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Johnson

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[54] **HAND WASHING AND DRYING EQUIPMENT UNIT**

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[51] **Int. Cl.**[6] **B08B 3/02**

[52] **U.S. Cl.** **134/95.2**; 4/619; 4/628; 4/630; 4/638; 134/44; 134/104.2; 134/107; 134/198

[58] **Field of Search** 4/619, 628, 630, 4/638, 653; 604/289; 134/44, 50, 95.2, 99.2, 102.3, 104.2, 107, 198, 199, 200; 222/181.3, 185.1

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,144,596	3/1979	MacFarlane et al.	4/628 X
4,336,619	6/1982	Hinkel et al.	4/619
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4,942,631	7/1990	Rosa	4/623
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5,186,360	2/1993	Mease et al.	222/63
5,199,118	4/1993	Cole et al.	4/619
5,265,628	11/1993	Sage et al.	134/58 R

FOREIGN PATENT DOCUMENTS

923011	4/1963	United Kingdom	4/628

Primary Examiner—Philip R. Coe
Attorney, Agent, or Firm—Bean, Kauffman & Spencer

[57] **ABSTRACT**

A portable hand washing and drying equipment unit comprises a housing having a front hand receiving opening communicating with a central hand compartment. Adjacently above the hand compartment is an upper compartment having a cleansing liquid reservoir with a valve-controlled flow tube for selectively delivering cleansing liquid from the reservoir to the hand compartment, and an electrically powered fan for providing a flow of hand drying air within the hand compartment. The reservoir and fan are supported by a shelf which is slidable into and out of the housing to enable access to such elements. Adjacently below the hand compartment is a lower compartment having a removable waste liquid receptacle therein for temporarily storing used cleansing liquid.

