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(54) **A LAUNDRY DRYER COMPRISING A FILTER ASSEMBLY AND A METHOD TO CLEAN A FILTER ASSEMBLY**

WÄSCHETROCKNER MIT EINER FILTERANORDNUNG UND VERFAHREN ZUR REINIGUNG
EINER FILTERANORDNUNG

SÈCHE-LINGE COMPRENANT UN ENSEMBLE FILTRE ET PROCÉDÉ DE NETTOYAGE
D'ENSEMBLE FILTRE

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EP 3 562 987 B1

Description

[0001] The present invention relates to a laundry dryer comprising a filter assembly having a cleaning device and to a method to clean such a filter assembly by means of the cleaning device.

[0002] Laundry dryers usually comprise filter systems for collecting fluff or lint which is detached from the laundry to be treated in the drying process. Typically, a prior art tumble dryer provides a filter system which is accessible for control and/or maintenance by opening a door of the tumble dryer. An air flow is provided inside the tumble dryer that enters the filter system. Fluff or lint (in general foreign substances) that is carried by the air flow from the laundry to be dried is filtered out by the filter system, such that air that leaves the filter system is substantially free from lint or fluff. Said air can be heated up again and conveyed to the laundry treatment chamber of the tumble dryer. Alternatively, process air can be vented outside the dryer.

[0003] If the accumulation of the foreign substance on the filter system becomes greater than a pre-set level, the foreign substance can interfere with the discharge of the air from the drum by reducing the circulation of air from to the drum; thus, the filter system in the dryer should be cleaned periodically.

[0004] The way in which the operation of cleaning of the filter is performed depends on the type of filter system used. For example, some dryer includes below the laundry loading/unloading door a plinth having a plinth door to be opened in order to reach the filter system and clean the same using a suitable tool, leaving the filter system in place. Alternatively, the filter system cleaning is carried out as the user separates the filter system from the dryer after finishing a drying cycle, removes the foreign substance from the filter system, and again mounts the filter system into the dryer. Further cleaning operations of known type provide for removing foreign substances through a fluid sprayed onto the fluffed filter system. The activation of the fluid spraying operation is generally automatic, i.e. activated by the laundry drying control unit algorithm. Such automatic filter cleaning operation requires the provision of complex arrangements in the dryer architecture which, however, always need a user to remove the washed-off fluff from the machine.

[0005] Filter cleaning carried out manually with an external tool or by removing completely the filter system is not only cumbersome but also generally not liked by the user, who tries to postpone it. Due to this, because the filter cleaning may not be carried out every time the dryer is operated, until the filter is cleaned, a failure to secure adequate air flow rate required for drying due to the foreign substance interfering with the air flow being discharged from the drum can be obtained, thereby reducing the overall efficiency of the drying machine and even causing the laundry not to be as dried as the user desires at the end of a drying cycle.

[0006] Further, in case the cleaning of the filter system

requires an external tool, such as a brush, the latter can be lost or misplaced. In case the filter system needs to be removed from the laundry dryer in order to be cleaned, this may cause damages to the filter system itself in case of improper handling.

[0007] WO 2010/071355 discloses a foreign material removing apparatus for a dryer having a case including an air introduction hole into which air discharged from a drum is introduced, an air discharge hole, and a foreign material discharge hole; a filtering unit that is provided in the case and includes a filter; and a cleaning unit that moves relatively to the filter and has one or more cleaning devices for removing the foreign materials accumulated in the filter.

[0008] US 2012/084992 discloses a clothes dryer having a lint cleaning device to collect and store lint generated during drying through a simple structure. The lint cleaning device, including a filter, a rectilinear blade performing a rectilinear motion to collect lint, and a rotary blade performing a rotary motion interlocking with the rectilinear motion of the rectilinear blade to collect lint, collects lint at a spot and stores the collected lint in a compressed state. The lint cleaning device is used for a long time without replacement.

[0009] EP 2 749 689 discloses a laundry treatment apparatus including a connection duct through which air inside a drum, in which laundry is received, is discharged, a discharge duct configured to extend in a longitudinal direction of the drum and connected to the connection duct, a filter assembly including a filter unit located in the discharge duct to filter air introduced into the discharge duct and an impurity remover unit configured to separate impurities remaining on the filter unit from the filter unit, and an impurity storage device separable from the discharge duct, the impurity storage device being located below the filter unit to store the impurities separated from the filter unit.

[0010] The goal of the present invention is therefore to render available a laundry dryer including a filter assembly and a method to clean a filter assembly in a laundry dryer in which the cleaning operations of the filter assembly are simplified with respect to the prior art of record.

[0011] Preferably, the cleaning of the filter assembly does not require additional tool(s) external to the dryer which needs to be stored away and retrieved at the time of cleaning.

[0012] Further, the act of cleaning is preferably relatively easy and quick.

[0013] According to a first aspect, the invention relates to a laundry dryer comprising:

- a casing;
- a drum rotatably supported in the casing;
- a duct defining a flow passage for process air exiting the drum;

◦ a filter assembly positioned at least partially in the duct so as to filter process air flowing therein;

◦ said filter assembly including:

- a frame;
- a filtering element supported by the frame and defining a first filtering surface lying on a filtering plane;
- cleaning device for cleaning the first filtering surface, including a wiper to wipe the first filtering surface, said wiper being connected to a portion of said frame by means of a connection, said connection allowing the wiper to perform a roto-translational movement with respect to said frame in a plane substantially parallel to said filtering plane during wiping,

wherein said connection between said wiper and said frame includes a guide on the frame to guide a corresponding pin in said cleaning device in said roto-translational movement, or a guide in said cleaning device to guide a corresponding pin in said frame in said roto-translational movement characterised in that said guide includes a rectilinear portion and a curvilinear portion.

[0014] According to a second aspect, the invention relates to a method to clean a filter assembly in a laundry dryer, wherein the laundry dryer comprises:

- a casing;
- a drum rotatably supported in the casing;
- a duct defining a flow passage for process air exiting the drum;
- a filter assembly positioned at least partially in the duct so as to filter process air flowing therein; said filter assembly including:
- a frame;
- a filtering element supported by the frame and defining a first filtering surface lying on a filtering plane;
- a cleaning device for cleaning the first filtering surface including a wiper to wipe the first filtering surface said wiper being connected to a portion of said frame by means of a connection, said connection allowing a portion of the wiper to perform a roto-translational movement with respect to said frame in a plane substantially parallel to

said filtering plane during wiping,

- wherein said connection between said wiper and said frame includes a guide on the frame to guide a corresponding pin in said cleaning device in said roto-translational movement, or a guide in said cleaning device to guide a corresponding pin in said frame in said roto-translational movement, wherein said guide includes a rectilinear portion and a curvilinear portion the method comprising:
 - roto-translating said wiper with respect to said frame in a plane substantially parallel to said filtering plane in order to wipe said first filtering surface, as allowed by said connection.

[0015] In the following, when relative terms such as "front", "back", "rear", "lateral", "top", "bottom", etc. are used, they refer to the normal operational position of the laundry dryer when in use, e.g. located on a floor which usually is (substantially) horizontal. Thus, a horizontal plane is a plane parallel to the floor where the dryer is located. The location of a loading/unloading door of the laundry dryer, usually used to load and unload laundry from the dryer and generally coupled to a front wall of the casing in order to access the drum, defines the "front" of the dryer itself. Given the horizontal plane on which the laundry is located, "top" and "bottom" - as their normal common meaning - refer to the position of an object along a vertical axis. The vertical axis is defined as an axis perpendicular to the horizontal plane, such as the floor.

[0016] With the terms "laundry dryer" or "dryer" both an appliance having drying functions only, or a combined washer-dryer appliance, which is capable of performing both washing and drying cycles, are meant.

[0017] The dryer includes a casing or bearing structure, comprising preferably a basement, a front wall and a rear wall. The front and rear wall are preferably mounted on the basement, which is standing on a surface, such as the floor. The front wall may advantageously be provided with a through opening, at which a door is mounted to access the interior of the casing in order to locate or remove the laundry. Lateral walls connect the front and the rear wall to form, together with a top wall, a closed volume.

[0018] The basement rests on a floor and its vertical distance from the floor may be advantageously adjusted through regulating feet provided on the lower surface of the basement facing the floor.

[0019] The basement defines in turn a plinth region of the dryer. The plinth has a plinth inner volume, that is, the volume inside the casing delimited by the casing walls and located at the plinth region. The plinth may be perforated, or including a perforated element, so as to enable cooling air to be taken in and expelled, if needed. The plinth can be provided with portions for supporting operational components of the laundry dryer that are needed for carrying on a laundry drying process on laundry, such

as air conduits, motors and so on.

[0020] The laundry dryer of the invention includes a drum, in which the load, e.g. clothes or other laundry, to be dried is placed. The drum further preferably includes a mantle defining a front end and a rear end, the front end facing the front wall of the casing, and preferably the opening therein realized and closed by the door for loading and unloading the laundry, and a rear end facing the rear wall of the casing.

[0021] The drum of the dryer of the invention may be closed drum, i.e. the rear end is closed by a back wall or a flange, which rotates as a single piece together with the mantle when the drum is driven into rotation. Alternatively, it can be an open drum, where the closure of the rear end of the drum is given by a back wall which is stationary, that is, it does not rotate with the drum and it is preferably integral to the casing. Thus, the back wall of the drum can be either attached to the drum and rotate with the same, or attached to the casing and be still.

[0022] Within the casing, the drum is rotatably mounted for rotating, preferably according to a substantially horizontal or tilted rotation axis. For example, at least one drum support assembly for rotatably supporting the drum in its rotation around this given rotation axis is provided for within the casing.

[0023] The drum is fluidly connected to a duct defining a flow passage for process air exiting the drum. Indeed, relatively dry and warm process air flows on the laundry located in the drum so as to dry the same. The then humid cooler process air needs to be removed from the drum so that, for example, additional dry air can flow in.

[0024] The drum is part of a process air circuit, in particular a closed-loop circuit in case of a condensed dryer or an open circuit in case of a vented dryer, which in both cases includes a process air duct for channelling a stream of process air to dry the load. The process air duct may be connected with its two opposite ends to the drum. In this embodiment, hot dry air is fed into the drum, flowing over the laundry, and the resulting humid (and to a lower temperature cooled down) air exits the same. In case of a closed-loop drying air circuit, the humid air stream, rich in water vapour, is then fed into a humidity removal element and/or a hot air generator, such as a heat exchanger. The resulting cool dry air is then heated up before re-entering again in the drying chamber by means of a hot drying air generator, which can be for example a condenser of the heat pump system or an air/air exchanger, and the whole loop is repeated till the end of the drying cycle. Furthermore, the hot drying air generator may comprise an electrical or gas powered heating device. In a vented dryer, ambient air is taken into the dryer via an inlet duct, such air is heated up by a hot drying air generator, such as condenser of a heat pump system and/or an electrical or gas powered heating device, before entering the drum. Heated air flowing through and on humid laundry contained in the drum, removes humidity from laundry. Humid air stream exiting the drum may be optionally dehumidified by an evaporator of a heat pump

system, or an air-air type heat exchanger as explained above, before being exhausted outside the dryer.

[0025] Preferably, the hot or drying air generator is located in a basement of the casing.

[0026] In an embodiment, the duct is guiding the process air from the drum. A section of the duct, preferably a front duct section, guides the process air coming out of the drum downwards towards the basement of the laundry dryer and deflects the process air flow from the downward direction to a horizontal direction. 'Downward' direction may include flow path sections that are vertical and/or (partially) inclined to the vertical or even partially horizontal - however with the net effect that in the channel section unit the process air is guided downward from a higher to a lower altitude level (in the normal operation orientation of the laundry treatment apparatus). Preferably the process air deflected to the horizontal flow direction is either vented to the outside or enters into the hot or drying air generator. In this latter case, then the process air then re-enters the drum, via for example a rear wall of the same, which can be perforated.

[0027] Further, preferably, the process air duct may include a fan to blow the process air flowing into the process air duct.

[0028] The process air duct is also provided with a filter assembly, which is arranged along the duct, before the vent in case of a vented dryer, so that fluff is not disposed to the outside, or upstream the hot or drying generator, in case of a condensed dryer, to prevent the fluff and/or lint particles from reaching and clogging up the generator and/or the fan.

[0029] Any filter assembly can be used in the present invention, as long as it includes a first filtering surface supported by a frame.

[0030] In the same way, the first filtering surface may have any shape, it may for example include a mesh or net having a proper size to block the typical fluff or particles generated by the laundry. As an example, the filter assembly may include a flat first filtering surface having a square shape. The filtering surface may be substantially vertical. Alternatively, the filtering surface may be tilted with respect to a vertical plane, or more than a filtering surface may be present. Further, the frame defines an inner frame volume. For example, the frame may have a box-like shape the walls of which surround an inner volume. The walls may be open or closed.

[0031] Alternatively, the filter assembly may include a substantially wedge-shaped filtering cartridge, which can be for example fitted in removable manner into an air-filtering cartridge seat realized on the annular frame that delimits the laundry loading/unloading opening on the front wall of the cabinet so as to cover/close the whole seat. In this case, the filtering surface may be tilted with respect to a vertical plane due to the wedge-shape of the cartridge.

[0032] Further, the filter assembly includes a cleaning device apt to clean the first filtering surface, where, as mentioned, fluff, particles, dust and other material may

be present, filtered from the process air leaving the drum and entering the duct. This material is filtered by the first filtering surface of the filter assembly, which is preferably properly dimensioned and positioned into the duct so that substantially the whole dimension in cross section of the duct is covered by the filtering surface. In this way, most of the foreign material present in the process air is removed by the first filtering surface.

[0033] Due to the filtering action, the first filtering surface becomes with time covered by the filtered material which has been removed from the process air flowing in the duct. In order to maintain efficiency of the dryer, the collected material on the filtering surface needs to be periodically removed.

[0034] The means to remove such material from the first filtering surface includes in the present invention the cleaning device, which comprises a wiper to wipe the first filtering surface. The wiper is connected to the frame in such a way that the movements performed by the wiper are roto-translations.

[0035] Roto - translations are rigid transformations. A rigid transformation is formally defined as a transformation that, when acting on any vector $\mathbf{v}$, produces a transformed vector $T(\mathbf{v})$ of the form

$$T(\mathbf{v}) = R \mathbf{v} + \mathbf{t}$$

where $R^T = R^{-1}$ (i.e., R is an orthogonal transformation), and $\mathbf{t}$ is a vector giving the translation of the origin.

[0036] A proper rigid transformation has, in addition, $\det(R) = 1$

which means that R does not produce a reflection, and hence it represents a rotation (an orientation-preserving orthogonal transformation).

[0037] Therefore, a roto-translation includes a translation AND a rotation which may take places in two different time intervals, or a combined translation and rotations which take place during the same time interval.

[0038] The vector $\mathbf{V}$ onto which the transformation is applicable, that is, the vector $\mathbf{v}$ which performs the roto-translation is a portion of the wiper, which is rigid, or it may even be the whole wiper, if the latter is a rigid element (that is, an element which does not bend or fold, but that it moves as a single unit).

[0039] The movements that the wiper performs are roto-translation in a plane which is substantially parallel to the filtering plane, and more preferably are realized on the same filtering plane. The translation and rotation which the wiper performs in its wiping movement are therefore contained in the same plane. Thus the end point of the movements lies on the same plane as the initial point and the whole movement lies on the same plane. Preferably, points of the wiper remain in the same plane for the whole transformation.

[0040] In the present context, only complete roto-translation are considered, that is, the wiper does not perform a movement consisting in translations ONLY or rotations

ONLY during the wiping movement. Both rotation(s) and translation(s) are present in the wiping movement of the present invention.

[0041] Further, the roto-translating movement performed by the wiper during the wiping action may include a single rotation, a single translation, or a combination of more rotation with one or more translations, and vice-versa.

[0042] Roto-translating movements of the wiper result in movements to wipe the first filtering surface. The wiping takes place due to the contact between the wiper and the first filtering surface. Such contact can be a friction contact, that is, preferably scratching, scraping or brushing of the first filtering surface takes place during the wiping movement.

[0043] To achieve this wiping movement, the wiper is connected to the frame. The movement is preferably manually triggered, that is, preferably the user grabs a portion of the wiper, for example one of its ends, and moves it, triggering a consequent movement of the whole wiper. Due to the existing connection between the wiper and the frame, the movement is forcedly a roto-translation.

