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(54) **Machine for domestic and/or industrial cleaning**

Haushalts- und/oder Industriereinigungsmaschine

Machine de nettoyage domestique et/ou industriel

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Description

[0001] The present invention relates to a machine for domestic and/or industrial cleaning.

[0002] Machines for domestic and/or industrial cleaning, such as vacuum cleaners and electric brooms, which can also act as air purifying machines, are known in the background art.

[0003] These machines usually comprise a filter or filtration assembly, arranged in a corresponding receptacle on a supporting chassis, through which the aspirated air is made to pass, retaining the suspended dust and dirt, and is then expelled outward after being cleaned.

[0004] EP 1 272 089 A in the name of same Applicant discloses a filtration assembly applied to a vacuum cleaner that comprises a wheeled chassis in which there is a receptacle for the filtration assembly, said receptacle being shaped substantially complementarily to said filtration assembly.

[0005] The receptacle is isolated from the outside and is connected to a suction motor arranged in a portion of the vacuum cleaner.

[0006] The filtration assembly comprises a box-like body that is provided with an air suction inlet that is connected to the air intake of the vacuum cleaner and with a perimetric wall constituted by a filtration strip.

[0007] The aspirated air is conveyed into the filtration assembly and exits from it through the filtration strip.

[0008] The filtration assembly must therefore be cleaned or replaced cyclically, since dust and dirt accumulate inside it, obstructing the filtration strip and reducing the filtration capacity. An other filter shaking arrangement is known for example from US 5 681 363 A.

[0009] The aim of the present invention is to provide a machine for domestic and/or industrial cleaning whose structure increases, in terms of duration, the capacity and effectiveness of the filtration assembly without having to act directly for cleaning and/or replacing it.

[0010] An object of the present invention is to provide a machine that can be used easily even by users lacking particular technical knowledge.

[0011] Another object of the present invention is to provide a machine that has a simple structure.

[0012] Another object of the present invention is to provide a machine that can be manufactured with known technologies and equipment.

[0013] This aim and these and other objects that will become better apparent hereinafter are achieved by a machine for domestic and/or industrial cleaning, of the type that comprises a chassis in which a receptacle is formed, said receptacle being isolated from the outside, being connected to a suction motor supported by said chassis, and being designed to accommodate a filtration assembly that is connected to the means for connection to the air intake accessories, characterized in that said filtration assembly is arranged with a preset clearance within said receptacle and comprises a box-like body, with at least one wall portion constituted by a filtering

strip, from which at least one first duct extends, said duct being connected to a corresponding second duct for aspirating air from outside, said first and second ducts forming a hermetic connection with elastic articulation that allows the movement of said filtration assembly inside said receptacle following variations in the pressure conditions inside said receptacle.

[0014] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a machine for domestic and/or industrial cleaning, according to the invention;

Figure 2 is a transverse sectional view of the machine of Figure 1.

[0015] With reference to the figures, a machine for domestic and/or industrial cleaning, according to the invention, is generally designated by the reference numeral 10.

[0016] The machine 10, which in the case shown in the figures is a vacuum cleaner, comprises a wheeled chassis 11 in which there is a receptacle 12 that is isolated from the outside and is connected to a suction motor, which is not shown in the figures but is in any case of the per se known type and is arranged in a portion 31 of the chassis 11.

[0017] A filtration assembly 13 is arranged with clearance within the receptacle 12 and is connected to means 14 for connection to the air intake accessories.

[0018] The filtration assembly 13 comprises a box-like body, described in greater detail hereinafter, with at least one wall portion constituted by a filtering strip, from which a first duct 15 extends which is connected to a corresponding second duct 16 for aspirating air from outside.

[0019] In practice, the first duct 15 and the second duct 16 form a hermetic connection with elastic articulation that allows the movement of the filtration assembly 13 inside the receptacle 12 as a consequence of the variation of the pressure conditions inside the receptacle 12, as will become better apparent hereinafter.

