or restrictions and by resort to a fish-tail flaring inlet near the foot of the bag.

The present application is a continuation in part of my prior applictaion, Serial No. 376,744, filed January 31, 1941.

In the accompanying drawings, in which is shown one of various possible embodiments of the several features of the invention;

Fig. 1 is a perspective view showing the equipment in use,

Fig. 2 is a transverse sectional view on a larger scale, through the casing taken on the line 2—2 of Fig. 1,

Fig 3 is a view in longitudinal cross-section taken on line 3—3 of Fig. 2,

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 2,

Fig. 5 is a circuit diagram of the apparatus,

Fig. 6 is a front elevation of the bag,

Fig. 7 is a longitudinal sectional view taken on line 7—7 of Fig. 6,

Figs. 8, 9 and 10 are cross-sectional details on a larger scale taken respectively on lines 8—8, 9—9 and 10—10 of Fig. 6, and

Fig. 11 is a sectional view showing the connection between the portable case and the bag.

Referring now to Fig. 1 of the drawings, the equipment comprises a portable case, resembling a small suit case 12, having a flexible hose 13, connected to an end wall thereof which communicates with a bag 14, encompassing the body of the user. The unit is operated from an ordinary electric outlet zox and that operation may be controlled from a suitable switch 15.

Referring now to Figs. 2, 3 and 4, the portable case desirably encloses a rotary blower of any of a wide variety of constructions. The blower is shown with an annular rotor 16 enclosed in an involute casing 17 cast as a unit with support legs 18 that may be bolted as at 19 to the floor of the case. The rotor shell desirably has a unitary duct 20 extending horizontally lengthwise of the case and enclosing a suitable electric heater 21, which may be resiliently pressed against shoulder 22 therein by an insulating bushing 23 at the mouth of said duct, and reacting against coil spring 24 that encircles the end of the heater base. The heater desirably has two coils 25, 26 (Fig. 5) connected respectively to contacts 25' and 26' of a conventional three-way switch 15, the forked arm 27 of which may be thrown into any of three possible operative positions, using either coil or both in parallel.

An electric motor 28 is supported upon legs 29 affixed to the base of the case, and its shaft 30 is drivingly connected to the rotor 16 of the blower.

Desirably, a fan 31 is mounted upon the extremity of the motor shaft 30 for cooling during operation.

Usually it is important that the hot air propelled into the bag hereinafter described, have a substantial water vapor content, for were the air nearly dry, the perspiration would be entrained from the body as quickly as it is formed, so that the skin would remain dry, the person would not be aware of the effect of such perspiration and the action might yet be too intense for comfort and health.

The mere passing of air over an open water pan in the case 12 would expose too small a surface of water to the flow of air to result in entraining sufficient moisture and the operation would be substantially the same as if dry air were used. According to the present invention, an adequate amount of water spray is forcefully injected into the hot stream of air. The hot air should not, however, carry so much moisture as to be saturated, for it is the deficiency with respect to the saturation point that determines the effectiveness with which moisture is carried from the skin of the user.

For humidifying the air, water may be forcefully supplied from an ordinary Mason jar, resting upon the floor of the case. The jar may be threaded into the skirt 36 at the base of a hood element 33 affixed as by screws 32 to the outlet end of the air duct 20. The hood element has a unitary outlet collar 34 exposed through an aperture 35 in the end wall of the case, and of the same diameter as and axially aligned with the heater duct 20. Usually sufficient water will be introduced in jar 37 for one treatment only and this ordinarily is about three fourths of a pint. The level of water in the jar may be seen through window opening 38 in the contiguous wall of the case.

Affixed in the hood 33 immediately above the skirt 36 is an air duct 39 which leads into and supports a substantially conventional vacuum type atomizer head. The atomizer head may involve a cap 40 threaded upon a bushing 41 concentric therewith, which has a nozzle 42 protruding through the head and aligned with a drop pipe 44 threaded into the bushing and ending near the bottom of the jar. Air propelled through the duct 39 escapes through annular jet 43 between nozzle 42 and cap 40 and thereby entrains water spray through nozzle 42.