[0044] In this way an easy wiping is performed. In particular an easy wiping of any shape of the first filtering surface is possible. The first filtering surface, although lying substantially on a plane, may have any area. The border of the first filtering surface may also be very irregular or complex due to the space and volume constraints present in the duct where the filter is positioned. A complex geometrical shape of the first filtering surface could cause problem in the cleaning of the same, because some areas of the surface might become difficult to reach. However in a relatively "complex" movement, which at the same is easy to achieve if forced by a connection, such on a roto-translation, the wiper may reach all areas of the first filtering surface, because combining translations and rotations in the same plane allows to reach more or less a whole area regardless of its boundaries' structure.

[0045] A proper cleaning of first filtering surface having any desired shape is therefore possible.

[0046] The invention, in any of the above mentioned aspects, may include one or more of the following characteristics, alternatively or in combination.

[0047] Preferably, said frame includes an upper portion and a lower portion, and said wiper includes a first end, wherein said first end is located at said lower portion before said roto-translational movement, and wherein, at the end of the roto-translational movement, said first end is located at said upper portion of said frame.

[0048] One end of the wiper, in the wiping movement, roto - translates so that it starts from a lower position, at the lower portion of the frame, and it ends, at the end of the wiping movement, an upper position, at the upper portion of the frame, spanning the whole first filtering surface.

[0049] Preferably, said roto-translational movement

with respect to said frame includes a first translational movement temporally followed and/or preceded by a second rotational movement.

[0050] As mentioned, the roto-translation performed by the wiper may include two temporally separated movements: a translation followed by a rotation or a rotation followed by a translation. More than one translation or one rotation may be performed in a row.

[0051] More preferably, said roto-translational movement with respect to said frame consists of a first translational movement temporally followed and/or preceded by a second rotational movement.

[0052] That is to say that the wiping movement of the wiper is a series of translations and rotations one followed by the other and there is no translation and rotation movements performed at the same time.

[0053] According to the invention said connection between said wiper and said frame includes a guide on the frame to guide a corresponding pin in said cleaning device in said roto-translational movement, or a guide in said cleaning device to guide a corresponding pin in said frame in said roto-translational movement.

[0054] The connection between wiper and frame which allows the wiper to perform roto-translating movements preferably includes a combination of a guide and a pin. The geometrical shape of the guide is such that, when the pin slides into it, the wiper performs a roto-translation due to the guide geometrical constraints.

[0055] Said guide includes a rectilinear portion and a curvilinear portion.

[0056] In this way, when the pin is sliding into the rectilinear portion, a translation can be performed, while when the pin is sliding in the curvilinear portion, a rotation or a roto-translation can be performed.

[0057] Preferably, said connection between said wiper and said frame is located at a lower portion of the frame. For example, a guide is positioned along the lower edge of the frame so that the pin of the wiper can slide therein and the whole filtering surface of the frame can be wiped.

[0058] Preferably, said connection includes a cam profile located in one of said wiper and frame and a pin located in the other of said wiper and frame, so as to allow roto-translational of said wiper with respect to said frame. More preferably, said connection includes a groove on said frame and a pin on one end of said wiper, so as to allow roto-translational movements of said wiper with respect to said frame.

[0059] The connection should preferably allow both rotational and translational movements of the wiper with respect to the frame. A cam allows this type of movements and it is easy to realize.

[0060] Preferably, said wiper includes a bar-like element having a first and a second end, said second end being connected to a lower portion of said frame.

[0061] The shape of the wiper is preferably simple to fabricate and at the same time allows an easy cleaning of the filtering surface. The wiper can be for example bar-shaped so that its lateral edge may rub onto the filtering

surface to wipe the same and remove fluff or lint.

[0062] Preferably, said second end includes a pin as part of said connection between said wiper and said frame. Preferably, the connection between the wiper and the frame takes place at the second end of the wiper, so that the first end can be handled by the user to actuate, for example move, the wiper.

[0063] Preferably, said filter assembly includes a second filtering surface facing the first filtering surface, wherein said wiper is positioned between said first and second filtering surfaces so as to wipe filtered material attached to said first and/or second filtering surfaces. More preferably, said wiper includes a first wiping element apt to contact and wipe said first filtering surface during said roto-translational movement and a second wiping element apt to contact and wipe said second filtering surface during said roto-translational movement.

[0064] In an embodiment, the filter assembly includes two filtering surfaces, for example positioned one in front of the other to define the wiper seat. The wiper portion is thus preferably positioned within the wiper seat, that is, between the two filtering surfaces. The wiping portion may therefore include a first and a second wiping element in order to wipe both surfaces during the wiping movements.

[0065] Even more preferably, the roto-translational movement of said first wiping element is identical to the roto-translational movement of said second wiping element.

[0066] In case the two wiping portions perform the same movement - while moved - on the first and the second surface, in order to strengthen their connection, a connector may be positioned between the first and the second wiping elements. The connector keeps the two wiping elements firmly fixed one to the other. In order not to disturb the flow of process air, preferably the connector is air permeable, so that the flow of process air flowing through the duct can pass the connector without being blocked by it. The same movement is possible for example if the first and the second wiping element are integral one to the other, being part of the same physical object.

[0067] Alternatively, said first wiping elements perform translational movements only and said second wiping element performs rotational movements only. The wiper may include different elements, not only a single one. The wiper therefore may include one element that performs only translations and a different elements that performs only rotations. Both elements are used to wipe the first and the second filtering surface.

[0068] Preferably, said wiper includes a connector to connect the first and the second wiping elements, said connector being air-permeable in a given direction.

[0069] The fact that the connector is air permeable allows a proper flow of air through the filter assembly.

[0070] More preferably, each of said first and second wiping elements defines a first and a second end, respectively, and wherein said connector includes any of:

- a wall with perforations connecting the first and second wiping elements;
- a plurality of ribs connecting said first and said second elements;
- a first and a second crosspiece connecting said first and second wiping elements at their respective first and second ends.

[0071] In order to realize a connector which is air permeable, several possibilities arise. For example, the connector may include perforations, or it may include ribs or crosspieces connecting the two wiping elements.

[0072] Preferably, said cleaning device includes a manually operable handle connected to the wiper to rotate the same.

[0073] The cleaning device of the invention preferably comprises a wiper to wipe the first filtering surface, and a manually operable handle connected to the wiper. When the manually operable handle is actuated, for example handled by a user, movements of the manually operable handle result in movements of the wiper, in particular to wipe the first filtering surface. The wiping takes place due to the contact between the wiping portion and the first filtering surface. Such contact can be a friction contact, that is, preferably scratching, scraping or brushing of the first filtering surface takes place during the wiping movement. Thus manual movements of a user gripping the manually operable handle result in wiping of the first filtering surface due to a consequent movement of the wiper.

[0074] Preferably, said first and second filtering surfaces facing each other define an inner volume, and said manually operable handle is movable from a resting position where it is inserted in said inner volume to an operative position during roto-translational movements where it protrudes at least partially from said inner volume.

[0075] The transition between the resting position to the operative position, which is the wiping position(s), is preferably performed by the user and his/her action on the manually operable handle, that is, on his/her handling of the manually operable handle. The manually operable handle is moved from one position to the other so that it is first "hidden" in the inner volume (hidden when there is no need of wiping) and then it protrudes from the latter (when wiping is needed).

[0076] In this way an easy wiping is performed, due to the fact that - when not used - the cleaning device is substantially "hidden" and the standard usage of the dryer does not change or require special adaptation. The wiping itself is very simple because in the wiping position the cleaning device is very easily handled by the user via the manually operable handle portion.

[0077] Preferably, said casing includes a seat to house said filter assembly, said seat being positioned downstream said drum in the flowing direction of the process

air and wherein said filter assembly is housed in said seat. More preferably, said casing includes a loading/unloading aperture to allow access to the drum and a door to close said aperture, an inlet of said seat being formed on a rim of said aperture.

[0078] Often, filter assemblies are positioned in a seat which opens at the loading/unloading aperture of the dryer. This position is easily accessible by a user, because the same operations to load or unload the dryer have to be performed in order to access the filter assembly. The filter assembly therefore can have parts which are standard in the field of filter assemblies and only the wiper has to be created to be applied to the filter assembly.

[0079] Preferably, said manually operable handle is movable from a resting position where it is inserted in said seat to an operative position during translational and/or rotational movement where it protrudes at least partially from said seat.

[0080] Due to the fact that the seat is realized at the loading/unloading aperture of the dryer, a manually operable handle that stuck out or protruded from the seat constantly, would hinder the standard loading/unloading operations of the dryer. For this reason, when there is no wiping of the filter, the manually operable handle is preferably "hidden" in the seat.

[0081] Preferably, said filter assembly comprises the first filtering surface and a non-filtering surface facing the first filtering surface.

[0082] In this configuration, the filter assembly is defining a seat for the wiper between the first filtering surface and the non filtering surface, but one surface only, the filtering one, is subjected to the flow of process air in order to filter it.

[0083] Preferably, said casing includes a swivelling door and said filter assembly is positioned behind said swivelling door. More preferably, said casing includes a swivelling door and said filter assembly is attached to said swivelling door.

[0084] The filter assembly can be attached to a door, used for example to access a portion of the dryer different from the drum (which is accessible opening the loading/unloading door). By opening this further door, the filter assembly can be for example removed, or the cleaning device actuated in order to wipe the filtering surface, by means of the manually operable handle portion.

[0085] Preferably, said casing includes a loading/unloading aperture to allow access to the drum and a door to close said aperture, said swivelling door being located below said loading/unloading aperture.

[0086] More preferably, said swivelling door is a plinth door giving access to a plinth portion of the casing or a door accessible by opening said plinth door.

[0087] The plinth of the dryer advantageously comprises an openable plinth door, typically hinged at one side to the remaining of the casing, for enabling the access to the inner region of the casing and, in particular, to the heat exchanger, if present, or in order to empty the condense water collection tank, for cleaning the condensing

system or generally for maintenance purposes.

[0088] Preferably, said swivelling door is hinged to a front wall of said casing defining a swivelling axis, said swivelling axis being substantially horizontal.

[0089] Preferably, said non-filtering surface is attached to said swivelling door.

[0090] When the filter assembly is located in the plinth region, it can be part of the duct itself. For example, the non-filtering surface may be a wall, or part of a wall, of the duct. The filter assembly is then used to guide and eventually bend the flow of process air.

[0091] Preferably, said filter assembly defines a portion of said duct for said process air. Even more preferably, said non - filtering surface is a portion of a delimiting wall of said duct.

[0092] The filter assembly therefore forms a part of the duct and guides the flow of process air in the duct.

[0093] Preferably, the dryer includes:

- a plinth as base portion of said casing, said plinth defining an inner plinth volume within said casing and said filter assembly being located in said inner plinth volume;
- an actuator, adapted to force said wiper to perform said roto-translational movement with respect to said frame when actuated, said actuator being located remote from said filter assembly;
- a connecting element, to connect the actuator and the wiper, so that movements of the actuator are transformed in the roto-translational movement of the wiper.

[0094] The wiper may be actuated remotely, that is, the wiper can be moved from a position which may be remote from the actual position of the wiper. For example, the filter assembly can be located in the plinth portion and an actuator - including the manually operable handle portion can be located in another region of the dryer. A connecting element connects the actuator and the wiper portion so that movements of the actuator stir movement of the wiper portion. In this way, the filter assembly can be placed in the most optimal position for filtering purposes, while the wiping can be performed from a position which can be comfortable for the user to reach.

[0095] Preferably, said actuator is adapted to perform linear translations.

[0096] The linear translations of the actuator become roto-translations of the wiper.

[0097] Preferably, said casing includes a loading/unloading aperture to allow access to the drum and a door to close said aperture, an inlet of said duct being formed on a rim of said aperture, and wherein said actuator is located in said inlet.

[0098] For example, the actuator may be located at the loading/unloading door so that, in order to operate it, the door has to be opened. The actuator cannot be operated

by accident, because during the normal functioning of the dryer, or when the drier is switched off, is hidden and protected by the loading/unloading door.

[0099] Preferably, said connecting element is realized in plastic and/or metal.

[0100] Preferably, said connecting element includes a bar.

[0101] The bar is connected to the wiper, preferably at the first end of the wiper, and can protrude more or less from the seat. In this way translating the bar a roto-translation of the wiper is possible. A joint is present between the bar forming the connecting element and the wiper.

[0102] Preferably, said step of roto-translating the wiper includes:

- translating the wiper for a distance on the first filtering surface within said inner volume so as to remove filtered material from the same; and
- rotating the wiper for a given angle on the first filtering surface so as to pull the filtered material out from the first filtering surface of the filter assembly.

[0103] The roto-translation is preferably a combination of a translation used to wipe a first portion of the filtering surface and a rotation so that the wiper moves the fluff or other material outside the filtering surface. For example, during the rotation, a second end of the wiper, which during the translation is located in a lower part of the filtering surface, may be moved at an upper part of the filtering surface, pushing the filtered material upwards.

[0104] Preferably, the step of manually roto-translating said wiper so that it wipes said first filtering surface.

[0105] The wiper is handled by hands, for example by a user, which actuate the wiper simply moving it by gripping it with his/her hands. A handle may be present to facilitate the gripping and consequent movement.

[0106] Preferably, the step of rotating the wiper is following and/or preceding the step of translating said wiper.

[0107] According to the invention, said step of roto-translating the wiper includes a step of:

- Moving the wiper along the guided connection between said wiper and said frame.

[0108] In order to roto-translate the wiper, a guide may be formed, for example in the frame, where an end of the wiper may slide. The roto translation takes place in the guided movement of the wiper within the guide, in particular with the movement of a pin located at one end of the wiper which is slidably inserted in the guide.

[0109] Further advantages of the present invention will be better understood with non-limiting reference to the appended drawings, where:

- Fig. 1 is a perspective view of a laundry dryer realized according to the present invention;
- Fig. 2 is a schematic view of an air process duct in the dryer of the invention;

- Fig. 3 is a perspective view of a laundry dryer of Fig. 1 in a partially disassembled configuration;
- Fig. 4 is a perspective view of the dryer of Fig. 1 and Fig. 3 where the a wall of the cabinet has been removed;
- Fig. 5 is a perspective view of the dryer of figure 1, 3 and 4;
- Fig. 6 is a perspective view of another embodiment of the dryer of the invention;
- Fig. 7 is a perspective view of the dryer of figure 6;
- Fig. 8 is a perspective view of the dryer of figure 6 or 7 including the first embodiment of the filter assembly in a first configuration;
- Fig. 9 is a perspective view of the dryer of figures 6 - 8 including the first embodiment of the filter assembly in a second configuration;
- Figs. 10 - 12 are perspective views of the first embodiment of the filter assembly included in the dryer of figures 6 — 9;
- Fig. 13 is a front view of the first embodiment of the filter assembly of figs. 10 - 12;
- Figs. 14 - 17 are perspective views of a second embodiment of the filter assembly in different configurations;
- Fig. 18 is a front view of a dryer including a third embodiment of the filter assembly in a partially exploded view and in a first configuration;
- Fig. 19 is a front view of the dryer of fig. 18 with the third embodiment of the filter assembly in a different configuration;
- Fig. 20 is a front view of the dryer of fig. 18 and fig. 19 with the third embodiment of the filter assembly in a further different configuration;
- Fig. 21 is a perspective rear view of a portion of the dryer of figure 20; and
- Fig. 22 is a perspective rear view of a portion of the dryer of fig. 19.

[0110] With initial reference to Fig. 1, a laundry dryer realized according to the present invention is globally indicated with 1.

[0111] Laundry dryer 1 comprises an outer box cabinet 2, preferably but not necessarily parallelepiped- shaped, and a drying chamber, such as a drum 3 (visible only in

figs. 3 - 4), for example having the shape of a hollow cylinder, for housing the laundry and in general the clothes and garments to be dried. The drum 3 is preferably rotatably fixed to the cabinet 2. Access to the drum 3 is achieved for example via a door 4, further referred also as the loading/unloading door, preferably hinged to cabinet 2, which can open and close a loading/unloading aperture 5 realized on the cabinet itself.

[0112] More in detail, cabinet 2 generally includes a front wall 20, a rear wall 21 and two sidewalls 25, all mounted on a basement 24. Preferably, the basement 24 is realized in plastic material. Preferably, basement 24 is molded via an injection molding process. Preferably, on the front wall 20, the door 4 is hinged so as to access the drum. The cabinet, with its walls, defines the volume of the laundry dryer 1. The basement 24 rests on a floor and its vertical distance from the floor may be advantageously adjusted through regulating feet (not shown) provided on the lower surface of the basement facing the floor. The dryer 1, and in particular basement 24, defines an horizontal plane (X,Y) which is substantially the plane of the ground on which the dryer 1 is situated, thus it is considered to be substantially horizontal, and a vertical direction Z perpendicular to the plane (X,Y).

