

Jan. 5, 1971

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3,552,100

VACUUM CLEANER

Filed Sept. 17, 1968

3 Sheets-Sheet 1

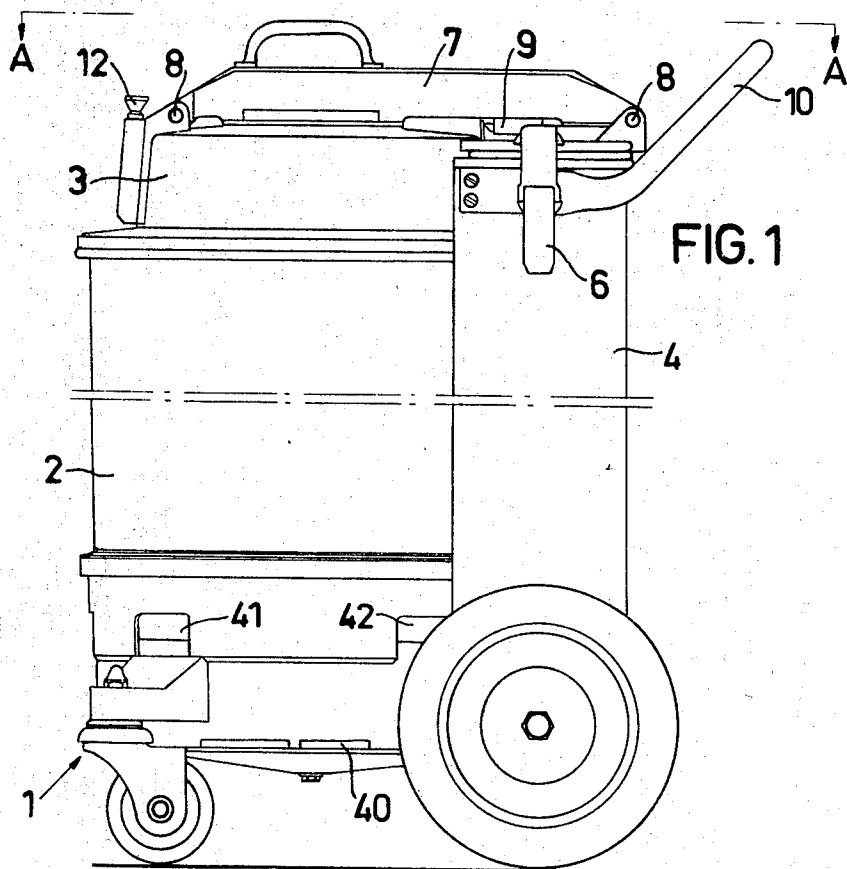


FIG. 1

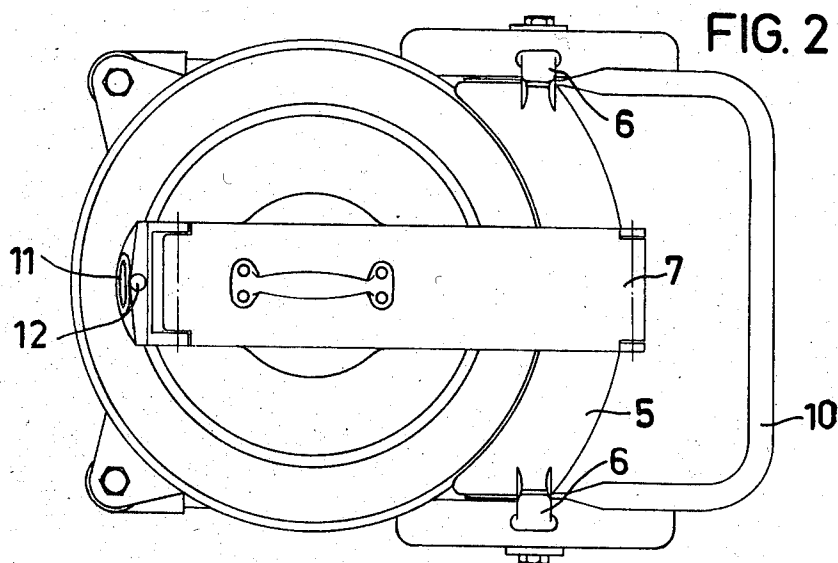


FIG. 2

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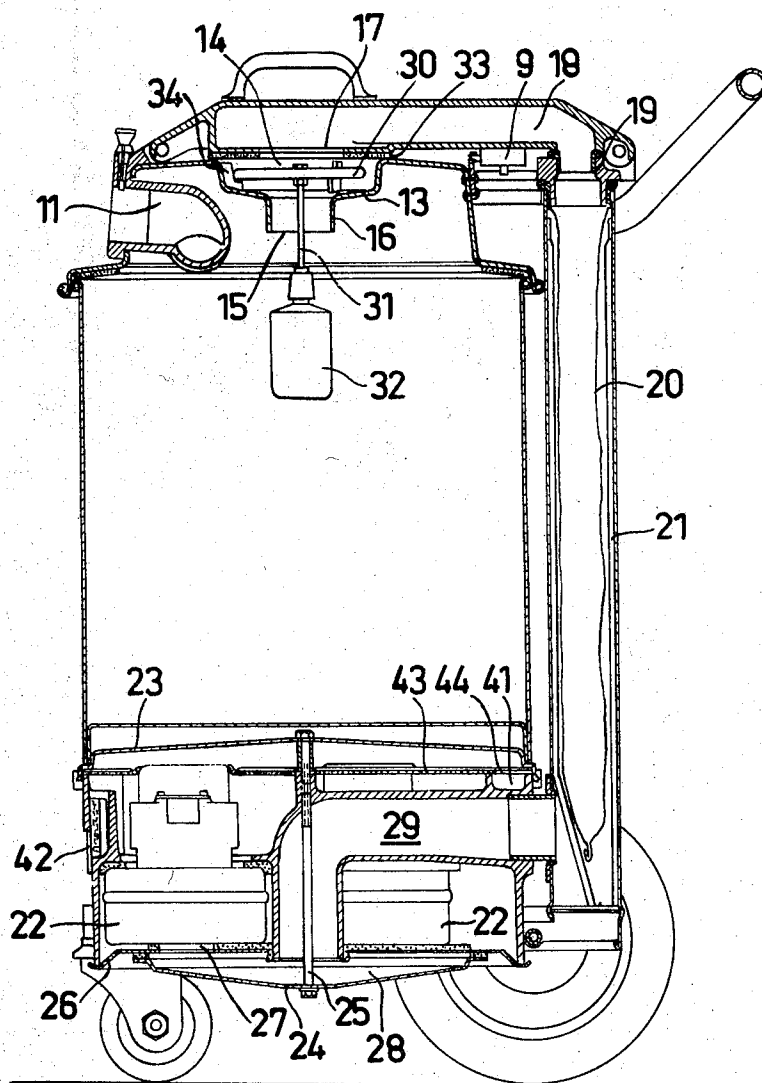
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Filed Sept. 17, 1968

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FIG. 3



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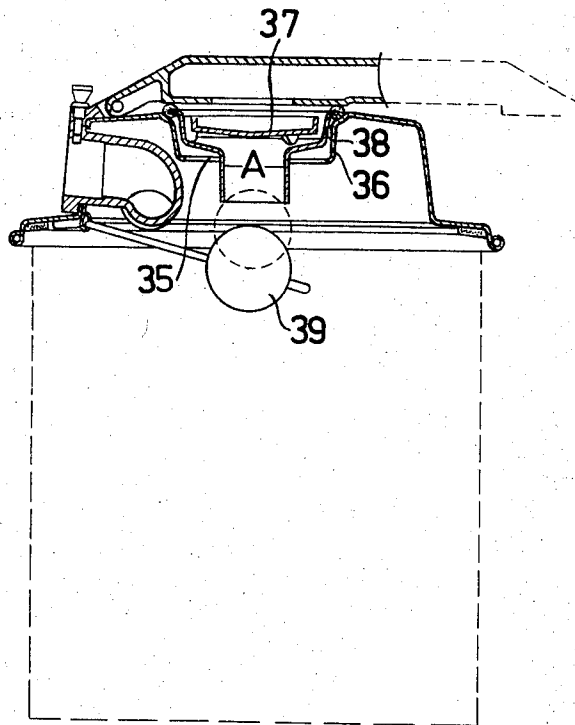
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Filed Sept. 17, 1968

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FIG. 4



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## VACUUM CLEANER

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Filed Sept. 17, 1968, Ser. No. 760,293

Claims priority, application Sweden, Sept. 18, 1967,

12,813/67

Int. Cl. B01d 50/00

U.S. Cl. 55—337

2 Claims

### ABSTRACT OF THE DISCLOSURE

A water and/or vacuum cleaner which includes a detachable upright collecting tank for water and larger particles provided with a cyclone effect for separation of the water and the larger particles in the collecting tank and a dust filter located in the direction of flow before the motor unit for the cleaner.

