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(54) **A laundry drying machine with a fluff filter revealing device**

(57) A laundry drying machine (100) comprising an external cabinet (105), which contains a rotatable drum (110) for laundry to be dried and a loading opening (120; 630) for allowing laundry loading into and unloading from the drum; a door (135; 620) is provided for closing said loading opening. The laundry drying machine further comprises a drying air circuit for circulating drying air for drying the laundry, where a removable fluff filter (200; 715) adapted to be associated with said drying air circuit in a working position in which said fluff filter (200; 715)

retains fluff suspended in the drying air, so as to avoid that fluff goes into said drying air circuit downstream said fluff filter (200; 715). Said removable fluff filter (200; 715) is secured by a filter revealing device (300; 700) configured for automatically preventing the door from being closed when the filter is not in said working position. Said filter revealing device (300; 700) characterized in that it is arranged to at least partly protrude externally from said cabinet (105) in proximity of the loading opening (120; 630) when the fluff filter (200; 715) is not in said working position.

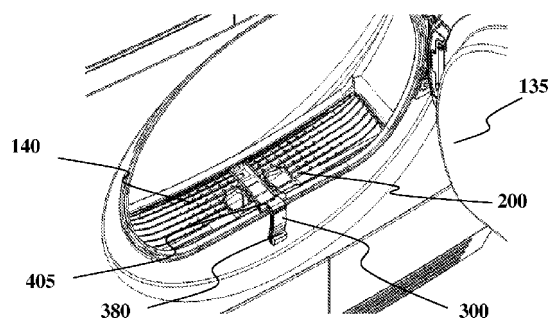


FIG. 4B

Description

[0001] The present invention relates to laundry drying machines, like laundry dryers and washer/dryers, for example tumble dryers.

[0002] In particular the invention relates to a revealing device for revealing the presence and/or the correct positioning of a fluff filter and for preventing the machine operation when the fluff filter is not properly positioned.

[0003] As known, tumble dryers typically comprise a cabinet substantially parallelepiped-shaped; the cabinet accommodates a rotatable drum apt to contain the laundry to be dried, as well as the electrical, electronic, mechanical, and hydraulic components necessary for the operation of the tumble dryer. A front panel of the cabinet has a loading opening to access the rotatable drum for loading/unloading the laundry, and a door is provided for closing the loading opening, particularly during the tumble dryer operation.

[0004] In operation, the laundry is dried by causing warm, dry air to flow through the drum while the latter is rotated, so that the laundry is tumbled.

[0005] During the drying process, the clothes inside the rotating drum typically loose lint particles or fluff. Said fluff is light and tiny so it can be brought by the hot air flow into the drying air circuit. Once the fluff enters the drying air circuit, it can obstruct it or affect the fan operation, to the extent of possibly cause the latter to stop; in general, this has a detrimental effect on the dryer functioning.

[0006] Therefore, fluff (or "de-fluff") filters have been designed suitable to retain the fluff so as to prevent it from damaging the dryer's components. The fluff filter needs to be periodically cleaned to avoid it to get clogged; to this purpose, the fluff filter is removably accommodated in a filter seat, for example located at the front of the cabinet, adjacent the loading opening and in fluid communication with the drying air circulation circuit.

[0007] The removability of the fluff filter however is intrinsically dangerous: there is in fact the possibility that a user, after removing the fluff filter for cleaning it, forgets to reinstall the filter in its seat or reinstalls it in a wrong way before setting the dryer in operation.

[0008] Solutions have been proposed to overcome this problem.

[0009] For example, EP 0443361 discloses a fluff filter monitor device for laundry driers comprising a flexible plastic strip member fixedly mounted in a housing space for the filter, so that, when the filter is removed, the flexible strip member is displaced and intercepts the movement of a lug projecting from the loading opening door and therefore preventing the door from closing.

[0010] One of the major drawback of the aforementioned solution is that the monitoring device is embedded inside the filter seat, thereby it is out of the sight and unreachable by the user. Consequently a user cannot notice if the monitor device works properly or if the prolonged use has caused a reduction of its flexibility to the

extent that the monitor device is no longer capable of preventing the closure of the door. Should this happen, the user could inadvertently close the door and set the machine in operation even if he/she forgot to reinstall the filter after its removal. This solution also needs a complex procedure during in-factory assembly, due to the fact that the filter seat offers a narrow workspace.

[0011] The purpose of the present invention is to provide a device suitable for revealing the absence of the fluff filter from its working position that at least partly overcomes said drawbacks.

[0012] It is underlined that in the present application the expression "working position" (or "correct working position") of the fluff filter has to be intended as a position of the fluff filter with respect to its seat which ensures that lint or fluff can't go into the drying air circulation circuit downstream the fluff filter; in other words the fluff filter is considered in the working position if it is correctly inserted in its seat, while the fluff filter is not in the working position if it is not inserted in the seat or if it is inserted in the seat in a wrong or non-perfect way, so that some fluff can avoid the fluff filter and enter into the circulation circuit downstream the fluff filter.

[0013] Essentially, according to the present invention, a device is proposed for revealing that the fluff filter is not inserted into the respective housing/seat, or generally it is not in the correct working position. The revealing device is structured and arranged in such a way as to at least partly protruding outside the loading opening of the appliance when the fluff filter is out of its seat or generally not properly positioned thereinto. In this way, by protruding out of the loading opening, the revealing device is adapted to prevent the loading door from closing in case the fluff filter is not in working position, and moreover it is visible to the user, the latter can realize of any possible breakage or malfunctioning thereof.

[0014] The solution according to the present invention is more reliable in ensuring that the machine operation is prevented in case the fluff filter is not properly installed, or in general when it is not in working position, is less prone to failures, and needs a cheaper and a simpler assembly process during manufacturing.

[0015] One aspect of the present invention relates to a laundry drying machine comprising an external cabinet, which contains a rotatable drum for laundry to be dried and a loading opening for allowing laundry loading into and unloading from the drum; a door is provided for closing said loading opening. The laundry drying machine further comprises a drying air circuit for circulating drying air for drying the laundry, where a removable fluff filter adapted to be associated with said drying air circuit in a working position in which said fluff filter retains fluff suspended in the drying air, so as to avoid that fluff goes into said drying air circuit downstream said fluff filter. Said removable fluff filter is secured by a filter revealing device configured for automatically preventing the door from being closed when the filter is not in said working position. Said filter revealing device is characterized in that it is

arranged to at least partly protrude externally from said cabinet in proximity of the loading opening when the fluff filter is not in said working position.

[0016] Preferred embodiments of the invention are set forth in the dependent claims.

