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(54) **FLOOR CLEANING SYSTEM**

(57) A floor cleaning system comprises a floor cleaning machine and a self-cleaning station. The machine includes a cleaning base, a rechargeable battery, a first control unit controlling the floor cleaning machine to perform cleaning operations and self-cleaning operations and a first charging interface. The self-cleaning station includes a station body, a second charging interface, a

self-cleaning switch, a second control unit communicatively coupled with the self-cleaning switch a, and the first control unit is in signal communication with the second control unit via an electrical pathway passing through the first charging interface and the second charging interface when the first charging interface is electrically contacted with the second charging interface.

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Description

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application claims priority to Chinese Patent Application No. 202110677417.1, filed on June 16, 2021 and entitled "Floor Cleaning System", which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to the field of surface cleaning appliance. In its preferred embodiment, the present invention relates to a floor cleaning system comprising a floor cleaning machine and a self-cleaning station.

BACKGROUND OF THE INVENTION

[0003] Wet floor cleaning machines are adapted for cleaning the floor with cleaning fluid such as water. A wet floor cleaning machine typically comprises a brush roller, a fluid delivery unit and a fluid recovery unit. When the wet floor cleaning machine is in operation, the fluid delivery unit supplies the brush roller with the cleaning fluid, which is used to clean the surface to be cleaned, and the fluid recovery unit draws and stores the spent cleaning fluid and debris from the surface to be cleaned in its own recovery tank. As the brush roller is in directly contact with the surface to be cleaned, it inevitably adheres to the spent cleaning fluid and debris from the surface to be cleaned. In order to prevent the brush roller getting mouldy and to maintain the cleaning effect of the floor cleaning machine and the life of the brush roller, parts of the fluid recovery unit, including the brush roller, need to be cleaned after the floor cleaning machine has finished its cleaning work.

SUMMARY OF THE INVENTION

[0004] The invention provides a floor cleaning system comprising a floor cleaning machine and a self-cleaning station, wherein the floor cleaning machine includes a cleaning base movable over a surface to be cleaned and including at least one brush roller; a fluid delivery unit configured to deliver a cleaning fluid to the at least one brush roller and comprising a supply tank for storing the cleaning fluid and a fluid dispenser in fluid communication with the supply tank; a fluid recovery unit comprising a recovery tank; a rechargeable battery configured to power energy-consuming components of the floor cleaning machine; a first control unit controlling the floor cleaning machine to perform cleaning operations and self-cleaning operations; and a first charging interface electrically coupled to the rechargeable battery; and the self-cleaning station includes a station body configured to receive and hold at least a portion of the base, a power plug

provided on the station body and having ability to be electrically coupled to an external power source, a self-cleaning switch operably provided on the station body, a second charging interface configured to electrically contact to the first charging interface, and a second control unit communicatively coupled with the self-cleaning switch and the second charging interface; wherein the first control unit is in signal communication with the second control unit via an electrical pathway passing through the first charging interface and the second charging interface when the first charging interface is electrically contacted with the second charging interface, such that the self-cleaning operation is performed in response to an indication that the self-cleaning switch has been turned on.

[0005] Preferably, the floor cleaning machine comprises a charging control circuit controlling the charging of the rechargeable battery, wherein the charging control circuit is disabled when the first control unit controls the floor cleaning machine to perform the self-cleaning operation.

[0006] In a preferred embodiment, the self-cleaning switch is foot operated.

[0007] Preferably, the floor cleaning machine comprises a cleaning switch configured to be operable, and the cleaning switch is communicatively coupled to the first control unit for initiating the cleaning operation in response to an indication that the cleaning switch has been turned on.

[0008] Preferably, the floor cleaning machine comprises a power monitoring device configured to monitor the remaining power of the rechargeable battery and be in signal communication with the first control unit, and the first control unit is configured to perform the self-cleaning operation in response to an indication that the self-cleaning switch has been turned on when the power monitoring device detects the remaining power of the rechargeable battery being satisfied.

[0009] Preferably, the floor cleaning machine comprises a cleaning fluid monitoring device being in signal communication with the first control unit and configured to monitor the flow of the cleaning fluid in the fluid delivery unit.

[0010] It is preferred that the floor cleaning machine comprises a level monitoring device being in signal communication with the first control unit for monitoring the level in the recovery tank.

[0011] Preferably, the floor cleaning machine comprises a turbidity monitoring device being in signal communication with the first control unit for monitoring the turbidity of the fluid in the fluid recovery unit.

[0012] Preferably, the cleaning base comprises a brush-roller motor for rotating the at least one brush roller, the fluid delivery unit includes a liquid pump between the supply tank and the at least one brush roller, and the brush-roller motor and the pump are both communicatively coupled to the first control unit.

[0013] It is preferred that the fluid recovery unit comprises a suction motor in fluid communication with the

recovery tank and communicatively coupled to the first control unit.

[0014] Additional aspects and advantages of the invention will be given in part in the following description, and will in part become apparent from the following description, or from the practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a floor cleaning system according to one embodiment of the present invention;

FIG. 2 is a side view of a floor cleaning machine of the floor cleaning system of FIG. 1;

FIG. 3 is an exploded perspective view of the floor cleaning machine of FIG. 2;

FIG. 4 is a perspective view of a self-cleaning station of the floor cleaning system of FIG. 1;

FIG. 5 is a side view of the self-cleaning station of FIG. 4;

FIG. 6 is a schematic illustration of a first control unit of the floor cleaning machine of FIG. 2 and a second control unit of the self-cleaning station of FIG. 4;

FIG. 7 is a schematic circuit diagram of the floor cleaning system of FIG. 1;

FIG. 8 is a graph of voltage versus time transmitted through the electrical pathway to the first control unit after the first charging interface is electrically contacted with the second charging interface, when the user does not turn on the self-cleaning switch;

FIG. 9 is a graph of voltage versus time transmitted from the second control to the first control unit through the electrical pathway after the first charging interface is electrically contacted with the second charging interface, and the user turns on the self-cleaning switch.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0016] In order to illustrate in detail the technical content, the constructional features, the purpose achieved and the efficacy of the invention, the technical solutions in the embodiments of the present application are described below in conjunction with the accompanying drawings in the embodiments of the present application,

it being clear that the embodiments described are only a part of the embodiments of the present application and not all of them.

[0017] FIG. 1 illustrates an external view of a floor cleaning system 100, according to one embodiment of the invention. In this embodiment, the floor cleaning system 100 is capable of performing cleaning operations and self-cleaning operations. The floor cleaning system 100 comprises a floor cleaning machine 1 and a self-cleaning station 2. The floor cleaning machine 1 is adapted to move over the surface to be cleaned. The self-cleaning station 2 is capable of receiving and holding at least a part of the floor cleaning machine 1. The floor cleaning machine 1 can perform the self-cleanings or recharge while the floor cleaning machine 1 is supported on the self-cleaning station 2.

