



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.10.2024 Bulletin 2024/40

(51) International Patent Classification (IPC):
D06F 58/22 ^(2006.01)

(21) Application number: **23165205.8**

(52) Cooperative Patent Classification (CPC):
D06F 58/22

(22) Date of filing: **29.03.2023**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

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(54) **LAUNDRY DRYER WITH AIR FILTER**

(57) A laundry dryer (1), comprising:
- a casing (2) containing a rotatable drum (3) for holding laundry (4) to be dried;
- an air moving system (5) adapted to pass an airflow (6) through said drum (3), while said laundry dryer (1) is in an operative condition;
- an outlet duct (7), fluidly connected to said drum (3) for receiving said airflow (6) exiting said drum (3), while said laundry dryer (1) is in said operative condition;
- an air filter (8), arranged or arrangeable in said outlet duct (7), in an operative position, in which said air filter (8) is passed through by said airflow (6) exiting said drum (3), so as to trap lint, or other foreign bodies, dragged out of the laundry (4) by said airflow (6), while said laundry dryer (1) is in said operative condition;
wherein said air filter (8) comprises:
- an outer filtering element (9) comprising a first outer half-shell (10) and a second outer half-shell (11) being rotatably connected to each other in a book-like manner at a first connecting end (12) of said first outer half-shell (10) and at a second connecting end (13) of said second outer half-shell (11), respectively, so as to define a first cavity (14) between said first outer half-shell (10) and said second outer half-shell (11) when said air filter (8) is in a closed condition, in which closed condition a first inlet end (15) of said first outer half-shell (10), distinct from said first connecting end (12), is removably attached to a second inlet end (16) of said second outer half-shell (11), distinct from said second connecting end (13), said

first cavity (14) being accessible to a user's finger by a first access opening (17) defined between said first inlet end (15) and said second inlet end (16);
- an inner filtering element (18) arranged at least partially within said first cavity (14), said inner filtering element (18) comprising a first inner half-shell (19) and a second inner half-shell (20) being rotatably connected to each other in a book-like manner at a first connection end (21) of said first inner half-shell (19) and at a second connection end (22) of said second inner half-shell (20), respectively, so as to define a second cavity (23) between said first inner half-shell (19) and said second inner half-shell (20) when said air filter (8) is in a closed condition, in which closed condition a first entry end (24) of said first inner half-shell (19), distinct from said first connection end (22), is removably attached to a second entry end (25) of said second inner half-shell (20), distinct from said second connection end (22), said second cavity (23) being accessible to a user's finger by a second access opening (26) defined between said first entry end (24) and said second entry end (25);
wherein
said air filter (8) comprises an unlocking portion (27), arranged at the inner side (28) of said first outer half-shell (10) facing said first cavity (14), or arranged at the inner side (29) of said first inner half-shell (19) facing said second cavity (23), wherein, when said air filter (8) is in said closed condition, said unlocking portion (27) is accessible to a user's finger through said first access opening (17)

and/or through said second access opening (26), and is arranged in such a way that a user can place a finger on said unlocking portion (27) for exerting on said first outer half-shell (10), while holding said second outer half-shell (11) or said second inner half-shell (20), a first opening force to move said first inlet end (15) of said first outer half-shell (10) away from said second inlet end (16) of said second outer half-shell (11), so as to unlock said first outer half-shell (10) from said second outer half-shell (11), and thereby to open said outer filtering element (9).

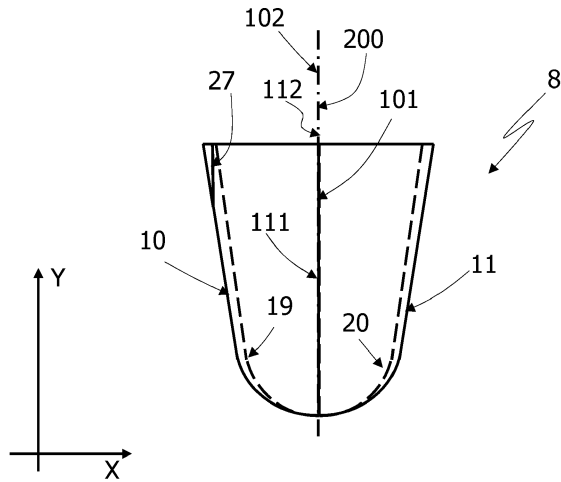


FIG 17

Description

[0001] The present invention relates to a laundry dryer provided with an air filter.

[0002] Nowadays the use of laundry dryers, both "regular" tumble dryers (i.e. laundry dryers which can only dry the laundry) and washer-dryers (i.e. laundry dryers which can both washing and drying the laundry), is widespread. In the present description the expression "laundry dryers" will refer to both to regular tumble dryers and to washer-dryers.

[0003] Known laundry dryers generally comprise an external casing provided with a rotatable drum wherein wetted laundry to be dried is loaded. The drying effect is obtained by forcing a heated airflow through the drum removing moisture from the laundry. The moisture-laden airflow is expelled from the drum to an outlet duct. In some kinds of conventional laundry dryers, expelled airflow is discharged to the external environment, while in other kinds of conventional laundry dryers, expelled airflow is recirculated into the drum after being dehumidified and reheated. Heating of the airflow is typically obtained by using an electric heater and/or a heat pump system.