14 Claims, 2 Drawing Sheets

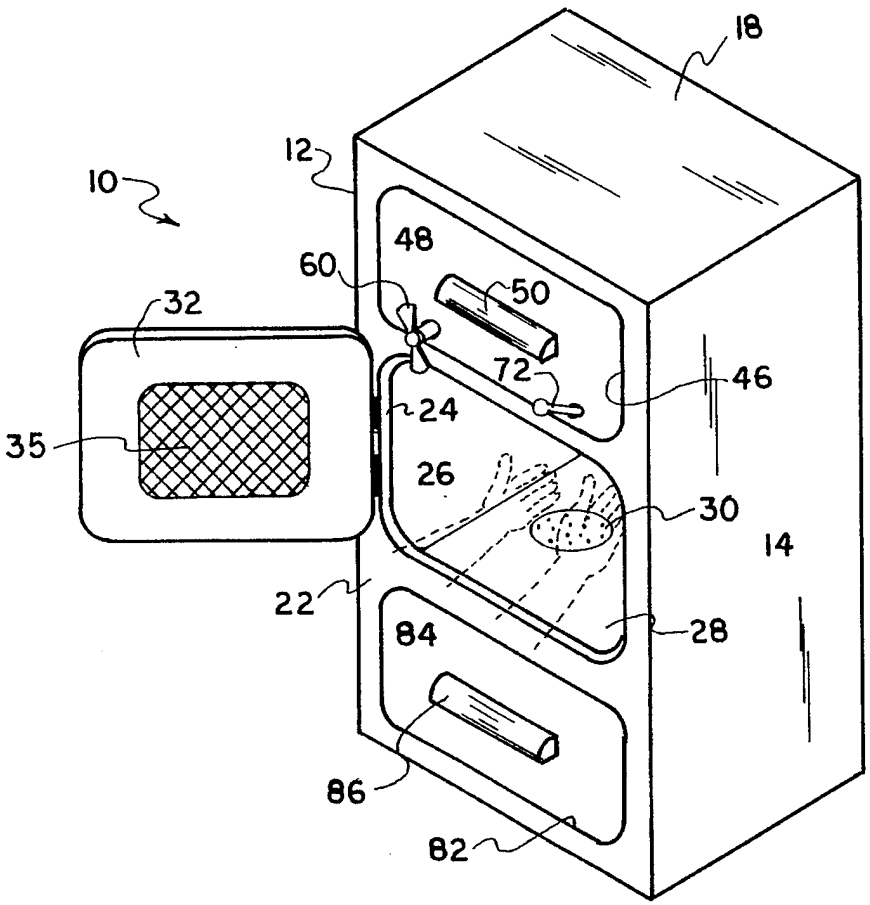
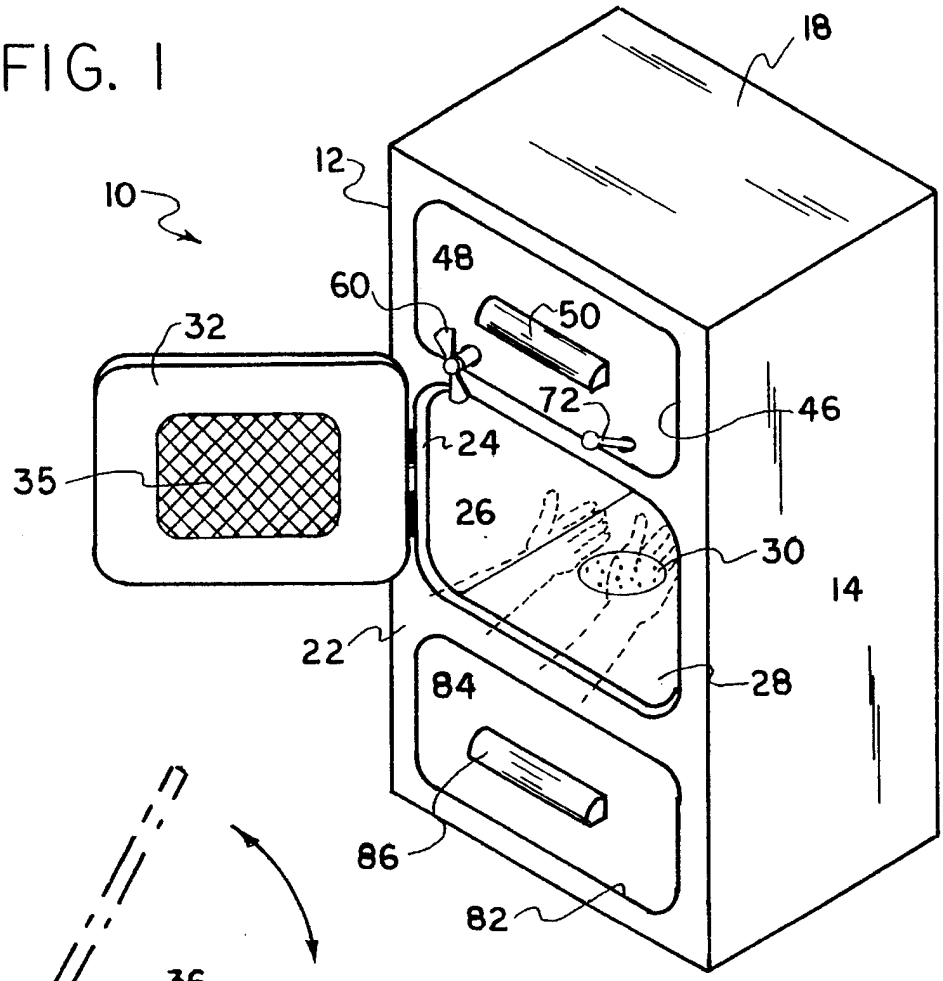


