Feb. 13, 1962 D. C. GERBER 3,020,576

SUCTION WASHING APPLIANCE

Filed July 11, 1960 2 Sheets-Sheet 1

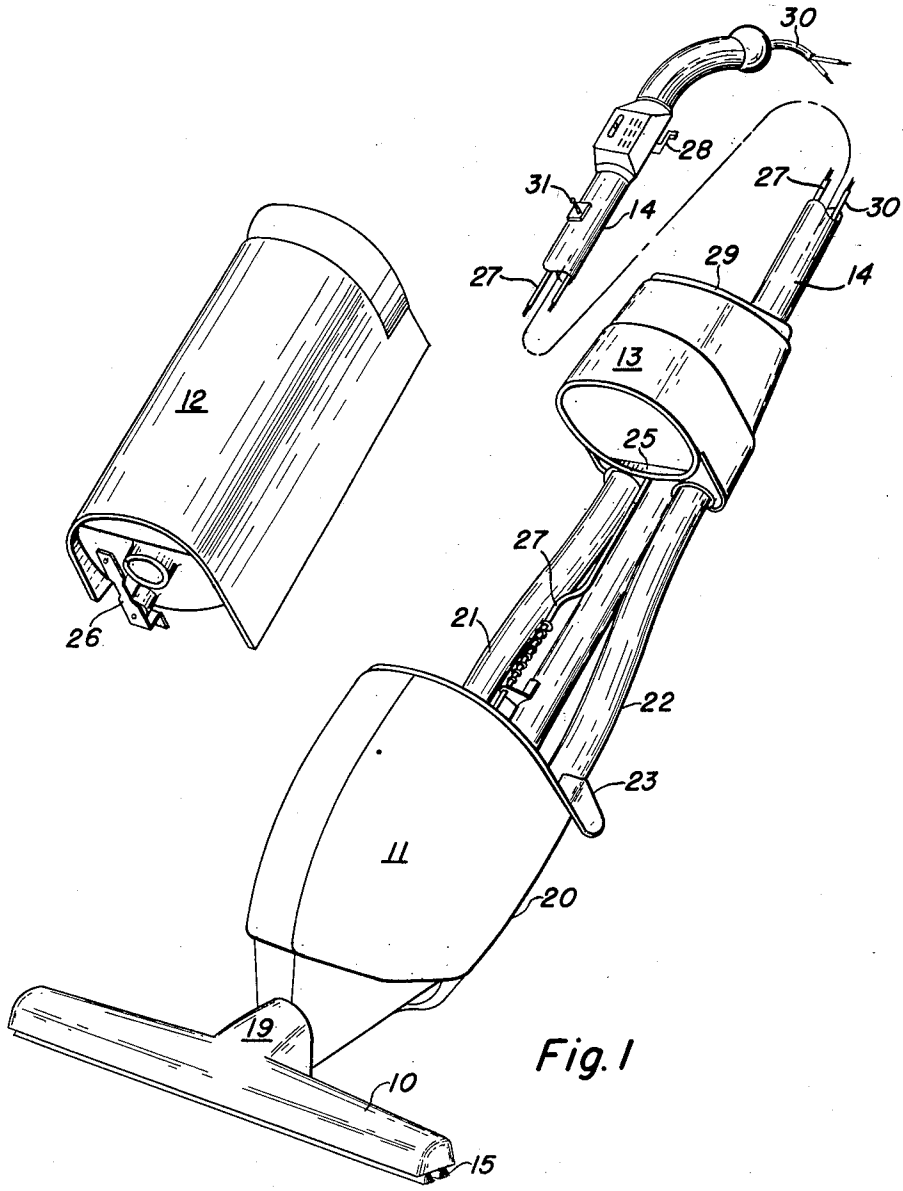


Fig. 1

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SUCTION WASHING APPLIANCE

Filed July 11, 1960 2 Sheets-Sheet 2

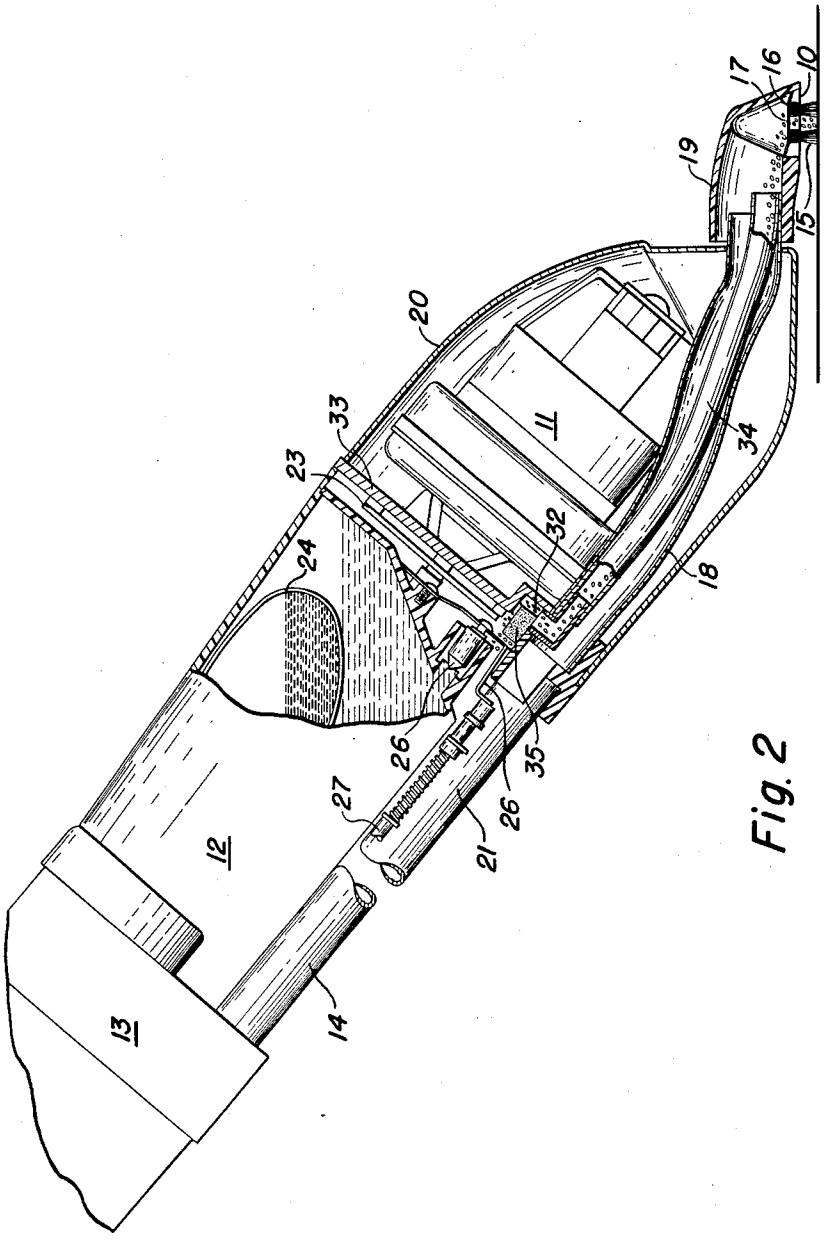


Fig. 2

United States Patent Office 3,020,576 Patented Feb. 13, 1962

3,020,576

SUCTION WASHING APPLIANCE

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Filed July 11, 1960, Ser. No. 41,890
6 Claims. (Cl. 15—320)

The present invention relates to a suction cleaning appliance and more particularly to means for inhibiting or suppressing the formation of suds or foam in a unitary floor washer having all of the necessary adjuncts for dispensing a clean detergent onto an area to be washed, for scrubbing the detergent over the area to dissolve and loosen dirt and grime thereon and then to dry the area by removing the dirty detergent solution by means of a suction air stream.

The present invention relates to the same general type of appliance disclosed in a copending application by Don C. Krammes, Serial No. 821,454, filed June 19, 1959, now Patent No. 2,993,223, dated July 25, 1961.

In the foregoing application a water soluble antifoamant cake containing an active antifoaming agent is positioned in the suction air stream of a suction floor washing appliance to suppress foam after it has formed or to inhibit its formation in the suction air stream.