Vacuum cleaners of this type are previously known. It is also known to equip such vacuum cleaners with supplementary means, so that they can be used for drawing in water, but not before the usual dust filter has been replaced by a float valve means which shuts off the air flow to the motors when the water level in the collecting tank has reached a certain position. In this state, the vacuum cleaners are not adapted for sucking dust, due to the absence of any dust filter. For this reason, the known vacuum cleaners cannot be used for drawing in dust and water at the same time. This has meant that by unawareness or carelessness, one has easily omitted the exchange the dust filter at the drawing in of water, and vice versa, which in the one case has resulted in a rapid clogging of the dust filter, which had to be replaced, and in the other case in damaging of the motors by the dust, which unavoidably had been drawn into them.

A further disadvantage of the known vacuum cleaners of this type is that they are very heavy to handle, because the motors are placed in the cover for the collecting tank, and which cover has to be lifted off every time the tank is to be emptied and the vacuum cleaner adapted to the drawing of water, and vice versa.

### SUMMARY OF THE INVENTION

By the present invention a water and/or vacuum cleaner has been obtained which, without adjustment, can be used for drawing in water and dust, in which the aforesaid disadvantages are eliminated and which, besides, is very easy to operate. The water and/or vacuum cleaner according to the invention is substantially characterized in that the motor unit is located in the lower portion in a preferably mobile chassis, on which the collecting tank is placed and retained in place by a cover, from which extends a duct, which, via a duct mounted along the tank, directs the air flow from the tank interior to the suction side of the motor unit. By mounting the motor unit downwardly in the chassis, the cover can be of very light weight, which considerably facilitates the emptying of the collecting tank of the cleaner. This cover also can be made upwardly foldable.

Additional objects and advantages of the invention will become more fully apparent to persons skilled in the art from the ensuing detailed specification and annexed drawings and in which drawings:

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in side elevation of the invention,

FIG. 2 is a plan view,

FIG. 3 is a view partly in elevation and partly in cross-section of the cleaner illustrated in FIG. 1, and

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FIG. 4 is a fragmentary view partly in elevation and partly in cross-section of a valve arrangement modified in relation to the float actuated valve means illustrated in FIG. 3.

### DETAILED DESCRIPTION OF THE INVENTION

The water and/or vacuum cleaner comprises a chassis 1, which, in the embodiment shown, is provided with wheels, a collecting tank 2 placed in the chassis, the tank being closed and retained in place by an upwardly foldable cover 3, and a filter container 4 disposed to the side of the tank 2 and provided with a cover 5 adapted to be clamped by clasps 6. The two covers are connected with one another by an arm 7, which, at its ends, is pivotally mounted to the cover 5 and cover 3, respectively, by hinge links 8. The arm 7 further is provided with a locking member 9, which detachably connects the cover 3 with the arm 7 so that the cover 3 follows with the arm 7 when the arm 7 is being folded up about the link 8 mounted on the container lock 5. By assistance of the arm, the cover 5 also can be folded up, after the clasps 6 and the locking member 9 have been opened, so that the dust filter in the container 4 is accessible. The water and/or vacuum cleaner is further provided with a handle 10 fastened to the container 4.

The cover 3 carries inlet socket 11, which is provided with a hose lock 12 and in a known manner is directed in a downwardly inclined manner to the tank wall, so that the incoming air is given a rotary motion in the tank, in order by a cyclone effect to separate the larger particles following with the air and the water in the tank 2. The cover further includes a central sunk portion, which forms a seat 13 for a float actuated valve 14, and is provided with an opening 15 located centrally in the seat and facing toward the tank. This opening is surrounded by a cylindrical collar 16 extending to the tank. Directly in front of the opening is located an opening 17 in the lower surface of the arm and which leads to a duct 18 arranged in the arm, which duct via a connecting piece 19 placed in the cover 5 to the filter container 4 opens into the filter container 4. In the container, as already mentioned, is mounted a dust filter 20, which may be of a cloth suitable for this purpose and shaped like a bag. Into this bag may be inserted, for practical and hygienic purposes, a paper filter bag of the throw-away type. The inner walls of the filter container are covered with a network 21 of zigzag form for providing a gap between the filter bag and the container walls so that the entire filter area of the filter bag can be utilized.

