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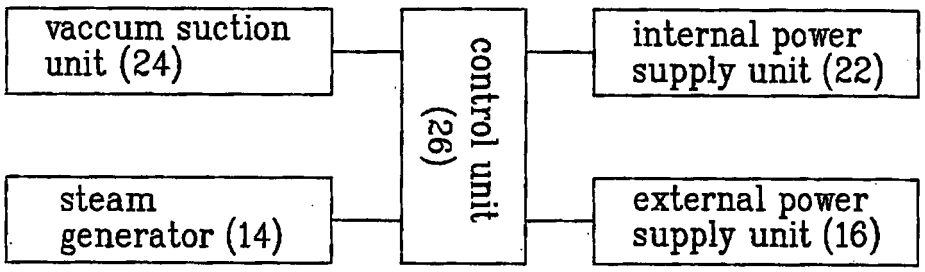
(54) Cleaner having steam generator

(57) A cleaner performs water preheating for a steaming function with power from an external power source, and generates steam with power from a battery provided within the cleaner. The cleaner includes a body (10), a steam generator (14) provided within the body (10) to generate steam by changing stored water into vapor; an internal power supply unit (22) supplying stored electricity to the steam generator (14); and an external power supply unit (16) supplying electricity from an external source to the generator (14).

FIG. 3



EP 1 795 108 A2

Description

[0001] This application claims the benefit of Korean Patent Application No. 10-2005-0120547, filed on December 9, 2005, which is hereby incorporated by reference in its entirety.

[0002] The present invention relates to a cleaner, and more particularly, to a steam cleaner. Although the present invention is suitable for a wide range of applications, it is particularly suitable for cleaning by discharging steam from a bottom surface of a cleaner body.

[0003] Generally, power consumption ranging between 500W to 1,500W is needed to produce a phase change from water to steam for performing a steam function of a cleaner. However, the cleaner should perform a vacuum suction function of sucking particles by vacuum from a floor to be cleaned as well as the steam function, requiring power consumption greater than that for steaming.

[0004] Since adequate power could not be provided by a battery, power is supplied to conventional cleaners via a long cord wire connected to an external power source.

[0005] However, conventional cleaners have the following problems.

[0006] First of all, in case of cleaning by providing both the steam function and the vacuum suction function of the cleaner, the external power is required and the cord of the cleaner connects the external power source to the cleaner. The cord can interfere with and interrupt the cleaning conducted by a user.

[0007] Secondly, the cord connected to the external power source has a limited length. This limits a cleaning range of the cleaner.

[0008] Accordingly, the present invention is directed to a cleaner that substantially obviates one or more problems due to limitations and disadvantages of the related art.

[0009] An object of the present invention is to provide a cleaner, by which water preheating for a steam function of the cleaner in the early stage of operation of the cleaner is achieved by receiving an external power, and by which a steaming operation is achieved by receiving power from a battery provided within the cleaner.

[0010] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0011] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a cleaner according to the present invention includes a body, a steam generator provided within the body to generate steam by changing stored water into vapor, an internal power supply unit supplying stored electricity to the steam generator; and an external power supply unit supplying electricity from an external source to the generator.

[0012] Preferably, the cleaner further includes a vacuum suction unit that sucks particles from a floor and transfers the particles to an internal storage space, the vacuum suction unit selectively receiving electricity from the external power supply unit or the internal power supply unit.

[0013] More preferably, the cleaner further includes a control unit controlling connections and power transfer between the steam generator, the vacuum suction unit, the external power supply unit and the internal power supply unit.

[0014] Preferably, the internal power supply unit comprises a battery. More preferably, the battery is detachably connected to the body. More preferably, the battery is rechargeable.

[0015] Preferably, the cleaner further includes a handle potion connected to the body. More preferably, the internal power supply unit includes a battery and the battery is detachably connected to the handle portion.

[0016] Preferably, the external power supply unit includes a cord and a plug.

[0017] In another aspect of the present invention, a method of controlling a cleaner includes the steps of determining whether power is being supplied to the cleaner through an external power supply unit; if power is supplied through the external power supply unit, operating a steam generator with power supplied though the external power supply unit; and if power is not supplied through the external power supply unit, operating the steam generator with power supplied from an internal power supply unit.

[0018] Preferably, the method further includes charging the internal power supply unit with power supplied to the cleaner through the external power supply unit.

[0019] Preferably, the method further includes operating a vacuum suction unit with power supplied to the cleaner through the external power supply unit.

