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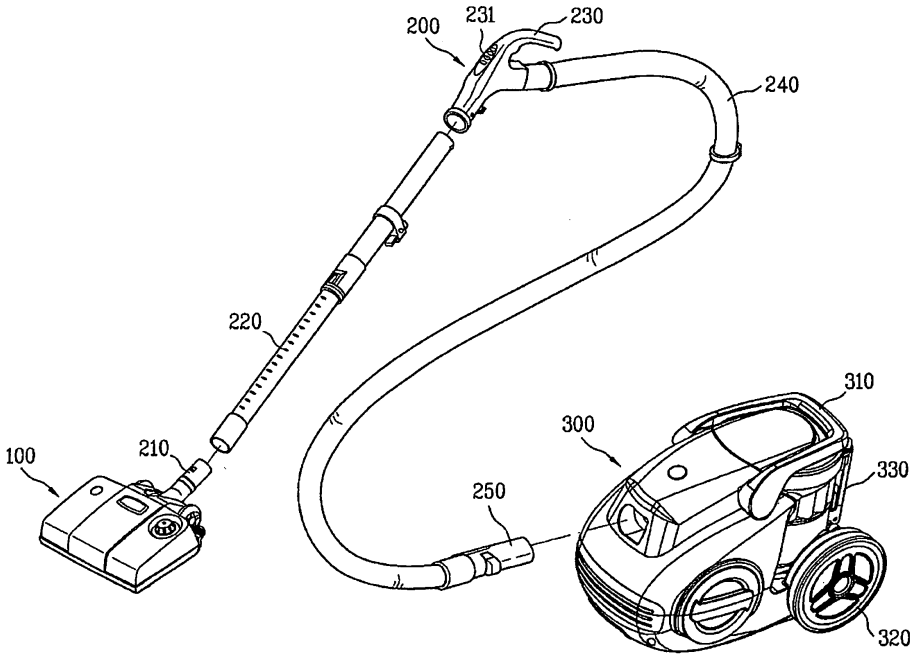
(54) Floor cleaner and method for controlling same

(57) A cleaner is provided that includes a head (100) having a base, which is configured to face a surface to be cleaned, and an intermediate connector (50) detachably coupled to a bottom of the base at an upper surface of the intermediate connector. Further, the intermediate connector supports a cleaning member (60) that is detachably coupled to a lower surface of the intermediate connector. Additionally, the cleaner also includes a first coupler (15,55) to detachably couple the intermediate connector to the bottom of the base.

FIG. 2



EP 1 795 107 A2

Description

[0001] This application claims the benefit of Korean Patent Application No. 10-2005-117973, filed on December 6, 2005, which is hereby incorporated by reference as if fully set forth herein.

[0002] The present invention relates to a cleaner, and more particularly, to a cleaner having a structure capable of achieving easy coupling and separation of a cleaning member, and a method for controlling the same.

[0003] Generally, a vacuum cleaner sucks air containing foreign matter such as dust, separates the foreign matter from the sucked air, and collects the separated foreign matter. In the following description, the function of such a vacuum cleaner to suck air and to remove foreign matter from the sucked air will be referred to as a "vacuum cleaning function".

[0004] The vacuum cleaner includes a cleaner body, which includes an air suction nozzle for sucking air, and a dust collector for separating foreign matter from the sucked air, and collecting the separated foreign matter, and a connecting tube for guiding the foreign matter sucked through the suction nozzle to the cleaner body.

[0005] An air suction unit, which generates an air suction force, is installed in the cleaner body. The cleaner body also includes a dust-collecting container mounting section arranged at a certain position of the cleaner body, in order to mount the dust collecting container in the cleaner body.

[0006] Traveling wheels are mounted to the cleaner body at opposite sides of a rear portion of the cleaner body. A freely-rotatable caster is mounted to a front portion of the bottom of the cleaner body, for direction change of the cleaner body.

[0007] Meanwhile, a general steam cleaner is also known which is configured to easily clean dirt strongly attached to a floor using steam generated by heating a cleaning member contacting the floor while supplying water to the cleaning member. In the following description, the function of such a steam cleaner to clean a floor using steam will be referred to as a "steam cleaning function".

[0008] Hereinafter, a conventional steam cleaner will be described with reference to FIG. 1.

[0009] The steam cleaner shown in FIG. 1 includes a cleaner body 1, a steam generator (not shown) installed in the cleaner body 1, and adapted to generate steam, and an extension rod 2 functioning as a handle when the user moves the cleaner body 1.

[0010] The steam generator includes a water container for supplying water, and a heater for converting water into steam. The extension rod extends from the top of the cleaner body 1 while being hingably mounted to the cleaner body 1.

[0011] A dustcloth 3 for cleaning a floor is detachably attached to the bottom of the cleaner body 1. The dustcloth 3 is heated by steam generated by the steam generator, so that it contains moisture. Thus, the dustcloth attached to the bottom of the cleaner body 1 can effectively clean the contaminated floor while being moved in accordance with movement of the cleaner body 1.

[0012] When the user desires to directly attach the dustcloth to the bottom of the cleaner body 1, he lifts up the cleaner body 1, and then lays the cleaner body 1 on the dustcloth. However, there is a problem in the procedure of lifting up the cleaner body, and laying the cleaner body on the dustcloth. That is, it is difficult to attach the dustcloth to the bottom of the cleaner body 1 at a correct position.

[0013] Furthermore, there is a drawback in that the cleaner body may be too heavy to enable some users to lift up and move the cleaner body. In addition, although the attachment of the dustcloth to the bottom of the cleaner body may be achieved by overturning the cleaner body, and attaching the dustcloth to the cleaner body, without using the procedure of lifting up and moving the cleaner body, the overturning procedure is inconvenient.

[0014] The above-mentioned steam cleaner further has a drawback in that, when the user desires to separate the dustcloth from the cleaner body after completion of cleaning, he/she must manually perform the separation of the hot dustcloth.

[0015] Accordingly, the present invention is directed to a cleaner and a method for controlling the same that substantially obviate one or more problems due to limitations and disadvantages of the related art.

[0016] An object of the present invention is to provide a cleaner and a method for controlling the same which are capable of easily positioning a cleaning member of the cleaner at a correct position, i.e., such that the cleaning member is properly positioned on, for example, a head of the cleaner.

[0017] Another object of the present invention is to provide a cleaner and a method for controlling the same which are capable of easily coupling and separating (i.e., detachably coupling) a cleaner member for a steam cleaning operation.

[0018] 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.

[0019] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a cleaner includes a head (body) including a base facing a surface to be cleaned; an intermediate connector separably coupled to a bottom of the base at an upper surface of the intermediate connector, the intermediate connector supporting a cleaning member separably (or detachably) coupled to a lower surface of the intermediate connector, and adapted to clean the surface to be cleaned; and a first coupler for separably coupling the intermediate con-

nector to the bottom of the base at a correct position.