According to the present invention the antifoamant is applied to the detergent solution as it is dispensed so that the suds and foam are never formed.

The floor washing appliance to which the present invention is applied includes a suction nozzle having means for scrubbing the floor, a detergent solution tank for dispensing a detergent solution onto the floor prior to the scrubbing operation, a motor-fan unit for creating a suction and a suction air system for connecting the suction side of the motor-fan unit to the nozzle for picking up the dirty detergent after the scrubbing operation.

During the scrubbing operation suds and foam are sometimes formed, which when drawn into the suction system, interfere with the proper operation of the appliance.

According to the present invention the antifoamant is applied to the detergent solution as it is dispensed onto the floor so that the suds and foam are never formed.

Other objects and advantages of the present invention will become apparent as the description proceeds when taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of the appliance to which the present invention is applied with the detergent tank removed; and

FIG. 2 is a side of the appliance of FIG. 1, partly in section, to show how the present invention is applied.

Referring to FIG. 1 of the drawings, the washing appliance to which the present invention is applied includes a combined scrubbing and water pick-up nozzle **10**, a motor-fan unit **11**, a combined clean and dirty detergent tank **12**, a liquid separator **13** and a propelling handle **14**.

The nozzle **10** includes two rows of spaced apart bristles **15** which are secured to a bottom plate **16** (FIG. 2) having a narrow suction slit **17**.

The extension **19** (FIG. 2) of nozzle **10** is detachably connected to the suction tube **18** by a well known bayonet connection in which the nozzle **10** may be removed by rotating it 180° and moving it axially of the tube **18**.

The suction tube **18** extends through the split motor housing **20** and at its upper end is connected to the lower end of wet suction tube **21**. The manner in which that is done and the manner by which the suction circuit, including the separator **13**, is connected to the suction side

of the motor-fan unit **11** is more clearly shown in a copending application by Don C. Krammes, Serial No. 754,093, filed August 8, 1958.

The tube **21** communicates with the upper left hand side of the separator **13** and the dry suction tube **22** connects the upper right hand side of the separator **13** to the suction side of the motor-fan unit **11**, all as shown by the aforementioned copending application by Don C. Krammes, Serial No. 754,093. The interior construction of the separator **13** is also shown by that application.

The tank **12** is clamped between the upper end of the motor-fan unit **11** and the lower end of the separator **13** by means of a clamp **23** which need not be described in detail herein.

The tank **12** forms a reservoir for the clean detergent solution and also a reservoir for the dirty detergent as it is collected. A flexible bag **24** (FIG. 2) is removably mounted on the top interior of tank **12** and, when empty, floats on top of the clean detergent. When the tank **12** is in place, the bag **24** receives dirty water from the separator **13** through an opening **25**.

As the clean detergent is dispensed and the dirty water collected, the bottom end of the flexible bag **24** moves downwardly as the level of the clean detergent is lowered so that the dirty detergent, as it is collected, occupies the space in tank **12** formerly occupied by the clean detergent. The arrangement is disclosed in a copending application by Don C. Krammes, Serial No. 652,565, filed April 12, 1957.

The bottom of the tank **12** is provided with a valved opening normally closed by a spring closed valve **26** having an extension adapted to be contacted by a control rod **27** actuated by a control lever **28** at the top of the handle **14**. The lid **29** for the separator **13** is pivoted thereto at its rear end and is opened and closed by control lever **28**. The manner by which the control lever **28** operates to open valve **26** and to open and close lid **29** is more fully disclosed in a copending application by Don C. Krammes, Serial No. 753,900, filed August 8, 1958, now Patent No. 2,986,764, dated June 6, 1961.

The machine is supplied with electric current by an electric cord **30** connected to the switch **31** and to the motor-fan unit **11** in any well known manner.

The handle **14** houses the upper end of the control rod **27** and the electric cord **30**, and extends downwardly through a bore in the rear of the separator **13** to form a support for that vessel. At its lower end the handle **14** is rigidly attached to the motor-fan unit **11** and in effect forms the supporting backbone for the entire appliance.

