Nov. 21, 1961 E. A. MARTIN 3,009,188

PORTABLE SUCTION AND BLOWER UNIT

Filed Sept. 27, 1957 2 Sheets-Sheet 1

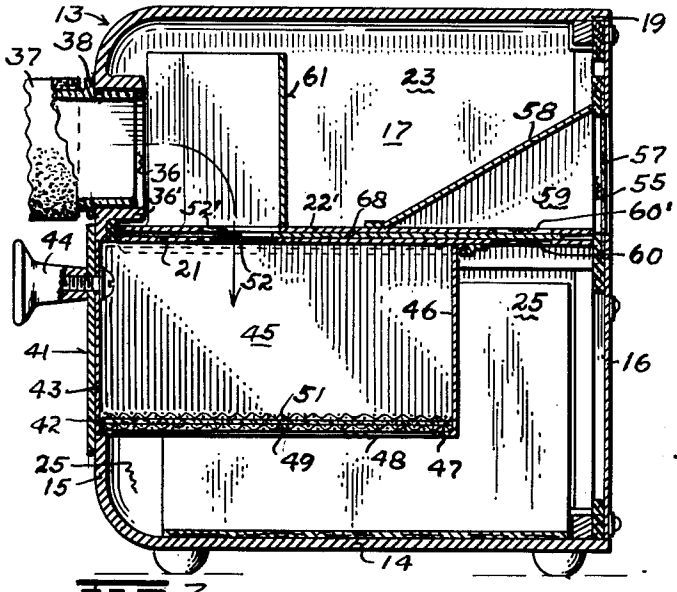


FIG. 3

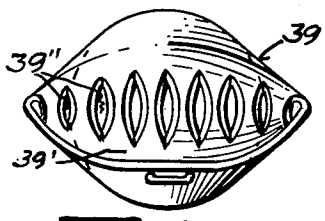


FIG. 4

