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PORTABLE CLEANER AND PRESSER

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2 Sheets-Sheet 1

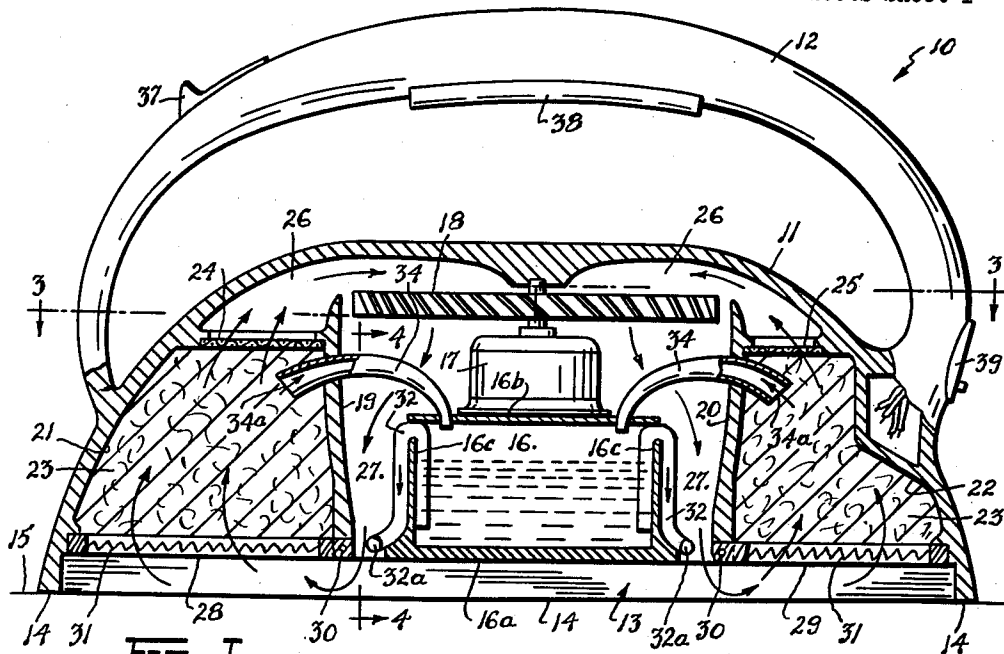


FIG. 1.

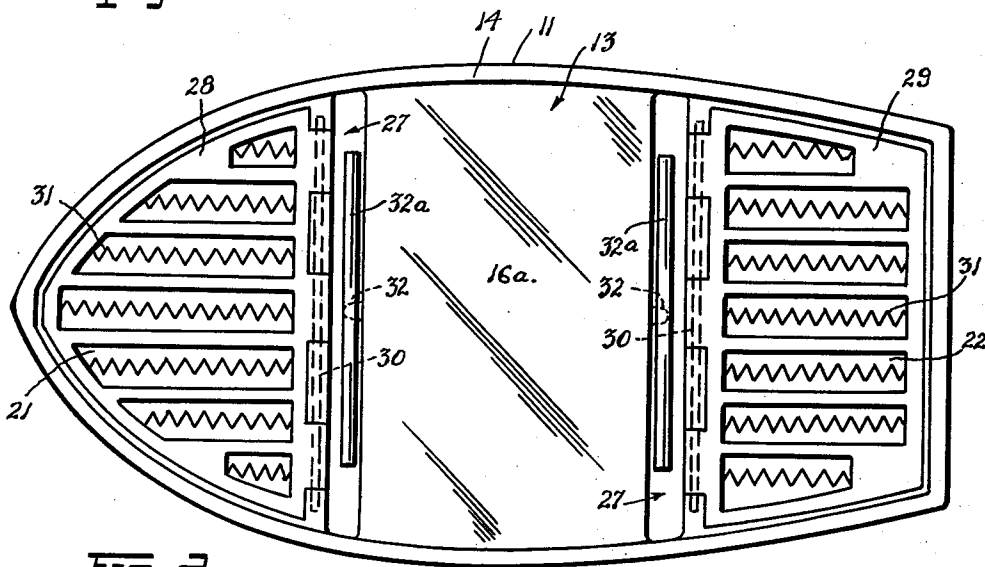


FIG. 2.

