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(54) CLOTHES PROCESSING MACHINE AND CONTROL PANEL COMPONENT THEREOF

(57) A control panel component of a clothes processing machine, including a panel body (2) and an electronic member (4) mounted on a back of the panel body (2), where a protection cover (10) is fixedly mounted on the panel body (2), and the electronic member (4) is accommodated between the panel body (2) and the protection cover (10), where a first seal member (12) is disposed between the protection cover (10) and the panel body (2). Due to a sealing effect of the protection cover (10), the electronic member (4) is not affected by water vapor and foreign matters in the air and has more stable performance. A clothes processing machine including a control panel component is further disclosed.

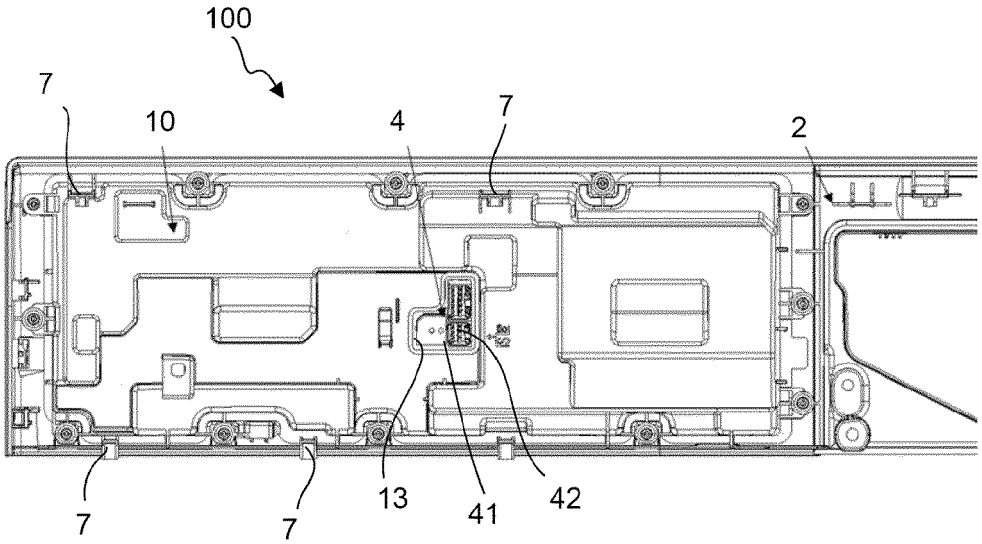

FIG. 1

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Description

[0001] The present invention relates to the field of household appliance technologies, to a clothes processing machine, such as a washing machine, a clothes dryer, and a washing and drying machine, and in particular, to a composition and a structure of a control panel component of a clothes processing machine.

[0002] A user sometimes may place a washing machine, a clothes dryer, or a washing and drying machine in a washroom. Large amounts of water vapor is generated during a shower. Electronic members that are exposed to such a high humidity environment for a long time are at risk of a failure. In addition, water vapor is likely to be condensed on an inner side of a display window, resulting in a failure of a touch function. When a machine is running, a specific amount of water vapor and fluff are generated, and the water vapor and fluff are attached to the electronic members and may also result in a failure. Based on development of digitalization, big data and the Internet of Things, intelligent household appliances are certainly a future development trend. Therefore, an electronic member of higher importance, such as a control module of a smart home, may be added to a control panel of a clothes processing machine. An existing control panel is not designed with an effective dustproof and waterproof structure for electronic members. This may affect stability of a product.

[0003] An objective of the present invention is to alleviate the defects existing in the prior art. The present invention provides a control panel component of a clothes processing machine, including a panel body and an electronic member mounted on a back of the panel body, where a protection cover is fixedly mounted on the panel body, and the electronic member is accommodated between the panel body and the protection cover, where a first seal member is disposed between the protection cover and the panel body, the protection cover is made of plastic, and a ventilation slot running through the panel body is provided in an area of the panel body covered by the protection cover. Due to a sealing effect of the protection cover, the electronic member is not affected by water vapor and foreign matters in the air and has more stable performance. In addition, the ventilation slot is provided in the panel body, so that the increased water vapor inside a confined space may be discharged through the ventilation slot, to balance pressure inside and outside the confined space.

