



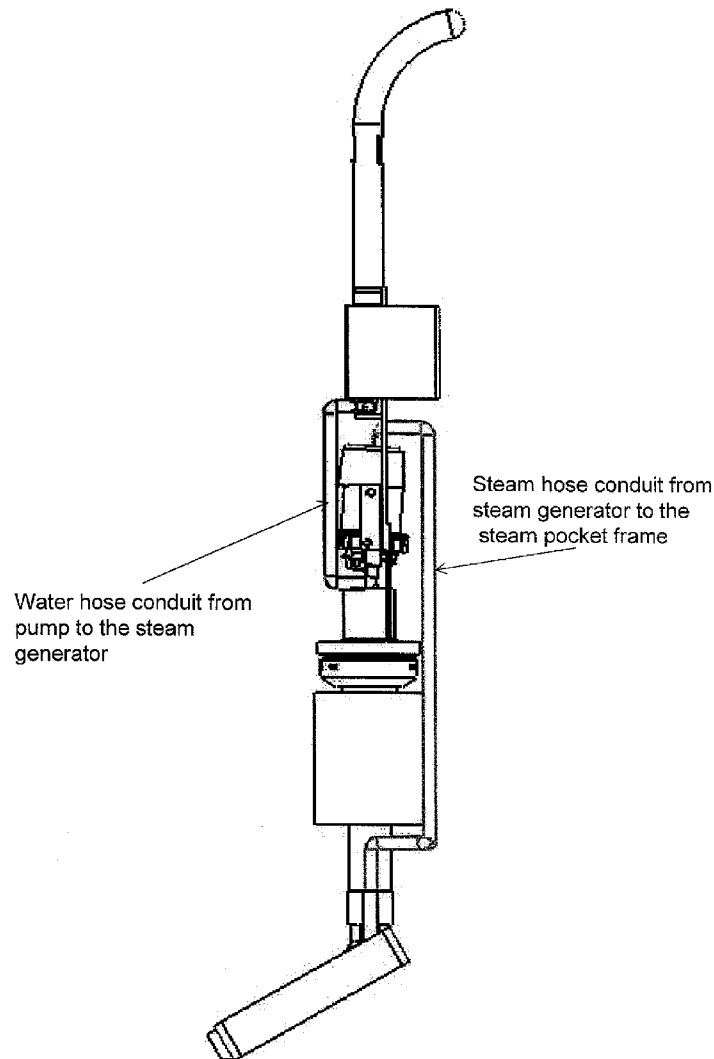
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VRDOLJAK(10) **Pub. No.: US 2010/0199455 A1**(43) **Pub. Date: Aug. 12, 2010**(54) **STEAM APPLIANCE WITH VACUUM
FUNCTION****Publication Classification**(75) Inventor: **OGNJEN VRDOLJAK**, Laval
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Newton, MA (US)(21) Appl. No.: **12/703,611**(22) Filed: **Feb. 10, 2010****Related U.S. Application Data**(60) Provisional application No. 61/151,366, filed on Feb.
10, 2009.(57) **ABSTRACT**

A steam appliance having a water reservoir, water pump and steam generator with a vacuum function is provided. The steam appliance has a water pump for selectively injecting water from a reservoir to a boiler to generate steam fed into a steam pocket frame with a fabric steam pocket mounted thereon. In one configuration, when steam is being generated, the vacuum function cannot be used. In another configuration, when the vacuum function is on, the heating element in the steam generator is power at reduced power to reduce power consumption and keep the steam generator heated in stand-by mode and water is not pumped.



