

United States Patent

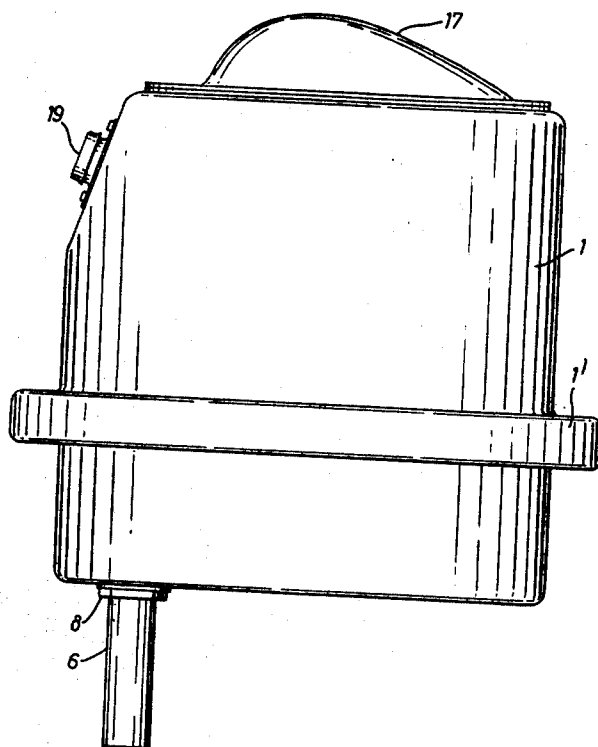
[11] 3,563,418

[72] Inventor Douglas Albert Hahn
Chinnor, England
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[73] Assignee Reckitt & Colman Products Limited
Dansom Lane, Hull, England
a British company. by mesne assignments

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Primary Examiner—David M. Bockenek
Attorney—Hall, Pollock and Vande Sande

[54] DETERGENT FOAM GENERATOR
4 Claims, 3 Drawing Figs.
[52] U.S. Cl..... 222/190,
15/50, 261/30, 261/121
[51] Int. Cl..... A47I 13/00,
B67d 5/58
[50] Field of Search..... 221/251;
222/190; 261/30, 121; 15/50, 29

ABSTRACT: A detergent foam generator attachable to a floor cleaning appliance having at least one rotary brush and comprising a liquid reservoir casing, which may be made of plastics material, formed with a tubular portion in which is an electric motor driving a fan and having a cap forming an air-flow path containing a nonreturn valve to a pipe extending into the interior of the casing, and a foam outlet pipe leading from the top of the casing out to therebelow.



