United States Patent [19]

Blåeldh

[11] **3,751,747**

[45] **Aug. 14, 1973**

[54] **SURFACE CLEANING APPARATUS**

[75] Inventor: **Erik Arne Blåeldh,** Skarholmen, Sweden

[73] Assignee: **Aktiebolaget Electrolux,** Stockholm, Sweden

[22] Filed: **Aug. 25, 1971**

[21] Appl. No.: **174,786**

[52] **U.S. Cl.** ..... **15/50 R,** 15/321, 15/410

[51] **Int. Cl.** **A47l 11/03,** A47l 11/34, A47l 11/40

[58] **Field of Search** ..... 15/50 R, 320, 321, 15/322, 333, 50 C, 410, 411, 361, 49 C

[56] **References Cited**

UNITED STATES PATENTS

3,633,240	1/1972	Crener	15/321
3,430,280	3/1969	Arones	15/50 C
2,199,615	5/1940	Casper	15/49 C

Primary Examiner—Wayne A. Morse, Jr.
Assistant Examiner—C. K. Moore
Attorney—Edmund A. Fenander

[57] **ABSTRACT**

This invention relates to surface cleaning apparatus having a base providing a housing in which foam is generated and from which the foam is discharged on a surface by a distributor in the bottom of the housing. Foam present in the distributor and passageway connected thereto changes into liquid when cleaning is terminated and foam generation is stopped. When normal cleaning ceases the base is supported in an inclined position on the surface so that liquid, which otherwise will drip on the surface from the distributor, is discharged therefrom and directed to flow along the bottom face of the housing which provides a surface to which liquid tends to adhere and along which liquid tends to flow from the distributor toward a place which receives the liquid.