FIG. 1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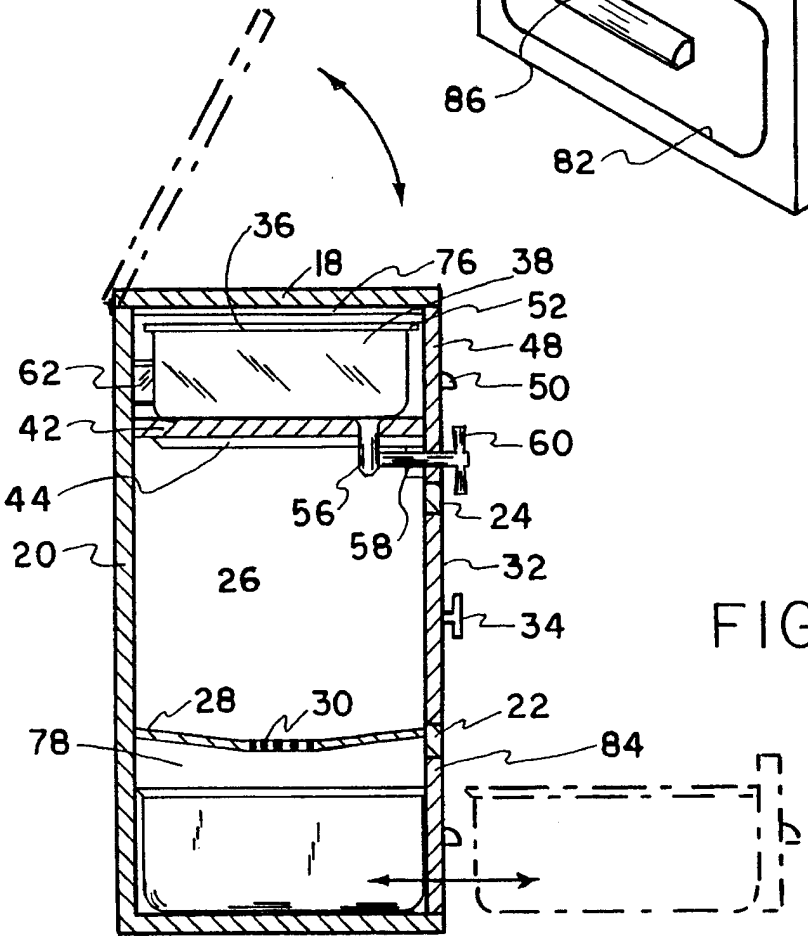
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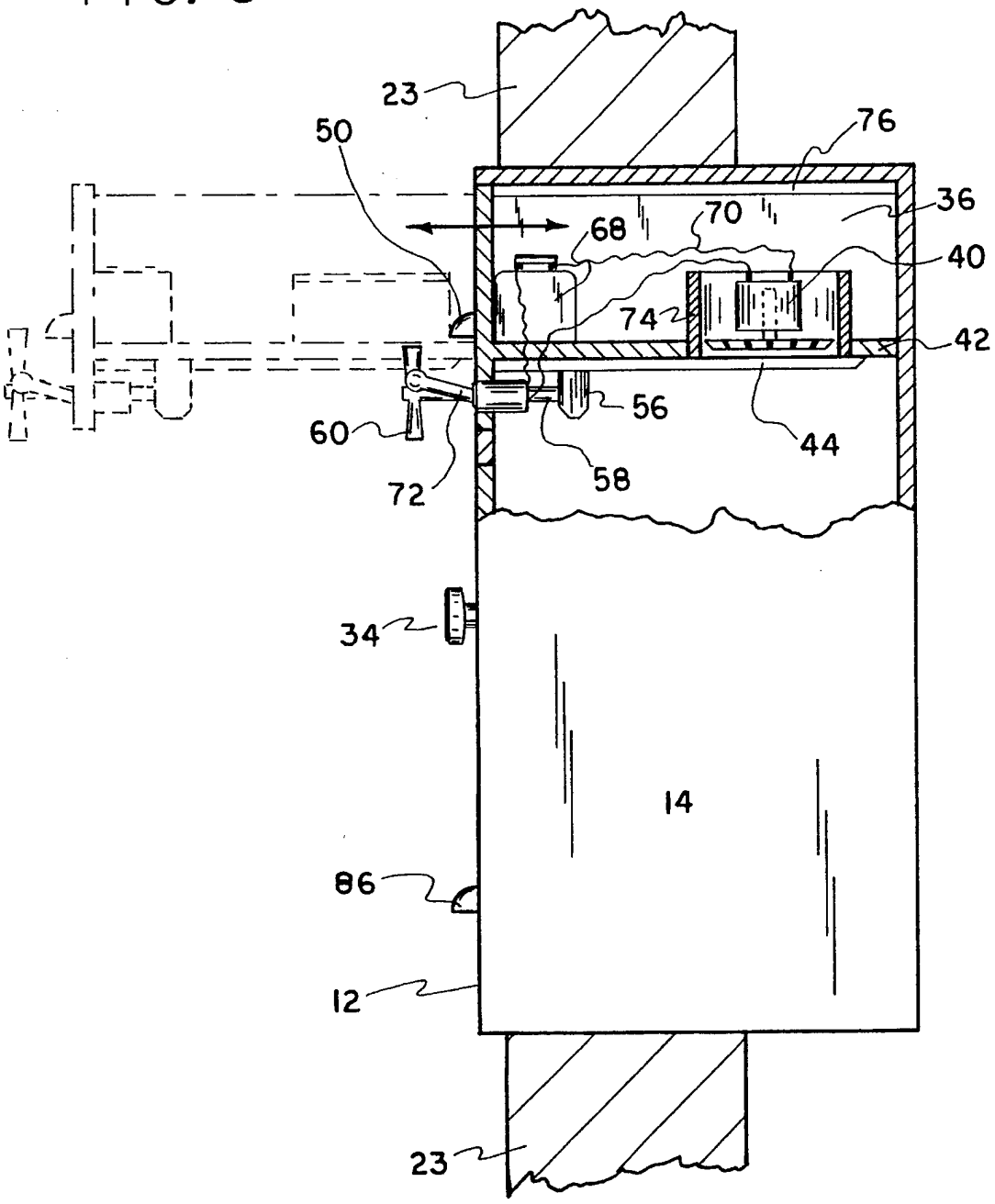
FIG. 2