[0018] As shown in FIG. 2 and FIG. 3, the floor cleaning machine 1 comprises a cleaning base 11 adapted for movement across a surface to be cleaned, an upright body 12 rotatably coupled to the cleaning base 11, a fluid delivery unit (not shown) for delivering a cleaning fluid to the cleaning base 11, a fluid recovery unit 14 for recovering a spent cleaning fluid and debris from the surface to be cleaned, and a first control unit 16 (FIG. 6) controlling the floor cleaning machine 1 to perform the cleaning operations and the self-cleaning operations.

[0019] The cleaning base 11 comprises a housing 111, an upper cover 115 removably provided on the housing 111, a brush roller 112 rotatably provided in the housing 111, moving wheels 113 for carrying the base 11 over the surface to be cleaned and a brush-roller motor 114 for driving the rotation of the brush roller 112. The wheels 113 are configured to contact with the surface to be cleaned. Some wheels 113 are provided to the rear end of the housing 111.

[0020] A suction chamber 116 located at the front of the cleaning base 11 is defined by the housing 111 and the upper cover 115. The suction chamber 116 has a lower opening (not shown) towards the surface to be cleaned. The brush roller 112 is rotatably supported in the suction chamber 116 by a support member (not shown). The lower end of the brush roller 112 passes through the lower opening to contact with the surface to be cleaned. In other embodiments, the housing and the upper cover may be provided as an integral, or the housing and the upper cover may be fixedly connected to each other.

[0021] The upright body 12 comprises a handle assembly 121 at the top, a joint assembly 123 rotatably hinged to the cleaning base 11, and a frame 122 between the handle assembly 121 and the joint assembly 123. The handle assembly 121 is configured to be hand carried by a user for operating the floor cleaning machine 1. The handle assembly 121 includes a cleaning switch 124 (FIG. 6), which is used by the user for initiating the cleaning operation of the floor cleaning machine 1. The cleaning switch 124 can be a individual switch or can be replaced by a main power switch (such as an on-off

switch) of the floor cleaning machine.

[0022] The fluid delivery unit comprises a supply tank 131 for storing the cleaning fluid, a fluid delivery pathway (not shown) between the supply tank 131 and the brush roller 112, and a liquid pump 132 located in the fluid delivery pathway. The supply tank 131 is removably mounted to the frame 122. The fluid delivery pathway passes inside the upright body 12, and some of the fluid delivery pathway is configured to pass through the joint assembly 123 to the cleaning base 11. An outlet of the fluid delivery pathway is defined by a fluid dispenser (not shown) located on the upper side of the brush roller 112. The dispenser is configured to evenly dispense the cleaning fluid to the outer circumferential surface of the brush roller 112. A cleaning fluid monitoring device 133 (FIG. 6) for monitoring the flow of the cleaning fluid through the delivery pathway is provided.

[0023] The fluid recovery unit 14 comprises a recovery tank 141 for receiving and storing the spent cleaning fluid and debris, a suction motor 142 mounted on the upper side of the recovery tank 141, and a fluid recovery pathway 143 between the suction chamber 116 and the recovery tank 141. In this embodiment, the suction motor 142 is installed inside the frame 122 and located underneath the supply tank 131 and. The recovery tank 141 is removably mounted to the frame 122, too. The recovery tank 141 is configured to be in fluid communication with the suction motor 142. The fluid recovery pathway 143 passes inside the upright body 12. Some of the fluid recovery pathway 143 passes through the joint assembly 123 to the cleaning base 11. The fluid recovery pathway 143 is in fluid communication with the suction chamber 116 and the recovery tank 141.

[0024] A level monitoring device 144 (FIG. 6) for monitoring the level of the recovery tank 141 and a turbidity monitoring device 145 (FIG. 6) for monitoring the turbidity of the recovery fluid in the fluid recovery pathway 143 are provided in the fluid recovery unit 14. The lower the turbidity of the recovery fluid is, the higher the clarity of the recovery fluid is. In this embodiment, the turbidity monitoring device 145 is set in the fluid recovery pathway 143.

[0025] The floor cleaning machine 1 also comprises a rechargeable battery 151, a first charging interface 152, and a charging control circuit 153 between the rechargeable battery 151 and the first charging interface 152 (FIG. 2 and FIG. 3). The charging control circuit 153 is in signal communication with the first control unit 16 and is controlled by the first control unit 16. The rechargeable battery 151 is located on the rear side of both the recovery tank 141 and the suction motor 142. The rechargeable battery 151 is configured to be inside the upright body 12. The rechargeable battery 151 is electrically coupled with the brush-roller motor 114, the liquid pump 132, the suction motor 142 and the first control unit 16 to power them.

[0026] The charging control circuit 153 is constructed to conduct and disconnect the electrical connection of

the rechargeable battery 151 to the first charging interface 152. The charging control circuit 153 is always on; however, the charging control circuit 153 is controlled by the first control unit 16 to disconnect the electrical connection between the first charging interface 152 and the rechargeable battery 151 when the floor cleaning machine 1 is activated and the self-cleaning operation is carried out. The first charging interface 152 is exposed to the upright body 12 for connection to an external charging interface (for example, the second charging interface of the self-cleaning station 2 mentioned below). In this embodiment, the floor cleaning machine 1 also has a power monitoring device 154 (FIG. 6), which is used to monitor the remaining power of the rechargeable battery 151.

[0027] The first control unit 16 is within the floor cleaning machine 1 and is pre-stored with a cleaning control procedure for cleaning operations and a self-cleaning control procedure for self-cleaning operations. The cleaning switch 124, the cleaning fluid monitoring device 133, the level monitoring device 144, the power monitoring device 154 and the turbidity monitoring device 145 are all communicatively coupled to the first control unit 16 for sending relevant signals to the first control unit 16. The first control unit 16 is in signal communication with the brush roller motor 114, the liquid pump 132, the charging control circuit 153 and the suction motor 142 to control the operations of the floor cleaning machine 1.

[0028] When the first control unit 16 executes the cleaning control procedure after the user turns on the cleaning switch 124, the floor cleaning machine 1 starts to perform a cleaning operation. The first control unit 16 starts the brush-roller motor 114, the liquid pump 132 and the suction motor 142 at the same time. The cleaning fluid in the supply tank 131 reaches the fluid distributor via the liquid pump 132 and it is distributed via the fluid distributor to the brush rollers 112. The brush roller 112, driven by the brush-roller motor 114, uses the cleaning fluid to scrub the surface to be cleaned. The suction motor 142 at work creates a negative pressure in the recovery pathway 143 from the lower opening of the suction chamber 116 to the recovery tank 141. The spent cleaning fluid and debris from the floor surface pass through the lower opening, the suction chamber 116 and the recovery pathway 143 in succession, arrive and are stored in the recovery tank 141 by the force of the negative pressure.