[0004] Conventional laundry dryers are typically provided with a bag-shaped air filter, removably installed in the outlet duct, so as to trap lint dragged out of the laundry by the airflow. In the laundry dryers which expels the moisture-laden airflow to the external environment, the air filter may hinder lint from being released into the external environment. Further, the air filter may hinder lint from settle on one or more components within the laundry dryer, such as the electric heater or components of a heat pump system, the fan for producing the airflow, etcetera, with the risk of deteriorating and/or of compromising the functioning and/or the performances of such components, and consequently the functioning and/or the performance of the whole laundry dryer.

[0005] In known laundry dryers, the air filter typically consists of two half-shells attached to one another in a book-like manner, at a first end thereof, to define a cavity therebetween when the air filter is in a closed condition. In known laundry dryers, the air filter is typically designed in such a way that, when it is installed in the laundry dryer, in its working condition, the upper parts of the half-shells, which are opposite to the first ends thereof, extend in the horizontal direction more than in the vertical direction, and they are removably attached to one another, so as to form a sort of lid for the cavity of the air filter. During the drying operations, the airflow drags lint and fluff from the drum into the cavity of the air filter through holes provided in such a lid, and exits the cavity through an outlet region of the air filter comprising one or more outlet openings provided at the half-shells, and covered by a filter mesh which allows the passage of air, but prevents the passage of the fluff, so that the fluff remains trapped within the cavity. After removing the air filter from the laundry dryer, the user can open the air filter by separating the second ends of the half shells from each other, where-

after lint and fluff can be manually removed from the cavity, for example by the user's fingers.

[0006] Typically, the upper parts of the half-shells are provided with a manually operable snap-on locking mechanism comprising a hook, protruding from the upper part of one of the half-shells, which, when the air filter is in the closed condition, is removably and elastically inserted in a seat provided in the upper part of the other half-shell, so as to keep the upper parts of the two half-shells attached to one another. For opening the air filter, the user has to exert, from the external of the air filter, a pressure on the hook towards the centre of the cavity, so as to disengage the hook from its seat, and has, contemporaneously, to exert a force on the upper parts of the two half-shells for moving such upper parts one away from the other.

[0007] In some cases, a second filter, typically similar to the air filter described above, but having smaller dimensions, is provided within the other air filter, so as to improve the filtering effect. These known laundry dryers have however some drawbacks. In fact, known air filters comprising the above-described snap-on locking mechanism are quite cumbersome to open.

[0008] An aim of the present invention is to provide a laundry dryer comprising an air filter which can be opened in an easier way with respect to the above-described known air filters. Another aim of the present invention is to provide a laundry dryer comprising an air filter which can be opened in an alternative way with respect to the above-described known air filters.

[0009] Applicant has found that, by providing a laundry dryer having an air filter, comprising an outer filtering element and an inner filtering element that can be both opened in a book-like manner, and by arranging an unlocking portion at an inner side of the outer filtering element or of the inner filtering element, so that such an unlocking portion can be reached by a user's finger through a first access opening of the outer filtering element and/or through a second access opening of the inner filtering element, for exerting, via the unlocking portion, a first opening force to open the outer filtering element, it is possible to open the air filter in an easier way with respect to the above-described known air filters.

[0010] In particular, the above aim is solved by a laundry dryer, comprising:

- a casing containing a rotatable drum for holding laundry to be dried;
- an air moving system adapted to pass an airflow through the drum, while the laundry dryer is in an operative condition;
- an outlet duct, fluidly connected to the drum for receiving the airflow exiting the drum, while the laundry dryer is in the operative condition;
- an air filter, arranged or arrangeable in the outlet duct, in an operative position, in which the air filter is passed through by the airflow exiting the drum, so as to trap lint, or other foreign bodies, dragged out

of the laundry by the airflow, while the laundry dryer is in the operative condition;
wherein the air filter comprises:

- an outer filtering element comprising a first outer half-shell and a second outer half-shell being rotatably connected to each other in a book-like manner at a first connecting end of the first outer half-shell and at a second connecting end of the second outer half-shell, respectively, so as to define a first cavity between the first outer half-shell and the second outer half-shell when the air filter is in a closed condition, in which closed condition a first inlet end of the first outer half-shell, distinct from the first connecting end, is removably attached to a second inlet end of the second outer half-shell, distinct from the second connecting end, the first cavity being accessible to a user's finger by a first access opening defined between the first inlet end and the second inlet end;
- an inner filtering element arranged at least partially within the first cavity, the inner filtering element comprising a first inner half-shell and a second inner half-shell being rotatably connected to each other in a book-like manner at a first connection end of the first inner half-shell and at a second connection end of the second inner half-shell, respectively, so as to define a second cavity between the first inner half-shell and the second inner half-shell when the air filter is in a closed condition, in which closed condition a first entry end of the first inner half-shell, distinct from the first connection end, is removably attached to a second entry end of the second inner half-shell, distinct from the second connection end, the second cavity being accessible to a user's finger by a second access opening defined between the first entry end and the second entry end;

wherein the air filter comprises an unlocking portion, arranged at the inner side of the first outer half-shell facing the first cavity, or arranged at the inner side of the first inner half-shell facing the second cavity, wherein, when the air filter is in the closed condition, the unlocking portion is accessible to a user's finger through the first access opening and/or through the second access opening, and is arranged in such a way that a user can place a finger on the unlocking portion for exerting on the first outer half-shell, while holding the second outer half-shell or the second inner half-shell, a first opening force to move the first inlet end of the first outer half-shell away from the second inlet end of the second outer half-shell, so as to unlock the first outer half-shell from the second outer half-shell, and thereby to open the outer filtering element.

