

[54] **SUCTION CLEANING APPARATUS**

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3,552,100 1/1971 Ekenberg15/353 X

FOREIGN PATENTS OR APPLICATIONS

10,485	1/1903	Austria.....	137/404
1,123,052	8/1968	Great Britain.....	15/320
892,658	3/1962	Great Britain.....	15/322

[30] **Foreign Application Priority Data**

March 25, 1970 Great Britain.....14,367/70

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[58] Field of Search.....15/302, 319-322,
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[57] **ABSTRACT**

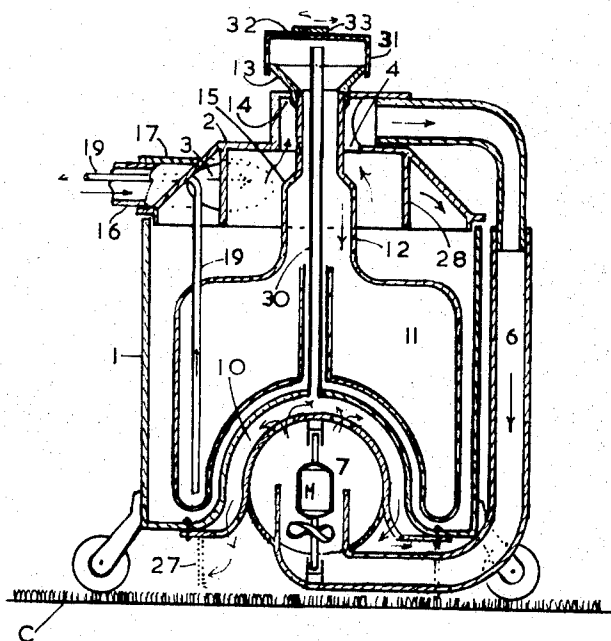
This invention relates to suction washing apparatus and has for its object to wash by suction the pile of carpets, surface of floor coverings, upholstery and other fabrics, and floor, windows and wall and even ceiling which in use is arranged to supply cleaning liquid to the surface to be cleaned and to remove same by suction means.

[56] **References Cited**

UNITED STATES PATENTS

2,549,181 4/1951 Durham.....15/321 X

1 Claim, 4 Drawing Figures



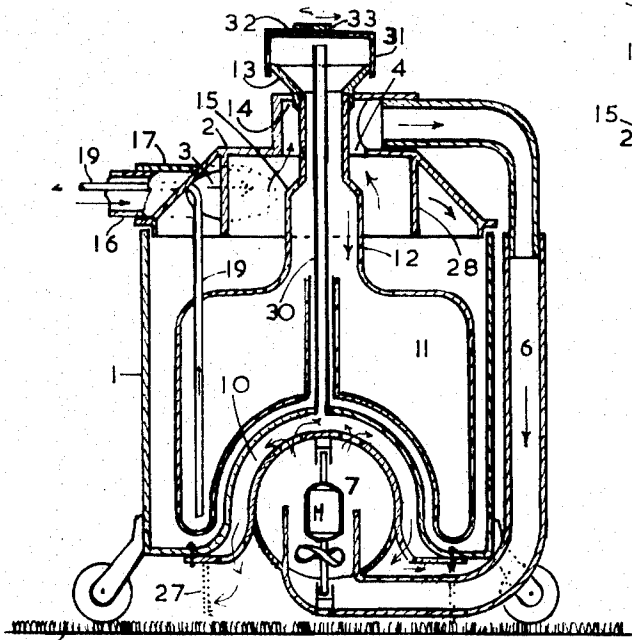


FIG. 1.

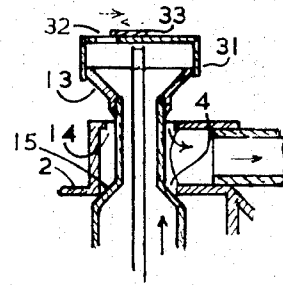


FIG. 2.

