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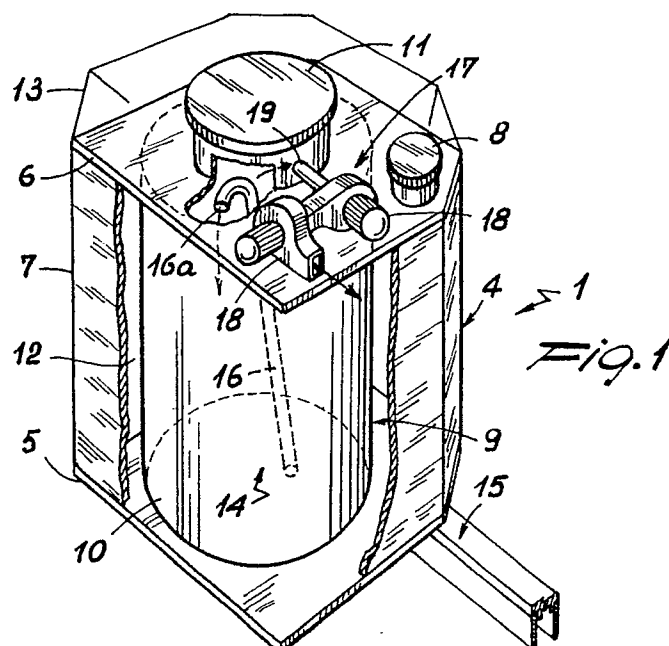
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(54) **Housing and collecting device of washing liquids for washing machines used for floorings and wide surfaces.**

(57) A housing and collecting device of washing liquids for washing machines used for floorings and wide surfaces including: a housing (4) for a washing liquid to be sprayed, a tank (9) for said washing liquid recovered from a flooring, and recovery means (14) for recovering said washing liquid from said flooring, including a suction device (17) suitable for

causing a depression into the same tank (9), said tank (9) and housing (4) being foreseen internal with one another, with said tank (9) inside said housing (4) and sealingly closed with respect to the housing for forming a hollow space (12) between one another housing the washing liquid to be sprayed.



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The invention refers to a housing and collecting device of washing liquids for washing machines used for floorings and wide surfaces.

As it is known, actually various machines for washing wide surfaces, e.g. in the inside or outside of industrial sheds, storehouses, service or cleaning and civil areas are present in the market.

These machines can be used not only for the washing and cleaning of said surfaces, but also for the garbage collection, and can have reduced or very wide dimensions with driving position for the operator.

In any case the washing operations include the necessity of wetting the surfaces with a washing liquid and then recovering the dispersed liquid for transferring it again into the machine inside.

Therefore it is necessary to have at disposal a housing for the washing liquid, that can be a particular washing solution or also simple water, a tank for the recovered dirty washing liquid, and recovery means for the washing liquid dispersed onto the treated surface.

Owing to the different functions, the housing and tank are completely separated with one another, even if they are foreseen contiguous in many cases. Practically this causes an increase of the overall dimensions of the same equipments.

The recovery means includes various elements. It is generally foreseen a flooring washing device developing transversally to the move direction of machines at the level of the treated surfaces and having a section in upset U-form in contact with ground. Starting from the flooring washing device it is developed a conveyor duct that is joined to the inside of the tank. The recovery means also includes a suction device that causes a depression in the tank and causes a suction effect that develops until the flooring washing device through the conveyor duct.

For making highly efficient the recovery means, it is necessary to create a great depression into the recovered washing liquid tank. This great depression cannot be easily got and above all the same depression causes great stresses onto the recovery tank: the walls of the same tank tend to be bent towards the tank inside each time the recovery means is driven and therefore they tend to be broken by fatigue stresses.

For avoiding this fatigue breackage it is necessary to make a tank with walls made of stainless steel of relevant thickness and high cost, and further the flexions of the walls cause a high noise.

