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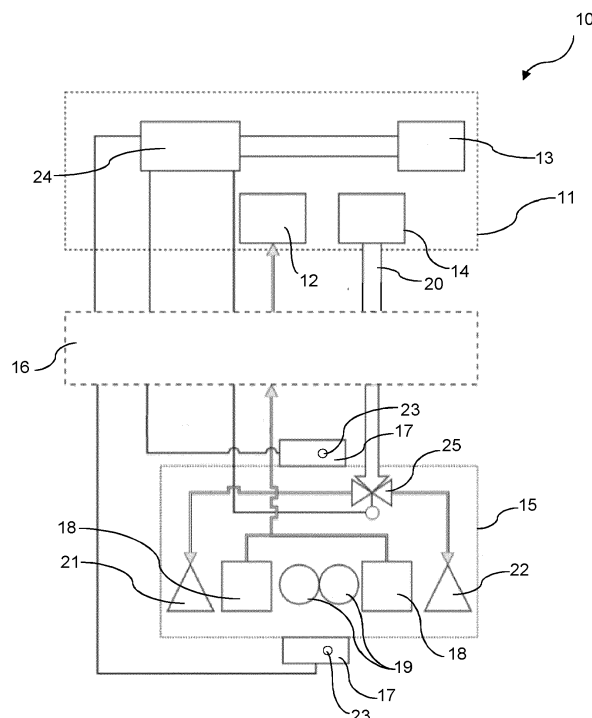
HANDHELD VACUUM CLEANER

(57) A handheld vacuum cleaner (10) comprising: a body (11) with a dirty air inlet (12), a dust box, a handle to be gripped, a battery (13), an exhaust (14) of the hot air, and a nozzle (15) configured to perform both wet and dry cleaning and connected with the body (11) by a tube (16), wherein the nozzle (15) comprises: wheels (17), at least one suction channel (18) and at least one rotating pad (19) wherein the body (11) of the handheld vacuum cleaner (10) has an exhaust air channel (20) directing

hot air from the exhaust (14) to the nozzle (15), wherein the nozzle (15) has a first air outlet (21) and a second air outlet (22).

The present invention provides a handheld vacuum cleaner with enhanced cleaning effect by using a nozzle configured to perform both wet and dry cleaning which is equipped with a hot air outlet which dry the cleaning surface which is a great advantage for the customer.

Fig. 1



Description

[0001] The present invention relates to a handheld vacuum cleaner having a body with a dirty air inlet, a dust box, a handle to be gripped, a battery, an exhaust of the hot air and a nozzle configured to perform both wet and dry cleaning. The nozzle is connected with the body by a tube and the nozzle comprises wheels, at least one suction channel and at least one rotating pad for wet cleaning.

[0002] Wet and dry vacuum cleaners equipped with a nozzle for vacuuming and mopping floor are known from the state of the art. Vacuum cleaners which simultaneously vacuum, mop and dry hard floor are also known from the state of the art. Simultaneous execution of different processes saves time and energy. In known solution a vacuum cleaner is vacuuming the hard floor by sucking the dirt from the floor. At the same time the mopping process is performed. The floor is mopped by a first roller brush and then the drying is performed by second brush which rotates and makes the floor dry. Instead of rotating brushes a flat rotating plates are also used. Pads and brushes are often made out of the microfiber or other material thanks to which the effective mopping and drying are possible.

[0003] The patent document US 2020 383 547 A1 discloses a robotic cleaner for autonomously cleaning a cleaning surface. The cleaner may include an agitation module configured to directly agitate a forward edge of cleaning pad. According to another aspect the cleaning pad may have a rigid strip at a leading edge thereof for slidably engaging a channel in a wet cleaning module to removably couple the cleaning pad to the wet cleaning module. According to another aspect, the cleaner may include wheels having a gapless tread configuration.

[0004] The patent document DE 20 2016 104 251 U1 discloses a damp cleaning apparatus, in particular an automatically moving cleaning apparatus which has an apparatus housing and a drying device for drying residual moisture on a cleaned surface. The drying device has an air guide device with an opening by means of which an air flow from a pressure side of a suction blower and/or from a heat generator of the damp cleaning apparatus can be guided through the opening directed onto the surface with respect to an orientation of the damp cleaning apparatus during a normal cleaning operation.