[0020] The first coupler may comprise coupling grooves provided at one of the intermediate connector and the base, and coupling protrusions provided at the other one of the intermediate connector and the base. The coupling protrusions correspond with the coupling grooves, respectively. However, it should be appreciated that any suitable detachable coupling arrangement can be employed.

[0021] Additionally, the coupling protrusions and the coupling grooves may be coupled together by a magnetic force.

[0022] One of each coupling groove and each coupling protrusion may be made of a metal material. The other one of each coupling groove and each coupling protrusion may be made of a magnetic material.

[0023] The intermediate connector may include a coupling releaser for releasing the coupling between the intermediate connector and the base.

[0024] The coupling releaser may be arranged at (or proximate) a peripheral portion of the intermediate connector positioned at the rear of the head when viewing in an advance direction of the head.

[0025] The cleaner may further comprise a steam generator arranged on the base, and adapted to generate steam.

[0026] The cleaner may further comprise an injection guide provided at the bottom of the base, and adapted to inject the steam generated by the steam generator to the cleaning member.

[0027] The intermediate connector may further include a guide hole engaging with the injection guide, for positioning of the intermediate connector.

[0028] One of the guide hole and the injection guide may have side surfaces formed with side protrusions. The other one of the guide hole and the injection guide may have side surfaces formed with insertion grooves corresponding to the side protrusions.

[0029] The side protrusions and insertion grooves may be coupled together by a magnetic force.

[0030] The cleaner may further comprise a water tank communicating with the steam generator, to supply water to the steam generator.

[0031] The cleaner may further comprise a second coupler for coupling the cleaning member and the intermediate connector.

[0032] The cleaner may further comprise an air suction tube arranged or provided on the base, and adapted to suck air containing foreign matter present on the surface to be cleaned.

[0033] In another aspect of the present invention, a cleaner comprises a cleaner body including a fan-motor assembly for sucking air, and forcibly causing the sucked air to flow; a dust collector separably coupled to the cleaner body, and adapted to separate foreign matter (or debris) from the sucked air and to collect the separated foreign matter; a head including an air suction tube for sucking air in accordance with an operation of the fan-motor assembly, and a steam generator arranged at one side of the air suction tube, and adapted to generate steam; an intermediate connector separably coupled to a bottom of the head at an upper surface of the intermediate connector, the intermediate connector supporting a cleaning member separably (or detachably) coupled to a lower surface of the intermediate connector, and adapted to clean the surface to be cleaned, using the steam; and a first coupler for separably (or detachably) coupling the intermediate connector to the bottom of the head at a correct position.

[0034] The cleaner may further comprise a connector for separably connecting the cleaner body and the head, to enable the cleaner to simultaneously or selectively perform a vacuum cleaning function for sucking air, to remove foreign matter from a contaminated (or soiled) surface, and a steam cleaning function for cleaning the contaminated surface using steam.

[0035] The cleaner may further comprise a partition plate for preventing the steam from entering a base opening formed through the bottom of the head to communicate with the air suction tube.

[0036] In still another aspect of the present invention, a method for controlling a cleaner includes coupling a cleaning member for cleaning of a contaminated surface to an intermediate connector; coupling the intermediate connector to a bottom of the head at a correct position; performing a steam cleaning operation for steam-cleaning the contaminated surface by injecting steam to the cleaning member; and separating the intermediate connector from the head after completion of the steam cleaning operation.

[0037] The method may further comprise performing a vacuum cleaning operation by sucking air containing foreign matter (or debris) through an air suction tube mounted to the head, and removing the foreign matter from the sucked air.

[0038] The steam cleaning operation and the vacuum cleaning operation may be simultaneously or selectively performed.

[0039] 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.

[0040] The present invention is further described in the detail description which follows, in reference to the noted plurality of drawings, by way of non-limiting examples of preferred embodiments of the present invention, in which like characters represent like elements throughout the several views of the drawings, and wherein:

[0041] FIG. 1 is a perspective view illustrating a conventional steam cleaner;

[0042] FIG. 2 is an exploded perspective view illustrating a cleaner according to the present invention;

[0043] FIG. 3 is a top perspective view illustrating an inner structure of a head shown in FIG. 2;

[0044] FIG. 4 is a bottom perspective view schemati-

cally illustrating the head shown in FIG. 2;

[0045] FIG. 5 is an exploded perspective view illustrating coupling of an intermediate connector to the head according to the present invention; and

[0046] FIG. 6 is an exploded perspective view illustrating coupling of a cleaning member to the intermediate connector according to the present invention.

[0047] The particulars shown herein are by way of example and for purposes of illustrative discussion of the embodiments of the present invention only and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the present invention. In this regard, no attempt is made to show structural details of the present invention in more detail than is necessary for the fundamental understanding of the present invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the present invention may be embodied in practice.

[0048] Reference will now be made in detail to the preferred embodiments of the present invention examples 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.

[0049] FIG. 2 is an exploded perspective view illustrating a cleaner according to a non-limiting embodiment of the present invention. Hereinafter, the cleaner according to the present invention will be described with reference to FIG. 2.

[0050] The cleaner has both a steam cleaning function and a vacuum cleaning function, and may operate to simultaneously or separately achieve the steam cleaning function and the vacuum cleaning function.

[0051] The cleaner includes a head 100 movable along a floor to be cleaned, a cleaner body 300 separate from the head 100, and a connector 200 for connecting the head 100 to the cleaner body 300.

[0052] The connector 200 also functions to guide contaminated air sucked into the head 100 toward the cleaner body 300. The connector 200 includes a first coupling tube 210 directly coupled to the head 100, an extension tube 220 coupled to the first coupling tube 210, and an extension tube handle 230 mounted to an upper end of the extension tube 220. The connector 200 also includes a connecting hose 240 coupled to the extension tube handle 230, and a second connecting tube 250 for connecting the connecting hose 240 to the cleaner body 300.

[0053] The first coupling tube 210 extends from the head 100. The extension tube 220 has a telescopic tube structure such that it is adjustable in length. A control panel 231 for controlling operation of the cleaner is installed on the extension tube handle 230.

[0054] A portable power supply may be installed in the head 100. Alternatively, the head 100 may be electrically connected to an external power source. Accordingly, when it is desired to perform only the steam cleaning function, it may be possible to use only the head 100 under the condition in which the head 100 is separated from the cleaner body 300 by separating the extension tube handle 230 from the connecting hose 240.

