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Vacuum cleaner having a steam jetting apparatus.

This invention provides a canister type vacuum cleaner on which a steam jetting apparatus of compact construction is mounted so as to perform steam-jetting cleaning with ease as well as vacuum cleaning. The steam jetting apparatus according to this invention comprises a water container, a transfer pump, a heater, and a steam tube having a plurality of steam-jetting nozzles on its end portion. The water container, transfer pump and heater are combined in an assembly. The assembly is attached to the lower portion of the suction pipe connecting the cleaner body to the brush, or is disposed in the interior of the brush. The steam tube and a cloth roller are also mounted in the interior of the brush for jetting the steam to the bottom floor of a room being cleaned and absorbing the water on the bottom, respectively.

This invention relates to a canister type vacuum cleaner having a steam jetting apparatus which can easily eliminate dirt sticking to a floor or room needed to be cleaned, thereby performing steam cleaning as well as vacuum cleaning.

Vacuum cleaners are generally divided into two types: up-right type cleaners and canister type cleaners.

In the upright type vacuum cleaner the brush with an intake hole is integrally mounted on the bottom of the body with a suction motor and a dust-collecting filter. With the movement of the body, the suction motor inhales dust and crumbs etc. on the floor directly through the intake hole of the brush.

In the canister type vacuum cleaner the body and the brush, which are separated from each other, are connected by a suction pipe and a flexible hose. Dust and/or crumbs are inhaled through the intake hole of the brush by the operation of the suction motor, and then transferred to the dust-collecting filter of the body through the suction pipe and flexible hose.

That is, the above general vacuum cleaners perform cleaning in such a manner that the surrounding air, including dust, is inhaled through the intake hole of the brush by the suction motor. The dust and trash of the inhaled air is then collected in the collecting filter, and finally only the clean air is discharged to the exterior of the body.

However, conventional vacuum cleaners have demerit in that they are not able to eliminate old dirt or crumbs from sticking to the bottom of a floor or room because they perform the cleaning work only by the suction of the surrounding air. In order to eliminate old dirt or crumbs from sticking to the bottom of a room being cleaned or to do further cleaning of a room, you must first eliminate the dust on the floor with a vacuum cleaner, and then wipe the room with a damp cloth. Accordingly, the cleaning work is very troublesome.

Figure 6 illustrates a conventional up-right type vacuum cleaner capable of eliminating old dirt by use of jetting steam.

The up-right type vacuum cleaner 21 with a steam generating apparatus includes a water container 26 and a steam generator 27 in a body 22 of which a fan casing 23, a filter 24, and a brush 25 are mounted. Steam tube 28 is used both for connecting the above components with each other and for jetting steam to the bottom floor of a room. One end of the steam tube 28 joins the bottom of the water container 26 which is disposed at the upper portion of the body 22, and the other end of the steam tube 28 is disposed at the bottom of the body 22 in the front of a brush drum 29.

In the operation, water from the water container 26 flows along the steam tube 28 by gravity and passes through the steam generator 27. As the water passes through the steam generator 27, steam of a

high temperature is generated. Finally, the steam is jetted onto the bottom floor of a room that is being cleaned through the steam tube 28. By inhaling the dust and crumbs through the brush drum 29 with the above steam action, the bottom floor is wiped cleanly.

However, the up-right vacuum cleaner 21 with such a steam generating apparatus has several demerits in that it does not have good workability and because the brush 25 is integrally combined with the body 22 of the cleaner 21, it is difficult to clean a confined area.

Further, the up-right vacuum cleaner 21 has demerit in that the water container 26 and the steam generator 27 are mounted inside the body 22, so that dimensions and weight become larger, and therefore inconvenient for the user to handle.

Consequently, the up-right vacuum cleaner 21 with such a steam generating apparatus is unsuitable for the cleaning of confined places like chinks between the parts of a door or a window, the corner portions of a room, the parts underneath a kitchen unit, or a bed and sofa etc., and so it is not ideal for home use.

It is accordingly an object of this invention to provide a canister type vacuum cleaner on which a steam jetting apparatus is compactly mounted in order to perform steam-jetting cleaning as well as vacuum cleaning.