[0113] Laundry dryer 1 also preferably comprises an electrical motor assembly (not shown) for rotating, on command, revolving drum 3 along its axis inside cabinet 2.

[0114] In the drum 3 of the laundry dryer 1, the load, e.g. clothes or other laundry, to be dried is placed via the door 4 provided on the front wall 20 of the cabinet. The drum preferably includes a mantle defining a front end 3a which is facing the front wall 20 of the casing and a rear end 3b facing the rear wall 21 of the casing (visible only in figure 15).

[0115] With now reference to the schematic view of figure 2, the drum 3 is fluidly connected to a duct defining a process air circuit 18 (depicted with a series of arrows in figure 2). The process air circuit 18 involves the circulation - first - of relatively dry and warm process air, inside the drum 3, on the laundry located therein so as do dry it and - second - of humid cooler process air, outside the drum 3. New dry and warm process air enters the drum 3 and the circuit is repeated until desired, preferably until the laundry is dried. When the humid process air exits the drum 3, it may be channeled in different ways, depending on the dryer type.

[0116] If the dryer 1 is a condensed dryer, the circuit 18 of the process air is a closed-loop circuit and the humid process air leaving the drum 3 is first dried by passing through a humidity removal element and/or a hot air generator, such as a heat exchanger 19. The resulting cool dry air is then heated up by means of the hot air generator 19 before re-entering again the drum 3. Preferably, the hot air generator is a heat pump and the humid air is first passing through an evaporator where the water contained in it is removed and then it is heated in a condenser before returning into the drum 3.

[0117] If the dryer 1 is a vented dryer, the circuit of the process air is open, i.e. ambient air is taken into the drier, heated up and entered into the drum 3 while the humid process air leaving the drum 3 is exhausted outside the dryer 1. This open circuit is not depicted in the drawings.

[0118] Preferably, the hot or drying air generator (e.g. heat pump 19) is located in a basement 24 of the cabinet.

[0119] The duct forming the process air circuit 18 includes a first portion 18a having an inlet 16 connected with the front end 3a of the drum. This first portion 18a receives the air coming from the drum 3. The inlet 16 of the first portion 18a of the duct is located preferably at a surface 17 contouring a rim of loading/unloading aperture 5, as visible in fig. 3. Further, preferably, this first portion 18a of the duct is substantially vertical, that is, the process air flowing within the first portion 18a has the longest component of motion along a vertical axis. The process air coming from the drum 3 thus, flowing substantially horizontally, or having a motion with a longest horizontal component, needs to turn by substantially 90° at the loading/unloading aperture 5 so that it can flow within the first portion 18a of the duct via inlet 16. This situation is schematically depicted in fig. 2.

[0120] Further, the first portion 18a of the duct extends from the inlet 16 into the basement 24. The duct then preferably continues with a second portion 18b which extends in the basement 24 and runs substantially horizontally, or with a longer horizontal component, so that the process air, at the end of the first portion 18a, performs a further 90° bend to continue its flow.

[0121] The process air then either preferably passes through the rear end 3b into the interior side of the drum 3, so the circuit 18 is a closed loop circuit as depicted. There, the air absorbs moisture or humidity from the laundry and, thus, dries the laundry. Alternatively, the process air is directed outside the dryer 1 via a vent (not visible in the attached drawings).

[0122] The dryer 1 is adapted to provide circulation of air, preferably with variable temperature. The process air flow is preferably generated in a region below the basement, e.g. in the duct of the process air circuit 18, for example by means of a fan (not depicted in the drawings).

[0123] The duct defining the process air circuit 18 is also provided with a filter assembly, preferably situated in proximity of or at the front wall 20 of the cabinet 2, with the purpose of stopping the fluff and/or lint particles detached from the laundry during the drying process to reach undesired locations and flowing with the process air. For example, in a vented dryer, the filter assembly is situated upstream the vent such that the fluff and/or lint is stopped from reaching outside the dryer together with the humid process air leaving the drum 3 and being exhausted outside. In a condensed dryer, the filter assembly is situated upstream the hot or drying generator 19 for stopping the fluff and/or lint from reaching and clogging up said generator.

[0124] The duct 18 thus guides the process air leaving the drum 3 towards the filter assembly. The filter assembly

is preferably arranged in such a way that the process air passes there through, reaches the end of the first portion 18a of the duct and flows within the second portion 18b, and advantageously reaches the region below the basement, where it is again sucked in by the fan.

[0125] Preferably, the filter assembly is arranged below the drum 3.

[0126] In the dryer of figure 3 - 5, at the rim surface 17 of loading/unloading aperture 5, and more preferably at the inlet 16 of the conduit 18, a seat 8 is formed. The seat extends from the surface 17 into the conduit 18 and it preferably extends downwards into the basement 24.

[0127] In the seat 8, a first embodiment of the filter assembly 80 is positioned. The filter assembly 80 can be inserted in a removable manner inside the seat 8. The filter assembly 80 includes an inlet 41 which is positioned substantially at the inlet 16 of the conduit 18, e.g. flush or in very close proximity to the rim surface 17.

[0128] The filter assembly 80 is shown in enlarged view and detached from the dryer 1 in figures 14 - 17.

[0129] The filter assembly 80 includes a substantially wedge-shaped filtering cartridge. In detail, the filter assembly 80 includes a frame 31 which comprises a shell or cartridge 112. The shell 112 includes a first part 116 and a second part 118. The first part 116 and the second part 118 of the shell 112 are hinged to each other. For example, the two parts are connected via hinge 124.

[0130] The first part 116 and the second part 118 are both defining filtering surfaces. Preferably, the first and second parts are covered or coverable by a filtering net so as to form filtering surfaces. The filtering nets are not explicitly shown in Figs. 14 - 17. Each of the filtering nets extends within one plane.

[0131] For example, shell 112 includes two filtering surfaces, one per part. For example, the filtering surfaces may be formed by a perforated grid. One portion of the perforated grid may be an integrated part of the first part 116, forming a first filtering surface 32, while the other portion of the perforated grid may be an integrated part of the second part 118 forming a second filtering surface 32'. The portions of the perforated grid are arranged at the first and second outer parts 116 and 118, respectively, opposite to the outer hinge 124. In a closed state of the filter assembly 30', the two filtering surfaces 32, 32' are substantially parallel one to the other and facing each other. An inner volume 40 of the frame 31 is thus defined between the first and second part 116, 118.

[0132] Preferably, the shell 112 is positioned inside the seat 8 so that the first and second filtering surface 32, 32' are substantially vertical.

[0133] The frame 31 defines an upper part, including inlet 41, and a lower part 42, being substantially vertically oriented.

[0134] In total, the filter assembly 80 includes two filtering surfaces 32, 32'.

[0135] Further, the filter assembly 80 includes a cleaning device 33 apt to clean the first and the second filtering surface 32, 32' of fluff or other materials deposited on it.

The cleaning device 33 comprises a wiper 330 to wipe the first and second filtering surface 32, 32'.

[0136] Preferably, the wiper is made of plastic material.

[0137] The wiper 330 cleans the filtering surface by means of movement of the same, as detailed below.

[0138] The movements performed by the wiper 330 onto the first and second filtering surface 32, 32' of frame 31 are, in the first embodiment of the filter assembly 80, roto-translation movements, that is, the wiper 330 roto-translates onto the first and second filtering surface 32, 32' in order to remove fluff or other filtered material from it.

[0139] In this embodiment, the wiper 330 includes a rigid element, bar 331, which is inserted inside the frame 31. Preferably, bar 331 is a rigid element defining a longitudinal axis, being extended pronominally in one direction. Bar includes opposite axial ends 331a and 331b.

[0140] Shell 112 includes a guide or rail 15 which runs for a first rectilinear portion 15a on the bottom 41 of the frame, and for a second curvilinear portion 15b it extends from the first curvilinear portion 15a upwards running along a portion of a side of the frame 31.

[0141] The bar 331 is connected to shell 112 at rail 15. The end 331b of bar 331 is inserted in rail and its movement are limited because it is forced to remain inside rail 15.

[0142] The second end 331a of the bar 331 preferably includes a handle 338. Preferably handle 337 is either positioned at the inlet 41 of frame 31 or it protrudes from the same. Preferably, the size of handle 337 is such that the handle 337 cannot enter inside shell 112 when the shell 112 is closed. However, handle 338 can remain hidden inside inlet 41 of shell 112.

[0143] In an initial configuration, bar 331 is preferably disposed substantially vertically, having a length equal or slightly shorter than the height of the shell 112. In this configuration, bar 331 has its longitudinal axis substantially vertical and the handle 338 is located at the inlet 41 of the frame 31. This configuration is depicted in fig. 14.

[0144] Bar 331 is apt to be moved so that the end 331b runs into the whole length of rail 15, therefore scratching the first and second filtering surface 32, 32' to remove filtered material from the same. The bar 331 starts at the configuration of fig. 14, substantially vertical, and then it translates in a horizontal direction, passing through the configuration of figures 15 and 16, to end up at the curvilinear portion 15b of rail 15 where it rotates, as depicted in fig. 17.

[0145] The movement of the bar 331 is triggered by pulling handle 338, for example translating the same.

[0146] In order to properly clean the surfaces 32, 32', the bar 331 includes parallel opposite walls 335, 336, in contact with first and second filtering surfaces 32, 32', respectively, so that, when the wiper 330 roto-translates in shell 112, the walls 335, 336 scratch first and second filtering surfaces 32, 32'.

[0147] As mentioned above, wiper 330, in addition to bar 331, includes the handle 338. Handle 338 is preferably a cylindrical or spherical element.

[0148] The handle 338 can be moved between a first and a second configuration, shown in figure 14 (hidden configuration) and figures 15 - 17 (visible configuration). The second configuration is in reality a plurality of configurations angularly positioned between the hidden configuration which represents the starting of the wiping action, and the end of the wiping action.

[0149] In the hidden configuration, the wiper 330 is positioned vertically and the handle 338 is "hidden" within the inlet of frame 31, that is, at inlet 41. Handle and wiper are thus substantially completely hidden in frame 31 and thus in seat 8.

[0150] At the start of a wiping action, that is, at the start of a roto-translation of bar 331 moving the end 331b in rail 15, the handle 338 and bar 331 change position. The handle 338 protrudes from frame 31 and thus from seat 8. In this configuration therefore, where the axis of bar 331 may be tilted with respect to the vertical axis or still vertical, the handle 338 protrudes from frame 31 and seat 8. This protrusion continues till the bar 331 reaches the end of rail 15.

[0151] Therefore, during the whole wiping action, handle 338 protrudes from frame 31 and seat 8.

[0152] During roto-translation, the bar 331 with walls 335, 336, scratches first and second filtering surfaces 32, 32'. The removed fluff is pushed by the bar 331 so that it follows the bar 331 during its movement and thus when the bar 331 is at the end position, fluff is pulled out of frame 31.

[0153] The functioning of the dryer 1 is as follows.

[0154] During the drying cycles, the filter assembly 80 is positioned in the seat 8 and the bar extends substantially vertically on one side of the shell 112. Handle 338 is hidden at inlet 41 of the shell 112.

[0155] At the end of the drying cycle, the loading/unloading door 4 is opened and the seat 8 at the rim surface 17 is visible. The filter assembly 80 is reachable from the loading/unloading aperture 5. The handle 338 can be moved, that is, it can be for example translated.

[0156] Due to the constraint of rail 15, translation of handle 338 turn into roto-translations of the bar 331. In this way, the first and second filtering surfaces 32, 32' are cleaned by walls 335, 336 and filtered material deposited in them ends up at the upper part of frame 31, transported by bar 331.

[0157] This fluff can be removed by hand.

[0158] A different embodiment of the dryer, dryer 1', is now described with reference to figure 6 - 13. Characteristics identical to those of dryer 1 are indicated with the same reference number.

[0159] The basement 24 defines a plinth region 7 of the dryer 1'. The plinth region 7 defines a plinth inner volume, that is, the volume inside the cabinet 2 delimited by the cabinet walls and located at the plinth region 7. Preferably the plinth region 7 includes a perforated portion, for example it may include a perforated element 71 on the front wall 20, so as to enable cooling air to be taken in and/or expelled from/to the plinth inner volume,

if needed. The plinth region 7 can be provided with portions and/or elements and/or components for supporting operational components of the laundry dryer 1' that are needed for carrying on a laundry drying process on laundry, such as air conduits, motors and so on.

[0160] Preferably, the cabinet 2 includes a plinth door 60, such as a rotatable door, to access the plinth inner volume. Preferably, the plinth door 60 is hinged to the cabinet 2 and its rotation axis is substantially horizontal. The plinth door 60 is preferably hinged at the front door 20 of the cabinet 2.

[0161] Upon opening the plinth door 60, a further door 61 - called first door 61 - is present. This first door 61 is accessible only opening the plinth door 60. Preferably this further door 61 is also rotatable along an axis which is substantially horizontal. The first door 61 is situated behind the plinth door 60, such that the plinth 7 is accessible by opening both doors. Further, plinth door 60 and first door 61 are located substantially below the loading/unloading aperture 5 and door 4.

[0162] In the first portion 18a of duct 18, a filter assembly 90 is positioned. Filter assembly 90 is placed inside the plinth region 7.

[0163] In the example illustrated in the enclosed drawings of figs. 6 - 9, the filter assembly 90 is advantageously arranged below the drum 3. Preferably, the filter assembly 90 is contained for its majority within the plinth region 7. Further, the filter assembly 90 is arranged within the first portion 18a of the duct of the process air circuit 18, for example below the inlet 16 of the duct itself. The filter assembly 90 according to one embodiment of the invention is depicted in enlarged view in figs. 11 - 14 and includes a first filtering surface 32, in the present embodiment substantially flat, supported by a frame 31. Preferably, the filtering surface 32 is substantially vertical. The frame 31 is in this embodiment a box-like container which forms a part of the first portion 18a of the duct and the first filtering surface 32 is a side or wall of the box-like container. The box-like container 31 includes an inlet 41 for the process air, positioned on top of the frame, and surrounding walls which prevent the process air to leave the container with the exception of the wall having the first filtering surface 32. The filtering surface 32 is preferably substantially perpendicular to the inlet 41 of the box-like container. The process air therefore, entering the inlet 41 from above, is forced to perform a 90° turn to change direction from a downwards direction to a substantially horizontal direction and is apt to leave the box-like container via the filtering surface 32. The first filtering surface 32 separates the first portion 18a of the duct 18 and the second portion 18b of the duct, that is, the first filtering surface 32 puts in fluid communication the first portion 18a and second portion 18b of the duct 18.

[0164] Preferably, the inlet 41 is located at the top of the frame 31. A bottom part 42 is also defined, opposite to inlet 41. The bottom part 42 is not used as an outlet, on the contrary, the outlet from the filter assembly 90 is via the first filtering surface 32, as better detailed below.

[0165] The first filtering surface 32 may be in the form of a mesh or net having a proper size to block the typical fluff or particles generated by the laundry. The mesh or filter is not depicted in the drawing otherwise it would cover all other elements. Therefore, in the drawings, first filtering surface 32 appears "open", but it should be interpreted as covered by a net or a mesh, or any other structure apt to filter material flowing in the process air flowing in duct 18.

[0166] Preferably, the filtering surface 32 is positioned substantially vertically, or with a small tilt with respect to the vertical direction. The frame 31 thus defines an upper portion, which is the portion of the frame having the top most vertical position (i.e. the portion including the inlet 41).

[0167] In the filter assembly 90 of figs. 6 - 13 a single filtering surface 32 is present.

[0168] The frame 31 may also comprise a non-filtering surface 37 facing the first filtering surface 32. In this configuration, the frame 31 is defining an inner volume 40 between the first filtering surface 32 and the non-filtering surface 37, but one surface only, the filtering one, is subjected to the flow of process air in order to filter it. The non-filtering surface 37, in other words, in this embodiment, is a wall of the box-like container or frame 31 which is opposite and facing the first filtering surface 32 (which forms another wall of the box like container 31) and directs the flow of process air.