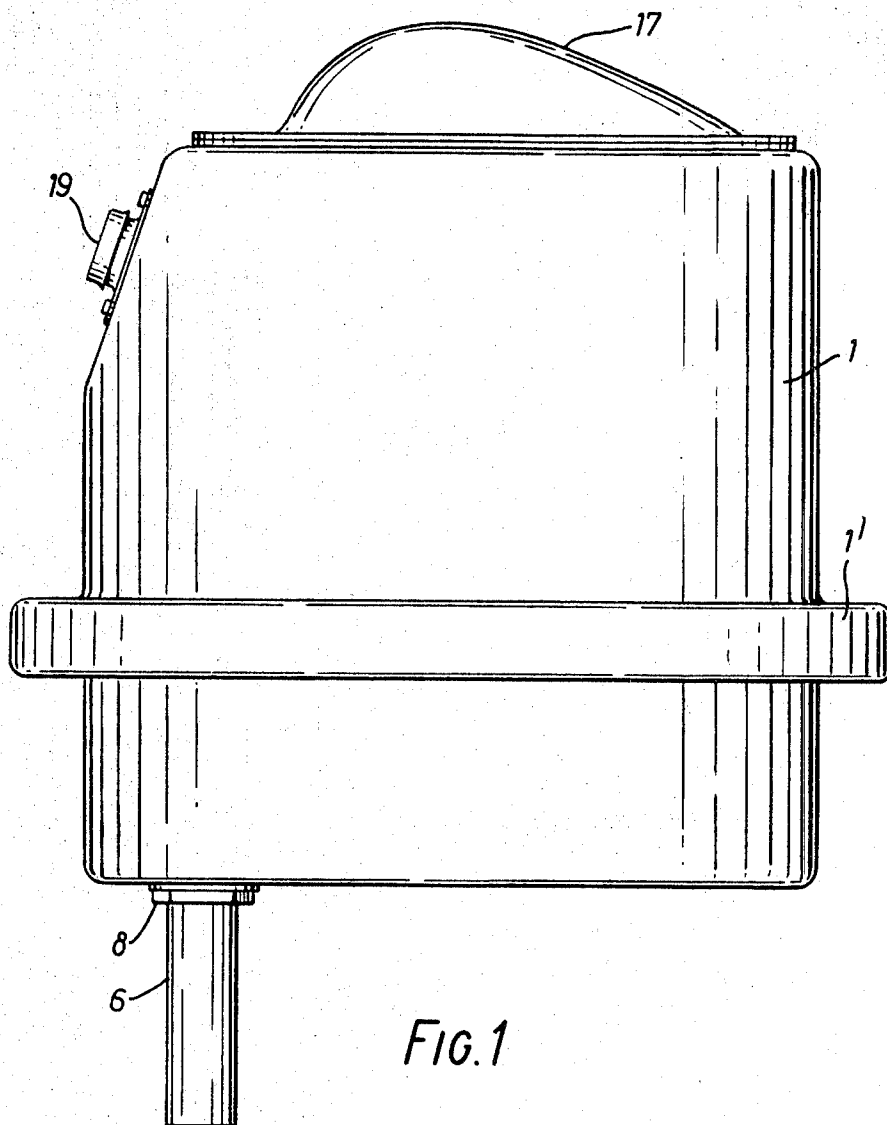


FIG. 1

Douglas Albert Hahn
Inventor

by Hall, Pollock & Vande Nard
Attorneys

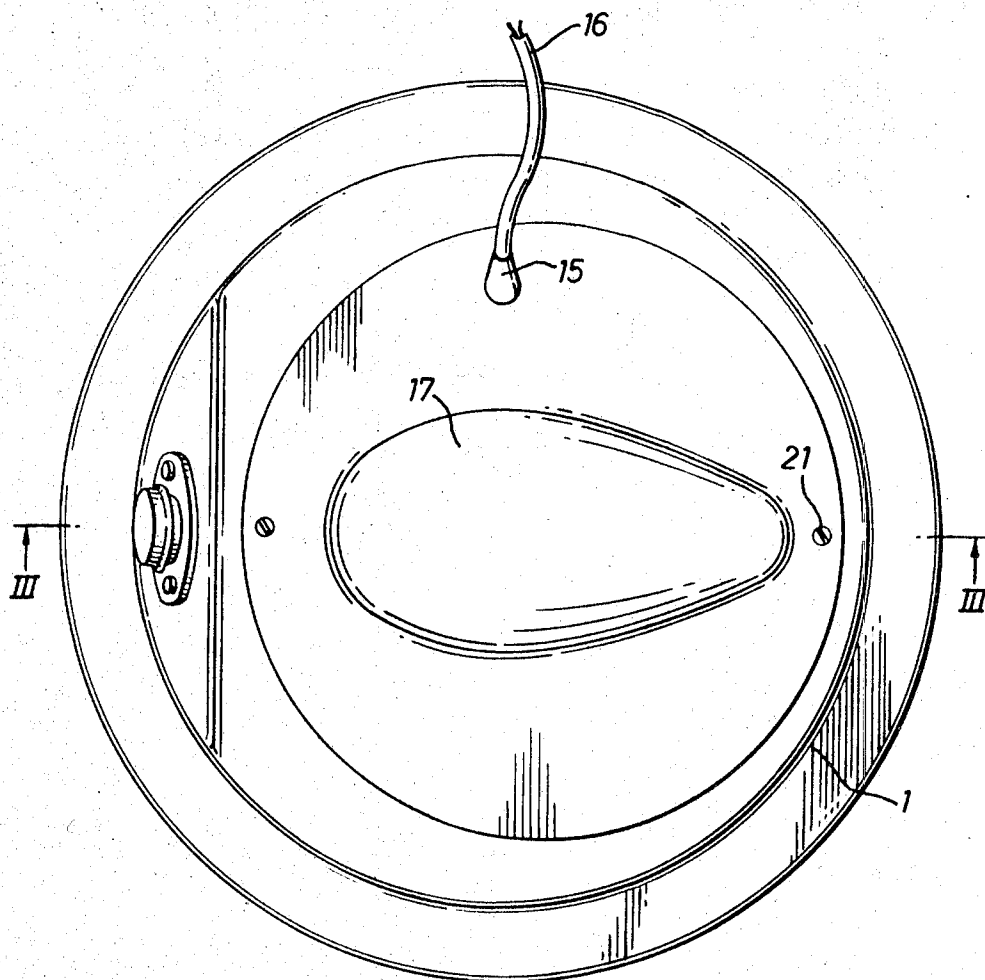


FIG. 2

Douglas Albert Hahn
Inventor

by Hall, Pollock & Vande Nande
Attorneys

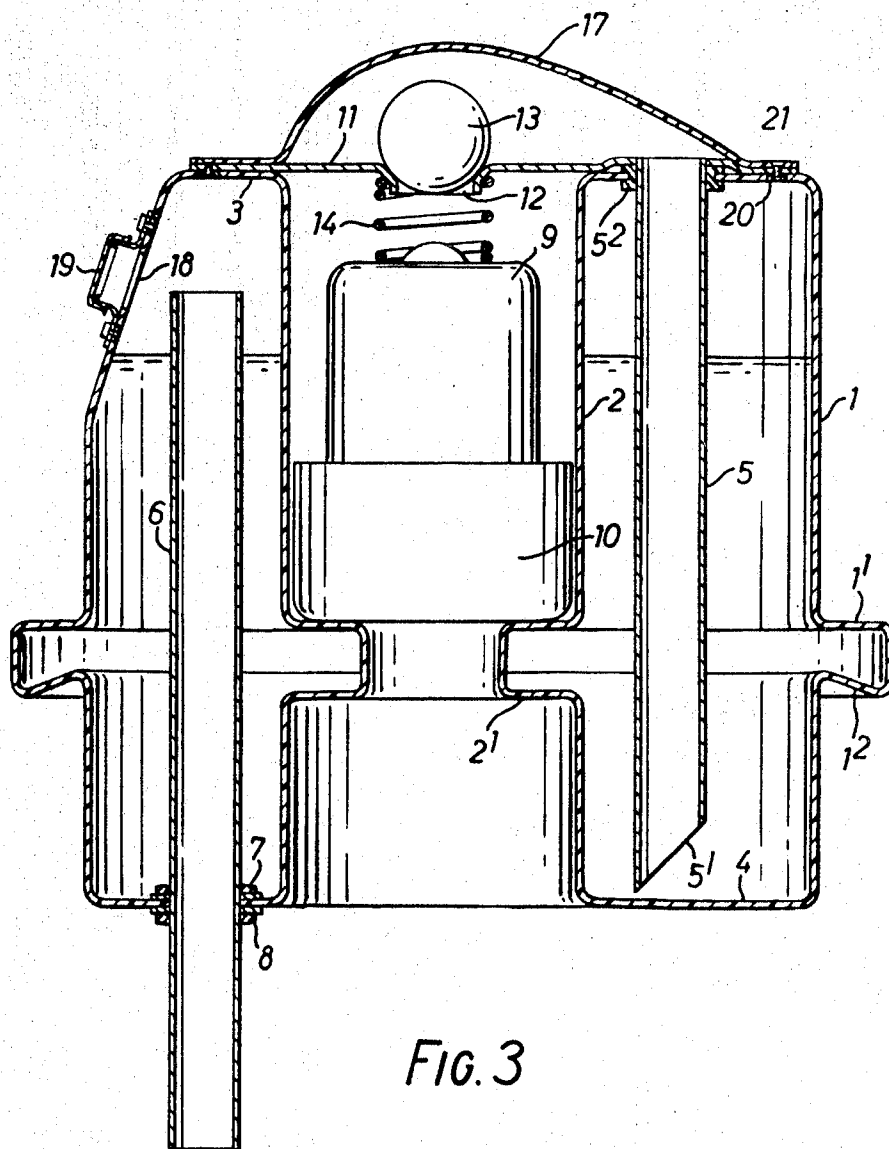


FIG. 3

Douglas Albert Hahn

Inventor

by Hall, Pollock & Vande Sande

Attorneys

DETERGENT FOAM GENERATOR

BACKGROUND TO THE INVENTION

There are on the market a number of floor cleaning appliances with rotary brushes the bristles of which work on the floor or floor covering and it is known to provide such appliances with means for generating a detergent foam, in the so called dry cleaning technique, as by feeding the liquid detergent to the rotating brushes or to mechanical agitators or by blowing air through the liquid detergent.

The simplest way of foaming a detergent liquid is to blow air through it, but the application of this method to floor cleaning appliances has hitherto required complex apparatus with the air supply obtained from the motor of the appliance, the use of a float valve to control the level of the liquid detergent, and the use of nonreturn valves to protect the necessary pump and driving motor from the generated foam.

This invention relates to detergent foam generators for converting liquid detergent into foam as cleaning material for carpets, floors and floor coverings and has for its object to provide a detergent foam generator unit for connection to existing floor cleaning appliances having at least one rotary brush for use when foam is required to be applied to a floor.