[0011] An advantage is that manual unlocking and opening of the air filter is facilitated. Advantageously, the direction(s) of the force(s) required to unlock the first outer half-shell from the second outer half-shell are the same as for moving the first inlet end of the first outer half-shell away from the second inlet end of the second outer half-

shell, i.e. opening the first outer half-shell from the second outer half-shell.

[0012] In one example, the air filter comprises an inflow region, through which the airflow enters the air filter when the air filter is in the operative position and the laundry dryer is in the operative condition, and an outflow region, through which the airflow exits the air filter when the air filter is in the operative position and the laundry dryer is in the operative condition, wherein the unlocking portion is arranged in the inflow region. Thus, the unlocking portion is positioned in the more rigid inflow region, thereby reducing the risk to damage the filter mesh in the outflow region, while opening the air filter.

[0013] In a further example, the air filter comprises:

- a first outer inflow portion of the first outer half-shell, arranged in the inflow region, through which first outer inflow portion at least part of the airflow enters the first cavity of the outer filtering element when the air filter is in the operative condition and the laundry dryer is in the operative condition, and
- a first outer outflow portion of the first outer half-shell, arranged in the outflow region, through which first outer outflow portion at least part of the airflow exits the first cavity of the outer filtering element when the air filter is in the operative condition and the laundry dryer is in the operative condition.

[0014] In yet a further example, the unlocking portion is arranged at the inner side of the first outer inflow portion. An advantage of this is that the outer filtering element can be opened separately.

[0015] In another example, the air filter comprises:

- a first inner inflow portion of the first inner half-shell, arranged in the inflow region, through which first inner inflow portion at least part of the airflow enters the second cavity of the inner filtering element when the air filter is in the operative position and the laundry dryer is in the operative condition;
- a first inner outflow portion of the first inner half-shell, arranged in the outflow region, through which first inner outflow portion at least part of the airflow exits the second cavity of the inner filtering element when the air filter is in the operative position and the laundry dryer is in the operative condition; and
- a second inner outflow portion of the second inner half-shell, arranged in the outflow region, through which second inner outflow portion at least part of the airflow exits the second cavity of the inner filtering element when the air filter is in the operative position and the laundry dryer is in the operative condition.

[0016] In a further example, the unlocking portion is arranged at the inner side of the first inner inflow portion. An advantage of this is that the inner filtering element and the outer filtering element can be opened at the same time.

[0017] In yet a further example, first outer half-shell comprises a first perimeter edge extending at least partially along a first plane, wherein the second outer half-shell comprises a second perimeter edge extending at least partially along a second plane, wherein when the air filter is in the closed condition, the first perimeter edge is parallel to the second perimeter edge, such that the inner side of the first outer half-shell faces the inner side of the second outer half-shell, and the first plane and the second plane are both parallel or substantially parallel to a mid-plane, wherein a first direction is defined, parallel to the mid-plane and going from the outflow region to the inflow region.

[0018] In another example, when the air filter is in the closed condition, the first outer inflow portion extends in the first direction more than in a second direction which is perpendicular to the first direction and to the mid-plane.

[0019] In a further example, when the air filter is in the closed condition, the first outer half-shell extends in the first direction more than the first inner half-shell, such that, seen from the first direction, an upper portion of the first outer inflow portion extends above the first inner half-shell, such that the upper portion of the first outer inflow portion is accessible to a user's finger through the first access opening without entering the second access opening and wherein the unlocking portion is arranged in the upper portion of the first outer inflow portion.

[0020] In yet a further example, when the air filter is in the closed condition, the unlocking portion is arranged at the first outer half-shell, and wherein the first inner half-shell comprises an opening facing, when the air filter is in the closed condition, the unlocking portion of the first outer half-shell, so as to allow access to the unlocking portion.

[0021] In a further example, wherein, when the air filter is in the closed condition, the unlocking portion is parallel, or substantially parallel, to the mid-plane.

[0022] In another example, the first inner outflow portion of the first inner half-shell comprises a first inner filter mesh arranged in such a way to be passed through by the airflow when the airflow exits the inner filtering element through the first inner outflow portion, and in such a way to trap within the inner filtering element lint, or other foreign bodies, introduced to the inner filtering element by the airflow; and

wherein the second inner outflow portion of the second inner half-shell comprises a second inner filter mesh arranged in such a way to be passed through by the airflow when the airflow exits the inner filtering element through the second inner outflow portion, and in such a way to trap within the inner filtering element lint, or other foreign bodies, introduced to the inner filtering element by the airflow.

[0023] In a further example, the inner filtering element comprises a scraper, movably associated to the inner filtering element in such a way to be able to slide on at least part of the first inner filter mesh and/or the second inner filter mesh, to scrape off possible lint or other foreign

bodies accumulated on the first inner filter mesh and/or the second inner filter mesh.

[0024] In yet a further example, the inner filtering element comprises a scraper connection system connected to the first inner half-shell and/or the second inner half-shell, wherein the scraper is rotatably attached to the scraper connection system and wherein the scraper connection system is arranged between the unlocking portion and the outflow region. An advantage of this is that the unlocking portion can be reached by the user's finger through the first access opening and/or the second access opening, without reaching the scraper connection system.

[0025] In another example, the air filter comprises a first locking system configured to keep the air filter in the closed condition until a force of predetermined magnitude, directed away from the second outer half shell, is applied to the first outer half-shell while holding the second outer half-shell, or a force of predetermined magnitude, directed away from the first outer half-shell, is applied to the second outer half-shell while holding the first outer half-shell.