[0017] These, and others, features and advantages of the solution according to the present invention will be better understood with reference to the following detailed description of some embodiments thereof, provided for illustrative and not restrictive purposes, to be read in conjunction with the attached drawings. In this regard, it is expressly intended that the drawings are not necessarily to scale and that, unless specified otherwise, they simply aim to conceptually illustrate the structures and procedures. In particular:

Figure 1 shows in a perspective view, a tumble drier provided with a filter revealing device according to an embodiment of the present invention, with the door wide open;

Figure 2A shows a first perspective view of a fluff filter;

Figure 2B shows a second perspective view of the fluff filter;

Figure 3A shows a perspective view of an embodiment according to the present invention of a filter revealing device for preventing the machine loading door from closing unless the fluff filter is in proper working position;

Figure 3B shows an exploded view of the filter revealing device of **Figure 3A**;

Figure 4A shows an enlarged perspective view of the loading opening of the machine with the fluff filter inserted into its seat in the correct working position, and of the device of **Figures 3A** and **3B**;

Figure 4B shows an enlarged perspective view of the loading opening of the machine with the fluff filter inserted in its seat, and the filter revealing device in opened position;

Figure 4C shows a detailed perspective view of the loading opening of the machine without the fluff filter and the filter revealing device according to an embodiment of the present invention in opened position;

Figure 5A is a sectional view, along the plane indicated **VA-VA** in **Figure 4A**, of the lower side of the loading opening and front panel showing the fluff filter housed in its seat in the correct working position and with the filter revealing device according to an embodiment of the present invention in closed position;

Figure 5B is a sectional view, along the plane indicated **VB-VB** in **Figure 4C**, of the lower side of the loading opening and front panel showing the fluff filter seat without the fluff filter and with the filter revealing device according to an embodiment of the present invention in opened position preventing the loading door from closing;

Figure 6 shows in a perspective view a front panel

of a tumble dryer comprising a filter revealing device according to another embodiment of the present invention;

Figure 7 is a detailed view of a filter revealing device according to the embodiment of **Figure 6**;

Figure 8 is an exploded view of the filter revealing device of **Figures 6** and **7**;

Figure 9A is a cutaway view of a machine with the filter revealing device of **Figures 6** and **7**, in a free position; and

Figure 9B is a cutaway view similar to that of **Figures 9A**, with the filter revealing device of **Figures 6** and **7** in locking position;

[0018] With reference to **Figure 1**, there is shown in a perspective view, a tumble drier with the laundry loading door wide open.

[0019] The tumble dryer, denoted as **100** in the drawings, comprises a cabinet **105**, for example parallelepiped-shaped. The cabinet accommodates a rotatable drum **110** apt to contain the laundry to be dried, as well as the electrical, electronic, mechanical, and hydraulic components necessary for the operation of the tumble dryer (not shown in Figures since they are well known in the art). A front panel **115** of the cabinet has a loading opening **120** to access the rotatable drum **110** for loading/unloading the laundry to be dried. The loading opening **120** has a border **125**, preferably substantially annular, in which door hinges **130** as well as door locking means (not shown) are arranged for, respectively, hinging and locking a door **135**. Said door **135** is adapted for sealably closing said loading opening **120** during the tumble dryer operation. A fluff filter (whose upper side is visible in **Figure 1**, and denoted therein as **140**) is housed in a fluff filter seat (numbered **410** in **Figures 5A** and **5B** and not shown in **Figure 1**) formed in correspondence of the front panel **115** adjacent to the loading opening **120** and behind the annular border **125**. The fluff filter upper side **140** is, in this particular embodiment, substantially flat, and more in general it is capable of adapting itself to a peripheral rim **145** of the annular border **125**, once correctly housed in its seat.

[0020] **Figures 2A** and **2B** show a perspective view a fluff filter assembly (which in the following, for simplicity, will be called also "fluff filter") **200**, comprising, in this particular example, a filter frame **200a**, and one or more fluff filtering surfaces **200b** (comprising for example a suitable net, or a sieve, or any kind of septum adapted to allow the passage of air but to impede the passage of lint or fluff); clearly the fluff filter **200** can be of any other type. In particular, **Figure 2A** is a front view, while **Figure 2B** is a rear view, respectively, of a fluff filter **200** according to the invention. The fluff filter **200** advantageously comprises an upper face **140** preferably, but not necessarily, substantially flat, comprising a grid structure **205** that prevents clothes or foreign matters from accessing the fluff filter **200** itself and the drying air circuit downstream the fluff filter **200**. A seat **210** is provided prefer-

ably, but not necessarily, in the middle of the upper face **140** for receiving a fluff filter revealing device according to an embodiment of the present invention (not shown in **Figures 2A and 2B**). The seat **210** further comprises first blocking means **215**, for example a recess **215**, whose purpose will be explained in the following.

[0021] Advantageously, the fluff filter **200** comprises releasable filter blocking means, adapted for releasably blocking the fluff filter **200** to the fluff filter seat inside the cabinet **105**; these filter releasable blocking means comprise, for example, a resilient hook **220** projecting from beneath upper surface **140** rim toward the bottom of the fluff filter **200**, adapted to releasably blocking said fluff filter **200** to the fluff filter seat inside the cabinet **105**, as will result more clear in the following.

[0022] **Figures 3A and 3B** show a fluff filter revealing device according to an embodiment of the present invention; in particular **Figure 3A** shows the fluff filter revealing device fully assembled, while **Figure 3B** shows an exploded view of the revealing device.

[0023] Advantageously, as will be better explained in the following, the fluff filter revealing device comprises a door abutment portion with an associated biasing element configured for biasing the door abutment portion towards a position protruding externally from the cabinet in proximity of the loading opening.

[0024] In the embodiments illustrated in **Figures 3A and 3B**, the fluff filter revealing device, globally denoted **300**, advantageously comprises a sort of lever comprising two portions: a first portion **305**, preferably arc-shaped, and second portion **310**, preferably substantially rectilinear and longer than the first portion. As will be better explained in the following, in this embodiment the above mentioned abutment portion comprises the second portion **310**.

[0025] The two portions **305** and **310** are hinged together, preferably, but not necessarily, by a hinge **315**. Said hinge **315** comprises in particular three appendages **320a**, **320b** and **320c**, each provided with an eye, in comb-like arrangement on a first end of the second portion **310**. On a facing, first end of the first portion **305** there are arranged, also comb-like, four appendages **325a**, **325b**, **325c** and **325d** each provided with an eye; the eyes of the appendages **325a**, **325b**, **325c** has substantially the same diameter as the eyes of the appendages **320a**, **320b** and **320c**, while the eye of the appendage **325d** has a smaller diameter compared to the others. Advantageously, the appendages **320a**, **320b**, **320c**, **325a**, **325b**, **325c** and **325d** are arranged on the ends of the respective device portions in such a way as, when the second and first device portions are assembled, the appendages **320a**, **320b**, **320c** and the appendages **325a**, **325b**, **325c**, **325d** are interleaved, and the appendages eyes are aligned, so that a pivot **327**, comprising two parts **330a** and **330b**, can be inserted for obtaining a pin hinge. The pivot part **330a** comprises a hollow cylindrical body **335a**, insertable into the eyes of the appendages **320a**, **320b**, **320c**, **325a**, **325b**, **325c**, with a

circular, enlarged head **335b**; the pivot part **330b** comprises a cylindrical body **340a**, having a diameter smaller than the diameter of the hollow cylindrical body **335a** and essentially matching the diameter of the eye of the appendage **325d**, so as to result insertable thereto and into the hollow cylindrical body **335a**, and a circular enlarged head **340b**. The flat circular heads **335b** and **340b** prevent the pivot **327** from sliding out of the appendages eyes.

[0026] Clearly the above described hinge **315** is only an example, and it can be replaced by any suitable hinge adapted to connect in a rotatable way the first portion **305** and the second portion **310**.

[0027] In another embodiment, not illustrated, the first and second portions of the fluff filter revealing device **300** are obtained in a single piece construction, for example by moulding of a plastic material, and they can be rotated one with respect to the other for example thanks to the intrinsic elasticity of the material of which they are made, and/or thanks to a suitable shaping of the region which connects the first and second portions.

