April 21, 1953 W. J. BELKNAP 2,635,277

SUCTION-OPERATED DEVICE FOR SCRUBBING AND DRYING FLOORS

Filed Feb. 16, 1948 2 SHEETS—SHEET 1

FIG. 1

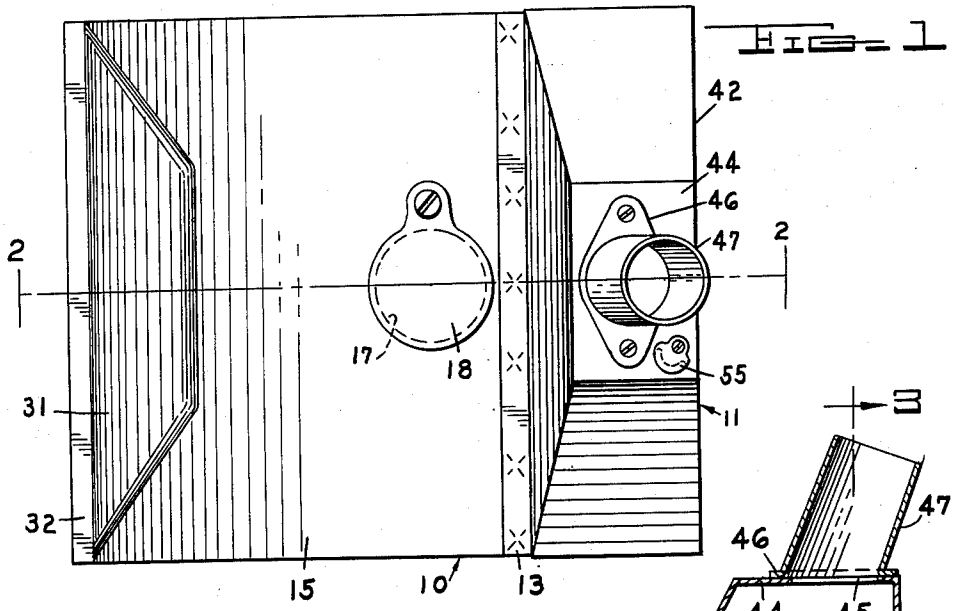
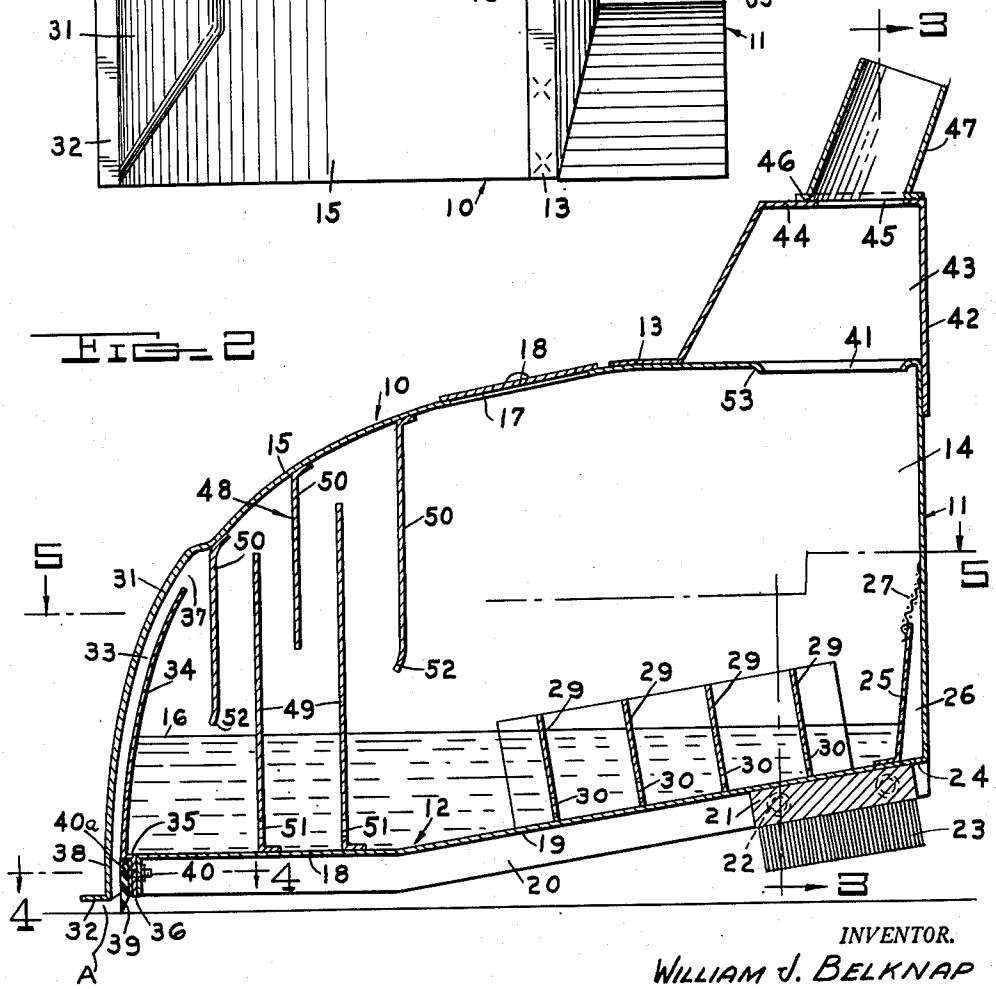


