ABSTRACT

A method and apparatus for drying laundry or the like is provided with a cross flow of heated air issuing generally parallel to the laundry from a first vertical wall in planes generally parallel to the hanger rods for the laundry. A plurality of vertically spaced hanger rods are provided with the heated air being discharged from the plurality of air discharge means located vertically at the level of the respective hanger rods to direct the air substantially parallel across the tops of the rods with the air outlet means being at the lower end of the opposite vertical wall for moving air from the enclosed interior of the closet. In the preferred embodiment of the invention, the air is discharged from a back wall and the air is collected at the bottom of the front wall and then the collected air flows upwardly through a door of the closet to discharge at the top of the door. The hanger rods are preferably in the form of hanger grids which may be pivoted downwardly and which may be removed in order to provide space for large pieces of laundry hanging down from the uppermost hanger rods. Because of the large air throughput with the cross flow principle, the humidity of the exhausting air is kept sufficiently low to avoid annoyance to the environment surrounding the closet.

9 Claims, 18 Drawing Figures
Drying Time: Diagram A at 21°C + 62% Relative Atmospheric Humidity
Diagram B at 12°C + 75% Relative Atmospheric Humidity

Laundry to be dried: 6 bed sheets 160x260 cm and 4 terry towels 50x100 cm totaling 5 kgs

Output for example according to diagram at 50% water content:
A in 40 min. Ironing Dryer and 80 min. Cabinet Dryer
B in 50 min. Ironing Dryer and 115 min. Cabinet Dryer

Table 1
### TABLE 2

<table>
<thead>
<tr>
<th>WATER IN KG</th>
<th>READING IN SUCION AND DISCHARGE IN °C</th>
<th>AIR DISCHARGE IN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>22°-37°-35%</td>
<td>-5.5%</td>
</tr>
<tr>
<td>0.5</td>
<td>22°-37°-35%</td>
<td>-5.5%</td>
</tr>
<tr>
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<td>22°-37°-35%</td>
<td>-5.5%</td>
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<tr>
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</tr>
<tr>
<td>2.3</td>
<td>22°-37°-35%</td>
<td>-5.5%</td>
</tr>
</tbody>
</table>

SEE L.X DIAGRAM TABLE 5

<table>
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<tr>
<th>0</th>
<th>15</th>
<th>30</th>
<th>45</th>
<th>60</th>
<th>75</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINUTES DRYING TIME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DRIED TEST IN ROOM 28 M³ WITH TIP WINDOW AT 21°C
Drying test in room 60 m$^3$ without window opening at 12.5°C
75% rel. humidity

Readings in suction and discharge in °C and rel. atmospheric humidity in air discharge in %

SEELX diagram table 4

Table 3
MOLLIER'S IX TABLE FOR HUMID AIR Pm 760 TORR
X GRAMS OF WATER VAPOR PER KG OF DRY AIR
I: Kcal FOR 1KG DRY AIR, MIXED WITH X GRAMS WATER VAPOR
$\phi$: DEGREE OF MOISTURE (RELATED TO BAROMETRIC READING OF 760 MM)

TABLE 4
A DRYING AIR DISCHARGE "DREVER"
B ROOM AIR THEORETICAL

WATER VAPOR TENSION IN mm AT BAROM. PRESSURE 760 mm Hg DRY
MARGINAL SCALE $\frac{dL}{dx}$

ROOM 60 M$^3$
MOLLIER'S I X TABLE FOR HUMID AIR Pm 760 TORR

X = GRAMS OF WATER VAPOR PER KG OF DRY AIR

I * Kcal FOR 1KG DRY AIR, MIXED WITH X GRAMS WATER VAPOR

° = DEGREE OF MOISTURE (RELATED TO BAROMETRIC READING OF 760MM)

TABLE 5

A = DRYING AIR DISCHARGE "DRYER"

B = ROOM AIR THEORETICAL

MARGINAL SCALE $\frac{dI}{dx}$
METHOD AND DRYING CLOSET FOR DRYING LAUNDRY AND THE LIKE

The present invention relates to a method of drying laundry and the like within a drying closet (drier), and a drying closet for carrying out such method, said closet including an inlet opening, a blower of fan and a heater for the drying air.