This invention comprises a steam jetting apparatus which is mounted in a canister vacuum cleaner which includes a body having an air-suction motor and a dust-collecting filter therein, a brush having an air intake and a cloth roller therein, and a suction pipe and flexible hose connecting the body to the brush.

The steam jetting apparatus comprises a water container having a receptacle for receiving water, a transfer pump provided at the outlet of the water container for transferring the water in the water container at a constant rate and pressure, a heater disposed at the outlet of the transfer pump for generating steam from the water transferred by the transfer pump, and a steam tube, one end of which is connected to the heater, and the other end of which is disposed longitudinally in the brush.

The water container, the transfer pump, and the heater are compactly combined as an assembly and are mounted on the suction pipe of the vacuum cleaner.

To jet the steam to the bottom floor of a room being cleaned, a plurality of steam-jetting nozzles are formed at regular intervals on the bottom end of the steam tube.

The water container, the transfer pump, and the heater, which are compactly combined as an assembly, may also be mounted in the brush.

Such a vacuum cleaner, having the steam jetting apparatus according to this invention, can perform steam cleaning as well as vacuum cleaning in a one

round operation so that dust and crumbs on the bottom floor of a room are inhaled into the air intake of the brush and old dirt sticking to the bottom of the floor is removed by the steam jetted through the steam-jetting nozzles, and the water on the bottom of the floor is absorbed by the cloth roller.

By way of example, specific embodiments of the invention will now be described, with reference to the accompanying drawings, in which :-

Figure 1 shows a perspective view of a canister type vacuum cleaner having a steam jetting apparatus according to this invention;

Figure 2 shows a schematic bottom view of a brush in Figure 1;

Figure 3 is a view schematically showing steam generated by the steam jetting apparatus in this invention being jetted onto the bottom floor of a room;

Figure 4 shows a perspective view of a canister type vacuum cleaner having a steam jetting apparatus according to another embodiment of this invention;

Figure 5 shows a schematic bottom view of a brush in Figure 4; and

Figure 6 is a view schematically showing a conventional upright type vacuum cleaner having a steam jetting apparatus.

Figure 1 illustrates a canister type vacuum cleaner 1 having a steam jetting apparatus 10 according to this invention.

The canister type vacuum cleaner 1 comprises a movable body 2 which includes an air-suction motor and a dust-collecting filter (not shown) therein, a brush 4 having an air intake (not shown) and a cloth roller 7 therein, and a suction pipe 5 and flexible hose 3 for carrying dust and/or crumbs from the air intake to the body 2. The cloth roller 7 is comprised of a cylindrical roller free to rotate and a cloth which is attached to the surface of the roller for wiping the bottom floor of a room.

The steam jetting apparatus 10, which is mounted on the canister type vacuum cleaner 1, comprises a water container 11 for storing a fixed amount of water, a transfer pump 12 disposed under the water container 11 for transferring the water in the water container 11 at a constant rate and pressure, a heater 13 disposed at the outlet of the transfer pump 12 for heating the water from the transfer pump 12 to a fixed temperature for generating steam, and steam tube 14 having a plurality of steam-jetting nozzles 14b for jetting the steam generated by the heater 13 to the bottom floor being cleaned.

The water container 11, the transfer pump 12, and the heater 13 are compactly combined as an assembly and are mounted on the lower portion of the suction pipe 5.

One end of the steam tube 14 is connected to the lower end of the heater 13 and the other end of the

steam tube 14 is arranged longitudinally in the brush 4.

A receptacle 15, for receiving water from the exterior, is provided on the upper end of the water container 11.

Figure 2 illustrates the bottom of the brush 4 schematically.

As shown in Figure 2, the steam tube 14 is disposed in the rear of the brush 4, while the steam-jetting nozzles 14b are arranged at regular intervals on the end portion 14a of the steam tube 14 which is longitudinally placed in the brush 4. In the front of the brush 4 a cloth roller 7 is mounted for wiping off dust and water from the steam jetted, and an air intake (not shown) is formed on the cloth roller 7.

As shown in Figure 3, the steam-jetting nozzles 14b jet the steam toward the subject which is being cleaned (a room or floor) from behind the cloth roller 7.