FIG. 2



INVENTOR.
WILLIAM J. BELKNAP
BY

Whittemore Hulbert & Belknap
ATTORNEYS

April 21, 1953 W. J. BELKNAP 2,635,277

SUCTION-OPERATED DEVICE FOR SCRUBBING AND DRYING FLOORS

Filed Feb. 16, 1948 2 SHEETS—SHEET 2

FIG. 3

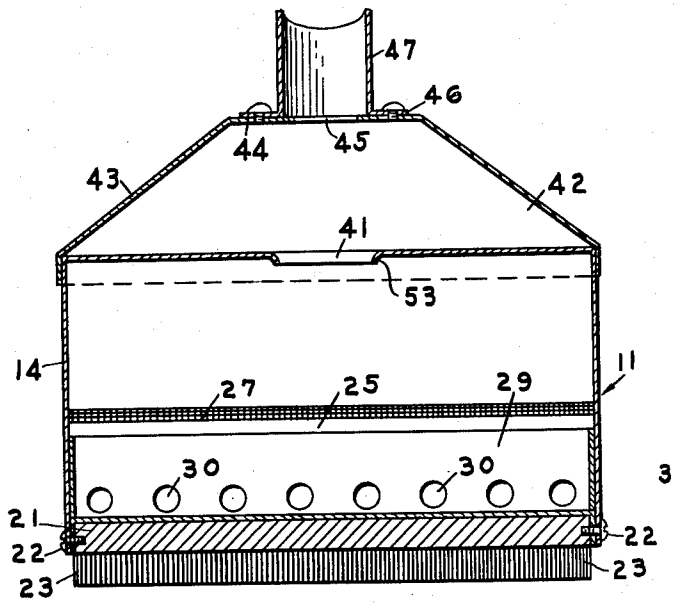


FIG. 4

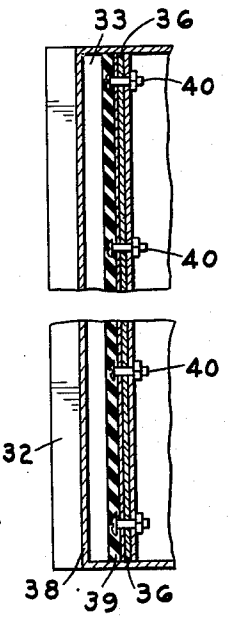
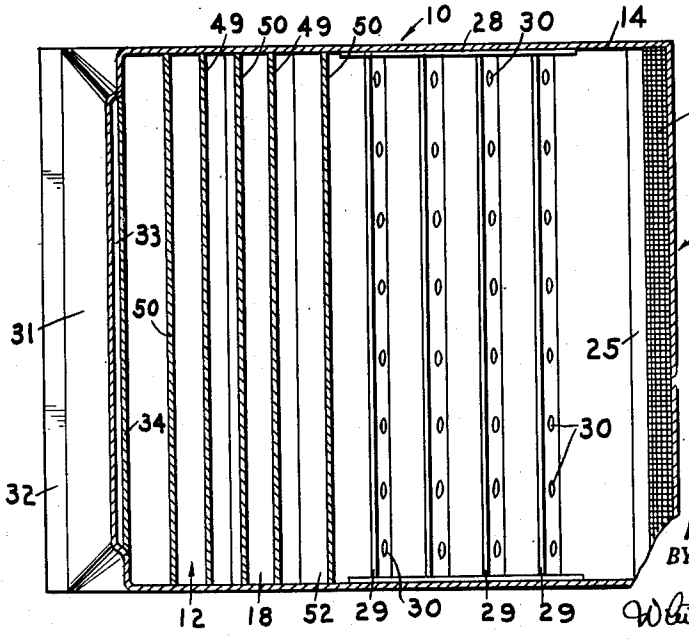


