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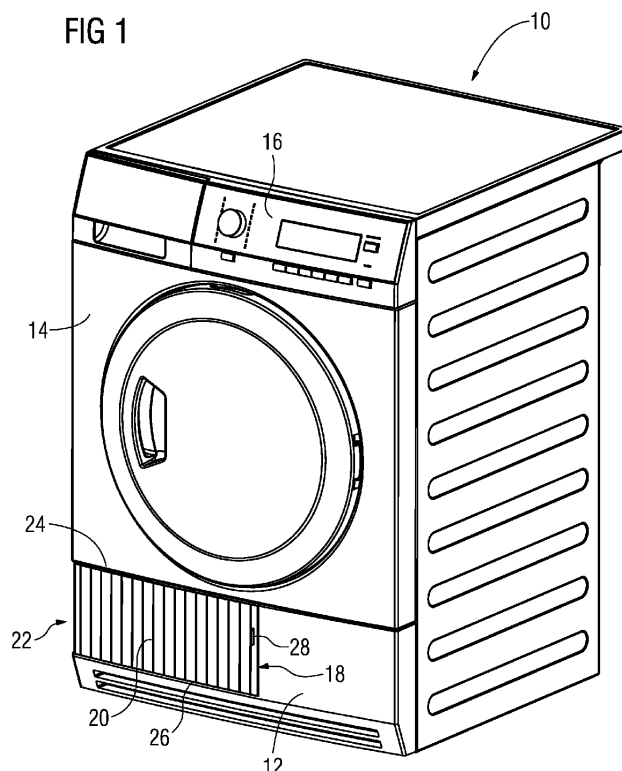
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(54) A laundry treatment machine including a front panel

(57)

The present invention relates to a laundry treatment machine (10) including a front panel (12). The front panel (12) is provided for covering at least a portion of a front side of the laundry treatment machine (10). The front panel (12) comprises a sliding shutter (18) for closing and unclosing an opening in said front panel (12).

The sliding shutter (18) includes a flexible cover (20) for covering the opening. The sliding shutter (18) includes a winding mechanism (22) for coiling up the flexible cover (20). The winding mechanism (22) is arranged besides, below or above the opening. The sliding shutter (18) includes at least one guiding rail (24, 26) for conducting the flexible cover (20).



Description

[0001] The present invention relates to a laundry treatment machine including a front panel according to the preamble of claim 1. In particular, the present invention relates to a laundry dryer including a front panel.

[0002] Some domestic appliances, in particular laundry treatment machines, comprise components, which have to be exchanged and/or cleaned from time to time. In order to allow an access to said components, a revolving door is provided at the housing of the domestic appliance. Usually, said revolving door is formed in or at a lower front panel at the front of the domestic appliance.

[0003] For example, the domestic appliance is a laundry dryer with an air to air heat exchanger located behind the revolving door. Further, the domestic appliance may be a laundry dryer including a heat pump system, wherein a heat pump evaporator and/or a fluff filter arranged upstream said heat pump evaporator are located behind the revolving door. However, the revolving door is relative complex. In particular, the revolving door requires a push button mechanism or the like in order to open said door.

[0004] It is an object of the present invention to provide a laundry treatment machine including a front panel, wherein said front panel comprises a closable opening by low complexity.

[0005] The object of the present invention is achieved by the laundry treatment machine including a front panel according to claim 1.

[0006] The present invention relates to a laundry treatment machine including a front panel, wherein

- the front panel is provided for covering at least a portion of a front side of the laundry treatment machine,
- the front panel comprises a sliding shutter for closing and unclosing an opening in said front panel,
- the sliding shutter includes a flexible cover for covering the opening,
- the sliding shutter includes a winding mechanism for coiling up the flexible cover,
- the winding mechanism is arranged besides, below or above the opening, and
- the sliding shutter includes at least one guiding rail for conducting the flexible cover.