[0026] Other advantages and features of a laundry dryer according to the present invention will be clear from the following detailed description, provided only as a not limitative example, in which:

FIG 1A is a schematic lateral cross section view of a laundry dryer according to the invention;

FIG 1B is a perspective view of an advantageous embodiment of some components of a laundry dryer according to the invention;

FIGs 2A to 2D show different views of a first prior art air filter;

FIGs 2E and 2F show different views of a second prior art air filter;

FIGs 3 and 4 are two perspective views of an advantageous embodiment of an air filter of a laundry dryer according to the invention, in a closed condition of the air filter;

FIG 5 is a top view of the air filter of FIGs 3 and 4; FIG 6 is a perspective view the air filter of the previous figures in a partially opened condition;

FIG 7 is a perspective view the air filter of the previous figures, in a fully opened condition;

FIG 8 is a perspective view the air filter of the previous figures, in a fully opened condition, without a scraper; FIGs 9 to 15 are perspective views of enlarged details of the air filter of the previous figures;

FIG 16 is a schematic view of the air filter of a laundry dryer according to the invention in an open condition; FIG 17 is a schematic view of the air filter of FIG 16 in a closed condition;

FIG 18 is a schematic view of the air filter of a laundry dryer according to the invention while the laundry dryer is in an operative condition;

FIG 19 is a schematic view of another embodiment of an air filter of a laundry dryer according to the

invention while the laundry dryer is in an operative condition;

FIG 20 is a schematic view of a further embodiment of an air filter of a laundry dryer according to the invention while the laundry dryer is in an operative condition.

[0027] In the figures, same parts are indicated with the same reference numbers.

[0028] FIGs 1A and 1B illustrate an advantageous embodiment of a laundry dryer 1 according to the invention. Advantageously, the laundry dryer 1 illustrated in FIGs 1A and 1B is a laundry dryer 1 of "horizontal axis" type. It is however clear that the invention can be applied, without any substantial modification, also to laundry dryers of "vertical axis" type, and to washer-dryers both of "horizontal axis" and "vertical axis" types. The laundry dryer 1 comprises a casing 2. Preferably, the casing 2 is a parallelepiped. However, the casing 2 may have any other shape. The laundry dryer 1 may be configured to be positioned on a horizontal surface 300, for example the floor of a building. The laundry dryer 1 may comprise feet 301, possibly of adjustable height, so as to adapt to a possible not perfect planarity of the horizontal surface 300. Advantageously, in the frontal wall 2A of the casing 2, an access opening 2B is obtained, advantageously selectively closable by a loading/unloading door 302. The loading/unloading door 302 is preferably hinged to the frontal wall 2A. The laundry dryer 1 comprises a rotatable drum 3 rotatably housed within the casing 2, in which laundry 4 to be dried can be loaded. If the laundry dryer 1 is a "regular" tumble dryer, like in the advantageous embodiment of FIG 1A, the drum may be supported by rollers 303, provided within the casing 2. If the laundry dryer 1 is a washer-dryer, the casing 2 also houses a washing tub, not illustrated, preferably suspended to the casing 2 through springs and dumpers, also not illustrated, in which the drum 3 is rotatably contained.

[0029] The laundry dryer 1 comprises an air moving system 5 adapted to pass an airflow 6, represented by arrows, through the drum 3. Advantageously, the air moving system 5 comprises one or more fans or air conveying units 51 configured for circulating the airflow 6 through the drum 3. Advantageously the laundry dryer 1 comprises an outlet duct 7, fluidly connected to the drum 3 for receiving the airflow 6 exiting the drum 3. As shown in FIGs 1A and 1B, the outlet duct 7 may be obtained in a frontal region of the laundry dryer 1, behind the frontal wall 2A of the casing 2. The outlet duct 7 may be arranged below the loading/unloading door 302. However, in another laundry dryer architecture, the outlet duct 7 may be arranged at a different position in the laundry dryer, fluidly connected to the drum 3 for receiving the airflow 6 exiting the drum 3. Preferably, the position of the outlet duct 7 is easily accessible for the user.

[0030] In an advantageous embodiment, like the one schematically illustrated in FIG 1A, the outlet duct 7 is arranged within a recirculation circuit 52 fluidly connected

to the drum 3 in such a way to recirculate the airflow 6 exiting the drum 3 through the outlet duct 7 into the drum 3. The recirculation circuit 52 further may comprise, preferably downstream of the outlet duct 7, a dehumidification device 53 dehumidifying the airflow 6 and a heating device 54 reheating the airflow 6. The dehumidification device 53 may be a first heat exchanger of a heat pump system. Alternatively, the dehumidification device 53 may be a condenser. The heating device 54 may be a second heat exchanger of the heat pump system. Alternatively, the heating device 54 may be an electric heater.

[0031] In a further advantageous embodiment, not illustrated, the outlet duct 7 can be fluidly connected to the external environment, so that the airflow 6 exiting the drum 3 is discharged into the external environment after having passed through the outlet duct 7.

[0032] Advantageously, the laundry dryer 1 comprises an air filter 8, arranged or arrangeable in the outlet duct 7 in an operative position, illustrated for example in FIGs 1A and 1B, in which operative position, while the laundry dryer 1 is in the operative condition, the air filter 8 is passed through by the airflow 6 exiting the drum 3, so as to trap lint, or other foreign bodies, dragged out of the laundry 4 by the airflow 6. When the laundry dryer 1 is in the operative condition, the air moving system 5 is moving an airflow 6 through the drum 3.