A temperature sensor and a fuse (not shown) are provided adjacent to the heater 13. The temperature sensor is for breaking electrical contact when the heater 13 rises above a predetermined temperature.

An operation switch (not shown), for operating the steam jetting apparatus 10, may be provided on the body 2, or may be combined with a control part (not shown) arranged on a handle 6 for operation of the vacuum cleaner 1. The operation switch may be comprised of a first switch and a second switch. So, when the first switch is "ON" for the jet steam, the heater 13 is preheated first to a predetermined temperature, and subsequently the preparation for changing water to steam is finished. It may be desired that a lamp or a buzzer (not shown) be provided in order that the user can tell when the preparation for the jetting steam has been finished. Next, when the user turns on the second switch, invoking the operation of the transfer pump 12, the steam-jetting work is done.

Accordingly, when the vacuum cleaner 1 is in operation with the steam-jetting function, and in simultaneity with the inhalation of dust and crumbs etc. through the air intake of the brush 4, the steam generated from the steam jetting apparatus 10 is jetted toward the bottom floor of a room.

The steam-jetting process is as below.

When the transfer pump 12 operates under the condition that the heater 13 is preheated to a predetermined temperature, the water which is stored in the water container 11 is transferred to the heater 13 at a constant rate and pressure. Passing through the heater 13, the water is changed to steam, and then the steam flows down through the steam tube 14 and finally reaches the end portion 14a of steam tube 14 in the brush 4. At this point, the steam is jetted toward the bottom floor through the steam-jetting nozzles 14b.

Accordingly, old dirt or crumbs sticking to the bottom floor are easily removed. The steam again

changes to water and is then absorbed by the cloth attached to the surface of the cloth roller 7. Subsequently, the removed dirt and/or crumbs are inhaled through the air intake.

Figures 4 and 5 illustrate another embodiment of this invention.

In the steam jetting apparatus of the second embodiment, the water container 11, the transfer pump 12, and the heater 13 are mounted in the brush 4. This causes the dimension of the brush 4 to become somewhat larger, but the length of the steam tube 14 is shortened and the appearance of the vacuum cleaner 1 becomes more appealing, compared with the first embodiment. A further description of the second embodiment is omitted because the construction of the steam jetting apparatus 10 and the steam-jetting process in the second embodiment are the same as in the first embodiment.

As described above, old dirt and crumbs sticking to the top surface of a floor or a room are easily removed by jetting hot steam, which is generated by the steam jetting apparatus according to this invention, to the top surface being cleaned.

Further, because the jetted steam is absorbed by the cloth roller and the removed dirt is inhaled into the body through the intake of the brush, the steam-jetting cleaning and the wet-cloth cleaning, as well as the vacuum cleaning, are performed in one step of the vacuum cleaner having the steam jetting apparatus according to this invention.

Furthermore, when cleaning the bathroom, the veranda or a confined area such as underneath the sofa or a table, as well as a room or floor, can be cleaned by the steam-jetting method according to this invention because the steam jetting apparatus is mounted in the brush where it is easy to handle, on the other hand the steam generating apparatus in the conventional up-right type vacuum cleaner is mounted in the body itself.

Consequently, a vacuum cleaner with the steam jetting apparatus according to this invention is excellent for any domestic use.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serv-

ing the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. In a canister type vacuum cleaner including; a body having an air-suction motor and a dust-collecting filter therein; a brush having an air intake and a cloth roller therein; and a suction pipe and flexible hose connecting said body with said brush,

said vacuum cleaner comprising a steam jetting apparatus which comprises; a water container having a receptacle for receiving water; a transfer pump which is provided at the outlet of said water container in order to transfer the water in said water container at a constant rate and pressure; a heater which is disposed at the outlet of said transfer pump in order to generate steam from the water transferred by said transfer pump; a steam tube, one end of which is connected to said heater, and the other end of which is arranged longitudinally in said brush; and a plurality of steam-jetting nozzles which are formed at regular intervals on the other end of said steam tube to jet the steam to the bottom floor of a room being cleaned.

2. A canister type vacuum cleaner according to Claim 1, wherein said water container, said transfer pump, and said heater are compactly combined as an assembly and are mounted on said suction pipe.