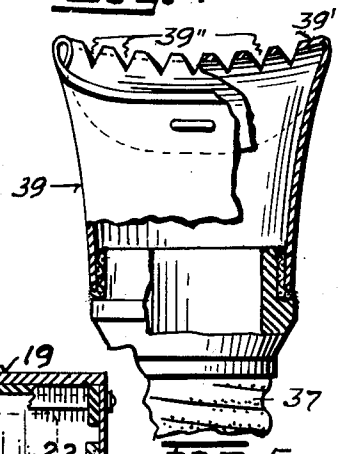


FIG. 5

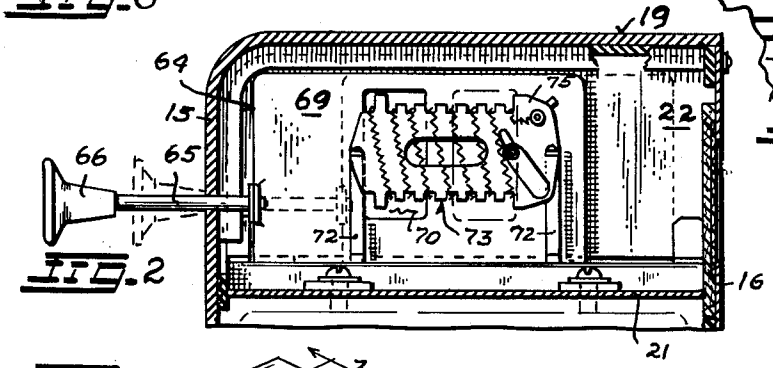


FIG. 2

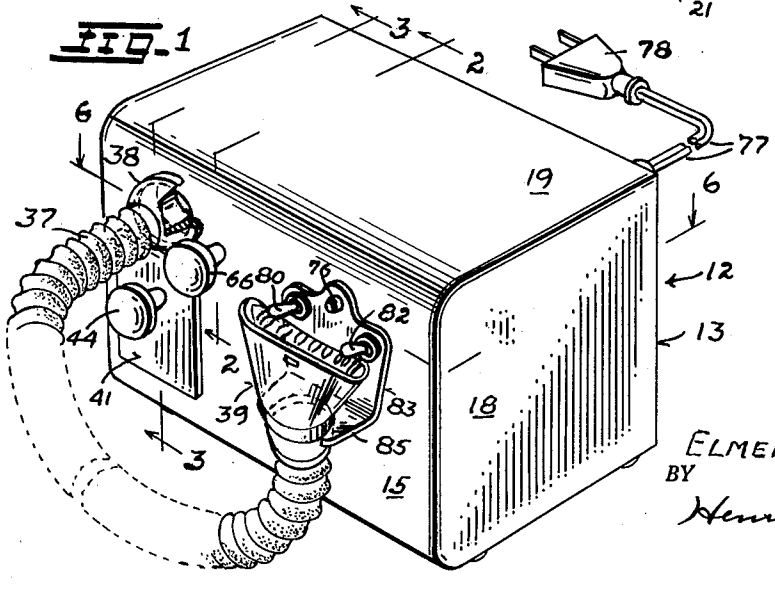


FIG. 1

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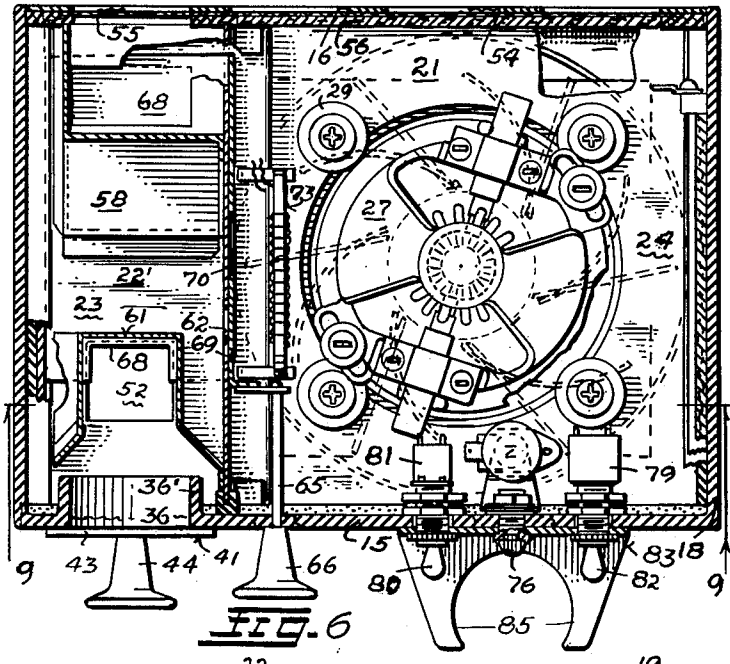