[0020] The hermetic connection with elastic articulation is provided by end portions 15a and 16a, respectively, of the first and second ducts 15 and 16, which are arranged substantially coaxially when in use and are inserted with play in one another with the interposition of a sealing gasket 17 that has a toroidal sealing surface and allows articulation.

[0021] In practice, the connection substantially provides a cantilevered support for the filtration assembly 13.

[0022] The second duct 16 runs substantially vertically downward from the bottom 22 of the receptacle 12,

with an upper end portion 16a at which the end portion 15a of the first duct 15 engages during use.

[0023] The first duct 15 protrudes laterally from the filtration assembly 13, with a substantially L-shaped path and an end portion 15a to be arranged along a substantially vertical axis during use.

[0024] The filtration assembly 13 comprises two lateral covers 18a and 18b, from the first of which the first duct 15 protrudes, and a perimetric wall 19, which lies substantially at right angles to the covers 18a and 18b and is constituted by a filtering strip.

[0025] The first duct 15 supports, at its free end portion 15a, the sealing gasket 17, which engages, during use, by means of its toroidal sealing surface, the outer perimetric surface of the end portion 16a of the second duct 16.

[0026] As shown in Figure 2, the filtration assembly 13, when in use, rests with its lower portion 20, on the side of the first duct 15, on a raised portion 21 of the bottom 22 of the receptacle 12.

[0027] The receptacle 12 is formed by a tank 23, from the bottom 22 of which the second duct 16 rises, said tank being designed to be arranged within a complementarily shaped compartment 24 of the chassis 11, and by a cover 25, with a lateral portion 26 that is suitable to connect the suction motor to the receptacle 12.

[0028] The machine 10 further comprises a pressure sensor 27, which is suitable to detect an increase in the pressure conditions inside the receptacle 12 with respect to normal operating conditions.

[0029] The pressure sensor 27 comprises a preload spring 28, which acts in contrast with the action of the pressure inside the receptacle 12 on a slide valve 29 that is visible to the user and moves within a corresponding tubular guide 30.

[0030] In this embodiment, the perimetric wall 19 is constituted by a filter made of washable polyester, but in other embodiments it is possible to use conveniently microperforated filters, for example of the activated carbon type for antiallergenic actions, or filters of the HEPA type.

[0031] As regards operation, since the filtration assembly 13 in practice is arranged so as to cantilever out inside the receptacle 12, it tends to be arranged so that it is inclined downward due to its own weight and to the coupling with elastic articulation.

[0032] When the machine 10 is operated, the pressure conditions inside the receptacle 12 generate a resultant force that acts on the filtration assembly 13 so as to contrast its weight without being able to overcome it.

[0033] When instead the means 14 for connection to the air intake accessories are partially obstructed accidentally or intentionally, the pressure conditions inside the receptacle 12 increase in intensity and generate a resultant force that acts on the filtration assembly 13, overcoming its weight and making it rotate upward with respect to the articulation point.

[0034] In this manner, by rapidly repeatedly obstructing and releasing the connection means 14 or the air intake accessories, for example with one hand on the outlet, the filtration assembly 13 is shaken, making it oscillate with respect to the articulation point and making the dirt accumulated on the filtering wall fall, increasing the capacity and effectiveness over time of the filtration assembly 13.

[0035] The filtration assembly shaking effect can of course also be produced unintentionally, during the normal use of the machine.

[0036] A machine for domestic and/or industrial cleaning according to the invention can be constituted by a vacuum cleaner but also by an electric broom.

[0037] In practice it has been found that the present invention has achieved the intended aim and objects.

[0038] A machine has in fact been provided which has a simple structure, entails an increase in terms of duration of the capacity and effectiveness of the filtration assembly, without the need to act directly for its cleaning and/or replacement.

[0039] The machine can be used easily even by users lacking particular technical skills.

[0040] The technical details may be replaced with other technically equivalent elements.

[0041] The materials and the dimensions may be any according to requirements.

[0042] The disclosures in Italian Utility Model Application ITPD20020020 from which this application claims priority are incorporated herein by reference.