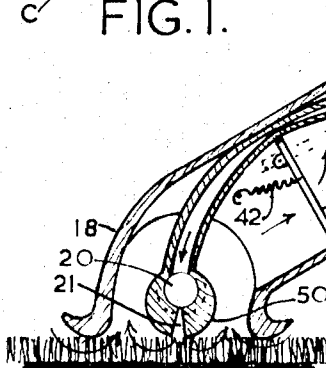


FIG. 3.

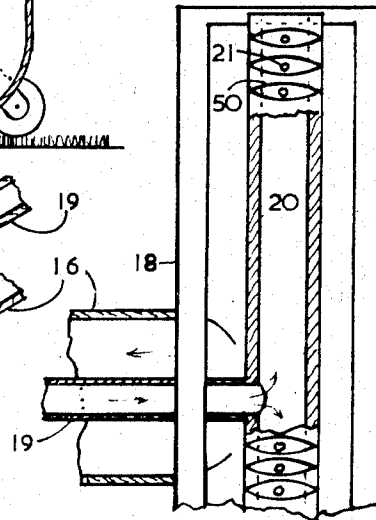


FIG. 4.

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SUCTION CLEANING APPARATUS

This invention is an improvement or modification of the suction cleaning device of my U.S. Pat. No. 3,616,482 in which a container is provided with a first suction tube connected with a cleaning nozzle and a second suction tube for connection with a source of suction.

In the said container is provided a liquid supply reservoir for clean cleaning solution.

A liquid supply tube is provided which is housed within the first suction tube, one end connected with a cross-tube housed in the nozzle, and the other end whereof communicates with said reservoir.

The said container is arranged so as to function in use as a separator for removing and collecting used liquid from the air passing through the container from the cleaning nozzle, the arrangement being such that the feed of liquid to the nozzle is effected automatically by reason of the vacuous conditions obtaining within the nozzle, which such liquid is continuously returned to and collected by the separator.

The object of the present invention is to provide a suction washing apparatus as herein defined in which flow of liquid to the nozzle is simply and effectively prevented when the liquid level in the container rises too high.

According to the present invention, the liquid supply reservoir in the container is adapted in use to act as a float valve and the inlet to the reservoir is disposed externally of the container.

Also according to the present invention, the source of suction is mounted in a recess of the container so as to lower the center of gravity of the apparatus and to silence the motor.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a sectional view in elevation of a suction washing apparatus according to the present invention.

FIG. 2 is the upper part of FIG. 1, when the reservoir is empty.

FIG. 3 is a longitudinal section of a suction nozzle used in the present invention.

FIG. 4 is an underneath view of the nozzle of FIG. 3.

Referring now to FIGS. 1 to 4, the suction washing apparatus comprises a wheeled container 1 of circular cross-section having a removable top 2, a tangential part 3 and a port 4 in the top 2, the source of suction in a chamber 7 and a nozzle 18.

The port 4 opens into a suction tube 6 connecting the port 4 with a chamber 7 in which is the source of suction, mounted in a recess 10 in the base of the container 1 so as to lower the center of gravity of the apparatus.

A rigid liquid reservoir 11 is mounted centrally within the container 1 and is provided with an elongated neck 12 which passes upwardly through the port 4 and through the housing 2.

The neck 12 opens out in the manner of a funnel 13 externally of the container 1 and serves to enable the reservoir to be charged with liquid. It will be apparent from the FIG. 1 that the reservoir is suspended from the housing by the funnel 13 which in the lowered position shown in FIG. 1 seals an aperture 14 in the housing 2. In a raised position FIG. 2 of the reservoir 11 the funnel 13 is lifted out of sealing engagement with the aperture

14 and an external shoulder 15 on the neck 12 internally of the container is moved into sealing engagement with the cover 2 around the underside of the port 4. To hold the reservoir 11 in the center of container 1, the tube 30 is provided which also communicates one end with a recess 10 where is pressured air, and the other end whereof communicates with the top of the neck of the reservoir 11 to regulate the pressure in the reservoir 11. The cover of the funnel, a cap 31, is provided having an opening 32 therein. A plate 33 is pivoted to the top of the cap 31 to close the opening if required.