FIG. 5



INVENTOR.
WILLIAM J. BELKNAP
BY
Whittemore Hulbert & Belknap
ATTORNEYS

Patented Apr. 21, 1953 2,635,277

UNITED STATES PATENT OFFICE

2,635,277

SUCTION-OPERATED DEVICE FOR SCRUBBING AND DRYING FLOORS

William J. Belknap, Corning, N. Y.

Application February 16, 1948, Serial No. 8,533

8 Claims. (Cl. 15—322)

1

This invention relates generally to floor cleaning equipment and refers more particularly to improvements in floor scrubbing and/or drying devices.

One of the objects of this invention is to provide a compact, light weight device equipped with means for scrubbing and drying a floor surface with a minimum of effort on the part of the user.

A more detailed feature of this invention is to provide a scrubbing device comprising a housing adapted to contain a supply of cleaning liquid and equipped with a brush supported at the under side of the housing for engagement with a floor surface.

Another object of this invention is to provide such a scrubbing device with means for distributing cleaning fluid from the housing onto the floor surface in response to fore and aft movement of the brush over the floor surface.

Still another object of this invention is to provide such a scrubbing device with means for connecting the housing to a source of suction subsequent to the scrubbing operation and also with means responsive to the suction for effectively returning the cleaning liquid from the floor surface back into the housing. Thus the cleaning liquid is continuously recirculated by alternately manipulating the housing to scrub and dry the floor surface.

A further feature of this invention is to provide such a scrubbing device adapted for connection to orthodox tank type vacuum cleaners and having a suction passage carefully designed to enable effectively raising the liquid cleaner from the floor surface back into the housing with the power available in commercial domestic types of vacuum cleaners.

A still further important feature of this invention is to design the suction passage between the intake port in the housing and the suction outlet opening of the housing in such a scrubbing device in a manner such that the liquid cleaner on the floor surface is not only rapidly returned to the housing during the drying operation with the application of a minimum pressure differential, but in addition, particles of the liquid are prevented from being carried through the suction outlet opening even in cases where the suction force is relatively great. In accordance with this invention the above is accomplished by shielding the suction outlet opening from direct communication with the interior of the housing and by providing a system of baffles arranged between the intake port and the suction outlet opening in a manner to require the air to flow through a serpentine path. Thus any moisture suspended in the air flowing from the intake port to the suction outlet opening is collected on the baffles and is drained to the lower portion of the housing.

Still another advantageous feature of this invention is to collect the liquid cleaner at the

2

intake port during the drying operation by a squeegee secured to the housing of such a scrubbing device in a position such that it actually forms the inner side of the intake port. The design is such that all of the liquid cleaner collected by the squeegee is directly subjected to the action of the suction and is quickly returned to the housing.

The foregoing as well as other objects will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a top plan view of a scrubbing device embodying the features of this invention;

Figure 2 is an enlarged sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a reduced sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a slightly enlarged sectional view taken on the line 4—4 of Figure 2; and

Figure 5 is a reduced sectional view taken on the line 5—5 of Figure 2.

The scrubbing device forming the subject matter of this invention is particularly designed for the purpose of cleaning flooring with a liquid cleaner, and is adapted to effectively dry the floor subsequent to the cleaning operation. Thus the tedious and time consuming operation of mopping the floor surface is eliminated.