The noise is caused also owing to the fall of the liquid recovered into the recovery tank, this fall occurring in an irregular manner, in wave form, and the liquid can also collide with the tank sheets.

Further it must be noticed that the tank can be submitted to external shocks, as these machines

must also move and extricate oneself among various obstacles, and a little crack in the tank is very dangerous as it annuls the suction effect caused by the recovery means and causes the dispersion of polluted liquid.

On the contrary the damages of the housing, that is not in depression and houses a clean liquid, cause a limited effect and can be repaired easily.

In this situation the technical aim of the present invention is to supply a housing and collecting device suitable for obviating substantially to the above mentioned drawbacks. The above mentioned technical aim is substantially achieved by a housing and collecting device of washing liquids for washing machines used for floorings and wide surfaces including:

- a housing for a washing liquid to be sprayed, a tank for said washing liquid recovered from said surfaces, and recovery means for said washing liquid including a pipe for transferring said washing liquid from said surfaces to said tank and a suction device suitable for causing a depression into said tank,
- characterized in that said tank and said housing are disposed substantially inside one another, with said tank being located inside said housing and air-tight closed with respect to the same housing,
- and in that said tank and said housing form between one another a hollow space housing said washing liquid to be sprayed,
- said conveyor duct being also inserted inside said housing and said suction device being suitable for causing an air flow passing also to the outside of said housing.

Now it is described a preferred fulfilment form of a device according to the invention, shown in the annexed drawings, in which:

Figure 1 shows in schematic perspective view the device according to the invention;

Figure 2 shows a simplified form of a washing machine including the device according to the invention; and

Figures 3 and 4 show respectively in front and plan view the device according to the invention mounted on the washing machine of Figure 2.

Making now reference to the mentioned figures, the device according to the invention is indicated by the reference number 1.

It is mounted into a washing machine 2, in which there is a chassis 3 supporting the device 1. In Figure 2 the machine 2 is of the type that can wash by front brushes and collect garbage by a central roller.

In detail the device 1 includes a housing 4 having in plan view a shape and overall dimensions similar to the ones of the chassis part 3 in which it is housed (Figure 4). At the base there is a base

wall 5 and on the top part there is a superior wall 6, both these walls being in a flat form and substantially horizontally located in work position. A lateral wall 7, bended for forming vertical edges, is included between the base wall 5 and superior wall 6. The housing 4 holds a clean washing liquid, in particular clean water, and its superior wall 6 includes a first cover 8, located in proximity of the lateral wall 7.

A tank 9 for the washing liquid, in particular dirty water recovered from the washed surfaces is hold in the housing 4 in a position spaced from the first cover 8.

The tank 9 has a cylindrical wall 10 that has a circular section developing between the superior wall 6 and the base wall 5 that form also the bases of the tank 9.

The superior wall 6 holds a second cover 11 that can be air-tight closed.

The whole tank 9 is sealingly closed with respect to the housing 4 and it is installed in a suitable manner for not touching the lateral wall 7 of the housing 4 in any point. In practice it is foreseen a hollow space 12 of various widths between the lateral wall 7 of the housing 4 and the cylindrical wall 10 of the tank 9.

The housing 4 and above all the tank 9 are made of plastic material and preferably of fiberglass reinforced plastics. Further there is a deadening cover 13 made of plastic material, preferably ABS, over the superior wall 6 and therefore over both covers 8 and 11.

Further the device 1 includes recovery means 14. This last means is developed from a flooring washing device 15 and includes a conveyor duct 16 and a suction device 17.

The flooring washing device 15, per se known, is formed from an element located at the level of the treated surfaces and developing transversally to the move direction of the machine 2.

Said element has a section in upset U-form formed from a superior metallic strip and from blades made of elastically flexible material in contact with the ground.

The conveyor duct 16 is developed from the flooring washing device 15 and is inserted into the housing 4 for going into the tank 9. This last tank includes a supply opening 16a substantially located at the level of the superior end of the same tank.