Drying closets of the above type are particularly useful for drying laundry of all kind; however, they may also be used for drying or aerating films, periwigs, clothes, suits and other articles, such as sausage and meat products.

There are already known drying closets wherein the drying air to major part is conducted in a circulating motion so that it flows from the lower portion to the upper portion, or vice versa, through the articles hung into the drying closet. However, these drying closets are subject to the disadvantage that the laundry is non-uniformly dried therein and becomes hard and stiff, while the drying time is of excessive length, and the dryers are complicated and expensive.

Furthermore, in these known drying closets the laundry does not assume the desired fresh smell.

Although other drying closets do not cause the drying air to circulate, they likewise, in disadvantageous manner, cause the air to flow in vertical direction only.

Accordingly, it is the object of the present invention to provide a method and a drying closet for drying laundry and other goods, wherein the disadvantages of the prior art are no longer present, wherein, in particular, the laundry assumes the fresh and natural smell of laundry dried outdoors thereby avoiding damages by solar radiation, which render possible a uniform and fast drying of the laundry, which have low energy consumption, and which do not require a connection to a water supply conduit or to an exhaust air chimney, and which do not affect the environment by the emission of too much humidity.

Moreover, the drying closet according to the invention should be constructed in simple and economical manner and be safe in operation. Preferably, it should be adaptable in its capacity or performance to the desired type of drying, and it should be capable of drying laundry or articles of various lengths and kind.

In the method according to the invention, this object is solved in that the air is taken in from the outside, filtered, compressed and heated, whereupon it flows through the closet and the laundry disposed therein in cross-current and from above in order to be exhausted thereafter.

Advantageously, the air thereby enters the inner space of the closet in uniform distribution through a closet wall, while it exits from said inner space through the lower portion of the opposite wall.

In order that the user of the closet is not annoyed by the exhausting air, and to improve the heat economy, expeditiously the air flows in the abovementioned opposite wall in upward direction to exit therefrom in inclined upward direction.

In the apparatus according to the invention, the object of the invention is solved in that the drying closet as specified at the beginning comprises air conducting means for uniformly discharging the air from the rear closet wall into the interior of the closet, and an outlet opening for the drying air from the inner space of the closet into the closet door and positioned in the lower portion thereof.

In order to permit adjustment of the drying capacity, the drying closet according to the invention may include a multi-stage heater element comprising selectively activatable stages and associated control lamps, whereby, advantageously, the heater elements of each stage extend over the full cross-section of the air flow.

In order to permit easy adaptation of the drying closet for various kinds and lengths of laundry preferably such closet is provided with pivotable and removable hanger grids for the laundry.

It is the particular merit of the invention that it provides with simplest means a particularly favorable drying closet wherein, in a manner surprising to the expert, a natural smell of the laundry is obtained in addition to a particularly uniform and fast drying operation.

It is another object of the invention to provide a drying closet which is of simple construction and, primarily, of extraordinarily small volume and of compact size, and wherein the laundry may be filled in most comfortable manner.

According to the invention, this object is solved in that the air flows through the inner space of the closet in cross-current fashion from above the planes parallel to the hanger rods for the laundry.

More particularly, preferably the air may enter the interior of the closet in uniform distribution from one closet wall and exit from the interior of the closet at the bottom in front of the opposite closet wall.

The drying closet according to the invention is preferably characterized in that it comprises air conducting means for uniformly discharging the air from one of the closet walls having chimney-like configuration, into the interior of the closet, and one or more outlet openings for the exhaust air from the interior of the closet which openings are positioned at the bottom or at a more elevated position in the opposite closet wall, and further comprises rods for hanging up the laundry, which rods are disposed under right angles to the closet walls conducting the air.