14 Claims, 7 Drawing Figures

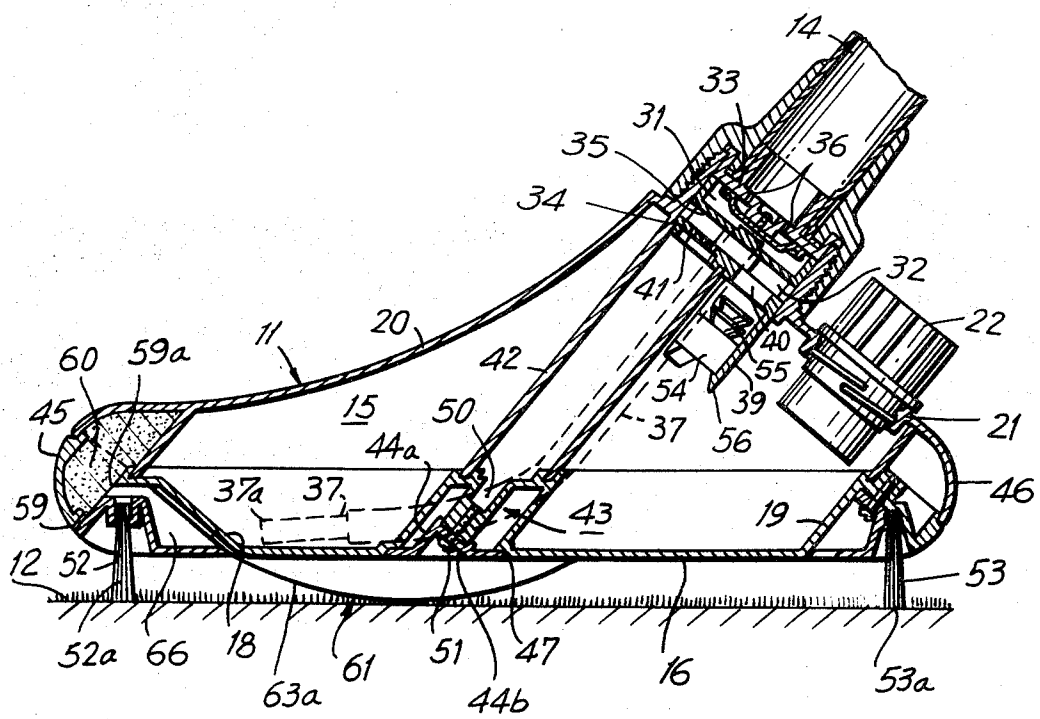


FIG. 1

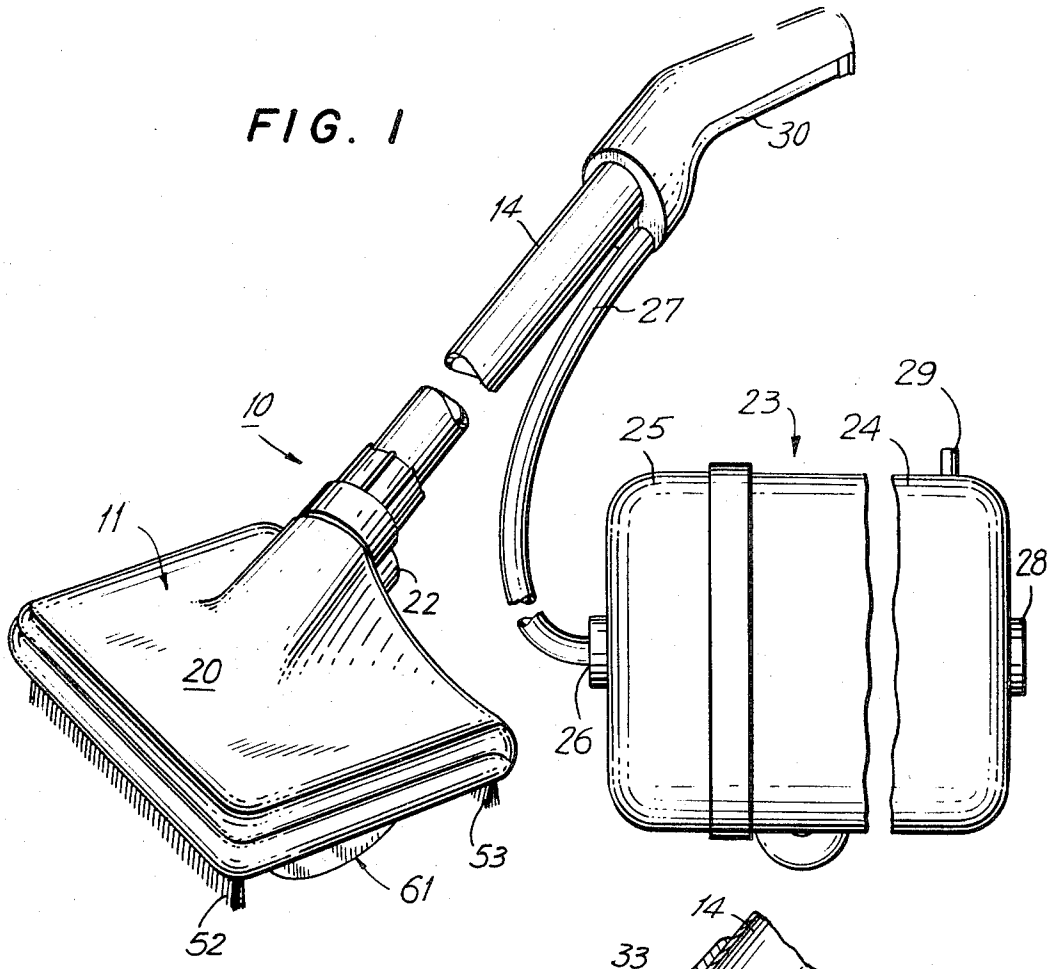

30
14
27