[0033] Advantageously, when the laundry dryer 1 is in the operative condition, one or more fans or air conveying units 51 is/are circulating the airflow 6 through the drum 3. Preferably, when the laundry dryer 1 is in the operative condition, the dehumidification device 53 is dehumidifying the airflow 6 after the airflow 6 is exiting the drum 3. Preferably, when the laundry dryer 1 is in the operative condition, the heating device 54 is heating the airflow 6 before the airflow 6 is entering the drum 3. In other words, when the laundry dryer 1 is in the operative condition, the laundry dryer 1 may be operative to dry the laundry 4, by dehumidifying the airflow 6 after the airflow 6 is exiting the drum 3 and forcing the dehumidified and reheated airflow 6 through the drum 3.

[0034] FIGs 2A to 2D show different views of a first prior art air filter described in EP2867401B1.

[0035] FIGs 2A to 2D discloses an air-filtering cartridge, or air filter, which is fitted in removable manner into an air-vent, or outlet duct, which is passed through by a laundry drying airflow.

[0036] The air-filtering cartridge comprising a first substantially bag- or pocket-shaped, air-filtering shell or vessel which is dimensioned for being inserted/plugged into the air-vent, or outlet duct, and is structured to restrain the fluff and/or lint particles in suspension into the airflow.

[0037] The air-filtering cartridge further comprises a second, completely separated, substantially bag- or pocket-shaped, air-filtering shell or vessel which is fitted/recessed into the first air-filtering shell or vessel so as to be crossed by substantially the same airflow that crosses the first air-filtering shell or vessel, and which is structured to restrain the fluff and/or lint particles in sus-

pension into the airflow. The substantially bag- or pocket-shaped, air-filtering shell or vessel is moreover divided into two complementary valve-like pieces which are selectively separable to one another, and each valve-like piece preferably incorporates a respective permeable-to-air sidewall of the air-filtering shell or vessel. As can be seen in FIGs 2A and 2B, the air-filtering cartridge comprises a permeable-to-air upper lid which is rigidly associated/fixed to the top of the second air-filtering shell or vessel so as to close the upper mouth of the second air-filtering shell or vessel and which is furthermore preferably shaped/dimensioned so as to close/cover the whole air-vent. The permeable-to-air upper lid is preferably divided into two preferably substantially platelike-shaped and permeable-to-air, complementary pieces which are selectively separable to one another, and each of which is permanently rigidly fixed to a respective valve-like piece of the second air-filtering shell or vessel, so as to allow the second air-filtering shell or vessel to open in a book-like manner.

[0038] Preferably the two valve-like pieces are furthermore laterally hinged to one another preferably approximately at the bottom of the air-filtering shell or vessel, i. e. opposite to the upper mouth of the air-filtering shell or vessel, for reciprocal rotation about a transversal reference axis preferably substantially parallel to the permeable-to-air sidewalls of the air-filtering shell or vessel, so that the whole air-filtering shell or vessel is openable in a book-like manner about the transversal reference axis. Preferably, the permeable-to-air upper lid furthermore comprises a manually-operated snap-on locking mechanism which is structured for selectively rigidly anchoring/fixing the two complementary pieces to one another when they are reciprocally coupled to form/compose the permeable-to-air upper lid, thus preventing any unintended opening of the second air-filtering shell or vessel. In the example shown, the snap-on locking mechanism is preferably incorporated into the two complementary pieces of the permeable-to-air upper lid. The manually-operated snap-on locking mechanism is accessible to the user from the outside of the air-filtering cartridge, arranged on the permeable-to-air upper lid, more precise the second air-filtering shell or vessel, closing the upper mouth of the second air-filtering shell or vessel. Thus, the force required to unlock the snap-on locking mechanism is directed from the upper side of the air-filtering cartridge towards the bottom of the air-filtering cartridge. Hence, in order to facilitate the opening of the second air-filtering shell or vessel, separate forces are needed, one in the downward direction of the snap-on locking mechanism and at least an additional force, substantially perpendicular to the downward force, for reciprocal rotation about the transversal reference axis preferably substantially parallel to the permeable-to-air sidewalls of the air-filtering shell or vessel, so that the whole air-filtering shell or vessel is opened in a book-like manner about the transversal reference axis. FIG 2C shows the second air-filtering shell or vessel in an open, unlocked, state, in which

the inner side of the second air-filtering shell or vessel may be manually cleaned by the user. FIG 2D shows the first air-filtering shell or vessel in an open, unlocked, state, in which the inner side of the first air-filtering shell or vessel may be manually cleaned by the user.

[0039] FIGs 2E and 2F show different views of a second prior art air filter described in EP2870283B1. FIGs 2E and 2F show an example of a filter similar to the filter described in relation to FIGs 2A to 2D. However, the filter of FIGs 2E and 2F has two main differences compared to the previously described filter of FIGs 2A to 2D. The first main difference is that the outer air-filtering shell comprises the permeable-to-air upper lid rigidly closing the upper mouth of the outer air-filtering shell. The second main difference is that the inner air-filtering shell is hinged (or folded) along a different direction than the outer air-filtering shell, in a direction substantially perpendicular to the hinge of the outer air-filtering shell. In other words, two valve-like pieces of the inner air-filtering shell are pivotally jointed to one another via a pair of connecting hinges which are located on a side edge of the inner air-filtering shell, in relation to the upper mouth of the outer air-filtering shell. Furthermore, the rotation axis of the two valve-like pieces, is substantially perpendicular to the rotation axis of the valve-like pieces of the outer air-filtering shell. However, the mouth opening of the inner air-filtering shell is directed to receive air from the upper mouth of the outer air-filtering shell (hence the mouth opening of the inner air-filtering shell is substantially parallel to the upper mouth of the outer air-filtering shell), such that air entering through the permeable-to-air upper lid rigidly closing the upper mouth of the outer air-filtering shell also is entering through the mouth opening of the inner air-filtering shell into the inner air-filtering shell without passing through the filter mesh of the inner air-filtering shell. Hence, the inner filter mesh of the inner air-filtering shell is only passed in the direction from inside and out of the inner air-filtering shell, such that lint is deposited on the inside of the filter mesh of the inner air-filtering shell.