[0169] In this embodiment, the non-filtering surface 37 is attached to the first door 61. By opening this further first door 61, the filter assembly 90 can be, for example, rotated from a position where the first filtering surface is substantially vertical to a position where the first filtering surface is tilted with respect to a vertical plane. Further, rotation of the first door 61 causes rotation of the whole filtering assembly 90 which is attached to the door 61.

[0170] Frame 31 includes rail 15 positioned in the bottom part 42 for a rectilinear portion 15a and on one side of the frame 31 for the curvilinear portion 15b.

[0171] In this embodiment, therefore, the filtering surface 32 is substantially facing and even more preferably parallel to the first door 61 to which the non-filtering surface 37 is attached. Both first door 61 and filtering surface 32 are preferably vertical, that is, they define substantially vertical planes or planes only slightly tilted with respect to a vertical plane. Between the two surfaces, i.e. non filtering surface 37 and filtering surface 32, the inner volume 40 is defined. Inner volume 40 can be considered as a wiper seat, as detailed below.

[0172] In a non-depicted embodiment, the first door 61 is not attached to the non-filtering surface 37. The filter assembly 90 may still be rotatable, for example with a rotation axis also parallel to the horizontal axis around which the plinth door 60 and the first door 61 rotates, however the rotations of the doors 60, 61 and of the filter assembly 30 are independent. Therefore, in order to move into a position in which the first filtering surface is tilted with respect to a vertical plane, in this non depicted

embodiment the first door 61 is first rotated and then the filter assembly is rotated as well.

[0173] In all embodiments, rotation of the filter assembly, attached or not to the first door 61, implies that the filter assembly 90 reaches a tilted position where the inlet 41 of the frame is directed outwards, that is, the inlet 41 is facing the exterior of the cabinet 2.

[0174] Further, the filter assembly 90 includes a cleaning device 33 apt to clean the first filtering surface 32 of fluff or other materials deposited on it. The cleaning device 33 comprises wiper 330.

[0175] The wiper 330 of this embodiment is realized as the wiper of the first embodiment 80 and thus not further detailed. The wiper 330 is inserted in the inner volume 40 of the frame 31.

[0176] The movements performed by the wiper 330 onto the first filtering surface 32 of frame 31 are roto-translational, that is, the wiper 330 roto-translates onto the first filtering surface 32 in order to remove fluff or other filtered material from it.

[0177] The wiper 330 includes a rigid element, bar 331 and handle 338. The bar 331 is preferably disposed substantially vertically on one side of the filtering surface 32 at the beginning of the wiping action.

[0178] Bar 331 is apt to be roto-translated from one side to the other of rail 15, that is, end 331b runs the whole rail 15, therefore scratching the first filtering surface 32 to remove filtered material from the same. In Figs. 11 and 13, the bar 331 is shown vertically at the beginning of the wiping action. In Figs. 10 and 12, the bar 331 is shown during a wiping action, inclined with respect to the vertical axis.

[0179] In order to properly clean the surface 32, bar 331 includes parallel opposite walls 335, 336, in contact with first filtering surfaces 32, and non-filtering surface 37, so that, when the wiper 330 rotates, in frame 31, the wall 335 scratches first filtering surface.

[0180] The handle 338 can be moved between a first and a second configuration, shown in figure 11 (hidden configuration) and figures 10 and 12 (visible configuration).

[0181] In the hidden configuration, the wiper 330 is vertically positioned at one end of frame 31. In this configuration, the handle 338 is substantially preferably completely hidden in frame 31, inside inlet 41.

[0182] In the wiping, the handle protrudes from frame 31.

[0183] In order to perform a wiping action, the handle is then moved, translated, so that the bar 331 with walls 335, 336, scratches first filtering surfaces 32.

[0184] The roto-translation of bar 331 terminates when the bar 331 reaches - with end 331b, the end of rail 15 (i.e. the end of the curvilinear portion 15b).

[0185] The operation of the filter assembly 90 is as follows.

[0186] During the drying cycle, or outside a wiping action, the wiper 330 is positioned inside the frame 31, inserted in the inner volume 40. Bar 331 is vertically ar-

ranged at one side of frame 31. The whole assembly is located within the plinth inner volume and it forms a portion of the conduit 18. The first filtering surface 32 filters the flowing process air in circuit 18 and filtered material accumulates on it. The first filtering surface 32 is preferably substantially vertical of with a large vertical component. Handle 338 does not extend outside the frame 31 or volume 40 but it is completely contained therein.

[0187] In this configuration, inlet 16 of the conduit 18 and inlet 41 of the filter assembly 90 are one below the other, being part of the same conduit.

[0188] At the end of a drying cycle, or every time there is a need of cleaning the first filtering surface 32 of the filter assembly from the filtered material which has accumulated during the drying cycle, the plinth door 60 is opened. The opening takes place preferably with a rotation of the plinth door 60 around a horizontal axis. This configuration is shown in figure 8. Behind the plinth door 60, the first door 61 is present. Attached to the first door, the filter assembly 90 is located. Alternatively, the filter assembly is freely rotatable around a horizontal axis.

[0189] Opening the first door 61, that is, preferably rotating the same around a horizontal axis, removes the assembly 90 from the inner volume of the plinth 7 and the inlet 41 of the frame 31 is oriented outwards (see figure 8).

[0190] In order to wipe the first filtering surface 32, the wiper is actuated. The actuation is performed for example by hand. The handle 338 is translated so that the bar 331 starts the roto-translation onto the first filtering surface 32. This roto-translation causes a wiping of the first filtering surface 32.

[0191] The fluff and lint is thus transported to the inlet 41 by the bar 331 and there possibly removed, for example by the user.

[0192] A third embodiment of the filter assembly 90' is depicted in figures 19 - 22.

[0193] In this embodiment, characteristics identical to those of the second embodiment are referred with the same reference numerals.

[0194] Filter assembly 90' includes a frame 31 having the same characteristics as in the second embodiment.

[0195] Frame 31 has a box shape as in second embodiment of the filter assembly 90. The first filtering surface is preferably vertical and it is preferably one of the walls of the box defined by the frame 31. For other characteristics of frame 31 and filtering surface 32, reference is made to the second embodiment of the filter assembly 90.

[0196] Frame 31 includes a guide or rail 15 which runs for a first rectilinear portion 15a on the bottom 41 of the frame, and for a second curvilinear portion 15b it extends from the first curvilinear portion 15a upwards running along a portion of a side of the frame 31.

[0197] The filter assembly 90' further comprises a wiper 330 apt to wipe the first filtering surface 32. The wiper 330 includes a bar 331, substantially rectilinear, having a first and second ends 331a, 331b. The second end

331b of the bar 331 is inserted in the rail 15 so that it can be guided in movements by the rail 15 itself. The movements of the bar therefore are forced by the geometrical configuration of the rail. The wiper 330 therefore can only perform rotations or translations, that is, roto - translations, while being guided with its end 331b inside the rail. For example, the bar 331 can be translated, substantially with a horizontal direction of translation, while the end 331b slides inside the rectilinear portion of the rail 15a, and it then rotates when the end 331b is guided in the curvilinear portion 15b of rail 15.

[0198] For example, the end 331b of the bar 331 located in the rail 15 may include a pin (not depicted) or any other ending to provide a good slidable connection of the wiper in the rail.

[0199] Wiper 330 thus can be translated or rotated onto the first filtering surface 32, from a position in which the wiper 330 is substantially vertical, to a position where the wiper may be tilted with respect to a vertical axis. Preferably, the wiper 330 is long enough so that the whole first filtering surface 32 is wiped. Preferably, the length of the wiper (bar 331) is equal or slightly smaller than the height of the frame.

[0200] The configuration in which bar 331 is on one side of the frame 31 in a vertical position is depicted in figure 18 at the beginning of the rectilinear portion of rail 15. The configuration with the wiper is at the opposite side of filtering surface 32 at the end of the curvilinear portion of rail 15 is depicted in figure 20.

[0201] Further, the filter assembly 90' comprises an actuator 81. The actuator is positioned in seat 8 realized at the inlet 16 of duct 18. When not actuated, preferably, the actuator 81 remains completely contained within seat 8, realized at the rim surface 17 of the loading/unloading opening 5. When actuated, the actuator 81 protrudes from seat 8.

[0202] The actuator 81 includes a handle 84 having the form of a lump or a knob.

[0203] The actuator 81 is connected to the wiper 330 by means of a connector 82, including a rigid element 89 and a pivot point 87. The pivot point connects the free end 331a of the bar 331 not inserted in the rail 15 with an end of the rigid element 89. The rigid element connects the wiper 330 to the handle 84 so that movements of the handle 84 result in movements of the wiper 330 and more precisely translations of the handle 84 result in roto-translations of the wiper 330 due to the combination of rigid element 89 and pivot point 87.

[0204] The handle 84 is apt to translate within the inlet 16 of the duct 18, for example it is apt to translate horizontally within a guide rail 94 formed in the inlet 16.

[0205] The actuation of the actuator 81 includes the following movements. A first movement is a translation of the actuator 81, that is, translation of handle 84 within rail 94. Due to the connector 82, the wiper 330 is roto-translated. The bar 31 perform a translation while in the rectilinear portion of rail 15 and then a rotation in the curvilinear portion. A second movement takes place

when the handle 84 is brought back to the resting position. Translations of the actuator 81 thus results in roto-translations of the wiper 330.

[0206] The roto-translations of wiper 330, that is, not only translations of the wiper 330 in an horizontal direction, but also oscillations around pivot point 87 are due to constraints on the translational movements of the actuator 81. The actuator is preferably guided in its translation and therefore forces the wiper 330 to bend, i.e. bar 331 and rigid element 89 changes angle when the end 331b slides in the curvilinear portion of rail 15.

[0207] The operation of the filter assembly 90' is as follows.

[0208] When no wiping is needed, the actuator 81 is positioned in the seat 8 and does not protrude from the same (see figure 18). The wiper 330 is located on one side of the filtering surface 32 and it is substantially vertical. In this configuration door 61 cannot be opened. The filtering surface 32 is substantially vertical.

[0209] The loading/unloading door 4 is opened, for example to download laundry from the drum 3. At the end of the download, the user may actuate the actuator 81, translating handle 84 within the rail 94. By translating the actuator, the connector 82 attached to the wiper 330 and to the actuator 81 roto-translates the wiper 330 so that the bar 331 scrapes the first filtering surface 32 from one side to the other while the end 331b of bar 331 is guided in rail 15. The fluff is collected in the fluff collector 50 within the frame 31. The end position of the wiper 330 is reached when it rest on the other side of the frame. In this configuration, as depicted for example in figure 20, handle 84 protrudes from seat 8.

[0210] The wiper 330 may be totally extracted from the seat 8. In this configuration, the door 61 can be opened and the frame 31 may be reached. The opening of the first door 61 can take place also for example for maintenance purposes.

[0211] Further, before starting a new drying cycle, the wiper 330 needs to be reinserted in the frame 31.

[0212] The above configuration in which the wiper 330 is actuated by means of an actuator via a connector can be realized also using a filter assembly not attached to door 61.

Claims

1. A laundry dryer (1) comprising:

- a casing (2);
- a drum (3) rotatably supported in the casing;
- a duct (18a) defining a flow passage for process air exiting the drum (3);
- a filter assembly (90) positioned at least partially in the duct (18a) so as to filter process air flowing therein;
- said filter assembly (90) including:

- a frame (31);
 - a filtering element (80) supported by the frame (31) and defining a first filtering surface (32) lying on a filtering plane;
 - a cleaning device (33) for cleaning the first filtering surface (32), including a wiper (330) to wipe the first filtering surface (32), said wiper (330) being connected to a portion of said frame by means of a connection, said connection allowing a portion of the wiper (330) to perform a roto-translational movement with respect to said frame (31) in a plane substantially parallel to said filtering plane during wiping, wherein said connection between said wiper (330) and said frame (31) includes a guide (15) on the frame to guide a corresponding pin in said cleaning device (33) in said roto-translational movement, or a guide (15) in said cleaning device to guide a corresponding pin in said frame in said roto-translational movement
- characterised in that** said guide (15) includes a rectilinear portion and a curvilinear portion.
2. The laundry dryer according to claim 1, wherein said filter assembly (90) includes a second filtering surface (32') facing the first filtering surface (32), wherein said wiper (330) is positioned between said first and second filtering surfaces (32, 32') so as to wipe filtered material attached to said first and second filtering surfaces, said wiper (330) including a first wiping element (335) apt to contact and wipe said first filtering surface (32) during said roto-translational movement and a second wiping element (336) apt to contact and wipe said second filtering surface during said roto-translational movement, wherein said first wiping elements (335) perform translational movements only and said second wiping element (336) performs rotational movements only.
 3. The laundry dryer according to claim 1, wherein said filter assembly (90) includes a second filtering surface (32') facing the first filtering surface (32), wherein said wiper (330) is positioned between said first and second filtering surfaces (32, 32') so as to wipe filtered material attached to said first and second filtering surfaces, said wiper (330) including a first wiping element (335) apt to contact and wipe said first filtering surface (32) during said roto-translational movement and a second wiping element (336) apt to contact and wipe said second filtering surface (32') during said roto-translational movement, said wiper including a connector to connect the first and the second wiping elements (335, 336), said connector being air-permeable in a given direction.
 4. The laundry dryer according to claim 3, wherein each of said first and second wiping elements (335, 336) defines a first and a second end (331a, 331b), respectively, and wherein said connector includes any of:
 - a wall with perforations connecting the first and second wiping elements;
 - a plurality of ribs connecting said first and said second elements;
 - a first and a second crosspiece connecting said first and second wiping elements at their respective first and second ends.
 5. The laundry dryer according to any of the preceding claims, wherein said cleaning device (33) includes a manually operable handle (338) connected to the wiper (330) to roto-translate the same.
 6. The laundry dryer according to any of claims 2 - 4 and 5, wherein said first and second filtering surfaces (32, 32') facing each other define an inner volume, and said manually operable handle (338) is movable from a resting position where it is inserted in said inner volume to an operative position during roto-translational movements where it protrudes at least partially from said inner volume.
 7. The laundry dryer according to any of the preceding claims, wherein said casing (2) includes a seat (8) to house said filter assembly (90), said seat (8) being positioned downstream said drum (3) in the flowing direction of the process air and wherein said filter assembly (90) is housed in said seat (8).
 8. The laundry dryer according to claim 7, wherein said casing (2) includes a loading/unloading aperture (5) to allow access to the drum (3) and a door (4) to close said aperture (5), an inlet of said seat (8) being formed on a rim (17) of said aperture (5).
 9. The laundry dryer according to claim 7 or 8 and 5, wherein said manually operable handle (338) is movable from a resting position where it is inserted in said seat (8) to an operative position during translational and/or rotational movement where it protrudes at least partially from said seat (8).
 10. The laundry dryer according to any of the preceding claims, wherein said filter assembly (90) comprises the first filtering surface (32) and a non-filtering surface (37) facing the first filtering surface (32), wherein said casing (2) includes a swivelling door (60, 61) and said filter assembly (90) is positioned behind and attached to said swivelling door (60, 61), wherein said filter assembly (90) defines a portion of said duct for said process air and said non - filtering surface (37) is a portion of a delimiting wall of said duct.

11. The laundry dryer according to claim 10, wherein said swivelling door (60) is a plinth door giving access to a plinth portion (7) of the casing (2) or a door (61) accessible by opening said plinth door (60).

12. A method to clean a filter assembly in a laundry dryer, wherein the laundry dryer comprises:

- a casing (2);
- a drum (3) rotatably supported in the casing;
- a duct (18a) defining a flow passage for process air exiting the drum (3);
- a filter assembly (90) positioned at least partially in the duct (18a) so as to filter process air flowing therein; said filter assembly (90) including:

- a frame (31);
- a filtering element (80) supported by the frame (31) and defining a first filtering surface (32) lying on a filtering plane;
- a cleaning device (33) for cleaning the first filtering surface (32) including a wiper (330) to wipe the first filtering surface (32) said wiper (330) being connected to a portion of said frame by means of a connection, said connection allowing a portion of the wiper (330) to perform a roto-translational movement with respect to said frame (31) in a plane substantially parallel to said filtering plane during wiping,
- wherein said connection between said wiper (330) and said frame (31) includes a guide (15) on the frame to guide a corresponding pin in said cleaning device (33) in said roto-translational movement, or a guide (15) in said cleaning device (33) to guide a corresponding pin in said frame in said roto-translational movement, wherein said guide (15) includes a rectilinear portion and a curvilinear portion

the method comprising:

- roto-translating said wiper with respect to said frame in a plane substantially parallel to said filtering plane in order to wipe said first filtering surface, as allowed by said connection.