[0005] The patent document CN 1 04 207 730 A discloses a vertical multifunctional floor cleaning blow-drying device. The vertical multifunctional floor cleaning blow-drying device comprises a holding rod device, a host machine, a rotating device, a combined mop device and a cleaning cushion. The holding rod device is connected with the host machine. The host machine is connected with the combined mop device through the rotating device. The vertical multifunctional floor cleaning blow-drying device further comprises an electric heating blower, a dust sucking device and a steam device, wherein the steam device can be installed inside the host machine or inside the combined mop device. By means of the vertical multifunctional floor cleaning blow-drying device, a wet and slippery floor can be quickly blown dry while the floor is mopped, and meanwhile the dust sucking function and the steam cleaning function are achieved. The vertical multifunctional floor cleaning blow-drying device is good in safety performance, simple in structure and convenient to use, the cleaning time can be greatly shortened, the working efficiency can be improved, the cleaning and decontaminating effects are very good, and the vertical multifunctional floor cleaning blow-drying device can be widely applied to cleaning and decontaminating houses, hotels and office spaces.

[0006] It is the object of the present invention to provide a handheld vacuum cleaner with a wet and dry nozzle of improved drying effect of the cleaning surface without necessity of generating additional energy for this purpose.

[0007] This object is solved by a handheld vacuum cleaner in which the body has an exhaust air channel directing hot air from exhaust to the nozzle, wherein the nozzle has a first air outlet and a second air outlet to perform a drying process of the cleaning surface.

[0008] The handheld vacuum cleaner is a device for picking and collecting dust from the cleaning surfaces e. g. floors, carpets, etc. The handheld vacuum cleaner comprises a body with a dirty air inlet through which the dust is directing into the dust box, a handle to be gripped, a battery and an exhaust of the hot air which is generated by the vacuum cleaner during work. The handheld vacuum cleaner has a nozzle which is connected with the body by the tube. The nozzle is configured to perform both wet and dry cleaning. For this purpose the nozzle is provided with at least one suction channel through which the dirt is sucked up and directed to the dust box by the tube. For the wet cleaning the handheld vacuum cleaner is equipped with mop which usually is a rotating pad provided with a textile which is responsible for mopping the hard floor. The handheld vacuum cleaner can be also provided with a water supplying system as integrated part of the vacuum cleaner or as an separate, external water system in which water with detergent is delivered by the user.

[0009] In a preferred embodiment of the invention the first air outlet and a second air outlet are placed at the bottom side of the nozzle on the sides of the nozzle and directed toward the cleaning surface. The positive effect is that the hot air from the exhaust is directed straight toward the cleaning surface. Thanks to such setup the floor is dried in effective way without energy lost.

[0010] In a preferred embodiment of the invention the first air outlet is placed at a front side of the nozzle and the second air outlet is placed at a rear side of the nozzle. The first air outlet and the second air outlet are placed in the vicinity of the suction channel and mopping pads and dry the cleaning surface.

[0011] In another embodiment of the invention wheels of the nozzle has encoders. Encoders are connected by

a microcontroller with a valve. The valve is placed on the end of the exhaust air channel and the microcontroller is placed in the body of the handheld vacuum cleaner. The first air outlet and the second air outlet are activated alternately depending on the movement direction of the nozzle.

[0012] The nozzle of the handheld vacuum cleaner typically has wheels to enable the nozzle to move on the cleaning surface. Wheels are provided with encoders. Encoder is a type of motion control sensor that provides a feedback to a control system and converts the rotary or linear motion of a nozzle into an electrical signal. The signal is read by the microcontroller which is placed on the body of the handheld vacuum cleaner and is responsible for valve control. The valve is placed at the end of the exhaust air channel and it can be a solenoid valve. The valve is provided to control the opening and closing the first air outlet and the second air outlet. The first air outlet and the second air outlet are activated alternately depending on the movement direction of the nozzle. During vacuuming, the nozzle moves in two general directions - forward and backward. Forward direction means in the direction from the user, the backward direction means towards the user. Depending on the movement direction the respective air outlet is activated. When the nozzle moves forward the second air outlet is activated. When the nozzle moves backward, the first air outlet is activated. The positive effect is that the situation when the dust can be blow up by airflow of the hot air is prevented.

[0013] The present invention provides a handheld vacuum cleaner with enhanced cleaning effect by using a nozzle configured to perform both wet and dry cleaning which is equipped with a hot air outlet which dry the cleaning surface which is a great advantage for the customer.

[0014] The construction of the invention, however, together with additional objects and corresponding advantages will be best understood from the following description of specific embodiments and in connection with the accompanying drawing.