3. A canister type vacuum cleaner according to Claim 1, wherein said water container, said transfer pump, and said heater are compactly combined as an assembly and are mounted in said brush.

FIG. 1

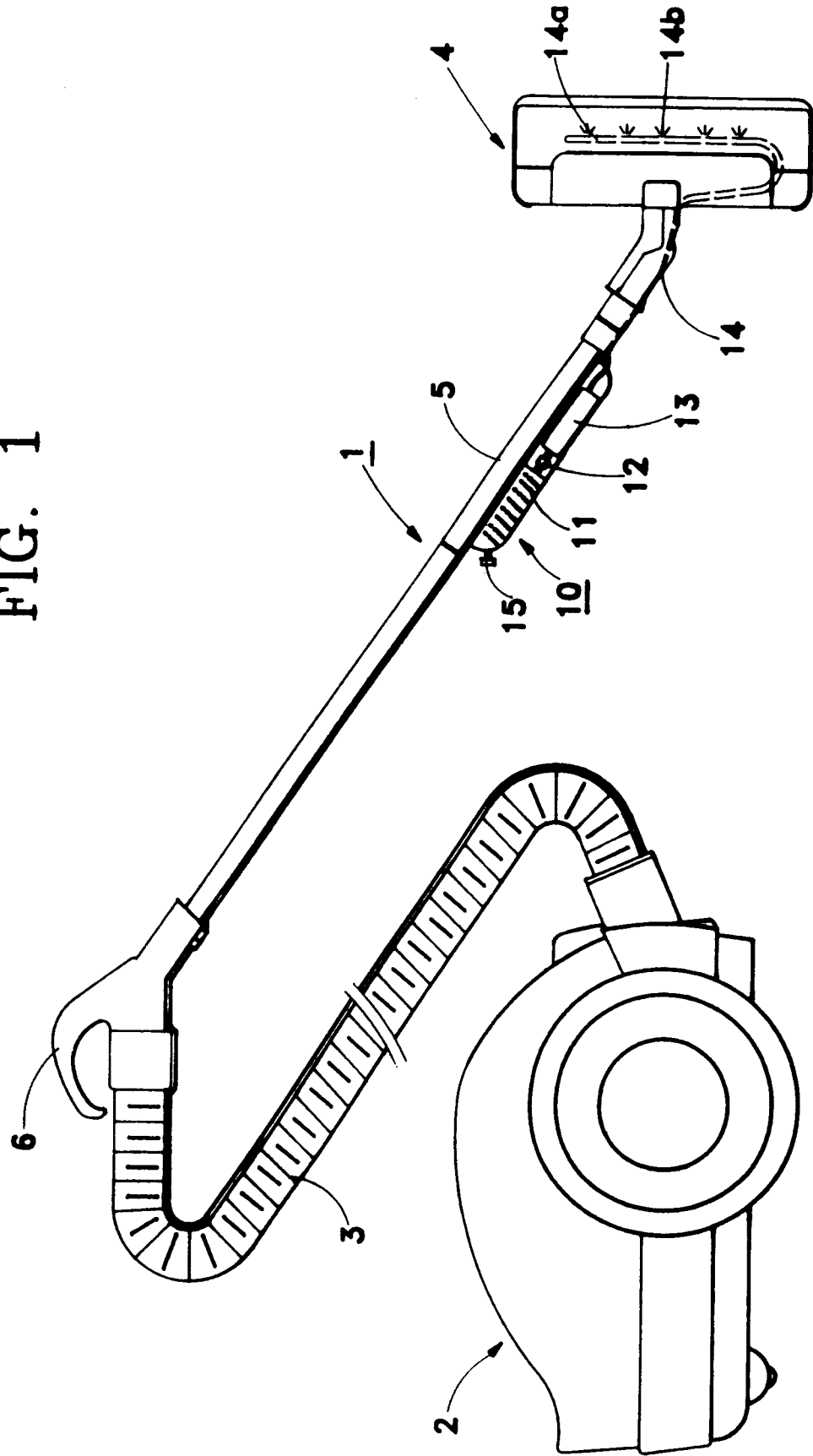


FIG. 2

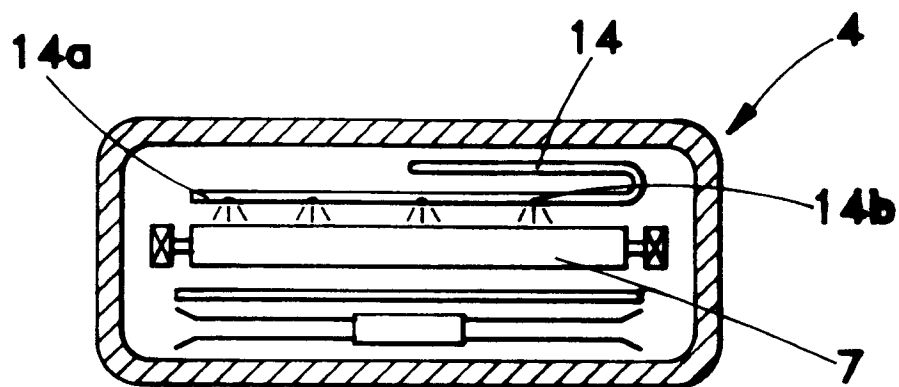


FIG. 3

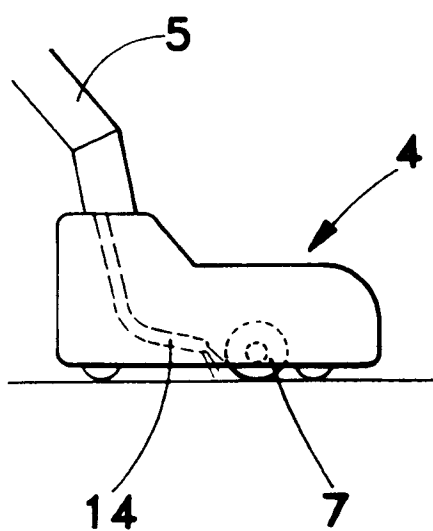


FIG. 4