[0055] The first coupling tube 210, second coupling tube 250, and extension tube 220 may be made of a hard material, whereas the connecting hose 240 may be made of a flexible material. The first coupling tube 210, extension tube 220, extension tube handle 230, connecting hose 240, and second coupling tube 250 may be coupled to one another in a hooking manner. Of course, the constituent elements of the connector 200 may be threadedly coupled to one another. Also, both the threadedly-coupling method and the hooking method may be used.

[0056] A fan-motor assembly (not shown) is installed in the cleaner body 300, in order to suck air, and thus, to forcibly cause the air to flow. When a vacuum cleaning mode is set by the user, the fan-motor assembly is operated, thereby causing foreign matter (or debris) on the floor to be sucked into the head 100, together with air.

[0057] A cleaner handle 310 is provided at the top of the cleaner body 300, in order to allow the user to carry the cleaner body 300. Wheels 320 are rotatably mounted to a rear portion of the cleaner body 300 at opposite sides of the cleaner body 300, respectively, to enable the cleaner body 300 to move smoothly along the floor.

[0058] A freely-rotatable caster (not shown) is mounted to a front portion of the bottom of the cleaner body 300, for direction change of the cleaner body 300. A dust collector 330 is separably coupled to the cleaner body 300 inside the cleaner body 300, in order to separate foreign matter from the sucked air, and to collect the separated foreign matter.

[0059] FIG. 3 is a top perspective view illustrating an inner structure of the head in the cleaner of FIG. 2. FIG. 4 is a bottom perspective view illustrating the head.

[0060] The head 100 includes a base 10 arranged to face the floor to be cleaned, and a steam generator 20 arranged on the base 10 at one side of the base 10, and adapted to generate steam. The head 100 also includes an air suction tube 30 functioning as an air suction passage, and a water tank 40 for supplying water to the steam generator 20.

[0061] An agitator (not shown) for shaking dust off a floor or a carpet, a motor (not shown) for driving the agitator, and a belt (not shown) for transmitting a rotating force from the motor to the agitator may also be installed in the head 100.

[0062] The steam generator 20 includes a case 21 provided with an water inlet and a steam outlet, and a heater (not shown) arranged in the interior of the case.

[0063] The case 21 has a chamber defined in the case 21 to contain a certain amount of water. The water inlet and steam outlet are arranged at a substantially-upper portion of the case 21, in order to prevent water from being outwardly discharged from the interior of the case 21 through the water inlet, and to enable steam generated in the case 21 to be smoothly discharged through the steam outlet.

[0064] The heater is fitted into the case 21 from the outside of the case 21. The steam generator may further include a water level sensor for sensing the water level in the case 21.

[0065] The water level sensor senses a minimum water level and a maximum water level, and sends the resultant data to a controller for controlling the steam generator 20. Based on the data sent from the water level sensor, the controller controls the steam generator 20.

[0066] The steam generator 20 is arranged or provided on the base 10 at one side of the base 10, whereas the water tank 40 is arranged on the base 10 at the other side of the base 10 while communicating with the steam generator 20. The air suction tube 30 is arranged on the base 10 at a central portion of the base 10, namely, between the steam generator 20 and the water tank 40.

[0067] Auxiliary wheels (not shown) may be mounted to a front end of the bottom of the base 10, for movement of the head 100. The auxiliary wheels are received in wheel recesses 12 formed in the bottom of the base 10, respectively.

[0068] The air suction tube 30 may communicate with a base opening 11. For example, the base opening 11 may be formed through a front end of the bottom of the base 10 when viewing in a cleaning advance direction of the cleaner.

[0069] An intermediate connector 50 may be mounted to a rear end of the bottom of the base 10, as a medium for coupling the base 10 and a coupling member. The intermediate connector 50 may be separably (or detachably) coupled, at an upper surface thereof, to the bottom of the base 10. The cleaning member may be coupled to a lower surface of the intermediate connector 50. The cleaning member performs cleaning using steam.

[0070] A partition plate 16 may be arranged between the base opening 11 and the intermediate connector 50. The partition plate 16 functions to prevent steam discharged through the lower surface of the intermediate connector 50 from entering the base opening 11.

[0071] The coupling of the base and intermediate connector will now be described with reference to FIG. 5.

[0072] The intermediate connector 50 and base 10 may be coupled to each other by a first coupler including, by way of non-limiting example, elements designated reference numerals 15 and 55.

[0073] For Example, the first coupler may include coupling grooves 15 formed at the bottom of the base 10, and coupling protrusions 55 formed at the upper surface of the intermediate connector 50. Of course, the coupling protrusions 55 may be formed at the bottom of the base 10, and the coupling grooves 15 may be formed at the upper surface of the intermediate connector 50.

[0074] One of each coupling groove 15 and each coupling protrusion 55 may be made of a metal material, whereas the other may be made of a magnetic material, so that they are coupled to each other by a magnetic force. Each coupling groove 15 and each coupling protrusion 55 may be made of magnetic materials having opposite polarities, respectively. Alternatively, one of each coupling groove 15 and each coupling protrusion 55 may be made of a metal material, whereas the other may be made of an electromagnet.

[0075] Accordingly, when the top of the head 100 is positioned near the intermediate connector 50, the intermediate connector 50 may be coupled to the head 100 by a magnetic force generated between the coupling grooves 15 and the coupling protrusions 55. Since the coupling grooves 15 and coupling protrusions 55 have corresponding shapes, respectively, the intermediate connector 50 is automatically positioned at a correct (i.e., the intermediate connector 50 is positioned properly , e.g., so that it is aligned) position on the head 100.

[0076] An injection guide 13 is mounted to the bottom of the base 10, for injection of steam. In detail, the injection guide 13 is mounted to the bottom of the base 10 such that it has a lower surface flush with the lower surface of the intermediate connector 50. In one example, the injection guide 13 has the same thickness as the intermediate connector 50. However, it should be appreciated that the injection guide 13 may be provided having any suitable shape or form. Of course, the injection guide 13 may be formed integrally with the base 10.

[0077] A plurality of uniformly-spaced injection holes 13b may be formed at the lower surface of the injection guide 13 such that they communicate with the steam generator 20. In this regard, the injection guide 13 extends in a width direction of the base 10 such that it is perpendicular to the movement direction of the head 100 during a cleaning operation. The injection guide 13 may be engaged in a guide hole 53 formed through the intermediate connector 50.

[0078] Side protrusions 13a having a certain shape are formed at opposite side surfaces of the injection guide 13, in order to set the coupling position of the intermediate connector 50. The side protrusions 13a are engaged in insertion grooves 53a provided at opposite side surfaces of the guide hole 53 of the intermediate connector 50. Of course, the side protrusions 13a and insertion grooves 53a may be coupled to each other by a magnetic force.