10
11
22
20
29
23
25
24
28
26
53
61
52

FIG. 2

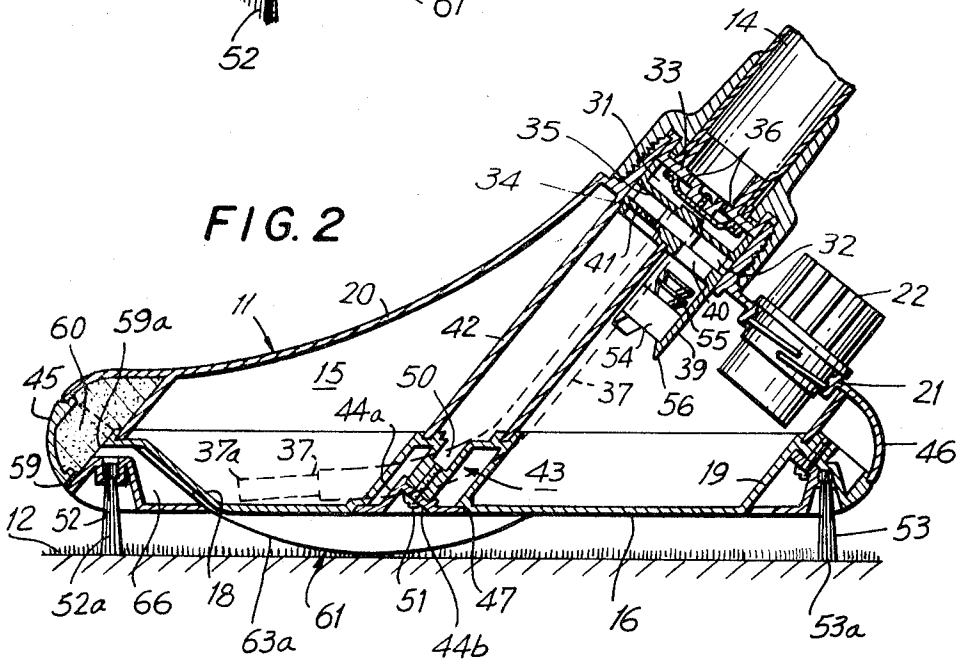
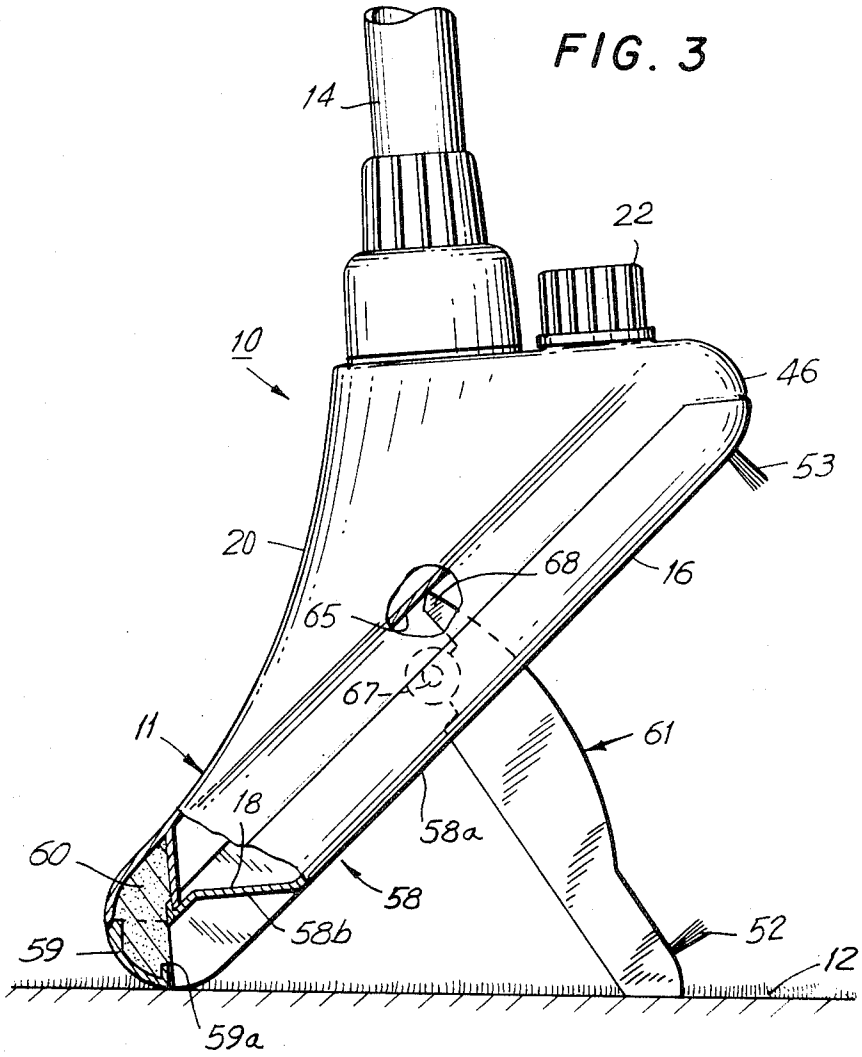