In the following, exemplary embodiments of the invention are explained in greater detail in connection with the drawings, wherein:

FIG. 1 is a front elevational view of the drying closet according to the invention;

FIG. 2 is a side elevational view of the closet according to FIG. 1, shown in sectional view;

FIG. 3 is a plan view of the closet according to FIG. 1 as seen from above, in sectional view taken along the level of a hanger grid;

FIG. 4 is a view similar to FIG. 3, the section being taken at the level of the heating means and of the fans;

FIG. 5 is a view of a clamp including the cross-rods of the hanger grid with the hanger grid placed into the chamber;

FIG. 6 is a view of the clamp according to FIG. 5 with pivoted hanger grid;

FIG. 7 is a front elevational view of a drying closet according to the invention in compact construction;

FIG. 8 is a view of the drying closet according to FIG. 7 with the front door removed;

FIG. 9 is a sectional view through the drying closet according to FIG. 7;
FIG. 10 is a horizontal sectional view of a drying closet according to FIG. 7 with the door opened and the hanger device pulled out;

FIG. 11 is a view of another example of the drying closet according to FIG. 7 with a hanger device adapted to be pivoted to the outside;

FIG. 12 is a perspective view of a hanger device pivoted to the outside and including a series of hinged down rods; and

FIG. 13 shows an example for the installation of the drying closet according to the invention.

Table 1 is a graphic representation indicating the amount of water being removed from the laundry for two specific examples as related to drying time and the relationship thereto to the percent of residual humidity of the exhausting drying air.

Table 2 illustrates a specific example of water removal from a room having a window partially opened as related to the minutes of drying time and percent of relative humidity at given temperatures shown thereon.

Table 3 is similar to that of Table 2 except that a different example of laundry drying is used.

Table 4 discloses a Mollier diagram with an outlet air and theoretical space air curves thereon for a given example.

Table 5 is similar to Table 4 and comprises a Mollier diagram with curves thereon.

As shown in FIGS. 1 to 6, the drying closet according to the invention has rectangular configuration, whereby the inner wall panel 9 of the rear wall, a trunk door 7 as the closet's front wall and two closet side walls 4 define the interior 21 of the closet which is closed from above and below by horizontal closures. The bottom of the drying closet is subdivided into several segments by means of corrugations or beads, which segments merge at a lowermost point where a drain opening for water dripping down from the laundry is provided. A drip tray 20 adapted to be emptied is provided beneath the drain opening for receiving the water.

Underneath the lower closure, there are provided in a frame an intake opening 6 for taking in the drying air, two fans 11 for compressing and pumping the drying air, as well as heater elements 12 for heating the drying air. A filter 5 is arranged upstream of the fans 11. The fans 11 proper are cross-current fans or blowers; however, fans operating in a different manner may be employed, too.

Downstream of the fans in the direction of flow, there is positioned a heater element 12 having two discrete heating stages in which the form of a wire helix extend over the full flow cross-section and the operation of which may be indicated through control lamps 2 installed into the upper portion of the door.

In order to obtain increased throughput efficiency and uniform aeration, preferably there are arranged beneath the bottom of the drying closet a pair of fans 11 in side-by-side arrangement with an immediately disposed drive motor 23, and the heating stages are each inserted with half of their lengths into the cross-section of the air outlet of each fan. The wattage of the heating stages is, e.g., 2,000 watts and 1,300 watts, respectively. By selectively adding the stages, there may be adjusted a capacity of both 1,300 or 2,000 watts and 3,300 watts. The connected load of the drying closet, including the motor, then will always be less than 16 amperes.

The fans 11 are designed to provide in the free running state an air throughput of 1,000 cubic meters per hour. In normal operation, they provide a pressure head of from 5 to 6 millimeters of water column.

The rear wall 8, 9 and the door 7 are of double-wall construction and they serve to conduct the drying air in its flow through the drying closet. The upper side of the door carries at a readily visible place the operating switches with the integrated control lamps 2 and a time regulator 3 adapted to be selectively set to a period of up to three hours, in order to set the period of time to lapse until the drying closet is switched off.

A baffle 10 is installed between the rear wall 8 and the inner wall 9, which baffle conducts the air exiting from the fans 11 into a pair of channels, whereby the front channel assumes about 40 percent of the fan outlet area and guides the air into the lower portion of the drying closet, while the rear channel occupies about 60 percent of the fan outlet area and passes the air into the upper portion of the drying closet.