FIG. 6

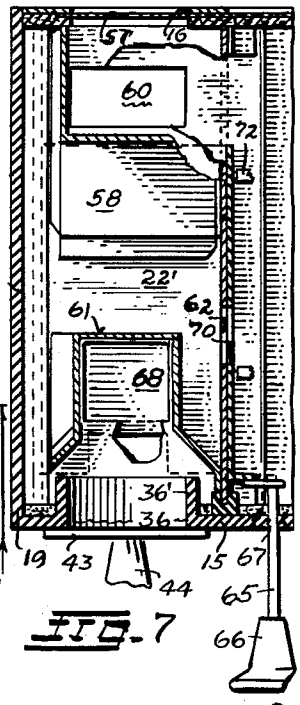


FIG. 7

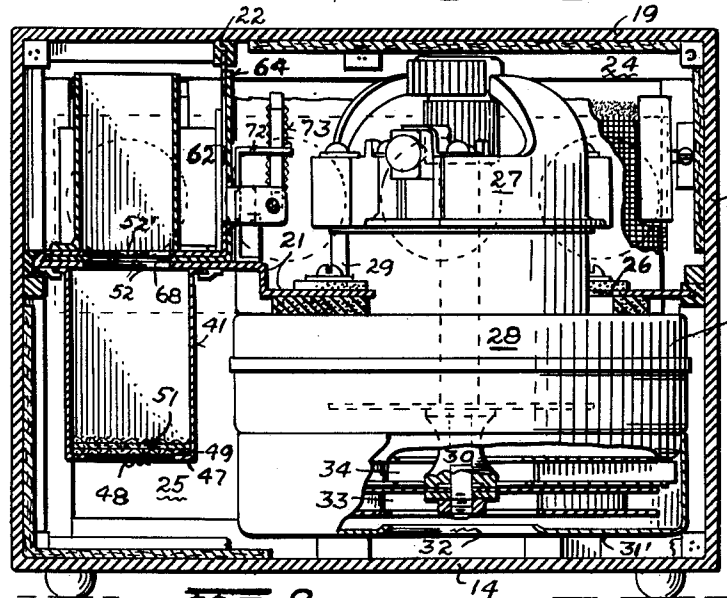


FIG. 9

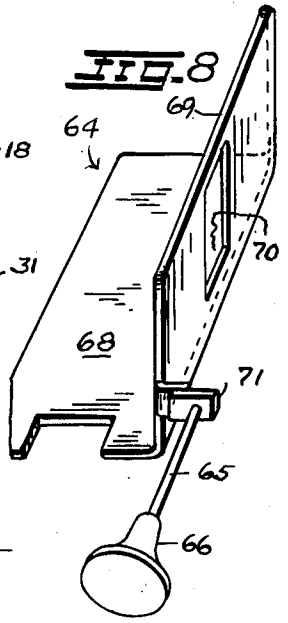


FIG. 8

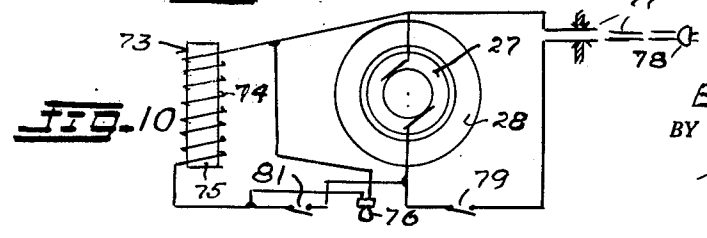


FIG. 10

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3,009,188

PORTABLE SUCTION AND BLOWER UNIT

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3 Claims. (Cl. 15—330)

The invention relates to a portable suction and blower unit which is particularly arranged for such personal uses as removing hair trimmings and/or effecting drying operations about the head.

The present suction and blower unit comprises a unitary machine which has been particularly designed for such further alternative personal uses of its suction feature as for facial massage or removing black-heads, or the use of its blower feature for drying the neck and scalp and facial mudpacks, and a general object is the provision of a particularly compact and effective self-contained portable machine for selectively carrying out the aforesaid and other related operations.

Another object of the invention is to provide for a removably collected retention in the machine of hair trimmings and other material from the head while preventing the escape of bacteria or dust into the air from the collected material.

A further object is to provide a machine of the character described having its suction and blowing operations both provided by an electric motor-blower unit which is actuated in the same rotary direction for both operations.

An added object is to provide for electrically heating the air discharged from the motor-blower unit as a drying means.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following description of a typical embodiment thereof, and in the accompanying drawings, in which

FIGURE 1 is a perspective view of a portable suction and blower unit embodying the present features of invention.

FIGURE 2 is a fragmentary sectional elevation taken at the plane of the broken line 2—2 in FIGURE 1.

FIGURE 3 is a sectional view taken at the plane of the broken line 3—3 in FIGURE 1.

FIGURE 4 is a front end view of a nozzle of the unit.

FIGURE 5 is a partly sectional side view of the nozzle of FIGURE 4.

FIGURE 6 is a plan section taken on the broken line 6—6 in FIGURE 1.

FIGURE 7 is a showing of a portion of the structure of FIGURE 6 in which certain elements of the structure are disposed differently than in FIGURE 6.

FIGURE 8 is a perspective view of a slide-valve member of the assembly.

FIGURE 9 is a sectional elevation taken at the line 9—9 in FIGURE 6.

FIGURE 10 presents an electric wiring diagram for the unit.