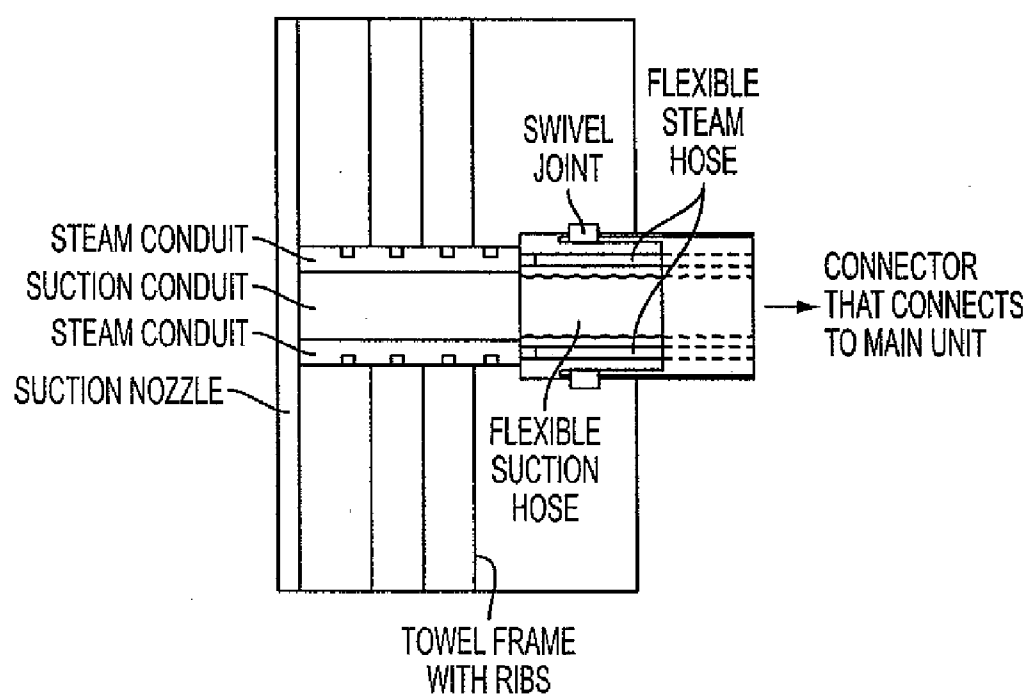


FIG. 1

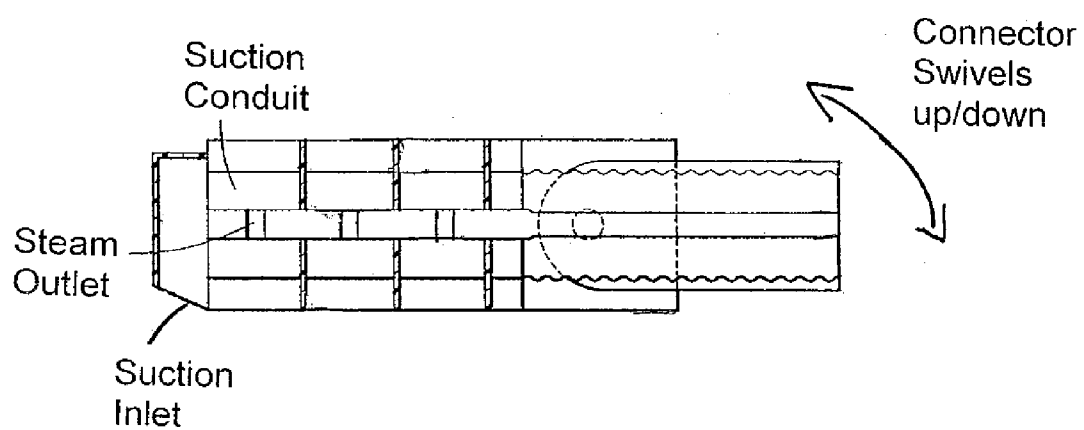


FIG. 2

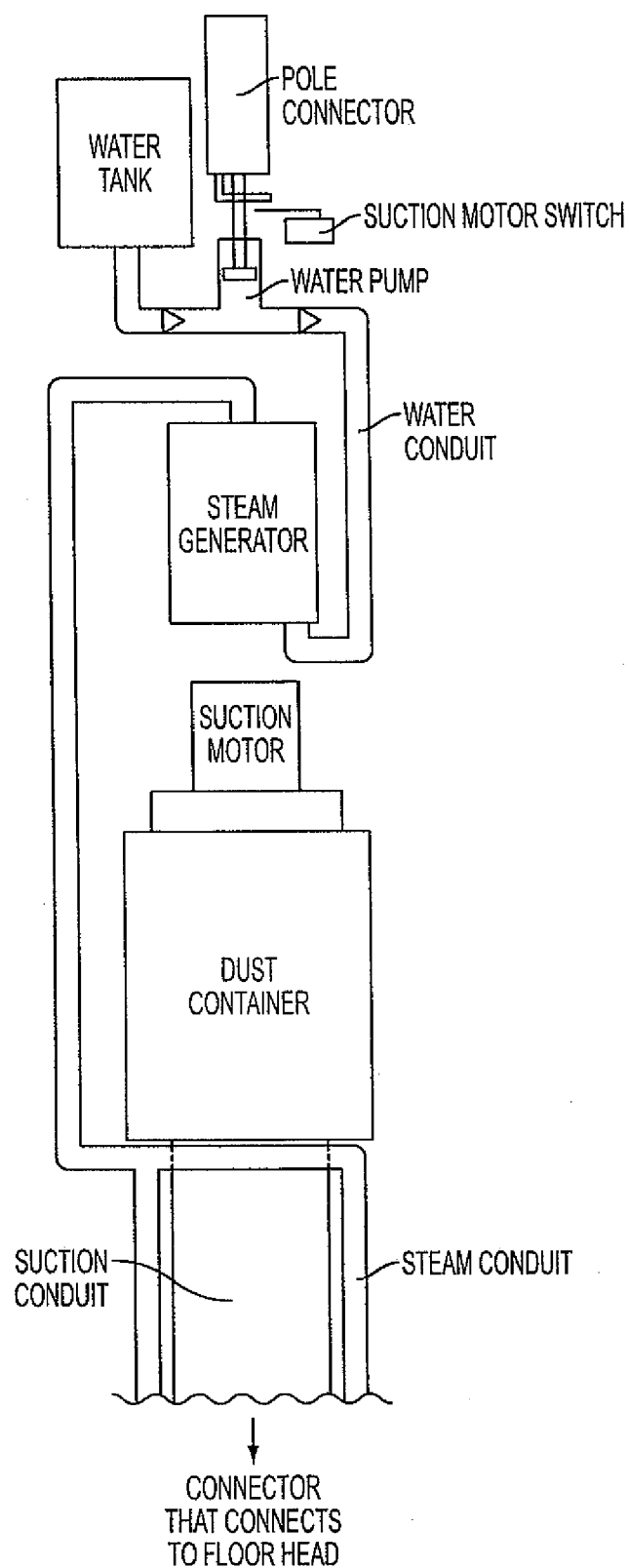