[0028] In correspondence of a second end of the first portion **305**, the revealing device **300** is hinged to the annular border rim **145** of the loading opening **120** by a hinge, denoted **345**, comprising for example two eyed appendages **350a**, **350b** provided at the second end of the first portion **305**, matching corresponding eyed appendages formed on the rim of the loading opening, and a pin **360**. Clearly, also in this case substantially any kind of hinge can be used for connecting the first portion **305** to the annular border rim **145** of the loading opening.

[0029] In this embodiment the biasing element configured for biasing the door abutment portion (in this case the second portion **310**) towards a position protruding externally from the cabinet in proximity of the loading opening advantageously comprises a biasing element, in the example here considered a retaining spring **355** inserted on the pin **360** in a position intermediate between the appendages **350a**, **350b**; the spring **355** is adapted to bias the filter revealing device **300** towards an open position illustrated for example in **Figures 4B and 4C** (in which at least a part of the filter revealing device **300** protrudes from the annular border rim **145** of the loading opening **120** so as to prevent the door from closing), once the user manually releases the filter revealing device **300** from the respective seat **210** formed in the fluff filter frame at the top thereof.

[0030] A cushion **380** (or similar damping means) is provided at the second **310** end opposite to the first end thereof, for preventing scuffs on the door **130** internal face should the latter come into contact with the filter revealing device **300** due for example to an attempt of closing the door without the filter in the working position. The cushion **380** is mounted to the second portion **310** for example by snap-fit through projections **385a**, **385b**, **385c** and **385d** shaped to enable snap-fit engagement with four respective apertures (only two **390a** and **390b** shown in **Figure 3B**) formed in the long strip-like portion

310.

[0031] Clearly the cushion **380** may be associated to the fluff filter revealing device **300** by any other suitable fixing means, for example by glueing, and/or by welding, and/or by overmoulding.

[0032] Furthermore, the second portion **310** is provided, at the second end thereof, with second blocking means, for the reciprocal cooperation with the first blocking means, and in particular, as in the considered example, adapted to engage the first blocking means **215** provided in the filter **200** frame, so as to releasably block the filter revealing device **300** to the fluff filter **200** in a locked position, illustrated for example in **Figures 4A** and **5A**.

[0033] For example the second blocking means can comprise a projection **370** shaped so as to match the retaining recess **215**, in particular configured to snap fit into the recess **215** obtained in the seat **210**, so as to releasably block the filter revealing device **300** in a locked position.

[0034] Clearly the second blocking means (in this example the projection **370**) can be provided on either the fluff filter revealing device or the fluff filter, and the first blocking means (in this example the retaining recess **215**) can be accordingly provided on either the fluff filter or the fluff filter revealing device.

[0035] The second portion **310** of the filter revealing device **300** further comprises, in correspondence of its second end and on a face opposite to the cushion, holding means adapted to facilitate the unlocking of the filter revealing device **300**; advantageously the holding means comprises an appendage **375** defining a hook for a finger.

[0036] The operation of the filter revealing device **300** will be now described, with the aid of **Figures 4A**, **4B** and **4C**, which show a close up perspective view of the loading opening **120**.

[0037] In particular, referring to **Figure 4A** the fluff filter **200** is in a correct working position, and the filter revealing device **300** is associated to the fluff filter **200** in a locking position in which the filter revealing device **300** is retained in the seat **210** of the fluff filter **200** by the snap-fit engagement of the projection **370** with the recess **215**. Such a configuration of the fluff filter **200** and filter revealing device **300** could be defined as door unblocking position, since in this position it is possible to close the door **135**, i.e. the closure of the door is unblocked. The filter revealing device **300**, the fluff filter seat **410** and the fluff filter **200** are arranged in such a way that the filter revealing device **300** can be fixed to the fluff filter **200** in the locking position only if the fluff filter **200** is inserted into the fluff filter seat **410** in the correct working position, while the filter revealing device **300** cannot be fixed to the fluff filter **200** in the locking position if the fluff filter is not inserted into the fluff filter seat **410** or it isn't in the correct working position. Advantageously, when the fluff filter **200** is in the working position, the resilient hook **220** is in turn snap-fit engaged with a recess **415**, formed in a back wall of the fluff filter seat **410**, and in this way the fluff filter **200** is firmly kept in the correct working position.

[0038] When the user wishes to remove the fluff filter **200** for, e.g. cleaning or replacing it with a new filter, the user has to act on the revealing device **300** so that the latter moves from the locking position to an open position, shown in **Figure 4B**, as it will be better explained in the following. This open position corresponds to a door blocking position in which the filter revealing device **300** prevents the closure of the door **135**. To do this, the user simply slightly pulls upwards the revealing device **300**, using a finger to catch the hook **375**. As soon as the projection **370** disengages the recess **215**, the retaining spring **355** pulls backward the device **300**, until the first portion **305** has rotated by an angle of substantially 180° around the hinge **405**, and this causes the second portion **310**, under its own weight, to rotate about the hinge **315** until a rest position is reached. In the rest position, the second portion **310** is substantially parallel and adjacent to the annular border **125** of the loading opening. In this position the filter revealing device **300** thus prevents the door closure; in this position the cushion **380** faces outwards, so as to prevent any scuffing of the door **135** internal face should the user inadvertently try to close the door when the fluff filter **200** is not inserted or it is not in the correct working position. With the revealing device **300** in this position, the fluff filter **200** can be extracted from its seat **410**, by simply pulling the fluff filter **200** up enough to cause the hook **220** to flex inward and disengage from the recess **415**.

[0039] After the removal of the fluff filter **200**, the revealing device **300** remains in the open position, as shown in **Figure 3**, still preventing the door closure.

[0040] When the fluff filter is reinserted into the seat, and it is placed in the correct working position, the filter revealing device **300** can be brought back by the user to the locking position (that is, the door unblocking position as described in the above) of **Figure 4A**, and the door can again be closed.

[0041] **Figure 5A** is a section view of the lower side of the loading opening and front panel showing the fluff filter **200** housed in its seat **410** with the filter revealing device **300** according to an embodiment of the present invention in locking position. The second portion **310** and the device seat bottom **505** are shaped so as to fit each other. The projection **370** present at the end of the second portion **310** firmly engages the recess **215** while in locking position.

[0042] **Figure 5B** is a section view of the lower side of the loading opening **120** and front panel **115** showing the fluff filter seat **410** with the filter removed, and the filter revealing device **300**, according to an embodiment of the present invention, in opened position preventing the loading door **135** from closing. As stated above the first portion **305** of the device **300** is rotated by approximately 180° in the open position, while the second portion **310** is substantially parallel and adjacent to the annular border **125**, abutting the same by its hook-like appendage **375**. The spring **355** of the hinge **405** biases the device **300** to maintain the open position, until the user correctly

reinstalls the fluff filter **200** into its seat **410** and pulls the device **300** until the projection **370** engages the recess **215**, reaching the locking position (as shown earlier in **Figure 4A**).