In general terms, a present suction-and-blower unit 12 comprises a machine providing an electrically operable motor-blower combination for optionally providing a suction intake or a blowing discharge of air through a flexible hose having a terminal nozzle for application at a working point. As particularly illustrated, the cooperative elements of the present portable machine 12 are provided in or on a rectangular casing 13 having a bottom wall 14, front and rear walls 15 and 16 respectively, left and right side end walls 17 and 18 respectively, and a top wall 19. As shown, the rear casing wall 16 comprises a removably mounted closure plate, and all the other bounding walls of the casing 13 are integrally related in a one-piece structure which may be molded of a plastic material, or be otherwise constituted.

At an intermediate level in the space thereof, the casing 13 fixedly mounts a cross-partition 21 having its side and front edges suitably supported at and by the casing front wall 15 and the end walls 17 and 18. A partition 22 extends upwardly from the horizontal partition 21 to the top casing wall 19 and between the casing front and rear walls 15 and 16 to divide the casing space above the partition 21 into portions 23 and 24 overlying the space portion 25 beneath the partition 21. The portion of the partition 21 defining the bottom of the causing space 24 is provided with an interior circular opening 26 which freely and coaxially receives therethrough the electric motor 27 of a motor-blower unit having its fan assembly 28 lowermost and carried by the motor, and said motor-blower unit 27—28 is carried on the partition 21 by feet 29 extending radially and fixedly from the motor casing and fixed to the partition 21, with the armature of the motor 27 and the rotor assembly of the blower 28 mounted on a common shaft 30.

It will now be noted that the laterally-closed cylindrical housing 31 of the blower 28 is arranged to receive air centrally thereof from below and to discharge the air centrally thereof at its top for flowing upwardly through and about the motor 27 and into the upper casing space 24, while incidentally cooling the motor. As indicated in FIGURE 9, the blower housing 31 is arranged to receive air at room temperature through a central opening 32 provided in the bottom 31′ of the blower housing and to discharge the air through the motor and along the motor exterior through the annular passage provided about the motor at the outer portion of the opening 26. For providing the foregoing upward air flow from the space 25 below the partition 21, the blower 28 has lower and upper rotor sections 33 and 34 mounted directly on the motor shaft and arranged to successively direct the air outwardly and inwardly in the space of the enclosing portion of the housing 31 and thence upwardly through and about the motor into the space 24.

By particular reference to FIGURES 1 and 3, it will be noted that the front wall 15 provides a circular opening 36 opposite the upper cavity 23 and arranged for the detachably sealed connection thereat of a suitable flexible air hose 37 having at one end an attaching plug 38 arranged for its frictionally held and sealed engagement in an inwardly-directed tubular flange 36′ provided at said front opening 36. The other end of the hose 37 is provided with a nozzle 39 arranged for the in or out flow of air therethrough, said nozzle terminating in a generally flattened extremity at which an end plate 39′ thereof has a line of port slots 39″ through and along it; the effective aggregate arrange area of the nozzle slots 39″ is preferably somewhat less than the cross-section area of the hose 37, whereby the flow of air through the slots may be uniformly distributed across the head during an inflow or outflow of air with respect to the nozzle.

A rectangular drawer 41 for collecting hair trimmings received through the hose 37 is removably mounted in the lower casing cavity 25 beneath the relatively narrow left-side upper cavity 23, said drawer being slidably supported on and from the under side of the partition 21 for its removal or displacement through an opening 42 provided in the front casing wall 15. The drawer front member 43 has a bounding edge portion which laps the edges of the opening 42 whereby said edge portion may engage the outer face of the front wall 15 about the opening as a stop for limiting the insertion of the drawer within the casing, and said front drawer member 43 mounts a suitable push-and-pull knob 44 for use in mounting or dismounting the drawer with respect to the casing. The front 43 and sides 45 and inner end 46 of the drawer are imperforate, and the drawer bottom 47 is provided with an interior opening 48 across which one

or more suitable screening and/or filtering elements are supported on the drawer bottom portions bounding the opening 48. In practice, a relatively stiff wire screen element 49 is directly supported on the drawer bottom 47 for supporting one or more suitable hair-catching and dust-filtering pads 51 for cleaning air passing downwardly into and through the drawer from an opening 52 which is provided in the partition 21 above the location for the inserted drawer.