FIG. 3

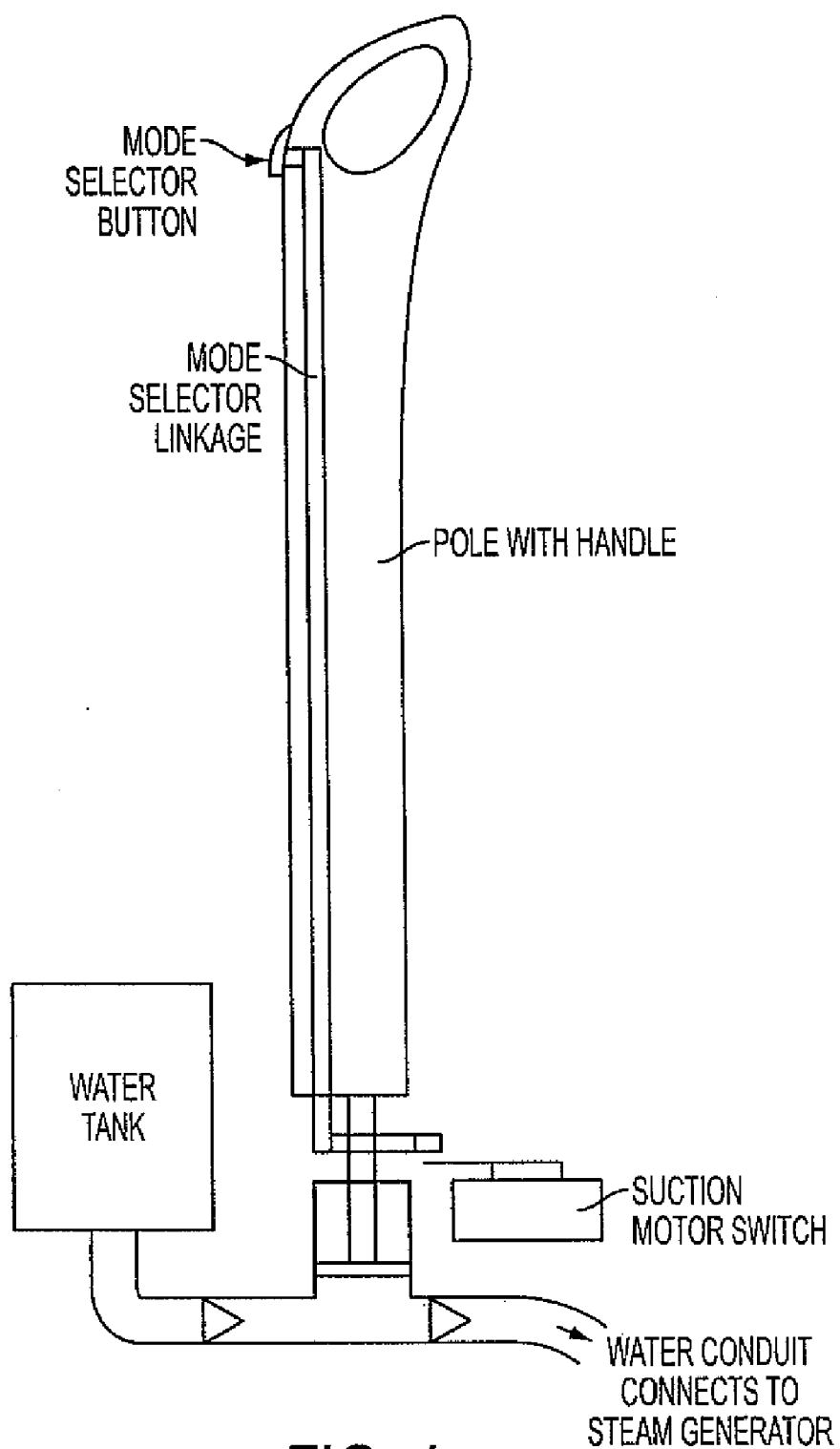


FIG. 4

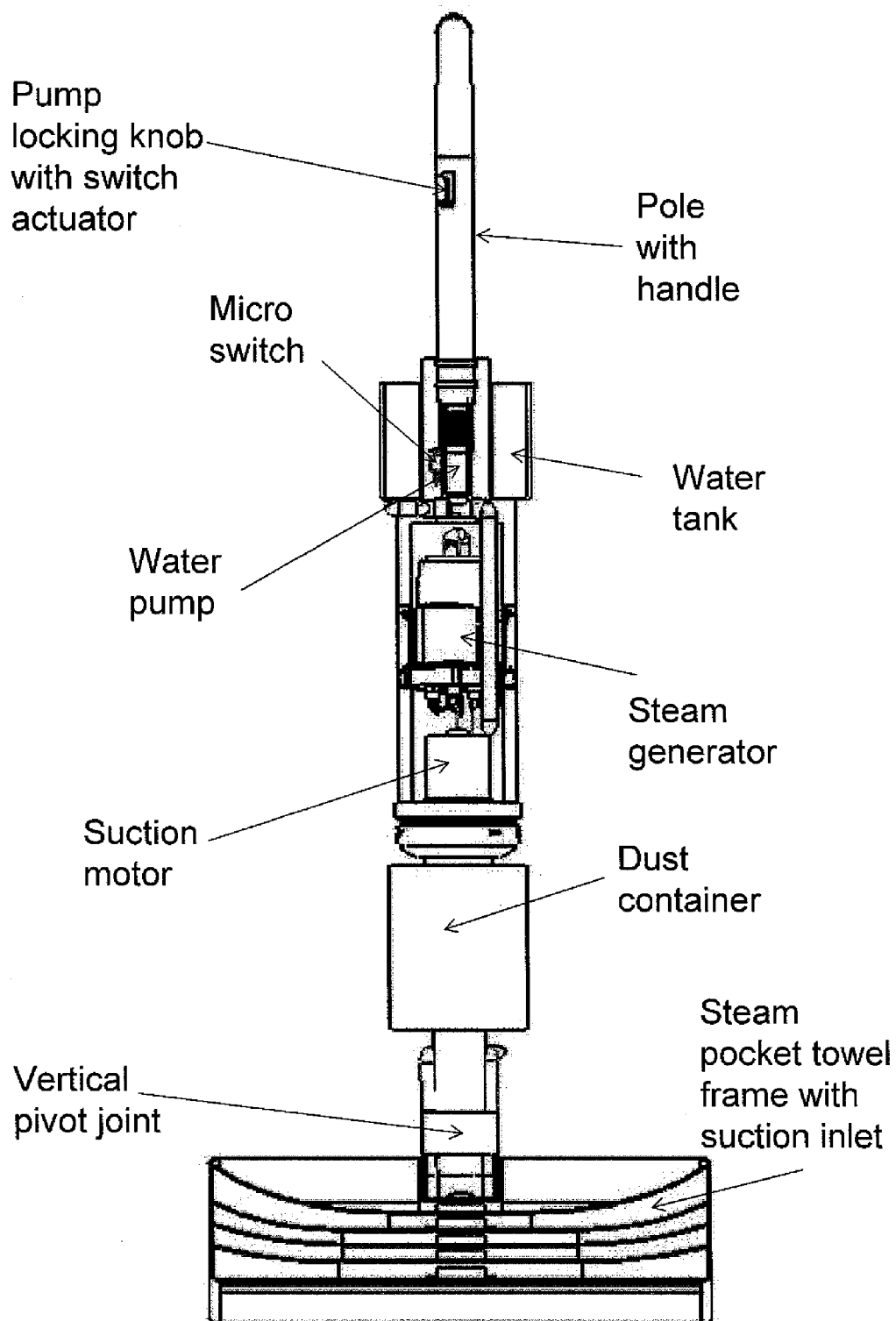


FIG. 5