[0029] As shown in FIG. 3, FIG. 4 and FIG. 5, the self-cleaning station 2 comprises a station body 21, a self-cleaning switch 22 operably provided at the rear of the body 21, a second control unit 23 communicatively coupled to the self-cleaning switch 22, and a second charging interface 24 capable of engaging with the first charging interface 152. The second charging interface 24 is electrically coupled with the second control unit 23. The self-cleaning station 2 is supported on the floor surface by its bottom surface or own legs (not shown). A power plug 26 (FIG. 6) is provided with the station body 21. The power plug 26 has ability to electrically couple to an external

power source, such as a household outlet. The power plug 26 is arranged on the body 21 and is capable of directing current from the external power source to the second charging interface 24.

[0030] The station body 21 comprises a column 211 extending in an upward and downward direction, and a tray 212 fixed to the lower part of the column 211. The tray 212 has a portion 214 capable of receiving and holding the cleaning base 11 and an upright sidewall 213 formed by the upward extension of the edge wall surface of the portion 214. The portion 214 comprises a recess 215 and a support part 216. The recess 215 is provided on the front side of the support part 216. The support part 216 has a flat surface sloping forward and downwards. The support part 216 is configured to receive and support parts of the bottom of the housing 111, such as the wheels. The recess 215 is configured to receive and hold the brush roller 112.

[0031] The second charging interface 24 is located at the top of the column 211. The second charging interface 24 is electrically contacted with the first charging interface 152 when the floor cleaning machine 1 is placed on the self-cleaning station 21. When the charging control circuit 153 is enabled, a charging current is continuously delivered to the rechargeable battery 151 via an electrical pathway passing through the first charging interface 152 and the second charging interface 24 to enable charging of the rechargeable battery 151.

[0032] In this embodiment, the self-cleaning switch 22 is configured as a foot-operated switch. It is mounted at the rear of the tray 212. It is for the user to activate the self-cleaning operations of the floor cleaning machine 1. In other embodiments, the position of the self-cleaning switch can be changed as desired, such as provided on the front side of the recess, and the self-cleaning switch can also be provided as a hand-operated switch, such as a button or a slider.

[0033] As shown in FIG. 6 and FIG. 7, the second control unit 23 is in signal communication with the second charging interface 24 and the self-cleaning switch 22. When the second charging interface 24 is electrical contacted with the first charging interface 152, the second control unit 23 is in signal communication with the first control unit 16 via an electrical pathway passing through the second charging interface 24 and the first charging interface 152. Thereafter, it allows the second control unit 23 to send signals or messages to the first control unit 16 by the electrical pathway. For example, a signal from the self-cleaning switch 22 to the second control unit 23 can be further transmitted to the first control unit 16 by the electrical pathway.

[0034] When the second charging interface 24 is electrical contacted with the first charging interface 152 and the self-cleaning switch 22 is not turned on, the electrical pathway through the second charging interface 24 and the first charging interface 152 directly transmits a charging voltage signal by the control of the second control unit 23; and at this moment, the first control unit 16 of the

floor cleaning machine 1 receives a normal voltage wave signal corresponding to the charging voltage signal. For example, the charging voltage wave signal is received with a charging voltage of V_0 at all times as shown in FIG. 8; the waveform of the voltage wave is a straight line. Upon receipt of the normal voltage wave signal, the first control unit 16 controls the charging control circuit 153 is enabled, and the rechargeable battery 151 starts charging.

[0035] When the second charging interface 24 is electrical contacted with the first charging interface 152 and the self-cleaning switch 22 is turned on, the electrical pathway passing through the second charging interface 24 and the first charging interface 152 transmits a protocol voltage signal. The protocol voltage signal is different from the charging voltage signal. At this moment the first control unit 16 of the floor cleaning machine 1 receives an abnormal voltage wave signal corresponding to the protocol voltage signal. For example, the waveform of the received protocol voltage signal is rectangular as illustrated in FIG. 9. Upon receipt of the protocol voltage waveform, the first control unit 16 controls the charging control circuit 153 is disabled, and the first control unit 16 executes the self-cleaning control procedure, a self-cleaning operation starts. After the self-cleaning operation is completed, the first control unit 16 controls the charging control circuit 153 is enabled again until charging the rechargeable battery 151 is complete. Before the self-cleaning control procedure starts to run, the first control unit 16 checks whether the charge of the rechargeable battery 151 meets the power requirements for the self-cleaning operation, whether the cleaning fluid in the supply tank 131 meets the requirements for the self-cleaning operation, and whether the recovery tank 141 is empty, based on the individual monitoring devices, and only starts when all these needs are met. In this embodiment, the protocol voltage waveform is designed as a "special-shaped" waveform that is temporarily inserted into the charging voltage waveform. This "special-shaped" waveform is typically short in duration and easily recognized by the first control unit 16.

[0036] The application uses the electrical pathway through the second charging interface 24 and the first charging interface 152 to transmit the protocol voltage signal generated by turning on the self-cleaning switch, and a separate transmission signal wire between the self-cleaning station 2 and the floor cleaning machine 1 is not necessary. It simplifies the electrical or signal connection structure between the floor cleaning machine 1 and the self-cleaning station 2. The self-cleaning switch does not require a locking procedure for the self-cleaning switch to prevent in advertent operation compared to the previous solution of having the self-cleaning switch on the floor cleaning machine, which also simplifies the self-cleaning control procedure.

[0037] The working principle of the self-cleaning operations of the floor cleaning system 100 is described below. It should be noted that, in order to avoid power supply

interruptions during the self-cleaning operation of the floor cleaning machine 1, the first control unit 16 is pre-stored with a minimum power threshold based on the power required for the self-cleaning operation of the floor cleaning machine 1. The first control unit 16 can only perform the self-cleaning operation of the floor cleaning machine 1, if the power level monitored by the power monitoring device 154 is greater than the minimum power threshold.

[0038] When the user turns on the self-cleaning switch 22, the second control unit 23, which is communicatively coupled with the self-cleaning switch 22, sends a protocol voltage waveform to the first control unit 16 via the electrical pathway through the second charging interface 24 and the first charging interface 152, which are electrically contacted with each other. It can indicate the start of the self-cleaning operation of the floor cleaning machine 1. When the first control unit 16 receives the protocol voltage wave signal, and on the one hand, it sends a signal to disable the charging control circuit 153, the rechargeable battery 151 disconnects from the first charging interface 152, and the rechargeable battery 151 pauses charging; on the other hand, it makes a pre-judgement on the self-cleaning conditions; and when all the conditions are met, it starts the brush-roller motor 114, the liquid pump 132 and the suction motor 142 at the same time to perform the self-cleaning control procedure.