[0007] The core of the present invention is the sliding shutter for closing and unclosing the opening in the front panel, wherein the sliding shutter includes a flexible cover and a winding mechanism for coiling up said flexible cover. The front panel with the sliding shutter allows a domestic appliance by reduced complexity. An opening button system is not required. Further, the front panel with the sliding shutter avoids problems due to a misalignment between the front panel and a revolving door. The sliding shutter may be opened and closed without any additional parts or tools.

[0008] Preferably, the flexible cover comprises a plu-

rality of elongated lamellae arranged side by side and in parallel.

[0009] Further, two neighboured lamellae may be connected by at least one hinge.

[0010] For example, the lamellae are made of a stiff material.

[0011] Alternatively, the lamellae are made of a flexible material.

[0012] Instead of the plurality of elongated lamellae, the flexible cover may be made of at least one flexible sheet.

[0013] Further, the flexible cover may include a snap-in mechanism in order to close the sliding shutter.

[0014] Moreover, the winding mechanism includes at least one elastic element in order to bias the winding mechanism to the open position of the flexible cover.

[0015] For example, the elastic element is a spring element.

[0016] Further, the laundry treatment machine may include a door for loading laundry into a treatment chamber of the laundry treatment machine.

[0017] In this case, the sliding shutter is at least partially arranged below the door for loading laundry into the treatment chamber.

[0018] Preferably, the treatment chamber includes a rotating drum.

[0019] In particular, the domestic appliance is a laundry dryer.

[0020] Further, the sliding shutter may be provided for an opening containing a removable component of the laundry dryer, which component has to be exchanged and/or cleaned.

[0021] For example, the sliding shutter is provided for an opening containing a removable air to air heat exchanger of the laundry dryer.

[0022] According to a further embodiment, the laundry dryer includes a heat pump system.

[0023] In this case, the sliding shutter may be provided for an opening containing a removable fluff filter of the heat pump system.

[0024] The novel and inventive features believed to be the characteristic of the present invention are set forth in the appended claims.

[0025] The invention will be described in further detail with reference to the drawings, in which

FIG 1 illustrates a perspective view of a domestic appliance including a front panel according to a preferred embodiment of the present invention,

FIG 2 illustrates a front view of the front panel in a closed state according to the preferred embodiment of the present invention,

FIG 3 illustrates a sectional top view of the front panel in the closed state according to the preferred embodiment of the present invention,

FIG 4 illustrates a sectional side view of the front panel in the closed state according to the preferred embodiment of the present invention,

FIG 5 illustrates a front view of the front panel in an open state according to the preferred embodiment of the present invention, and

FIG 6 illustrates a sectional top view of the front panel in the open state according to the preferred embodiment of the present invention.

[0026] FIG 1 illustrates a perspective view of a domestic appliance 10 including a front panel 12 according to a preferred embodiment of the present invention. In particular, the domestic appliance 10 is a laundry treatment machine 10. For example, said laundry treatment machine 10 is a laundry dryer. Further, the laundry treatment machine 10 may be a washing machine or a spinner-washer.

[0027] In this example, the front panel 12 according to the preferred embodiment of the present invention is provided for covering a lower portion of a front side of the domestic appliance. Further, a central front panel 14 covers a central portion of the front side of the domestic appliance. In a similar way, an upper front panel 16 covers an upper portion of the front side of the domestic appliance. The central front panel 14 encloses an opening for a laundry drum. The upper front panel 16 is provided for control and display devices. However, the central front panel 14 and the upper front panel 16 are not formed according to the present invention.

[0028] The front panel 12 according to the present invention includes a sliding shutter 18. In FIG 1 the sliding shutter 18 is in a closed state. In said closed state the sliding shutter 18 covers substantially the left hand side of the front panel 12. The sliding shutter 18 can be opened by a movement from right to left. In contrast, the sliding shutter 18 is closable by a movement from left to right.