13. The method according to claim 12, wherein said step of roto-translating the wiper includes:

- translating the wiper (330) for a distance on the first filtering surface (32) within said inner volume so as to remove filtered material from the same; and
- rotating the wiper (330) for a given angle on the first filtering surface (32) so as to pull the filtered material out from the first filtering surface

(32) of the filter assembly (90).

14. The method according to claim 12 or 13, including the step of manually roto-translating said wiper (330) so that it wipes said first filtering surface (32).

15. The method according to claim 13, wherein the step of rotating the wiper (330) is following and/or preceding the step of translating said wiper (330).

Patentansprüche

1. Wäschetrockner (1), umfassend:

- ein Gehäuse (2),
- eine in dem Gehäuse drehgelagerte Trommel (3),
- einen Kanal (18a), der einen Strömungsdurchgang für aus der Trommel (3) austretende Verfahrensluft definiert,
- eine Filteranordnung (90), die mindestens teilweise in dem Kanal (18a) positioniert ist, um dort strömende Verfahrensluft zu filtern,
- wobei die Filteranordnung (90) Folgendes aufweist:

- einen Rahmen (31),
- ein von dem Rahmen (31) gestütztes Filterelement (80), das eine erste Filterfläche (32) definiert, die auf einer Filterebene liegt,
- eine Reinigungsvorrichtung (33) zum Reinigen der ersten Filterfläche (32), einschließlich eines Wischers (330) zum Wischen der ersten Filterfläche (32), wobei der Wischer (330) mittels einer Verbindung mit einem Abschnitt des Rahmens verbunden ist, wobei die Verbindung gestattet, dass ein Abschnitt des Wischers (330) während des Wischens eine Dreh-Translationsbewegung bezüglich des Rahmens (31) in einer im Wesentlichen parallel zu der Filterebene verlaufenden Ebene durchführt, wobei die Verbindung zwischen dem Wischer (330) und dem Rahmen (31) eine Führung (15) an dem Rahmen aufweist, um einen entsprechenden Stift in der Reinigungsvorrichtung (33) in der Dreh-Translationsbewegung zu führen, oder eine Führung (15) in der Reinigungsvorrichtung, um einen entsprechenden Stift in dem Rahmen in der Dreh-Translationsbewegung zu führen,
- dadurch gekennzeichnet, dass** die Führung (15) einen geradlinigen Abschnitt und einen krummlinigen Abschnitt aufweist.

2. Wäschetrockner nach Anspruch 1, wobei die Filter-

- anordnung (90) eine zweite Filterfläche (32') aufweist, die der ersten Filterfläche (32) zugewandt ist, wobei der Wischer (330) zwischen der ersten und der zweiten Filterfläche (32, 32') positioniert ist, um gefiltertes Material, das an der ersten und der zweiten Filterfläche hängt, wegzuwischen, wobei der Wischer (330) ein erstes Wischelement (335), das in der Lage ist, die erste Filterfläche (32) während der Dreh-Translationsbewegung zu kontaktieren und abzuwischen, und ein zweites Wischelement (336), das in der Lage ist, die zweite Filterfläche während der Dreh-Translationsbewegung zu kontaktieren und abzuwischen, aufweist, wobei die ersten Wischelemente (335) nur Translationsbewegungen durchführen und das zweite Wischelement (336) nur Drehbewegungen durchführt.
3. Wäschetrockner nach Anspruch 1, wobei die Filteranordnung (90) eine zweite Filterfläche (32') aufweist, die der ersten Filterfläche (32) zugewandt ist, wobei der Wischer (330) zwischen der ersten und der zweiten Filterfläche (32, 32') positioniert ist, um gefiltertes Material, das an der ersten und der zweiten Filterfläche hängt, wegzuwischen, wobei der Wischer (330) ein erstes Wischelement (335), das in der Lage ist, die erste Filterfläche (32) während der Dreh-Translationsbewegung zu kontaktieren und abzuwischen, und ein zweites Wischelement (336), das in der Lage ist, die zweite Filterfläche (32') während der Dreh-Translationsbewegung zu kontaktieren und abzuwischen, aufweist, wobei der Wischer einen Verbinder aufweist, um die ersten und zweiten Wischelemente (335, 336) zu verbinden, wobei der Verbinder in einer gegebenen Richtung luftdurchlässig ist.
4. Wäschetrockner nach Anspruch 3, wobei jedes der ersten und zweiten Wischelemente (335, 336) jeweils ein erstes und ein zweites Ende (331a, 331b) definiert und wobei der Verbinder beliebige von Folgenden aufweist:
- eine Wand mit Perforationen, die die ersten und zweiten Wischelemente verbindet,
 - eine Vielzahl von Rippen, die die ersten und zweiten Elemente verbinden,
 - ein erstes und ein zweites Querstück, die die ersten und zweiten Wischelemente an ihren jeweiligen ersten und zweiten Enden verbinden.
5. Wäschetrockner nach einem der vorhergehenden Ansprüche, wobei die Reinigungsvorrichtung (33) einen manuell betätigbaren Griff (338) aufweist, der mit dem Wischer (330) verbunden ist, um diesen zu dreh-translatieren.
6. Wäschetrockner nach einem der Ansprüche 2 - 4 und 5, wobei die erste und die zweite Filterfläche (32, 32'), die einander zugewandt sind, ein inneres Volumen definieren und der manuell betätigbare Griff (338) während Dreh-Translationsbewegungen aus einer Ruheposition, in der er in dem inneren Volumen eingeführt ist, in eine Betriebsposition, in der er mindestens teilweise aus dem inneren Volumen vorragt, beweglich ist.
7. Wäschetrockner nach einem der vorhergehenden Ansprüche, wobei das Gehäuse (2) einen Sitz (8) zur Unterbringung der Filteranordnung (90) aufweist, wobei der Sitz (8) in der Strömungsrichtung der Verfahrensluft stromabwärts von der Trommel (3) positioniert ist und wobei die Filteranordnung (90) in dem Sitz (8) untergebracht ist.
8. Wäschetrockner nach Anspruch 7, wobei das Gehäuse (2) eine Belade-/Entladeöffnung (5) aufweist, um Zugang zu der Trommel (3) zu gestatten, sowie eine Tür (4) zum Schließen der Öffnung (5), wobei ein Einlass des Sitzes (8) an einem Rand (17) der Öffnung (5) ausgebildet ist.
9. Wäschetrockner nach Anspruch 7 oder 8 und 5, wobei der manuell betätigbare Griff (338) während der Translations- und/oder Drehbewegung aus einer Ruheposition, in der er in dem Sitz (8) eingeführt ist, in eine Betriebsposition, in der er mindestens teilweise aus dem Sitz (8) vorragt, beweglich ist.
10. Wäschetrockner nach einem der vorhergehenden Ansprüche, wobei die Filteranordnung (90) eine erste Filterfläche (32) und eine nicht filternde Fläche (37) umfasst, die der ersten Filterfläche (32) zugewandt ist, wobei das Gehäuse (2) eine Schwenktür (60, 61) aufweist und die Filteranordnung (90) hinter der Schwenktür (60, 61) positioniert und an dieser angebracht ist, wobei die Filteranordnung (90) einen Abschnitt des Kanals für die Verfahrensluft definiert und die nicht filternde Fläche (37) ein Abschnitt einer Begrenzungswand des Kanals ist.
11. Wäschetrockner nach Anspruch 10, wobei die Schwenktür (60) eine Sockelschwenktür ist, die Zugang zu einem Sockelabschnitt (7) des Gehäuses (2) gewährt, oder eine Tür (61), die durch Öffnen der Sockeltür (60) zugänglich ist.
12. Verfahren zum Reinigen einer Filteranordnung in einem Wäschetrockner, wobei der Wäschetrockner Folgendes umfasst:
- ein Gehäuse (2),
 - eine in dem Gehäuse drehgelagerte Trommel (3),
 - einen Kanal (18a), der einen Strömungsdurchgang für aus der Trommel (3) austretende Verfahrensluft definiert,

• eine Filteranordnung (90), die mindestens teilweise in dem Kanal (18a) positioniert ist, um dort strömende Verfahrensluft zu filtern, wobei die Filteranordnung (90) Folgendes aufweist:

- o einen Rahmen (31),
- o ein von dem Rahmen (31) gestütztes Filterelement (80), das eine erste Filterfläche (32) definiert, die auf einer Filterebene liegt,
- o eine Reinigungsvorrichtung (33) zum Reinigen der ersten Filterfläche (32), einschließlich eines Wischers (330) zum Wischen der ersten Filterfläche (32), wobei der Wischer (330) mittels einer Verbindung mit einem Abschnitt des Rahmens verbunden ist, wobei die Verbindung gestattet, dass ein Abschnitt des Wischers (330) während des Wischens eine Dreh-Translationsbewegung bezüglich des Rahmens (31) in einer im Wesentlichen parallel zu der Filterebene verlaufenden Ebene durchführt,
- wobei die Verbindung zwischen dem Wischer (330) und dem Rahmen (31) eine Führung (15) an dem Rahmen aufweist, um einen entsprechenden Stift in der Reinigungsvorrichtung (33) in der Dreh-Translationsbewegung zu führen, oder eine Führung (15) in der Reinigungsvorrichtung (33), um einen entsprechenden Stift in dem Rahmen in der Dreh-Translationsbewegung zu führen, wobei die Führung (15) einen geradlinigen Abschnitt und einen krummlinigen Abschnitt aufweist,
- wobei das Verfahren Folgendes umfasst:

• Dreh-Translatieren des Wischers bezüglich des Rahmens in einer im Wesentlichen parallel zu der Filterebene verlaufenden Ebene, um die erste Filterfläche abzuwischen, wie durch die Verbindung gestattet.

13. Verfahren nach Anspruch 12, wobei der Schritt des Dreh-Translatierens des Wischers Folgendes aufweist:

- Translatieren des Wischers (330) über eine Strecke auf der ersten Filterfläche (32) in dem inneren Volumen, um gefiltertes Material von dieser zu entfernen, und
- Drehen des Wischers (330) in einem gegebenen Winkel auf der ersten Filterfläche (32), um das gefilterte Material aus der ersten Filterfläche (32) der Filteranordnung (90) herauszuziehen.

14. Verfahren nach Anspruch 12 oder 13, aufweisend den Schritt des manuellen Dreh-Translatierens des Wischers (330), so dass er die erste Filterfläche (32) abwischt.

15. Verfahren nach Anspruch 13, wobei der Schritt des Drehens des Wischers (330) dem Schritt des Translatierens des Wischers (330) folgt und/oder diesem vorhergeht.

Revendications

1. Sèche-linge (1) comprenant :

- un corps (2) ;
- un tambour (3) supporté de manière rotative dans le corps ;
- un conduit (18a) définissant un passage d'écoulement pour l'air de traitement sortant du tambour (3) ;
- un ensemble filtre (90) positionné au moins partiellement dans le conduit (18a) de sorte à filtrer l'air de traitement s'écoulant en son sein ;
- ledit ensemble filtre (90) comprenant :

- un cadre (31) ;
- un élément de filtration (80) supporté par le cadre (31) et définissant une première surface de filtration (32) reposant sur un plan de filtration ;
- un dispositif de nettoyage (33) pour nettoyer la première surface de filtration (32), comprenant un racleur (330) pour essuyer la première surface de filtration (32), ledit racleur (330) étant relié à une partie dudit cadre au moyen d'une liaison, ladite liaison permettant à une partie du racleur (330) d'effectuer un mouvement de rotation-translation par rapport audit cadre (31) dans un plan sensiblement parallèle audit plan de filtration pendant l'essuyage, ladite liaison entre ledit racleur (330) et ledit cadre (31) comprenant un guide (15) sur le cadre pour guider une broche correspondante dans ledit dispositif de nettoyage (33) dans ledit mouvement de rotation-translation, ou un guide (15) dans ledit dispositif de nettoyage pour guider une broche correspondante dans ledit cadre dans ledit mouvement de rotation-translation

caractérisé en ce que ledit guide (15) comprend une partie rectiligne et une partie curviligne.

2. Sèche-linge selon la revendication 1, ledit ensemble filtre (90) comprenant une seconde surface de filtration (32') faisant face à la première surface de filtration (32), ledit racleur (330) étant positionné entre lesdites première et seconde surfaces de filtration (32, 32') de sorte à essuyer le matériau filtré fixé auxdites première et seconde surfaces de filtration,

- ledit racleur (330) comprenant un premier élément d'essuyage (335) pouvant entrer en contact avec et essuyer ladite première surface de filtration (32) pendant ledit mouvement de rotation-translation et un second élément d'essuyage (336) pouvant entrer en contact avec et essuyer ladite seconde surface de filtration pendant ledit mouvement de rotation-translation, lesdits premiers éléments d'essuyage (335) effectuant des mouvements de translation uniquement et ledit second élément d'essuyage (336) effectuant des mouvements de rotation uniquement.
3. Sèche-linge selon la revendication 1, ledit ensemble filtre (90) comprenant une seconde surface de filtration (32') faisant face à la première surface de filtration (32), ledit racleur (330) étant positionné entre lesdites première et seconde surfaces de filtration (32, 32') de sorte à essuyer le matériau filtré fixé auxdites première et seconde surfaces de filtration, ledit racleur (330) comprenant un premier élément d'essuyage (335) pouvant entrer en contact avec et essuyer ladite première surface de filtration (32) pendant ledit mouvement de rotation-translation et un second élément d'essuyage (336) pouvant entrer en contact avec et essuyer ladite seconde surface de filtration (32') pendant ledit mouvement de rotation-translation, ledit racleur comprenant un raccord pour relier les premier et second éléments d'essuyage (335, 336), ledit raccord étant perméable à l'air dans une direction donnée.
 4. Sèche-linge selon la revendication 3, chacun desdits premier et second éléments d'essuyage (335, 336) définissant une première et une seconde extrémité (331a, 331b), respectivement, et ledit raccord comprenant l'un quelconque parmi :
 - une paroi avec des perforations reliant les premier et second éléments d'essuyage ;
 - une pluralité de nervures reliant ledit premier et ledit second élément ;
 - une première et une seconde traverse reliant lesdits premier et second éléments d'essuyage au niveau de leurs première et seconde extrémités respectives.
 5. Sèche-linge selon l'une quelconque des revendications précédentes, ledit dispositif de nettoyage (33) comprenant une poignée à commande manuelle (338) reliée au racleur (330) pour lui faire effectuer un mouvement de rotation-translation.
 6. Sèche-linge selon l'une quelconque des revendications 2 à 4 et 5, lesdites première et seconde surfaces de filtration (32, 32') se faisant face définissant un volume intérieur, et ladite poignée à commande manuelle (338) étant mobile d'une position de repos où elle est insérée dans ledit volume intérieur à une position opérationnelle lors de mouvements de rotation-translation où elle fait saillie au moins partiellement dudit volume intérieur.
 7. Sèche-linge selon l'une quelconque des revendications précédentes, ledit corps (2) comprenant un siège (8) pour loger ledit ensemble filtre (90), ledit siège (8) étant positionné en aval dudit tambour (3) dans la direction d'écoulement de l'air de traitement et ledit ensemble filtre (90) étant logé dans ledit siège (8).
 8. Sèche-linge selon la revendication 7, ledit corps (2) comprenant une ouverture de chargement/déchargement (5) pour permettre l'accès au tambour (3) et une porte (4) pour fermer ladite ouverture (5), une entrée dudit siège (8) étant formée sur un rebord (17) de ladite ouverture (5).
 9. Sèche-linge selon les revendications 7 ou 8 et 5, ladite poignée à commande manuelle (338) étant mobile d'une position de repos où elle est insérée dans ledit siège (8) à une position opérationnelle pendant un mouvement de translation et/ou de rotation où elle fait saillie au moins partiellement dudit siège (8).
 10. Sèche-linge selon l'une quelconque des revendications précédentes, ledit ensemble filtre (90) comprenant la première surface de filtration (32) et une surface non de filtration (37) faisant face à la première surface de filtration (32), ledit corps (2) comprenant une porte pivotante (60, 61) et ledit ensemble filtre (90) étant positionné derrière et fixé à ladite porte pivotante (60, 61), ledit ensemble filtre (90) définissant une partie dudit conduit pour ledit air de traitement et ladite surface non de filtration (37) étant une partie d'une paroi de délimitation dudit conduit.
 11. Sèche-linge selon la revendication 10, ladite porte pivotante (60) étant une porte de socle donnant accès à une partie de socle (7) du corps (2) ou une porte (61) accessible en ouvrant ladite porte de socle (60).
 12. Procédé pour nettoyer un ensemble filtre dans un sèche-linge, le sèche-linge comprenant :
 - un corps (2) ;
 - un tambour (3) supporté de manière rotative dans le corps ;
 - un conduit (18a) définissant un passage d'écoulement pour l'air de traitement sortant du tambour (3) ;
 - un ensemble filtre (90) positionné au moins partiellement dans le conduit (18a) de sorte à filtrer l'air de traitement s'écoulant en son sein ; ledit ensemble filtre (90) comprenant :

un cadre (31) ;
 un élément de filtration (80) supporté par le
 cadre (31) et définissant une première sur-
 face de filtration (32) reposant sur un plan
 de filtration ; 5
 un dispositif de nettoyage (33) pour nettoyer
 la première surface de filtration (32), com-
 prenant un racleur (330) pour essuyer la
 première surface de filtration (32), ledit ra-
 cleur (330) étant relié à une partie dudit ca- 10
 dre au moyen d'une liaison, ladite liaison
 permettant à une partie du racleur (330)
 d'effectuer un mouvement de rotation-
 translation par rapport audit cadre (31) dans
 un plan sensiblement parallèle audit plan 15
 de filtration pendant l'essuyage,
 ladite liaison entre ledit racleur (330) et ledit
 cadre (31) comprenant un guide (15) sur le
 cadre pour guider une broche correspon-
 dante dans ledit dispositif de nettoyage (33) 20
 dans ledit mouvement de rotation-transla-
 tion, ou un guide (15) dans ledit dispositif
 de nettoyage (33) pour guider une broche
 correspondante dans ledit cadre dans ledit 25
 mouvement de rotation-translation, ledit
 guide (15) comprenant une partie rectiligne
 et une partie curviligne

le procédé comprenant l'étape consistant à :
 faire effectuer un mouvement de rotation-trans- 30
 lation audit racleur par rapport audit cadre dans
 un plan sensiblement parallèle audit plan de fil-
 tration afin d'essuyer ladite première surface de
 filtration, comme le permet ladite liaison.