[0039] The cleaning fluid in the supply tank 131 is pumped by the liquid pump 132 through the fluid delivery pathway to the fluid distributor and distributed via the fluid distributor to the brush roller 112. The brush roller 112, driven by the brush-roller motor 114, uses the cleaning fluid to wash itself. The suction motor 142 creates a negative pressure in the recovery pathway 143 from the suction chamber 116 to the recovery tank 141, and the spent cleaning fluid and debris from the brush roller 112 flows along the fluid recovery pathway 142, reaches and stores in the recovery tank 141.

[0040] The first control unit 16 also pre-stores a cut-off flow rate threshold corresponding to the flow rate of cleaning fluid, a cleanliness threshold corresponding to the turbidity of the spent cleaning fluid and debris, and a level threshold corresponding to the level of the recovery tank 141. During the self-cleaning operation of the floor cleaning machine 1, the first control unit 16 interrupts the self-cleaning operation and reminds the user to add new cleaning fluid if the cleaning fluid flow rate monitored by the cleaning fluid monitoring device 133 is lower than the cut-off flow rate threshold; if the level monitored by the level monitoring device 144 is higher than the full-level tank threshold, the first control unit 16 interrupts the self-cleaning operation and reminds the user to dump the fluid in the recovery tank 141; If the turbidity level monitored by the turbidity monitoring device 145 is below the cleanliness threshold, the first control unit 16 ends the self-cleaning operation and the self-cleaning operation of the floor cleaning machine 1 is finished. In other embodiments, the floor cleaning machine can also cancel

the turbidity monitoring device, and the first control unit can be equipped to automatically end the self-cleaning of the floor cleaning machine after the self-cleaning operation has been carried out for a pre-set period of time.

[0041] The above examples are intended only to illustrate the technical concept and features of this application, and are intended to enable those familiar with the technology to understand and implement the contents of this application accordingly, and not to limit the scope of protection of this application. Any equivalent changes or modifications made in accordance with the spirit of this application shall be covered by the scope of protection of this application.

Claims

1. A floor cleaning system, comprising:
a floor cleaning machine(1) including:

a cleaning base(11) movable over a surface to be cleaned and having at least one brush roller(112);

a fluid delivery unit configured to deliver a cleaning fluid to the at least one brush roller (112)and comprising a supply tank (131)for storing the cleaning fluid and a fluid dispenser in fluid communication with the supply tank(131);

a fluid recovery unit (14)comprising a recovery tank(141);

a rechargeable battery(151)configured to power energy-consuming components of the floor cleaning machine(1);

a first control unit(16) controlling the floor cleaning machine(1) to perform cleaning operations and self-cleaning operations;

a first charging interface(152) electrically coupled to the rechargeable battery(151);

a self-cleaning station (2)including:

a station body(21) configured to receive and hold at least a portion of the base(11);

a power plug(26)provided on the station body(21)and having ability to be electrically coupled to an external power source;

a second charging interface (24) configured to electrically contact to the first charging interface(152) ;

characterized in that the self-cleaning station (2) comprises a self-cleaning switch (22)operably provided on the station body and a second control unit(23) communicatively coupled with the self-cleaning switch(22) and electrically coupled with the second charging interface(24), and the first control unit(16) is in signal communication with the second control unit (23)via an electrical pathway passing through the first

- charging interface(152) and the second charging interface (24)when the first charging interface(152) is electrically contacted with the second charging interface(24), such that the self-cleaning operation is performed in response to an indication that the self-cleaning switch (22)has been turned on .
2. The floor cleaning system according to claim 1, wherein the floor cleaning machine(1) comprises a charging control circuit(153) controlling the charging of the rechargeable battery(151), and the charging control circuit(153) is disabled when the first control unit (16)controls the floor cleaning machine (1)to perform the self-cleaning operation.
 3. The floor cleaning system according to claim 1, wherein the self-cleaning switch (22) is foot operated.
 4. The floor cleaning system according to claim 1, wherein the floor cleaning machine (1)comprises a cleaning switch (124)configured to be operable, and the cleaning switch (124)is communicatively coupled to the first control unit (16)for initiating the cleaning operation in response to an indication that the cleaning switch(124) has been turned on.
 5. The floor cleaning system according to claim 1, wherein the floor cleaning machine (1) comprises a power monitoring device (154)configured to monitor the remaining power of the rechargeable battery(151) and be in signal communication with the first control unit(16), and the first control unit(16) is configured to perform the self-cleaning operation in response to an indication that the self-cleaning switch (22)has been turned on when the power monitoring device(154) detects the remaining power of the rechargeable battery (151) satisfied.
 6. The floor cleaning system according to claim 1, wherein the floor cleaning machine (1)comprises a cleaning fluid monitoring device(133) being in signal communication with the first control unit(16) and configured to monitor the flow of the cleaning fluid in the fluid delivery unit.
 7. The floor cleaning system according to claim 1, wherein the floor cleaning machine (1) comprises a level monitoring device (144) being in signal communication with the first control unit (16) for monitoring the level in the recovery tank(141).
 8. The floor cleaning system according to claim 1, wherein the floor cleaning machine(1) comprises a turbidity monitoring device(145) being in signal communication with the first control unit (16)for monitoring the turbidity of the fluid in the fluid recovery unit(14).
 9. The floor cleaning system according to claim 1, wherein the cleaning base (11) comprises a brush-roller motor (114) for rotating the at least one brush roller (112), the fluid delivery unit includes a liquid pump (132) between the supply tank (131)and the at least one brush roller(112), and the roller -brush motor(114) and the pump (132)are both communicatively coupled to the first control unit(16).
 10. The floor cleaning system according to claim 1, wherein the fluid recovery unit (14) comprises a suction motor (142) in fluid communication with the recovery tank(141) and communicatively coupled to the first control unit(16).