[0004] A total cross-sectional area of the ventilation slot may be set between 0.8 square millimeters and 1 square millimeter. Since the cross-sectional area for ventilation is extremely small, external water vapor is unlikely to enter into the confined space inside the protection cover.

[0005] In some specific implementations, the panel body is provided with a mounting hole that receives a shaft of a knob that extends into the mounting hole, and the ventilation slot is provided in a side wall of the mounting hole and communicates a space between the panel body and the protection cover with an external space. The ventilation slot is disposed in such a way that it is covered by the knob, is unlikely to be clogged with dirt, and also does not affect an appearance of the panel.

[0006] A specific implementation includes that the electronic member includes a circuit board, the circuit board is provided with a circuit port, an opening is provided at a location on the protection cover corresponding to the circuit port, a second seal member is disposed on an edge of the opening, and the second seal member is pressed tightly on a circuit board around the protection cover and the circuit port. In this way, the protection cover does not affect use of the circuit port, and in addition, other parts of the electronic member are still protected by the protection cover from water and dust.

[0007] The control panel component includes a light guide member disposed on the back of the panel body, where an elastic member may be disposed at a location on the protection cover corresponding to the light guide member, and the elastic member presses the light guide member upward to fix the light guide member to the panel body. The elastic member may be a rubber member. In this way, the light guide member may be fixed by using the protection cover without disposing a fixing means for fixing the light guide member, such as a buckle, on the panel body, thereby simplifying a structure of the panel body.

[0008] Several clamping means that extend away from the panel body may be disposed on the protection cover, to connect the control panel component to a body of the clothes processing machine. Such a design greatly simplifies a design of the panel body. A mold structure of the panel body may be simpler, injection molding cycles of parts thereof may be shorter, molding processes may be more stable, and costs of the parts may also be reduced.

[0009] In a specific embodiment, a first seal member is disposed along an edge of the protection cover as a closed loop.

[0010] The embodiments above may be arbitrarily combined.

[0011] The present invention further provides a clothes processing machine, including the control panel components according to any combination of the foregoing embodiments.

[0012] The clothes processing machine may include a washing machine, a clothes dryer, or a washing and drying machine.

[0013] The following describes the specific implementations of the present invention with reference to the accompanying drawings.

FIG. 1 is a partial view of a back of a control panel component;

FIG. 2 is a three-dimensional diagram of a protection cover;

FIG. 3 is a front view of a part for mounting a knob on a panel body;

FIG. 4 is a cross-sectional view of a location of a knob of a control panel component; and

FIG. 5 is a cross-sectional view of a location of a light guide member in a control panel component.

[0014] As shown in FIG. 1 and FIG. 2, a control panel component 100 of a clothes processing machine may be mounted on a body of the clothes processing machine, and may operate and control the machine. The control panel component 100 includes a panel body 2 and an electronic member 4 mounted on a back of the panel body. The electronic member includes a circuit board 41, and the circuit board 41 is provided with a circuit port 42. A protection cover 10 made of plastic covers the electronic member 4 and is fixedly mounted on the back of the panel body 2. A confined space 11 is formed between the protection cover 10 and the panel body 2, thereby accommodating the electronic member 4 inside the confined space 11. A first seal member 12 is disposed along an edge of the protection cover 10 as a closed loop. After being mounted, the first seal member 12 is squeezed between the protection cover 10 and the panel body 2. The first seal member 12 may be a loop-shaped rubber seal strip.

[0015] An opening 13 is provided at a location on the protection cover 10 corresponding to the circuit port 42. A second seal member 14 is disposed on an edge of the opening 13. The second seal member 14 is pressed tightly on the circuit board 41 around the protection cover 10 and the circuit port 42. The second seal member 14 may be a loop-shaped rubber seal strip. In this way, the protection cover 10 does not affect the circuit port 42 from externally connecting to a connecting terminal, and in addition, other parts of the electronic member 4 are still protected by the protection cover 10 from water and dust.

[0016] Several clamping means 7 that extend away from the panel body 2 may be disposed on the protection cover 10, to connect the control panel component 100 integrally to the body of the clothes processing machine. Such a design greatly simplifies a design of the panel body 2. A mold structure of the panel body 2 may be simpler, injection molding cycles of parts thereof may be shorter, molding processes may be more stable, and costs of the parts may also be reduced.