Air pumping means actuates the atomizer and is desirably operated from the electric motor. In one illustrative embodiment, a pumping unit of the flexible diaphragm type is employed. It comprises a flexible diaphragm 45 secured at its periphery by screws 46 to a housing 47 attached to the floor of the case 12. In housing 47 is enclosed a check valve 48 normally held against its seat 49 by a coil spring 50. A wad of felt 51 over the valve port acts as an air filter and assures the admission of clean air thereto and so protects the jet from clogging with dust. The pump discharges through a duct 52 by way of flexible hose 53 which communicates with the inlet of duct 39. The protruding end of the motor shaft 30 has an eccentric 55 for driving the pump diaphragm through a connecting rod 56.

The hood 33 has a gable-shaped roof 33' the peak of which communicates with a neck 55 extending through a corresponding aperture 56 in the top wall of the case. The hood 33 is also provided with circular, inwardly extending lips 35 which are axially aligned in the line of air blast, and serve a purpose set forth hereinafter. A gasket 57 about the lip 58 of the neck is interposed between the neck and wall of the case. The neck preferably tapers downward as shown, so that a wad 59 of cotton or other absorbent, soaked with suitable essential oils or medicaments may be retained therein. A removable plug 60 closes the neck and is retained by suitable bayonet slot connection 61, and may be readily removed for refilling jar 37 with water, or replacing or recharging plug 59.

The case is desirably provided with adequate louvers 62 in the side wall adjacent the blower through which air is drawn from the exterior, and other louvers 63 are provided to avoid overheating.

The bag desirably comprises a front panel 65, a back panel and a bottom strip 67 of suitable textile such as duck, which are stitched together at lateral seams, desirably with an interposed welt 68 for added strength. The front panel desirably has a longitudinal hookless fastener 69 extending downward from the neck, which may be closed in use with desired degree of snugness or looseness about the neck of the wearer. The sleeve openings 70 desirably embrace the arms below the elbow of the wearer. To this end, an arm band selvage 71 is stitched as at 72 about the sleeve openings and has an elastic band 73 in a suitably shirred enclosure 74. The bag is of peripheral dimensions considerably greater than even a large person, so that it will bulge or billow outward considerably in inflated condition.

A fish-tail inlet 75 of the same flexible textile as the bag itself is stitched at its flaring rim 76 about the correspondingly shaped wide aperture 77 across the lower end of the front panel 65, the reduced forward extremity of said fish-tail presenting an inlet opening 78 hemmed inward as at 79.

Desirably, the lower half of the fish-tail inlet 75 is not stitched to the lower edge of the front of the bag, but to the edge 67' of a corresponding notch in the forward edge of the bottom strip 67. Accordingly there is no danger of the fish-tail inlet offering undue obstruction to the entry of air if the user is in reclining position when starting the motor.

In general, it is preferred to use a bag, the fabric of which is of pervious mesh, for instance, of duck, and the escape of hot air therethrough would render its exterior warm to the touch. However, a non-porous bag will operate and will have the advantages of permitting the vapor of essential oils, or other medicament, to be directed over the face of the user, if venting is effected about the neck of the wearer, either through small apertures thereat, or looseness of closure at the neck. The bag is of width considerably greater than the average human body, so that in inflated condition, as shown in Fig. 1, it bulges outward considerably.

Connection between the air supply unit and the bag is desirably by means of a flexible wire-bound hose 13 of conventional construction, the inlet end of which may be inserted into the collar 34 accessible through the end wall of the case and the outlet end of which may be introduced into the inlet 78 of the fish-tail element 75 of the bag.