It will now be noted that the removable rear casing wall 16 is provided with a plurality of openings 54 in its portion which defines the rear side of the cavity 24, and is also provided with an opening 55 in line with the cavity 23. Strips of suitable material seal the mounted rear wall 16 with respect to the rear edges of the casing walls 14 and 17 and 18 and 19, and also the rear edges of the partitions 21 and 22, against the passage of air at the lines of abutment of the rear wall 16 with said casing parts. The openings 54 are arranged for the pressure discharge of air therethrough from the casing, and an air-pervious pad 56 of fiberglass or other suitable material is fixed across said openings for further filtering out dust or bacteria while providing a necessary back-pressure thereat. The opening 55 is usable for the intake of air with respect to the lower cavity 25, and may be provided with a protective wire screen 57 of open mesh thereat.

The rearward portion of the casing space 23 opposite the rear wall opening 55 has a part thereof partitioned off from the remainder of the space, as by a partition 58 extending obliquely upwardly and rearwardly from the bottom of the space 23 and between the end wall 17 and the upright partition 22, to define a space 59 of triangular prism form above an opening 60 through the partition 21. A U-shaped baffle member 61 has its sides extending upwardly from the partition 21 about the opening 52 with its open side opposite the front casing opening 36 and its bottom generally enclosing the forward partition opening 52, and having its top spaced from the casing top wall 19. Also, the upright partition 22 is provided with a rectangular opening 62 at a point thereof between the rear side of the baffle member 61 and the partition 58, said opening being utilized, when desired, to connect the spaces 23 and 24 above the partition 21 and forwardly of the partition 58.

In the use of the present machine for its intended purposes, the port or passage provided by the opening 52 above the installed drawer 41 is arranged to be open when the openings 60 and 62 are closed, and vice versa. Accordingly, a unitary slide gate assembly 64 is provided for controlling said openings by the use of a positioning stem 65 slidably and guidedly extended to it from a positioning knob 66 disposed in front of the casing and engaged through a guide opening 67 provided in the front casing wall 15. As is brought out in FIGURE 8, the present slide assembly 64 essentially comprises perpendicularly and fixedly related horizontal and upright slide plates 68 and 69 which are suitably guided for a fore-and-aft adjustment between limiting positions thereof along the partitions 21 and 22 in flat engagement therewith. As is brought out in FIGURE 9, the plate 68 is slidably engaged between the partition 21 and a fixed horizontal bottom extension 22' of the upright partition 22 which is provided with openings 52' and 60' registering with the underlying openings 52 and 60.

The relation of the plate 68 to the openings 52 and 60 of the partition 21 is essentially such that these openings are alternately open and closed when the valve assembly 64 is in its limited rearward and forward positions respectively. An intermediate upright slot 70 in the upright portion 69 of the slide gate unit 64 is arranged to fully register with the opening 62 in the partition 22 when the valve assembly is disposed in its limiting forward position. The mounting stem 65 of the control knob 66 is suitably fixed to the forward edge of the plate 69 by its engagement with an ear 71 extending transversely and rigidly from the plate, it being noted that said plate is held in guided relation against the side of the partition 22 in the space 24 by laterally spaced upright stem members 72 extending rigidly from the partition 21. It will be understood that intermediate settings of the slide valve 64 provide for a variable control of the flow into or from the hose 37 through an intermediate position in which neither suction nor pressure exist in the hose, all without interfering, with the air-circulation duty of the operating motor-blower unit.

