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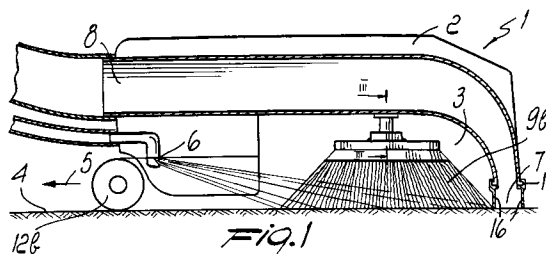
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I-20123 Milano(IT)(54) **Multiple-use floor cleaning machine.**

(57) The multiple-use floor cleaning machine, particularly for the in-depth and routine cleaning of household floors, includes a box-like supporting structure (2) which defines a chamber (3) which has a downwardly directed opening toward the floor (4) and which accommodates at least one nozzle (6) for dispensing a washing liquid and at least one rotating brush (9b) with a vertical axis for treating the floor with the washing liquid dispensed by the nozzle. A suction intake (7) for recovering the washing liquid and the removed dirt is provided at the rear end of the machine with respect to its advancement direction (5).

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The present invention relates to a multiple-use floor cleaning machine for the in-depth and routine cleaning of floors, in particular for household use.

Machines for performing the in-depth cleaning of floors are known; said machines generally comprise a box-like structure which defines a chamber which is open on the side directed toward the floor and in which there are a nozzle for dispensing a washing liquid and a roller with a horizontal axis arranged transversely to the direction of advancement of the machine. The nozzle is arranged in front of the roller along the direction of advancement of the machine, whereas a suction intake is provided behind the roller and recovers the washing liquid and the dirt removed from the floor by the action performed by the roller.

This type of machine is suitable for performing the in-depth cleaning of textile floors having a medium or large surface, but due to its bulk it is difficult to use in household environments. The action performed by the roller on the floor furthermore achieves good results on textile floors, but provides an unsatisfactory performance on hard floors, on which, after cleaning, it is possible to observe scratches at the regions where the machine has stopped.

Large machines for industrial use, such as for example those of the type described in patent application DE-A-3830847, are also known. Said machines comprise a box-like structure which supports two brushes which can rotate about a substantially vertical axis. An outlet for dispensing a washing liquid is arranged on the front side of the machine with respect to its advancement direction; the washing liquid is distributed on the floor by the brushes and is collected, together with the dirt which has been removed, by a suction intake which is arranged behind the brushes in an intermediate region of the machine. Another suction intake is provided further behind said first suction intake and dries the floor. This type of machine, apart from its size, which would prevent its use in a household environment, has the problem of spreading the washing liquid excessively around the machine during operation and that its suction intakes cannot reach the walls or in any case the obstacles located on the floor. In practice, if floors were cleaned with a machine of this type in a household environment, there would be untreated regions proximate to walls or obstacles in general and an excessive spreading of liquid which might damage furniture or other interior fittings.

Neither this type of machine nor the above described type can be used to perform a routine cleaning of floors; they can be used only for an in-depth cleaning.

Routine cleaning is instead performed with a machine provided exclusively for textile floors, in

which a washing liquid dispensing nozzle is simply mounted and arranged proximate to a suction intake through which the washing liquid and the removed dirt are recovered.

The aim of the present invention is to solve the above described problems by providing a multiple-use floor cleaning machine, intended in particular for use in household environments, which can perform, according to the requirements, a rapidly executable in-depth cleaning or routine cleaning.

Within the scope of this aim, an object of the invention is to provide a multipurpose machine which can be used not only for washing operations but also to polish or simply as vacuum cleaner.

Another object of the invention is to provide a machine which can also be actuated with liquid injection-suction units already commercially available for the outfitting of other types of machine.

A further object of the invention is to provide a structurally simple machine which can be manufactured with modest production costs.