The operation proceeds as follows:

The desired amount of water being introduced into the jar 37 through neck 55, the user steps into the garment and closes the hookless fas-

tener about the neck, the sleeve-bands resiliently embracing the arms. The outlet plug is introduced into an ordinary outlet box, whereby the electric motor **28** will be set into operation to blow air into the bag. Upon closing the switch **15** the heater **21** is set into operation, and the blower **16** driven by the motor **28** propels air through the duct **20** about the heater **21** and thence across the hood **33** and through hose **13** into the bag, which accordingly becomes gradually inflated about the body of the user. The atomizer being at a substantial distance from the course of air flow, the droplets issuing therefrom will be further subdivided by the time they reach the path of air flow, and the atomized water will be subdivided substantially to a vapor as it enters and is entrained by the hot air stream. The hot humidified air passes at relatively low pressure, but at high speed through the small diameter duct **20** and hose **13** without material heat loss. The linear speed of flow is gradually reduced as it passes into the flaring fish tail **75** of the bag. Nowhere is the hot air trapped or pocketed, so that there is no scorching.

The air in the inflated bag becomes progressively hotter as it is passed over the heater **20**, until a static temperature is reached, which depends upon the size of the heater used, and the setting of the switch **15**, so that the air passing through the inflated bag about the wearer will be gradually elevated to a temperature in the order of 120 degrees F., 130 degrees F. or warmer, and said temperature will be maintained fairly uniform throughout the bag during operation. The bag is vented to such extent as to impose sufficient back pressure to maintain its condition of inflation, that is, after it has once become inflated, air escapes from the bag at substantially the rate at which air is forced into the bag by the operation of the rotor. At no time will air stagnate in the bag, but the fish-tail inlet directs the air over and along the body of the user, so that the spent air is deflected to the wall of the inflated bag and is expelled through the meshes thereof or through the neck passage or openings.

The operation is so effective that the equipment may be used on the ordinary house lighting circuit.

Simultaneously with the heating and propulsion of the air, the atomizer operated from the diaphragm pump **4—57** injects a spray of water transversely across the air stream into the hood **33**. The effectiveness of the atomizer is such that the spray will be projected clear to the roof **33'** of the hood and thereby moisten the medicament in the absorbent plug **59**. By reason of the oblique wall of the gable-shaped hood, there will be no return drip of water or medicament from the plug across the air blast from duct **20** to outlet collar **34**. The moisture will flow down along the oblique side wall and about the rims **35'** of the end walls of the hood back into the water jar. Thus, where the case is used without the bag, to blow the heated, humidified air directly into the room (as is desirable in certain applications) no discrete drops of moisture will be blown out, since any excess water returning by gravity along the walls of the hood to the jar is kept out of the path of the direct blast of air from duct **20** to outlet collar **34**. The wall or the furniture in the room will, therefore, not be drenched.

As contrasted with the conventional steam bath in which the person is confined in a closed chamber with stagnant hot water vapor laden air, the present invention effects active motion of ar about the body, involving an effective air massage, the body being placed in a hot, moist windstorm as it were, uniformly effective from head to foot of the user. The air entering at the foot region applies adequate treatment thereat, as contrasted with the deficiency in this regard, of the ordinary steam room. The hot air applied to the body, carrying considerable humidity but short of saturation, the air remains sufficiently avid for moisture to carry off perspiration from the pores at the desired rate. Preferably, the atomizer head and operating pump and its drive are so adjusted as to humidify the hot air to from 20 to 25 per cent at 120 degrees F. The treatment is exhilarating rather than enervating in effect, since moisture is effectively evaporated from the body in the moving air stream, thereby to promote further perspiration and such evaporation tends to cool the body and accordingly permits the application of hotter and more effective vapors without discomfort than would be possible in a chamber with stagnant air.

It will also be seen that since the air is passed directly over the red hot electric heater **21**, sterilization and some other therapeutic benefits due to infra red rays occur.