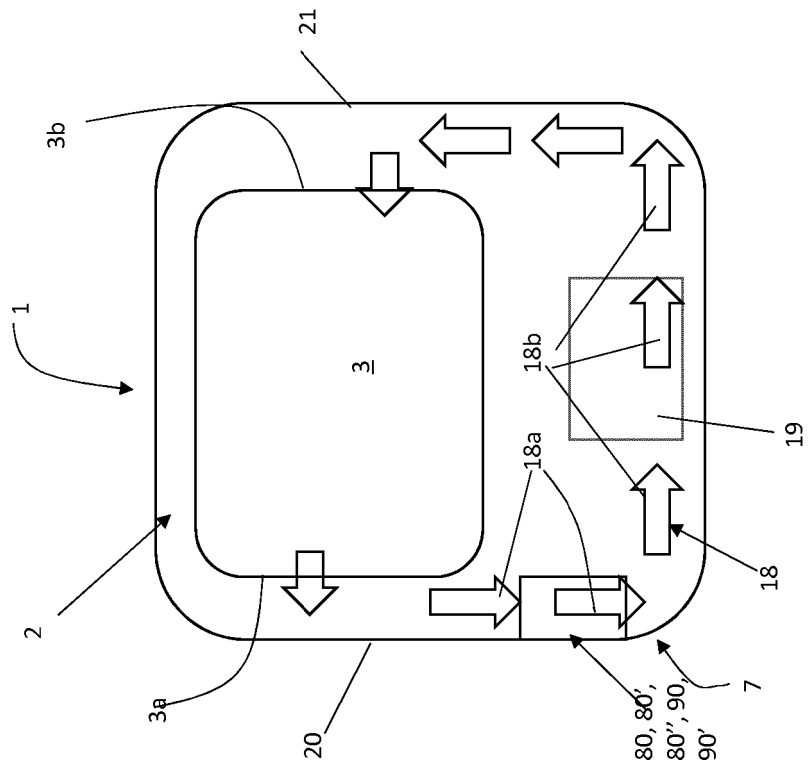
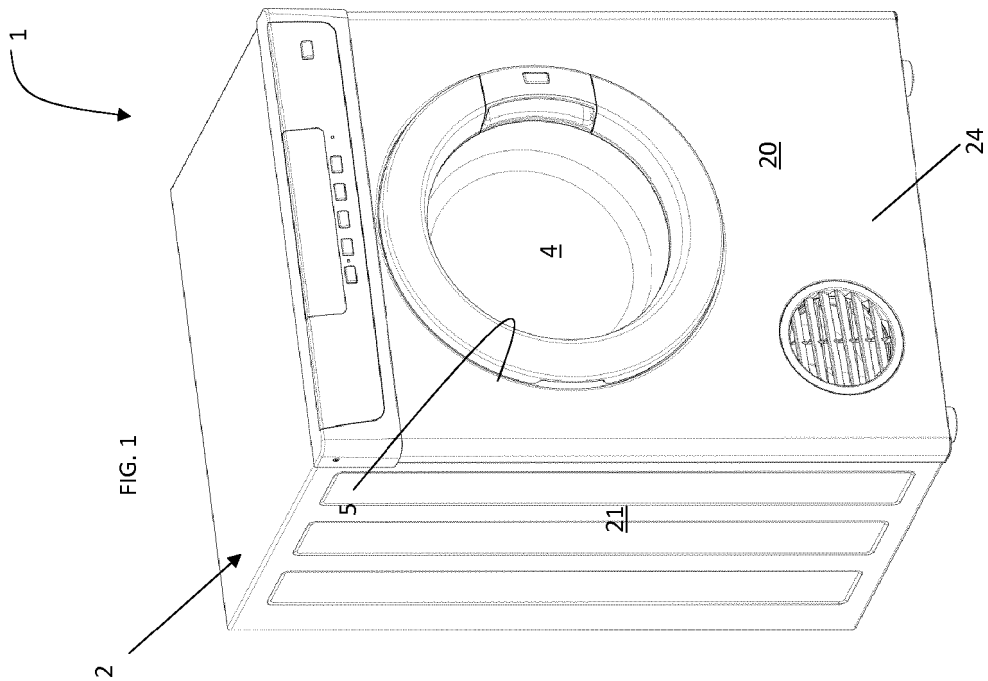
35

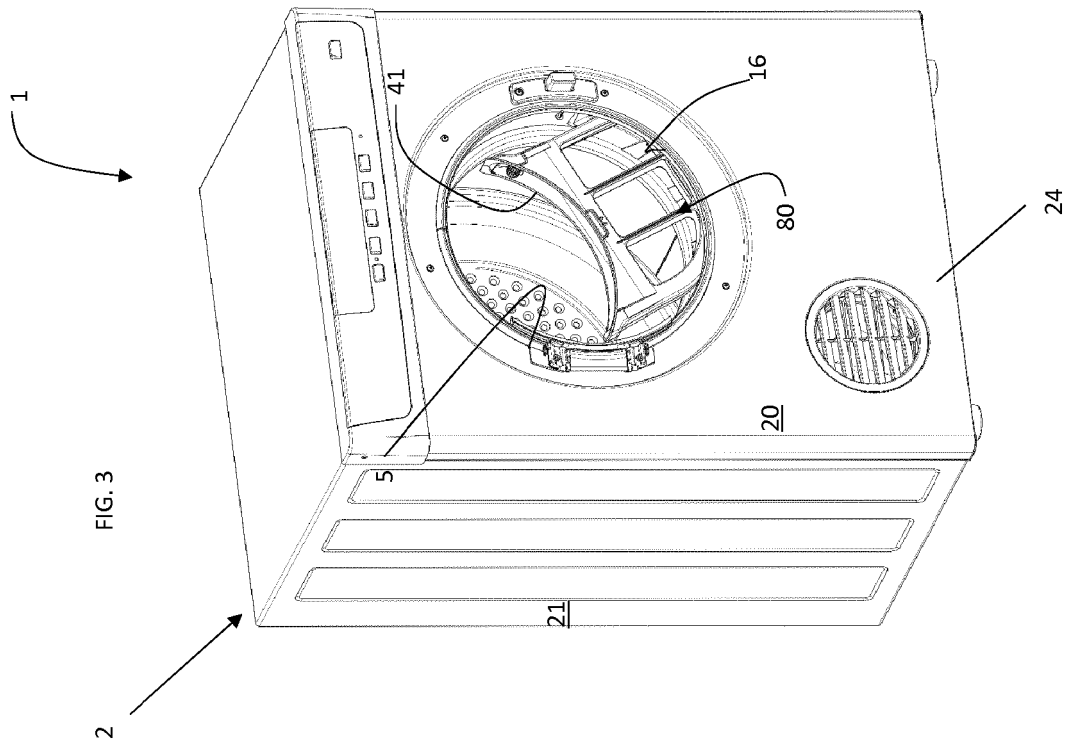
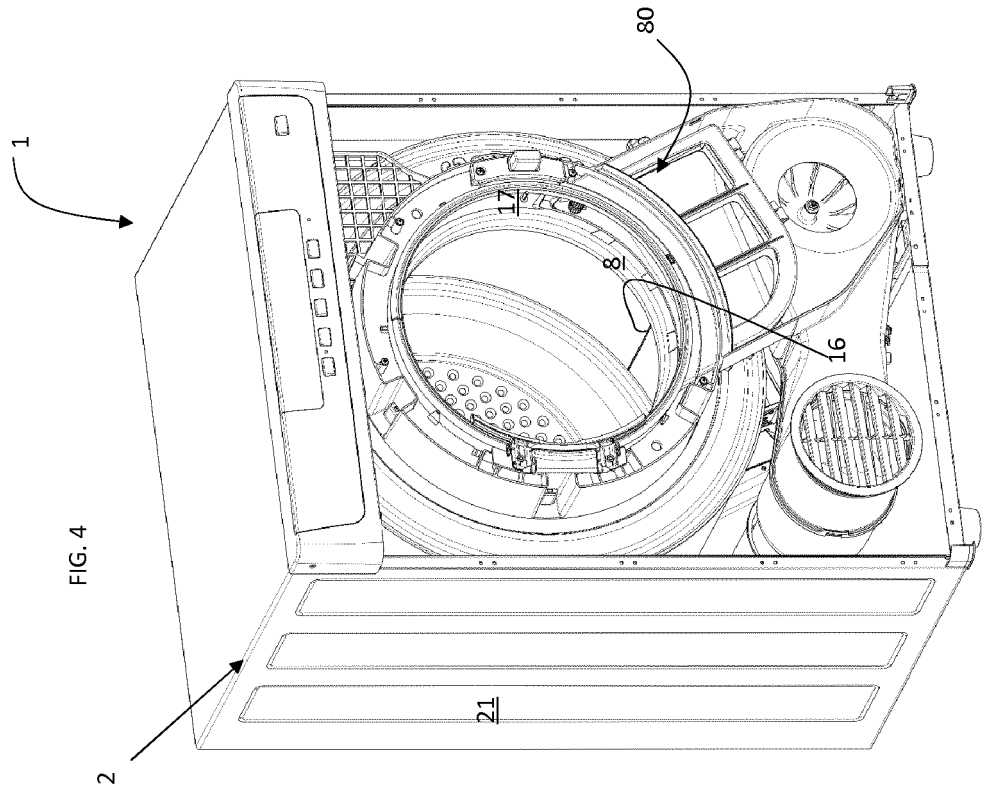
13. Procédé selon la revendication 12, ladite étape de
 rotation-translation du racleur comprenant les éta-
 pes consistant à :

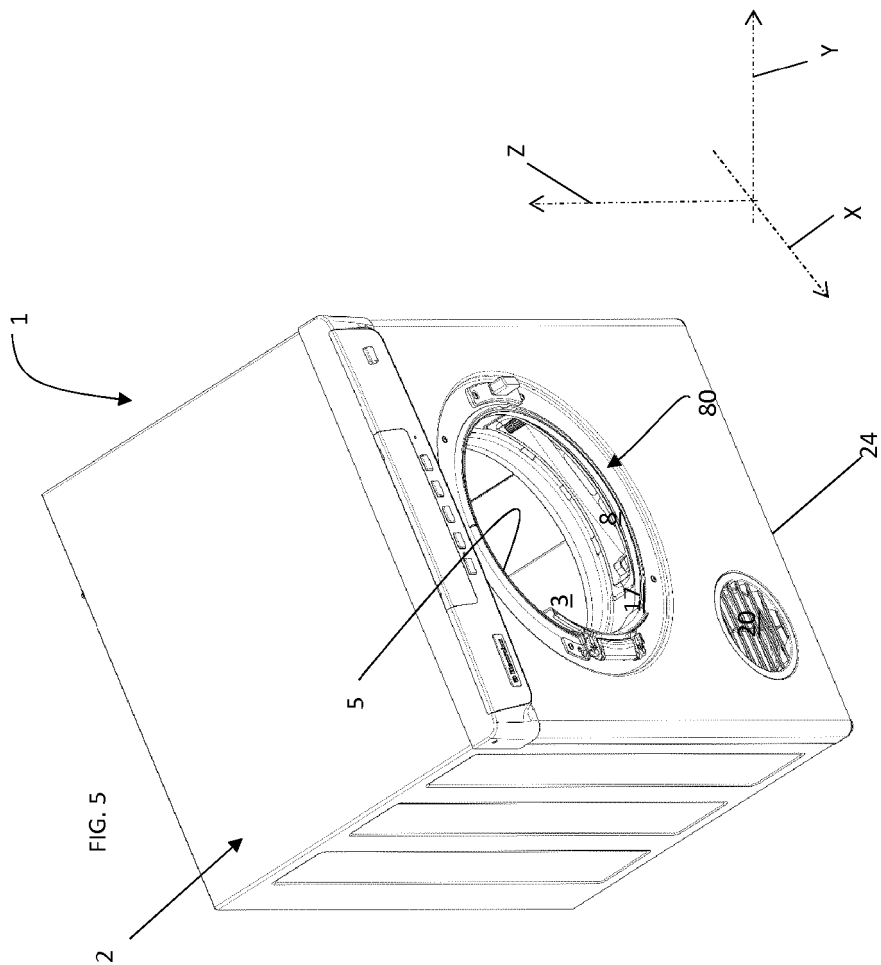
translater le racleur (330) sur une certaine dis- 40
 tance sur la première surface de filtration (32) à
 l'intérieur dudit volume intérieur de sorte à retirer
 le matériau filtré de celui-ci ; et
 faire tourner le racleur (330) sur un angle donné
 sur la première surface de filtration (32) de sorte 45
 à tirer le matériau filtré hors de la première sur-
 face de filtration (32) de l'ensemble filtre (90).