[0029] The sliding shutter 18 comprises a flexible cover 20, which can be coiled up by a winding mechanism 22. Said winding mechanism 22 is arranged inside the front panel 12 at the left side. The winding mechanism 22 is elongated and extends along a vertical direction. In this example, the flexible cover 20 comprises a plurality of vertical elongated lamellae. Said lamellae are arranged side by side and in parallel. Two neighboured lamellae may be connected by at least one hinge. The lamellae are made of a stiff or a flexible material. Alternatively, the flexible cover 20 may be made of one or more flexible sheets.

[0030] The sliding shutter 18 is slidable between an upper guiding rail 24 and a lower guiding rail 26 along a horizontal direction. The lower guiding rail 26 is formed at the front panel. In this example, the upper guiding rail 24 is formed at the central front panel 14. Alternatively, the upper guiding rail 24 may be also formed at the front panel 12.

[0031] Further, the sliding shutter 18 may be formed without the upper guiding rail 24, so that the flexible cover 20 is supported by the lower guiding rail 26. The user can open and close the sliding shutter 18 by a handle bar 28 attached at the outer right hand side of the flexible cover 20.

[0032] The sliding shutter 18 provides an access to the interior of the domestic appliance. If the domestic appliance is a laundry dryer, then an air to air heat exchanger may be located behind the sliding shutter 18. In particular, the air to air heat exchanger is removable for cleaning, after the sliding shutter 18 has been opened. If the laundry dryer includes a heat pump system, then a heat pump evaporator and/or a fluff filter arranged upstream said heat pump evaporator may be located behind the sliding shutter 18. Thus, the fluff filter may be removed for cleaning purposes.

[0033] FIG 2 illustrates a front view of the front panel 12 in a closed state according to the preferred embodiment of the present invention. The front panel 12 is provided for covering the lower portion of the domestic appliance.

[0034] The front panel 12 includes the sliding shutter 18. The sliding shutter 18 is in a closed state and covers substantially the left hand side of the front panel 12. The sliding shutter 18 can be opened by moving the flexible cover 20 from right to left. Thereby the user can grip the flexible cover 20 at the handle bar 28. The flexible cover 20 is supported by the lower guiding rail 26.

[0035] FIG 3 illustrates a sectional top view of the front panel 12 in the closed state according to the preferred embodiment of the present invention. FIG 3 relates to the horizontal sectional plane A-A in FIG 2. FIG 3 clarifies that the flexible cover 20 is rolled away from the winding mechanism 22.

[0036] FIG 4 illustrates a sectional side view of the front panel 12 in the closed state according to the preferred embodiment of the present invention. FIG 4 relates to the vertical sectional plane B-B in FIG 2. FIG 4 clarifies that the flexible cover 20 is supported by the lower guiding rail 26.

[0037] FIG 5 illustrates a front view of the front panel 12 in an open state according to the preferred embodiment of the present invention. The flexible cover 20 of the sliding shutter 18 is furled by the winding mechanism 22 at the left hand side of the front panel 12.

[0038] FIG 6 illustrates a sectional top view of the front panel 12 in the open state according to the preferred embodiment of the present invention. FIG 6 relates to the horizontal sectional plane C-C in FIG 5. FIG 6 clarifies the arrangement of the furled flexible cover 20 in the winding mechanism 22. The space required by the winding mechanism 22 is relative small.

[0039] The front panel 12 with the sliding shutter 18 according to the present invention allows a domestic appliance by reduced complexity. An opening button system is not required. The front panel 12 with the sliding shutter 18 avoids problems due to a misalignment be-

tween the front panel 12 and a revolving door. The sliding shutter 18 according to the present invention may be opened and closed without any additional parts or tools.

[0040] Further, the sliding shutter 18 may comprise a snap- in connection or snap- in mechanism for closing the flexible cover 20 at the front panel 12. Said snap- in connection or snap- in mechanism may be installed at the right edge of the flexible cover 20 and at the left edge of the corresponding opening at the front panel 12.

[0041] Moreover, the winding mechanism 22 may comprise one or more elastic elements, e.g. one or more spring elements, in order to bias the winding mechanism 22 to the open position of the flexible cover 20 of the sliding shutter 18.