In general particularly satisfactory results are obtained by employing any one of a number of available detergents for actually effecting the cleaning operation, and this detergent or cleaning liquid is recirculated until it accumulates sufficient dirt or foreign matter to impair its cleaning function. When such a condition prevails the detergent or cleaning liquid in the device may be replaced with little effort on the part of the user. In the present instance the liquid cleaner is drawn from the floor surface back into the device by suction, and the source of the suction may be in the form of any one of the available tank type domestic vacuum cleaners, and in any of the upright vacuum cleaners with hose attachments. As will be presently described, the device is equipped to readily receive the conventional nozzle provided on the suction hose of such a vacuum cleaner.

With the above in view, reference is now made more in detail to the drawings, wherein the numeral 10 indicates a housing capable of being inexpensively produced from either sheet metal and/or castings. In any case, the housing comprises a rear side wall 11, a bottom wall 12, a top wall 13, end walls 14 and a front side wall 15 which is shown in Figure 2 of the drawings as curved upwardly from the front edge of the bottom wall 12 to the top wall 13. The housing is adapted to contain a specified amount of a selected liquid cleaner, and the quantity of cleaner introduced is preferably predetermined to assume substantially the level indicated by the

line 16 in Figure 2 of the drawings. The liquid cleaner is introduced into the housing through a filler opening 17 formed in the top wall 13 and adapted to be closed by a cap 18 suitably mounted on the top wall 13 for convenient manipulation.

Referring again to Figure 2 of the drawings, it will be noted that the bottom wall 12 is bent or otherwise fashioned to form angularly related front and rear sections 18 and 19, respectively. It will further be noted that the front and end edge portions of the bottom wall 12 are formed with depending flanges 20. In the specific embodiment of the invention selected herein for the purpose of illustration, the rear section 19 of the bottom wall 12 is inclined upwardly with respect to the front section 18 at an angle of approximately 10° and a scrubbing brush 21 of any suitable design is secured against the bottom wall section 19 adjacent the rear edge by suitable fastener elements 22 which may be in the form of screws anchored in the flanges 20. The bristles 23 of the scrubbing brush 21 project below the bottom edges of the flanges 20, and may be engaged with the floor surface to be cleaned by tilting the front side portion of the housing 10 upwardly from the position thereof shown in Figure 2 of the drawings.

When the housing 10 is in its scrubbing position noted above, the same may be moved back and forth on the floor surface with a scrubbing action. In response to this scrubbing motion of the housing 10, liquid cleaner contained in the housing is distributed on the floor surface rearwardly of the brush 21. In detail it will be noted from Figure 2 of the drawings that a plurality of restricted orifices 24 are formed in the bottom wall section 19 adjacent the rear wall 11. It will further be noted that a baffle 25 is secured to the bottom floor section 19 in advance of the orifices 24. The baffle 25 extends upwardly to a position substantially above the normal level of the cleaning fluid in the housing and the opposite ends of the baffle are respectively secured to the end walls 14. The upper end of the baffle 25 is spaced laterally forwardly from the rear wall 11 to provide a restricted slot 26 and this slot may be protected by a screen 27 if desired. The construction is such that the liquid cleaner in the housing is agitated during the scrubbing action to such an extent that a small amount of cleaner escapes through the slot 26. The cleaner escaping through the slot 26 passes downwardly through the orifices 24 and is distributed on the surface of the floor being scrubbed. In order to retard the turbulence imparted to the liquid cleaner in the housing during the scrubbing action, a grill 28 is secured to the bottom wall section 19 in advance of the baffle 25. This grill comprises a plurality of vertical baffles 29 which extend between the end walls 14 of the housing and are spaced laterally from each other. The baffles 29 extend to approximately the normal level of the cleaning fluid in the housing, and are formed with openings 30 adjacent their bottom edges to enable relatively free passage of cleaning fluid therethrough. Thus the grill 28 damps the turbulent action of the cleaning fluid during scrubbing and prevents this fluid from wetting the upper portions of the housing walls. This is advantageous in that it assists in reducing the amount of moisture which may be drawn into the suction producing device or vacuum cleaner during the drying operation.