[0043] 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. A machine for domestic and/or industrial cleaning, of the type that comprises a chassis (11) in which a receptacle (12) is formed, said receptacle being isolated from the outside, being connected to a suction motor supported by said chassis (11), and being designed to accommodate a filtration assembly (13) that is connected to means (14) for connection to the air intake accessories, **characterized in that** said filtration assembly (13) is arranged with a preset clearance within said receptacle (12) and comprises a box-like body, with at least one wall portion constituted by a filtering strip, from which at least one first duct (15) extends, said duct being connected to a corresponding second duct (16) for aspirating air from outside, said first and second ducts (15, 16) forming a hermetic connection with elastic articulation that allows the movement of said filtration

assembly (13) inside said receptacle (12) following variations in the pressure conditions inside said receptacle (12).

2. The machine according to claim 1, **characterized in that** said hermetic connection with elastic articulation is provided by end portions (15a, 16a) of said first and second ducts (15, 16), which during use are arranged substantially coaxially and are inserted with clearance in one another, with the interposition of a sealing gasket (17), said connection providing substantially a cantilevered support for said filtration assembly (13). 5
3. The machine according to the preceding claims, **characterized in that** said second duct (16) runs substantially vertically downward from the bottom (22) of said receptacle (12), with an upper end portion (16a) at which the end portion (15a) of said first duct (15) engages during use. 15
4. The machine according to one or more of the preceding claims, **characterized in that** said first duct (15) protrudes laterally from said filtration assembly (13), is substantially L-shaped and has an end portion (15a) to be arranged, during use, so that its axis is substantially vertical. 25
5. The machine according to claim 4, **characterized in that** said filtration assembly (13) comprises two lateral covers (18a, 18b) from one of which said first duct (15) extends, and a perimetric wall (19) that lies substantially at right angles to said covers (18a, 18b) and is constituted by a filtering strip. 30
6. The machine according to one or more of the preceding claims, **characterized in that** said first duct (15) has, at its free end portion (15a), said sealing gasket (17), which engages during use, by means of its toroidal end surface, the outer perimetric surface of the end portion (16a) of said second duct (16). 35
7. The machine according to one or more of the preceding claims, **characterized in that** during use said filtration assembly (13) rests with its lower portion (20), on the side of said first duct (15), on a raised portion (21) of the bottom (22) of said receptacle (12). 40
8. The machine according to one or more of the preceding claims, **characterized in that** said receptacle (12) is formed by a tank (23), from the bottom (22) of which said second duct (16) rises, said tank being designed to be arranged within a complementarily shaped compartment (24) of said chassis (11), and by a cover (25), which has a lateral portion (26) that is suitable to connect said suction motor to said 45

receptacle (12).

9. The machine according to one or more of the preceding claims, **characterized in that** it comprises a pressure sensor (27) that is suitable to detect at least an increase in the pressure conditions inside said receptacle (12) with respect to normal operating conditions. 5
10. The machine according to claim 9, **characterized in that** said pressure sensor (27) comprises a preloaded spring (28), which acts in contrast with the action of the pressure inside said receptacle (12) on a slide valve (29) that is visible to the user and moves within a corresponding tubular guide (30). 10