[0042] In the example mentioned above the sliding shutter 18 is movable from right to left and vice versa. Alternatively, the sliding shutter 18 may be opened by a movement from the top to the bottom and vice versa.

[0043] The above example of the present invention describes particularly the laundry treatment machine 10. In general, the present invention relates to an arbitrary domestic appliance 10.

[0044] Although an illustrative embodiment of the present invention has been described herein with reference to the accompanying drawings, it is to be understood that the present invention is not limited to that precise embodiment, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

List of reference numerals

[0045]

10	domestic appliance, laundry treatment machine
14	central front panel
16	upper front panel
18	sliding shutter
20	flexible cover
22	winding mechanism
24	upper guiding rail
26	lower guiding rail
28	handle bar

A-A	horizontal sectional plane in FIG 2
B-B	vertical sectional plane in FIG 2
C-C	horizontal sectional plane in FIG 5

Claims

1. A laundry treatment machine (10) including a front panel (12), wherein

- the front panel (12) is provided for covering at

least a portion of a front side of the laundry treatment machine (10),

- the front panel (12) comprises a sliding shutter (18) for closing and unclosing an opening in said front panel (12),

- the sliding shutter (18) includes a flexible cover (20) for covering the opening,

- the sliding shutter (18) includes a winding mechanism (22) for coiling up the flexible cover (20),

- the winding mechanism (22) is arranged besides, below or above the opening, and

- the sliding shutter (18) includes at least one guiding rail (24, 26) for conducting the flexible cover (20).

2. The laundry treatment machine according to claim 1, **characterized in, that** the flexible cover (20) comprises a plurality of elongated lamellae arranged side by side and in parallel.

3. The laundry treatment machine according to claim 2, **characterized in, that** two neighboured lamellae are connected by at least one hinge, wherein the lamellae are made of a stiff or a flexible material.

4. The laundry treatment machine according to claim 1, **characterized in, that** the flexible cover (20) is made of at least one flexible sheet.

5. The laundry treatment machine according to any one of the preceding claims, **characterized in, that** the flexible cover (20) includes a snap-in mechanism in order to close the sliding shutter (18).

6. The laundry treatment machine according to any one of the preceding claims, **characterized in, that** the winding mechanism (22) includes at least one elastic element in order to bias the winding mechanism (22) to the open position of the flexible cover (20).

7. The laundry treatment machine according to claim 6, **characterized in, that** the elastic element is a spring element.

8. The laundry treatment machine according to any one of the preceding claims, **characterized in, that** the laundry treatment machine (10) includes a door for loading laundry into a treatment chamber of the laundry treatment machine (10).

9. The laundry treatment machine according to claim

8, characterized in, that

the sliding shutter (18) is at least partially arranged below the door for loading laundry into the treatment chamber.

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- 10.** The laundry treatment machine according to claim 8 or 9,

characterized in, that

the treatment chamber includes a rotating drum.

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- 11.** The laundry treatment machine according to claim 10, **characterized in, that**

the laundry treatment machine (10) is a laundry dryer.

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- 12.** The laundry treatment machine according to claim 11, **characterized in, that**

the sliding shutter (18) is provided for an opening containing a removable component of the laundry dryer, which component has to be exchanged and/or cleaned.

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- 13.** The laundry treatment machine according to claim 11 or 12,

characterized in, that

the sliding shutter (18) is provided for an opening containing a removable air to air heat exchanger of the laundry dryer.

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- 14.** The laundry treatment machine according to any one of the claims 11 to 13,

characterized in, that

the laundry dryer includes a heat pump system.

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- 15.** The laundry treatment machine according to claim 14, **characterized in, that**

the sliding shutter (18) is provided for an opening containing a removable fluff filter of the heat pump system.