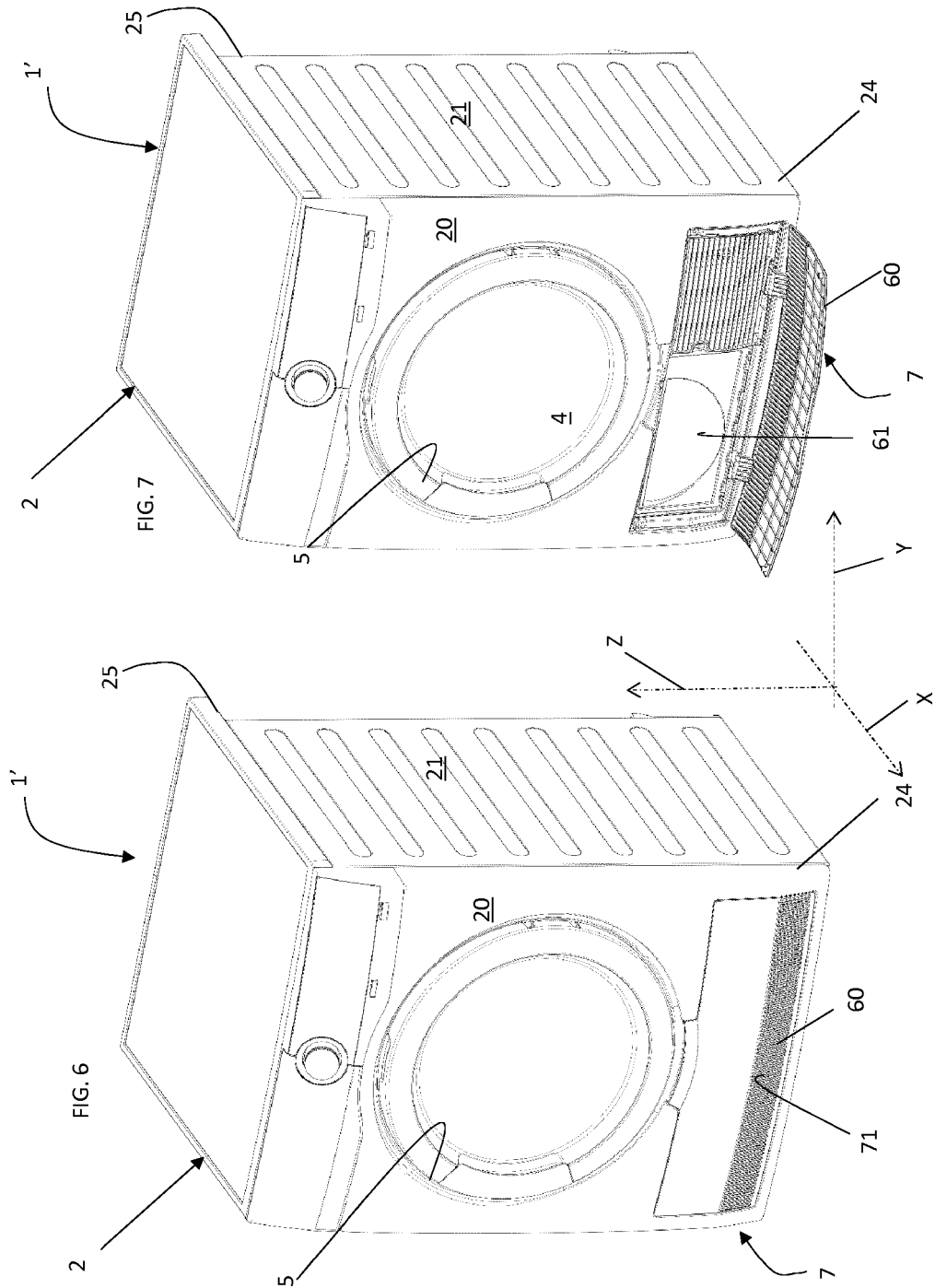
14. Procédé selon la revendication 12 ou 13, compre-
 nant l'étape consistant à faire effectuer manuelle- 50
 ment un mouvement de rotation-translation audit ra-
 cleur (330) de sorte qu'il essuie ladite première sur-
 face de filtration (32) .

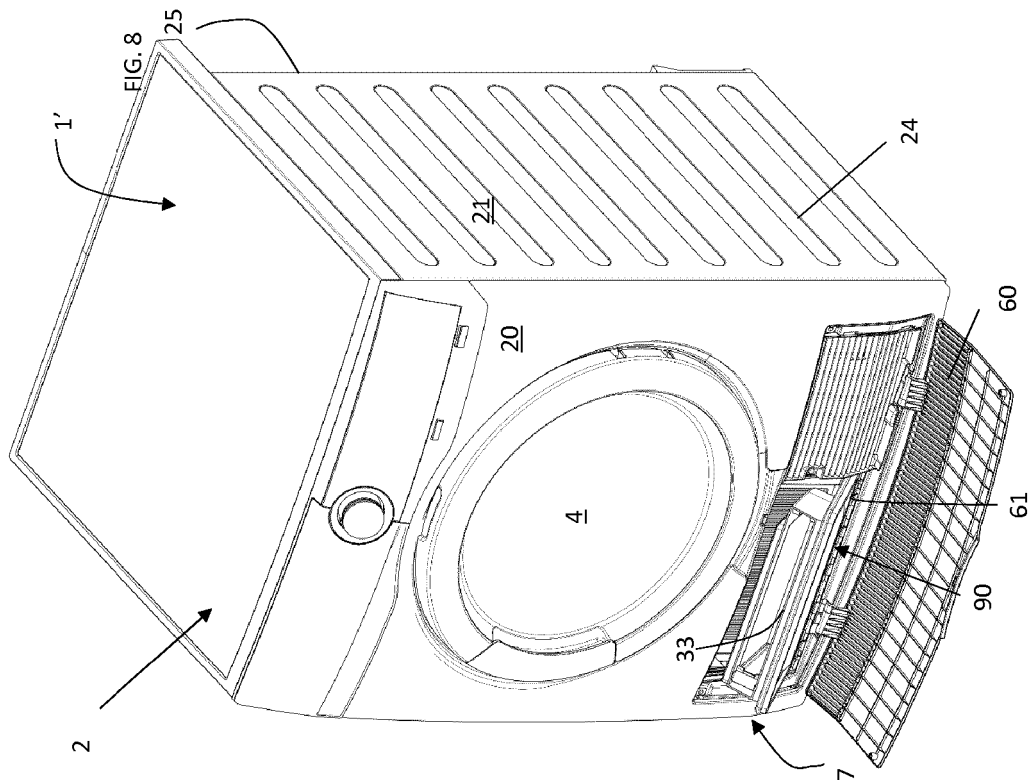
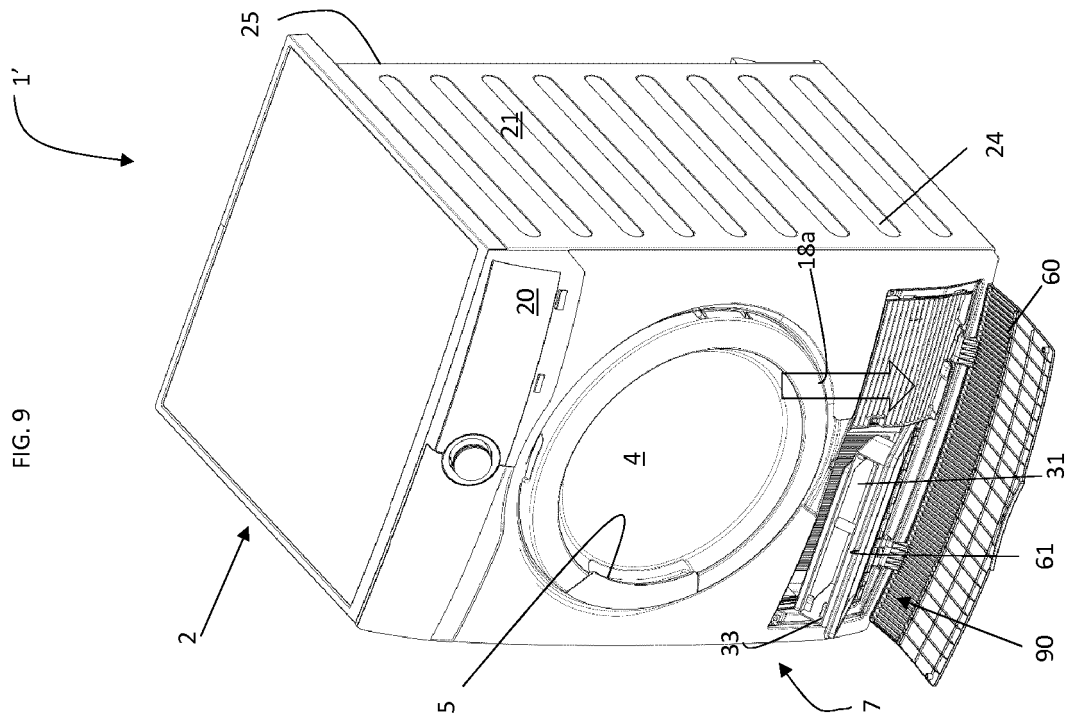
15. Procédé selon la revendication 13, l'étape de rota- 55
 tion du racleur (330) suivant et/ou précédant l'étape
 de translation dudit racleur (330).