This aim, these objects and others which will become apparent hereinafter are achieved by a multiple-use floor cleaning machine particularly for the in-depth and routine cleaning of household floors, characterized in that it comprises a box-like supporting structure which defines a chamber which has a downwardly directed opening toward the floor and which accommodates at least one nozzle for dispensing a washing liquid and at least one brush which is rotatable about a substantially vertical axis and which is directed downwardly toward the floor for treating said floor with the washing liquid dispensed by said nozzle, a suction intake being provided and being arranged at a rear end of the machine with respect to its advancement direction for recovering the washing liquid and the dirt.

Further characteristics and advantages of the invention will become apparent from the description of two preferred but not exclusive embodiments of the machine according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic sectional view of a first embodiment of the machine according to the invention, taken along a vertical plane;

figure 2 is a partially sectional top plan view of the machine illustrated in figure 1;

figure 3 is an enlarged sectional view of a detail of the machine, taken along the axis III-III indicated in figure 1; and

figure 4 is a sectional view of the same enlarged detail, taken along the axis IV-IV indicated in figure 3.

figure 5 is a schematic sectional view of the machine in the second embodiment, taken along a vertical plane;

figure 6 is a partially sectional top plan view of the machine illustrated in figure 5.

With reference to the above figures, the machine according to the invention, generally indicated, in the first embodiment, by the reference numeral 1, comprises a box-like structure 2 which defines a chamber 3 which is open on its side directed toward the floor 4 and in which a nozzle 6 for dispensing a washing liquid is arranged in a front region according to the direction of advancement 5 of the machine during use; said nozzle is directed toward the floor and toward the rear side of the chamber 3.

A suction intake 7 is arranged in the rear region of the machine, extends transversely to the direction 5 and is directed toward the floor 4. Said intake 7 can be connected, by means of a duct 8, to a known liquid suction device which is not illustrated for the sake of simplicity.

Two brushes 9a and 9b, each rotatably supported about a substantially vertical axis, are arranged between the nozzle 6 and the suction intake 7 and can be actuated with a rotary motion about their respective axes, for example by means of a known electric motor which is accommodated within the box-like structure 2 outside the chamber 3.

The two brushes 9a and 9b are arranged symmetrically with respect to a vertical median plane which is parallel to the advancement direction 5. The nozzle 6 is arranged in said plane and dispenses a fan-shaped jet so as to strike the region of the floor which, in each instance, is affected by the brushes 9a and 9b.

The nozzle 6 can be connected to a known liquid injection device which is not illustrated for the sake of simplicity.

Advantageously, the brushes 9a and 9b are associated, by means of elastic couplings 10a and 10b, to shafts 11a and 11b which protrude downward from the upper wall of the chamber 3 so that they can be rapidly assembled and disassembled.

In the second embodiment, illustrated in figures 5 and 6, the machine according to the invention, generally designated by the reference numeral 1a, differently from what has been described with reference to the first embodiment, is provided, in the chamber 3, with two nozzles 6a and 6b for dispensing the washing liquid; said nozzles are arranged between the brushes 9a and 9b and the suction intake 7 and are supplied by a single duct 13 which branches so as to define a T. The nozzles 6a and 6b are arranged symmetrically with respect to a median vertical plane which is parallel to the advancement direction 5 of the machine.

The same reference numerals have been kept in figures 5 and 6 for the elements which correspond to the elements of the machine which have already been described with reference to the

first embodiment.

In both embodiments, the duct 8 extends partially inside a handle 14 which is applied to the front side of the machine and is used to manoeuvre it.

In the first embodiment as well as in the second one, on the edges of the suction intake 7 there is a frame 15 provided with flexible edges 16 which extend the intake toward the floor in order to clean hard floors, as illustrated in figure 1, or there is a frame 17 with rigid edges 18 for cleaning textile floors, as illustrated in figure 5. The most suitable frame is fitted to the intake 7 according to the floor to be cleaned.

For the sake of descriptive completeness, it should be noted that the box-like structure 2 can be provided, at least frontally, with wheels 12a and 12b to facilitate its movement during use.

It should be noted that the machine according to the invention can be provided with its own liquid injection-suction unit or can be actuated with a known injection-suction unit which can be used for other types of machine.