14
33
31
35
36
34
41
32
22
40
55
54
39
56
37
21
46
19
53
11
20
42
60
59a
45
15
50
44a
37a
37
43
59
12
52
52a
66
18
63a
61
51
44b
47
16
53a

FIG. 3



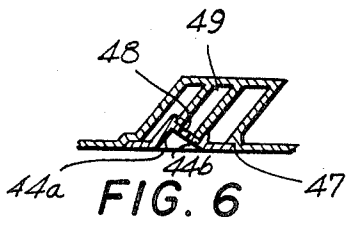


FIG. 6

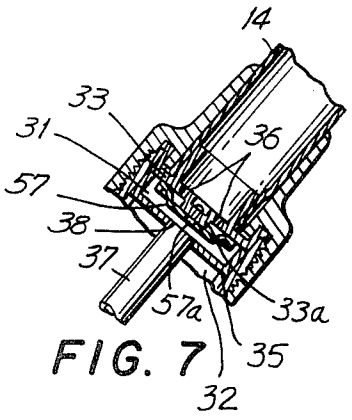


FIG. 7

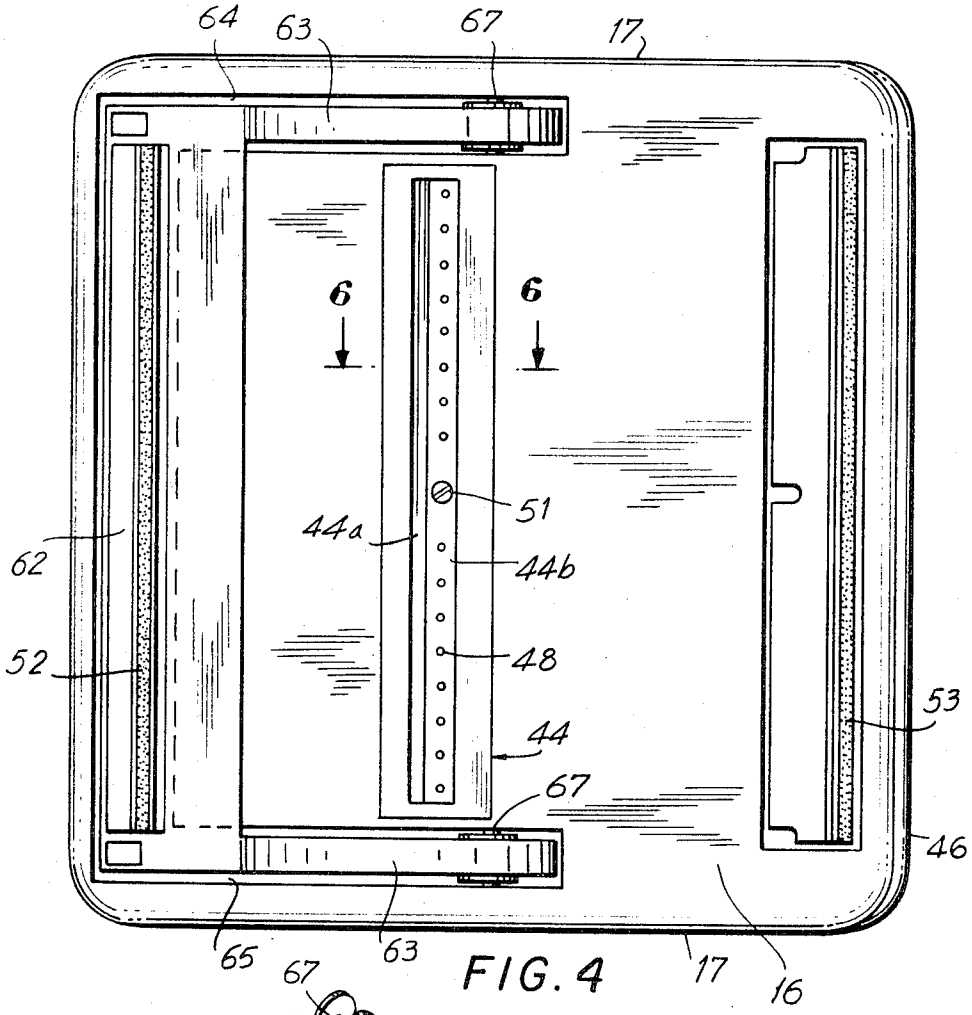

64
63
67
17
6
6
51
44a
44b
62
48
52
53
44
67
46
65
63
17
16

FIG. 4

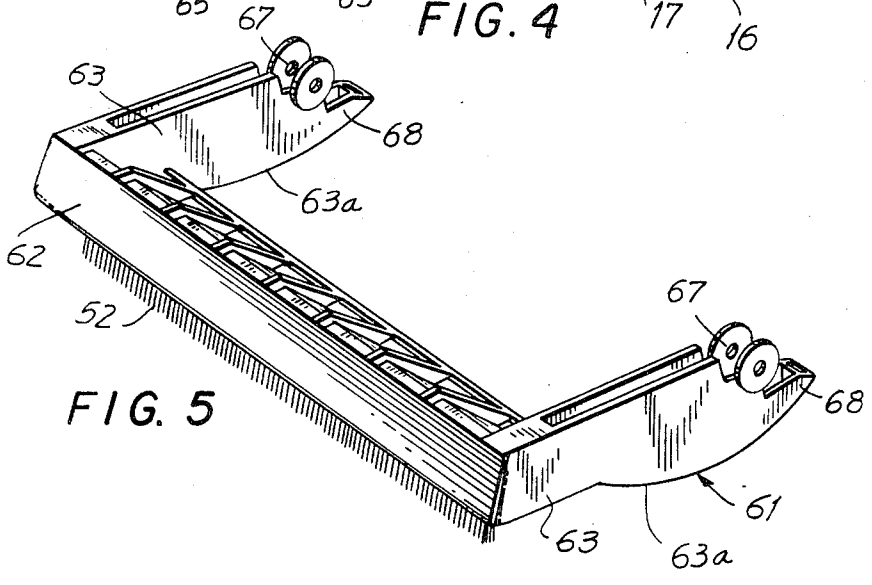

67
63
68
63a
62
52
67
68
61
63
63a

FIG. 5

SURFACE CLEANING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to surface cleaning apparatus in which foam is generated in a body of cleaning liquid by bubbling air therethrough, the foam being conducted from a space above the liquid surface of the liquid body to a distributor which is movable over a surface in close proximity thereto and functions to distribute the foam.

2. Description of the Prior Art

In known surface cleaning apparatus of this kind foam present in the distributor and passageway leading thereto changes into liquid when cleaning is suspended or terminated and foam generation is stopped. Such liquid flows by gravity from the distributor onto the surface and wets the surface which is objectionable.

It has been the practice to provide an accessory which is in the form of an open top receptacle in which the surface cleaning apparatus can be positioned when cleaning and foam generation is stopped. Such an accessory serves to collect liquid dripping from the apparatus when the foam in the distributor and downward extending passageway connected thereto is converted to liquid.

While an accessory of this kind is not unduly expensive, it does add to the overall cost of the surface cleaning apparatus. However, it requires additional storage space which is often at a premium. And when cleaning is effected with the aid of such an accessory, the operator must lift and carry the surface cleaning apparatus back and forth between the surface being cleaned, such as a rug, for example, and the accessory each time cleaning is stopped which is objectionable.

SUMMARY OF THE INVENTION

It is an object of my invention to provide an improved apparatus for cleaning with the aid of foam in which wetting of a surface by liquid dripping from the apparatus is eliminated when cleaning is halted and foam generation is stopped. I accomplish this by shifting the surface cleaning apparatus from a substantially horizontal working position to an inclined position when cleaning is suspended or terminated. Liquid discharged from the distributor is directed to flow along an outer surface or face at the underside of the apparatus which is at an acute angle to the horizontal. Such outer face at the exterior of the apparatus, which is directed downward toward the surface being cleaned, provides a surface to which liquid tends to adhere and along which liquid tends to flOw from the distributor at one level to a chamber at a lower level. A body of material, such as porous plastic, for example, may be provided in the chamber for retaining liquid flowing thereto and from which the liquid can evaporate into the ambient air without wetting the surface.