To this end according to the present invention a detergent foam generator unit for attachment to a floor cleaning appliance comprises a liquid reservoir casing with an open ended tubular portion extending therethrough and having an inwardly extending peripheral constriction therein, a unit comprising an electric motor driving a fan in a cylindrical housing disposed in said tubular portion with its fan housing seated on the constriction therein, a top plate with an aperture therein normally closed by a ball or the equivalent and locating a spring pressing on the motor unit, a cap for confining the movement of the ball and forming an airflow path to a pipe extending through the top of the reservoir casing to near the bottom thereof, a foam discharge pipe extending through the bottom of the reservoir casing to near the top thereof, and a filling aperture with closure means provided at an upper part of the reservoir casing external wall.

Preferably the casing forming the liquid reservoir is moulded in plastics material.

The constriction in the open end tubular portion of the casing may be an integral inwardly directed flange but it is preferred to form such constriction by deformation of the wall forming such tubular portion.

The external wall of the reservoir casing may also be formed with an outwardly directed flange or projecting wall deformation of uniform or varying extent of projection to stiffen such external wall as well as provide a convenient finger grip for transporting the unit and holding it when attaching it to and removing it from a floor cleaning appliance.

The foam generator unit may be provided with means for attaching it to the floor cleaner appliance or with means to be engaged by securing means provided on such appliance, and the shaping of the reservoir casing and in particular of the bottom thereof may be such as to adapt it to seat on the uppermost part of the floor cleaning appliance.

Current conducting leads to the electric motor extend through the top plate of the unit and are taken to a switch, either provided on the unit or mountable on the floor cleaning appliance, to switch on the electric motor when a generation of detergent foam is desired.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows the unit in elevation;
FIG. 2 is a plan view looking down on FIG. 1; and
FIG. 3 is a section taken on the line III-III of FIG. 2.

DESCRIPTION OF PREFERRED EMBODIMENT OF THE INVENTION

The foam generator unit, illustrated in the said drawings, comprises a liquid reservoir casing comprising an external wall 1 and an internal wall 2, forming an open end tubular portion,

spaced from such external wall 1 by a top end wall 3 and a bottom end wall 4; such external wall being either circular as shown or of other configuration and the tubular portion either symmetrically or eccentrically disposed relative thereto.