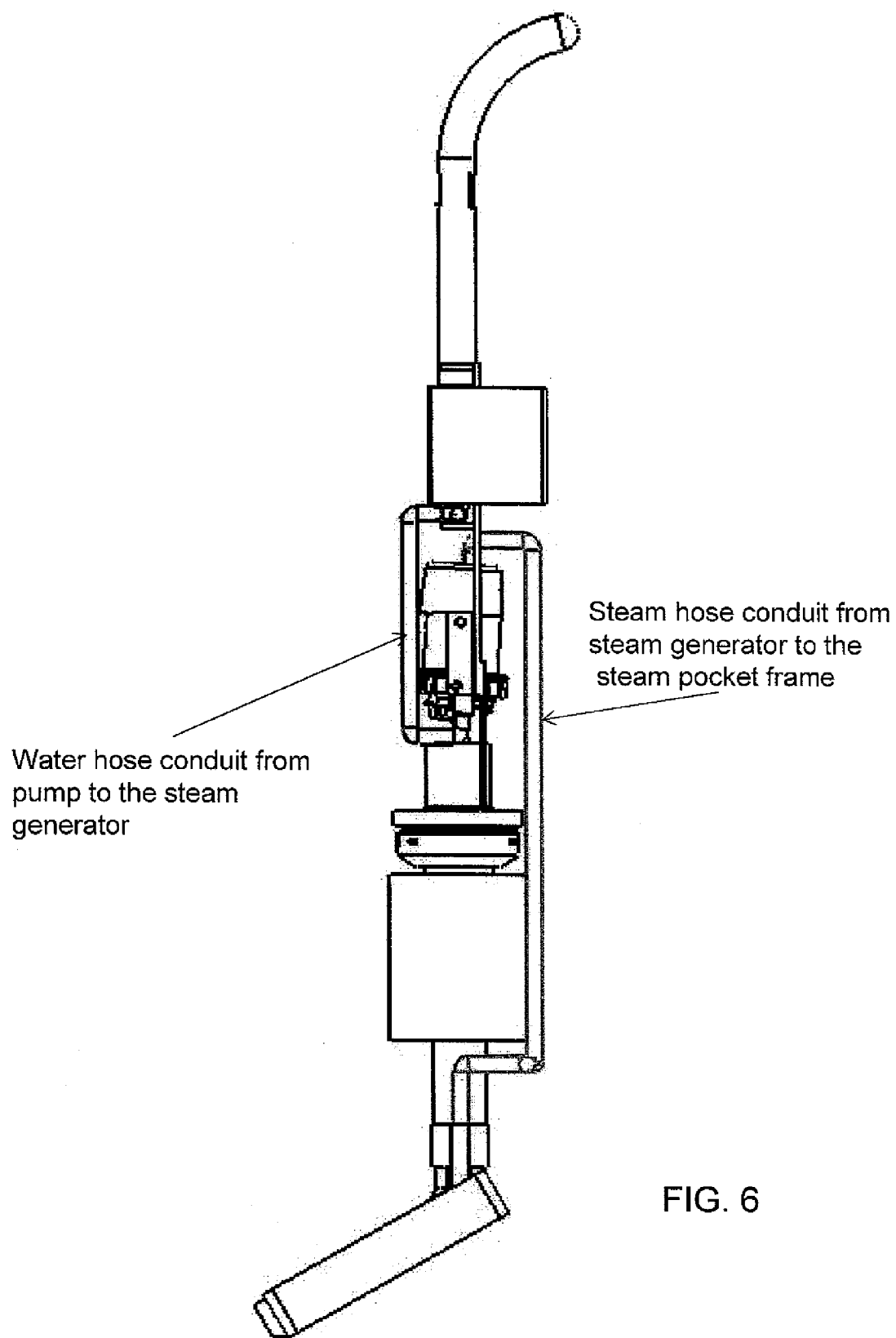


FIG. 6

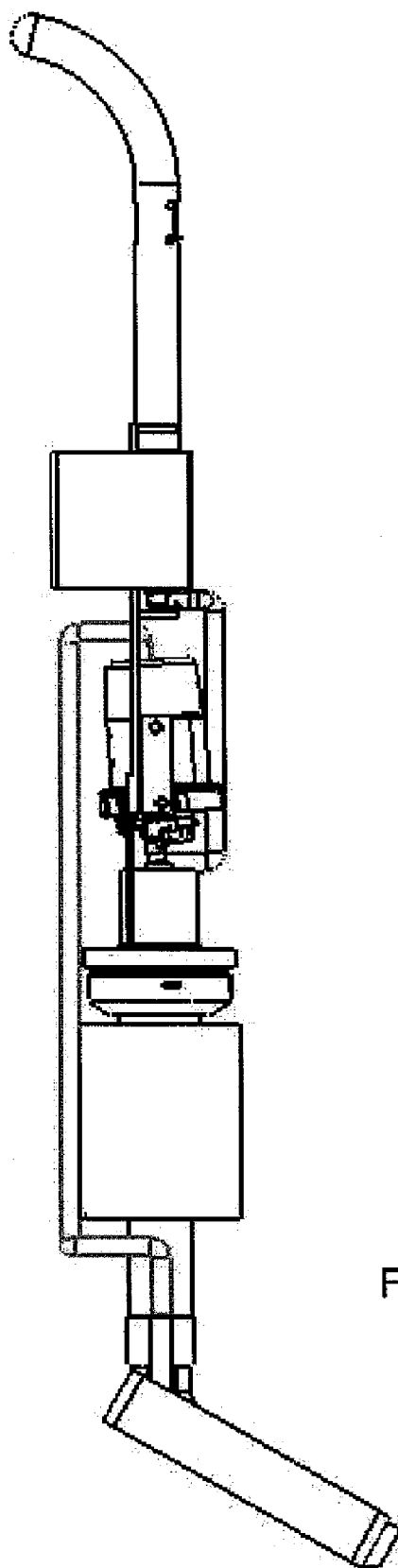


FIG. 7

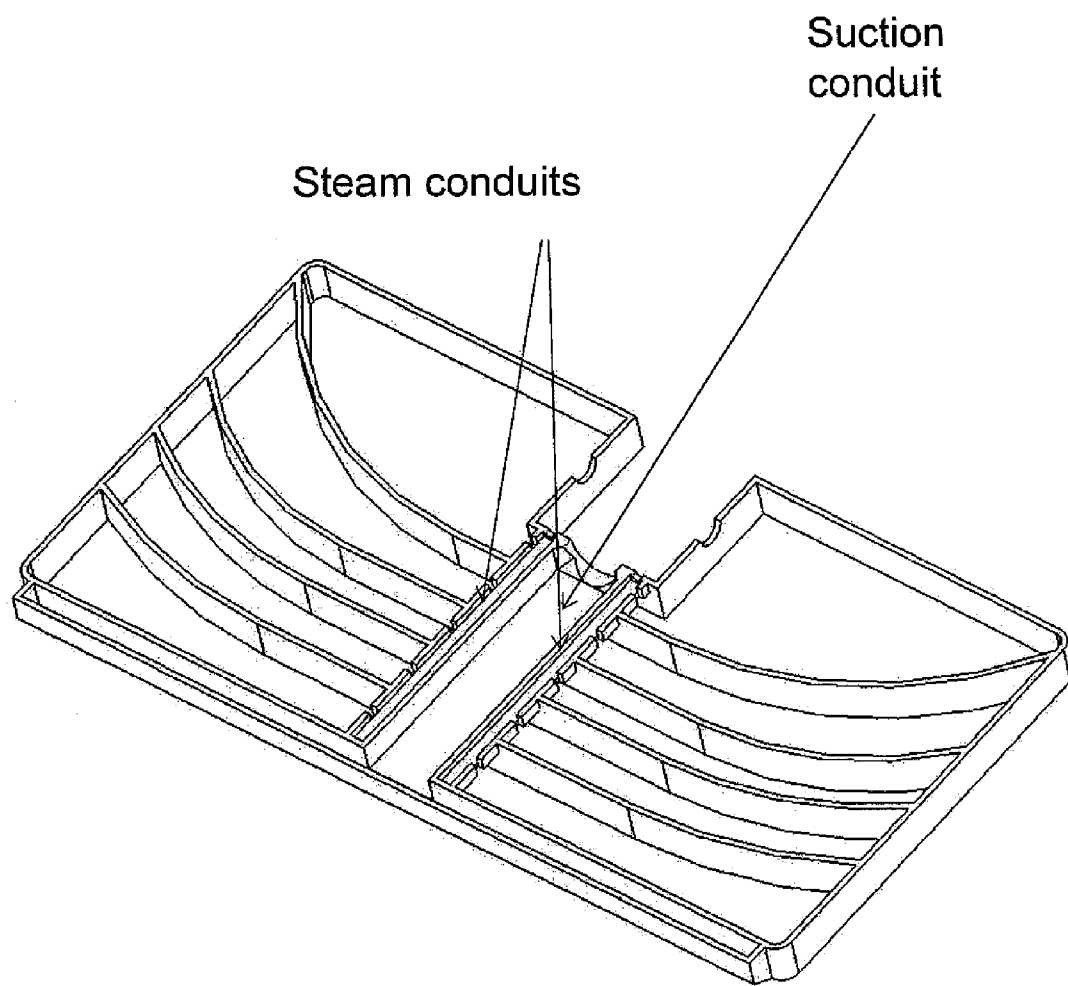


FIG. 8