[0079] Thus, the intermediate connector 50 may be attached to the bottom of the base 10 not only by the magnetic force exerted between the coupling protrusions 55 and the coupling grooves 15, but also by the magnetic force exerted between the side protrusions 13a and the insertion grooves 53a. Also, since the side protrusions 13a and insertion grooves 53a have corresponding shapes, similarly to the coupling protrusions 55 and coupling grooves 15, the intermediate connector 50 can be more reliably positioned at the correct position thereof.

[0080] Of course, it should be appreciated that, the coupling protrusions 55 provided at the bottom of the base 10 and the coupling grooves 15 provided at the intermediate connector 50 may be coupled in an interference fit manner. Alternatively, the first coupler for the coupling between the base 10 and the intermediate connector 50 may include hooks formed at the bottom of the

base 10, and hook grooves formed at the upper surface of the intermediate connector 50 such that the hook grooves engage with the hooks.

[0081] Alternatively, packing members each having a groove with a certain shape may be formed at the bottom of the base 10, and coupling protrusions may be formed at the upper surface of the intermediate connector 50 such that the coupling protrusions are interference-fit in (or closely inter-fit) the grooves of the packing members, respectively. In addition, the base 10 and intermediate connector 50 may be coupled to each other by corresponding loops respectively formed at the base 10 and intermediate connector 50. Thus, the coupling between the base 10 and the intermediate connector 50 may be achieved using a variety of couplers, and the present invention is not limited to the above-described

examples.

[0082] A coupling releaser may be provided at (or proximate) the intermediate connector 50, in order to release the coupling of the intermediate connector 50 to the base 10. The coupling releaser is a device for releasing the magnetic force exerted between the intermediate connector 50 and the base 10. In the illustrated embodiment, a pedal 57 provided at a portion of the peripheral edge of the intermediate connector 50 is used as the coupling releaser for releasing the coupling between the intermediate connector 50 and the base 10. The pedal 57 is outwardly protruded from the peripheral edge of the intermediate connector 50, and has a shape corresponding to the foot shape of the user.

[0083] When the user depresses the pedal 57, the intermediate connector 50 is separated (or decoupled) from the base 10. Preferably, the pedal 57 is arranged at a rear portion of the peripheral edge of the intermediate connector 50 when viewing in the advance direction of the head 100. This is because the user is positioned at the rear of the head 100 in the advance direction of the head 100 during and after a cleaning operation.

[0084] Of course, when the intermediate connector 50 and base 10 are coupled using an electromagnet, the coupling releaser may be an electric device for cutting off supply of electric power.

[0085] Hereinafter, the coupling between the cleaning member and the intermediate connector will be described with reference to FIG. 6. For a steam cleaning operation, the intermediate connector 50 and cleaning member 60 are coupled to each other by a second coupler, for example, including elements designated reference numerals 51 and 61. For the cleaning member 60, any member may be used, including a member capable of containing moisture provided from steam and cleaning a floor. In the illustrated non-limiting embodiment, a dustcloth is shown as the cleaning member for a steam cleaning operation.

[0086] In one non-limiting example, the second coupler includes male Velcro members 51 mounted to the lower surface of the intermediate connector 50, and a female Velcro member 61 mounted to an upper surface of the cleaning member 60. The male Velcro members 51 are arranged along a peripheral portion of the intermediate connector 50 while being spaced apart from one another by a predetermined distance.

[0087] The cleaning member 60 has a dustcloth portion 63 for actually cleaning the floor. The user can couple the cleaning member 60 to the head 100 by coupling the cleaning member 60 to the intermediate connector 50, and then coupling the intermediate connector 50 to the base 10.

[0088] The Velcro members may be mounted only to the lower surface of the intermediate connector 50. In this case, the cleaning member may be made of a material easily attachable to the Velcro members. Also, the cleaning member and intermediate connector may be coupled together by a coupler such as a rubber string.

[0089] For example, the rubber string is inserted into the cleaning member 60 such that it extends along a peripheral portion of the cleaning member 60. The cleaning member 60 is coupled to the intermediate connector 50 such that the peripheral portion of the cleaning member 60, in which the rubber string is inserted, encloses the peripheral portion of the intermediate connector. Alternatively, an elastic member such as a rubber string may be used to bind the cleaning member in a state in which the cleaning member encloses the intermediate connector. Thus, the coupling between the intermediate connector 50 and the cleaning member 60 may be achieved using a variety of couplers, and the present invention is not limited to the above-described examples.

[0090] Hereinafter, the procedure for coupling the cleaning member, intermediate connector, and base will be described with reference to FIGs. 5 and 6.

[0091] For example, the user may first couple the cleaning member 60 for cleaning of a contaminated floor to the intermediate connector 50. In this case, the user can easily perform the coupling between the cleaning member 60 and the intermediate connector 50 because the male Velcro members 51 are provided at the intermediate connector 50, and the female Velcro member 61 is provided at the cleaning member 60.

[0092] Next, the user moves the head 100 such that the top of the head 100 is positioned near the intermediate connector 50. At this time, a magnetic force is exerted between the coupling protrusions 55 formed at the intermediate connector 50 and the coupling grooves 15 formed at the bottom of the base 10, so that the coupling protrusions 55 and coupling grooves 15 attract each other.

[0093] As a result, the coupling protrusions 55 and coupling grooves 15 are coupled together at correct positions (e.g., so that they are properly aligned) thereof because they have corresponding shapes, respectively. At this time, the guide hole 53 of the intermediate connector 50 and the injection guide 13 are automatically engaged with each other. At the same time, the insertion grooves 53a

provided at the side surfaces of the guide hole 53 and the side protrusions 13a formed at the side surfaces of the injection guide 13 are automatically coupled together.

[0094] Accordingly, the intermediate connector 50 and base 10 are correctly coupled together in accordance with not only the coupling between the coupling protrusions 55 and the coupling grooves 15, but also the coupling between the insertion grooves 53a and the side protrusions 13a.

[0095] After completion of the coupling of the intermediate connector 50 to the bottom of the base 10, the user operates the cleaner. When it is desired to perform only the steam cleaning function, only the head 100 is driven to generate steam. On the other hand, when it is desired to perform both the steam cleaning function and the vacuum cleaning function, the user operates the cleaner to drive not only the head 100, but also the fan-motor assembly of the cleaner body 300.

[0096] Accordingly, air containing foreign matter (or debris) is sucked into the air suction tube 30, so that the foreign matter is separated from the sucked air in the cleaner body 300. Dirt strongly attached to the floor to be cleaned is removed by the cleaning member 60 heated by steam.

[0097] After completion of the cleaning operation, the user depresses the pedal 57 provided at the intermediate connector 50, thereby causing the intermediate connector 50 to be separated from the head 100. Accordingly, the user can separate the cleaning member 60 from the head 100 without directly contacting the hot cleaning member 60.