The volumes of the upper and lower portions of the drying closet are related to each other in a ratio of 2 to 1. The drying air enters the interior 21 of the drying closet through transversely extending outlet slots 13 in the inner wall 9, whereby the lower portion of the closet has a transversely extending air outlet or exhaust slot 13 in the central part thereof and another slot at its upper end. The upper closet portion includes a pair of slots 13 one of which is disposed in the central part and the other one in the upper section thereof.

In the door of the drying closet, there are provided an outlet opening 18 for the drying air at the lower and inner portion, and a blowout opening 1 at the outer and upper portion. The drying air enters through the inner outlet opening 18 from the interior of the closet into the trunk door 7 constructed in the manner of a chimney, and leaves said door through said blowout opening 1. Baffles 19 in front of the blowout opening 1 conduct the exhausting drying air obliquely upwardly.

In the region of the transverse slots 13, the two side walls each carry a pair of oppositely disposed bars 15 and 16 each forming a clamp, which bars are bent from a rectangular rod. These clamps have inserted therein hanger grids 14 adapted to be removed and pivoted downwardly and on which the laundry may be hung up.

Now, the flow of the drying air extends parallel to the pieces of laundry from the rear wall 9 towards the door 7, and in addition to this cross-current has a flow component directed from above to below.

Surprisingly, this conduction of the drying air provides a uniform and highly efficient drying operation, even in the case of a high throughput of air.

The hanger grids 14 comprise individual rods 30 extending from the rear wall towards the door. The rods have an upright rectangular profile and having their rear ends passed through transversely by a pair of round, spaced rods 24, 25. The spacing between rods 24 and 25 is from about 3 to 4 centimeters.

Thus the rods 30 are each secured at one end to the pair of transversely extending rods 24 and 25 to define the hanger grid 14 which when held by the clamps formed by the bars 15 and 16 projects substantially at right angles to the rear wall 9 and laterally across the closet toward the opposite vertical wall of the closet.
The individual rods 30 and the three hanger grids 14 shown in FIG. 2 thus are parallel to one another at vertically spaced locations and are generally horizontally disposed. As the clamps formed by the bars 15 and 16 are located adjacent and at the level of the respective vertically spaced air outlets slots 13, the discharging heated air travels and is directed generally parallel to the rods 30 and across the top of the laundry thereon toward the front wall of the closet.

The upper clamp bar 15 is provided with an opening 17 the width of which is slightly in excess of the thickness of the rods 24, 25 and which has a greater spacing from the rear end of the clamp and a smaller spacing from the front end of the clamp, than the spacing between the rods 24, 25.

The bars are disposed with a spacing from each other which is slightly greater than the thickness of the rods 24, 25.

In their normal position (FIG. 5), the rods 24, 25 are situated in the rear portion of the clamp bars 15, 16 and are supported by the lower or upper bar, respectively. For pivoting, the hanger grid 14 is pulled forwardly, and the rear rod 24 may rotate upwardly through the opening 17, as shown in FIG. 6.

In this position, the hanger grid 14 may be easily removed in order to clear in its lower positions the space for larger pieces of laundry hanging down from the uppermost hanger grid.

It has found to be of particular importance that the hanger grids 14 are arranged at the level of the air discharging from the transverse slots 13.

Because of the large air throughput and because of the design of the air path, the humidity of the exhausting air is sufficiently low during the drying operation to avoid annoyance of the environment.

Thermo switches deactivate the heater elements individually if excessive temperatures are reached, such as in the case of failure of the fans. The switches have disposed therein control lamps 2 which light when the respective device controlled by the associated switch is in operation.

Tables 1 to 3 graphically illustrate the water removal of the laundry dried in the above described drying closet as related to drying time for several specific examples. The figures shown at the measuring points in first line indicate the temperature in degrees Centigrade of the taken in air, secondly the temperature in degrees Centigrade of the exhausted air, and thirdly the water content of the exhausted air in percent of relative humidity. Apparently, a drying time of 180 minutes is not exceeded even if 5 kilograms of water are to be removed; in the case of lesser water removal, such as by means of a preceding centrifuging step, the drying time is still further decreased to substantial degree. This applies even for the extremely low room temperature of 12°C.

As shown by the figures for the air exhaust temperature in the mid position, the air exhaust temperatures during the full period of drying never become uncomfortably high; as shown by the figures for the air inlet temperature, the room temperature increases only insignificantly, and the relative humidity always stays below 80 percent.