The operation of the machine according to the invention is as follows.

If an in-depth cleaning of a floor 4 is required, the machine is equipped with the brushes 9a and 9b, which are rotated about their axes, and the nozzle 6 and the suction intake 7 are activated.

The jet emitted by the nozzle or nozzles 6 strikes the floor region which is affected in each instance by the brushes 9a and 9b which, by rotating, clean the floor. The advancement of the machine along the direction 5 causes the intake 7 to recover the washing liquid together with the removed dirt. In this manner the intake 7 removes the dirt and performs a partial drying of the floor.

If instead a routine cleaning is required, the brushes 9a and 9b are removed and the nozzle 6 and the suction intake 7 are again activated. In this case, the jet emitted by the nozzle or nozzles 6 strikes the floor 4 in front of the intake 7, which by passing recovers the washing liquid and the removed dirt.

It is stressed that since the washing liquid dispensing nozzle or nozzles are arranged inside the chamber 3, excessive spreading of liquid outside the machine is avoided. The particular arrangement of the intake 7, at the rear end of the machine, allows perfect cleaning even proximate to walls and obstacles.

It should be noted furthermore that if the nozzle 6 is not activated, the machine according to the invention can be used as a polishing machine, by mounting the brushes 9a and 9b, or as a simple vacuum cleaner, by removing the brushes 9a and 9b and keeping the suction intake 7 activated.

In practice it has been observed that the ma-

chine according to the invention fully achieves the intended aim, since it allows to perform both an in-depth cleaning and a routine cleaning, providing excellent results both on hard floors and on textile floors.

The machine thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to the requirements and to the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Multiple-use floor cleaning machine (1;1a), in particular for the in-depth and routine cleaning of household floors, characterized in that it comprises a box-like supporting structure (2) which defines a chamber (3) which has a downwardly directed opening toward the floor and which accommodates at least one nozzle (6;6a;6b) for dispensing a washing liquid and at least one brush (9a,9b) which is rotatable about a substantially vertical axis and which is directed downwardly toward the floor (4) for treating said floor with the washing liquid dispensed by said nozzle (6,6a,6b), a suction intake (7) being provided and being arranged at a rear end of the machine (1;1a) with respect to its advancement direction (5) for recovering the washing liquid and the dirt.
2. Machine according to claim 1, characterized in that said nozzle (6) is arranged in a front region of said chamber (3) with respect to the advancement direction (5) of the machine (1) and is directed toward said suction intake (7), said at least one brush (9a,9b) being arranged between said nozzle (6) and said suction intake (7).
3. Machine according to one or more of the preceding claims, characterized in that said nozzle (6) dispenses a fan-shaped jet in order to strike the floor region which is affected, in each instance, by said brushes (9a,9b).
4. Machine according to claim 1, characterized in

that said nozzle (6a,6b) is arranged between said at least one brush (9a,9b) and said suction intake (7).

5. Machine according to one or more of the preceding claims, characterized in that it comprises two rotating brushes (9a,9b) which are arranged symmetrically with respect to a vertical median plane which is parallel to the direction (5) of advancement of the machine.
6. Machine according to one or more of the preceding claims, characterized in that it comprises two washing liquid dispensing nozzles (6a,6b) which are arranged between said two brushes (9a,9b) and said suction intake (7) and are arranged symmetrically with respect to said vertical median plane.
7. Machine according to claim 1, characterized in that said at least one brush (9a,9b) is removably associated with an actuation shaft (11a,11b) which is supported by said box-like structure (2).
8. Machine according to one or more of the preceding claims, characterized in that said suction intake (7) extends transversely to the direction (5) of advancement of the machine.
9. Machine according to one or more of the preceding claims, characterized in that each one of said brushes (9a,9b) can be inserted in a snap-together manner on a substantially vertical shaft (11a,11b) which protrudes in said chamber (3) and can be actuated with a rotary motion about its own axis.
10. Machine according to one or more of the preceding claims, characterized in that said nozzle (6,6a,6b) can be controllably connected to a device for pumping the washing liquid.
11. Machine according to one or more of the preceding claims, characterized in that said suction intake (7) can be controllably connected to a suction device.
12. Machine according to one or more of the preceding claims, characterized in that said suction intake (7) is arranged at the rear end of the machine (1;1a) and in that a machine manoeuvring handle is connected on the front side of the machine.
13. Machine according to one or more of the preceding claims, characterized in that said intake (7) is connected to said suction device through

a duct (8) which at least partially extends within said handle.