[0098] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

[0099] The cleaner having the above-described configuration has the following effects.

[0100] First, in the case where the cleaning member is first coupled to the intermediate connector, and then the intermediate connector is coupled to the base of the head, there is an advantage in that it is unnecessary to attach the cleaning member to the head after overturning the head.

[0101] Second, there is an advantage in that it is possible to conveniently attach the cleaning member to the head because the intermediate connector supporting the cleaning member is coupled to the head by a magnetic force. There is another advantage in that the head and intermediate connector are coupled together at correct positions thereof in accordance with the coupling between the coupling grooves and coupling protrusions having corresponding shapes and the coupling between the side protrusions and insertion grooves having corresponding shapes.

[0102] Third, there is an advantage in that it is unnecessary for the user to directly contact the cleaning member by hand when the cleaning member should be separated from the head after completion of the cleaning operation, because the pedal is provided at one side of the intermediate connector.

Claims

1. A cleaner comprising:

   a head including a base configured to face a surface to be cleaned;
   an intermediate connector detachably coupled to a bottom of the base at an upper surface of the intermediate connector,

   wherein the intermediate connector supports a cleaning member that is detachably coupled to a lower surface of the intermediate connector; and
   a first coupler that detachably couples the intermediate connector to the bottom of the base.

2. The cleaner according to claim 1, wherein the first coupler further comprises coupling grooves provided at either one of the intermediate connector and the base, and coupling protrusions provided at the other one of the intermediate connector and the base, wherein the coupling protrusions correspond to the coupling grooves, respectively.

3. The cleaner according to claim 2, wherein a magnetic force couples the coupling protrusions and the coupling grooves.

4. The cleaner according to claim 3, wherein either one of each coupling groove and each coupling protrusion is made of metal, and the other one of each coupling groove and each coupling protrusion is made of a magnetic material.

5. The cleaner according to any of claims 1 to 4, wherein the intermediate connector includes a coupling releaser to release the coupling between the intermediate connector and the base.

6. The cleaner according to claim 5, wherein the coupling releaser is provided proximate a periphery of the intermediate connector, and is located at a rear end of the head.

7. The cleaner according to any of claims 1 to 6, further comprising:

   a steam generator, which generates steam, provided on the base.

8. The cleaner according to claim 7, further comprising:

an injection guide, provided at a bottom of the base, that injects steam generated by the steam generator into the cleaning member.

9. The cleaner according to claim 8, wherein the intermediate connector further comprises a guide hole that engages the injection guide such that the intermediate connector is positioned on the head.

10. The cleaner according to claim 9, wherein either one of the guide hole and the injection guide has side surfaces formed with side protrusions, and the other one of the guide hole and the injection guide has side surfaces formed with insertion grooves corresponding to the side protrusions.

11. The cleaner according to claim 10, wherein a magnetic force couples the side protrusions and the insertion grooves.

12. The cleaner according to any of claims 7 to 11, further comprising:

a water tank that communicates with the steam generator to supply the steam generator with water.

13. The cleaner according to any of claims 1 to 12, further comprising:

a second coupler that couples the cleaning member and the intermediate connector.

14. The cleaner according to any of claims 1 to 13, further comprising:

an air suction tube provided on the base, and configured to suck air containing debris, which is present on the surface to be cleaned.

15. A cleaner comprising:

a cleaner including a fan-motor assembly that sucks air;
a dust collector detachably coupled to the cleaner body,

wherein the dust collector is configured to separate and collect debris from the sucked air;
a head including an air suction tube that sucks air in accordance with an operation of the fan-motor assembly, and a steam generator, which generates steam, arranged at one side of the air suction tube;
an intermediate connector detachably coupled to a bottom of the head at an upper surface of the intermediate connector, and the intermediate connector supporting a cleaning member detachably coupled to a lower surface of the intermediate connector; and

a first coupler that detachably couples the intermediate connector to a bottom of the head.

16. The cleaner according to claim 15, further comprising:

a connector that detachably connects the cleaner body and the head, to enable the cleaner to either simultaneously or selectively perform a vacuum cleaning function to suck air and generate steam.

17. The cleaner according to claim 15 or 16, further comprising:

a partition plate that prevents the steam from entering a base opening formed through the bottom of the head to communicate with the air suction tube.

18. A method for controlling a cleaner, comprising:

coupling a cleaning member, which is configured to clean a soiled surface, to an intermediate connector;
providing a head that is configured to face the soiled surface;
coupling the intermediate connector to a bottom of the head;
performing a steam cleaning operation to steam-clean the soiled surface by injecting steam into the cleaning member; and
separating the intermediate connector from the head after completion of the steam cleaning operation.

19. The method according to claim 18, further comprising:

performing a vacuum cleaning operation by sucking air containing debris through an air suction tube mounted to the head, and removing the debris from the sucked air.

20. The method according to claim 19, wherein the steam cleaning operation and the vacuum cleaning operation are simultaneously or selectively performed.