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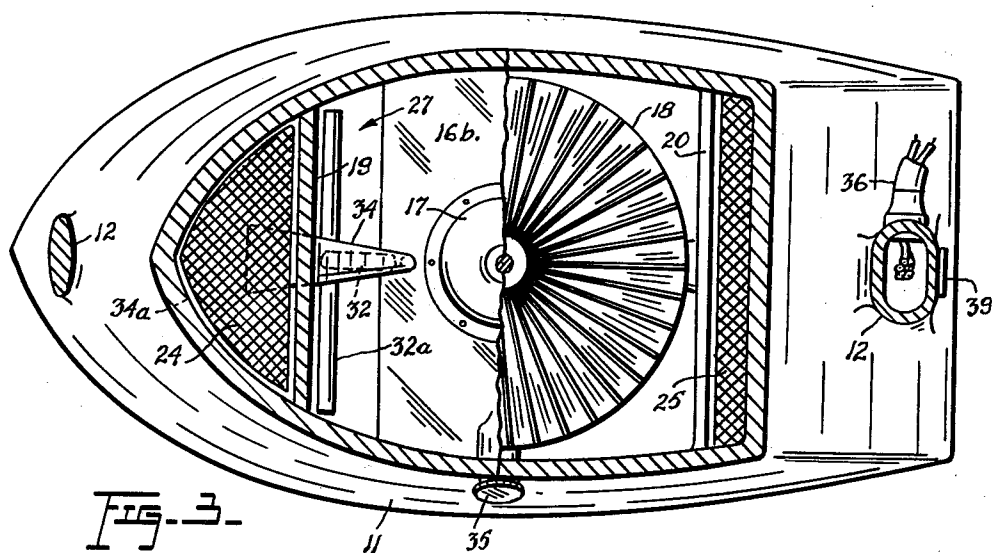
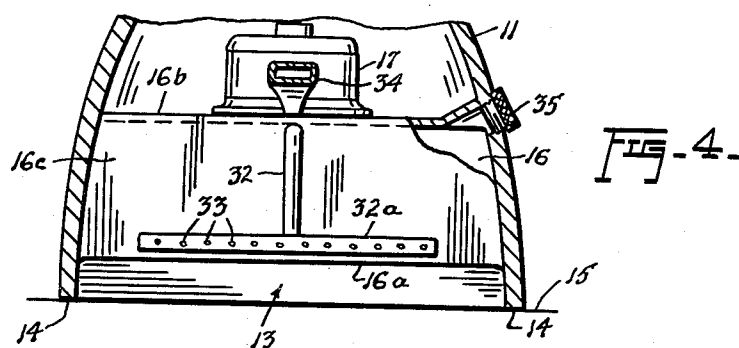
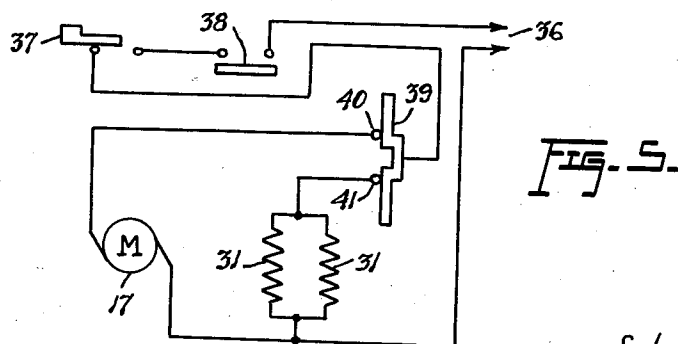
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PORTABLE CLEANER AND PRESSER

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8 Claims. (Cl. 38-77)

This invention relates to new and useful improvements in apparatus for suction cleaning garments, rugs, fabrics and other similar materials, and the principal object of the invention is to provide an easily manipulatable, portable cleaner whereby the cleaning operation may be performed faster and with much greater efficiency than with the use of cleaners of conventional types.