Further, Tables 4 and 5 show the Mollier diagrams of the outlet air (curve a) and of the theoretical space air (curve b). Apparently and in a manner surprising to the expert, the curve for the outlet air at the beginning passes in optimum manner along the dew point curve and then, at the end of the drying operation, shows very low humidities such as are necessary for complete drying of laundry.

The theoretical space air temperature curve shows substantial increases of temperatures up to about 40°C. Thus, an even rough calculation would deter every expert from installing a drying closet according to the invention without a drain or an exhaust air chimney. In fact, however, and in a manner absolutely surprising to the expert, it has been found that there do not arise any troubles as can be best understood when viewing the results graphically illustrated in Tables 2 and 3.

In detail, curves a reflect the variation of condition or state of the drying air exiting from the drier. Surprisingly after a starting period of about 15 minutes which most probably is necessary to heat the drier contents, a constant water discharge of about 20 to 22 grams per kilogram of drying air occurs.

Curves b would result in accordance with the proportioning rule if the drying operation were performed in an enclosure having heat-impermeable walls with complete air encapsulation toward the outside and uniform temperature and moisture distribution, and if the drying closet did not re-introduce substantial amounts of moisture along with the air taken in.

In fact, in the test rooms there is present a certain exchange of air through open windows or doors, and heat is transmitted to the outside through the walls. This explains the fact that, according to rough estimation, theoretically the space condition should be within the fog range, whereas this does not hold true in practice.

Among other factors, the drying efficiency depends on the ambient temperature and on the relative humidity, as it is shown by diagrams A + B at equal loads.

Diagram A shows a drying operation wherein the room temperature increased only from 21° to 22°C over the whole drying period of 135 minutes. The air exiting from the drying closet (as measured directly at the outlet) raised its temperature from +21°C to a maximum of 47.5°C, whereas the relative humidity (also measured directly at the outlet) increased from 62 to 74 percent and decreased again to 65 percent after a period of 30 minutes while it was 32 percent at the termination of the drying period.

In diagram B, the drying step started at a temperature of as low as 12°C; after 180 minutes, at the end of the drying step, a room temperature of 15.5°C was measured. The exhausted air was heated to a maximum of 46.5°C while the humidity increased from 75 to 82 percent and decreased to 76 percent again after a period of 30 minutes, and 30 percent of relative humidity were indicated at the end of the drying operation.

In both cases, the drying results were obtained in a room of 28 cubic meters, with only a tiltable window being open in said room. In spite of critical observation, no vapor formation could be noted in the room environments. Obviously, the drying closet does not require an exhaust air duct for removing the moisture. A slightly open window or door will suffice in any case.

As shown in FIGS. 7 to 12, it is possible to construct a particularly small sized and compact embodiment of the drying closet according to the invention by employing the cross-current principle. The cross-current principle may be realized both from front to the rear, from the rear to front, and from the left to the right and...
vice versa. Hereby, it is essential that the air in either case flows parallel to the hanger rods for the laundry.

For easier filling with laundry, the drying closet according to FIG. 7 includes grids adapted to be pulled out in forward direction, which grids, if necessary, may be pivoted additionally when the grid is in its extreme outwardly drawn position. It has been found, in a manner surprising to the expert, that the full load of a washing machine can be readily dried within the interior of a narrow closet having a depth of, e.g., 320 millimeters of the interior space and an overall depth of 350 millimeters with a height of 1.150 millimeters and a width of 600 millimeters. When drying bedlinen or bed sheets, not only the 5 to 6 kilograms of laundry of a normal load of a washing machine, but approximately twice that weight, i.e., 10 to 12 kilograms, can be dried rapidly and uniformly.

It is of particular advantage that the laundry drying closet according to the invention because of its small depth and its ideal installation dimensions may be installed in modular kitchens or, e.g., in bathrooms at a place above the tub, whereby the depth, height and width dimensions correspond to the standard dimensions of modular components. It is of special advantage that the grids of the drying closet, with the door open, may be drawn out so that the pieces of laundry then may be placed onto the individual bars. The interior of the closet includes, for example, 10 rods arranged in tandem and in two levels, thus amounting to 20 rods for hanging up the laundry. The center spacing between the rods is, e.g., 33 millimeters.