[0015] In the drawing:

Fig. 1 shows a schematic view of the handheld vacuum cleaner

[0016] In cooperation with attached drawing, the technical contents and detailed description of the present invention are described thereafter according to a preferable embodiment being not used to limit its executing scope. Any equivalent variation and modification made according to appended claims is all covered by the claims claimed by the present invention.

[0017] In the following description of the preferred embodiments of the present invention, similar identical reference numbers designate identical or comparable components.

[0018] Fig. 1 shows a schematic view of the handheld vacuum cleaner 10 comprising a body 11 and a nozzle

15 which is connected with the body 11 by the tube 16. The body 11 has a dirty air inlet 12, a dust box, a handle to be gripped, a battery 13 and an exhaust 14 of the hot air generated by the handheld vacuum cleaner 10. The hot air from the exhaust 14 is transferred into the nozzle 15 by the exhaust air channel 20. At the end of the exhaust air channel 20 a valve 25 is provided. The nozzle 15 is configured to perform both wet and dry cleaning. The nozzle 15 has wheels 17, a suction channel 18 and two rotating pads 19. Each wheel 17 has an encoder 23. Encoders 23 are connected with the valve 25 by the microcontroller 24. Encoders 23 are provided to detect the movement direction of the nozzle 15 and control the operation of the valve 25 through the microcontroller 24 depending on the movement of the nozzle 15. The valve 25 is responsible for activating the first air outlet 21 and the second air outlet 22. Depending on the nozzle movement the relevant air outlet is activated by the valve 25. When the nozzle 15 moves backward, the first air outlet 21 is activated and when the nozzle moves forward the second air outlet is activated. The first air outlet 21 is placed at a front side of the nozzle 15 and the second air outlet 22 is placed at a rear side of the nozzle 15. The first air outlet 21 and the second air outlet 22 are placed in vicinity of the suction channel 18.

[0019] The body 11 of the handheld vacuum cleaner 10 has an exhaust air channel 20 directing hot air from the exhaust 14 to the nozzle 15. The nozzle 15 has a first air outlet 21 and a second air outlet 22 for redirecting the hot air from the exhaust air channel 20 into the cleaning surface. Rotating pads 19 are placed in the nozzle 15 between the outlets of the suction channel 18.

[0020] The present invention provides a handheld vacuum cleaner with enhanced cleaning effect by using a nozzle configured to perform both wet and dry cleaning which is equipped with a hot air outlet which dry the cleaning surface which is a great advantage for the customer.

REFERENCE SIGNS

[0021]

10	handheld vacuum cleaner
11	body
12	inlet
13	battery
14	exhaust
15	nozzle
16	tube
17	wheel
18	suction channel
19	pad
20	exhaust air channel
21	first air outlet
22	second air outlet
23	encoder
24	microcontroller
25	valve