[0043] The device **300** in open position prevents the door **135** from completely closing the loading opening **120**. It is possible to notice that the filter revealing device **300** contacts the door **135** only by the cushion **380**, ensuring that the door **135** is not damaged while contacting the device **300**, even if pushed strongly against the cushion **380**. However the presence of the cushion **380** is only a preferable feature, but it is not necessary for the functioning of the present invention; in a further embodiment the cushion is not provided and the filter revealing device **300** contacts the door **135** directly.

[0044] In a further embodiment, not illustrated, the fluff filter revealing device **300** comprises a single flexible portion, a first end of which is rotatably associated with the annular border rim **145** of the loading opening **120** and cooperates with biasing means, for example, a retaining spring, adapted to bias the filter revealing device **300** towards an open position in which at least a part of the filter revealing device **300** protrudes from the annular border rim **145** of the loading opening **120** so as to prevent the door from closing. In this case the above mentioned door abutment portion comprises a second end of the single flexible portion; advantageously the second end of the single flexible portion is provided with second blocking means, adapted to engage the first blocking means **215** provided in the filter **200** frame, so as to releasably block the filter revealing device **300** to the fluff filter **200** in the locked position.

[0045] Another embodiment of the present solution is shown in **Figures 6 - 9**. In particular, **Figure 6** shows in a perspective view, a tumble dryer with the door wide open. A machine front panel **600** is essentially identical to that shown in **Figure 1** apart from being provided with a hole **605** in a lower left quadrant of the border **610**, preferably annular, of the loading opening.

[0046] As will be better explained in the following, also in this embodiment the fluff filter revealing device comprises a door abutment portion with an associated biasing element configured for biasing the door abutment portion towards a position protruding externally from the cabinet in proximity of the loading opening; in this case the door abutment portion comprises a pushbutton **615** slidable through the hole **605**, so as to project outwardly from the hole **605** and to prevent a door **620** from closing if a fluff filter (of which is visible only its upper face **625**) is removed from its seat or generally not in correct working position, as will be more extensively described in the following.

[0047] The fluff filter may be identical to the one described in connection with the previous embodiment, with the only difference that in the present case the filter has not the device seat **210** in its upper face.

[0048] **Figure 7** is a section view showing a fluff filter revealing device **700**, according to the herein described

embodiment of the present invention. The device **700** is mounted in an internal cavity of the front panel in correspondence to the region from which the pushbutton **615** projects through the hole **605**. The filter revealing device **700** comprises, in addition to the pushbutton **615**, a pushbutton blocking element for blocking the backward movement of the pushbutton **615**. Said pushbutton blocking element comprise for example, as shown in **Figure 7**, a lever **705**, preferably, but not necessarily, substantially S-shaped, a first end **710** of which is arranged so as to be automatically actuated by the fluff filter **715** (only partly shown), when the fluff filter is inserted into its seat and pushed downward. The lever **705** is hinged in **720** to the inner walls of the front panel **600**. A second end **730** of the lever **705** is arranged so as to engage the pushbutton **615** when the fluff filter **715** is removed from its seat.

[0049] Advantageously in the embodiment of **Figure 8** the biasing element configured for biasing the door abutment portion (in this case the pushbutton **615**) towards a position protruding externally from the cabinet in proximity of the loading opening comprises first biasing means, for example a biasing element **810**, e.g. a coil spring, fitted, for axially biasing the pushbutton **615** outwardly from the hole **605**, in its rest position; in this embodiment the pushbutton **615** advantageously comprises a hollow cylindrical body **805** open at a rear end, inside which the coil spring **810** is fitted. The spring **810** is attached at one end thereof to the internal wall of the tumble dryer. Two annular projections **815a** and **815b** are provided on the first hollow cylindrical body **805**, adapted to prevent the pushbutton **615** from being expelled from the hole **605**, and at the same to define a groove **830** that forms a catch for the engagement by the second end **730** of the lever **705** when the latter is brought in the locking position. The fluff filter revealing device **700** comprises second biasing means **825**, for example a retaining spring, for biasing the lever **705** in locking position, in which the second end **730** of the lever engages the groove **830**.

[0050] Advantageously the free end of the pushbutton **615** can comprise a cushion (or similar damping means), not illustrated, adapted for preventing scuffs on the internal face of the door **620** should the latter come into contact with the pushbutton **615** due for example to an attempt of closing the door **620** without the fluff filter in the working position. The operation of the filter revealing device **700** according to the present embodiment of the invention is depicted in the cutaway views of **Figures 9A** and **9B**.

[0051] When the fluff filter **715** is placed in its seat, the first end **710** of the lever **705** is pushed downward by the same fluff filter **715**, against the biasing action of the spring **825**. This causes the lever **705** to slightly rotate (clockwise with reference to the enclosed drawings) about the hinge **720** axis, to an extent sufficient for causing the second end **730** of the lever **705** disengage the groove **830**. In this way, the pushbutton **615** is left free to slide axially. When the user closes the door **620**, the

latter pushes the pushbutton **615** backward (against the action of the coil spring **810**), and the door can close the loading opening **630**.

[0052] Otherwise, when the fluff filter **715** is removed from its seat, or more generally if the fluff filter **715** is not in the working position, the spring **825** biases the lever **705** to rotate counterclockwise, until the second end **730** of the lever engages the groove **830** of the pushbutton **615**. In this position, the lever **705** prevents axial sliding movement of the pushbutton **615**, and thus the door **620** cannot be closed until the fluff filter **715** is reinstalled correctly into its seat.

[0053] Also in this embodiment of present invention, the user is able to detect whether the fluff filter revealing device **700** operates properly, by simply checking the blocking of the pushbutton **615** once the fluff filter **715** is removed from it seat, without the need for closing the door **620**.

Claims

1. A laundry drying machine (**100**) comprising:

- an external cabinet (**105**), which contains a rotatable drum (**110**) for laundry to be dried,
- a loading opening (**120; 630**) for allowing laundry loading into and unloading from the drum,
- a door (**135; 620**) for closing, said loading opening,
- a drying air circuit for circulating drying air for drying the laundry,
- a removable fluff filter (**200; 715**) adapted to be associated with said drying air circuit in a working position in which said fluff filter (**200; 715**) retains fluff suspended in the drying air, so as to avoid that fluff goes into said drying air circuit downstream said fluff filter (**200; 715**),
- a filter revealing device (**300; 700**) configured for automatically preventing the door from being closed when the filter is not in said working position,

characterized in that

said filter revealing device (**300; 700**) is arranged to at least partly protrude externally from said cabinet (**105**) in proximity of the loading opening (**120; 630**) when the fluff filter (**200; 715**) is not in said working position.

2. The laundry drying machine according to claim 1, wherein said filter revealing device is arranged at least partially on a border (**125; 610**) of the loading opening (**120; 630**).

3. The laundry drying machine according to claim 1 or 2, wherein said fluff filter revealing device comprises a door abutment portion (**310; 615**) with an associated biasing element (**355; 810**) configured for bias-

ing the door abutment portion towards a position protruding externally from the cabinet in proximity of the loading opening.

4. The laundry drying machine according to claim 3, wherein said door abutment portion is part of a lever hinged at a hinge (**345**) to the annular border of the loading opening.

5. The laundry drying machine according to claim 4, wherein said biasing element is provided at said hinge (**345**).

6. The laundry drying machine of claim 4 or 5, wherein the lever is manually actuatable for bringing it to a door unblocking position against the action of said biasing element.