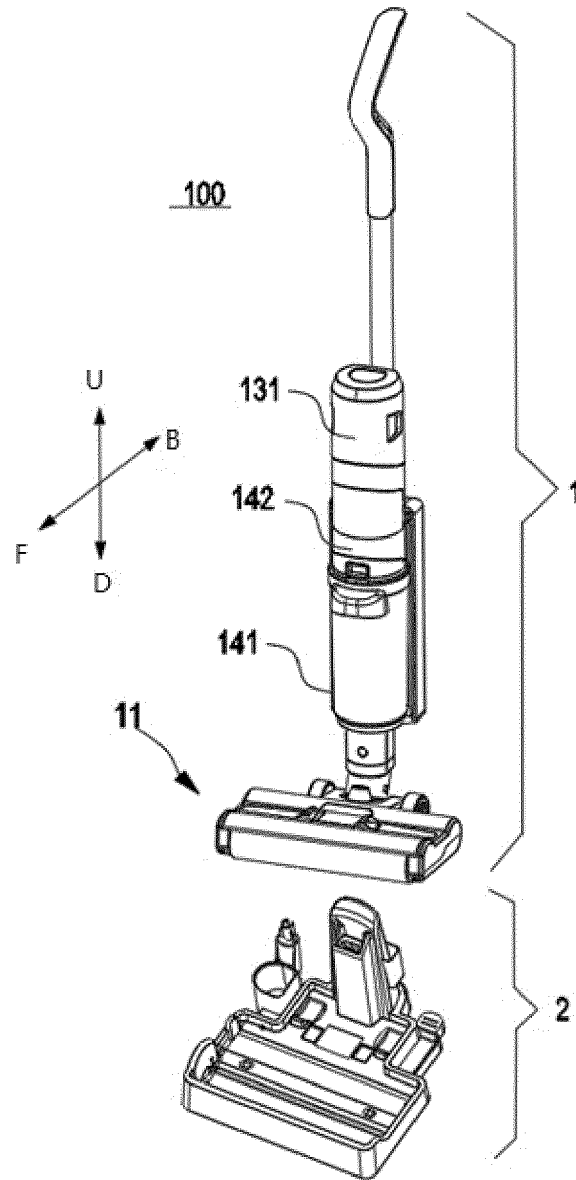


FIG.1

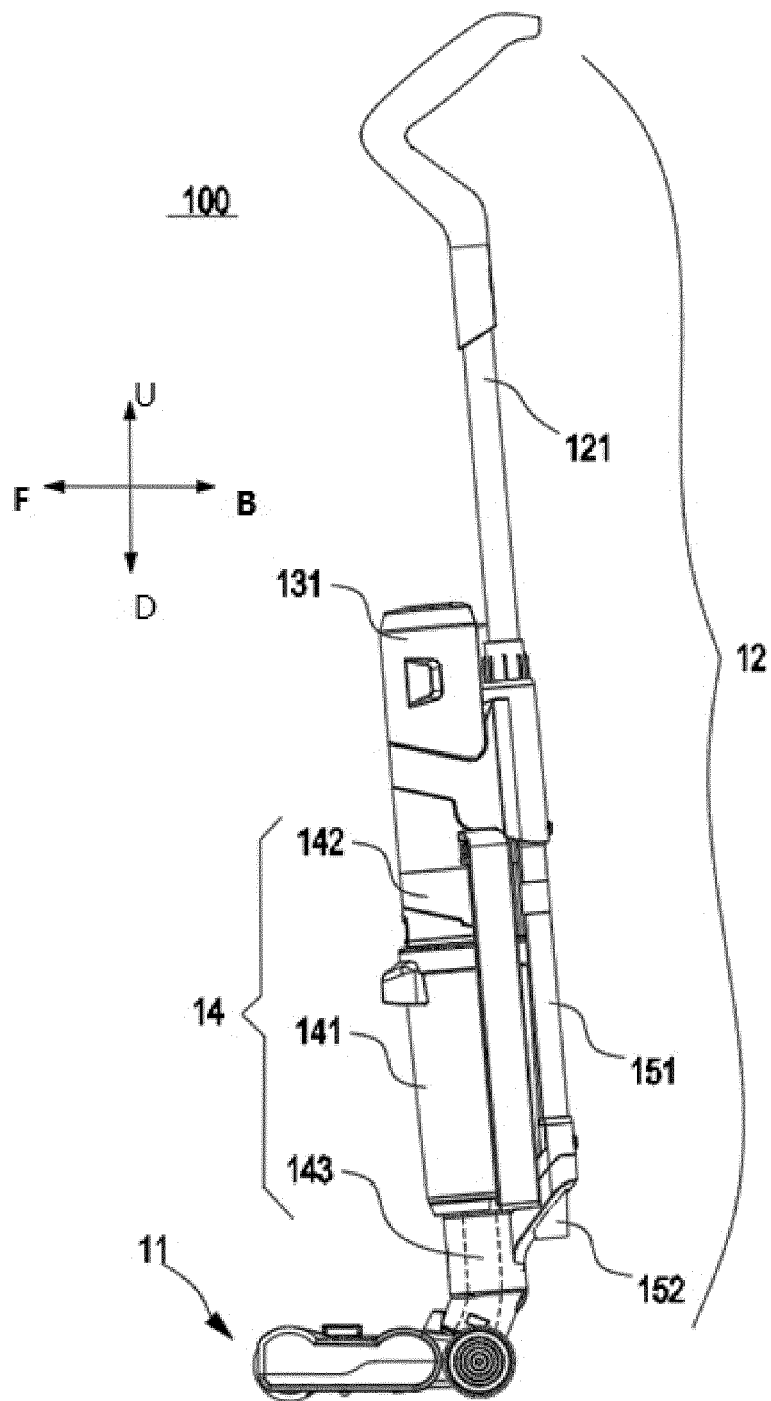


FIG.2

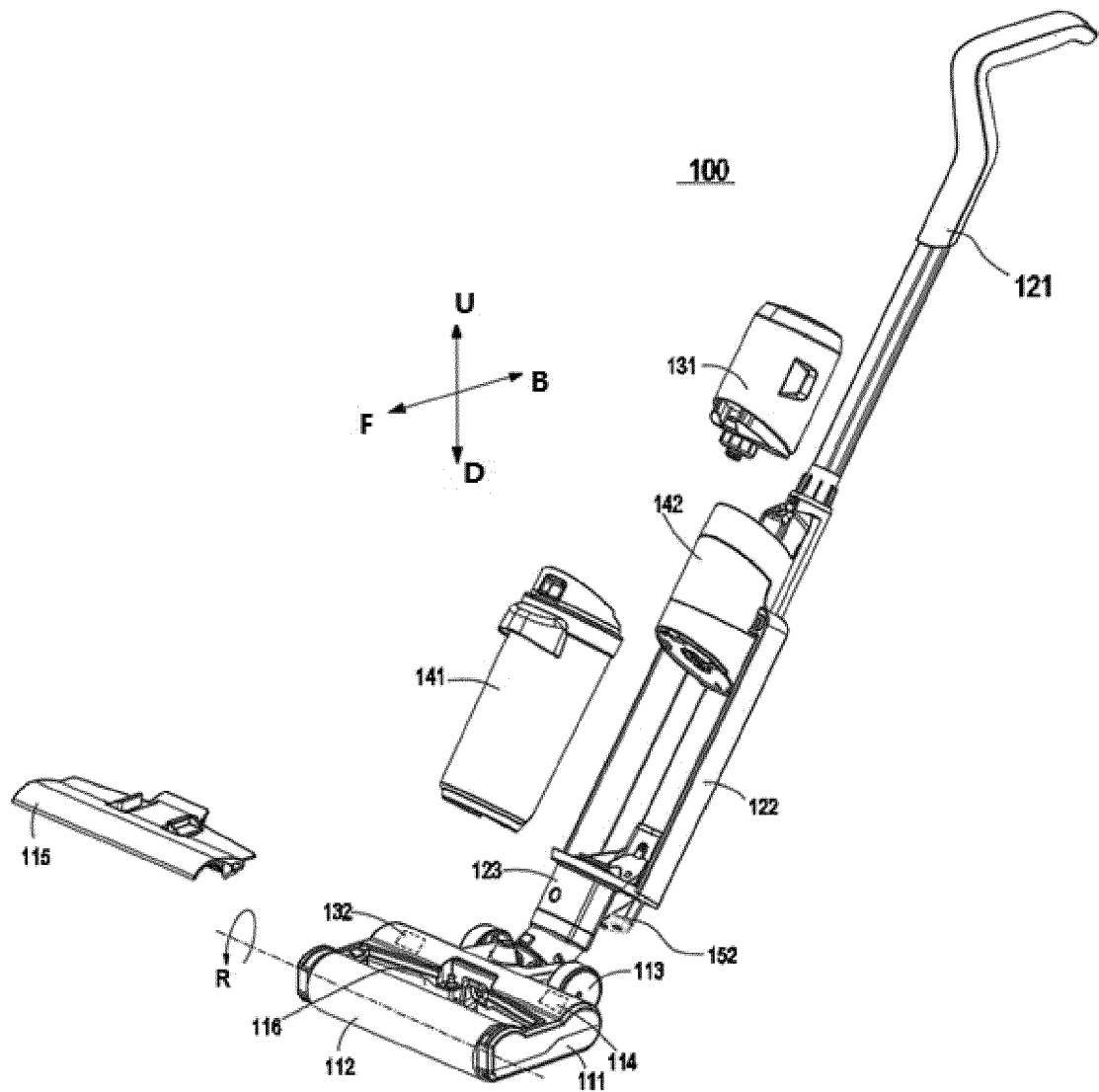


FIG.3

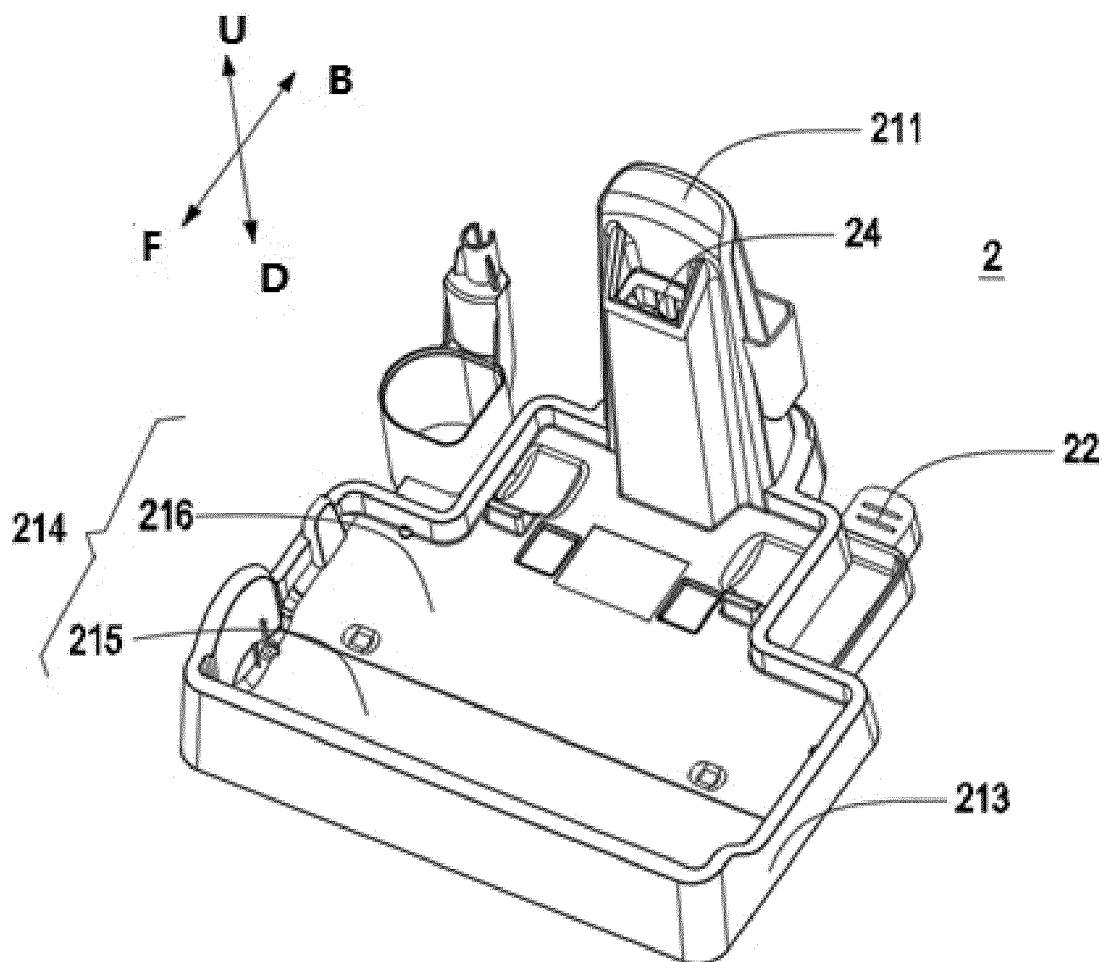


FIG.4

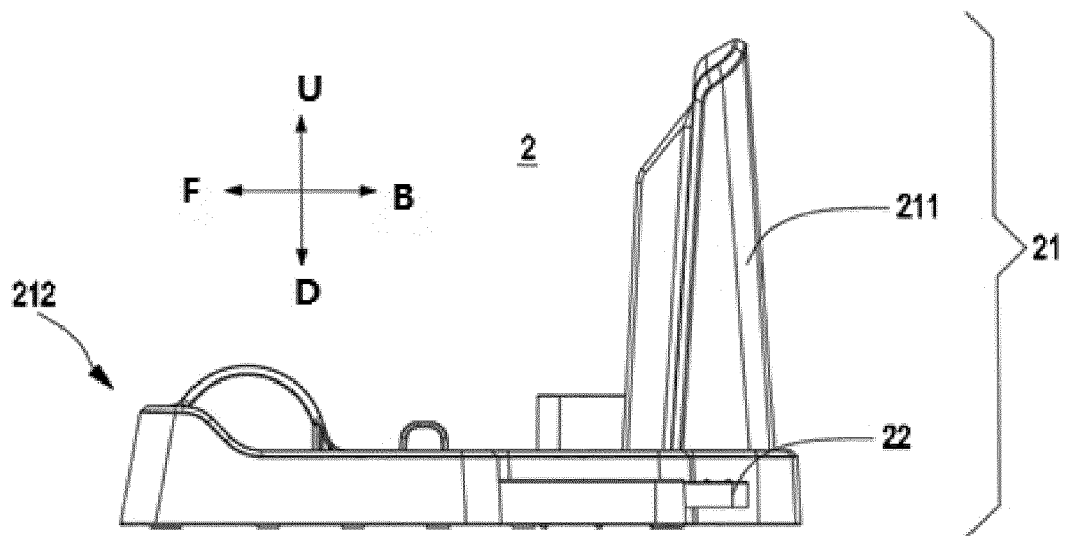


FIG.5

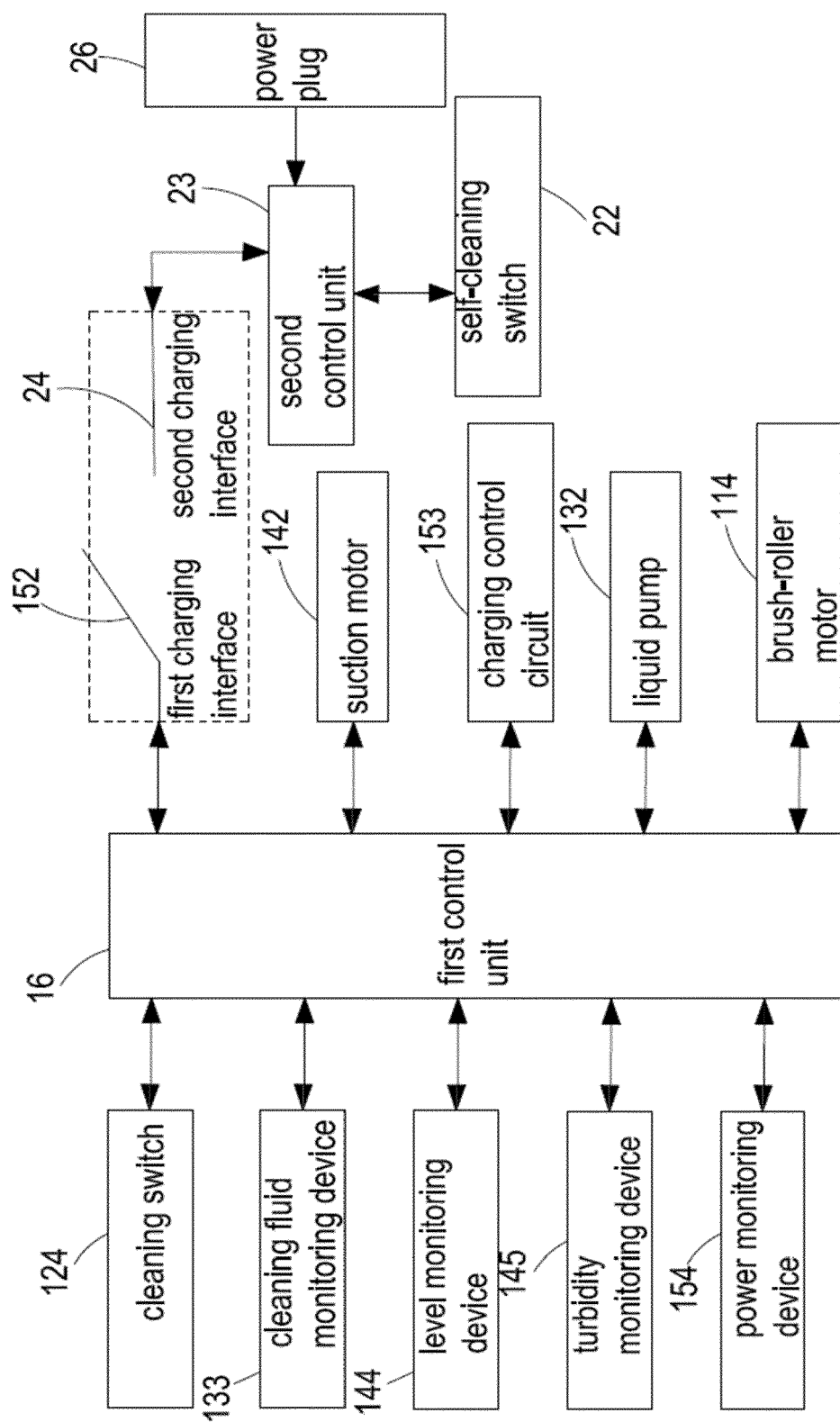


FIG. 6

