APPARATUS FOR WASHING AND DRYING HANDS

FIELD OF THE INVENTION

The present invention relates to apparatus for washing and drying hands.

BACKGROUND OF THE INVENTION

Apparatus for washing and drying hands generally include a chamber provided with sprays of water to wash the hands, and flows of drying air to dry them. Problems with existing apparatus include splashing of water, and blowing of air, outside the chamber. This leads to inefficient use of water and energy, as well as unhygienic contamination of surrounding areas.

WO 2006/058374 describes a hand washing and drying apparatus that includes a horizontal chamber having a front opening, and a back wall. A sump with a drain is arranged in a lower portion of the chamber. An upper spray nozzle is arranged in an upper portion of the chamber to direct liquid generally vertically downward, and two side spray nozzles are arranged in opposed side portions of the chamber to respectively direct liquid generally laterally inward. An air conduit from an air dryer is arranged in an upper portion of the chamber between the upper spray nozzle and the back wall so as to direct air downward and into the chamber.

What is needed are apparatus for washing and drying hands which provide for more efficient and hygienic use of water and drying air.

SUMMARY OF THE INVENTION

According to the present invention, there is provided apparatus for washing and drying hands including ~~a generally horizontal chamber having a defining wall, a central axis, an open end with an inwardly curved peripheral lip, a closed end, a top micro-spray nozzle arranged in the wall above the central axis, two side micro-spray nozzles arranged in the wall on opposed sides of the central axis, an air inlet arranged in the wall above the central~~

~~liquid is sprayed from the top and side micro-spray nozzles to collectively establish a liquid curtain of micro-sprays across the central axis of the chamber, and air circulates within the chamber and recirculates around the chamber from the air outlet to the air inlet.~~:a generally horizontal chamber having a defined by a wall, the chamber having a central axis, an open end with an inwardly curved peripheral lip, and a closed end;a top micro-spray nozzle arranged in the wall above the central axis;two side micro-spray nozzles arranged in the wall on opposed sides of the central axis; an air inlet arranged in the wall above the central axis; an air blower that includes a heater, the air blower being arranged to deliver drying air to the air inlet; an air outlet arranged in the wall below the central axis; and two side air ducts that each exteriorly surround at least a portion of the wall to connect the air outlet to the air blower, such that the air blower draws air from the chamber through the air outlet and then through the side air ducts; wherein in use liquid is sprayed from the top and side micro-spray nozzles to collectively establish a liquid curtain of micro-sprays across the central axis of the chamber, and air circulates within the chamber and recirculates around the chamber from the air outlet to the air inlet.

The chamber can have a circular, oval or elliptical vertical cross section.

CLAIMS:

1. Apparatus for washing and drying hands including:

a generally horizontal chamber having a defined by a wall, the chamber having a central axis, an open end with an inwardly curved peripheral lip, and a closed end;

a top micro-spray nozzle arranged in the wall above the central axis;

two side micro-spray nozzles arranged in the wall on opposed sides of the central axis;

an air inlet arranged in the wall above the central axis;

an air blower that includes a heater, the air blower being arranged to deliver drying air to the air inlet;

an air outlet arranged in the wall below the central axis; and

~~a plurality of~~two side air ducts that each exteriorly surround at least a portion of the wall to connect the air outlet to the air blower, such that the air blower draws air from the chamber through the air outlet and then through the side air ducts;

wherein in use liquid is sprayed from the top and side micro-spray nozzles to collectively establish a liquid curtain of micro-sprays across the central axis of the chamber, and air circulates within the chamber and recirculates around the chamber from the air outlet to the air inlet.

~~2. Apparatus according to claim 1, wherein the plurality of side air ducts includes two side air ducts.~~

~~3~~2. Apparatus according to ~~either~~ claim 1 ~~or 2~~, wherein the air inlet is partially fluidly connected to a diverter having two opposite facing air vents arranged in the chamber above the central axis, so that in use air is partially directed by the air vents toward the wall in opposite transverse directions relative to the central axis to thereby circulate air rotationally within the chamber about axes parallel to the central axis.

~~4~~3. Apparatus according to ~~any one of~~either claims 1 ~~to 3~~or 2, wherein the chamber has a circular, oval or elliptical vertical cross section.

~~5~~4. Apparatus according to any one of claims 1 to 4~~3~~, wherein the top and side micro-spray nozzles each have a flat fan-shaped spray pattern.

~~6~~5. Apparatus according to claim ~~5~~4, wherein the top and side micro-spray nozzles collectively establish a flat fan-shaped spray pattern within a sector having a sector angle of between 45 degrees and 180 degrees.

~~7~~6. Apparatus according to claim ~~6~~5, wherein the top and side micro-spray nozzles are directed generally radially orthogonal to the central axis.

~~8~~7. Apparatus according to claim ~~7~~6, wherein the top and side micro-spray nozzles are directed radially inwards at an angle of 88 degrees to the central axis towards the closed end.

~~9~~8. Apparatus according to any preceding claim, wherein the inwardly curved peripheral lip of the open end is disposed about the central axis within a sector having a sector angle of between 45 degrees and 180 degrees.

~~10~~9. Apparatus according to any preceding claim, wherein the inwardly curved peripheral lip can be formed as a continuation of the wall of the chamber that terminates in a rounded end.

~~11~~10. Apparatus according to any preceding claim, wherein in use, the inwardly curved peripheral lip is ~~configured to restrict~~ restricts air flowing axially out the open end of the chamber.

~~12~~11. Apparatus according to any preceding claim, wherein the apparatus includes a chamber for storing a liquid to be added to the washing liquid.

~~13~~12. Apparatus according to claim ~~12~~11, wherein the liquid to be added to the washing liquid is a liquid soap.