Further, the apparatus conveniently can be shifted back and forth between its substantially horizontal working position and inclined position by a pivotally mounted bracket. The bracket is readily movable between a retracted position beneath the apparatus and an outer operative position for supporting the apparatus in a stable inclined position.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of surface cleaning apparatus which embodies my invention and a suction cleaner for supplying thereto air under pressure;

FIG. 2 is a vertical sectional view of the base of the apparatus shown in FIG. 1;

FIG. 3 is an elevation view, partly broken away and in section, of the apparatus shown in FIGS. 1 and 2 with the base supported in an inclined position on a surface;

FIG. 4 is a bottom plan view of the base of the apparatus shown in FIGS. 1 to 3;

FIG. 5 is a perspective view of the pivotally mounted supporting bracket shown most clearly in FIGS. 3 and 4;

FIG. 6 is a sectional view taken at line 6—6 of FIG. 4; and

FIG. 7 is a fragmentary enlarged sectional view illustrating details in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1, 2 and 4, the surface cleaning apparatus 10 embodying my invention comprises a base 11 which is in close proximity to and movable over a surface 12, such as a rug, for example. The apparatus is provided with a hollow handle 14 which is connected at its lower end to the base 11 and extends upward therefrom at an acute angle to the horizontal.

The base 11 is of rectangular form having walls which provide a housing 15 having a bottom 16 and an upstanding side wall which includes erect lateral side walls 17 and inclined front and rear walls 18 and 19, respectively. The base 11 includes a top 20 having an opening 21 adapted to be closed by a cap 22. The housing 15 is adapted to be filled at the opening 21 with a suitable cleaning agent capable of generating foam when air bubbles therethrough, as will be explained presently.

In the illustrated embodiment a suction cleaner 23 serves as a source of supply of air under pressure for the apparatus 10. The suction cleaner 23 includes a casing 24 having an end cover 25 provided with an outlet 26 to which a hose 27 is adapted to be removably connected in any well known manner (not shown). Air is drawn into the casing 24 through an inlet 28, which is at the end of the casing opposite the end cover 25, by a suitable motor-fan unit (not shown) disposed therein. The motor-fan unit is controlled by a switch (not shown) which also is disposed in the casing 24 and arranged to be actuated by a push button 29 to start and stop the suction cleaner 23. Air discharged under pressure from the outlet 26 flows through the hose 27 which is connected at its opposite end to a hand grip 30 at the outer end of the handle 14, Air flows through the hand grip 29, which is hollow, and then passes downward through the hollow handle 14 into the base 11 in a path of flow which will be described presently.

As shown in FIG. 2, the lower end of the hollow handle 14 is connected to a top opening in the base 11 by structure providing an upper chamber 31 and a lower chamber 32. The chambers 31 and 32 have top and bottom walls 33 and 34, respectively, and are divided by a partition 35. The top wall 33 of the upper chamber 31 is formed with openings 36 through which air can pass into the chamber 31 from the hollow handle 14.

Air is conducted from the upper chamber 31 to the bottom of the housing 15 by a conduit 37, the lower end 37a of which is disposed at the extreme bottom of the housing 15 and the upper end of which extends

through wall 34 and the lower chamber 32 and is in communication with an opening 38 in the partition 35. The lower end 37a of the conduit 37 in any suitable manner (not shown) may be formed to subdivide the air discharged therefrom which then bubbles upward through the body of cleaning agent in the bottom half of the housing 15.

The air bubbling upward through the body of cleaning agent generates foam which is forced upward in the upper part of the housing 15 above the liquid level therein. The foam is forced through a hollow sleeve 39 which depends downward from the wall 34 and is in communication with a port 40 therein. In this way the foam is introduced into the lower chamber 32 which is defined in part by the wall 34 and the partition 35.

The wall 34 is formed with openings 41 through which the foam passes from the chamber 32 into the upper end of a conduit 42, the lower end of which is connected to a distributor 43 provided at the bottom 16 of the housing 15 which also may be referred to as the bottom of the base 11.

The distributor 43 includes a flanged angle member 44 which has a central L-shaped section and extends transversely of the base 11 in a direction parallel to the front and rear walls 45 and 46 thereof and closes an opening 47 in the bottom 16 of the base. Both arms 44a and 44b of the L-shaped member 44 are at an acute angle to the bottom 16 and the arm 44b thereof is formed with a row of openings 48 in communication with the bottom of an elongated hollow manifold 49 which is closed along its length except at an intermediate zone 50 at which region the manifold is in communication with the lower end of the conduit 42, as shown in FIG. 2. The apertured L-shaped member 44 forms the bottom wall of the hollow manifold and is removably fixed thereto at 51 at the zone 50.

It will now be understood that one portion of the bottom 16 of the base 11 forms the bottom of the housing 15 and the distributor 43 is disposed at another portion of the bottom 16 of the base and is positioned intermediate the front and rear walls 45 and 46, respectively, of the base.

Elongated brushes 52 and 53 are carried by the base 11 adjacent to its front and rear walls 45 and 46, respectively. The tips of the bristles 52*a* and 53*a* of the brushes are adapted to frictionally engage the surface 12 being cleaned which, as previously explained, may be a carpet, for example.