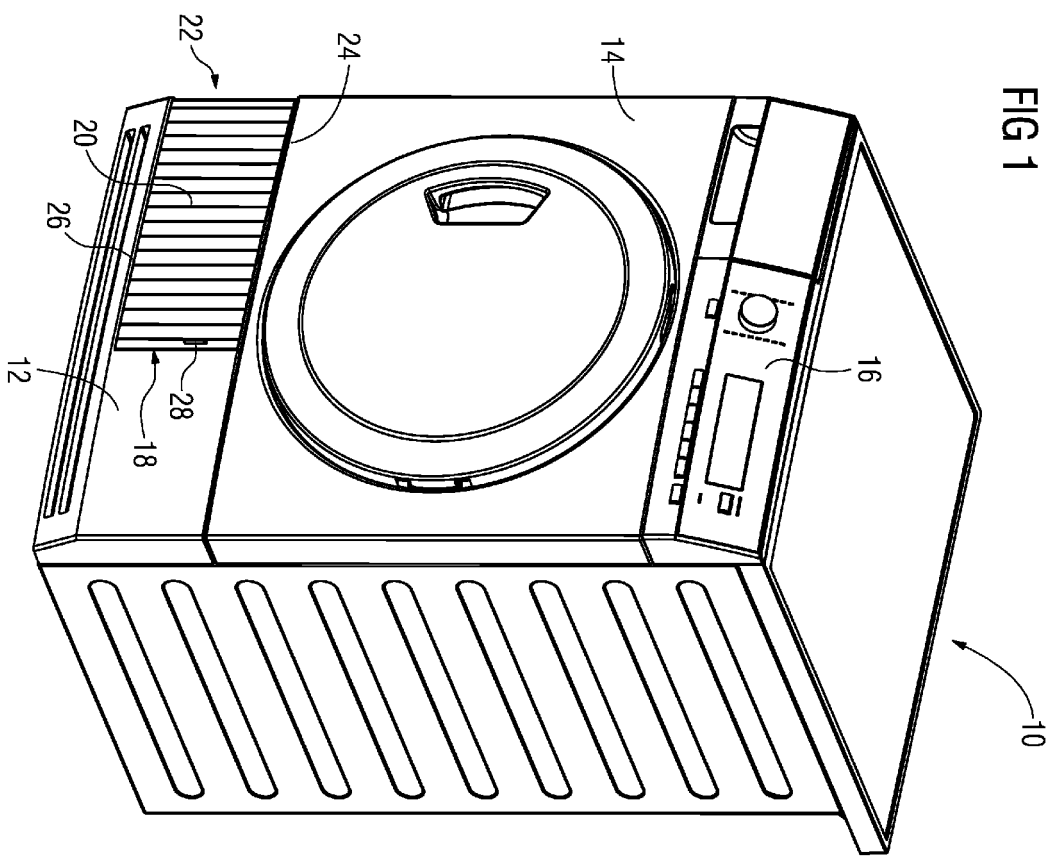
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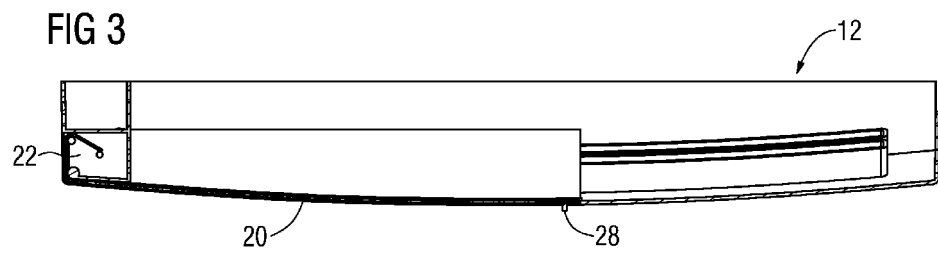
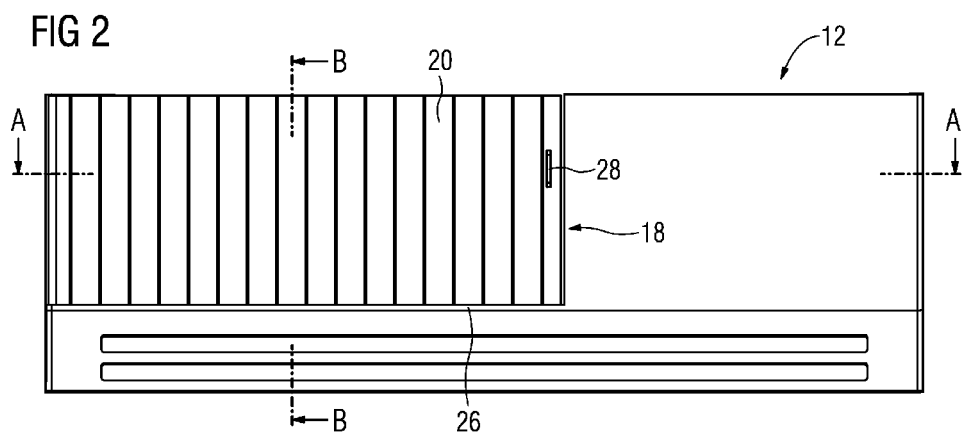
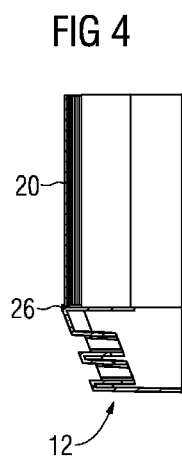