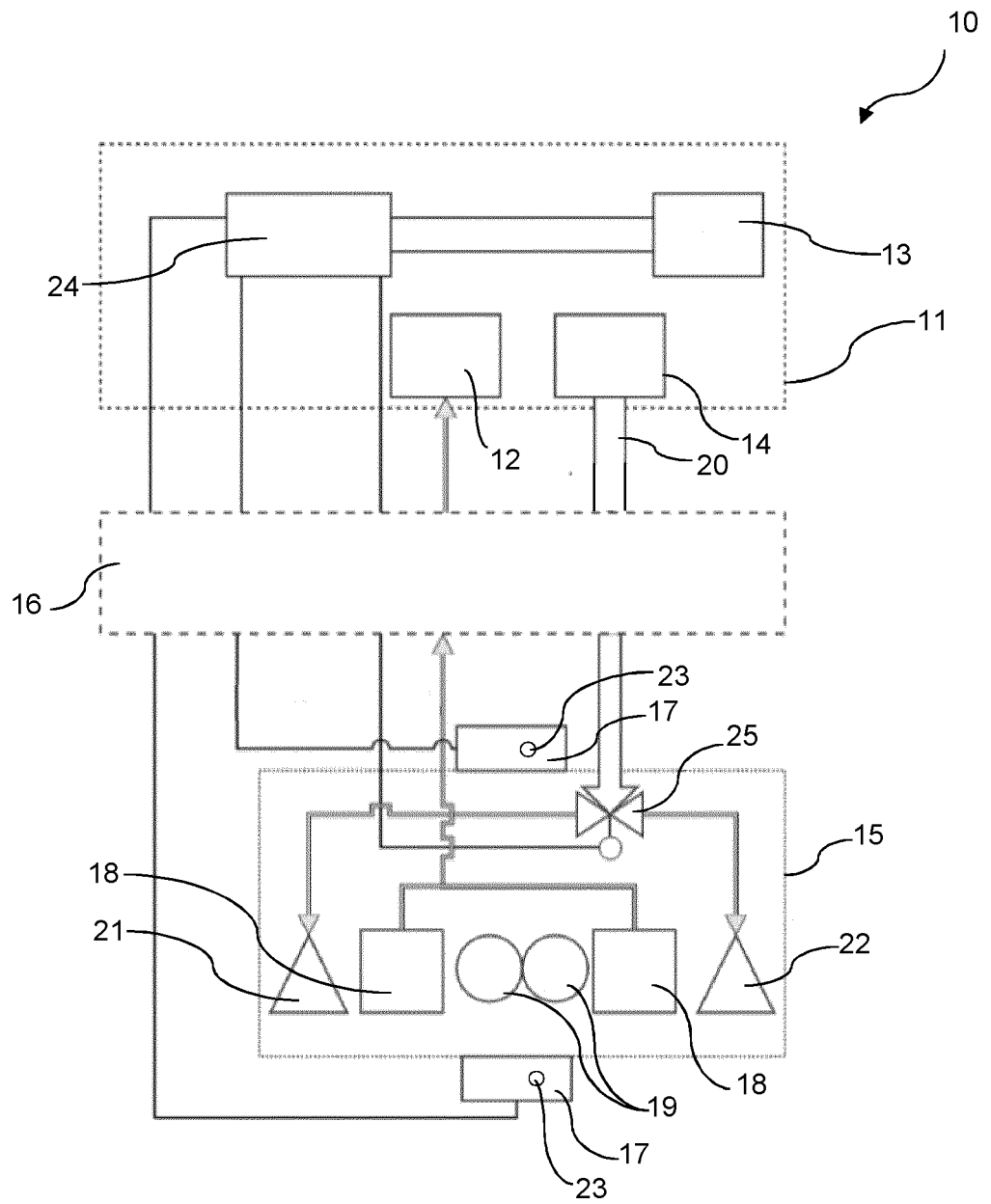
Claims

1. A handheld vacuum cleaner (10) comprising: a body (11) with a dirty air inlet (12), a dust box, a handle to be gripped, a battery (13), an exhaust (14) of the hot air, and a nozzle (15) configured to perform both wet and dry cleaning and connected with the body (11) by a tube (16), wherein the nozzle (15) comprises: wheels (17), at least one suction channel (18) and at least one rotating pad (19), **characterized in that** the body (11) of the handheld vacuum cleaner (10) has an exhaust air channel (20) directing hot air from the exhaust (14) to the nozzle (15), wherein the nozzle (15) has a first air outlet (21) and a second air outlet (22). 5 10 15
2. The handheld vacuum cleaner (10) according to claim 1, **characterized in that** the first air outlet (21) and the second air outlet (22) are placed at the bottom side of the nozzle (15) on a sides of the nozzle (15). 20
3. The handheld vacuum cleaner (10) according to any of the preceding claims, **characterized in that** the first air outlet (21) and the second air outlet (22) are directed toward the cleaning surface. 25
4. The handheld vacuum cleaner (10) according to any of the preceding claims, **characterized in that** the first air outlet (21) is placed at a front side of the nozzle (15) and the second air outlet (22) is placed at a rear side of the nozzle (15). 30
5. The handheld vacuum cleaner (10) according to any of the preceding claims, **characterized in that** wheels (17) of the nozzle (15) has encoders (23). 35
6. The handheld vacuum cleaner (10) according to claim 5, **characterized in that** encoders (23) are connected by a microcontroller (24) with a valve (25) placed on the end of the exhaust air channel (20) wherein the microcontroller (24) is placed in the body (11) of the handheld vacuum cleaner (10). 40
7. The handheld vacuum cleaner (10) according to any of the preceding claims, **characterized in that** the first air outlet (21) and the second air outlet (22) are activated alternately depending on the movement direction of the nozzle (15). 45 50

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Fig. 1





EUROPEAN SEARCH REPORT

Application Number

EP 22 19 0877

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EPO FORM 1503 03:82 (P04C01)

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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