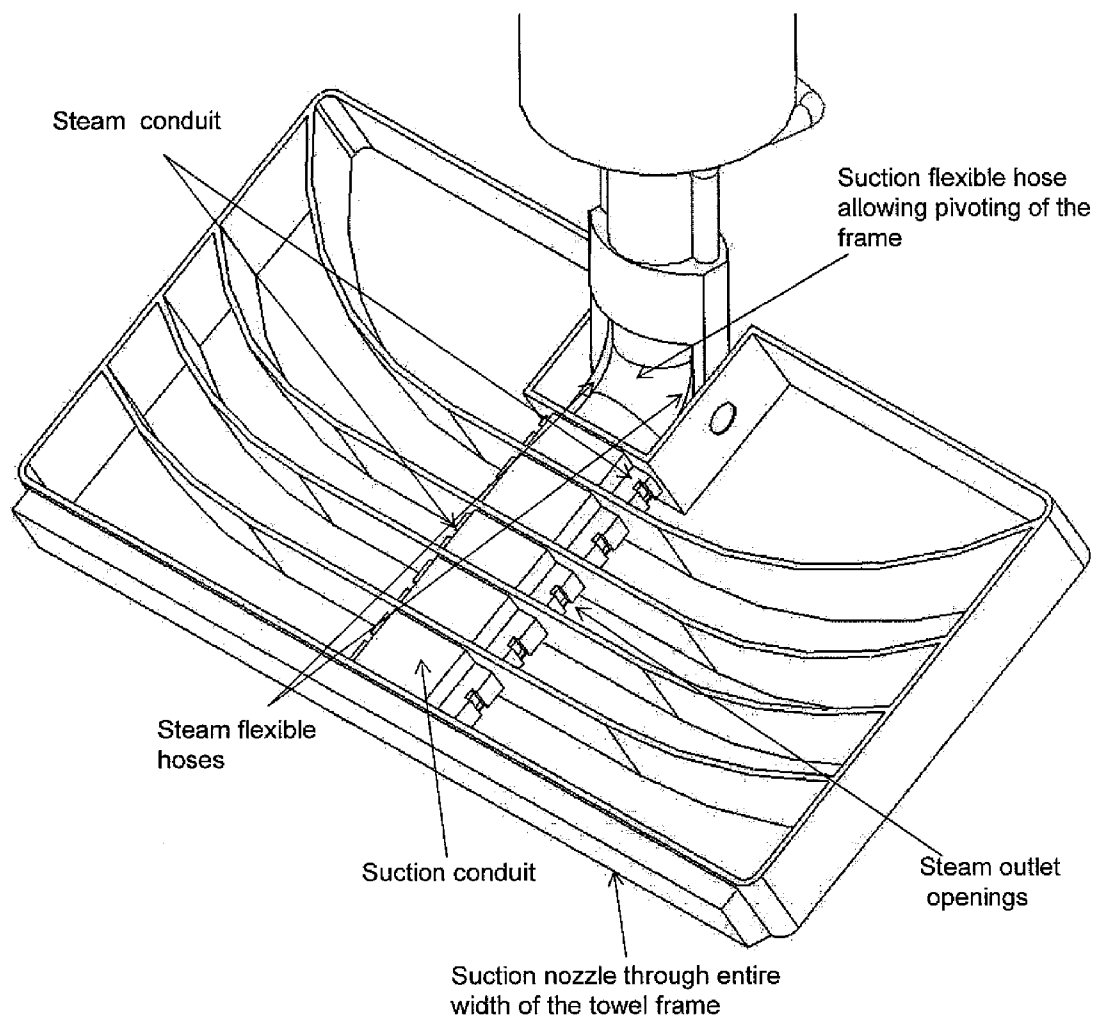


FIG. 9

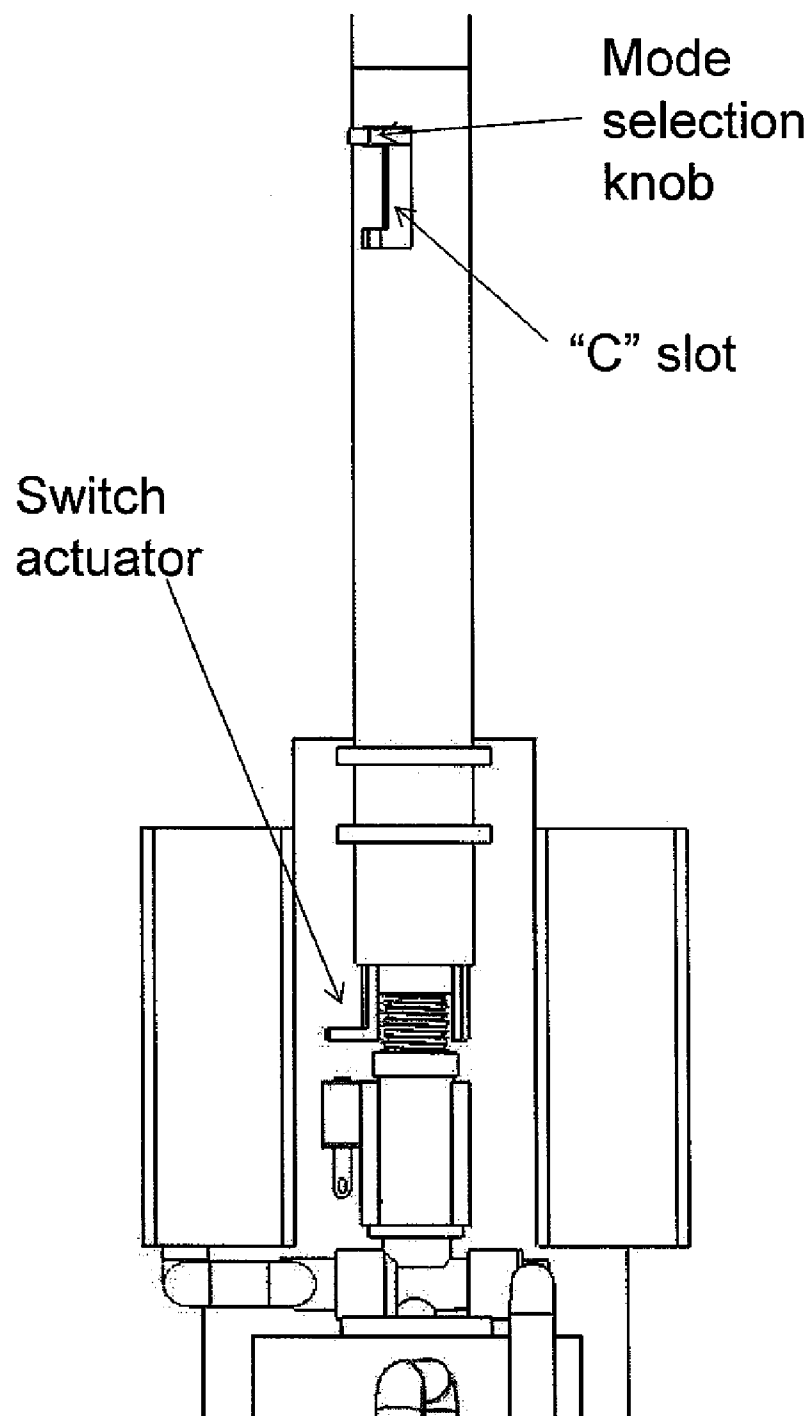
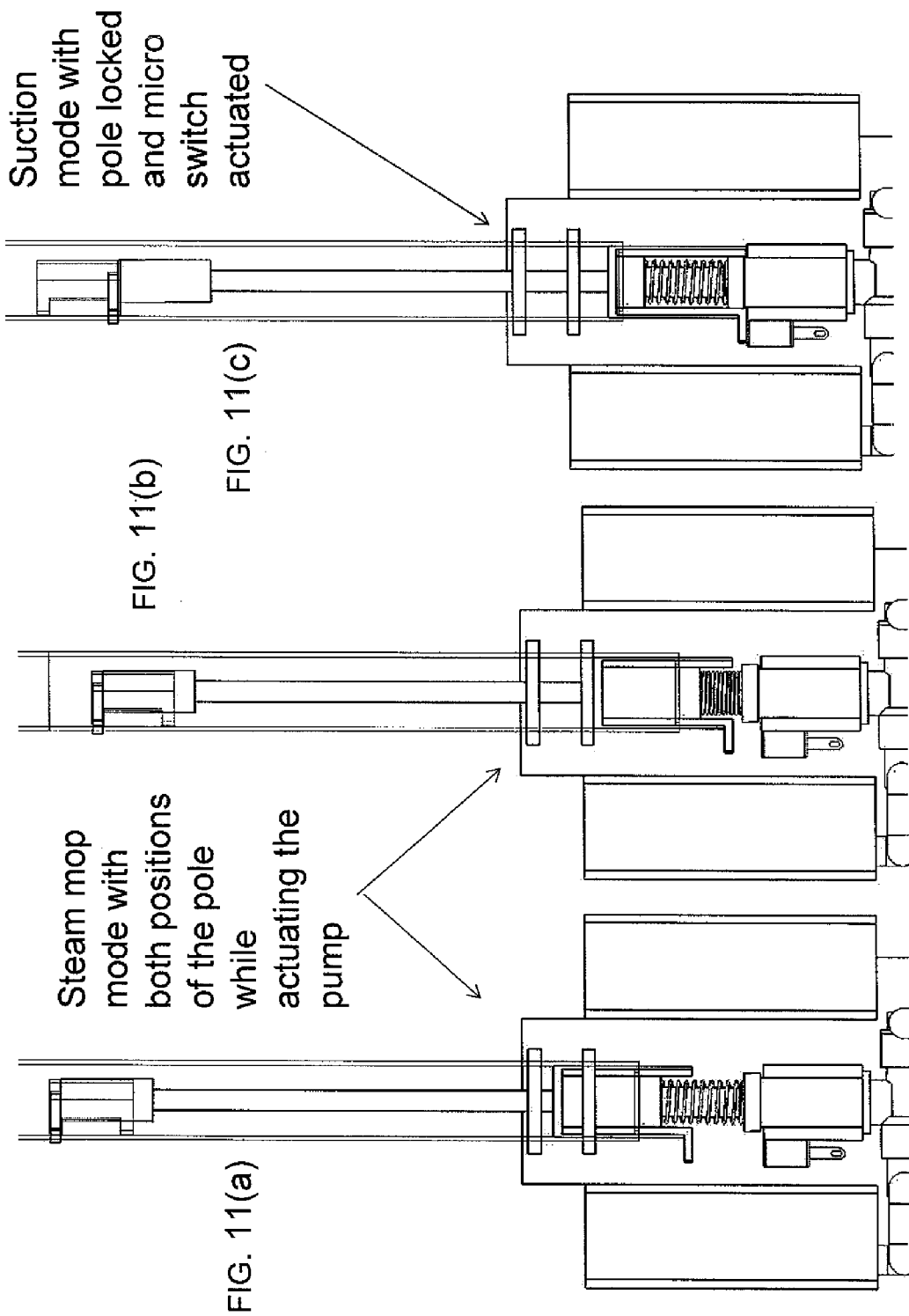