The portion 31 of the front wall 15 of the housing is embossed laterally forwardly, and is

provided with a forwardly extending flange 32 at the bottom edge thereof. Cooperating with the embossed portion 31 to form a generally vertically extending passage 33 is a plate 34. The lower end of the plate 34 is bent rearwardly opposite the flange 20 at the front edge of the bottom wall 12 to form a recess 35, and the rear wall 36 of the recess is welded, brazed or otherwise secured to the adjacent flange 20. The opposite ends of the plate 34 are respectively welded or brazed throughout the length thereof to the embossed portion 31 and the top edge of the plate 34 terminates short of the corresponding edge of the embossed portion to form an elongated outlet opening 37. If desired the embossed portion 31 and plate 34 may be formed so that the side walls of the passage converge from the bottom of the passage to the top of the latter. This arrangement facilitates flow of fluid upwardly through the passage into the housing.

As shown in Figure 2 of the drawings, the bottom portion 38 of the embossed front wall 15 extends downwardly at the front side of the recess 35 to a position wherein the flange 32 lies substantially in the same general plane as the bottom edge of the flange 20 on the section 18 of the bottom wall 12. Thus the bottom portion 38 forms the front side of the passage 33 at the entrant end of the latter. The rear side of the lower end portion of the passage 33 is formed by a squeegee 39 having a frame 40a removably clamped to the depending flange 20 at the front edge of the bottom wall section 18 by suitable screws 40. The squeegee extends for the full width of the housing, and the front side thereof forms in effect, a continuation of the plate 34 or the rear wall of the passage 33. The lower end of the squeegee projects downwardly beyond the plane of the flange 32 for contact with the surface of the flooring being cleaned. The extent to which the squeegee 39 projects below the flange 32 is determined to enable the squeegee to support the flange 32 a slight distance above the floor surface when the housing is tilted to its floor drying position shown in Figure 2 of the drawings.

Secured to the top wall 13 of the housing adjacent the rear wall 11 is a shell 42 fashioned to cooperate with the top wall of the housing to form a chamber 43 communciating with the interior of the housing through an opening 41 formed in the top wall of the housing. As shown in Figure 3 of the drawings, the opposite end walls of the shell converge and are connected by a top wall 44 having an outlet opening 45 therethrough. A fitting 46 is secured to the top wall 44 of the shell and is provided with an upwardly extending tubular part 47 in registration with the opening 45. The tubular part is tapered for connection with a suction tube (not shown) which forms a standard part of orthodox tank type vacuum cleaners.

It will be understood that the housing may be manipulated to effect both the scrubbing and drying operations by the suction tube of the vacuum cleaner. However, during the scrubbing operation, the vacuum cleaner is preferably rendered inoperative, so that moisture will not be drawn into the vacuum cleaner during the scrubbing operation. On the other hand when it is desired to dry the floor previously scrubbed, the vacuum cleaner is rendered operative, and the housing is tilted to the position shown in Figure 2 of the drawings. In this position the housing is moved at a relatively slow rate over

the floor surface. As the housing is moved forwardly, cleaning fluid on the floor surface is accumulated in advance of the squeegee 39, and is subjected to the action of the suction which is communicated to the floor surface through the passage 33. As will be presently set forth, the critical portions of the device are carefully proportioned so that the suction force available in commercial cleaners is sufficient to draw the cleaning fluid from the floor into the housing 10, but is not sufficient to draw an appreciable amount of moisture through the suction opening 45 in the housing.

In connection with the above, it will be noted that the cross sectional area of the passage 33 at the entrant end does not exceed and is preferably substantially the same as the cross sectional area of the suction opening 45. In this connection it may be explained that if the cross sectional area of the entrant opening in the passage 33 is appreciably less than the area of the opening 45, the velocity of the air through the housing may be increased so that moisture is likely to escape into the vacuum cleaner. On the other hand, if the cross sectional area of the entrant opening at the lower end of the passage 33 exceeds the area of the opening 45 by an appreciable amount, the efficiency of the unit to pick up cleaning fluid from the floor surface is proportionately reduced. It is also desirable to proportion the cross sectional area of the outlet opening 37 so that this area is at least as great as the area of the entrant opening in order to permit free passage of the air into the housing. Another important factor that should be taken into consideration is the location of the squeegee 39 in a position to form a continuation of the rear wall of the passage 33. In practice the squeegee is positioned opposite the portion 38 of the front wall and preferably lies in substantially the same plane as the rear wall of the passage formed by the plate 34. This location of the squeegee tends to reduce turbulence at the entrant opening to the passage 33 and assures withdrawing practically all of the cleaning fluid from the floor surface. This is particularly true in the present instance where the flange 32 is normally positioned by the squeegee in such close proximity to the floor surface during the drying operation that the area of the resulting entrant opening A does not appreciably exceed the cross sectional area of the passage 33 and is preferably less.