More particularly, the invention concerns itself with a suction cleaner which is equipped with means for delivering a stream of air laden with liquid vapor against the surface of material under treatment and continually removing by suction the vapor-laden air from such material, together with dirt and other particles of foreign matter in the material which the vapor-laden air has loosened. Another important feature of the invention resides in the provision of a filter element in the cleaner for trapping the dirt and other particles of foreign matter removed by suction from the treated material, the filter element also functioning as a condenser for vapor carried by the air passing therethrough. Still another important feature of the invention resides in the provision of means whereby the cleaner may be simultaneously used as a pressing iron for the material being cleaned, if so desired, the pressing means being selectively usable, either with or without the cleaning facility.

Some of the advantages of the invention reside in its simplicity of construction, efficient and dependable operation, in its convenient use, and in its adaptability to economical manufacture.

With the foregoing more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention will be understood from the following description taken in conjunction with the accompanying drawings, wherein like characters of reference are used to designate like parts, and wherein:

FIGURE 1 is a longitudinal, vertical sectional view, partly in side elevation, of the combined cleaner and presser in accordance with the invention;

FIGURE 2 is an underside plan view thereof;

FIGURE 3 is a horizontal sectional view, taken substantially in the plane of the line 3-3 in FIGURE 1;

FIGURE 4 is a fragmentary vertical sectional view, taken substantially in the plane of the line 4-4 in FIGURE 1; and

FIGURE 5 is a wiring diagram of the electrical components of the invention.

Referring now to the accompanying drawings in detail, the combined suction and vapor cleaner and presser in accordance with the invention is designated generally by the reference numeral 10 and, as will be apparent, comprises a somewhat elongated housing 11 which is substantially in the form of a conventional pressing iron. Since the entire device is a readily portable appliance, the housing 11 is provided at the top thereof with a convenient handle 12, which also serves to accommodate various switches and electrical connections hereinafter to be described. The housing has an open bottom 13, but the lower marginal edges 14 of the housing which surround the open bottom are adapted to function as means for pressing the material 15 over the surface of which the device is moved during use.

A transversely extending liquid receptacle 16 is provided substantially centrally or intermediate the ends of the housing, the receptacle 16 having a bottom wall 16a

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spaced above the open bottom of the housing, a top wall 16b, and a pair of side walls 16c.

A suitable electric motor 17 is mounted on the top wall 16b of the receptacle or reservoir 16 and has an upwardly projecting armature to which is secured a fan or blower 18, the latter being disposed in the upper portion of the housing 11, as shown. The housing 11 is provided forwardly and rearwardly of the blower 18 with transverse partitions 19, 20 which define in the respective front and rear end portions of the housing a pair of compartments 21, 22, each containing a filter element 23 of sponge, foam rubber, fiberglass, or other suitable material. The compartments 21, 22 have openings at the top thereof provided with screens 24, 25, and communicating through ducts or passages 26 in the upper portion of the housing with the intake side of the blower 18, as will be clearly apparent. The aforementioned partitions 19, 20 are spaced from the side walls 16c of the receptacle or reservoir 16 so as to provide ducts or passages 27 therebetween, whereby streams of air from the blower 18 may be delivered into the open bottom portion of the housing so as to impinge against the material 15 under treatment and then be returned by suction through the compartments 21, 22 and ducts 26 to the intake side of the blower, as will be readily apparent from the paths of air flow indicated by the directional arrows in FIGURE 1. In this connection it may be noted that the bottoms of the compartments 21, 22 are provided with grate-like doors 28, 29 to facilitate the flow of air therethrough, the doors being substantially co-planar with the bottom wall 16a of the reservoir 16 and being pivotally or hingedly mounted as at 30, so that they may be opened whenever it becomes necessary to clean or replace the filter elements 23 in the compartments. Any suitable means (not shown) may be utilized to retain the doors 28, 29 in their closed position. Suitable electric heating elements 31 are provided in the openings of the grate-like doors 28, 29, so as to heat not only the air in the bottom portion 13 of the housing 11, but also the material 15, thus facilitating pressing of the material by the edges 14 of the housing. The heating elements 31 need not be exposed as shown, but may be encased in suitable jackets, as is customary in the art, or may be embedded directly into the material of the doors 28, 29 themselves.