7. The laundry drying machine of one or more of claims 4, 5, or 6, wherein said lever and said fluff filter comprise first and second blocking means (**370, 215**) adapted to reciprocally cooperate for retaining the lever in the door unblocking position when the fluff filter is in the working position.

8. The laundry drying machine of claim 7, wherein said first and second blocking means comprise a projection (**370**) provided on either the lever or the fluff filter, and a matching retaining recess (**215**) provided on either the fluff filter or the lever.

9. The laundry drying machine according to claim 3, wherein said door abutment portion comprises a pushbutton (**615**) slidable through a hole (**605**) formed in a panel of the cabinet in proximity of the loading opening, said biasing element (**810**) biasing the pushbutton (**615**) to protrude from the hole (**605**).

10. The laundry drying machine according to claim 9, wherein said biasing element comprises a spring axially biasing the pushbutton (**615**) to protrude from the hole (**605**).

11. The laundry drying machine according to claim 9 or 10, wherein the revealing device further comprises a pushbutton blocking element (**705**) biased for engaging the pushbutton so as to prevent it from sliding inward through the hole when the fluff filter is not in said working position.

12. The laundry drying machine according to claim 11, wherein the pushbutton blocking element (**705**) is arranged to be automatically actuated by the fluff filter when the latter is in said working position, so as to free the pushbutton sliding movement.

13. The laundry drying machine according to any one of claims 3 to 10, wherein said door abutment portion

comprises a cushion element adapted to prevent damages to the door when the latter abuts the door abutment portion.

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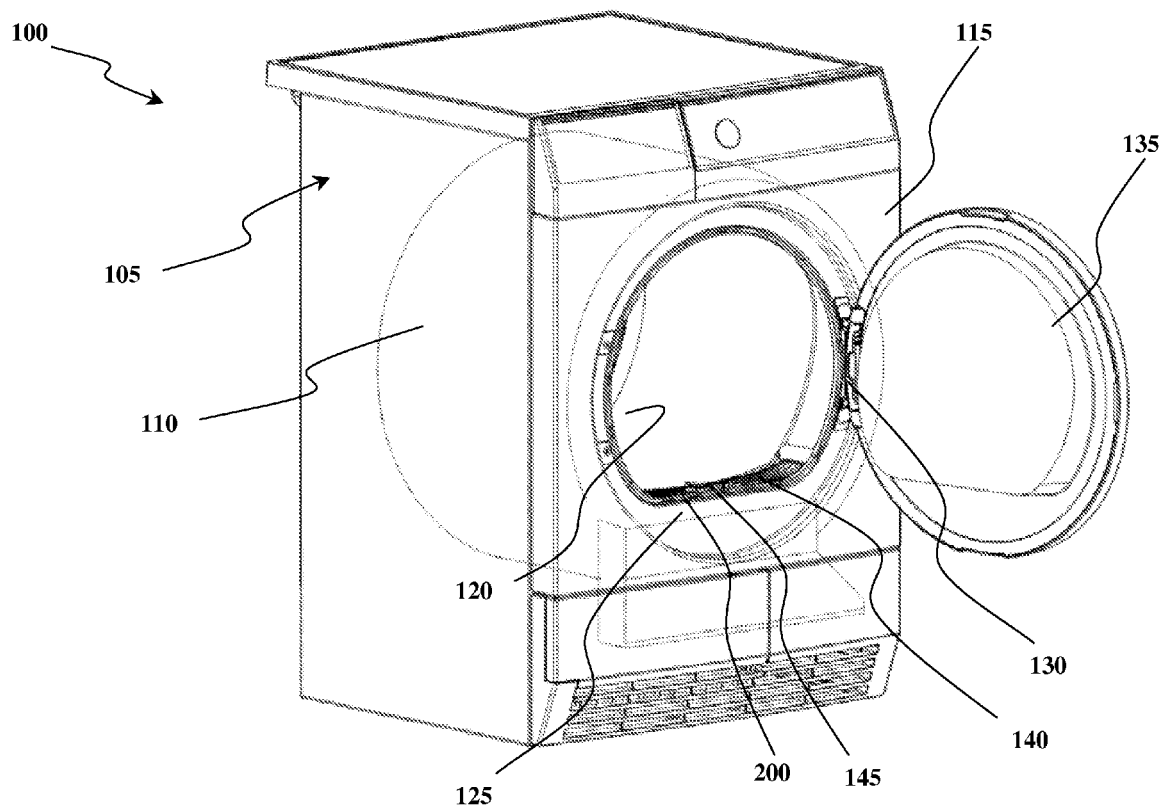