FIG. 10



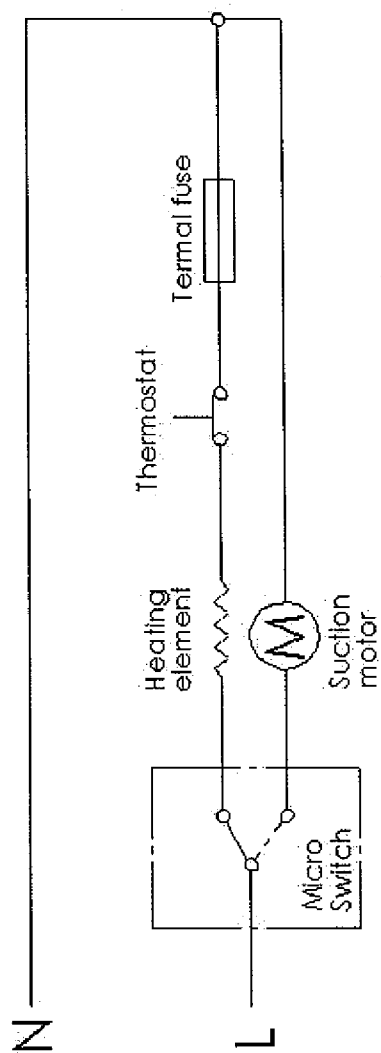


FIG. 12

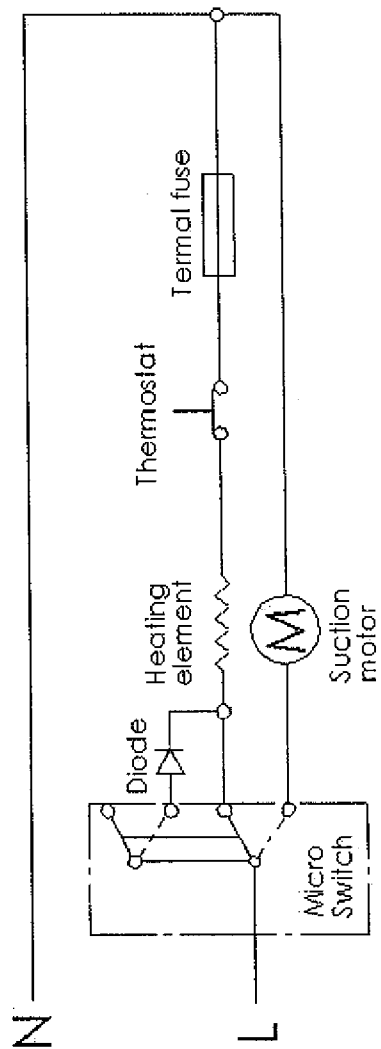


FIG. 13

STEAM APPLIANCE WITH VACUUM FUNCTION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit under 35 U.S.C. §119(e) of U.S. provisional application Ser. No. 61/151,366, filed Feb. 10, 2009, entitled “Steam Appliance with Vacuum Function”, the disclosure of which is incorporated by reference herein in its entirety.

BACKGROUND OF THE INVENTION

[0002] The invention relates generally to a steam appliance, and more particularly to a steam appliance including a vacuum that allows a surface to be cleaned before being steamed.

[0003] Steaming devices used to apply steam to household objects are well known. The uses of the devices vary widely, and may include the application of steam to drapes or other fabrics to ease wrinkles, and the application of steam to objects to assist in cleaning the various objects and surfaces.

[0004] In general, nozzles used with the steam appliances do not have large surface areas and a cloth or fabric pad is placed over a steam frame to provide a steaming or cleaning surface. The fabric pad may have Velcro strips to secure to cleats on the nozzle. Alternatively, a fabric steam pocket may be placed around a flat frame with baffles in order to increase the cleaning surface area.

[0005] Recently steam appliances have been developed where water is pumped from a reservoir to a boiler by the push-pull movement of the appliance handle. This actuates a bellows pump or piston pump operatively connected directly to the handle. These features are shown and described in parent applications Ser. No. 11/496,143 (now published application No. US2008/0236635) and Ser. No. 11/769,521 (now published application No. US2008/0066789), the contents of which are incorporated here by reference in their entireties.