A pair of aspirating tubes 32 communicate with the reservoir 16 and extend outwardly therefrom into the ducts 27, each tube having a transverse manifold or tube portion 32a at its outer end, provided with a plurality of metering apertures 33, as is best shown in FIGURE 4. The arrangement is such that when streams of air delivered by the blower 18 through the ducts 27 pass the apertured manifolds 32a, liquid such as water placed in the reservoir 16 is drawn by suction through the tubes 32 and through the manifold apertures 33 into the air streams, wherein the liquid assumes a vapor form and the vapor-laden air is propelled against the material 15 to loosen dirt and other particles of foreign matter therefrom, not only from the upper surface of the material, but with ample penetration into its thickness. At the same time, operation of the blower 18 produces a continuous suction at the intake side of the blower, that is, in the ducts 26 and compartments 21, 22, so that the air, laden with vapor and dirt particles loosened from the material 15 is sucked through the doors 28, 29 into the compartments. This action is assisted by the operation of the heating elements 31 which create convection air currents for propelling the air upwardly into the compartments, as will be apparent.

By the time the vapor and dirt laden air reaches the upper regions of the filter elements 23, the dirt particles will be trapped in the filter elements. Moreover, by then

the air will have become sufficiently cool for the vapor therein to condense in the upper regions of the filters, and means are provided for returning this condensed vapor to the reservoir 16, so that the air returned to the blower 18 is free of both dirt and vapor and is in readiness for recirculation through the device by the blower. The above mentioned means comprises a pair of curved, longitudinally tapered tubes 34 which extend outwardly from the top wall 16b of the reservoir 16 and have enlarged, scoop-like outer end portions 34a disposed in the compartments 21, 22 for gathering the condensed vapors in the filters 23 and delivering the condensed liquid back to the reservoir 16, this delivery being effected as a result of sub-atmospheric pressure existing in the reservoir in response to evacuation of liquid therefrom through the tubes 32 by the aspirating action of the streams of air passing through the ducts 27 from the blower 18. It may be noted in this connection that although the manifolds 32a are shown in the drawings as being disposed below the lower ends of the tubes 32 in the reservoir 16, the flow of liquid through the tubes under the aspirating action of the air streams is not sufficient to completely fill the tubes so as to result in siphoning. Rather, the aspirating action is more gradual, producing merely a drop-by-drop liquid flow through the tubes 32, but if siphoning should be encountered, the parts may be arranged so that the manifolds 32a are disposed above the lower ends of the tubes in the reservoir. The supply of liquid in the reservoir may be replenished as necessary through the medium of a filler plug 35 provided at one side of the housing 11.

A supply of electric current for the motor 17 and heating elements 31 is delivered by an extension cord 36 connected to the rear end portion of the handle 12, the latter being hollow so as to receive the various conductors in circuit with switches which control the operation of the motor and heating elements. One of these is a sliding on-and-off switch 37 mounted on top of the front end portion of the handle 12 where it may be conveniently operated by the thumb of the user grasping the handle, while another is a normally open, depressible switch 38 provided at the underside of the intermediate portion of the handle and arranged to be depressed and closed automatically when the handle is gripped. In addition, a sliding selector switch 39 is provided on the rear end portion of the handle, the switches 37, 38 being connected together in series with the switch 39 to the extension cord 36, while the motor 17 and the heating elements 31 are connected in parallel to the switch 39 in series with the switches 36, 37 to the cord 36, as is clearly shown in FIGURE 5. Thus, when the appliance is set aside and the handle 12 is not gripped, the motor 17 as well as the heating elements 31 are inactive, but when the appliance is picked up for use, depression of the switch 38 by gripping of the handle automatically closes the circuit (with the switch 37 already being closed), so that both the motor 17 and the elements 31 are energized when the switch 39 is in the position shown, wherein it engages both the switch contacts 40, 41. If it is desired to energize the motor 17 only, such as for cleaning without pressing, the switch 39 may be moved so that it engages only the contact 40 without energizing the heating elements 31 through the contact 41. Alternatively, when it is desired to energize only the heating elements, such as for pressing without cleaning, the switch 39 is moved so that it engages only the contact 41 without energizing the motor 17 through the contact 40. Finally, when it is desired to carry or otherwise handle the device without energizing neither the motor nor the heating elements, the switch 37 is moved to its "off" or open position, thus breaking the circuit through the series-connected switches 38 and 39.