As shown in FIG. 3 and FIG. 4, a knob 5 is mounted on the panel body 2. The knob 5 has a head 51 and a shaft 52. To receive the shaft 52, the panel body 2 is provided with a mounting hole 21 that can receive the shaft 52 that extends into the mounting hole 21.

[0017] When the machine runs a drying program or the electronic member overheats, an entire confined space is affected. Because under the same conditions, a water content of the plastic is higher than a water content of the air. During drying or severe overheating of an internal electronic member, a temperature in a space confined by the protection cover rises, and relative humidity of the air inside the space decreases, but a maximum allowable water content thereof increases. In this case, the protection cover and the circuit board both release a specific amount of water vapor to balance the original relative humidity, resulting in that absolute humidity of the air inside the confined space increases, and water vapor pressure increases.

[0018] To balance pressure inside and outside the confined space 11 under a high temperature condition and release water vapor inside the confined space 11, two ventilation slots 22 running though the panel body are provided in a side wall of the mounting hole 21, thereby communicating the space 11 between the panel body 2 and the protection cover 10 with an external space. The ventilation slot 22 is provided in the panel body 2, so that the increased water vapor inside the confined space 11 may be discharged through the ventilation slot 22, to balance pressure inside and outside the confined space 11. A total cross-sectional area of the ventilation slot 22 may be set between 0.8 square millimeters and 1 square millimeter.

[0019] As shown in FIG. 5, the control panel component 100 further includes a light guide member 6 disposed on the back of the panel body 2. An elastic member 15 may be disposed at a location on the protection cover 10 corresponding to the light guide member 6. The elastic member 15 presses a light guide member 6 toward the panel body 2, to fix the light guide member 6 to the panel body 2. The elastic member 15 may be a rubber member. In this way, the light guide member 6 may be fixed by using the protection cover 10 and the elastic member 15 without disposing a fixing means for fixing the light guide member 2, such as a buckle, on the panel body 2, thereby simplifying a structure of the panel body 2.

[0020] The various specific implementations described above and shown in the accompanying drawings are only used to illustrate the present invention. In the scope of the basic technical idea of the present invention, modifications in any form made to the present invention by a person of ordinary skill in the art shall fall within the protection scope of the present invention.

Claims

1. A control panel component of a clothes processing machine, comprising a panel body (2) and an electronic member (4) mounted on a back of the panel body, **characterized in that** a protection cover (10) is fixedly mounted on the panel body, and the electronic member is accommodated between the panel body and the protection cover, wherein a first seal member (12) is disposed between the protection cover and the panel body, the protection cover is made of plastic, and a ventilation slot (22) running through the panel body is provided in an area of the

panel body covered by the protection cover.

2. The control panel component according to claim 1, **characterized in that** a total cross-sectional area of the ventilation slot is between 0.8 square millimeters and 1 square millimeter.

3. The control panel component according to claim 1, **characterized in that** the panel body is provided with a mounting hole (21) that receives a shaft (52) of a knob (5) that extends into the mounting hole (21), and the ventilation slot is provided in a side wall of the mounting hole and communicates a space (11) between the panel body and the protection cover with an external space.

4. The control panel component according to claim 1, **characterized in that** the electronic member comprises a circuit board (41), the circuit board is provided with a circuit port (42), an opening (13) is provided at a location on the protection cover corresponding to the circuit port, a second seal member (14) is disposed on an edge of the opening, and the second seal member is pressed tightly on the circuit board around the protection cover and the circuit port.

5. The control panel component according to claim 1, **characterized by** comprising a light guide member (6) disposed on the back of the panel body, wherein an elastic member (15) is disposed at a location on the protection cover corresponding to the light guide member, and the elastic member presses the light guide member upward to fix the light guide member to the panel body.

6. The control panel component according to claim 1, **characterized in that** several clamping means (7) that extend away from the panel body are disposed on the protection cover, to connect the control panel component to a body of the clothes processing machine.

7. A clothes processing machine, **characterized by** comprising the control panel component according to any one of claims 1 to 6.