According to FIG. 7, the small drying closet comprises a pair of side walls each including an inner sheet metal plate 24a and a door 8a. In the interior space of the closet, there are provided a pair of hanger grids 23a each comprising individual rods 25a which extend from one side wall 2a to the opposite side wall 2a. The side walls 2a, 24 are of truck-like construction; they serve as air paths for the inlet and exhaust air. Baffles 11a in combination with the air exhaust or outlet slots 13a and small baffles 12a provide for uniform outflow of the drying air from the one side wall 2a in connection with the inner sheet metal plates 24a.

The drying air is taken in through the filter 9a, compressed by the fan or blower 15a, and heated by the heater 16a. Then, the air flows between the two wall positions 2a and 24a through the ventilating slots for the interior space so as to flow with uniform distribution through the interior space, whereupon it flows through the latter in cross-current to exit from the interior space via the air outlet opening which is provided preferably at the bottom of the opposite closet wall 24a or of the inner wall 2a. However, the air outlet may be positioned at a higher point as well. Thereafter, the drying air flows in a chimney-like path within the side wall 2a, 24a in upward direction and then through the outlet opening 16a into the room in which the drying closet is installed.

A timing switch 19a and switches 20a for ventilation and heating means permit to selectively adjust the drying air, the temperature and the drying time.

It has proved to be particularly expedient and current economizing if the temperature of the drying air is controlled downstream of the heater, and to switch off the heater when it exceeds a set or predetermined temperature, until the air temperature has reached a lower limit again. It is only in this way that a sufficiently uniform drying temperature can be ensured fully independently of the air being taken in at ambient temperature.

According to FIG. 12, the grids 23a comprise separate, horizontally extending rods 25a adapted to be swung downwardly. To this end, the rods have in their rear ends an elongated hole 34a wherein the suspension bolt 30a is slidingly movable. The bolt 30a is mounted in U-profile sections 31a, and in their rearwardly pushed condition the rods 25a are held at their rear ends in horizontal position by the U-profile sections 31a. When drawing forwardly, the horizontal contact with the U-profile sections 31a is lost so that the rods will swing downwardly to be suspended from their suspension bolts 30a. The depending rods facilitate filling of the closet because, expediently, each individual rod is swung upwardly not before laundry is to be hung up thereon. FIG. 12 shows an arrangement with U-profile sections placed underneath, whereby the rod ends are retained in horizontal position by the transverse rod 26a.

Further, lowering of the rods is important when laundry pieces of greater length are to be hung up, whereby the lower grid 23a would be in the way.

Rod 26a is a U-section which is slipped over a rod 27a which, again, is secured to the inner wall 24a of the closet. The box-type profile 27a includes an elongated aperture 29a in its upper and lower sides wherein a bolt 28a passing through the U-profile of the rod 26a is slidably mounted. The bolt 28a has both sides thereof secured to the U-profile of the rod 26a, and when the rod 26a is drawn out, the bolt slides within the elongated aperture 29a to the end thereof. Now, in this position the rod 26a may be pivoted about the bolt 28a, whereby the webs of the U-profile in combination with the box-type section prevent downward inclination of the grid. Ball bearings should be installed in order to facilitate inward and outward movement of the rod 26a.

In another modification of the invention, pivoting of the drawn out grid 23a may be eliminated. In this embodiment as shown in FIG. 10, the rearmost one of the rods 25b slides on another rod at the opposite wall of the closet. When the front rods 25b are lowered, it is not necessary to pull out the last one of the rods 25b from the closet.

Apparently, with the disclosed possibility of drawing out the grid, the individual rods may be easily hung with laundry in spite of the arrangement of the rods which extend transversely from one side wall to the other.

In a manner surprising to the expert, the invention succeeded in providing a closet of minimum volume of only 250 liters without thereby affecting operation of the closet or drying of the laundry. Further, it is surprising that the air path according to the invention in spite of the small spacing between the rods (33 millimeters) nevertheless renders possible an outstanding drying efficiency.