[0040] As shown in FIGs 3 to 8 and 18 to 20, the air filter 8 comprises an outer filtering element 9 comprising a first outer half-shell 10 and a second outer half-shell 11, which are rotatably connected to each other in a book-like manner at a first connecting end 12 of the first outer half-shell 10 and at a second connecting end 13 of the second outer half-shell 11, respectively. Advantageously, like in the advantageous embodiments of FIGs 3 to 8, the first connecting end 12 and the second connecting end 13 are hinged to one another by suitable first hinging means 304. In a further advantageous embodiment, not illustrated, the first connecting end 12 and the second connecting end 13 are permanently connected to one another by a flexible joint element, not illustrated, allowing the first outer half-shell 10 and a second outer half-shell 11 to rotate one with respect to the other. When the air filter 8 is in a closed condition, illustrated for example in FIGs 3 to 5 and 17 to 20, a first inlet end 15 of the first outer half-shell 10, distinct from the first connecting end

12, is removably attached to a second inlet end 16 of the second outer half-shell 11, distinct from the second connecting end 13. A first access opening 17 is defined as the opening between the first inlet end 15 and the second inlet end 16. A first cavity 14 is defined between the first outer half-shell 10 and the second outer half-shell 11 and limited by the first access opening 17. The first cavity 14 is accessible to a user's finger by the first access opening 17 defined between the first inlet end 15 and the second inlet end 16.

[0041] Preferably, the outer filtering element 9 is arranged in such a way that the first outer half-shell 10 and the second outer half-shell 11 can rotate one with respect to the other around an outer rotation axis "O", along which outer rotation axis "O" the first connecting end 12 and the second connecting end 13 are connected to each other. In a preferred embodiment, such as illustrated in FIGs 3 to 8, the first outer half-shell 10 and a second outer half-shell 11 are arranged such that the outer rotation axis "O" is on the opposite side of the outer filtering element 9 in relation to the first inlet end 15 and the second inlet end 16 and thus also in relation the first access opening 17, when the air filter 8 is in the closed condition. The air filter 8 comprises an inner filtering element 18, represented in dotted lines in schematic FIGs 16 to 20, arranged at least partially within the first cavity 14 of the outer filtering element 9. The inner filtering element 18 comprises a first inner half-shell 19 and a second inner half-shell 20, rotatably connected to each other in a book-like manner at a first connection end 21 of the first inner half-shell 19 and at a second connection end 22 of the second inner half-shell 20, respectively.

[0042] Advantageously, like in the advantageous embodiments of FIGs 3 to 8, the first connection end 21 of the first inner half-shell 19 and the second connection end 22 of the second inner half-shell 20 are hinged to one another by suitable second hinging means 305.

[0043] In a further advantageous embodiment, not illustrated, the first connection end 21 and the second connection end 22 are permanently connected to one another by a flexible joint element, not illustrated, allowing the first inner half-shell 19 and the second inner half-shell 20 to rotate one with respect to the other.

[0044] In an advantageous embodiment, like the one illustrated in FIGs 3 to 8, the inner filtering element 18 is connected to the outer filtering element 9. For example, like in the advantageous embodiment of FIGs 3 to 8, the first connection end 21 and the second connection end 22 of the inner filtering can be rotatably connected, for example hinged, to one between the first half-shell 10 and the second half-shell 11.

[0045] In another advantageous embodiment, not illustrated, the inner filtering element 18 can be completely separated from the outer filtering element 9.

[0046] When the air filter 8 is in the closed condition, illustrated for example in FIGs 3 to 5 and 17 to 20, a first entry end 24 of the first inner half-shell 19, distinct from the first connection end 21, is removably attached to a

second entry end 25 of the second inner half-shell 20, distinct from the second connection end 22. A second access opening 26 is defined as the opening between the first entry end 24 and the second entry end 25. A second cavity 23 is defined between the first inner half-shell 19 and the second inner half-shell 20 and limited by the second access opening 26. The second cavity 23 is accessible to a user's finger by the second access opening 26 between the first entry end 24 and the second entry end 25. The second cavity 23 is at least partly arranged within the first cavity 14.

[0047] In the examples of FIGs 18 and 19, the second cavity 23 is completely arranged within the first cavity 14.

[0048] In the example of FIG 20, the second cavity 23 is only partly arranged within the first cavity 14.

[0049] In advantageous embodiments, like the ones illustrated in FIGs 3 to 8, the outer filtering element 9 and the inner filtering element 18 are arranged in such a way that the first inner half-shell 19 and the second inner half-shell 20 can rotate one with respect to the other around an inner rotation axis "I", along which inner rotation axis "I" the first connection end 21 and the second connection end 22 are connected to each other. The inner rotation axis "I" may be parallel to the outer rotation axis "O" around which the first outer half-shell 10 and the second outer half-shell 11 can rotate one with respect to the other. In this case, the first inner half-shell 19 and the second inner half-shell 20 are arranged such that the inner rotation axis "I" is on the opposite side of the inner filtering element 18 in relation to the first entry end 24 and the second entry end 25 and thus also in relation to the second access opening 26.