It will be understood that the heater switch may be set for a lower heat as the treatment is about to end, and when the jar **37** is empty at the conclusion of the treatment, the switch may be shut off entirely, with only the blower operating, thereby gradually to cool down the air current, while the body dries, so that the user suffers no chill in stepping out of the bag. Usually a complete treatment takes from 20 minutes to one half hour.

In some applications, the heater may be kept out of operation entirely, and in other applications the rotor may draw upon a source of chilled air.

In coping with certain ailments as for instance, rheumatism or malaria, where especially rapid excretion through the pores is to be promoted, or in the case of persons so constituted as to perspire with difficulty, it may be desirable to eliminate the water from the jar **37** and to apply the air in dry or nearly dry condition.

As many changes could be made in the above method and equipment, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense.

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

1. The method of therapeutic treatment which consists in blowing a continuous blast of heated air, while positively injecting into the heated air stream a spray of water and directing the continuous stream of the water vapor laden heated air into a vented but otherwise confined path gradually expanding about the feet of the person to be treated thereby passing the hot water vapor-laden air in active motion about the body.

2. Equipment of the character described comprising a vented bag adapted to enclose the person to be treated and means for blowing hot water vapor laden air through said bag, said

means comprising a unit having an air blower therein, a heater in the path of air blown therethrough, a conduit delivering the hot air into said bag and positively driven means in said unit for spraying water into the heated air stream.

3. Therapeutic equipment comprising the combination of a portable case having therein an electrically driven blower, an air conduit for conveying discharge of said blower through said case, an electric heater in said case and in heat conductive relation with said conduit, a bag for enclosing the person to be treated, a flexible hose connecting the outlet of said conduit to said bag, said bag having a fish-tail shaped inlet duct near the lower end thereof, whereby pocketing in the bag of air from the case will be obviated, said bag being pervious to air to permit a continuous circulation of substantially uniformly heated air about the body of the user and through the wall of the bag.

4. In therapeutic equipment of the type comprising a vented bag adapted to enclose a person to be treated, and means for blowing hot vapors through said bag; the combination in which said means comprises a portable case, said case containing a blower, an electric motor for driving the same, an outlet leading to the bag, a duct across said case blowing the discharge of said blower to said outlet, an electric heater contained in said duct, a water container in said case, opening to said duct and a pumping device operated from said motor for blowing a spray of water from said container into said duct.

5. In a therapeutic equipment of the type comprising a vented bag adapted to enclose the person to be treated, and means for blowing hot vapors through said bag; the combination in which said means comprises a portable case having therein a rotary blower, a motor driving the same, an outlet in one of the walls thereof for connection to the vented bag, a duct connecting said blower to said outlet, an electric heater in said duct, a water container below said duct, a pneumatic injector in said container and communicating with said duct, and an air pump driven from said motor for ejecting a water spray into said air duct for entrainment thereof by the heated air stream, said duct having an enlarged hood in the length thereof along which excess water will flow back to the water container.

6. In a therapeutic equipment of the type comprising a vented bag adapted to enclose the person to be treated, and means for blowing hot vapors through said bag; the combination in which said means comprises a portable case having therein a rotary blower, a motor driving the same, an outlet in one of the walls thereof for connection to the vented bag, a duct connecting said blower to said outlet, an electric heater in said duct, a water container below said duct, a pneumatic injector in said container and communicating with said duct, and an air pump driven from said motor for ejecting water spray into said air duct for entrainment thereof by the heated air, said duct having a hood in the length thereof above said injector, along the wall of which excess water will flow back to the container, the upper end of said hood having a filling opening accessible through the top of the case.

7. A therapeutic equipment comprising a case having therein a rotary blower, an electric motor driving the same, a horizontal air duct discharging through an end wall of said case, an electric heater in said duct, a jar resting on the floor of said case, a hood capping said jar and communicating with said duct, a filling opening through the top of said case communicating with the upper end of said hood, pumping means driven from said motor and an injector within said jar for positively injecting water spray into the path of flow of the heated air stream.