FIG. 2 shows the position of the appliance when in use. In that position a recess **32** formed in the dividing wall **33** is positioned to receive detergent solution from the tank **12** when the valve **26** is open. The detergent solution is then led from the recess **32** through a small tube **34** to the interior of the nozzle **10** from which it flows through slit **17** onto the floor. A cake or bar **35** of an antifoamant material is positioned in the recess **32** in a position to be contacted by the liquid detergent as it is dispensed onto the floor.

The antifoamant cake **35** is in a stable normally solid form and comprises an active antifoaming agent, preferably a liquid silicone dispersed in a water soluble carrier which may be a water soluble wax. The liquid silicone is emulsifiable in water in the presence of an emulsifying agent which may be the soap in the detergent solution.

Various formulations which may be used for the cake are disclosed in a copending application, Serial No. 23,237, filed April 19, 1960.

Operation

The motor-fan unit **11** is energized by actuation of the switch **31**. The control lever **28** is then actuated to open lid **29** and vent the suction line to atmosphere so that no suction will be applied to nozzle **10**, and to simultaneously open valve **26** to dispense detergent solution into the recess **32** where it will come into contact with the antifoamant cake **35**.

As the liquid detergent comes into contact with the cake **35** the soluble wax carrier will slowly dissolve and release the active defoamant silicone into the detergent stream. That will form an emulsion of the defoamant and detergent which will flow through tube **34** onto the floor and prevent the formation of suds and foam as the appliance is moved back and forth to scrub the floor.

During the washing operation the lever **28** is intermittently actuated to open and close the valve **26** while the lid **29** remains open to prevent the suction from being applied to the nozzle **10**.

After an area of the floor is thoroughly scrubbed the lever **28** is actuated to close the lid **29** so that suction is applied at the nozzle **10** with the result that the dirty water will be sucked up between the rows **15** of bristles and through the slit **17** into the nozzle proper.

After leaving the nozzle **10**, the mixture of air, dirt, water, soap and emulsified defoamant passes through the suction tubes **18** and **21** and enters the separator **13**. In the separator **13** the water, soap, etc. will be separated from the air stream which will pass on to the suction side of the motor-fan unit **11** and be discharged to atmosphere.

The dirty water etc. will flow through opening **25** into the bag **24**. Should the suction air stream contain foam or suds as it enters the separator **13** it would soon render the separator inoperative and at least a portion of the dirty water, etc. would be carried over to the motor-fan unit **11** and eventually flow back to the floor.

That is effectively prevented by the defoamant in the detergent solution as it is dispensed and no suds or foam will be formed during the scrubbing operation or in the suction air stream leading to the separator **13** during the water pick-up operation.

While I have shown and described but a single embodiment of my invention it is to be understood that that embodiment is to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the particular structure shown and described but wish to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. A floor washing appliance comprising, a suction nozzle, suction creating means, a fluid flow system connecting the suction side of said suction creating means to said nozzle, a liquid detergent dispensing tank carried by said appliance above said nozzle, a liquid flow line leading from said tank into a position to discharge liquid detergent onto the floor and means in said liquid flow line for releasing an antifoamant into contact with the detergent as it is dispensed to prevent the formation of suds and foam and its entry into said fluid flow system.

2. An appliance according to claim 1 in which said liquid flow line leads to said nozzle so as to discharge liquid detergent therethrough.

3. An appliance according to claim 1 in which said means is in the form of a slowly soluble body having an active antifoaming agent dispersed therein.

4. An appliance according to claim 2 including means for venting said fluid flow system to atmosphere during detergent dispensing operations.

5. A floor washing appliance comprising, a suction liquid pick-up nozzle, a motor-fan unit, a fluid flow system including a separator connecting said nozzle to the suction inlet of said motor-fan unit, said separator being carried by said appliance above said motor-fan unit so as to form a space between them, a liquid detergent dispensing tank mounted in the space between said separator and said motor-fan unit, valve means formed in the lower end of said tank, means forming a pocket below said tank and positioned to receive liquid detergent dispensed by said valve means, a liquid flow line leading from said pocket to said nozzle and a body of antifoamant material positioned in said pocket.

6. An appliance according to claim 5 in which said body is in the form of a liquid soluble carrier having an active antifoaming agent dispersed therein.

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