FIG. 1

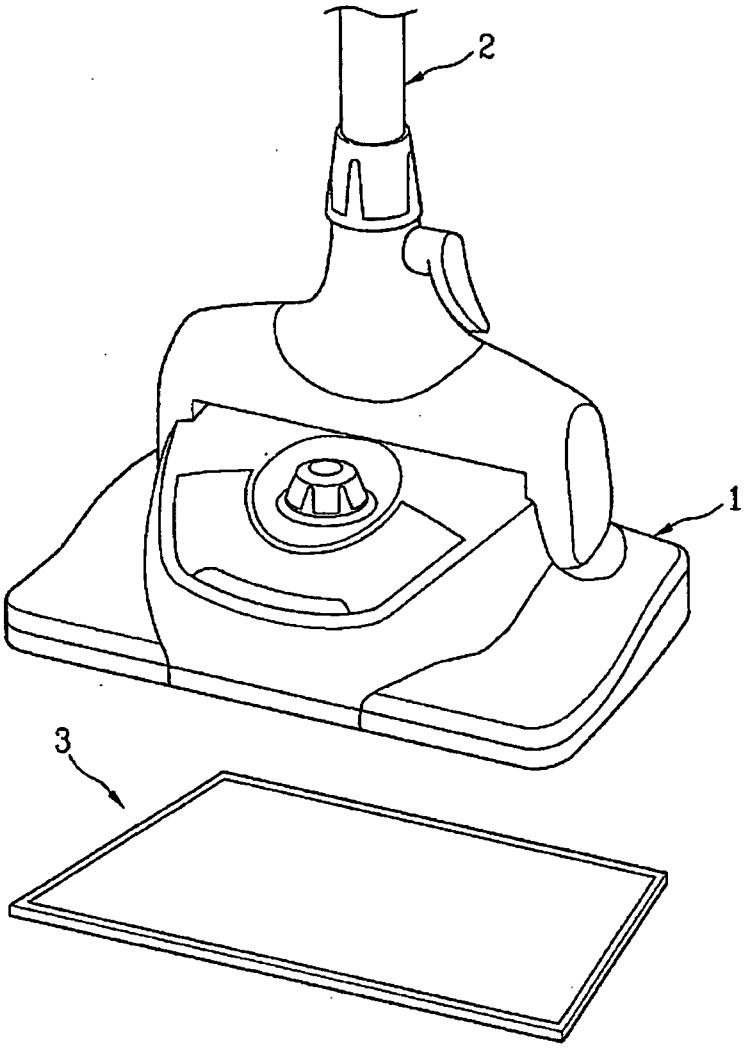


FIG. 2

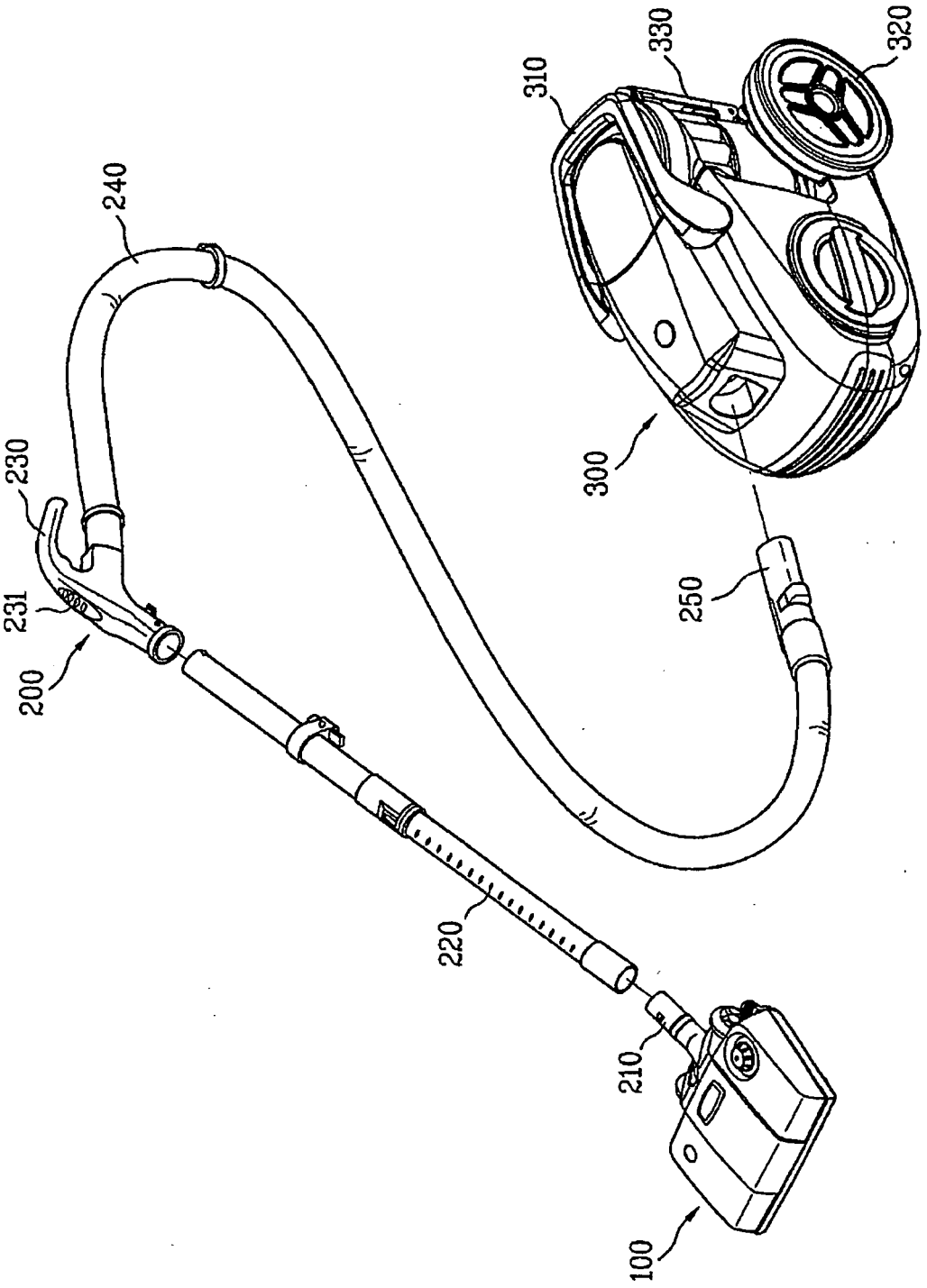


FIG. 3

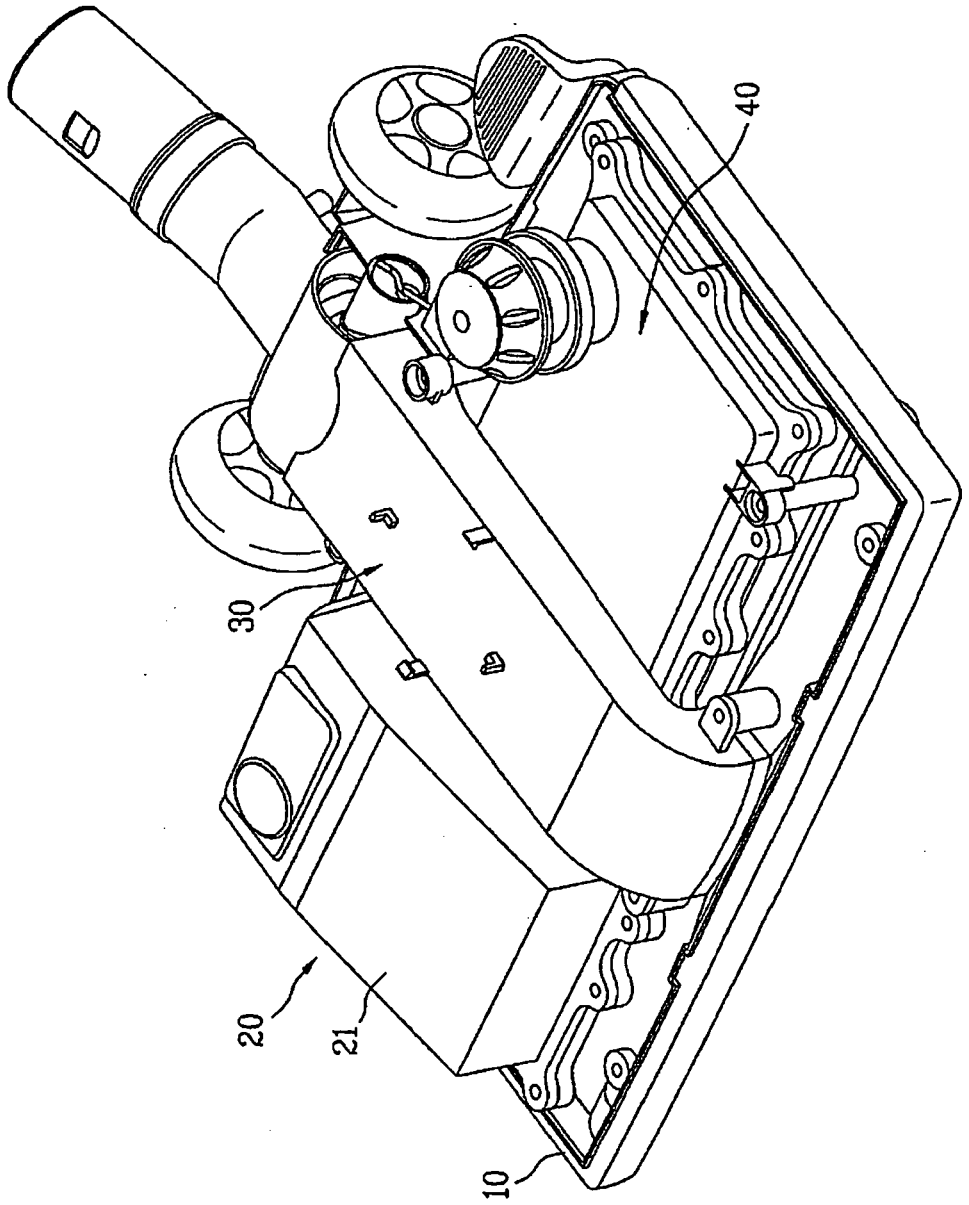