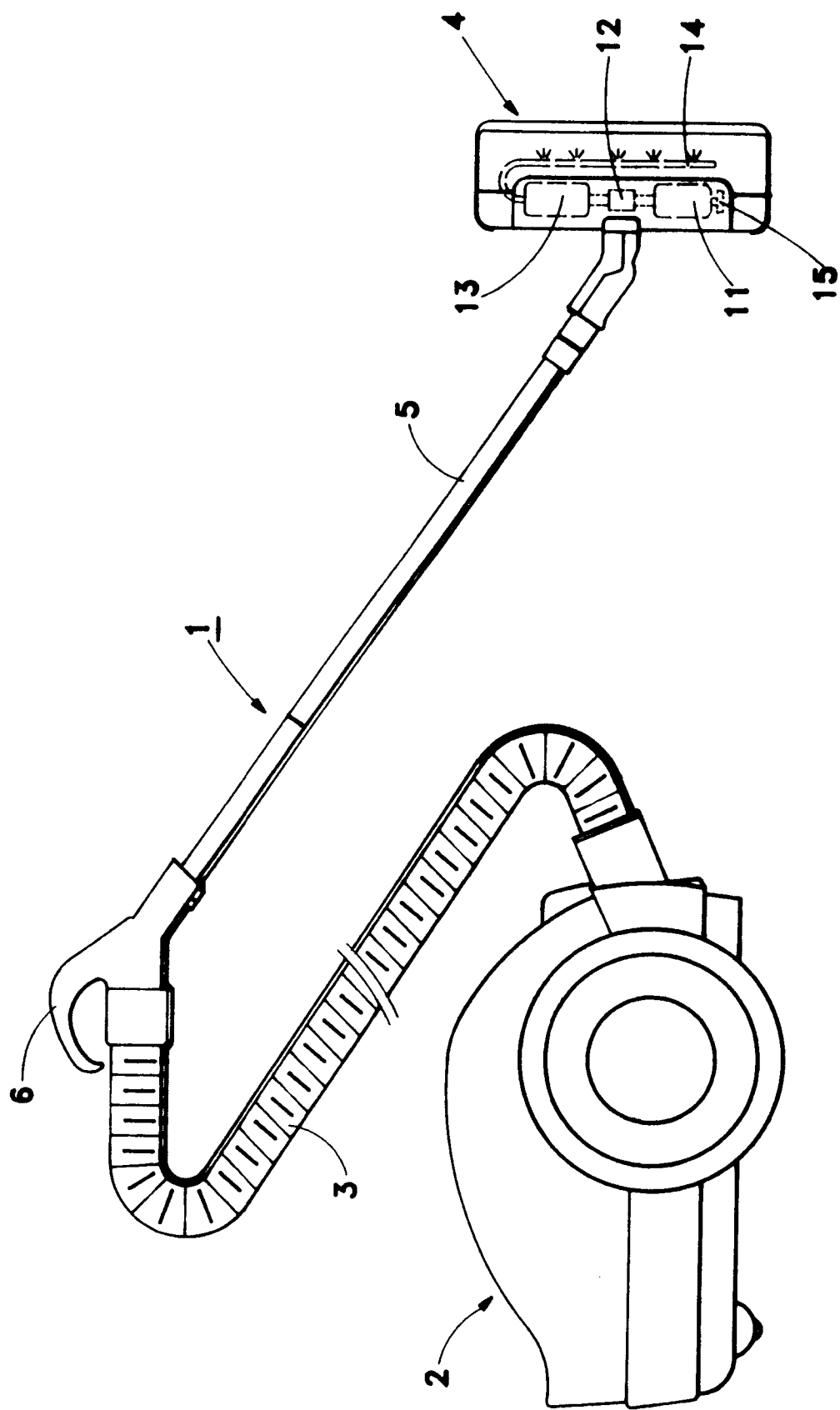


FIG. 5

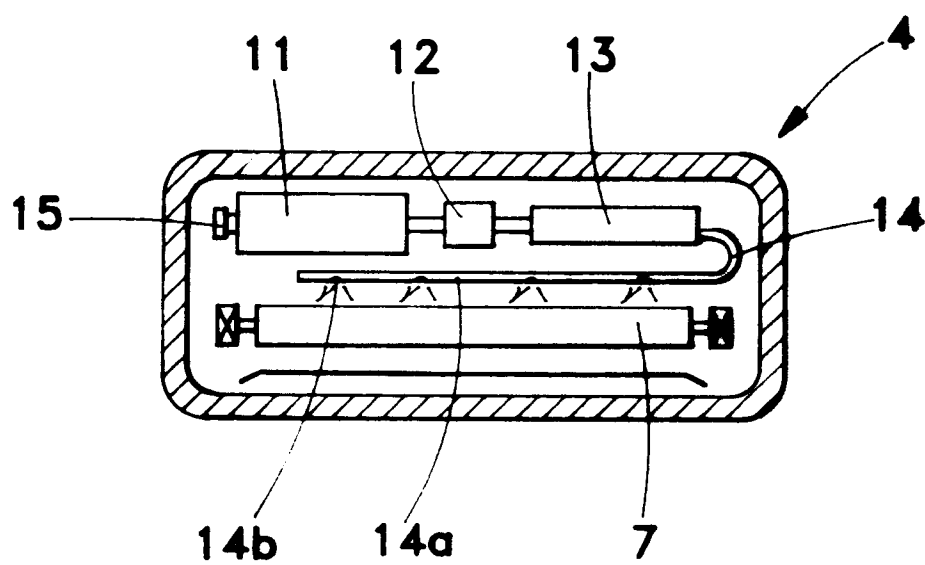
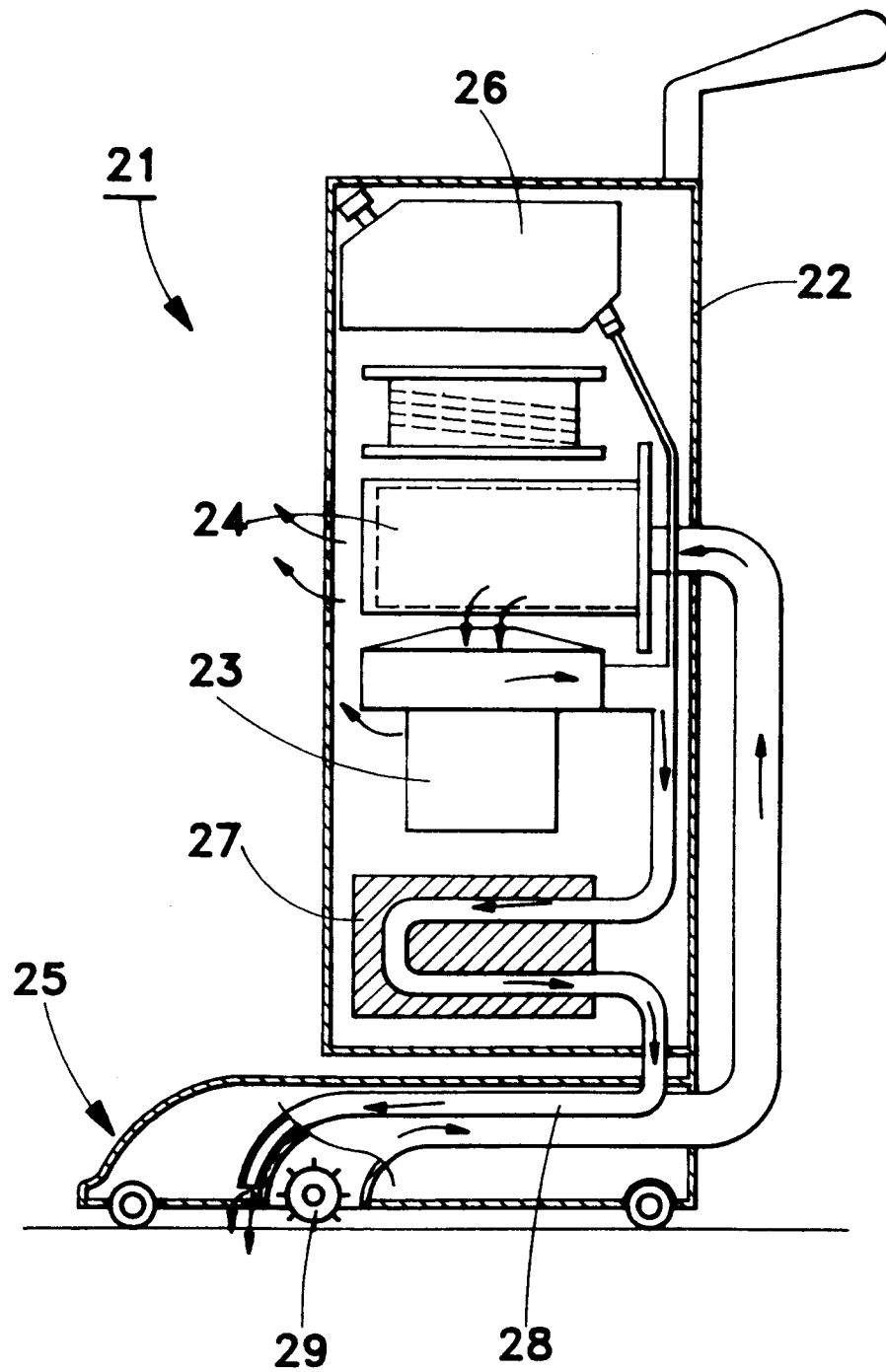


FIG. 6
(PRIOR ART)





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 3412

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.6)
P,X	GB-A-2 276 811 (GOLDSTAR CO LTD) * page 15, line 4 - page 18; figures 14-18 *	1,2	A47L11/34
Y	--- EP-A-0 253 910 (ELWATT SRL) * claims; figures *	1-3	
Y	--- EP-A-0 182 754 (A. CAVALLI) * claims; figures *	1-3	
A	--- FR-A-2 031 395 (AB ELECTROLUX) * the whole document *	1,2	
A	--- PATENT ABSTRACTS OF JAPAN vol. 14, no. 275 (C-0728) 14 June 1990 & JP-A-02 082 928 (SANYO ELECTRIC CO LTD) 23 March 1990 * abstract *	1,3	
A	--- DE-A-26 15 501 (W. WENDNER) * claims; figures *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
P,A	--- FR-A-2 704 741 (M. BLAIRON) * the whole document *	1-3	A47L
P,A	--- EP-A-0 625 331 (SAMSUNG ELECTRONICS CO LTD) * abstract *	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 August 1995	Examiner Vanmol, M
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			

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