[0050] In another embodiment, not illustrated, the outer filtering element 9 and the inner filtering element 18 are arranged in such a way that the inner rotation axis "I", between the first connection end 21 and the second connection end 22, and the outer rotation axis "O", between the first connecting end 12 and the second connecting end 13, are perpendicular (or in any case not parallel) to one another. In this case, the first inner half-shell 19 and the second inner half-shell 20 are arranged such that the inner rotation axis "I" is not on the opposite side of the inner filtering element 18 in relation to the first entry end 24 and the second entry end 25 and thus also not on the opposite side in relation to the second access opening 26, since the first access opening 17 and the second access opening 26 have to be facing in the same direction so that the airflow 6 can enter both the first and second filtering elements 9, 18, without passing through the first outer half-shell 10, the second outer half-shell 11, the first inner half-shell 19 or the second inner half-shell 20.

[0051] The air filter 8 comprises an unlocking portion 27 arranged at the inner side 28 of the first outer half-shell 10, facing the first cavity 14, or arranged at the inner side 29 of the first inner half-shell 19, facing the second cavity 23. When the outer filtering element 9 is in the closed condition, the unlocking portion 27 is accessible

to a user's finger through the first access opening 17 and/or through the second access opening 26, and is arranged in such a way that a user can place a finger on the unlocking portion 27 for exerting on the first outer half-shell 10, while holding the second outer half-shell 11 or the second inner half-shell 20, a first opening force to move the first inlet end 15 of the first outer half-shell 10 away from the second inlet end 16 of the second outer half-shell 11, so as to unlock the first outer half-shell 10 from the second outer half-shell 11, and thereby to open the outer filtering element 9.

[0052] Hence, the force or forces applied by the user's finger(s) required to unlock the first outer half-shell 10 from the second outer half-shell 11 will also open the first outer half-shell 10 from the second outer half-shell 11 in a book-like manner.

[0053] In a preferred embodiment, the unlocking portion 27 is a portion of the inner side 28 of the first outer half-shell 10. Alternatively, the unlocking portion 27 may be a portion of the inner side 29 of the first inner half-shell 19. The unlocking portion 27 may be shaped in such a way to easily receive a user's finger. For example, the unlocking portion 27 may have a concave shape. Further, the unlocking portion 27 may be configured for indicating to a user that he/she has to place a finger on the unlocking portion 27 and to apply a force to open the air filter 8. For example, the unlocking portion 27 may comprise a symbol or one or several characters indicating a user where to place a finger or fingers.

[0054] Advantageously, the air filter 8 comprises a first locking system configured to keep the air filter 8 in the closed condition until a force of predetermined magnitude, directed away from the second outer half shell 11, is applied to the first outer half-shell 10 while holding the second outer half-shell 11, or a force of predetermined magnitude, directed away from the first outer half-shell 10, is applied to the second outer half-shell 11 while holding the first outer half-shell 10. By placing a finger on the unlocking portion 27, a user can easily exert on the first outer half-shell 10, while holding the second outer half-shell 11 or the second inner half-shell 20, the force of predetermined magnitude directed away from the second outer half-shell 11, necessary for unlocking the first locking system, and opening the outer filtering element 9. The first locking system may be any locking system requiring a force of predetermined magnitude directing the first outer half-shell 10 away from the second outer half-shell 11 to unlock and open the outer filtering element 9.

[0055] In an advantageous embodiment, the air filter 8 comprises an inflow region 60, through which at least part of the airflow 6 enters the air filter 8, when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition. According to an advantageous embodiment, the unlocking portion 27 is arranged in the inflow region 60. In an advantageous embodiment, the first access opening 17 and/or the second access opening 26 is/are arranged in the inflow region 60.

[0056] In advantageous embodiments, like the ones illustrated in FIGs 3 to 12, the first locking system comprises a male element, such as a hook 34A, protruding from a lateral side 35 of one among the first outer half-shell 10 or the second outer half-shell 11 towards the other between the first outer half-shell 10 or the second outer half-shell 11, configured to be attachable/detachable, in a snap-on manner, respectively, to/from a female element, such as a seat 34B, provided in the other between the first outer half-shell 10 or the second outer half-shell 11. Advantageously the hook 34A is configured in such a way that, once inserted into the seat 34B, the hook 34A remains in the seat 34B until a force of predetermined magnitude, directed away from the seat 34B, is applied to the hook 34A.

[0057] The first locking system may comprise two male/female element pairs. For example, the first locking system may comprise a male/female element pair on each side of the air filter 8.

[0058] In an advantageous embodiment, the air filter 8 also comprises an outflow region 70, through which the airflow 6 exits the air filter 8 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0059] The first outer half-shell 10 may comprise a first outer outflow portion 71, arranged in the outflow region 70, through which first outer outflow portion 71 at least part of the airflow 6 exits the outer filtering element 9 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0060] In advantageous embodiments, like for example the ones illustrated in FIGs 3 to 8, 17, 18 and 19 (potentially also FIG 20), the first outer half-shell 10 comprises a first outer inflow portion 61, arranged in the inflow region 60, through which first outer inflow portion 61 at least part of the airflow 6 enters the first cavity 14 of the outer filtering element 9 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition. In advantageous embodiments, like the ones illustrated in FIGs 3 to 8, 17, 18, and 19 (potentially also FIG 20), the unlocking portion 27 is arranged at the inner side of the first outer inflow portion 61.