The motor unit of the water and/or vacuum cleaner which may comprise several, preferably two to three electric fan motors 22, is, according to the invention, mounted downwardly in the chassis and encased. Upwardly to the tank the motor unit is covered by a disk 23 and downwardly by a disk 24, and the disks are retained in place by a bolt 25. The lower disk 24 abuts tightly to a circular plate 26 and clamps it against the chassis. The plate 26 is provided with holes 27 located directly in front of each motor 22, and the holes lead to space 28 formed by the disk 24 and plate 26, such space communicates through a duct 29 with the lower portion of the filter container. 40 designates exhaust openings of the motor unit, and 41 the inlets for the cooling air, which is given off at 42. The disk 43, which is clamped against the chassis by the disk 23, separates the inlets and outlets for the cooling air of the motors 22 by means of holes (not shown) provided for motor and by openings 44 provided in the inlet 41 of each cooling air duct.

The float actuated valve 14 shown in FIG. 3 is a valve disk 30 connected with a float 32 which depends into the tank. The float may also be suspended on the cover 3 in the same manner as the float valve 39 shown in FIG. 4,

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whereby the spindle 31 is actuated by the float to move the valve disk 30 into closed position. For rendering it possible that air under normal conditions can flow past the valve 14, the valve disk is placed on distance members 34 for the valve seat. The distance members 34 may also be placed on the valve 14. When the contents in the tank 2 have raised to actuate the float, the float 32 lifts the valve disk 30 until it abuts against a packing 33, and in this position the air ceases to flow to the motor unit. Hence, the water is prevented effectively from being drawn into the duct 17, and thereby to the filter and motors 22 disposed in the chassis.

Instead of the float actuated valve 14, the present cleaner can be provided with the valve arrangement shown in FIG. 4. In this embodiment, the cover 3 is provided with a centrally located relatively large opening 35 surrounded by a collar 36 extending to the interior of the tank and formed as a splash guard. The collar may preferably be formed in one piece with the cover and in such a way that a groove or the like is formed about the opening 35 in the transition zone between the cover and the collar for suspending a substantially funnel-shaped body 38 formed as a seat for a foam-sensitive valve 37. The through area A of the body below the valve seat is equal to or smaller than the through area of the valve 37 proper, depending on the weight of the foam-sensitive valve. At the lower edge of the cover 3, there is further pivotally mounted a float valve adapted to close the opening in the funnel-shaped body 38 when the contents in tank 2 have raised to a pre-determined level.

This invention is not restricted to the embodiment shown and described, but can be modified and changed in many different ways within the scope of the claims.

What is claimed is:

1. In a vacuum cleaner, a base member, an open-top tank supported by the base member, a suction fan unit supported by the base member, walls secured to the base member and defining a duct open at the top and being in communication with the suction fan unit, cover means for closing the top of the tank and the top of the duct, conduit means in the cover means connecting the tank to the duct, means defining a tangential inlet opening for admitting air carrying foreign matter and liquid into the tank for providing a heavy particle and liquid receptacle for receiving heavy particles of foreign matter and the liquid carried by the air entering the tank, means defining an outlet in said cover means and connecting the tank to the conduit means in the cover means, the outlet including

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a relatively large opening located centrally of the tank in the cover means, a cylindrical collar surrounding said opening, said collar being directed toward the interior of the tank and constituting a splash guard, the lower end of said collar being situated within the cover means, a substantially funnel-shaped body carried by and sealed to a portion of the cylindrical collar and said cover means and extending through the large opening of the outlet from the tank, a foam-sensitive valve member for opening and closing flow communication between the tank and the conduit of the cover means and seat means provided inside of said funnel-shaped body supporting said foam-sensitive valve member within said body so that air can pass through said funnel-shaped body past the foam-sensitive valve member and into said conduit means in the cover means, and the through area of said body below the valve seat being equal to or smaller than the through area between the valve member and the inside of the funnel-shaped body, and a float valve pivotally connected to the cover means to close the smaller opening of the funnel-shaped body when the contents in the tank reach a pre-determined level to prevent flow of liquid to the fan unit.

2. The vacuum cleaner as claimed in claim 1 in which a dust filter is supported in the duct connecting the conduit means of the cover means to the suction fan unit.

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U.S. Cl. X.R.

15—353; 55—378, 417, 458, 472; 210—304