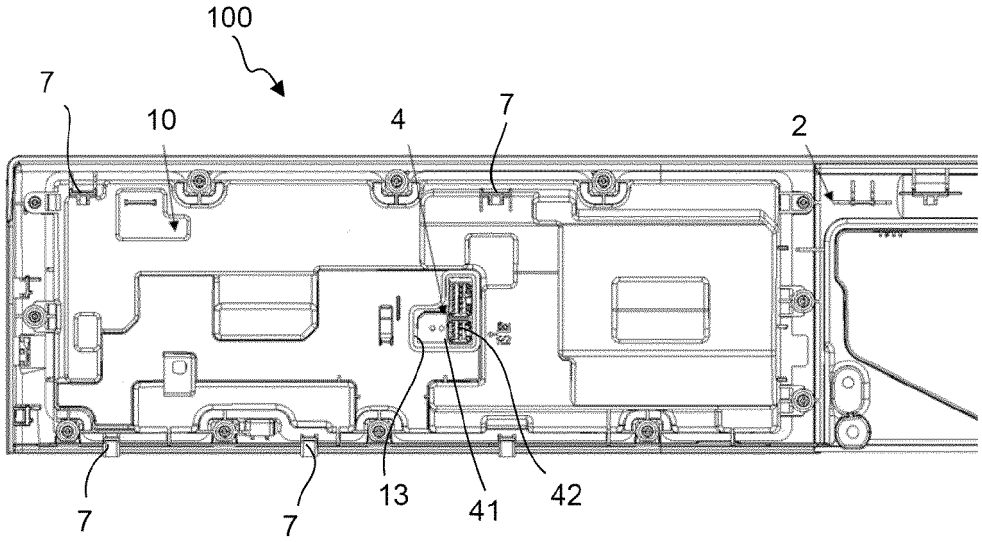

FIG. 1

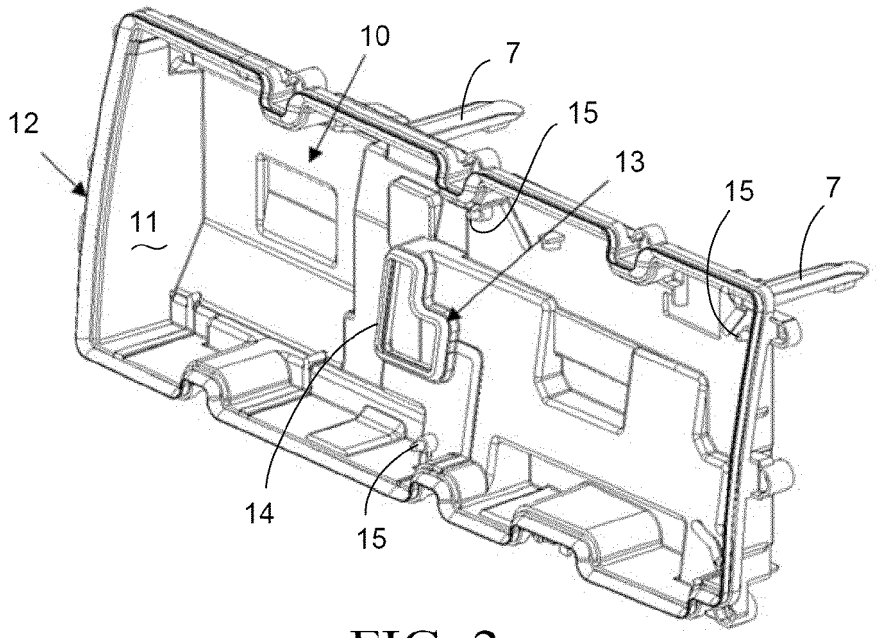

FIG. 2

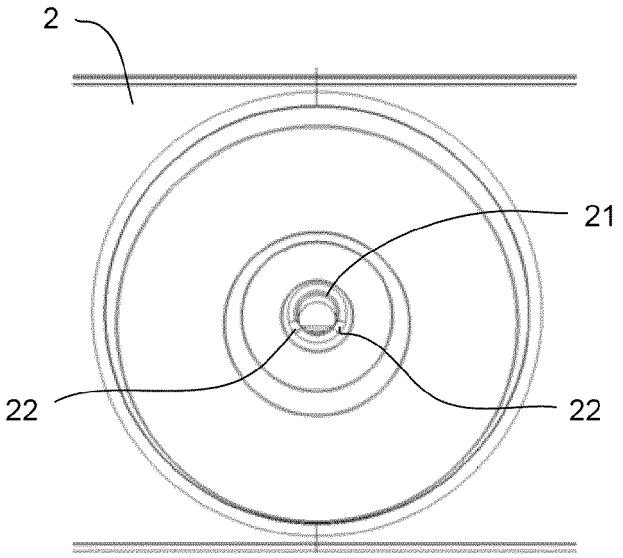

FIG. 3

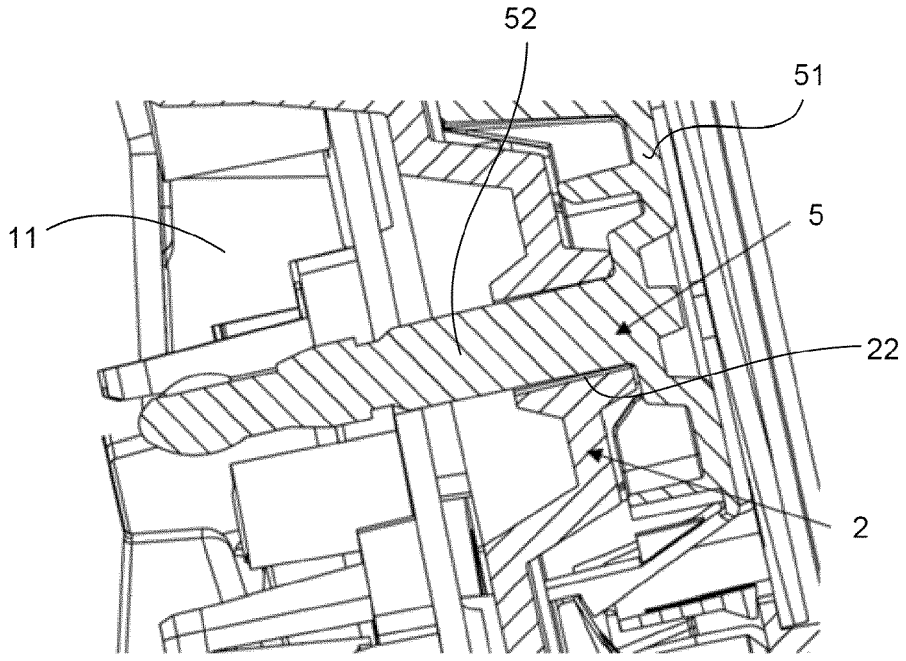

FIG. 4

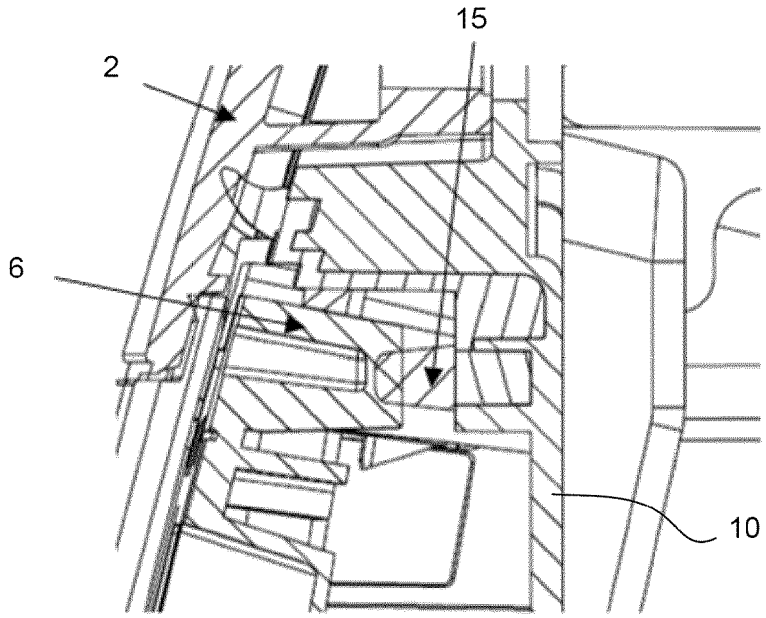

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 20 17 4328

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	* column 1, line 32 - line 33 * * column 3, line 31 - line 36; claims; figures *	4-6	

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A	* abstract; figure 1 *	4-7	

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A	* paragraph [0237]; figures *	1-3,5-7	

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A	* paragraph [0102]; claims; figures *	1-4,6,7	

Y	EP 3 139 394 A1 (ARÇELIK AS) 8 March 2017 (2017-03-08)	6	TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 July 2020	Popara, Velimir

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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