In this connection, the following has to be noted: All of the conventional drying closets having a capacity of from 5 to 6 kilograms of dry laundry, depending on the design, require a space volume of at least 570 to 950 liters and, thus, a specific volume of at least 112 to 158 liters per kilogram of laundry, whereas the present drying closet according to FIGS. 7 to 12 with maximum load requires a specific space volume of only 21 liters per kilogram of laundry. This means savings of more
than 80 percent in space volume or a space requirement of less than 20 percent of the previously known drying closet, based on 1 kilogram of dry laundry each.

In another embodiment of the invention, by retaining the above described principles of construction, the drying air may enter the closet in uniform distribution through the closet door and may exit at the bottom of the rear wall of the closet, whereby the heating and ventilating elements are arranged in the lower part of the closet door.

What we claim is:

1. An apparatus for drying laundry or the like comprising closet means having at least a first pair of opposite parallel, vertically extending walls co-operating with another pair of side walls to define a hollow closet interior in which laundry may be hung, a plurality of rod means attached to one of said walls and projecting therefrom at vertically spaced levels and in substantially horizontal planes toward an opposite vertical wall, means providing an air intake opening for said closet means, filter means for filtering the air flowing through said air intake opening, means for heating said air, fan means for moving said heated air, hollow duct means for conveying said heated air moved by said fan means along a path upwardly along one of said pair of vertical walls, a plurality of air discharge means for deflecting and discharging the entire flow of heated air from said duct means in directions laterally across the tops of said rod means toward the opposite one of said vertical walls, each of said air discharge means being located vertically at the level of one of said rod means for directing the air substantially parallel to each of said rod means for movement across the top of the laundry thereon, and air outlet means at the lower end of said opposite vertical wall means for removing said air from said closet interior after the same has flowed laterally and then downwardly to said air outlet means.

2. An apparatus in accordance with claim 1 in which each said rod means comprises a plurality of parallel rods constituting a hanger grid, means for pivoting said hanger grids for downward movement of the same and for allowing removal thereof from said closet means to permit longer laundry to hang in said closet.

3. An apparatus in accordance with claim 1 in which said duct means is in a rear wall of said closet means and in which said opposite wall is a front wall of said closet means.

4. An apparatus in accordance with claim 2 in which said front wall includes a door, said air outlet means located at the lower end of said door, an upwardly extending air passageway is provided in said door for conveying said discharging air upwardly to discharge the air adjacent the top of said door.

5. An apparatus in accordance with claim 1 in which a bottom wall means is provided for said closet and has a drain opening therein, and a drip tray is provided beneath said bottom wall for receiving liquid through said drain opening.

6. An apparatus in accordance with claim 1 in which clamping means are provided on said another pair of side walls, each of said clamping means comprising an upper bar having a slot of a predetermined width therein and a lower bar spaced from said upper bar, said rod means including a plurality of parallel rods and a pair of transversely extending members joined to said parallel rods, said transversely extending members being insertable through said slots and pivotal into interlocking relationship with said clamping means.

7. An apparatus in accordance with claim 1 in which means are provided on said side walls for mounting said rod means for sliding movement outwardly of said closet interior for loading or unloading with laundry.

8. An apparatus in accordance with claim 7 in which said rod means includes rods having bolts at rear ends thereof, in which said slide means includes means having elongated apertures in which said bolts may slide.

9. A method for drying laundry or the like within a drying closet comprising the steps of taking ambient air into the apparatus through an inlet opening, filtering said air, compressing said air, and heating said air, directing said heated and compressed air vertically along a first one of the vertical walls of the closet through a vertically extending duct means, discharging the entire flow of air from said duct means at vertically spaced levels of said vertical walls from a plurality of vertically spaced discharge openings each being adjacent one of a plurality of horizontally extending rods for holding the laundry, directing the discharging heated air in parallel flow patterns in directions parallel to the hanging laundry and rods across the top of the laundry and said rods and toward the opposite vertical wall, causing the air to flow downwardly adjacent the opposite vertical wall toward the lower end thereof, exhausting the air from said closet at the lower end of said opposite vertical wall, and then injecting the exhausted air into the room in a manner to reduce discomfort to persons in the room.

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