Patentansprüche 15

1. Eine Haushalts- und/oder Industriereinigungsmaschine der Art, die ein Chassis (11) umfasst, in dem ein Behälter (12) geformt ist, wobei der Behälter vom Außenraum isoliert ist, wobei er mit einem Saugmotor verbunden ist, der vom Chassis (11) gehalten wird, und wobei er konstruiert ist, um eine Filter-Gruppe (13) aufzunehmen, die mit Mitteln (14) zur Verbindung mit dem Lufteinlass-Zubehör verbunden ist, **dadurch gekennzeichnet, dass** die Filter-Gruppe (13) mit einem voreingestellten Spielraum innerhalb des Behälters (12) angeordnet ist und einen kastenähnlichen Körper umfasst, wobei mindestens ein Wandabschnitt aus einem Filtrierstreifen besteht, von dem sich mindestens eine Leitung (15) erstreckt, wobei die Leitung mit einer entsprechenden zweiten Leitung (16) zum Ansaugen von Luft von außen verbunden ist, wobei die erste und die zweite Leitung (15, 16) eine hermetische Verbindung mit elastischem Gelenk bilden, welche die Bewegung der Filter-Gruppe (13) in dem Behälter (12) nach Schwankungen der Druckverhältnisse innerhalb des Behälters (12) ermöglicht. 20
2. Die Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die hermetische Verbindung mit elastischem Gelenk von Endabschnitten (15a, 16a) der ersten und der zweiten Leitung (15, 16) bereitgestellt wird, die während des Gebrauchs im Wesentlichen koaxial angeordnet und mit Spielraum ineinander eingesetzt sind, wobei ein Dicht-ring (17) dazwischen gesetzt ist, wobei die Verbindung im Wesentlichen eine freitragende Stütze für die Filter-Gruppe (13) bereitstellt. 25
3. Die Maschine gemäß den obigen Ansprüchen, **dadurch gekennzeichnet, dass** die zweite Leitung (16) im Wesentlichen vertikal abwärts vom Boden (22) des Behälters (12) verläuft, mit einem oberen 30

Endabschnitt (16a), in welchen der Endabschnitt (15a) der ersten Leitung (15) während des Gebrauchs eingreift.

4. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die erste Leitung (15) seitlich aus der Filter-Gruppe (13) herausragt, im Wesentlichen L-förmig ist und einen Endabschnitt (15a) hat, der während des Gebrauchs so anzuordnen ist, dass seine Achse im Wesentlichen vertikal ist. 5
5. Die Maschine gemäß Anspruch 4, **dadurch gekennzeichnet, dass** die Filter-Gruppe (13) zwei seitliche Abdeckungen (18a, 18b) umfasst, wobei sich von einer dieser Abdeckungen die erste Leitung (15) erstreckt, und eine perimetrische Wand (19), die im Wesentlichen in rechten Winkeln zu den Abdeckungen (18a, 18b) liegt und aus einem Filterstreifen besteht. 10
6. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die erste Leitung (15) an ihrem freien Endabschnitt (15a) den Dichtring (17) hat, der während des Gebrauchs mit seiner ringförmigen Endoberfläche in die äußere perimetrische Oberfläche des Endabschnitts (16a) der zweiten Leitung (16) eingreift. 15
7. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass**, während des Gebrauchs, die Filter-Gruppe (13) mit ihrem unteren Abschnitt (20) auf der Seite der ersten Leitung (15) auf einem erhobenen Abschnitt (21) des Bodens (22) des Behälters (12) ruht. 20
8. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Behälter (12) von einem Gefäß (23) gebildet wird, von dessen Boden (22) die zweite Leitung (16) aufsteigt, wobei das Gefäß konstruiert ist, um innerhalb eines komplementär geformten Fachs (24) des Chassis (11) angeordnet zu werden, und von einer Abdeckung (25), die einen seitlichen Abschnitt (26) hat, welcher geeignet ist, den Saugmotor mit dem Behälter (12) zu verbinden. 25
9. Die Maschine gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie einen Drucksensor (27) umfasst, der geeignet ist, mindestens eine Erhöhung der Druckverhältnisse innerhalb des Behälters (12) in Bezug auf die normalen Betriebsbedingungen zu erfassen. 30
10. Die Maschine gemäß Anspruch 9, **dadurch gekennzeichnet, dass** der Drucksensor (27) eine vorgespannte Feder (28) umfasst, die im Gegensatz zu der Wirkung des Drucks innerhalb des Be- 35

hälters (12) auf ein Schieberventil (29) wirkt, das für den Benutzer sichtbar ist und das sich in einer entsprechenden rohrförmigen Führung (30) bewegt. 40