FIG. 3



HAND WASHING AND DRYING EQUIPMENT UNIT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to equipment used for sequentially washing and drying one's hands, and more particularly to a portable, self-contained hand washing and drying equipment unit.

2. Description of the Prior Art

It is well known to provide soap dispensing means and hand drying means proximate a conventional lavatory water faucet and basin, whereby a user may dispense soap and water onto his or her hands to wash the hands, rinse the hands under running water from the faucet, and dry the hands. Additionally, various devices have been introduced for providing similar hand washing and drying functions.

One such device, invented by Hinkel et al. and disclosed in U.S. Pat. No. 4,336,619, is a wall-mounted device having a bowl defining a hand washing and drying space and integral means on the bowl for supplying soap, water, and hand drying air to the bowl. The device is disclosed as being permanently connected to the water supply and sewage system of a building, and includes a housing having a removable front panel for providing limited access to elements enclosed thereby. The device must be connected to a standard 120 Volt alternating current outlet to power an air blower provided in the device.

U.S. Pat. No. 4,942,631 to Rosa describes a hand sanitizing station having a sink mounted on a plumbing cabinet with a spray manifold mounted above the sink for spraying a sanitizing solution and clear water rinse. The spray manifold is operable by an infrared proximity switch, and the cabinet includes a hinged front door for providing access to elements therein. However, the station lacks integral means for drying hands and is designed to be permanently connected to the plumbing lines of a building. A pump located in the plumbing cabinet and the infrared switch are electrically powered by connection to a standard 120 Volt AC outlet.

Another prior art hand washing and drying device is a wall-mounted station disclosed in U.S. Pat. No. 5,199,118 to Cole et al. Similar to the aforementioned devices of Hinkel et al. and Rosa, the device of Cole et al. is designed for permanent connection to the plumbing lines of a building and operates from a standard 120 Volt AC outlet.

Where limitations exist with regard to wall space, access to plumbing lines, and/or access to an electrical power outlet, or where portability is desired, prior art hand washing and drying devices may be unsuitable for use. For instance, in a typical barber shop or hair salon, it may be desirable to have hand washing and drying equipment conveniently located on a countertop proximate a barber chair or styling station to enable a barber or hair stylist to practice safe hygiene between operations without having to leave a customer to visit a separate wash room. Other settings wherein prior art devices may be unsuitable include laboratories, professional offices, schools, vehicles, and boats.