- 14.** Machine according to one or more of the preceding claims, characterized in that a removable frame (15) is fitted on the edges of said suction intake (7) and has rigid (18) or flexible (16) edges which extend said intake (7) toward the floor.

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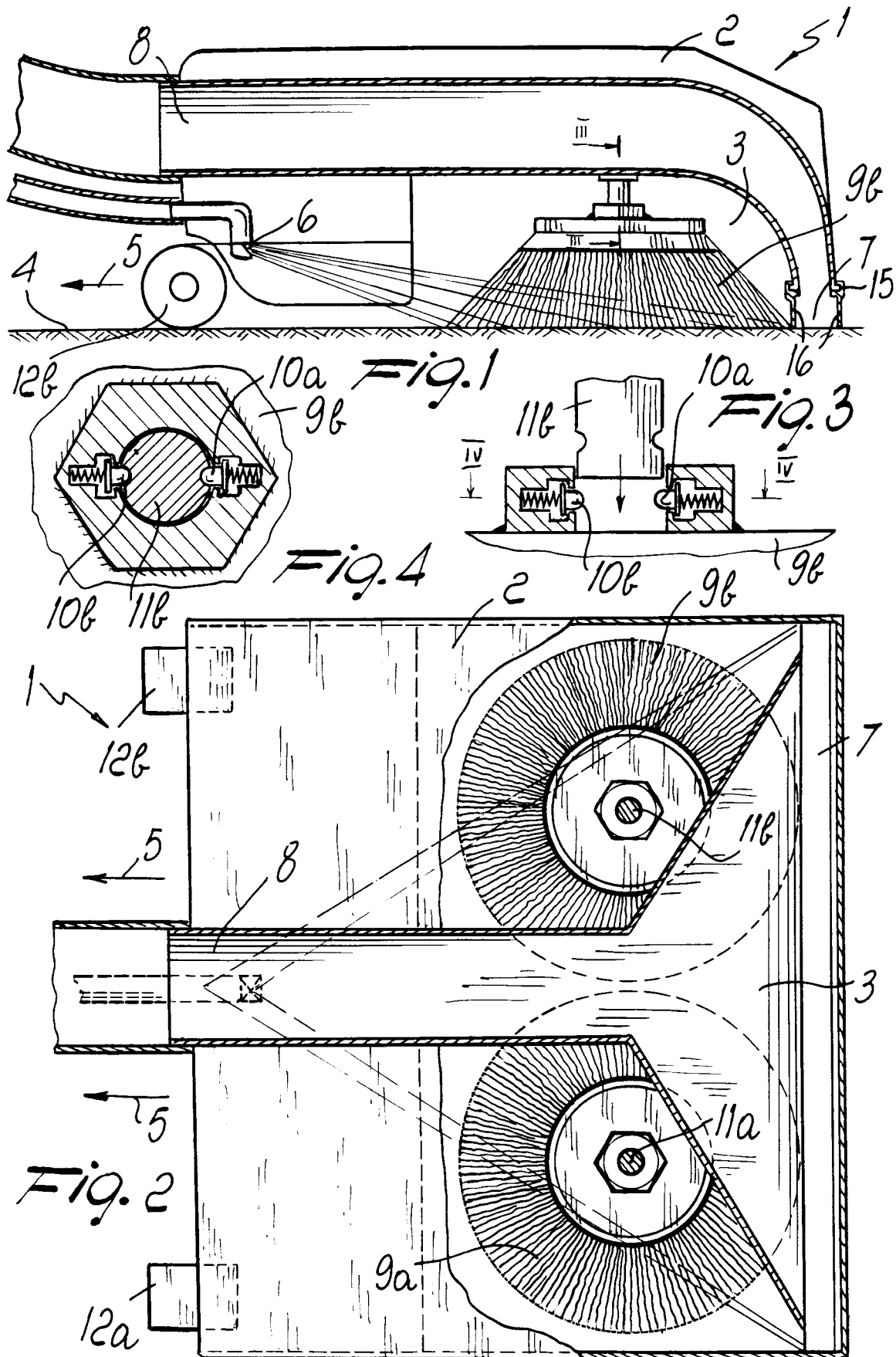
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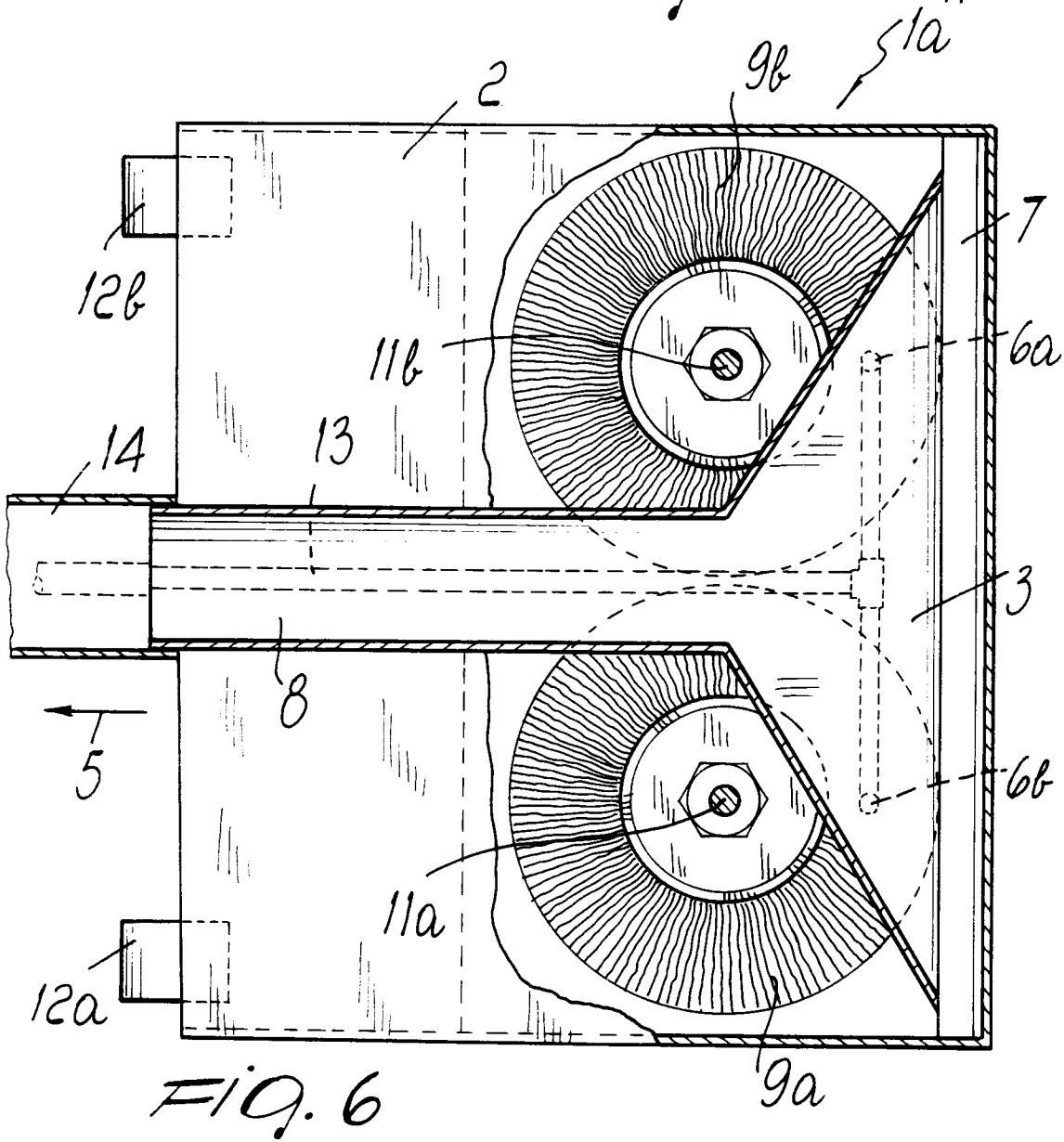
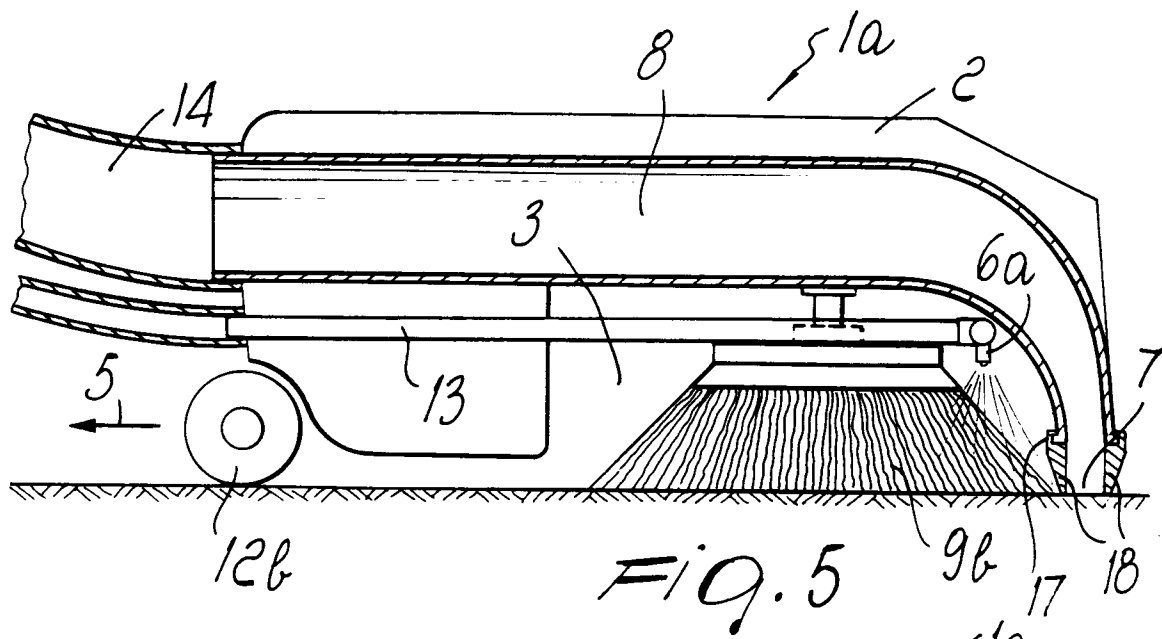
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EUROPEAN SEARCH REPORT

Application Number

EP 92 10 1001

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)
Y	US-A-4 182 001 (KRAUSE, H.W.) * column 2, line 17 - column 5, line 41; figures 1, 5, 11, 13 *	1	A47L11/30 A47L11/34
A	---	3, 12	
P, Y	DE-A-4 023 964 (GOLOSTAR CO., LTD.,) * column 1, line 9 - line 35; figures 1, 5 *	1	
A	---	4	
A	DE-A-3 227 349 (EUGEN GUTMANN GMBH & CO KG) * page 14, paragraph 2 - page 16, paragraph 1; figures 3, 4 *	1, 7	
A	---	1	
D, A	DE-A-3 830 847 (KRAHNEN GMBH) * column 2, line 16 - line 35; figures 2, 3 *	1, 2, 4, 8, 10	
A	FR-A-2 403 774 (VINOLAS Y VALL-LLOSERIA, N) ---		TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	DE-B-1 008 886 (LICENTIA PATENT-VERWALTUNGS-GMBH))		A47L

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 08 MAY 1992	Examiner MUNZER E.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			