A hollow member 54, which carries a valve 55, is movable axially within the hollow sleeve 38 between a stop 56 and the port 40 in the wall 34. When the surface cleaning apparatus 10 is upright, as shown in FIG. 2, the hollow member 54 is at the bottom of the hollow sleeve 38 and the port 40 remains open. If the apparatus 10 should be inverted the hollow member 54 will move axially of the sleeve 38 and the valve 55 closes the port 40. In this way liquid cannot flow through the hollow sleeve 38, chamber 32, conduit 42 and distributor to cause objectionable wetting of the surface being cleaned.

In the event the hose 27 is connected to the suction inlet 28 of the suction cleaner 23 instead of the outlet 26 at the blowing end of the cleaner, the suction effect produced in the hose 27 cannot be transmitted to the body of cleaning agent in the housing 15. As seen in FIGS. 2 and 7, a flexible diaphragm 57 having an aperture 57*a* is fixed to the underside of the wall 33. When air under pressure normally is supplied through the hose 27 to the hollow handle 14 the diaphragm 57 assumes the position shown in FIG. 7 and air can flow through the aperture 57*a* which is open. However, the diaphragm 57 will flex toward a central boss 33*a* in the wall 33 and close the aperture 57*a* when the diaphragm 57 is subjected to suction. Hence, liquid cannot be sucked from the housing 15 through the conduit 37 and flow to the suction cleaner 23 when the hose 27 inadvertently is connected to the suction inlet 28 of the cleaner.

When cleaning of the surface 12 is halted and the push button 29 of the suction cleaner 23 is actuated to stop the supply of air under pressure to the surface cleaning apparatus 10, foam present in the distributor 43 and passageway leading thereto, which includes the conduit 42 and chamber 32, is changed to liquid and flows downward by graivity to the bottom 16 of the base 11.

In accordance with my invention, in order to prevent such liquid wetting the surface 12, the base 11 is supported in an inclined position on the surface 12, as shown in FIG. 3, when the suction cleaner 23 is stopped by operating the push button 29. In such inclined position of the base 11, the liquid formed in the distributor 43 and passageway leading thereto and passing from the openings 48 in the distributor is directed to flow along the bottom surface or face 58 of the base 11, as shown in FIG. 3. The outer face 58 at the exterior of the base 11, which is directed downward toward the carpet 12 being cleaned, provides a surface to which liquid tends to adhere and along which liquid tneds to flow from the distributor 43 at one level to a chamber 59 at a lower level.

As seen in FIGS. 2 and 3, the chamber 59 is defined by the front curved wall 45 of the base 11 and is lcoated exteriorly of the housing 15 in which the body of cleaning agent is held. When the base 11 is supported in its inclined position illustrated in FIG. 3, the bottom half of the chamber 59 is located at the lowest point of the base 11 and disposed at the underside thereof. In its inclined position seen in FIG. 3, the outer face 58 includes a first portion 58*a* depending downward from the distributor 43 at an acute angle to the horizontal which is of a first magnitude and a second portion 58*b* at the inclined front wall 18 of the housing 15 which extends between the first portion 58*a* and the chamber 59 at an acute angle to the horizontal which is of a second lesser magnitude.

A body 60 of material, such as porous plastic, for example, is provided in the chamber 59 for retaining liquid flowing thereto and from which the liquid can evaporate into the ambient air without wetting the surface.

In further accord with my invention I provide a bracket 61 which is pivotally mounted on the base 11 and angularly movable thereon between a first position enabling the base to move horizontally on the surface and a second position operable to support the base in its inclined position on the surface. In FIG. 3 it will be observed that the handle 14, in the inclined position of the base 11, is substantially erect with its vertical axis passing through the vicinity of the center of gravity of the base.

As shown in FIG. 5, the bracket 61 comprises a U-shaped stirrup having a closed end 62 and spaced apart legs 63. The bottom of the base 11 is recessed to receive the bracket 61 in its retracted position shown in

FIG. 2. I accomplish this by providing inverted U-shaped channels 64 and 65 which are adjacent to and alongside the laterial side walls 17 of the base 11. The inverted U-shaped channels 64 and 65 are open at the bottom 16 of the base and of sufficient size to receive the legs 63 of the bracket.

An inverted U-shaped channel 66 extends across the front of the base 11 between the inverted U-shaped channels 64 and 65. As best shown in FIG. 2, the channel 66 is disposed between the chamber 59 and the inclined front wall 18 of the housing 16. In its retracted position the channel 66 receives the closed end 62 of the bracket 61. It will be seen that the elongated brush 52 at the front of the base 11 is fixed to the closed end 62 of the bracket 61.

The outer free ends of the legs 63 of the bracket 61 are pivotally connected at 67 to the walls of the inverted U-shaped channels 64 and 65. Further, the outer free ends of the legs 63 are provided with lugs 68 which engage the bottoms of the channels 64 and 65 when the bracket 61 is moved outward from its retracted position to the position shown in FIG. 3. In this way the bracket 61 is firmly held in the channels 64 and 65 to maintain the base 11 in a stable inclined position on the surface.