[0020] Preferably, the method further includes operating a vacuum suction unit with power supplied from the internal power supply unit.

[0021] In another aspect of the present invention, a method of controlling a cleaner includes the steps of preheating water within a steam generator with power supplied through an external power supply unit; determining whether power continues to be supplied through the external power supply unit; if power continues to be supplied through the external power supply unit, generating steam by heating the preheated water within the steam generator with power supplied through the external power supply unit; and if power is not being supplied through the external power supply unit, generating steam by heating the preheated water within the steam generator with power supplied from an internal power supply unit.

[0022] Preferably, the method further includes charg-

ing the internal power supply unit with power supplied through the external power supply unit.

[0023] Preferably, the method further includes operating a vacuum suction unit with power supplied through the external power supply unit.

[0024] Preferably, the method further includes operating a vacuum suction unit with power supplied from the internal power supply unit.

[0025] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

[0026] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0027] FIG. 1 is a perspective view of a cleaner according to a preferred embodiment of the present invention;

[0028] FIG. 2 is a perspective view of an inner configuration of the cleaner shown in FIG. 1; and

[0029] FIG. 3 is a block diagram of a control system of the cleaner shown in FIG. 1.

[0030] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0031] FIG. 1 is a perspective view of a cleaner according to a preferred embodiment of the present invention, FIG. 2 is a perspective view of an inner configuration of the cleaner shown in FIG. 1, and FIG. 3 is a block diagram of a control system of the cleaner shown in FIG. 1.

[0032] Referring to FIG. 1 and FIG. 2, a cleaner according to one preferred embodiment of the present invention includes a body 10 configured as a cleaner head and a handle or grip portion 12 provided on one side of the body 10 to be griped by a user in operating the cleaner. A floorcloth (not shown in the drawings) can be attached to a bottom of the body 10.

[0033] Referring to FIG. 2, a steam generator 14 is provided within the body 10. A prescribed space is provided within the steam generator 14 to store water therein. The steam generator 14 turns the water stored in the prescribed space into steam using electric power received from a power source.

[0034] An outlet (not shown in the drawing) is provided to a lower side of the steam generator 14 through a bottom of the body 10. The steam generated from the steam generator 14 is sprayed downwardly from the bottom of the body 10 via the outlet.

[0035] An external power supply unit 16 is provided to one side of the body 10 for supplying external power, e.g., an AC power to the body 10. The external power supply unit 16 includes a cord 18 having a prescribed length. One end of the external power supply unit 16 is connected to an electrical device within the body 10 and a plug 20 of the external power supply unit 16 is configured to be connected to an external power source.

[0036] An internal power supply unit 22 is provided to one end of the handle 12 to supply a DC power to the body 10. The internal power supply unit 22 is configured to be detachable from the handle portion 12 and may include a rechargeable battery.

[0037] Since a power supplied to a building is AC power, the power supplied to the external power supply unit 16 can be an AC power. Preferably, the internal power supply unit 22 discharges a DC power.

[0038] A vacuum suction unit 24 is also provided within the body 10. The vacuum suction unit 24 sucks particles from a floor and transfers the sucked particles to a storage space (not shown in the drawing) of the body 10.

[0039] The steam generator 14, the external power supply unit 16, the internal power supply unit 22 and the vacuum suction unit 24 are connected to a control unit 26. The control unit 26 transfers electrical signals or power between the steam generator 14, the external power supply unit 16, the internal power supply unit 22 and the vacuum suction unit 24.

[0040] An operation of the cleaner according to the present invention is explained in detail as follows.

[0041] First of all, a process for preparing an operation of the cleaner is carried out in the following manner.

[0042] The plug 20 of the external power supply unit 16 of the body 10 is connected to an outlet (not shown in the drawings) provided in a wall. An AC power is supplied to the body 10 via the plug 20 connected to the outlet, i.e., via the external power supply unit 16.

[0043] If preheating of the water in the steam generator is to be performed, the control unit 26 is activated to enable the AC current to be transferred to the steam generator 14 from the external power supply unit 16. For example, a preheating button on the body 10 may be pressed to activate the preheating function. The steam generator 14 receiving the AC current may preheat the water stored in the steam generator 14 until the water turns into steam.

[0044] After completion of the preheating in the steam generator 14, the control unit 26 cuts of the AC power supplied to the steam generator 14 from the external power supply unit 16. The control unit may inform a user that the preheating is completed, such as by providing an indication via a panel (not shown in the drawing) provided on the body 10. For instance, an indicator signal can be delivered via a display or by lighting or flickering of a display light.