The suction device 17 is developed at the outside of the housing 4 in the superior wall 6 thereof.

This device is suitable for forming an air flow outgoing from the tank 9 and includes two suction pumps 18 installed in series with one another. The two suction pumps 18 are joined with the internal volume of the tank 9 by means of an outlet pipe 19.

The running of the device occurs as follows.

The washing liquid, even simple clean water, is accumulated into the housing 4 and therefrom it is slowly supplied towards the surface to be washed. The housing 4 and the clean water or other liquid hold therein surround the tank 9, insulating it from outside.

Using also the sprayed washing liquid, the brushes of the machine 1 can treat a surface to be washed. A film of dirty washing liquid remains on this surface after the washing, this film being required to be completely removed.

This action is carried out from the recovery means 14, that causes a great depression into the tank 9, and suckes the dirty washing liquid inside the tank 9 by means of the flooring washing device 15 and the conveyor duct 16.

The high depression is obtained by means of the two suction pumps 18 installed in series with one another, and the cylindrical wall 10 of the tank 9 withstands the stresses caused by the depression.

The invention achieves important advantages.

In fact the device is compact and has the minimum possible overall dimensions but supplying the required performances. Further it is supplied a very efficient and sure device. In fact the tank 9 is installed in a completely protected position and therefore it is not submitted to shocks, damages or cracks that can cause a loss of its capacity to be put in depression, and can cause a dispersion of the recovered dirty washing liquid onto the ground.

Further the tank 9 is acoustically insulated in a sufficient manner to reduce greatly the noise caused by the fall of the recovered washing liquid.

The lateral wall of the tank 9, owing to the fact that is surrounded by a hollow space 12 holding a liquid, and also owing to its cylindrical shape remains stable in its shape and the great flexions present in the preceding technics, that caused the fatigue breackage and great noises, are no more present.

Owing to said characteristics, the cylindrical wall 10 can be made of plastic material and therefore it is light and cheap.

The hollow space 12 is emptied from the liquid passing the time, as the same liquid is supplied to the outside, but this does neither reduce the acoustic insulation nor increases the flexions of tank 9. In fact the emptying of the hollow space 12 causes a corresponding filling of tank 9, and the filling of tank 9 causes a reduction of inflexion phenomena in a manner similar to the effect obtained when the liquid is located outside the tank.

The suction device 17 appears to be powerful and efficient, notwithstanding its simple structure. Its particularly efficient action is essential for estab-

lishing the cleaning level of treated surfaces, as the washing liquid laid onto ground is very dirty owing to the cleaning action made by brushes. Nevertheless a high suction may be dangerous for the integrity of the tank 9 and cause high noises, without using the above mentioned technical solution of providing the hollow space 12 for the washing liquid located around the tank 9.

Even the specific construction used for the housing 4 and the tank 9 is advantageous as it is very simple and suitable for avoiding the weakening of the tank 9: the bases of tank 9, having reduced dimensions and therefore subject to limited strain phenomena, are flat and form a part of same housing 4.

Claims

1. A housing and collecting device of washing liquids for washing machines used for floorings and wide surfaces, including:

- a housing (4) for a washing liquid to be sprayed, a tank (9) for said washing liquid recovered from said surfaces, and recovery means (14) for said washing liquid including a pipe (16) for transferring said washing liquid from said surfaces to said tank (9) and a suction device (17) suitable for causing a depression into said tank (9),
- characterized in that said tank (9) and said housing (4) are disposed substantially inside one another, with said tank (9) being located in the inside of said housing (4) and air-tight closed with respect to the same housing,
- and in that said tank (9) and said housing (4) form between one another a hollow space (12) housing said washing liquid to be sprayed,
- said conveyor duct (16) being also inserted inside said housing (4) and said suction device (17) forming an air flow passing also towards the outside of said housing (4).