FIG. 4

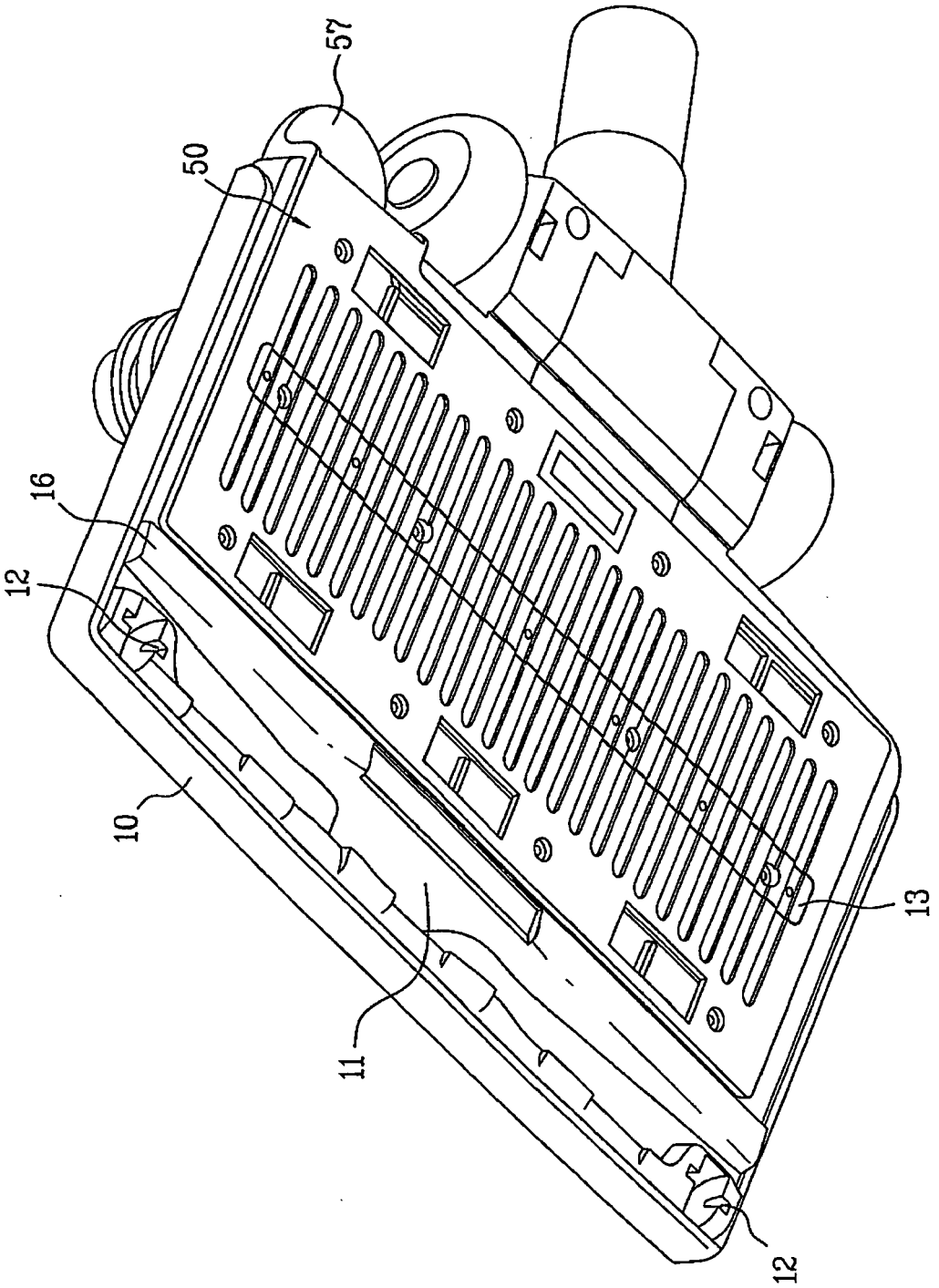


FIG. 5

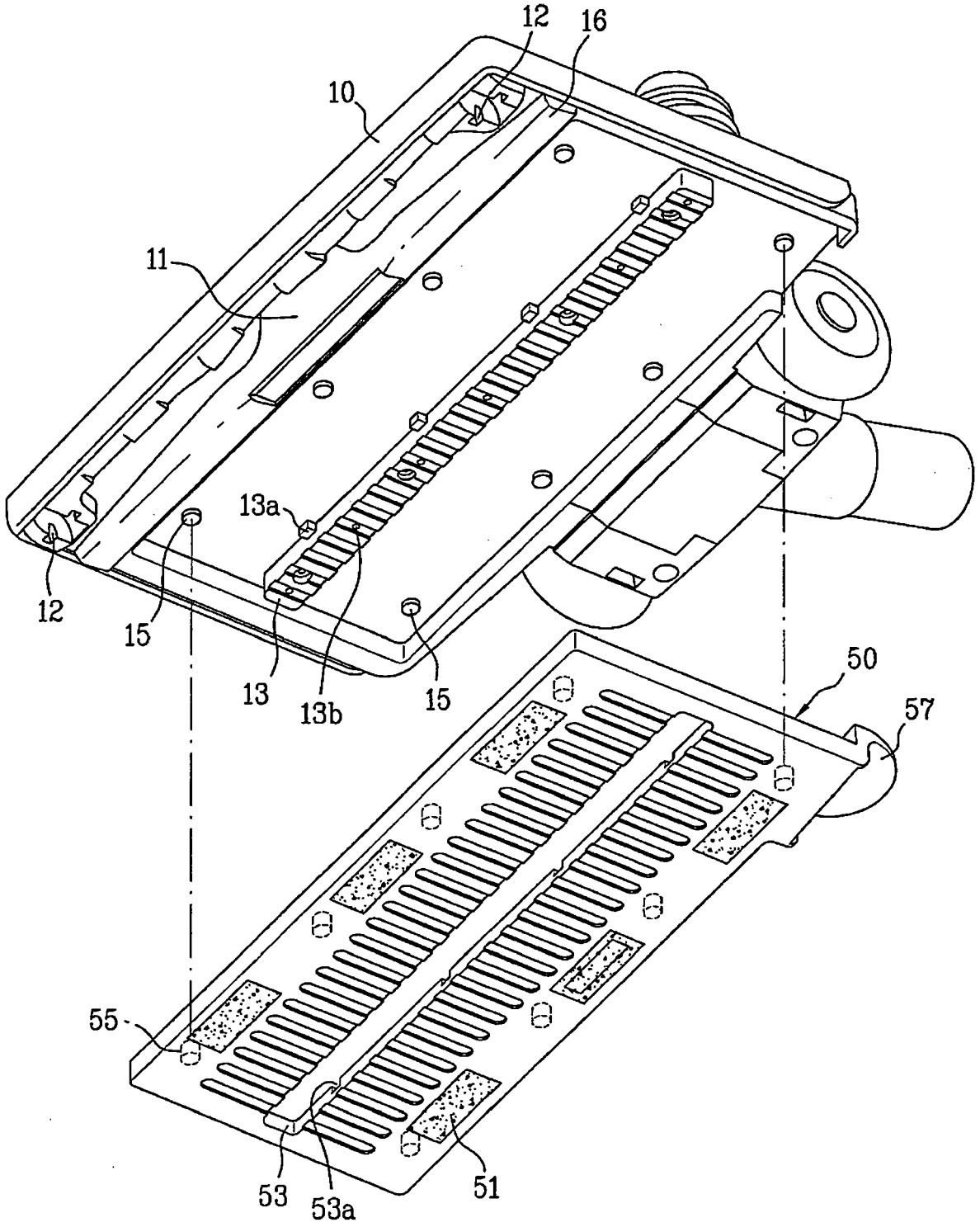
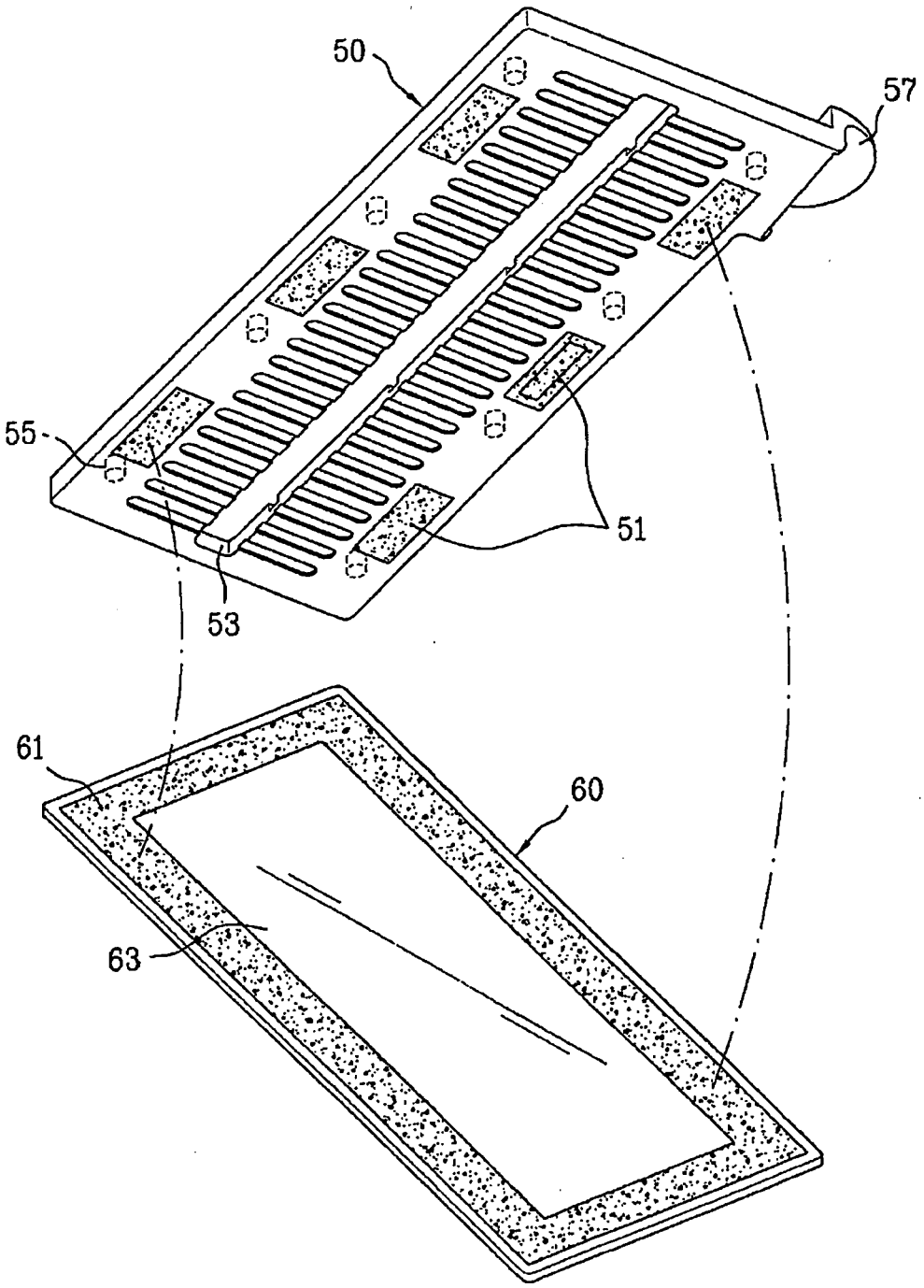


FIG. 6



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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