[0045] The internal power supply unit 22 including the battery preferably may be charged with the AC power supplied through the external power supply unit 16. Alternatively, the internal power supply unit 22 may be detached from the body 10 and then charged by a separate

charging device (not shown in the drawing).

[0046] A process for performing cleaning work using the preheated cleaner is explained as follows.

[0047] First of all, if a length of the cord 18 of the external power supply unit 16 is not adequate for reaching a necessary cleaning range, a user separates the plug 20 of the external power supply unit 16 from the outlet.

[0048] After the plug 20 has been separated from the outlet, the cleaner is moved to a place to be cleaned by the user.

[0049] After the cleaner has been moved to the place to be cleaned, a steaming function is activated, such as by pressing a button. The control unit 26 then supplies the DC power to the steam generator 14 from the internal power supply unit 22.

[0050] The steam generator 14 receiving the DC power turns the water into steam completely and discharges the steam via the outlet provided to the bottom of the body 10. The user is also able to clean the floor by activating the vacuum suction function, such as by pressing a vacuum suction button, while the steam function of the cleaner is working. The vacuum suction unit 24 may also receive power from the internal power supply unit 22.

[0051] If the length of the cord 18 of the external power supply unit 16 is adequate for the required cleaning range, the control unit 26 controls the AC power to be supplied to the steam generator 14 from the external power supply unit 16.

[0052] The steam generator 14 receiving the AC power heats the preheated water again until the water turns into steam completely. The steam is externally discharged from the body 10 via the outlet provided to the bottom of the body 10. The user is also able to clean the floor to be cleaned by pressing the vacuum suction button, The vacuum suction unit 24 receiving power from the external power supply unit 16.

[0053] Accordingly, the present invention provides the following effects or advantages.

[0054] First of all, water of a cleaner may be preheated by an external AC power, while cleaning is carried out by a DC power of an internal battery. In this manner a wireless steam cleaner can be provided.

[0055] Secondly, steam cleaning is available for an area in which external AC power is not accessible.

Claims

1. A cleaner comprising:

a body;
a steam generator provided within the body to generate steam by changing stored water into vapor;
an internal power supply unit supplying stored electricity to the steam generator; and
an external power supply unit supplying electricity from an external source to the generator.

2. The cleaner of claim 1, further comprising a vacuum suction unit that sucks particles from a floor and transfers the particles to an internal storage space, the vacuum suction unit selectively receiving electricity from the external power supply unit or the internal power supply unit.

3. The cleaner of claim 2, further comprising a control unit controlling connections and power transfer between the steam generator, the vacuum suction unit, the external power supply unit and the internal power supply unit.

4. The cleaner of any of claims 1 to 3, wherein the internal power supply unit comprises a battery.

5. The cleaner of claim 4, wherein the battery is detachably connected to the body.

6. The cleaner of claim 4 or 5, wherein the battery is rechargeable.

7. The cleaner of any of claims 1 to 6, further comprising a handle potion connected to the body.

8. The cleaner of claim 7, wherein the internal power supply unit comprises a battery and wherein the battery is detachably connected to the handle portion.

9. The cleaner of any of claims 1 to 8, wherein the external power supply unit includes a cord and a plug.

10. A method of controlling a cleaner, comprising the steps of:

determining whether power is being supplied to the cleaner through an external power supply unit;
if power is supplied through the external power supply unit, operating a steam generator with power supplied though the external power supply unit; and
if power is not supplied through the external power supply unit, operating the steam generator with power supplied from an internal power supply unit.

11. The method of claim 10, further comprising charging the internal power supply unit with power supplied to the cleaner through the external power supply unit.

12. The method of claim 10 or 11, further comprising operating a vacuum suction unit with power supplied to the cleaner through the external power supply unit.

13. The method of claim 10 or 11, further comprising operating a vacuum suction unit with power supplied from the internal power supply unit.

14. A method of controlling a cleaner, comprising the steps of:

preheating water within a steam generator with power supplied through an external power supply unit;
determining whether power continues to be supplied through the external power supply unit;
if power continues to be supplied through the external power supply unit, generating steam by heating the preheated water within the steam generator with power supplied through the external power supply unit; and
if power is not being supplied through the external power supply unit, generating steam by heating the preheated water within the steam generator with power supplied from an internal power supply unit.

15. The method of claim 14, further comprising charging the internal power supply unit with power supplied through the external power supply unit.

16. The method of claim 14, further comprising operating a vacuum suction unit with power supplied through the external power supply unit.