SUMMARY OF THE INVENTION

The present invention is directed to an improved hand washing and drying equipment unit which is portable for convenient placement on a table or counter top, or which may be easily mounted on a room wall without need to permanently connect the unit to building plumbing lines.

The unit comprises a housing having a central hand compartment, an upper compartment, and a lower compartment. A hand receiving opening is provided through a front wall of the housing for communication with the hand compartment, which includes a bottom drain board having a drain opening communicating with the lower compartment.

The upper compartment includes a cleansing liquid reservoir preferably containing a no-rinse cleansing liquid and having a flow tube and valve for selectively delivering cleansing liquid from the reservoir to the hand compartment under the force of gravity, and air flow means, such as a battery powered fan or blower, for providing a flow of hand drying air within the hand compartment. A valve control and switch for the fan or blower are provided on the exterior of the housing proximately above the hand receiving opening for controlling the flow of cleansing liquid and hand drying air, respectively. The reservoir and air flow means are preferably supported by a shelf which is slidably mounted for movement into and out of the housing to enable access to such elements for maintenance purposes. An alternative feature for enabling access to elements stored within the upper compartment is a hinged top wall on the housing.

The lower compartment includes a removable waste liquid receptacle arranged to receive and temporarily store used cleansing liquid which is channeled by the drain board through the drain opening and into the lower compartment.

BRIEF DESCRIPTION OF THE DRAWING

The nature and mode of operation of the present invention will now be more fully described in the following detailed description of the preferred embodiments taken with the accompanying drawing figures, in which:

FIG. **1** is a perspective view of a hand washing and drying equipment unit formed in accordance with the present invention;

FIG. **2** is a left side sectional view thereof showing an alternate position of the top wall and an alternate position of the waste liquid receptacle of the present invention;

FIG. **3** is a right side sectional view thereof showing the unit of the present invention mounted to extend behind a room wall surface and further showing an alternate position of the slidable shelf and elements supported thereby.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. **1** through **3**, a hand washing and drying equipment unit according to the present invention is indicated generally at **10**. Unit **10** comprises a housing **12** having a pair of opposing spaced side walls **14**, a bottom wall **16**, a top wall **18**, a rear wall **20**, and a front wall **22**. The dimensions of housing **12** are preferably chosen to provide a suitably sized, space efficient unit which may be conveniently located on a table or counter top, or mounted on a room wall using conventional means, such that rear wall **20** is flush against the room wall. As depicted in FIG. **3**, unit **10** may also be mounted within a cut-out opening in a room wall **23** such that the depth of housing **12** extends behind the surface of the room wall. Housing **12** is preferably constructed of an aesthetically pleasing material, such as finished wood, selected with appropriate consideration of the interior design scheme of the room in which it will be used. Other materials, including plastics and stainless steel, are contemplated.

A hand-receiving opening **24** is provided in front wall **22** to allow a user to insert his or her hands into a hand compartment **26** defined by housing **12**. Hand compartment **26** is generally located in a vertically central position between top wall **18** and bottom wall **16**, and includes a bottom drain board **28** mounted below hand receiving opening **24** and having a drain opening **30** therein. A hinged door **32** having a handle or knob **34** covers hand receiving opening **24** while unit **10** is not in use, and is preferably provided with a mesh or screen portion **35** to facilitate air circulation within hand compartment **26** while door **32** is closed. Door **32** may also be mounted on front wall **22** for horizontal sliding movement relative to hand receiving opening **24**.

Adjacently above hand compartment **26** in housing **12** is an upper compartment **36** wherein a cleansing liquid reservoir **38** and an electric fan **40** are supported by a horizontal shelf **42**. In a preferred form of the invention, shelf **42** is slidably mounted on a pair of horizontally arranged tracks **44**, fixed one on each side wall **14**, for horizontally directed movement into and out of housing **12** through an upper opening **46** in front wall **22**, thereby enabling easy access to elements contained within upper compartment **36**, particularly where unit **10** is mounted to extend behind room wall **23** as illustrated in FIG. **3**. A vertical portion **48** of shelf **42** is adapted to close or cover upper opening **46** when shelf **42** is fully inserted into housing **12** and includes an outer handle **50** thereon. As an additional or alternative means of enabling access to upper compartment **36**, top wall **18** may be connected to housing **12** by hinges, whereby the top wall may be moved to an open position as depicted in FIG. **2**.