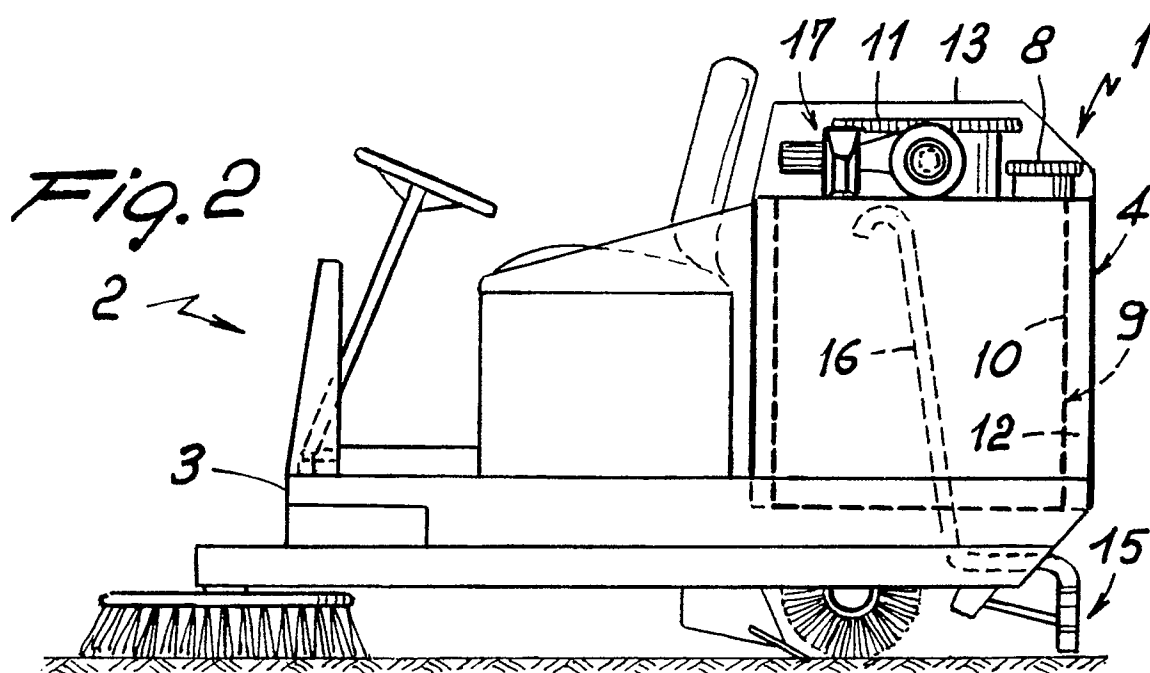
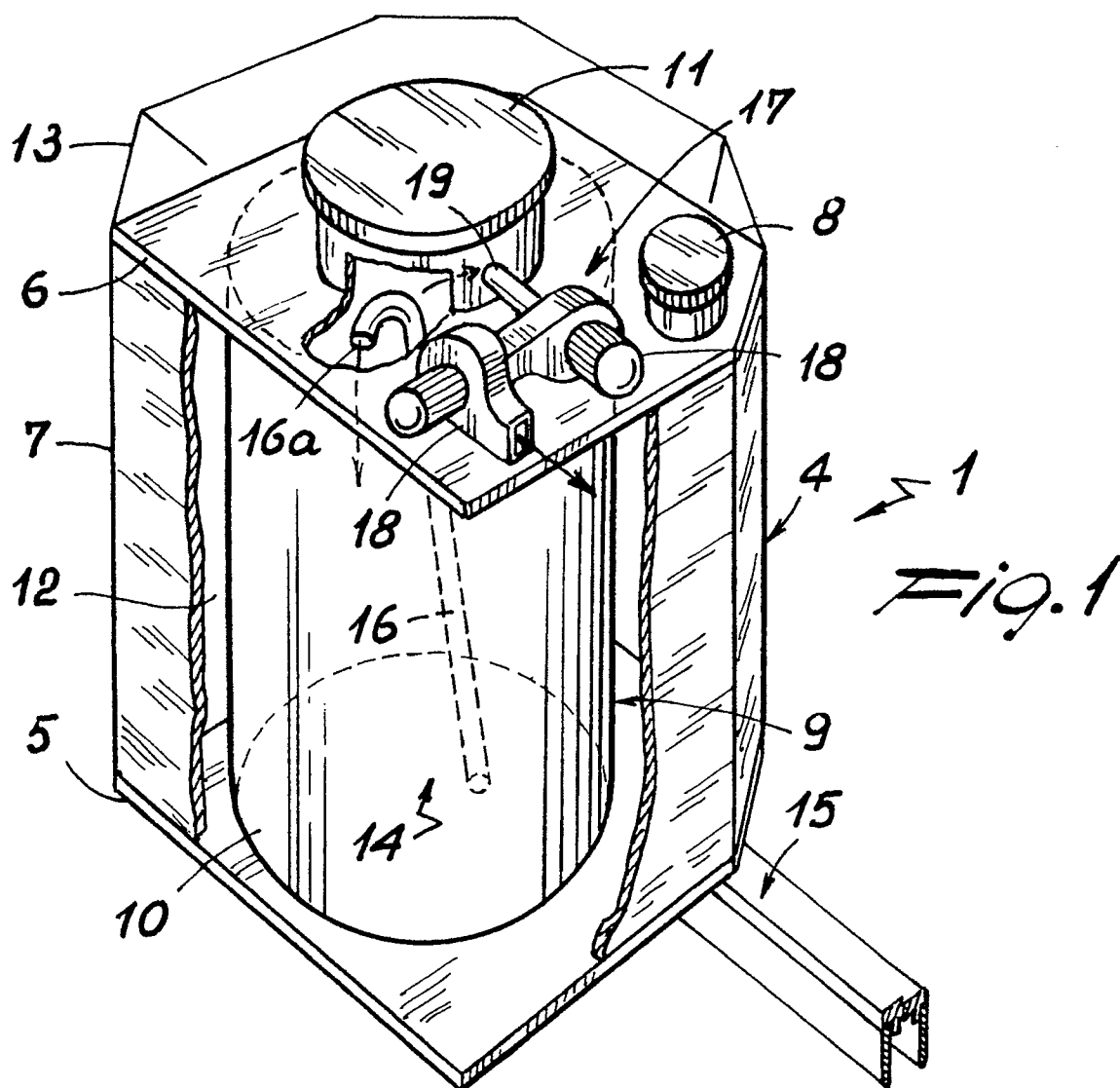
2. A device according to Claim 1, in which said tank (9) has a cylindrical wall (10) of substantially circular section, developing between two bases (5, 6) substantially horizontal in work position.