While in the foregoing there has been described and shown the preferred embodiment of the invention, various modifications may become apparent to those skilled in the art to which the invention relates. Accordingly,

it is not desired to limit the invention to this disclosure and various modifications may be resorted to, such as may lie within the spirit and scope of the appended claims.

What is claimed as new is:

1. In a suction cleaner, the combination of a housing having an open bottom adapted to be moved over a surface to be cleaned, a motor driven blower disposed in the upper portion of said housing, a filter compartment provided in the housing laterally of said blower, said compartment having perforate lower and upper walls communicating respectively with the open bottom of the housing and with the intake of said blower, a removable filter element provided in said compartment, a duct means in the housing for delivering air from said blower into the open bottom of the housing whereby the air may impinge against the surface to be cleaned and be returned by suction through said filter element to the blower, a liquid reservoir in said housing, and means for aspirating liquid from said reservoir by the air stream from said blower and vaporizing the same in the air stream delivered into the open bottom of the housing.
2. In a suction and vapor cleaner, the combination of a housing having an open bottom adapted to be moved over a surface to be cleaned, a motor driven blower provided in said housing, duct means in the housing for delivering air from said blower into the open bottom of the housing, a liquid reservoir in the housing, means for aspirating liquid from said reservoir by the air stream from said blower and vaporizing the same in the air stream delivered into the open bottom of the housing, a removable filter element provided in the housing above the open bottom thereof, and duct means in the housing for returning air from the bottom of the housing through said filter element to said blower.
3. The device as defined in claim 2 wherein said filter element affords means for condensing vapor carried by air passing through the filter element, together with means for returning the condensed vapor to said liquid reservoir, whereby air returned to said blower from the filter element is substantially vapor free.
4. In a suction and vapor cleaner, the combination of a housing having an open bottom adapted to be moved over a surface to be cleaned, a liquid reservoir provided in the housing above the open bottom thereof, a motor driven blower mounted in the housing above said reservoir, a filter compartment provided in the housing in laterally spaced relation from said reservoir whereby to provide therebetween a duct for delivering air from said blower into the open bottom of the housing to impinge against the surface to be cleaned, an aspirating tube extending from said reservoir into said duct whereby liquid in the reservoir may be aspirated by the air stream from the blower and vaporized in the air stream for impinging therewith against the surface to be cleaned, said filter compartment having perforate lower and upper walls communicating respectively with the open bottom of the housing and with the intake of said blower whereby air in the bottom of the housing may be returned through said compartment to the blower, a combined filtering and vapor condensing element provided in said compartment, and means for returning vapor condensed in the compartment to said reservoir.
5. The device as defined in claim 4 wherein said housing has marginal edges defining the open bottom thereof, said marginal edges constituting means for simultaneously pressing the material being cleaned.
6. In a combined suction and vapor cleaner and presser, the combination of a housing having an open bottom defined by marginal edges of the housing and adapted to be moved over material to be cleaned, said marginal edges of the housing at the open bottom thereof providing means for pressing the stated material during cleaning, a motor driven blower provided in the housing, duct means in the housing for delivering air from said blower into the open bottom of the housing, a liquid

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reservoir in the housing, means for aspirating liquid from said reservoir by the air stream from said blower and vaporizing the same in the air stream delivered into the open bottom of the housing, a filter element provided in the housing above the open bottom thereof, duct means in the housing for returning air from the bottom of the housing through said filter element to said blower, and a heating element provided in the housing under said filter element for heating the air in the bottom of the housing and the material under treatment.

7. The combination as defined in claim 6 wherein said filter element affords means for condensing vapor carried by air passing through the filter element, together with means for returning the condensed vapor to said liquid

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reservoir, whereby air returned to said blower is substantially vapor free.

8. The combination as defined in claim 6 together with means for energizing said blower and said heating element selectively in unison and independently of each other.

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