The bottom surfaces of the legs 63 have convex surfaces at 63*a*, as shown in FIGS. 2 and 5, and function as slides to enable the base 11 to move freely when movement is imparted thereto with the handle 14. The convex portions 63*a* of the legs 63 support the weight of the apparatus when the bracket 61 is in its retracted position seen in FIG. 2, thus permitting the brushes 52 and 53 to function efficiently to scrub the foam into the surface being cleaned.

In its retracted position, the closed end 62 of the bracket 61 is held in the front channel 66 and blocks the inlet 59*a* of the chamber 59 which faces rearward toward the distributor 43. When the bracket 61 is moved to the position shown in FIG. 3, the chamber 59 no longer is blocked by the closed end 62 of the bracket and liquid can freely flow thereto along the outer face or surface 58 of the base 11.

When cleaning is halted by rendering the suction cleaner 23 inoperable to supply air under pressure to the housing 15, the handle 14 is angularly moved upward through an arc toward the front wall 46 of the base. This movement of the handle 14 tilts the base 11 at a sharp angle to the surface which enables the bracket 61 to move from its retracted position. With proper manipulation of the handle 14 the bracket will move to the position shown in FIG. 3 in which It is operable to hold the base 11 in a stable position inclined to the surface. In FIG. 3 the legs 63 of the brcket 61 form an angle with the bottom edges of the side walls 17 of the base 11 which is in a range of about 70° to 80° and such that the center of gravity of the base 11 will be between the bracket 61 and components of the base to which the bracket is mounted and which may be referred to as the stationary part of the cleaning apparatus. When these condituions are satisfied the handle 14 assumes an upright position which is substantially vertical.

When it is desired to resume cleaning and shift the base 11 to its horizontal position shown in FIG. 2, the handle 14 initially is angularly moved sufficiently for the bracket 61 to assume a substantially vertical position. Thereafter, the base 11 is moved rearward with the handle 14 to enable the bracket 61 to move to its retracted position illustrated in FIG. 2.

It will be evident that, when it is desired to store the apparatus 10 after cleaning is completed, the bracket 61 can be employed to hold the base 11 in an inclined position with the handle 14 erect. Hence, the apparatus 10 is a self-contained unit which does not require an accessory to protect it when stored in a closet or elsewhere.

I claim:

1. Surface cleaning apparatus comprising

a. a base defined by wall means which provide a housing horizontally movable over a surface and adapted to hold a body of cleaning liquid possessing such physical properties that it will generate foam responsive to air bubbling therethrough, said base having a bottom of which a first portion forms the bottom of said housing,

b. a handle, means connecting the lower end of said handle to said base for moving the latter over the surface,

c. distributing means disposed at a second portion of the bottom of said base for distributing foam on the surface,

d. an air line having an air inlet exteriorly of said housing and an air outlet within said housing at the bottom thereof,

e. means adapted to be connected to the inlet of said air line for delivering thereto air under pressure from a source of supply, the air discharged from the outlet of said air line rising through the body of liquid to generate foam,

f. means providing a passageway having one end in communication with the upper part of said housing and the other end thereof communicating with said distributing means for flowing thereto foam from the upper part of said housing,

g. said base being movable back and forth by said handle and having front and rear walls transverse to the direction of such movement,

h. said distributing means at the second portion of the bottom of said base being intermediate said front and rear walls,

i. the wall means of said base defining a chamber exteriorly of said housing,

j. means for supporting said base in a stationary inclined position on the surface when cleaning is terminated and the generation of foam in said housing by air under pressure is stopped, said chamber being at one level and said distributing means being at a higher level in the inclined position of said base,

k. any foam present in said passageway and distributing means changing into liquid when cleaning is terminated and the generation of foam in said housing is stopped, such liquid being discharged exteriorly of said housing through said distributing means at the bottom of said base and directed to flow along the outer face of said housing, and

l. the outer face of said housing providing a surface to which liquid tends to adhere and along which liquid tends to flow from said distributing means toward said chamber in the inclined position of said base.

2. Apparatus as set forth in claim 1 in which the outer face of said housing, when said base is supported in the inclined position on the surface, includes a first portion

depending downward from said distributing means at an acute angle to the horizontal which is of a first magnitude and a second portion extending between said first portion and said chamber at an acute angle to the horizontal which is of a second lesser magnitude.

3. Apparatus as set forth in claim 1 which includes means in said chamber for retaining liquid flowing thereto along the outer face of said housing and from which liquid evaporates into the ambient air.

4. Apparatus as set forth in claim 1 in which said supporting means comprises a bracket which is pivotally mounted on said base and angularly movable thereon between a first position enabling said base to move horizontally on the surface and a second position operable to support said base in its inclined position on the surface.

5. Apparatus as set forth in claim 4 in which said handle is so connected to said base that, in the inclined position of said base, said handle will extend substantially erect from said base with its axis passing through the vicinity of the center of gravity of said base.

6. Apparatus as set forth in claim 4 in which said bracket comprises a U-shaped stirrup having the outer ends of its spaced apart legs pivotally connected to said base intermediate its front and rear walls, said stirrup being movable between the first position which is at the underside of said base and the second position at an acute angle to the vertical, and stop means to hold said stirrup in the second position.

7. Apparatus as set forth in claim 6 in which the bottom of said base is recessed to receive said stirrup in the first position.