17. The method of claim 14, further comprising operating a vacuum suction unit with power supplied from the internal power supply unit.

FIG. 1

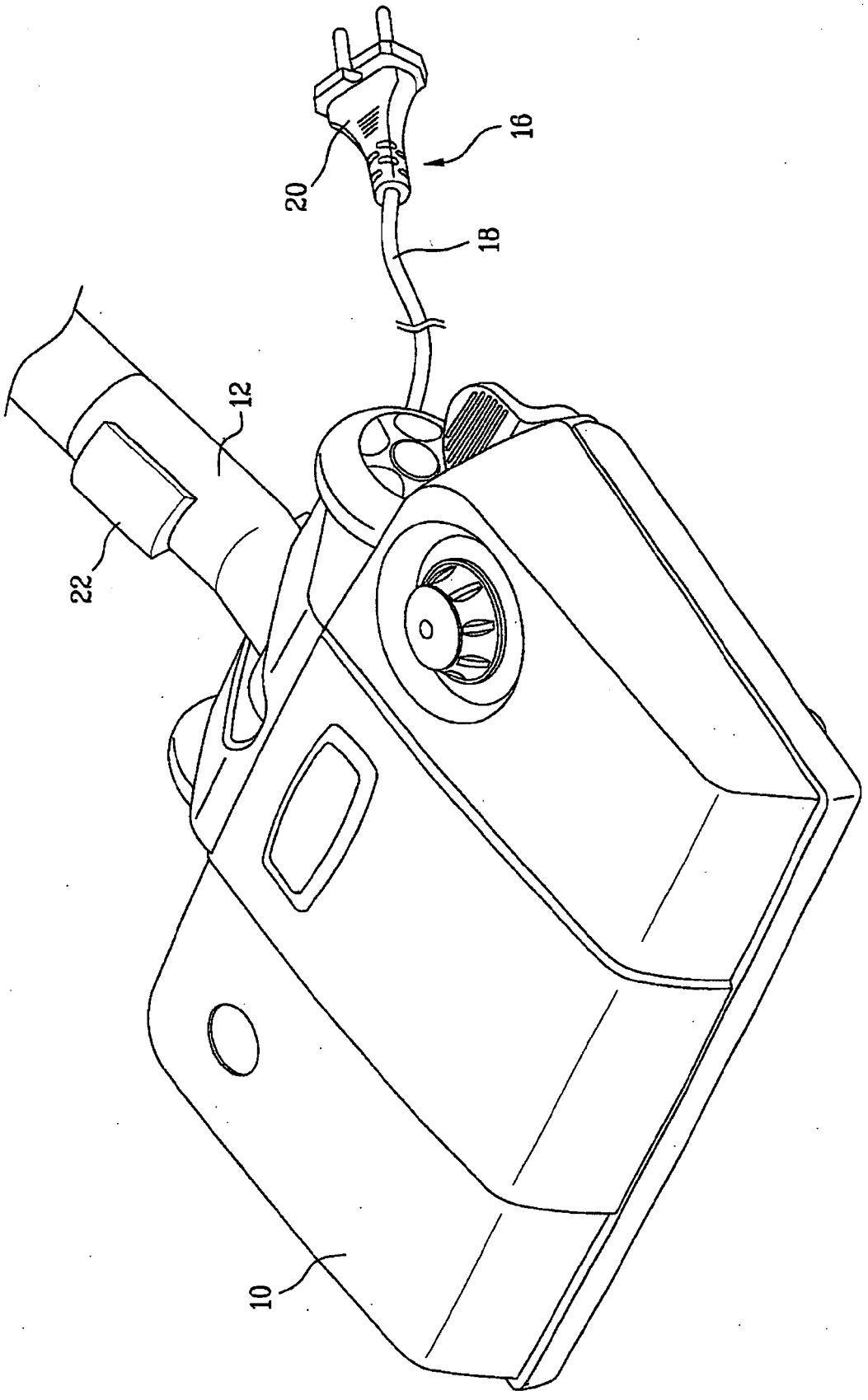


FIG. 2

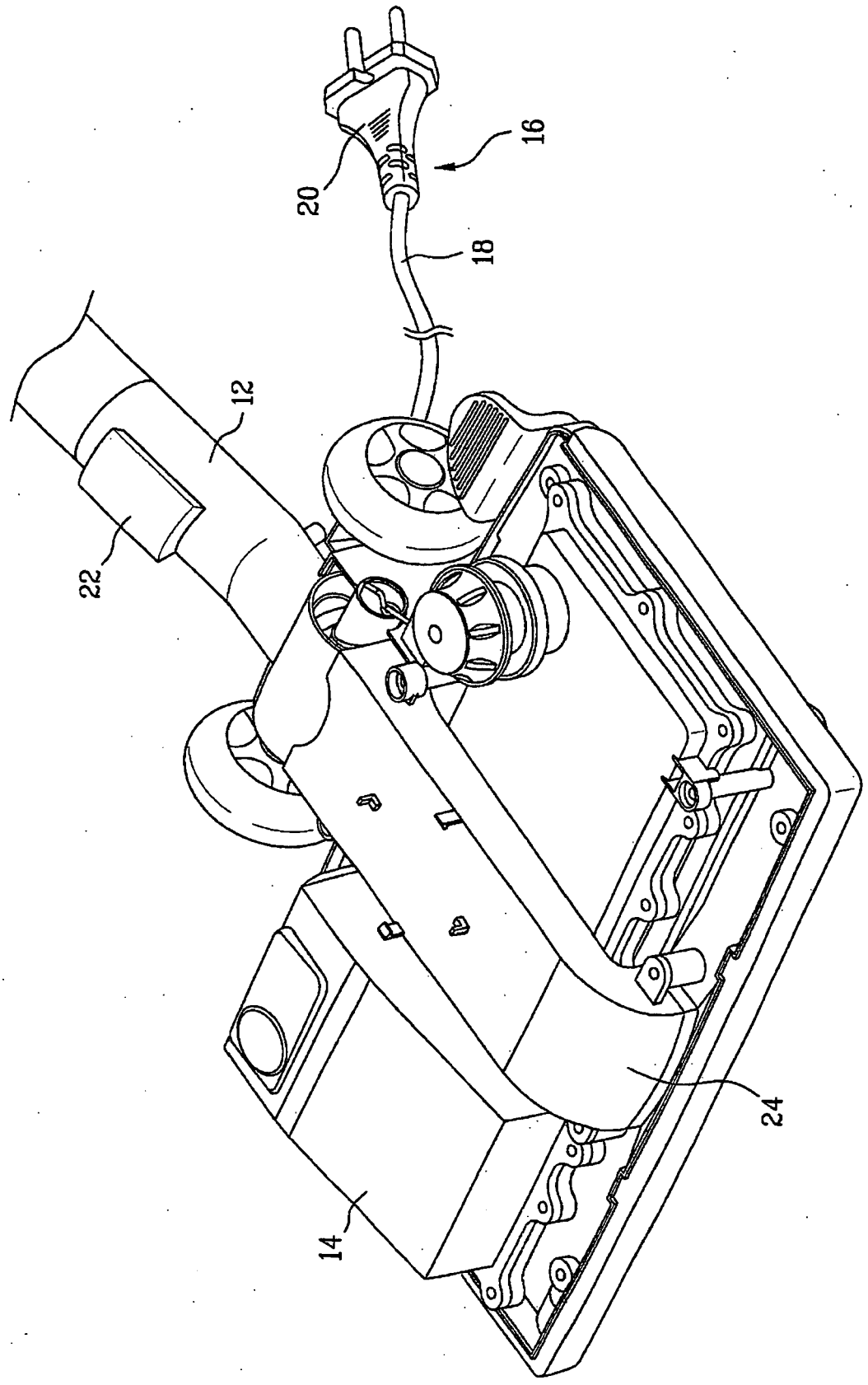
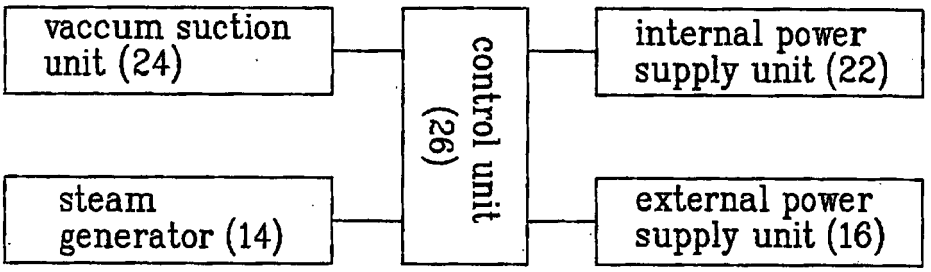


FIG. 3


vaccum suction unit (24)
steam generator (14)
control unit (26)
internal power supply unit (22)
external power supply unit (16)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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