Cleansing liquid reservoir **38** may be any leak-proof container suitable for holding liquid, such as a plastic tub, which fits conveniently within upper compartment **36**. Reservoir **38** includes a removable seal or cover **52** for permitting necessary refill of the reservoir with a cleansing liquid. It is also contemplated that reservoir **38** be integrally formed with shelf **42**, particularly for instance where shelf **42** is formed from plastic. The shape of reservoir **38** may be chosen to maximize the capacity thereof within space constraints of upper compartment **36**.

Reservoir **38** is provided with a flow tube **56** extending downward from the bottom of the reservoir, through shelf **42**, and into hand compartment **26**, and a valve **58** extending through vertical portion **48** for controlling the flow of cleansing liquid through the flow tube, whereby a user may selectively deliver cleansing liquid from the reservoir to hand compartment **26** by rotation of an externally accessible valve control **60**. While the illustrated flow tube and valve system provides a simple means for delivering cleansing liquid from reservoir **38** to hand compartment **26**, other liquid delivery means may be employed without straying from the spirit or scope of the present invention.

To avoid the need for rinse water from an external source or building water line, cleansing liquid stored within reservoir **38** may be of a "no-rinse" variety, for instance a dilute mixture of water and soap, or other sterilizing chemical. Where it is desirable to provide cleansing liquid at an elevated temperature, a conventional AC powered heating element **62** may be situated within upper compartment **36** proximate or in contact with reservoir **38** to effect heat transfer to cleansing liquid stored therein.

Electric fan **40**, powered by a DC battery **68** connected thereto by wires **70** and controlled by an externally accessible switch **72**, also resides within upper compartment **36** and communicates with hand compartment **26** through a fan duct **74** extending through shelf **42** to provide a flow of hand drying air within the hand compartment. Fan **40** and battery **68** are preferably separated from reservoir **38** by a liquid resistant, electrically insulated barrier **76**, which protects electrical elements within upper compartment **36** from inadvertent spillage of cleansing liquid during refill of reservoir **38** and shields a user from electrical shock. While the specifications of fan **40** and battery **68** are not critical, the air flow provided within hand compartment **26** should be sufficient to effectively dry wet hands within a reasonably short period of time. Alternative means of providing a flow of hand drying air, not shown, include the use of a fan or hot air blower operating from a standard 120 Volt AC power outlet and connected thereto by a power cord conveniently arranged to extend through a cord opening in housing **12**, for instance through rear wall **20**.

Adjacently below hand compartment **26** in housing **12** is a lower compartment **78** containing a waste liquid receptacle **80**. Receptacle **80** is sized to be removable through a lower opening **82** provided in front wall **22**, and includes a face portion **84** complementary in shape to lower opening **82** with a handle **86** thereon to assist in removal from and replacement of receptacle **80** within lower compartment **78**. Receptacle **80** may be a plastic tub or the like preferably having a capacity equal to or greater than reservoir **38** and being arranged to receive used cleansing liquid flowing through drain opening **30**.

To wash hands using the present invention, a user opens door **32**, places a first hand through hand receiving opening **24** and into hand compartment **26**, and uses a second hand to operate valve control **60**, thereby opening valve **58**. When valve **58** is open, cleansing liquid flows under the force of gravity from reservoir **38** through flow tube **56** and into hand compartment **26**, where it may be caught by the first hand; when a sufficient quantity of cleansing liquid has been delivered, the user again operates valve control **60** to close valve **58** and halt the flow of cleansing liquid. The user then places the second hand within hand compartment **26** and scrubs both hands together with the cleansing liquid. Used cleansing liquid is allowed to fall to drain board **28**, which channels the waste liquid to drain opening **30**, through which it passes under the force of gravity to receptacle **80**. When scrubbing is complete, the user momentarily withdraws either hand from the hand compartment and operates fan switch **72** to activate fan **40**. The user may then allow the air flow provided by fan **40** within hand compartment **26** to dry both hands. When the hands are sufficiently dry, the user removes them from hand compartment **26**, closes door **32**, and operates fan switch **72** to shut off fan **40**.