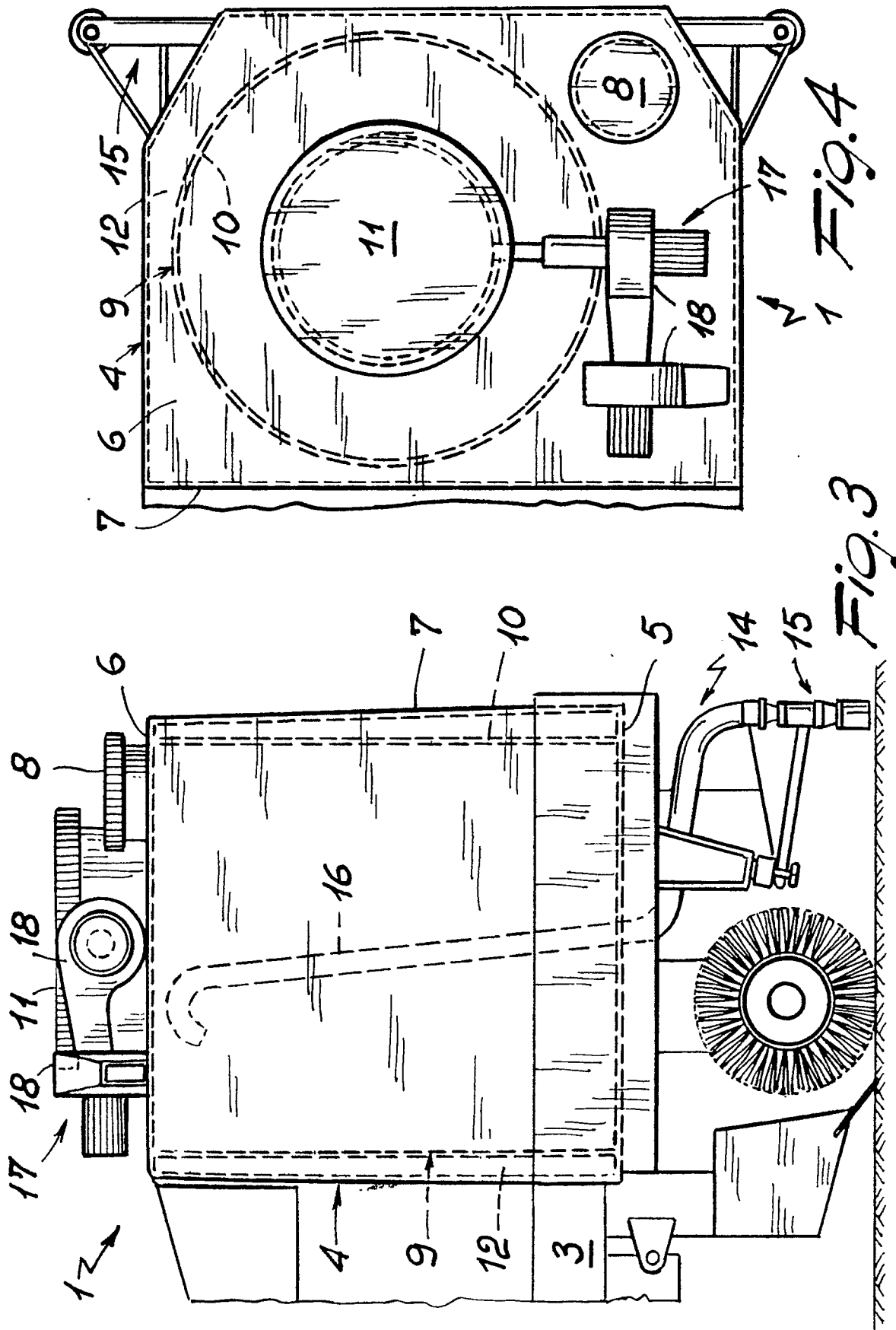
3. A device according to Claim 2, in which said cylindrical wall (10) is made of a plastic material.

4. A device according to Claim 1, in which said housing (4) and said tank (9) have a common

base wall (5) and a common superior wall (6), said tank (9) and said housing (4) having covers (8, 11) separated and independent with one another held in said superior wall (6).

5. A device according to Claim 1, in which said suction device (17) includes two suction pumps (18) installed in series with one another.
6. A device according to Claims 4 and 5, in which said suction pumps (18) are installed externally to said housing (4) over said superior wall (6) and communicate with said tank (9) by means of an unloading pipe (19).
7. A device according to Claim 6, in which a sole deadening dome (13) detachable and developing on the whole superior wall (6) is provided over said covers (8, 11) and said pumps (18).







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EUROPEAN SEARCH REPORT

Application Number

EP 90 12 4108

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 224 055 (HAKO-WERKE GMBH & CO) * column 3, line 48 - column 7, line 42; figures 4,5 * - - - -	1-8	A 47 L 11/30
A	EP-A-0 245 873 (SIPROTECH AG) * page 8, paragraph 2 - page 14, last paragraph; figure 2 * - - - -	1-4	
A	US-A-4 194 263 (F. J. HERPERS & AL) - - - - -		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A 47 L
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		12 June 91	VANMOL M.A.J.G.
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