[0006] Steam mops as floor cleaning devices have one major flaw. They do not pick up debris from the floor. Thus, in order to achieve good cleaning results, it is necessary to have the floor swept or vacuumed before using the mop. This means that for effective cleaning two operations have to be done, sweeping and then mopping.

[0007] Steaming and vacuuming are not provided in the same appliance due to power restrictions. Accordingly, it is desirable to provide a steam product capable of both operations.

SUMMARY OF THE INVENTION

[0008] Generally speaking, in accordance with the invention, a combined steam appliance with a vacuum function is provided. The steam appliance has a water pump for selectively injecting water from a reservoir to a boiler to generate steam in response to a user movement of the appliance and a user activated vacuum function for cleaning. The appliance includes a suction conduit connected to a dust container with suction provided by a suction motor turned on or off as needed and controlled by a user. Suction and mopping functions are separate features that can not be used at the same time. It is possible that both can be used at the same time. In another case when suction is on, the pump is deactivated and reduced power is provided to the steam generator to keep it in stand-by

mode. Switching from suction to mopping feature is done by the mechanism inside the pole and handle.

[0009] A mode selector button at a user handle is connected through a linkage inside a pole to a pole blocker. As the mode selector button moves downward the pole blocker extends below the pole and locks against the pump body. This action causes the pole to be locked in an upper position without the ability to move as the unit is pushed. This stops water from being pumped. At the same time the pole blocker presses against a switch that turns the suction motor on. In this position the water pump does not pump water into the steam generator and no steam is generated while suction is active.

[0010] In an alternative embodiment, a micro-switch having double contacts keeps the heating element hot when in suction mode. Addition of one diode to the circuit when in suction mode allows the heating element to be powered with one-half power to reduce the power consumption, but keeps it hot and in stand-by mode for immediate steam generation when required by user. The diode divides the power applied to the load.

[0011] Accordingly, it is an object of the invention to provide an improved steam appliance.

[0012] Another object of the invention is to provide an improved steam appliance having a vacuum function.

[0013] A further object of the invention is to provide a steam appliance with a steam generator and a vacuum function as two separate functions that can not be used at the same time.

[0014] Yet another object of the invention is to provide a steam appliance with a steam generator and vacuum function that can be used at the same time.

[0015] Yet a further object of the invention is an improved steam appliance with a steam generator and a vacuum function that allows use of the vacuum function and provides reduced power to the steam generator to maintain the generator in stand-by mode.

[0016] Yet a further object of the invention is an improved steam appliance with a steam generator and a vacuum function that allows use of the vacuum function and provides reduced power to the steam generator to maintain it in stand-by mode.

[0017] Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

[0018] The invention accordingly comprises a product possessing the features, properties, and the relation of components which will be exemplified in the product hereinafter described, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] For a fuller understanding of the invention, reference is made to the following description taken in connection with the accompanying drawing(s), in which:

[0020] FIG. 1 is a top plan view of a steam mop head constructed and arranged in accordance with one embodiment of the invention;

[0021] FIG. 2 is a left side cross-sectional view of the mop head of FIG. 1;

[0022] FIG. 3 is a front view of the mop components included in a mop constructed and arranged in accordance with the invention;

[0023] FIG. 4 is a schematic view of the mop handle and mode selector in accordance with one embodiment of the invention;

[0024] FIG. 5 is a front elevational view in of a steam mop with suction constructed and arranged in accordance with the invention;

[0025] FIG. 6 is a left side view of the steam mop with suction of FIG. 5;

[0026] FIG. 7 is a right side view of the steam mop of FIGS. 5 and 6;

[0027] FIG. 8 is a perspective view in section of a steam pocket frame suitable for use with the steam mop of FIGS. 5-7;

[0028] FIG. 9 is a perspective view of the steam pocket frame suitable of FIG. 8;

[0029] FIG. 10 is a plan view of a pole and locking mechanism for locking the steam mop in suction mode;

[0030] FIGS. 11(a), (b) and (c) are plan views of the pole and locking mechanism of FIG. 10 in different positions in use;

[0031] FIG. 12 is a schematic illustration of an electrical circuit of a combined steam appliance and vacuum constructed and arranged in accordance with the invention wherein when the heating switch is on the suction motor is off; and

[0032] FIG. 13 is a schematic illustration of an electrical circuit of a combined steam appliance and vacuum constructed and arranged in accordance with the invention wherein when the suction motor is on, the heating element is supplied with reduced power.

DETAILED DESCRIPTION OF THE INVENTION

[0033] FIG. 1 is a top plan view of a steam mop floor head constructed and arranged in accordance with the invention. The floor head is capable of delivering steam, suction and hold a towel with a steam pocket proven as the most effective towel arrangement for floor and flat surface cleaning. In this embodiment a suction nozzle is positioned in front of the towel frame and covers the entire width of the frame. A suction conduit and a steam conduit are incorporated into the center of the towel frame from the back to the front of the frame. The suction conduit is placed in the center of the towel frame and the steam conduits are divided in to two smaller conduits attached to the suction conduit on each side of the frame (left and right). The frame is connected to the housing of the steam appliance with a swivel-type connector. The steam conduits and suction conduit are connected to the housing and components through the connector via flexible hoses.

[0034] The arrangement of components inside the housing is shown in FIG. 3. A suction conduit that leads dust into the dust container is positioned over the connector. Suction is provided by suction motor positioned on top of the dust container. Dust separation can be by a conventional vacuum type collector with a bag, or a bag-less cyclonic-type dust collector. The bag-less type is preferred in view if the presence of steam and water vapor in and around the housing. Suction is turned on or off as needed and is controlled by a user.

[0035] The appliance can be configured to have suction and mopping functions as two separate features that can not be used at the same time. Alternatively, it can be configured wherein the suction motor switch and pole linkage are such that they can both be used at the same time. In this latter case provision is made to reduce power to the steam generator

when the suction is in use. Steam is generated in the steam generator that is connected to the water pump used as the water delivery system. The pump is actuated with pushing and pulling of the unit. The pole is linked to a pole connector that is linked to the pump. As the user pushes or pulls the unit, the pole connector moves the pump piston and water is fed from the water tank to the steam generator. Switching from the suction to the mopping feature is done by a control mechanism inside the pole and handle.

[0036] Referring now to FIG. 4, the mode selection mechanism in the pole is shown. A mode selector button is connected through a linkage inside the pole to a pole blocker positioned at the lower portion of the pole above the water pump. As the mode selector button moves downward the pole blocker extends below the pole and locks against the pump body. This action causes the pole to be locked in an upper position without the ability to move as the unit is pushed further. At the same time, the pole blocker presses against the switch that turns the suction on. When in this position, the pump does not pump water into the steam generator and steam is not generated while the suction function is active.

[0037] With minor modification but a very similar design, pole blocker can be configured to activate the suction and not to immobilize the pole. When this arrangement is used, both suction and steam generation can take place at the same time.