8. A therapeutic equipment comprising a portable case, a rotay blower having a frame mounted upon the floor of the case, and having a horizontal discharge duct, an electric motor mounted upon the floor of said case and drivingly connected to said blower, an electric heater in said duct, a hood unit in said case affixed at one side to the end of said duct and having an outlet extension aligned with said duct and accessible through the end wall of said case, a jar affixed to the lower end of said hood, a pumping device on the floor of said case, means drivingly connecting said motor to said pumping device, an injector in said jar and a duct connecting said pumping device to said injector.

9. A therapeutic equipment comprising a portable case, a rotary blower casing mounted upon the floor thereof, and having a horizontal discharge duct, an electric motor mounted upon the floor of said case and drivingly connected to said blower, an electric heater in said duct, a hood unit in said case affixed at one side to the end of said duct and having an outlet extension aligned with said duct and accessible through the end wall of said case, a jar affixed to the lower end of said hood, a pumping device on the floor of said case, means drivingly connecting said motor to said pumping device, an injector in said jar and a duct connecting said pumping device to said injector, said dome having a neck communicating with an aperture in the top of said case, serving for charging said jar and for housing medicament retaining absorbent.

10. Therapeutic equipment comprising a portable rectangular case, a blower having a casing shell with feet secured to the floor of the case, louvers in the side wall of said case through which said blower draws air, said shell including a horizontal duct longitudinally of the case, an electric heater in said duct, a hood unit laterally mounted upon the end of said duct, said unit having an outlet collar aligned with said duct and discharging through an end wall of said case, a jar affixed to the lower end of said hood, and resting upon the floor of said case, an electric motor for driving said blower and axially aligned therewith, means supporting said motor on the floor of said case, an eccentric on the shaft of said motor, a pump upon the floor of said case driven from said eccentric, a water injector in said jar and a conduit leading from said pump to said injector.

11. In a therapeutic equipment of the type comprising a unit for heating and blowing air into a flexible bag about the body of the user, the combination in which the bag is vented for escape of air therefrom, is of dimensions considerably larger than the human body, has an inlet attachment near its lower end and openings with means for snugly embracing the arms of the user, and in which said inlet attachment has a fish-tail shaped duct with its widened outlet extending transversely of said bag near the bottom thereof and feeding thereinto.

12. In therapeutic equipment, a flexible vented bag for enclosing the human body to be treated, with the head and hands exposed, said bag having a fish-tail shaped attachment at the

lower end thereof with an inlet adapted for connection with an air conduit and its flaring outlet stitched to the bag, the bag having a longitudinal hookless fastener for affixing the same about the neck and having armholes with resilient armbands.

13. In therapeutic equipment, a flexible bag of dimensions considerably larger than the human body, having a front and a back panel and defining neck and arm apertures, a fish-tail shaped flexible inlet attachment having a flared mouth attached to the lower end of the front panel of said bag, and having a small inlet aperture at its reduced end for admission of a stream of air, a hookless fastener extending longitudinally of the front panel from the neck, the armholes having elastic bands for resiliently embracing the arms.

14. In therapeutic equipment, a flexible bag of dimensions to encompass the human body with ample clearance, said bag including a bottom piece, an inlet unit of flexible fabric at the lower end of said bag, said inlet unit being fish-tail shaped, the wider end thereof being secured in place to the front of said bag and to the indented forward edge of said bottom piece.

15. A therapeutic equipment comprising a case having therein a rotary blower, an electric motor driving the same, a horizontal air duct discharging through an end wall of said case, an electric heater in said duct, a jar resting on the floor of said case, a hood capping said jar and communicating with said duct and the outlet of said duct through the end wall, means for injecting water spray from said jar into said hood, said hood having oblique side walls, and having inwardly extending rims at the end walls thereof in the line of said duct, whereby excess water from said jar, returning by gravity along the walls of said hood, will be kept out of the air stream.

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