It is extremely important to reduce to a minimum any tendency for moisture to escape through the suction opening 45 during the drying operation. In order to accomplish this result a plurality of baffles 48 are interposed between the opening 37 and the opening 45. In the present instance five baffles are shown, three of which are secured to the rearwardly curved portion of the front wall 15 and two of which are secured to the bottom wall section 18. The baffles extend for the full distance between the end walls 14 and are spaced laterally from one another. In detail the baffles 49 extending upwardly from the bottom wall section 18 alternate with the baffles 50 extending downwardly from the rearwardly curved portion of the front wall 15 and are formed with openings 51 to enable the flow of cleaning fluid therethrough during the scrubbing operation. The arrangement of the baffles is such that air flowing from the opening 37 to the opening 45 is required to flow through a serpentine path around the free ends of the baffles so that any moisture suspended in the air is impinged against the baffles and drained to the lower portion of the housing. If desired the lower ends of the front and rear baffles may be bent forwardly as indicated by the numeral 52 to minimize any tendency for the air to collect moisture draining from these baffles. Moreover, any moisture that may remain in the air as it passes upwardly through the opening 41 tends to drop out of suspension in the chamber 43 before it reaches the suction opening 45 and as a further precaution, the marginal edge of the top wall 13 surrounding the opening 41 may be flared downwardly as indicated by the numeral 53 to avoid any possibility of moisture being picked up from the underside of the top wall 13 of the housing.

It follows from the foregoing that I have provided a light weight, compact scrubbing device capable of being attached to orthodox vacuum cleaners to effectively dry flooring subsequent to the scrubbing operation. It will further be noted that the device is so designed that it may be successfully used in conjunction with relatively low pressure vacuum cleaners to effectively lift cleaning liquid from the flooring surface and return the same to the housing. More specifically, the design of the device is such that it may be successfully used in combination with vacuum cleaners capable of producing a water lift of 42" or less. In this connection it may be pointed out that the device is also designed to enable its use in connection with higher pressure vacuum cleaners without actually drawing moisture into the blower of the vacuum cleaner. In instances where the pressure of the cleaner is exceedingly high, provision may be made in the form of an adjustable bleed valve 55 for reducing the suction force.

What I claim as my invention is:

1. A floor scrubbing device comprising a housing adapted for movement over a floor surface and having top, side, end and bottom walls, a floor cleaning element supported in a position below the bottom wall of the housing adjacent one end wall of the latter and engageable with the floor surface, means defining a generally vertically extending passage adjacent the opposite end wall of the housing, said passage having a downwardly opening intake at the bottom thereof and having an outlet opening at the top communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, the floor engaging surface of the cleaning element and the intake opening at the bottom of the passage being so positioned that tilting the housing in opposite directions throughout an angle less than 90° alternatively engages the cleaning element with the floor surface and positions the intake opening immediately adjacent the floor surface, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, means within the housing between the outlet opening and suction opening for precipitating moisture from the air flowing from the outlet opening to said suction opening, perforated baffle means projecting upwardly from the bottom wall of the housing and adapted to reduce turbulence of the liquid accumulated in the bottom of the housing, and means defining a chamber adjacent the end wall above the floor cleaning element,

said chamber communicating with the interior of said housing and being adapted to receive a portion of the liquid accumulated in the bottom of said housing and being provided with openings adapted to discharge adjacent said floor cleaning element the liquid so received.