FIG.1

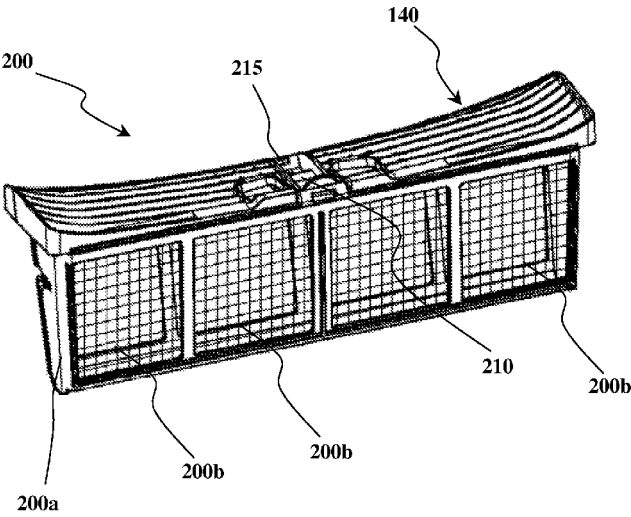


FIG.2A

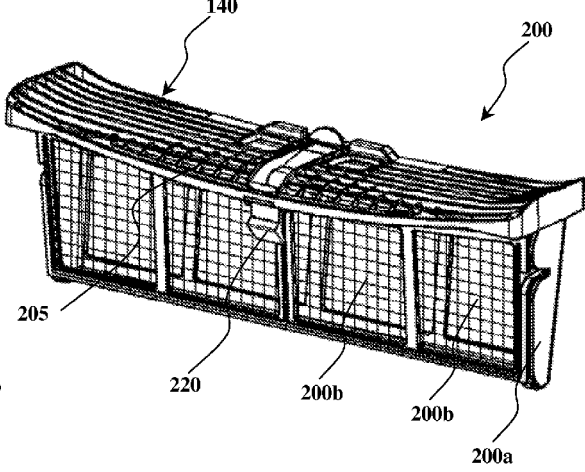


FIG.2B

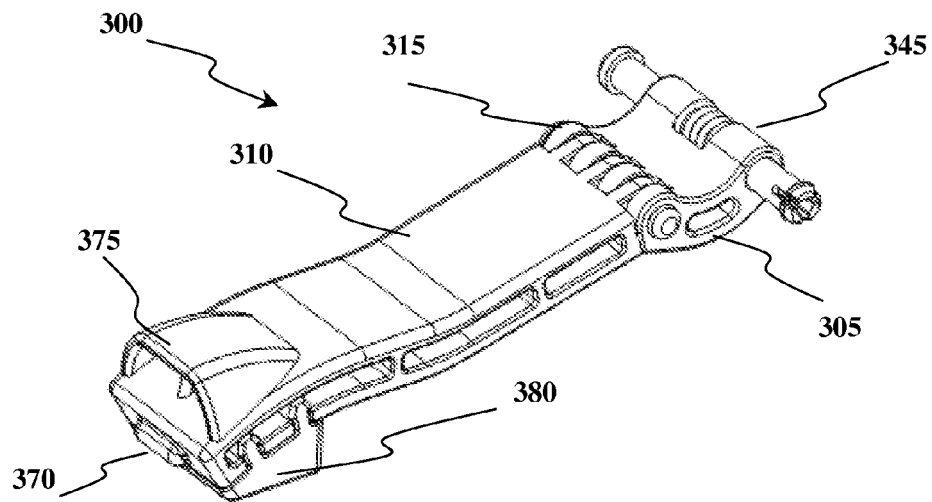


FIG.3A

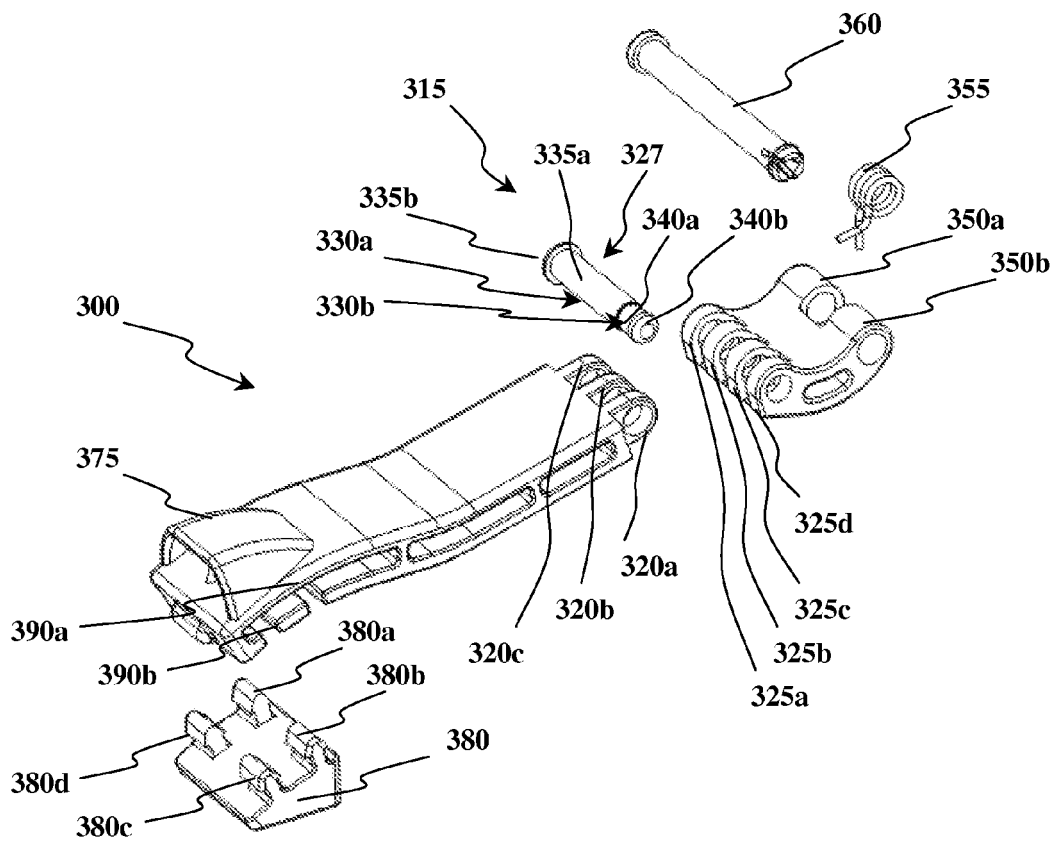


FIG.3B

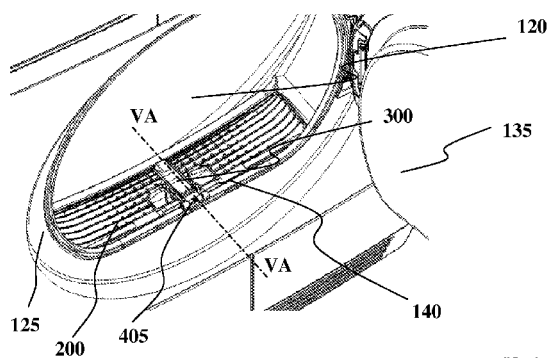


FIG. 4A

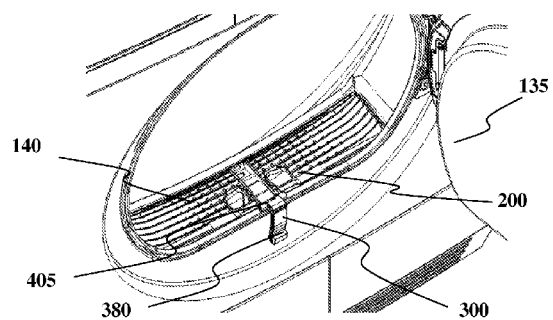


FIG. 4B

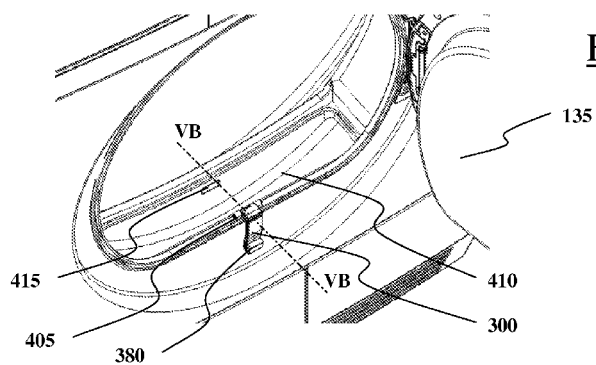


FIG. 4C

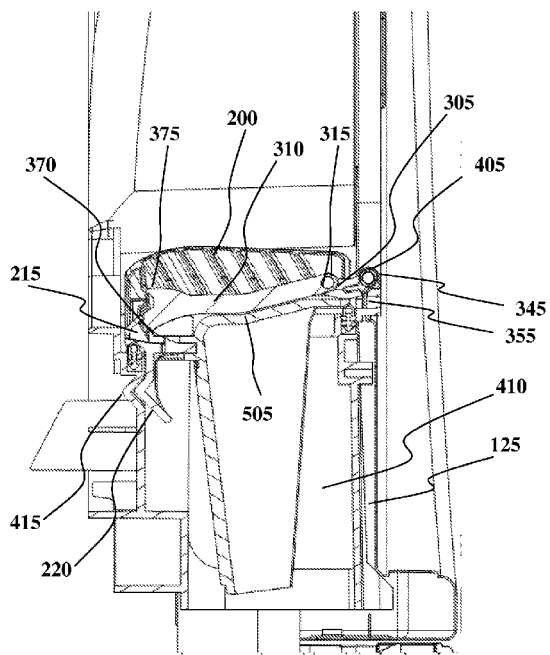


FIG. 5A

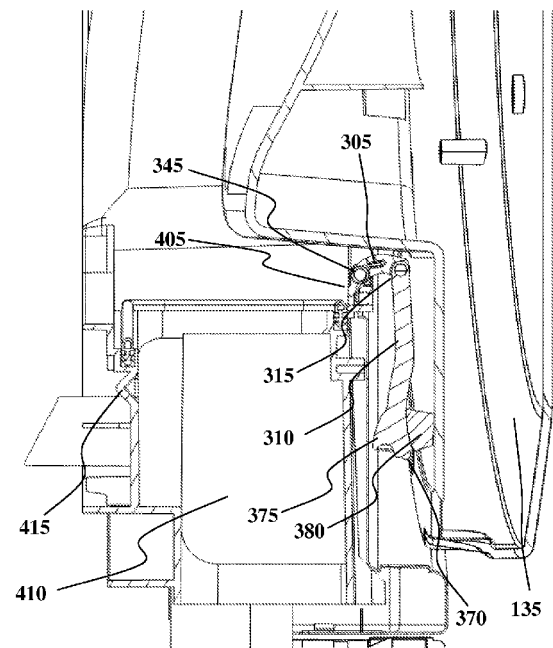


FIG. 5B

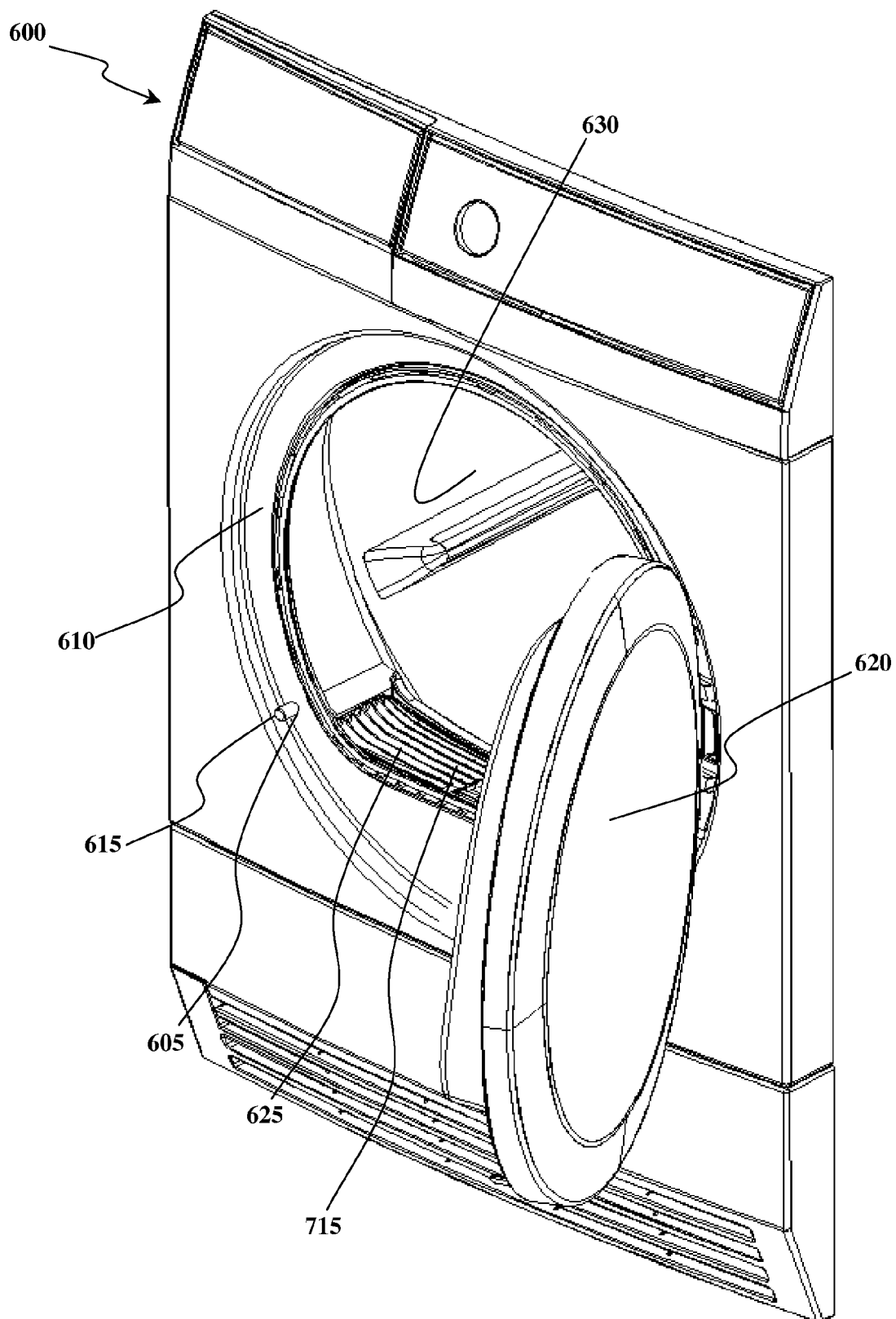


FIG.6

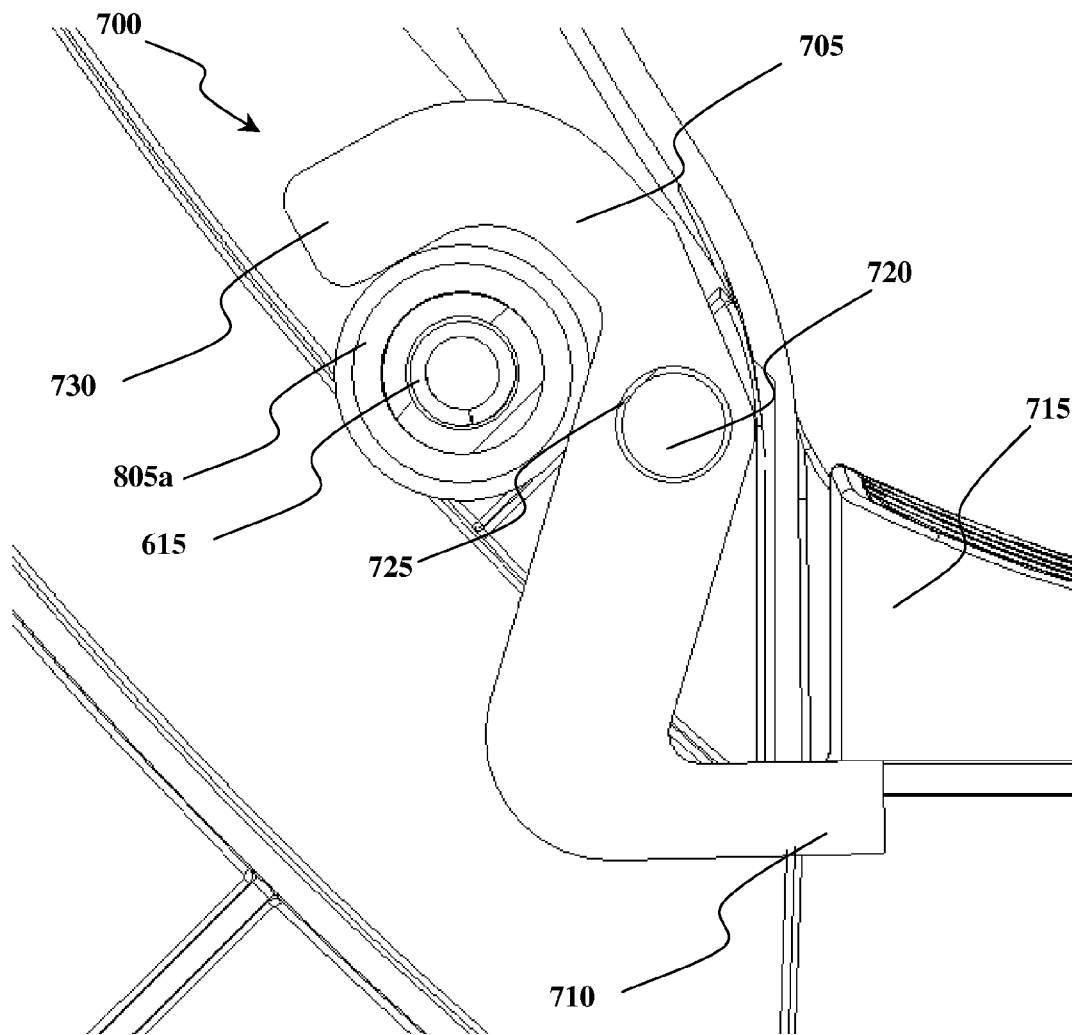


FIG.7