To maintain a suitable level of cleansing liquid within reservoir **38**, a user refills the reservoir by pulling handle **50** to slide shelf **42** outward from housing **12** or lifting hinged top wall **18** to expose the reservoir, removing reservoir cover **52**, pouring pre-mixed cleansing liquid into the reservoir, replacing cover **52**, and returning shelf **42** or top wall **18** to its original closed position.

To empty waste liquid collected in receptacle **80**, a user simply withdraws the receptacle from lower compartment **78** using handle **78** and pours the waste liquid from the receptacle into a sewage drain or the like. Receptacle **80** may then be replaced within lower compartment **70** for further use.

What is claimed is:

1. A hand washing and drying equipment unit comprising:

an external housing, said housing including a pair of spaced side walls, a rear wall, and a front wall coop-

erating to define an interior hand compartment, said front wall having a hand-receiving opening communicating with said hand compartment;

a cleansing liquid reservoir mounted within said housing and means for selectively delivering cleansing liquid from said reservoir to said hand compartment;

electrically powered air flow means mounted within said housing for selectively providing a flow of air within said hand-wash compartment to dry hands received therein;

support means for mounting said cleansing liquid reservoir and said air flow means within said housing, said support means being slidably mounted in said housing for horizontally directed movement into and out of said housing for enabling access to said cleansing liquid reservoir and said air flow means; and

a waste liquid receptacle beneath said hand compartment for storing used cleansing liquid, said hand compartment opening downwardly toward said receptacle.

2. A unit according to claim **1**, wherein said cleansing liquid reservoir contains no-rinse cleansing liquid.

3. A unit according to claim **2**, wherein said cleansing liquid reservoir is refillable.

4. A unit according to claim **2**, wherein said cleansing liquid reservoir includes means for heating said cleansing liquid.

5. A unit according to claim **1**, wherein said cleansing liquid reservoir is mounted above said hand compartment and said means for delivering cleansing liquid includes a flow tube extending from said reservoir to said hand compartment and a control valve for controlling the flow of cleansing liquid through said flow tube, whereby cleansing liquid may be selectively delivered to said hand compartment under the force of gravity.

6. A unit according to claim **5**, wherein said housing further includes a hinged top wall for enabling access to said cleansing liquid reservoir and said air flow means.

7. A unit according to claim **1**, wherein said hand compartment includes a bottom drain board having a drain opening therein to permit drainage of used cleansing liquid from said hand compartment to said receptacle.

8. A unit according to claim **1**, further including a door for said hand receiving opening.

9. A unit according to claim **1**, wherein said air flow means is a battery powered fan.

10. A unit according to claim **1**, wherein said air flow means is an AC powered fan.

11. A unit according to claim **1**, wherein said air flow means is an AC powered hot air blower.

12. A unit according to claim **1**, wherein said receptacle is removable from said housing.

13. A unit according to claim **12**, wherein said receptacle is slidably mounted in said housing for horizontally directed movement into and out of said housing.

14. A portable, self-contained hand washing and drying apparatus comprising:

an external housing, said housing including a pair of spaced side walls, a front wall, a rear wall, a removable top wall, and a bottom wall cooperating to enclose an upper compartment, a middle hand compartment, and a lower compartment;

said upper compartment including a cleansing liquid reservoir for storing no-rinse cleansing liquid, an electrically powered fan for selectively providing a flow of air within said hand compartment to dry hands received therein, and support means for mounting said cleansing liquid reservoir and said fan in said upper compartment, said support means being slidably mounted in said housing for horizontally directed movement into and out of said housing for enabling access to said cleansing liquid reservoir and said fan;

said hand compartment including a bottom drain board having a drain opening therein, said front wall including a hand-receiving opening communicating with said hand wash compartment;

said lower compartment including a removable waste liquid receptacle for storing used cleaning liquid; and

means for selectively delivering cleansing liquid from said reservoir to said hand wash compartment.

* * * * *