8. Apparatus as set forth in claim 7 in which said recess is defined by a U-shaped channel providing grooves open toward the bottom of said base, the chamber having an inlet to receive liquid from the outer face of said housing, and the closed end of said stirrup in the first position blocking said inlet.

9. In surface cleaning apparatus, the combination of

a. a base comprising a hollow member which is movable over a surface and defines a housing to hold a body of cleaning liquid possessing such physical properties that it will generate foam responsive to air bubbling therethrough,

b. a handle having its lower end rigidly connected to said base and extending upward therefrom at an acute angle to the vertical,

c. said base being movable back and forth by said handle and having a flat bottom and front and rear walls transverse to said handle,

d. distributing means at the bottom of said base between the front and rear walls thereof,

e. an air line having an air inlet exteriorly of said base and an air outlet within said base at the bottom thereof,

f. means adapted to be connected to the inlet of said air line for delivering thereto air under pressure from a source of supply, the air discharged from the outlet of said air line rising through the liquid in said base to generate foam,

g. means providing a passageway having one end in communication with the upper part of said base and the other end thereof communicating with said distributing means for flowing thereto foam from the upper part of said base,

h. means for supporting said base in a stationary inclined position with the bottom thereof at an acute angle to the surface, said supporting means comprising a U-shaped bracket at the bottom of said base, said bracket having a pair of spaced apart legs connected at one end by a cross connection, said legs being transverse to the front and rear walls of said base and said cross connection being parallel to the walls,

i. the bottom of said base being recessed to receive said legs and cross connection of said U-shaped bracket in a first retracted position thereof, said cross connection in the first retracted position of said bracket being at the vicinity of the front wall of said base,

j. means in the recessed bottom of said base for pivotally connecting thereto the opposite outer free ends of said legs,

k. means intermediate the opposing ends of said legs, when the U-shaped bracket is in its first retracted position, for supporting and guiding said base on the surface with back and forth movement of said handle,

l. said U-shaped bracket being movable about said pivotal connecting means through an obtuse angle between its first retracted position and a second outer operative position to support said base in the stationary inclined position,

m. said U-shaped bracket and the bottom of said base sloping upward toward one another from the surface when said base is supported thereon in its stationary inclined position, and

n. said handle being in a substantially upright position when said U-shaped bracket is in its second outer operative position.

10. The combination set forth in claim 9 in which said cross connection of said U-shaped bracket includes a brush having bristles, said brush extending lengthwise of said cross connection between said legs and serving as a tool to promote cleaning of the surface.

11. The combination set forth in claim 9 in which said legs have convex surfaces intermediate the opposing ends thereof, said means for supporting and guiding said hollow member on the surface comprising said convex surfaces.

12. The combination set forth in claim 9 in which the recessed bottom of said base is formed by channels which essentially are of inverted U-shape in section and open at the bottoms and accommodate said legs and cross connection of said U-shaped bracket in its first inner retracted position.

13. In surface cleaning apparatus, the combination of

a. a base comprising a hollow member which is movable over a surface and defines a housing to hold a body of cleaning liquid possessing such physical properties that it will generate foam responsive to air bubbling therethrough,

b. a handle having its lower end connected to said base and extending upward and rearward therefrom,

c. said base being movable back and forth by said handle and having a flat bottom and front and rear walls transverse to said handle,

d. distributing means at the bottom of said base between the front and rear walls thereof,

e. an air line having an air inlet exteriorly of said base and an air outlet within said base at the bottom thereof,

f. means adapted to be connected to the inlet of said air line for delivering thereto air under pressure from a source of supply, the air discharged from the outlet of said air line rising through the liquid in said base to generate foam,

g. means providing a passageway having one end in communication with the upper part of said base and the other end thereof communicating with said distributing means for flowing thereto foam from the upper part of said base,

h. means for supporting said base in a stationary inclined position with the bottom thereof at an acute angle to the surface, said supporting means comprising a U-shaped bracket at the bottom of said base, said bracket having a pair of spaced apart legs connected at one end by a cross connection, said legs being transverse to the front and rear walls of said base and said cross connection being parallel to the walls,

i. the bottom of said base being recessed to receive said legs and cross connection of said U-shaped bracket in a first retracted position thereof,

j. means in the recessed bottom of said base for pivotally connecting thereto the opposite outer free ends of said legs,

k. said U-shaped bracket being movable about said pivotal connecting means through an obtuse angle between its first retracted position and a second outer operative position to support said base in the stationary inclined position,

l. said U-shaped bracket and the bottom of said base sloping upward toward one another from the surface when said base is supported thereon in its stationary inclined position,

m. any foam present in said passageway and distributing means changing into liquid when cleaning is terminated and the generation of foam in said housing is stopped, such liquid being discharged exteriorly of said base through said distributing means at the bottom thereof, and

n. the downwardly directed outer face of said base, when it is in its inclined position, providing a surface to which liquid tends to adhere and along which liquid tends to flow from said distributing means.

14. Apparatus as set forth in claim **13** in which said base includes means to receive and collect liquid flowing along said surface from said distributing means.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,751,747 Dated August 14, 1973

Inventor(s) Erik Arne Blaeldh

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet insert

--- [30] Foreign Application Priority Data

September 4, 1970 Sweden 12028/70

Signed and sealed this 8th day of January 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.

98