[0038] The pole is equipped with a locking mechanism that is used to lock the motion of the pole when in suction mode. This is shown in detail in FIG. 10. Locking and unlocking of the pole is done with the mode selection knob that is positioned near the handle of the pole for one hand operation. The knob is moved inside a "C" slot which is cut into the pole. The knob is rotated and then moved up or down and then again rotated to lock it in the position. This motion of the knob moves the switch actuator in relation to the pump. When the knob is moved downward it actuates a micro-switch which is used to activate the suction motor and at the same time deactivate the steam generator for power saving. The switch actuator is designed in the way that in correlation with position of the mode selection knob actuates the micro-switch. When the knob is in an upper position, the actuator does not actuate the switch, regardless of the position of the pole. The pole moves up and down when actuating the pump. When the mode selection knob is in a lower position, the switch actuator actuates the micro-switch to turn on the suction.

[0039] FIG. 5 illustrates the position of all the main components of a steam mop with vacuum function constructed in accordance with the invention. FIG. 6 illustrates the water hose conduit for feeding water from the water tank to the steam generator and the steam hose conduit for feeding generated steam from the generator to the steam frame. FIG. 7 shows the conduits from the opposite side.

[0040] FIGS. 8 and 9 show a steam frame suitable for use with the steam appliance constructed and arranged in accordance with the invention, in section and perspective, respectively. The suction conduit runs from the suction nozzle in the front through the middle of the frame to the swivel connector and then to the dust container. There are two outer steam conduits with steam outlet openings along the right and left sides of the suction conduit. Each steam conduit includes a plurality of steam outlet openings in the frame between the baffles.

[0041] FIG. 11 shows the linkage inside the pole of FIG. 10 for different positions of the mode selection knob. Depending on the preferred function various modes of operations are possible.

[0042] FIGS. 12 and 13 are schematical electrical circuits for two modes of operation. In FIG. 12 when used in the "suction" mode, the heating element inside the steam generator is powered while suction motor is off. When the micro-switch is actuated, the suction motor is powered and heating element is off. In FIG. 13 the micro-switch has double contacts keeping the heating element hot when in suction mode. With addition of one diode in the circuit when in suction mode the heating element is powered with only one-half power to reduce the power consumption, but sufficient to keep it hot and ready for immediate steam generation when required by the user. Full power for the motor and heating element can be 50% above maximum rated power for a regular wall plug. A diode divides the power applied to the load by one-half, but various electronic circuits are well known that can be utilized in this application to divide the power with different ratios.

[0043] A fabric steam pocket is configured to slip over the frame and is formed of a first layer of fabric and an opposed second layer of fabric. The fabric layers each have a substantially rectangular shape with two opposed long edges and two opposed short sides. One long edge and two opposed short sides are stitched to a form pocket. The fabric along the opening on long edge may be optionally closed with a hook and loop fastener, buttons or snaps leaving exposed the suction nozzle. Typical steam pockets are a cloth or towel that may be formed of any suitable fabric, such as cotton or a synthetic fabric, such as polyester or polyolefin fiber. Preferably, the fabric is a microfiber. Most preferably, the microfiber is a synthetic polyester microfiber.

[0044] It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above product and device without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

[0045] It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

[0046] The present invention may be embodied in other specific forms without departing from the spirit or essential attributes of the invention. Accordingly, reference should be made to the appended claims, rather than the foregoing specification, as indicating the scope of the invention.

What is claimed is:

1. A combination steam and vacuum head for an appliance, comprising:

- a unitary frame including a cleaning surface, a suction opening at the cleaning surface, and at least one steam outlet, the unitary frame adapted to support a steam-permeable fabric about the cleaning surface;
- a connector to connect the unitary frame to the appliance;
- a suction conduit in the unitary frame extending from the suction opening and configured to communicate with a suction source in the appliance; and

a first steam conduit in the unitary frame in communication with the at least one steam opening and configured to communicate with a source of steam in the appliance.

2. A combination steam and vacuum head as in claim 1, wherein the suction conduit extends through a middle region of the unitary frame.

3. A combination steam and vacuum head as in claim 1, further comprising a plurality of baffles extending outwardly from a middle region of the unitary frame.

4. A combination steam and vacuum head as in claim 3, wherein the at least one steam outlet comprises a plurality of steam outlets, and a baffle is positioned between adjacent steam outlets.

5. A combination steam and vacuum head as in claim 1, wherein the unitary frame has a generally flat configuration.

6. A combination steam and vacuum head as in claim 1 wherein the suction inlet is defined by front end wall of the unitary frame.

7. A combination steam and vacuum head as in claim 1, further comprising a second steam conduit, wherein the first and second steam conduits extend along respective sides of the suction conduit in the unitary frame.

8. A combination steam and vacuum head as in claim 1, further including a steam-permeable fabric supported by the unitary frame.

9. A combination steam and vacuum head as in claim 8, wherein the steam-permeable fabric is supported by the unitary frame, and the suction opening remains exposed.

10. A combination steam and vacuum head as in claim 1, further including a steam-permeable fabric in form of pocket, the pocket being supported by the unitary frame.

11. A combination steam and vacuum head as in claim 10, wherein the steam-permeable fabric pocket is supported by the unitary frame, and the suction opening remains exposed.

12. A combination steam and vacuum head as in claim 1, wherein the connector comprises a swivel connector.

13. The combination steam and vacuum head for an appliance as in claim 1, in combination with the appliance, the appliance comprising:

- a water reservoir;
- a steam generator;
- a pump constructed and arranged to pump water from the water reservoir to the steam generator; and
- a suction source.

14. A combination steam and vacuum head as in claim 1, wherein the unitary frame includes an outer sidewall, the suction conduit extends through a central region of the unitary frame, and a plurality of baffles extends between the suction conduit and the outer sidewall.

15. A combination steam and vacuum head as in claim 1, wherein the unitary frame includes an outer sidewall, and the at least one steam outlet extends outwardly in a direction of the sidewall.

16. An appliance comprising:

- a body including a handle, at least a portion of the handle being manually moveable to actuate a first function of the appliance;
- a switch configured to electronically actuate a second function of the appliance;
- wherein the appliance is configured such that when the switch is electronically actuating the second function, manual movement of the handle that would actuate the first function is prevented.

17. An appliance as in claim **16**, wherein the first function is pumping water from a reservoir in the body to a steam generator in the body, and the second function is creating a vacuum.

18. An appliance as in claim **16**, further including a blocker associated with the switch for actuating the second function, the blocker being movable with actuation of the switch to a blocking position which prevents manual movement of the handle that would actuate the first function.

19. An appliance as in claim **18**, wherein the blocker is moveable in a lengthwise direction of the handle into the blocking position.

20. An appliance as in claim **16**, wherein the portion of the handle includes a pole that is moveable to actuate the first function, and the handle further includes a combination switch actuator linkage and blocker that is moveable relative to the pole.

21. An appliance as in claim **18**, wherein the handle includes a lock to releasably fix the blocker in the blocking position.

22. An appliance as in claim **16**, wherein the body includes:
a water reservoir;
a steam generator;
a pump constructed and arranged to pump water from the water reservoir to the steam generator;
a suction source; and wherein
the handle is operatively connected to the pump; and
the switch is configured to actuate the suction source.

23. An appliance as in claim **22**, wherein the appliance includes a cleaning head, the cleaning head having a suction inlet and a steam outlet.

24. An apparatus as in claim **22**, wherein when the switch for the suction source is actuated, the steam generator is provided with reduced power as compared to the power provided to the steam generator when the switch for the suction source is not actuated.

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