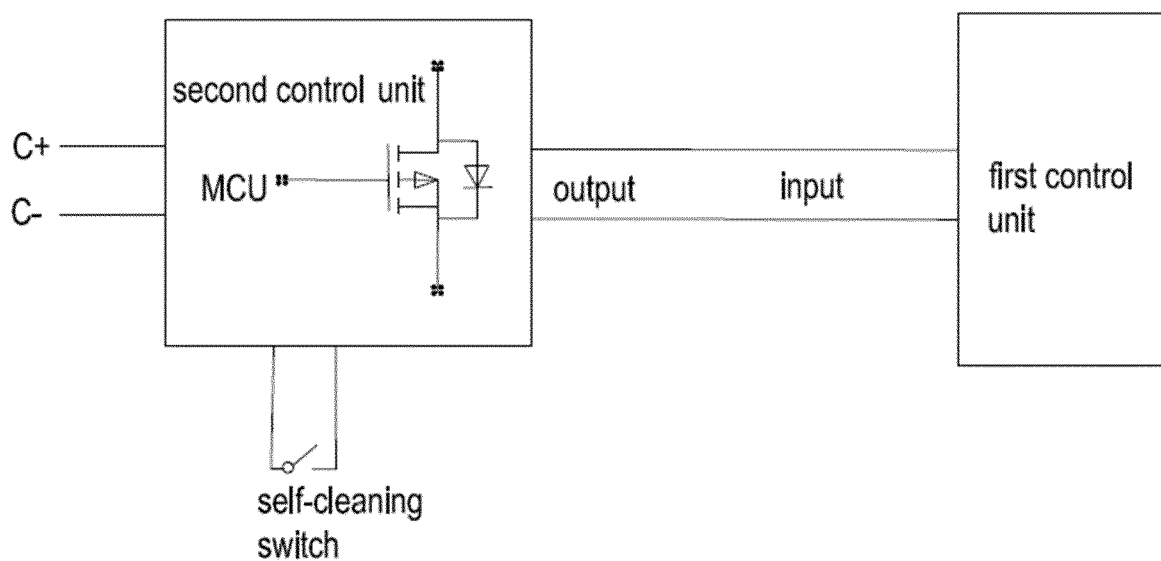


FIG.7

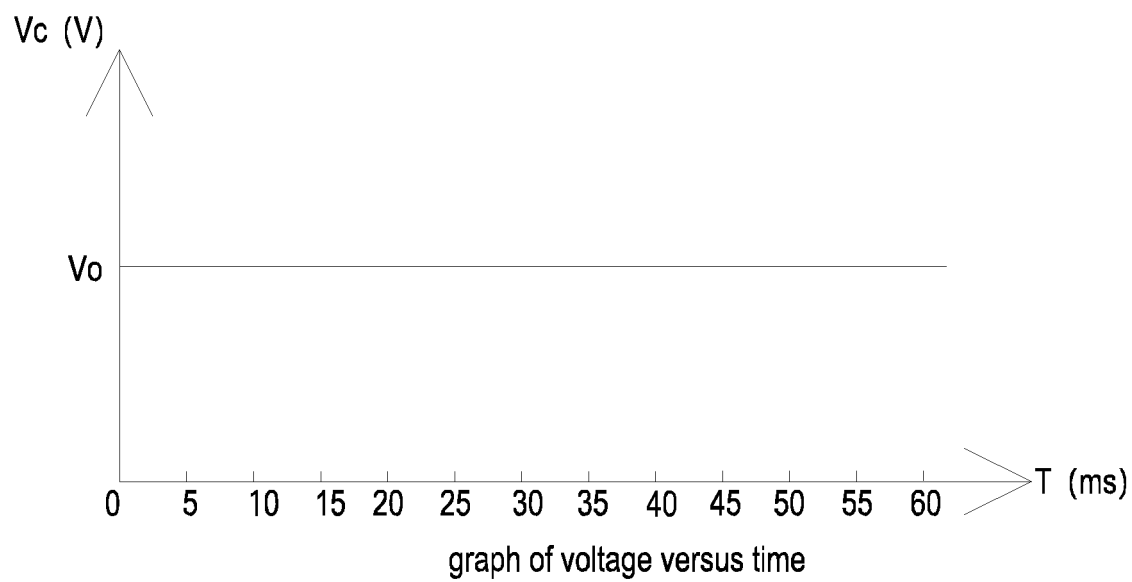


FIG.8

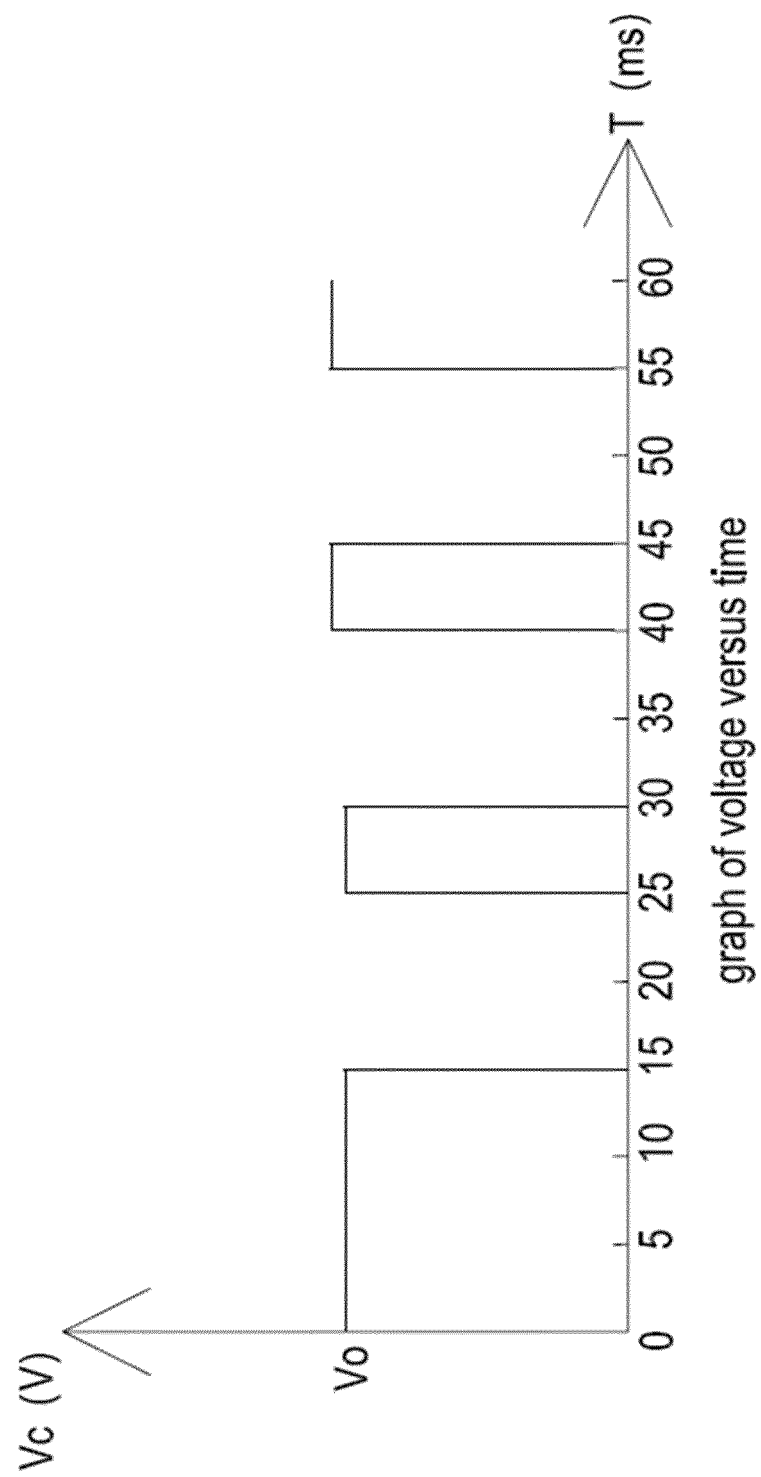


FIG.9



EUROPEAN SEARCH REPORT

Application Number

EP 22 17 8791

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 3 705 013 A1 (BISSELL INC [US]) 9 September 2020 (2020-09-09)	1-6, 9, 10	INV. A47L11/40
Y	* paragraph [0076] - paragraph [0111]; figures 1-9 *	7, 8	
Y	EP 3 818 920 A1 (BISSELL INC [US]) 12 May 2021 (2021-05-12) * paragraph [0044] - paragraph [0049]; figures 1-22 *	7, 8	
A	CN 112 641 397 A (ANHUI DAHAN ROBOT GROUP CO LTD) 13 April 2021 (2021-04-13) * abstract; figures 1-17 *	1-10	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
Place of search		Date of completion of the search	Examiner
Munich		26 October 2022	Hubrich, Klaus
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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