FIG 5

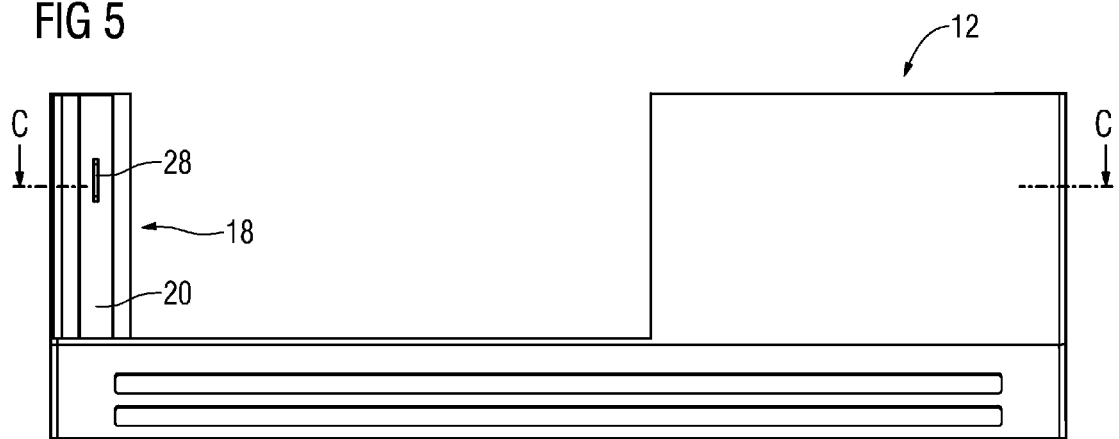
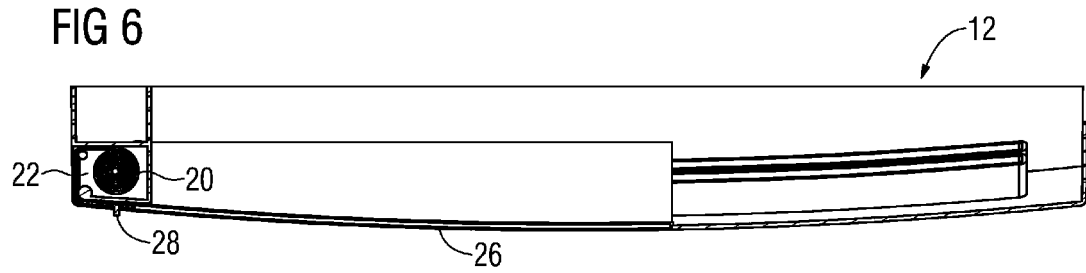


FIG 6





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Place of search Munich		Date of completion of the search 15 November 2012	Examiner Kising, Axel
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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