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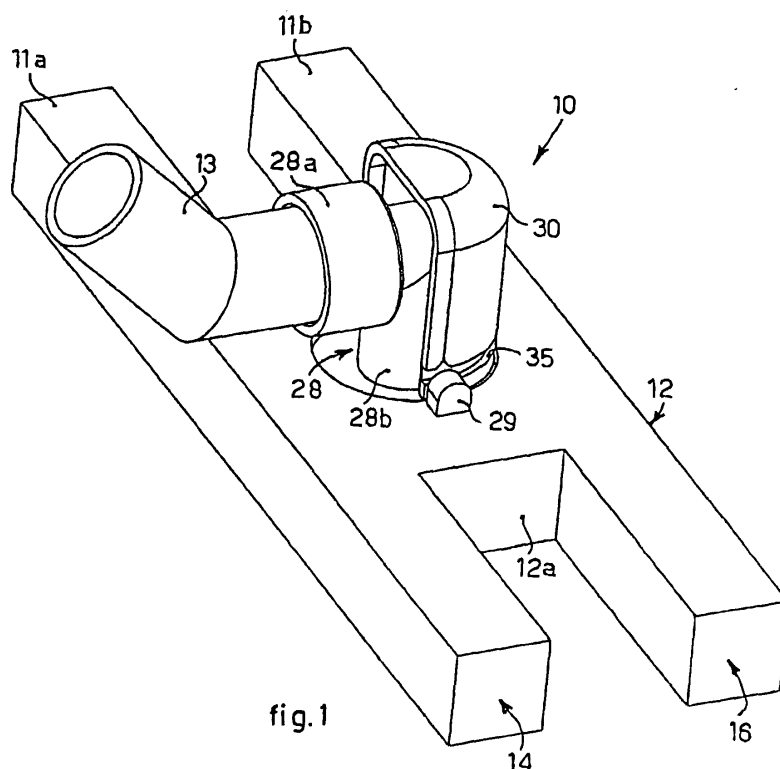
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(54) **Suction device able to be associated, in fixed or removable manner, with a cleaning apparatus**

(57) Cleaning device (10) coupled, in fixed or removable manner, with a cleaning apparatus and comprising a supporting element (12) having a suction unit (14) and a delivery unit (16) to deliver a detergent fluid under pressure, and connection elements (28) that connect the supporting element (12) to the cleaning appa-

ratus. The connection means (28) selectively position the supporting element (12) in a first stable operating position, wherein the delivery unit (16) is arranged at the front, in a determinate working direction, with respect to the suction unit (14), or in a second stable operating position, wherein the suction unit (14) is arranged at the front with respect to the delivery unit (16).



Description

FIELD OF THE INVENTION

[0001] The present invention concerns a suction device, for example of the brush type, able to be selectively associated with a cleaning apparatus. This latter can be an electric brush, a vacuum cleaner or suchlike, with or without a delivery device to deliver detergent fluids under pressure, such as steam or otherwise. To be more exact, the device according to the present invention is able to be associated, in fixed or removable manner, as an accessory, with a terminal portion of the main suction pipe of the cleaning apparatus, and allows to selectively perform the single function of dry suction, or the double function of wet cleaning by delivering detergent fluids under pressure and suction of the wet or dampened dirt.

BACKGROUND OF THE INVENTION

[0002] A device is known, shaped like a cleaning brush, like window washers, floor brushes or suchlike, which is able to be selectively associated with the terminal end portion of a cleaning apparatus, and comprising at least a suction pipe and a pipe through which the steam or other solvent passes. The two pipes are conveyed towards a central element shaped substantially like a parallelepiped and comprising two work zones, one at the front and one at the rear. The suction pipe and the pipe through which the solvent passes are able to be associated with the corresponding pipes of the apparatus by means of a connector of a fixed or rotary type.

[0003] Inside the central element, the suction pipe and the pipe through which the solvent passes branch off, in turn, into a plurality of apertures or nozzles, arranged respectively on the front and rear zone of the central element. To be more exact, the nozzles to deliver the solvent are arranged on the rear zone of the central element, while the suction apertures are arranged on the front zone in order to suck in both the steam delivered and also the dirt mixed with it.

[0004] This device also comprises fixed or removable bristles, located in correspondence with the rear zone where the solvent is delivered, which serve to combine the cleaning action of the solvent with the mechanical action of rubbing.

[0005] This conventional device has the disadvantage, however, that it does not allow the bristles or the unit through which the solvent passes to reach the zones to be cleaned situated in the proximity of obstacles, against which the front zone of the central element stops.