The wall 2 is formed with an inwardly directed peripheral constriction as an integral flange and as illustrated as a deformation 2' of such wall. The external wall 1 is preferably also provided with an external flange, as a stiffener and to provide a finger grip, and as shown formed as a deformation 1' of such wall 1. The deformation 1' may project outwardly to a uniform extent or to a varying extent around at least part of the extent of such wall 1, and the lower part 1² of such deformation may slope substantially as shown in the drawing (FIG. 3).

An airflow pipe 5 extends through the top wall 3, where it is held as by a rubber grommet 5², to extend to near the bottom wall 4. The lower end of such pipe 5 is conveniently cut at an angle, as shown at 5¹, when the longer length edge may abut the internal surface of the bottom end wall 4.

A foam discharge pipe 6 extends through the bottom end wall 4, to which it is conveniently secured by clamping nuts 7, 8 sandwiching the ambient portion of such wall between them, and extends to near the top end wall 3.

An air supply unit comprising an electric motor 9 driving a fan within a housing 10 is positioned in the tubular portion of the casing with its housing 10 seated on the constriction deformation 2'.

A top plate 11 has an aperture 12 therein with the ambient portion thereof shaped to form a seating for a ball 13 and to locate a coil spring 14 disposed between such plate 11 and the airflow unit to keep the latter in position with the fan casing 10 seated on the deformation 2'. The pipe 5 extends through another aperture in the plate 11, through which plate also extends the cover outlet 15 of electric leads 16 to the electric motor 9.

A cap 17 is disposed over the top plate 11 and attached to the top end wall 3 so also securing the plate 11 thereto, and so forms an airflow duct from the orifice 12 to the pipe 5 as well as confines the displacement of the ball 13, which forms a nonreturn valve, on it being unseated by the airflow generated by the fan on operation of the motor 9.

A filling orifice 18 is provided at an upper part in the external wall 1 and provided with a closure cap 19 to allow detergent liquid to be charged into the reservoir up to a convenient level such as that indicated in the drawing (FIG. 3).

The casing is preferably formed as a moulding in plastics material, conveniently in one piece by the spin moulding technique, and has moulded-in nuts 20 to be engaged by the securing screws 21 which fix the cap 17 and top plate 11 to the top end wall 3.

The foam generator unit is intended to be used with a floor cleaning appliance provided with at least one rotary brush and to be placed on the housing of the floor engaging part thereof, being provided either with means for attaching it thereto or with means engageable by attachment means provided on the appliance.

When required to generate foam from detergent liquid charged into the reservoir, the motor 9 is switched on to drive the fan in the casing 10 which draws air upwardly through the tubular portion of the casing and unseats the ball 13 for the airflow to pass down through the pipe 5 and out into the liquid to bubble up therethrough with the formation of foam above the liquid level which is carried down through the pipe 6 to fall therefrom onto the floor to be cleaned by the cleaning appliance to which the generator unit is fitted.

I claim:

1. A detergent foam generator including a liquid reservoir comprising a casing having an external wall and a tubular internal wall spaced from said external wall by top and bottom end walls, an inwardly directed peripheral constriction in said tubular internal wall, an airflow unit comprising an electric motor and a driven fan in a cylindrical housing seated on said peripheral constriction, a top plate with an aperture therein,

means for attaching said top plate to said top end wall, spring means between said top plate and said airflow unit, a displaceable ball to close said aperture in said plate, a pipe extending through said top plate and said top end wall to near said bottom end wall, cover means, means to connect said cover means to said top plate to confine displacement of said ball and to form an airflow path to said pipe, a discharge pipe extending through said bottom end wall to near said top end wall, and a closable filling orifice in said external wall.

2. A detergent foam generator as claimed in claim 1, in

which said liquid reservoir casing is a moulding in plastics material.

3. A detergent foam generator as claimed in claim 2, in which said peripheral constriction is formed by deformation of said tubular internal wall.

4. A detergent foam generator as claimed in claim 2, in which said external wall is deformed to provide an outwardly projecting rib.

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