2. A floor scrubbing device comprising a housing adapted for movement over a floor surface and having top, side, end and bottom walls, a floor cleaning element supported in a position below the bottom wall of the housing adjacent one end wall of the latter and engageable with the floor surface, means defining a generally vertically extending passage adjacent the opposite end wall of the housing, said passage having a downwardly opening intake at the bottom thereof and having an outlet opening at the top communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, the floor engaging surface of the cleaning element and the intake opening at the bottom of the passage being so positioned that tilting the housing in opposite directions alternatively engages the cleaning element with the floor surface and positions the intake opening immediately adjacent the floor surface, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, the effective cross sectional area of the passage being substantially the same as the effective cross sectional area of the suction opening to obtain the maximum flow of air upwardly through the passage, means for precipitating moisture from the air as it passes from the outlet opening to the suction opening, perforated baffle means projecting upwardly from the bottom wall of the housing and adapted to reduce turbulence of the liquid accumulated in the bottom of the housing, and means defining a chamber adjacent the end wall above the floor cleaning element, said chamber communicating with the interior of said housing and being adapted to receive a portion of the liquid accumulated in the bottom of said housing and being provided with openings adapted to discharge adjacent said floor cleaning element the liquid so received.

3. A floor scrubbing device comprising a housing adapted for movement over a floor surface and tiltable in opposite directions, said housing having top, side, end and bottom walls, a floor cleaning element supported in a position below the bottom wall of the housing adjacent one end wall of the latter and engageable with the floor surface in one tilted position of the housing, means defining a passage extending generally vertically from the bottom wall and positioned adjacent the opposite end wall of the housing, said passage having an intake opening located in a position to be immediately adjacent the floor surface in another tilted position of the housing and having an outlet opening communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, means for precipitating moisture from the air passing from the outlet opening to the suction opening including a series of generally vertically extending baffles spaced from each other in the direction of air flow, and a settling chamber beyond said baffles, said baffles being arranged to provide for said air a serpentine passage having abrupt directional changes whereby liquid particles are flung out of said air, and said settling chamber having a larger cross-sectional area than that of said first-mentioned passage and that of said serpentine passage, the last baffle in said series extending downwardly from the top wall of the housing and having the lower end spaced a substantial distance from the suction opening, and perforated baffle means projecting upwardly from the bottom wall of the housing for reducing turbulence of the liquid accumulated in the housing, said serpentine passage being spaced sufficiently far above the upper level of said liquid that restriction by said liquid of said serpentine passage is avoided.

4. A floor scrubbing device comprising a housing adapted for movement over a floor surface and having top, side, end and bottom walls, means defining a passage extending generally vertically from the bottom wall and positioned adjacent the front end wall of the housing, said passage having an intake opening located in a position to be immediately adjacent the floor surface and having an outlet opening communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, serpentine passage means positioned between said outlet opening and said suction opening and into which said outlet opening discharges directly, said serpentine passage means having throughout its length a greater cross-sectional area than that of said first-mentioned passage, an open settling chamber between the exit end of said serpentine passage means and said suction opening, said settling chamber having a larger cross-sectional area than that of said serpentine passage means and being adapted to provide relatively slow movement of the air passing therethrough whereby residual droplets of moisture in said air settle out therefrom, a plurality of upwardly-extending perforated baffles positioned at the bottom of said settling chamber and adapted to reduce the turbulence of liquid accumulated in the bottom of the housing, and means surrounding the suction opening for intercepting moisture flowing along the inner surfaces of the housing walls toward said suction opening.

5. A floor scrubbing device comprising a housing adapted for movement over a floor surface and having top, side, end and bottom walls, a floor cleaning element supported in a position below the bottom wall of the housing and engageable with the floor surface, means defining a passage extending generally vertically from the bottom wall and positioned adjacent the front end wall of the housing, said passage having an intake opening located in a position to be immediately adjacent the floor surface and having an outlet opening communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, a series of baffles extending from one side wall of the housing to the opposite side wall across the

path of travel of the air from the outlet opening to the suction opening and spaced from one another in the direction of air flow to provide a serpentine passage for said air having throughout its length a greater cross-sectional area than that of said first-mentioned passage, a settling chamber beyond said baffles in the direction of air flow, said settling chamber having a larger cross-sectional area than any other portions of the path of travel of said air in said device and being adapted to provide relatively slow movement of the air passing therethrough whereby residual droplets of moisture in said air settle out therefrom, perforate baffle means in the bottom of said housing adapted to reduce turbulence of the liquid therein, and means for distributing liquid from said housing to the floor adjacent said floor cleaning element.