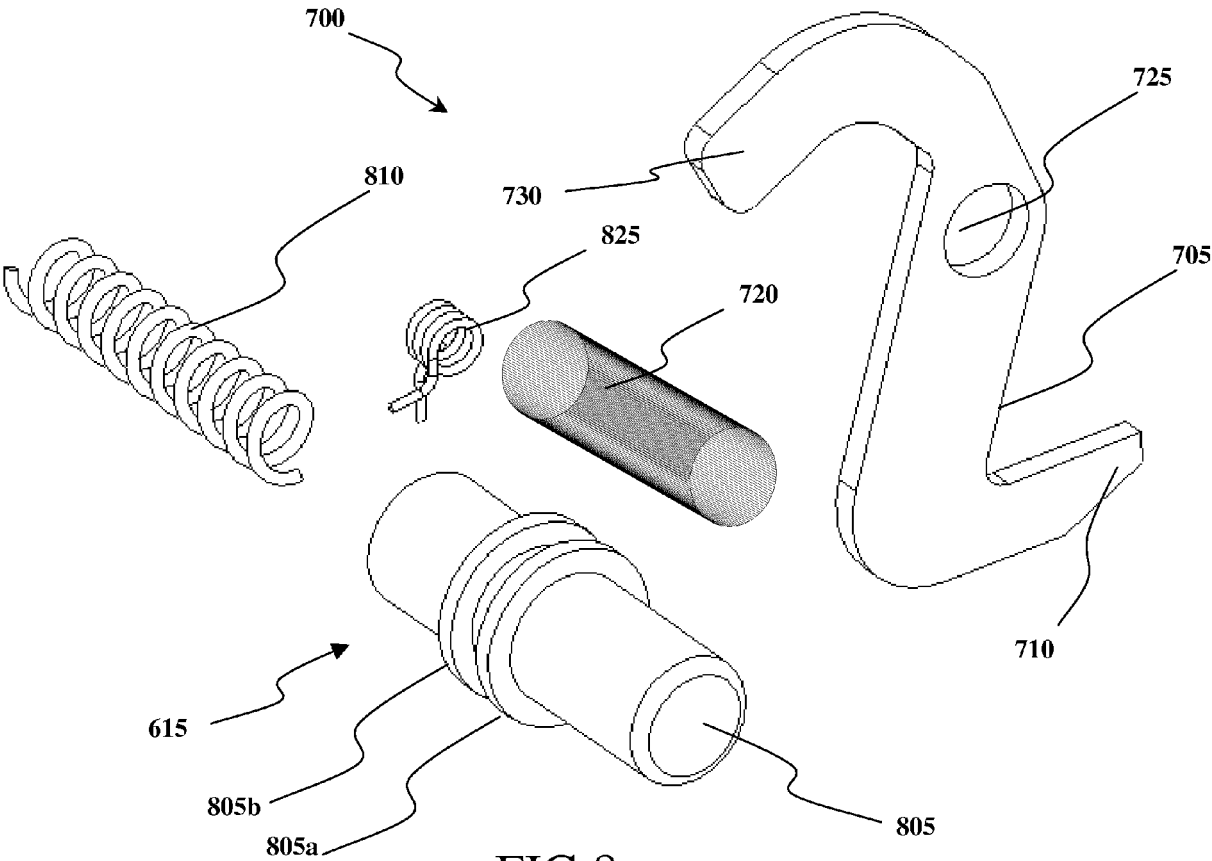


FIG.8

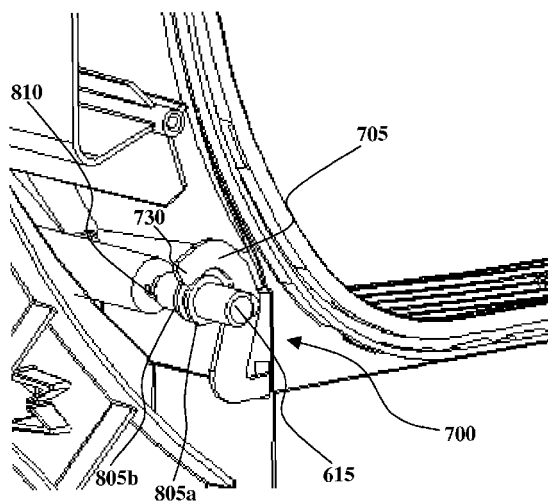


FIG. 9A

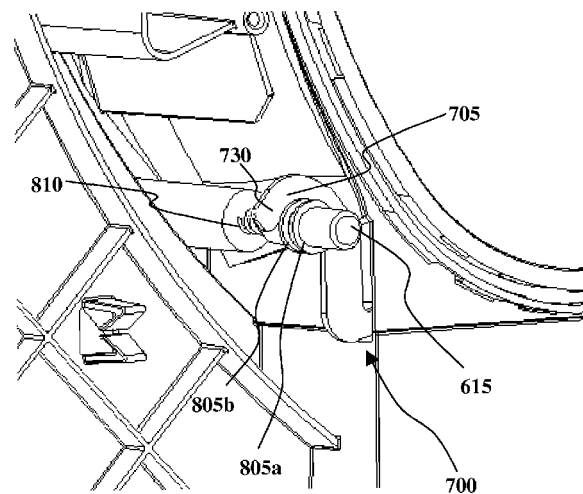


FIG. 9B



EUROPEAN SEARCH REPORT

Application Number
EP 10 15 6206

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 318 408 A (AEG HAUSGERAETE GMBH [DE]) 22 April 1998 (1998-04-22) * page 1, line 25 - page 7, line 35; figures 1-7 *	1-8,13	INV. D06F58/22
X	EP 2 055 825 A1 (FAGORBRANDT SAS [FR]) 6 May 2009 (2009-05-06) * abstract; figures 1-7d *	1-3	
A	EP 0 443 361 A1 (ZANUSSI A SPA INDUSTRIE [IT]) 28 August 1991 (1991-08-28) * the whole document *	1-13	
A	EP 0 250 789 A1 (ZANKER GMBH & CO OHG [DE]) 7 January 1988 (1988-01-07) * page 3, line 3 - page 7, line 35; figures 1-2 *	1-13	
			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 July 2010	Examiner Richmond, Sarah
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 15 6206

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The members are as contained in the European Patent Office EDP file on
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19-07-2010

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