[0006] Applicant has devised and embodied the present invention to overcome this shortcoming of the state of the art and to obtain other advantages.

SUMMARY OF THE INVENTION

[0007] The present invention is set forth and characterized essentially in the main claim, while the dependent claims describe other innovative characteristics of the invention.

[0008] The purpose of the present invention is to achieve a cleaning device, associated permanently, or able to be selectively associated, like any other accessory, to a cleaning apparatus by means of which it is possible to achieve alternately, in a practical and efficient manner, either a single function of dry suction of dust and dirt, or a double function of wet cleaning by delivering a detergent fluid under pressure, such as steam or otherwise, and subsequent suction of the wet dirt.

[0009] Another purpose of the present invention is to achieve a cleaning device of the type described above by means of which, when only the dry suction is functioning, the unit able to deliver the detergent fluid is not an obstacle to the suction itself.

[0010] In accordance with these purposes, a cleaning device according to the present invention comprises a supporting element associated with connection means, by means of which it is able to be coupled, in fixed or removable manner, with a cleaning apparatus. At least a delivery unit to deliver a detergent fluid and a suction unit are made in the supporting element. According to the present invention, the connection means are able to selectively position the supporting element in at least two stable operating positions, so that in a first of said positions the delivery unit to deliver the detergent fluid is in a front zone, in a determinate working direction, with respect to the suction unit, and in a second of said positions it is the suction unit that is positioned in the front zone, and therefore precedes the delivery unit to deliver the detergent fluid, so that the latter does not create any obstacle when the device is used only in the dry suction function.

[0011] According to one solution of the invention, the supporting element is shaped substantially like an "H" and comprises two substantially parallel blocks, on which the suction unit and respectively the delivery unit are arranged.

[0012] The connection means advantageously comprise a joint-type coupling having one part connected to a main pipe and a second part connected in articulated manner to the supporting element. In this way it is possible to position the suction unit and the delivery unit to deliver the detergent fluid simply by rotating the supporting element with respect to the joint-type coupling. Consequently, by arranging the suction unit and the delivery unit to deliver the detergent fluid in diametrically opposite positions with respect to the joint-type coupling, the passage between one operating position and the other can be obtained by means of a simple rotation of 180° around a central pivoting axis, advantageously vertical.

[0013] Intermediate stable positions, for example at

90° with respect to the two main operating positions, can be provided in order to use the suction device in cleaning operations in very narrow spaces.

[0014] According to the present invention, the suction device also comprises clamping means able to temporarily clamp the connection means, by means of a removable constraint, to the supporting element, so as to achieve the positioning in one or the other of the two stable operating positions. The clamping means are for example of a mechanical type and comprise hooks, grippers, clips or suchlike.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

- fig. 1 is a three dimensional view of a cleaning device according to the present invention;
- fig. 2 is a transverse median section of the device in fig. 1;
- fig. 3 is a section along the line III-III of the device in fig. 2;
- fig. 4 is a partly sectioned front view of the device in fig. 1;
- fig. 5 is a partly sectioned left side view of the device in fig. 1;
- fig. 6 shows an enlarged detail of fig. 5;
- fig. 7 is a plane view of a detail of the device in fig. 1;
- fig. 8 is a partly sectioned front view of the detail in fig. 7.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT OF THE INVENTION

[0016] With reference to figs. 1 and 2, a suction device 10 according to the present invention comprises a supporting element 12 substantially shaped like an "H" and comprising a central zone 12a and two lateral blocks 11a and 11b, parallel to each other.

[0017] The supporting element 12 also comprises a terminal part 13 by means of which it is able to be connected to a cleaning apparatus with a detergent fluid, for example steam, of a known type and not shown in the drawings.

[0018] The terminal part 13 comprises a main suction pipe 15 and a delivery pipe 23 to deliver the detergent fluid.

[0019] In the first block 11a a suction unit 14 is arranged, consisting of a suction aperture 20 (fig. 2) connected to the main suction pipe 15, while in the second block 11b a delivery unit 16 to deliver the detergent fluid is arranged, consisting of a plurality of nozzles 22 (figs. 2 and 4) associated with the delivery pipe 23.

[0020] The nozzles 22 to deliver the detergent fluid

are aligned along the block 11b and are substantially parallel and opposite the suction aperture 20 made on the block 11a, so as to obtain as big a cleaning zone as possible.

[0021] In correspondence with the suction aperture 20, moreover, two rubber blades 24 are arranged, while in front of the line of nozzles 22 a line of stiff bristles 26 is arranged.