6. A floor scrubbing device comprising a housing adapted for movement over a floor surface having top, side, end and bottom walls, a plate cooperating with the front end wall to form a generally vertically extending passage having an intake opening located in a position to lie immediately adjacent the floor surface and having an outlet opening communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, a squeegee supported on the housing to one side of the intake opening in a position to wipe the floor surface and accumulate moisture at the intake opening, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, a substantially vertical baffle extending between opposite side walls of the housing and projecting downwardly from the top wall to a point below the outlet opening, and a second baffle positioned between the suction opening and said first baffle, said second baffle also extending from one side wall of the housing to the opposite side wall and cooperating with the first baffle to precipitate moisture from the air flowing from the outlet opening to the suction opening and a settling chamber beyond said baffles in the direction of air flow, said settling chamber having a larger cross-sectional area than any other portion of the path of travel of said air in said device and being adapted to provide relatively slow movement of the air passing therethrough whereby residual droplets of moisture in said air settle out therefrom.

7. A floor scrubbing device comprising a housing adapted for movement over a floor surface having top, side, end and bottom walls, a plate cooperating with the front end wall to form a generally vertically extending passage having an intake opening located in a position to lie immediately adjacent the floor surface and having an outlet opening communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, a squeegee supported on the housing to one side of the intake opening in a position to wipe the floor surface and accumulate moisture at the intake opening, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, a substantially vertical baffle extending between opposite side walls of the housing and projecting downwardly from the top wall to a point below the outlet opening, a second baffle positioned between the suction opening and said first baffle, said second baffle also extending from one side wall of the housing to the opposite side wall and cooperating with the first baffle to precipitate moisture from the air flowing from the outlet opening to the suction opening, and additional baffles provided with perforations and extending upwardly from the bottom wall of the housing and from one side to the other thereof for reducing turbulence of the liquid in the housing and a settling chamber beyond said first and second baffles in the direction of air flow, said settling chamber having a larger cross-sectional area than any other portion of the path of travel of said air in said device and being adapted to provide relatively slow movement of the air passing therethrough whereby residual droplets of moisture in said air settle out therefrom.

8. A floor scrubbing device comprising a housing adapted for movement over a floor surface having top, side, end and bottom walls, a plate cooperating with the front end wall to form a generally vertically extending passage having an intake opening located in a position to lie immediately adjacent the floor surface and having an outlet opening communicating with the interior of the housing at a point spaced a substantial distance above the bottom wall, a squeegee supported on the housing to one side of the intake opening in a position to wipe the floor surface and accumulate moisture at the intake opening, a suction opening in one wall of the housing spaced a substantial distance from the outlet opening and adapted for connection to a suction producing device whereby air is drawn through the passage to the suction opening, a series of baffles projecting downwardly from the top wall of the housing to a point spaced a substantial distance below the outlet opening and spaced from one another in the direction of air flow from the outlet opening to the suction opening, said baffles extending across the path of air flow from one side wall of the housing to the opposite side wall, and additional baffles projecting upwardly from the bottom wall of the housing and respectively extending between adjacent baffles of the first series to provide a circuitous passage, of larger cross-sectional area throughout its length than said first mentioned passage, for the air and a settling chamber beyond said baffles in the direction of air flow, said settling chamber having a larger cross-sectional area than any other portion of the path of travel of said air in said device and being adapted to provide relatively slow movement of the air passing therethrough whereby residual droplets of moisture in said air settle out therefrom.

WILLIAM J. BELKNAP.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
742,283	Bowen	Oct. 27, 1903
866,469	Huggins	Sept. 17, 1907
1,014,027	Walter	Jan. 9, 1912
1,661,979	Ugolini	Mar. 6, 1928
1,690,472	Breton	Nov. 6, 1928
1,762,142	Breton	June 10, 1930
1,849,663	Finnell	Mar. 15, 1932

FOREIGN PATENTS

Number	Country	Date
31,311	France	Jan. 28, 1927
301,588	Great Britain	Dec. 6, 1928