It will now be noted that when the flow-control opening 52 is open and the flow-control openings 60 and 62 are closed by reason of a rearward positioning of the slide gate assembly 64, the operating motor-blower unit is arranged to produce a suction condition at the hose nozzle 39 whereby the application of the nozzle at a working point effects the suction removal of all loose material thereat for its retained deposit in the drawer 41 for discharging only cleaned air from the filter-closed casing openings 54. On the other hand, when the slide gate unit 64 is pulled forwardly to the permitted limit, the opening 52 is closed and the openings 60 and 62 simultaneously opened, whereby atmospheric air received in the casing through the opening 55 is delivered by way of the blower unit to the hose 37 by reason of its permitted passage from the blower unit through the opening 62 and over the baffle 61 into the hose at the effective pressure generated by the blower 28. It will thus be understood that a present suction and blowing unit is reversible as to its suction and blowing functions without requiring the use of a reversible motor, and solely under control of a positioning of the slide valve member 64.

Means are preferably provided for heating the air as it is forced by the operating blower through the opening 62 and into the hose 37 to thereby provide a drying airstream. As particularly brought out in FIGURES 2 and 6 and 8, the valve-guide stems 72 provide a support for an electric heating unit 73 comprising a resistance wire 74 mounted on and about a suitable centrally-apertured flat core 75 which is disposed opposite the opening 62 and within the space 25 for energizing to heat the air passing through and by it into said opening. Preferably, and as shown, a telltale lamp 76 is provided on the casing for viewing at the front of the unit for energizing when the heating unit 73 is energized by the closing of a control switch for the heater, said lamp being connected in parallel with the energized heating unit for its lighting when the heating circuit is closed.

As is indicated in the wiring diagram of FIGURE 10, and in FIGURES 1 and 6, electric power for operating the motor and heater of the present unit may be conveniently supplied to a suitable circuit within the casing 13 through a two-wire extension cord 77 arranged for its attachment to a power outlet by a usual attachment plug 78. The power-distributing circuit within the casing is arranged to supply the motor through a snap switch 79 mounted on the front casing wall 15 and arranged for its manual control by a setting arm 80 extending outwardly from said wall. Power for energizing the heating coil 73 is controlled through a snap switch 81 in a branch circuit connected in parallel with the motor power circuit, said switch also being mounted on the front casing wall 15 and being controlled by an arm 82 extending from said wall, and the telltale lamp 76 is arranged for its energizing only while the heating-control switch 81 is closed. As is brought out in FIGURES 1 and 6, a plate member 83 is mounted at the front of the wall 15, has the switch arms 80 and 82 extending therefrom, provides a sight opening for the lamp 76, and further provides a transversely outstanding forked portion 85 for supporting the hose nozzle 39 when the present unit is not being used. It will be understood that the provision for an independent setting of the motor-control switch 79 and the heater-control switch 81 provides for a use of the present unit as a blower with or

without effecting a heating of the discharged airstream, with the branch heater circuit preferably energizable only while the switch 79 is closed.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the present portable suction-and-blower unit will be readily understood by those skilled in the art to which the invention appertains. While I have shown and described a structure and operative arrangement which I now consider to be a preferred embodiment of my invention, I desire to have it understood that the showings are primarily illustrative, and that such changes and developments may be made, when desired, as fall within the scope of the following claims.

I claim:

1. In a combined hair-collecting and hair-drying machine, a casing having an air-inlet opening and an air-discharge opening and a hose-connection opening in upright casing sides at a common upper casing level, a partition intermediately and horizontally dividing the casing space below the level of said casing openings and provided with an upright opening therethrough, a motor-blower unit operative in said partition opening and having its intake below said partition to provide for a solely upward air flow along the unit and through the opening, an air hose having one end thereof connected at the hose-connection opening and arranged for the application of its other end at a working point, means in the casing space defining a passage to said hose-connection opening from said air-inlet opening, means in the casing space defining a passage from said hose-connection opening to said air-discharge opening, and a common flow-control valve means constantly operative in said passages and alternatively settable to connect said hose-connection opening with the air-inlet opening or to connect said hose-connection opening with the air-discharge opening while closing the air-inlet opening.

2. The structure of claim 1 wherein the passage to and from the hose-connection opening are respectively provided with an air-heating means and an air-filtering means at the blower side of the valve means.

3. The structure of claim 1 wherein the valve means utilizes a single movable member.

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