[0022] The central part 12a of the supporting element 12, moreover, is connected to the terminal part 13 by means of a joint-type coupling 28 (figs. 3, 4 and 5).

[0023] The joint-type coupling 28 is shaped substantially like a 90° tubular elbow, with a first part 28a connected to one end of the terminal part 13, so that the terminal part 13 is free to rotate with respect to the first part 28a, and a second part 28b coupled in a cylindrical seating 34 of the central part 12a of the supporting element 12 and free to rotate with respect thereto.

[0024] In this way, the supporting element 12 is free to rotate around a vertical axis X with respect to the joint-type coupling 28.

[0025] To be more exact, the joint-type coupling 28 is provided with a lower shoulder 28c which clamps it axially in the supporting element 12, although allowing it to rotate through 360° with respect thereto.

[0026] The rotation of the joint-type coupling 28 allows to selectively position the supporting element 12 with respect to the terminal part 13 between the following two operating positions (figs. 1, 2); a first wherein the delivery unit 16 is in a frontal position and a second wherein it is the suction unit 14 that is in the frontal position.

[0027] The rotation of the supporting element 12 with respect to the joint-type coupling 28 is normally clamped automatically by a clamping element 30, shaped substantially like a semi-dome and arranged above the second part 28b of the joint-type coupling 28.

[0028] The clamping element 30 is able to rotate together with the joint-type coupling 28 with respect to the axis X, but can slide axially with respect thereto by means of vertical guides 28d and corresponding grooves 30a (fig. 3).

[0029] A spring 33 is included between the joint-type coupling 28 and the top of the clamping element 30.

[0030] The lower part of the clamping element 30 is inserted in a circular seating 31 of the supporting element 12 around the cylindrical seating 34.

[0031] Two positioning pegs 32 are attached on two vertical fins 29 of the supporting element 12, on diametrically opposite sides with respect to the axis X, and are arranged inside the circular seating 31.

[0032] On the outer surface of the lower part a continuous, horizontal groove 35 is made and, in diametrically opposite positions, two semi-circular seatings 38 are made (fig. 6) able to accommodate the pegs 32 in a constrained condition.

[0033] In correspondence with each seating 38, the groove 35 includes an upper hollow 39, shaped like an upside-down V, also passing through the seatings 38,

and which defines two inclined planes 39a and 39b with which the fixed peg 32 is able to cooperate.

[0034] Normally the spring 33 thrusts the seatings 38 against the pegs 32 and holds the clamping element 30 clamped in one of the stable positions.

[0035] This constraint is removed when the clamping element 30 is pressed downwards against the action of the spring 33, so that the pegs 32 are in the groove 35, so as to allow the supporting element 12 to rotate around the axis X.

[0036] The clamping element 30 is then able to be selectively lowered towards the supporting element 12 in order to allow the latter to rotate, so that it can reach one or the other operating position with respect to the terminal part 13.

[0037] Once the supporting element 12 has reached the desired position, the spring 33, thrusting the clamping element 30 upwards, returns the pegs 32 into the respective seatings 38.

[0038] According to another characteristic of the present invention, the device 10 comprises two gripper-type attachment units 40 (figs. 7 and 8) arranged in two corresponding recesses 41 made between the blocks 11a and 11b, on reciprocally opposite sides with respect to the central part 12a and the clamping element 30.

[0039] By means of the two units 40 it is possible to easily attach a cloth, not shown in the drawings, under the supporting element 12, in order to improve the cleaning operation, for example when the detergent fluid is delivered.

[0040] To be more exact, each gripper-type attachment unit 40 comprises a fin 42 pivoting on a trolley 43, mounted on the supporting element 12. Under each trolley 43 a spongy block 49 is also attached.

[0041] Each trolley 43 is provided with inclined eyelets 45, into which fixed pegs 46 are inserted.

[0042] Each eyelet 45 has teeth 47 which define two stable lateral seatings wherein the pegs 46 are able to selectively position themselves, in order to make each trolley 43 assume a lowered and more outward position, when the cloth is attached, or a raised, more inward position when the cloth is not attached, wherein it takes up least space.

[0043] A traction spring 53 is associated with each fin 42, in order to keep it normally in a closed position once the cloth has been positioned.

[0044] It is clear, however, that modifications and/or additions of parts may be made to the device 10 as described heretofore, without departing from the field and scope of the present invention.

[0045] It is also clear that, although the present invention has been described with reference to specific examples, a skilled person in the art shall certainly be able to achieve many other equivalent forms of cleaning device, all of which shall come within the field and scope of the present invention.