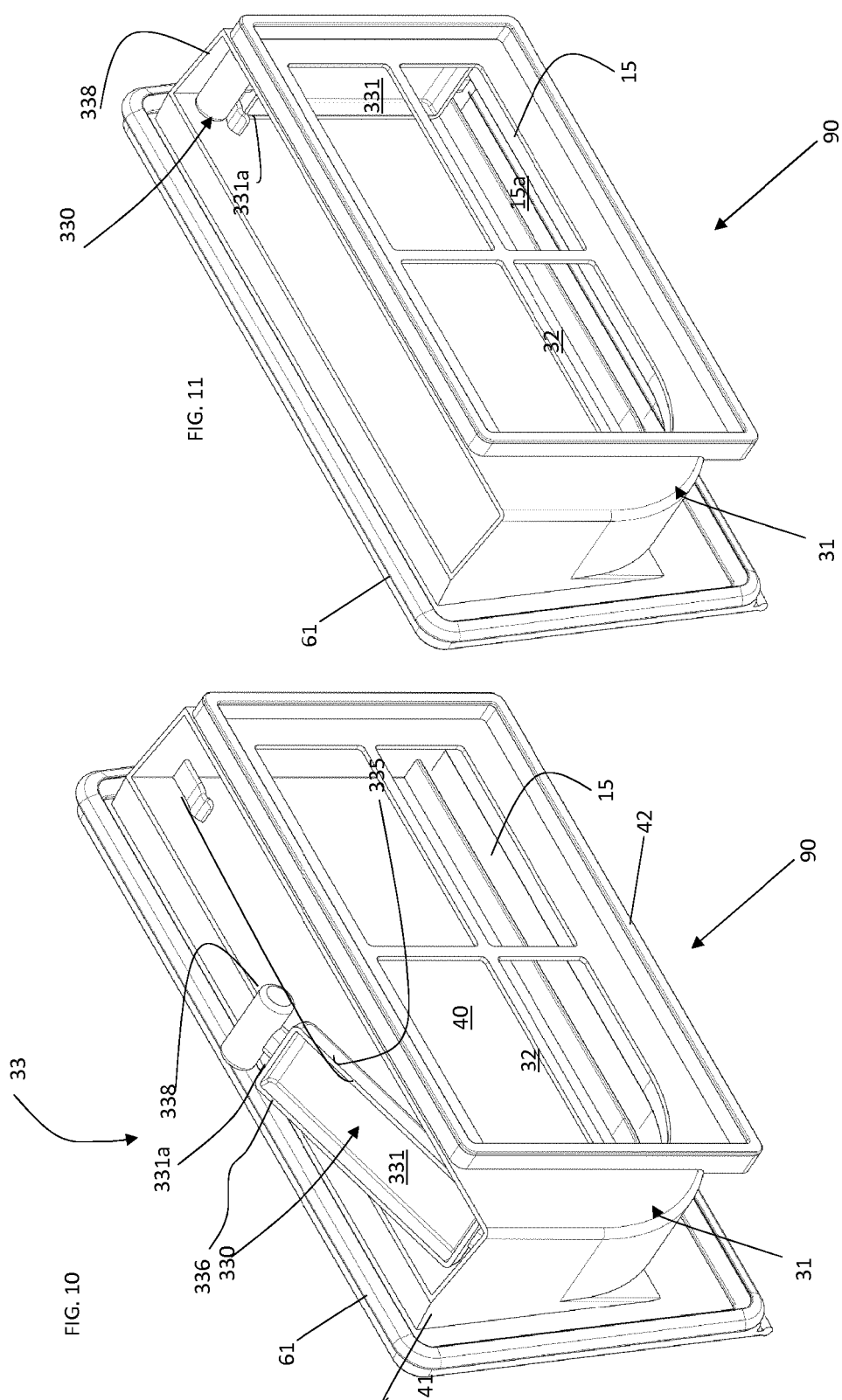


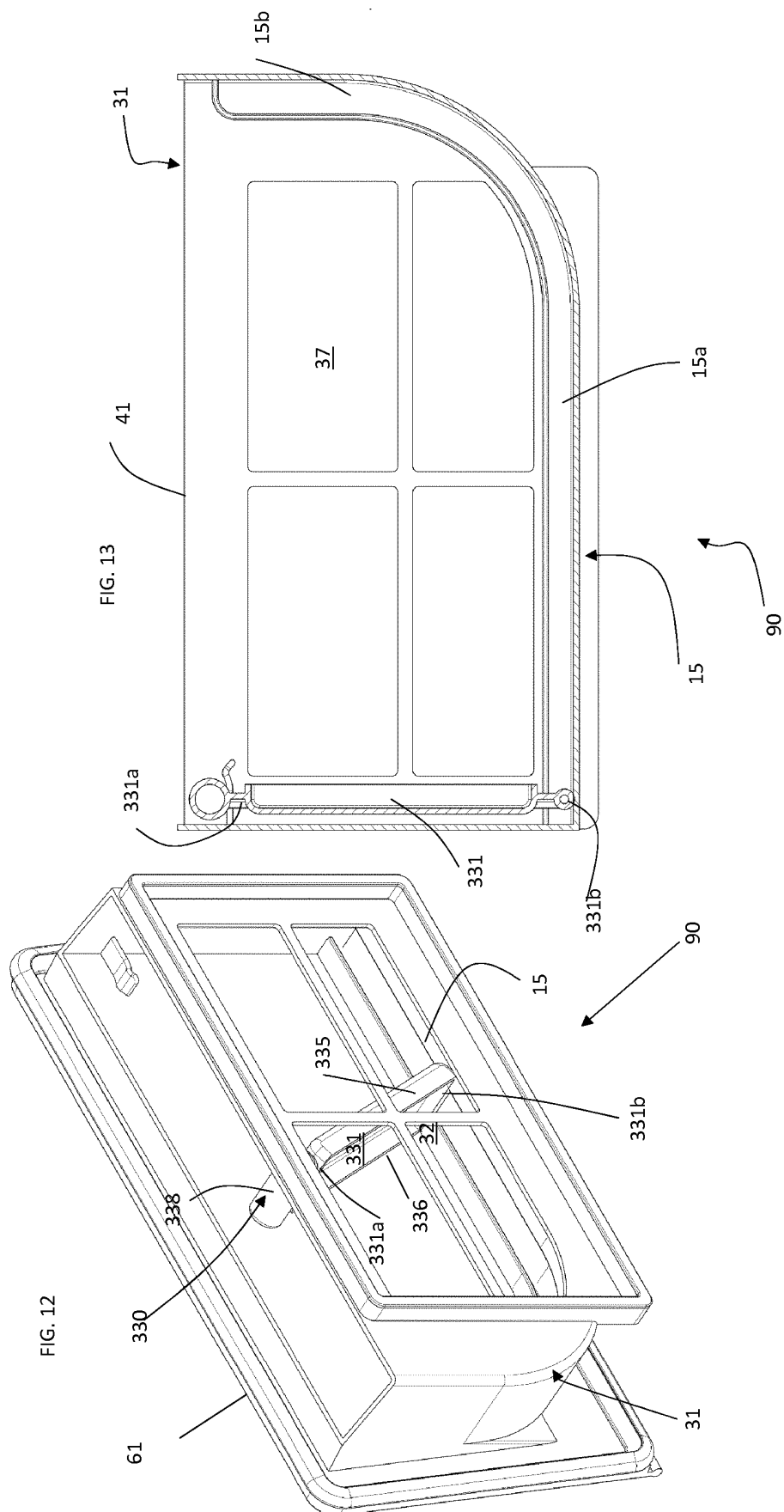


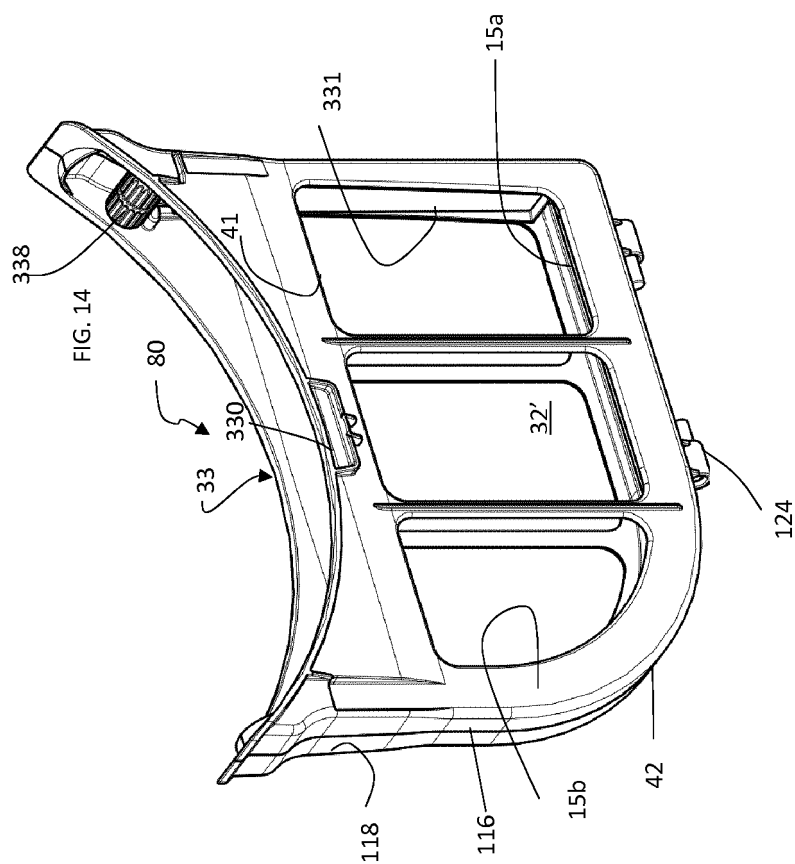
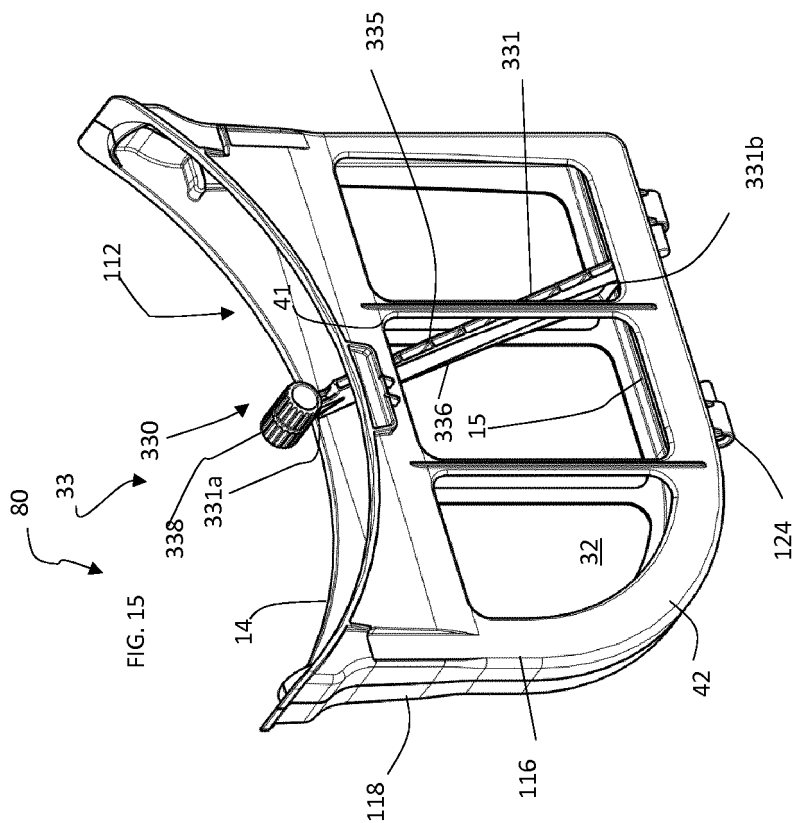


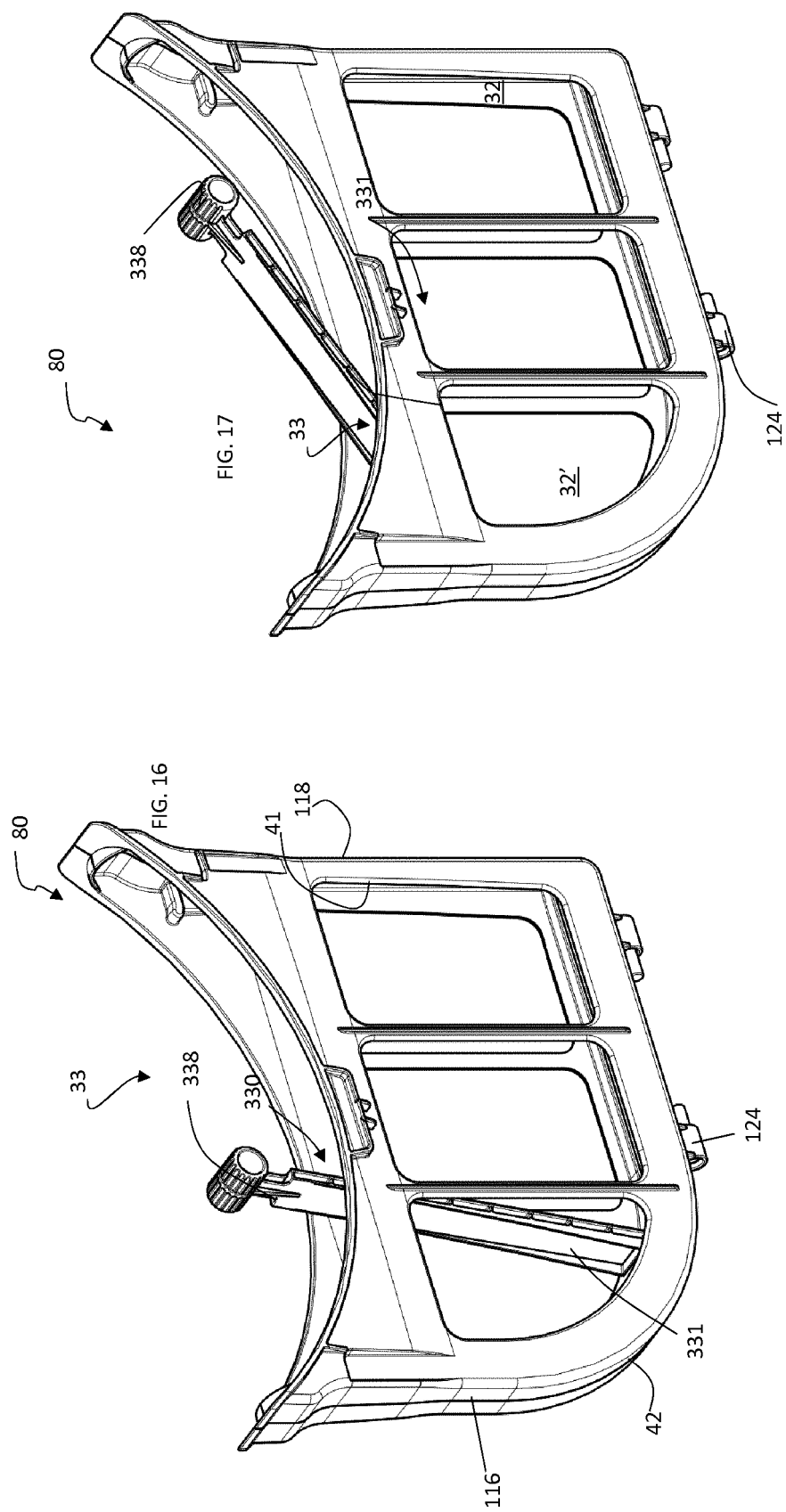


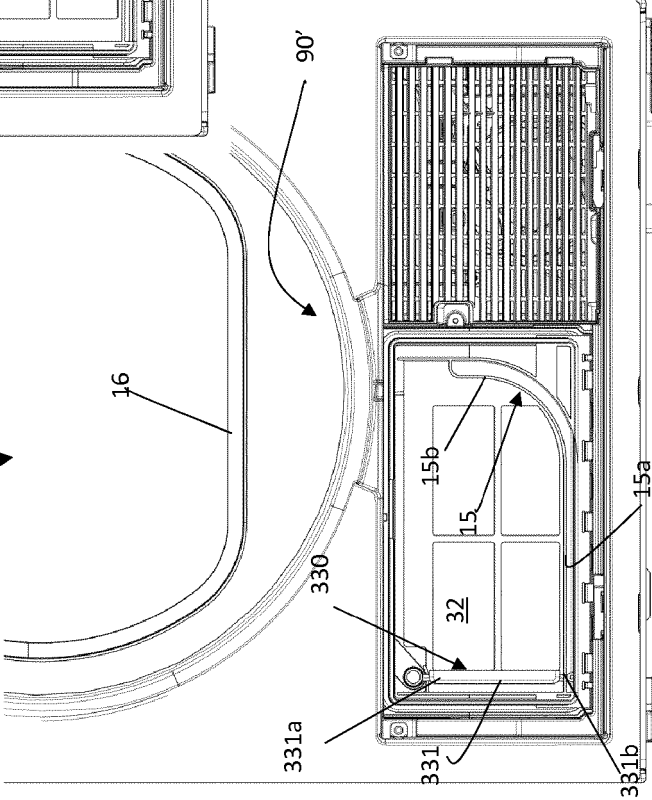
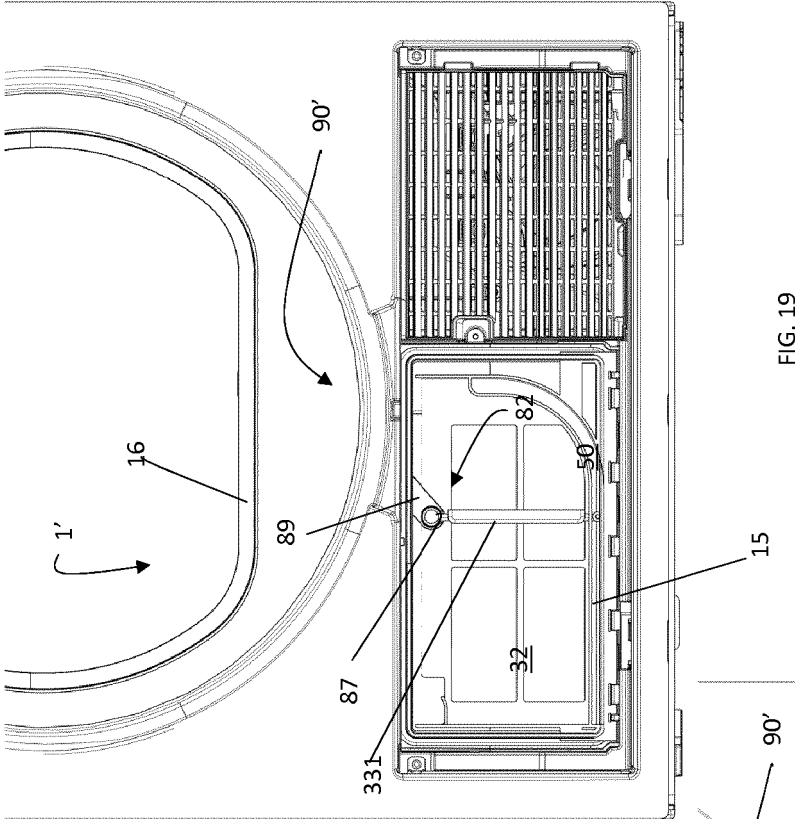












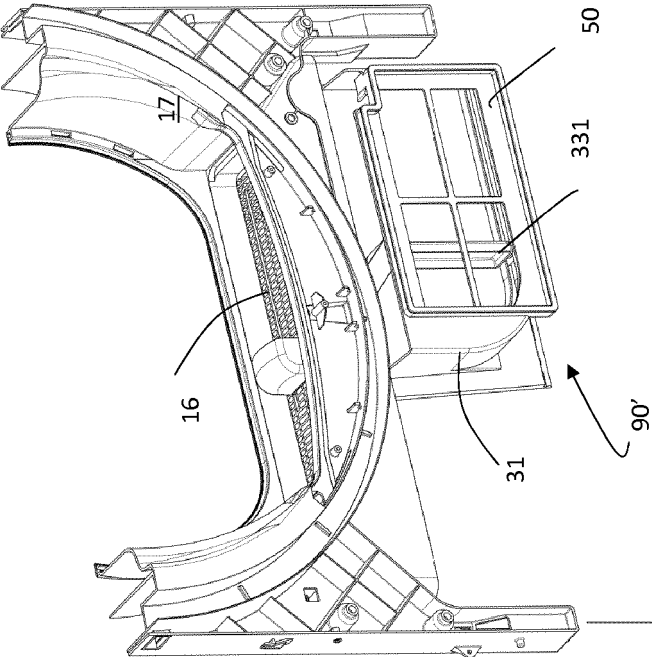
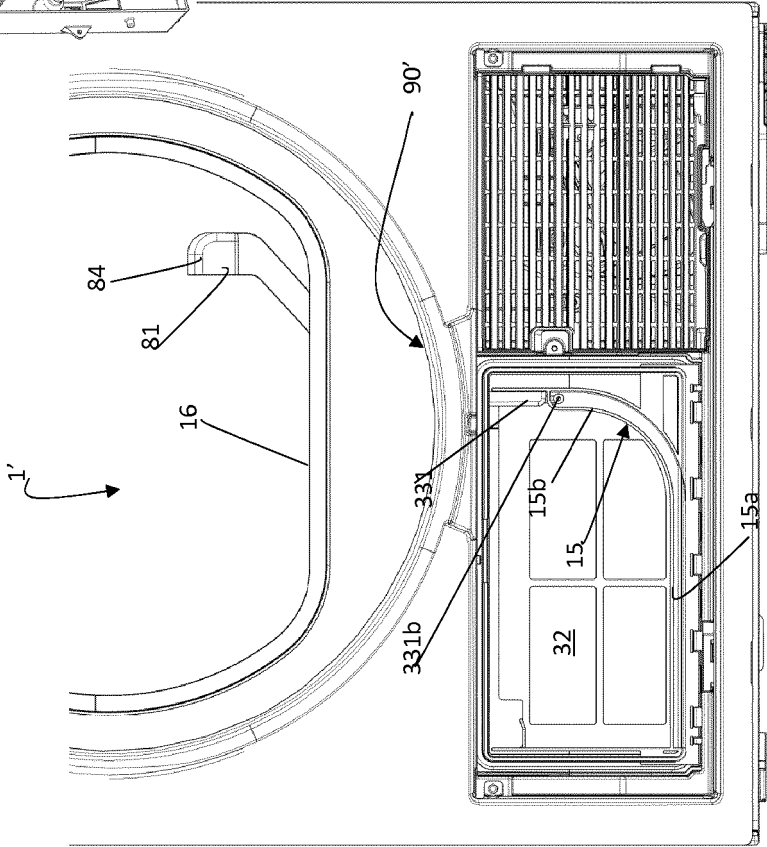


FIG. 20



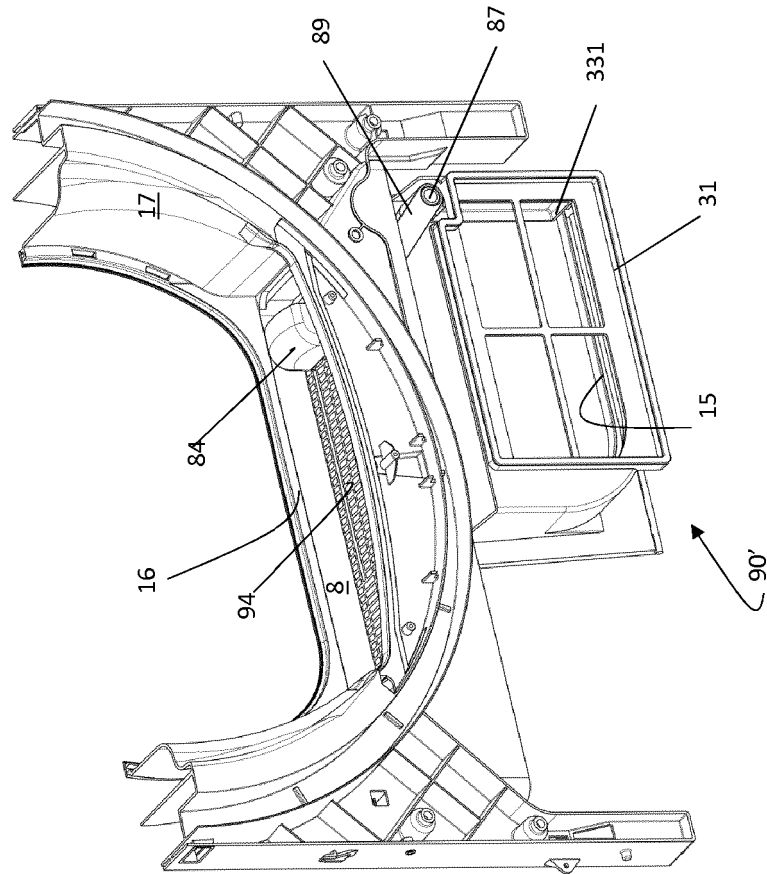


FIG. 22

REFERENCES CITED IN THE DESCRIPTION

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