Revendications

1. Machine pour le nettoyage domestique et/ou industriel, du type qui comprend un châssis (11) dans lequel un réceptacle (12) est formé, ledit réceptacle étant isolé de l'extérieur, étant relié à un moteur d'aspiration supporté par ledit châssis (11), et étant conçu pour loger un ensemble de filtration (13) qui est relié à des moyens (14) pour le raccord à des accessoires d'appel d'air, **caractérisée en ce que** ledit ensemble de filtration (13) est agencé avec un jeu prédéterminé dans ledit réceptacle (12) et comprend un corps en forme de boîte, avec au moins une partie de paroi constituée par une bande de filtration, depuis lequel au moins un premier conduit (15) s'étend, ledit conduit étant relié à un deuxième conduit (16) correspondant pour l'aspiration d'air depuis l'extérieur, lesdits premier et deuxième conduits (15, 16) formant un raccord hermétique avec articulation élastique qui permet le déplacement du dit ensemble de filtration (13) à l'intérieur du dit réceptacle (12) suivant des variations dans les conditions de pression à l'intérieur du dit réceptacle (12). 45
2. Machine selon la revendication 1, **caractérisée en ce que** ledit raccord hermétique avec articulation élastique est fourni par des parties d'extrémités (15a, 16a) des dits premier et deuxième conduits (15, 16), qui, pendant l'utilisation, sont agencées sensiblement de façon coaxiale et sont insérées avec jeu dans une autre, avec l'interposition d'un joint d'étanchéité (17), ledit raccord fournissant un support sensiblement en porte-à-faux pour ledit ensemble de filtration (13). 50
3. Machine selon les revendications précédentes, **caractérisée en ce que** ledit deuxième conduit (16) s'étend sensiblement verticalement vers le bas depuis le fond (22) du dit réceptacle (12), avec une partie d'extrémité supérieure (16a) au niveau de laquelle la partie d'extrémité (15a) du dit premier conduit (15) vient en prise pendant l'utilisation. 55
4. Machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** le premier conduit (15) fait saillie latéralement depuis ledit ensemble de filtration (13), est sensiblement en forme de L et présente une partie d'extrémité (15a) à agencer, pendant l'utilisation, de sorte que son axe soit sensiblement vertical. 60
5. Machine selon la revendication 4, **caractérisée en** 65

ce ledit ensemble de filtration (13) comprend deux carters latéraux (18a, 18b) depuis l'un desquels s'étend ledit premier conduit (15), et une paroi périmétrale (19) qui se trouve sensiblement à angle droit par rapport aux dits carters (18a, 18b) et qui est constituée par une bande de filtrage.

6. Machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** le premier conduit (15) présente, au niveau de sa partie d'extrémité libre (15a), ledit joint d'étanchéité (17), qui vient en prise, pendant l'utilisation, grâce à sa surface d'extrémité toroïdale, avec la surface périmétrale externe de la partie d'extrémité (16a) du dit deuxième conduit (16).
7. Machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que**, pendant l'utilisation, ledit ensemble de filtration (13) repose avec sa partie inférieur (20), sur le coté du dit premier conduit (15), sur une partie relevée (21) du fond (22) du dit réceptacle (12).
8. Machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit réceptacle (12) est formé par un réservoir (23), à partir du fond (22) duquel ledit deuxième conduit (16) s'élève, ledit réservoir étant conçu pour être agencer à l'intérieur d'un compartiment (24), formé de façon complémentaire, du dit châssis (11), et par un carter (25) qui présente une partie latérale (26) approprié pour relier ledit moteur d'aspiration audit réceptacle (12).
9. Machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend un capteur de pression (27) qui est approprié pour détecter au moins une augmentation dans les conditions de pression à l'intérieur du dit réceptacle (12) par rapport à des conditions normales d'opération.
10. Machine selon la revendication 9, **caractérisée en ce que** ledit capteur de pression (27) comprend un ressort pré-bandé (28), qui agit en contraste avec l'action de la pression à l'intérieur du dit réceptacle (12) sur une valve à tiroir (29) qui est visible à l'utilisateur et se déplace dans un guide tubulaire correspondant (30).

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