The cover 2 provided with an inner circular flange 28 concentric with the aperture 4 prevents a carry over of liquid into tube 6.

In operation air from the recess 10 is exhausted through the flexible, sound deadening skirt 27 which extends downwardly under the container 1 towards carpet C, or as an alternative, the skirt 27 may be replaced by an air permeable bag.

A flexible suction tube 16 is mounted with one end in a union 17 leading to the port 3 and with the other end connected to a suction nozzle 18. A tube 19 passes from the reservoir 11, through the port 3, inside the tube 16 to the cross-tube 20 which is housed within the nozzle 18. The cross-tube 20 has a series of tooth-like projections 50 each having a discharge aperture 21 constructed to diverge conically to assist in preventing clogging of the apertures.

Referring to FIG. 3, a cut-off valve is provided in tube 16, to prevent liquid passing through a tube 19, when the suction source is out of action. The valve comprises a plate 40 which is loaded by spring 42 into a position in which it substantially blocks the tube 19. In use when air passes through it urges the plate 40 to accept the position shown in the dotted line allowing the liquid to pass through.

The suction washing apparatus operates as follows: the reservoir 11 is suspended from housing 2, filled with cleaning solution closes the aperture (port) 14. The suction source 7 induces vacuous condition by tube 6 through port 4 in container 1 and through port 3 and flexible tube 16 on the end of which is nozzle 18. The air of sub-atmospheric pressure entering the nozzle 18 which is in contact with the surface to be cleaned, passing through the tube 16, urges the plate 40 to position 41, allowing liquid to pass through from a reservoir 11 by tube 19 to cross-tube 20, and then as a result of the sub-atmospheric pressure existing within the nozzle causes the liquid to be drawn in a controlled manner through, as for example, a pile of carpet, from apertures 21, to the container 1 where the liquid is separated from the air which, without liquid, passes through port 4 to the suction source 7. Reservoir 11 being housed in the container 1, prevents the used and soiled liquid from adopting the form of a cone, the top of which would enter the port 4 and subsequently the source of suction in chamber 7.

When all the cleaning solution is removed from reservoir 11, then the reservoir 11 becomes empty and as a result, soiled liquid in the container 1 lifts up the reservoir 11, blocking port 4 by shoulder 15 of the neck 12, allowing the air to pass through from outside by port 14 to the suction source in order to cool the motor.

As a result of the vacuous condition no longer existing in this container, cover 2 is lifted up by the reservoir from the container 1.

To renew the operation, soiled liquid from the container 1 has to be removed, the reservoir 11 refilled, and then the operation can be resumed.

I claim

1. A suction cleaning device comprising; a cleaning nozzle, a first suction tube attached to said nozzle, a liquid supply tube, one end whereof opens into said nozzle and the other end whereof communicates with a liquid supply reservoir, a container attached to said first suction tube, a second suction tube for connecting said container with a source of suction housed in a recess at the base of said container, said container being arranged so as to function in use as a separator removing and collecting used liquid from air passing through said container from the cleaning nozzle, a cover for said container having a tangential inlet union in the side thereof for detachable connection with said first suction tube, and an inlet port for connecting said container with said suction tube; said liquid supply reservoir being located within said container and

suspended from said cover by an elongated neck passing through a central aperture in said cover adapted to provide communication between the atmosphere and said second suction tube, said elongated neck being normally adapted to seal said central aperture, but arranged to unseal said aperture and close the inlet port connecting the container with the second suction tube when the liquid supply reservoir is raised; a tube passing through an aperture in the reservoir opening upwardly into an upper portion of the liquid supply reservoir, one end of said tube communicating with the recess housing the source of suction at the pressure end thereof; the other end communicating with the top of the elongated neck, whereby the liquid supply reservoir is pressurized, the liquid supply reservoir, in operation of the device, being emptied of liquid and the container filled with soiled liquid, whereby the liquid supply reservoir is raised when a predetermined level of liquid in the container is reached, thus causing closure of the inlet port to the second suction tube, so that vacuous conditions are no longer obtained at the nozzle.

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