Claims

1. Cleaning device able to be coupled, in fixed or removable manner, with a cleaning apparatus and comprising a supporting element (12) having a suction unit (14) and a delivery unit (16) to deliver a detergent fluid under pressure, and connection means (28) able to connect said supporting element (12) to said cleaning apparatus, **characterized in that** said connection means (28) are able to selectively position said supporting element (12) in a first stable operating position, wherein said delivery unit (16) is arranged at the front, in a determinate working direction, with respect to said suction unit (14), or in a second stable operating position, wherein said suction unit (14) is arranged at the front with respect to said delivery unit (16).
2. Device as in claim 1, **characterized in that** said supporting element (12) is shaped substantially like an "H" and comprises two blocks (11a, 11b) substantially parallel to each other, on which said suction unit (14) and respectively said delivery unit (16) are arranged.
3. Device as in claim 1 or 2, **characterized in that** said connection means comprise a joint-type coupling (28) having a first part (28a) connected to a main suction pipe (15) and to a delivery pipe (23) to deliver said detergent fluid, and a second part (28b) connected in articulated manner to said supporting element (12).
4. Device as in claim 3, **characterized in that** said second part (28b) is rotatably pivoted on said supporting element (12) and is able to rotate around a substantially vertical pivoting axis (X).
5. Device as in claim 4, **characterized in that** said joint-type coupling (28) is substantially shaped like a 90° tubular elbow, wherein said second part (28b) defines a substantially vertical portion which is inserted in a circular seating (34) made in said supporting element (12) and which is free to rotate with respect thereto.
6. Device as in any claim from 3 to 5 inclusive, **characterized in that** said joint-type coupling (28) is associated with clamping means (30) able to cooperate selectively with said supporting element (12) in order to selectively clamp said joint-type coupling (28) in one or the other of said operating positions.
7. Device as in claim 6, **characterized in that** said clamping means comprise a sliding element (30) which is able to slide axially with respect to said second part (28b) of said joint-type coupling (28) and is able to rotate together therewith with respect to

said pivoting axis (X).

8. Device as in claim 7, **characterized in that** the lower portion of said sliding element (30) is inserted in a mating seating (31) of said supporting element (12) and is able to cooperate with at least two positioning pegs (32) of said supporting element (12), which are attached on diametrically opposite sides with respect to said pivoting axis (X). 5
9. Device as in claim 8, **characterized in that** on the outer surface of said lower part of said sliding element (30) a groove (35) is made, horizontal and continuous, and **in that** two seatings (38) are made in diametrically opposite positions, able to accommodate said positioning pegs (32) in a condition of constraint. 10 15
10. Device as in claim 9, **characterized in that**, in correspondence with each seating (38), said groove (35) includes a hollow (39) shaped like an upside-down V, also passing through said seatings (38) and defining two inclined planes (39a and 39b) with which each of said positioning pegs (32) is able to cooperate. 20 25
11. Device as in claim 10, **characterized in that** elastic compression means (33) are associated with said sliding element (30) in order to constrain said positioning pegs (32) in said seatings (38) and to keep said sliding element (30) in a stable position. 30
12. Device as in claim 11, **characterized in that** said sliding element (30) is able to be pressed towards said joint-type coupling (28) against the action of said elastic compression means (33) in order to displace said positioning pegs (32) in said groove (35), so as to allow said supporting element (12) to rotate around said pivoting axis (X) until one or the other operating position, and **in that**, when said operating position has been reached, said elastic compression means (33) are able to again thrust said sliding element (30) into an inactive position in order to return said positioning pegs (32) to their respective seatings (38). 35 40 45
13. Device as in any claim hereinbefore, **characterized in that** it comprises two gripper-type attachment units (40) arranged in two corresponding recesses (41) made at the sides of said supporting element (12) and able to attach a cloth, a canvas or otherwise under said supporting element (12). 50
14. Device as in claim 13, **characterized in that** each of said attachment units (40) comprises a fin (42) pivoting on a trolley (43), mounted on said supporting element (12). 55
15. Device as in claim 14, **characterized in that** said trolley (43) is provided with inclined eyelets (45), in which fixed pegs (46) are inserted, and in which two stable outer seatings are made wherein each of said fixed pegs (46) is able to be selectively inserted in order to position respectively each trolley (43) in a lowered and more outward position or in a raised and more inward position.
16. Device as in claim 14, **characterized in that** a traction spring (53) is associated with said fin (42) in order to keep it normally in a closed position so as to close said cloth, canvas or otherwise.