[0061] In an advantageous embodiment, the first outer inflow portion 61 of the first outer half-shell 10 comprises a plurality of first holes 611, through which at least part of the airflow 6 enters the first cavity 14 of the outer filtering element 9 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0062] In advantageous embodiments, like the ones illustrated in FIGs 3 to 8, 17, 18 and 20 (potentially also FIG 19), the first inner half-shell 19 comprises a first inner inflow portion 62, arranged in the inflow region 60, through which first inner inflow portion 62 at least part of the airflow 6 enters the second cavity 23 of the inner filtering element 18 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0063] In an advantageous embodiment, the first inner half-shell 19 comprises a first inner outflow portion 72, arranged in the outflow region 70, through which first inner outflow portion 72 at least part of the airflow 6 exits the inner filtering element 18 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0064] In an advantageous embodiment, the first inner inflow portion 62 of the first inner half-shell 19 comprises a plurality of second holes 621, through which at least part of the airflow 6 enters the second cavity 23 of the inner filtering element 18 when the air filter 8 is the operative position and the laundry dryer 1 is in the operative condition.

[0065] In an embodiment, like the one illustrated in FIG 20, the unlocking portion 27 may be arranged at the inner side of the first inner inflow portion 62.

[0066] In advantageous embodiments, like the ones illustrated in attached FIGs 3 to 8, 17, 18 and 19 (potentially also FIG 20), the first access opening 17 is arranged within the inflow region 60.

[0067] In advantageous embodiments, like the ones illustrated in attached FIGs 3 to 8, 17, 18 and 20 (potentially also FIG 19), the second access opening 26 is arranged within the inflow region 60.

[0068] In advantageous embodiments, like the ones illustrated in FIGs 3 to 8, 17, 18 and 19 (potentially also FIG 20), the second outer half-shell 11 comprises a second outer inflow portion 63, arranged in the inflow region 60, through which second outer inflow portion 63 at least part of the airflow 6 enters the first cavity 14 of the outer filtering element 9 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0069] In an advantageous embodiment, the second outer half-shell 11 comprises a second outer outflow portion 73 arranged in the outflow region 70, through which at least part of the airflow 6 exits the outer filtering element 9 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0070] In an advantageous embodiment, the second outer inflow portion 63 comprises a plurality of third holes 631, through which at least part of the airflow 6 enters the first cavity 14 of the outer filtering element 9 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0071] In an embodiment as illustrated in FIGs 18 and 20 (potentially also FIG 19), the second inner half-shell 20 comprises a second inner inflow portion 64, arranged in the inflow region 60, through which second inner inflow portion 64 at least part of the airflow 6 enters the second cavity 23 of the inner filtering element 18 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0072] In an embodiment, the second inner half-shell 20 comprises a second inner outflow portion 74 arranged in the outflow region 70, through which second inner outflow portion 74 at least part of the airflow 6 exits the inner

filtering element 18 when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0073] In an embodiment, the second inner inflow portion 64 of the second inner half-shell 20 comprises a plurality of fourth holes not illustrated, through which at least part of the airflow 6 enters the second cavity 23 of the inner filtering element 18 when the air filter 8 is the operative position and the laundry dryer 1 is in the operative condition.

[0074] Advantageously, when the air filter 8 is in the closed condition, the unlocking portion 27 is accessible to a user's finger through the first access opening 17. In other words, the unlocking portion 27 is accessible to a user's finger without passing through the first outer inflow portion 61 of the first outer half-shell 10.

[0075] In examples, as can be seen in FIGs 3 to 9 and FIG 18, when the air filter 8 is in the closed condition, the unlocking portion 27 may be accessible to a user's finger through the second access opening 26 in addition to the first access opening 17.

[0076] In another example, as can be seen in FIG 19, when the air filter 8 is in the closed condition, the unlocking portion 27 may be accessible to a user's finger through the first access opening 17, without entering the second access opening 26.

[0077] Yet further, in one example, as can be seen in FIG 20, when the air filter 8 is in the closed condition, the unlocking portion 27 is accessible to a user's finger through the second access opening 26.

[0078] In advantageous embodiments, like the ones shown in attached figures, the first outer half-shell 10 comprises a first perimeter edge 101 extending at least partially along a first plane 102, and the second outer half-shell 11 comprises a second perimeter edge 111 extending at least partially along a second plane 112. When the air filter 8 is in the closed condition, the first perimeter edge 101 is parallel to the second perimeter edge 111, such that the inner side 28 of the first outer half-shell 10 faces the inner side of the second outer half-shell 11. When the air filter 8 is in the closed condition, the first perimeter edge 101 may be at least partly in contact with the second perimeter edge 111.

[0079] In the advantageous embodiment schematically illustrated in FIG 17, when the air filter 8 is in the closed condition, the first plane 102 coincides with the second plane 112 and with the mid-plane 200. In the present application, a first direction "Y" is defined, shown in FIGs 17 to 20, parallel to the mid-plane 200 and directed from the outflow region 70 to the inflow region 60. The first direction "Y" may coincide with the vertical direction when the air filter 8 is positioned in the operative position within the laundry dryer 1.

[0080] In advantageous embodiments, like the ones illustrated in attached figures, when the air filter 8 is in the closed condition, the first outer inflow portion 61 extends in the first direction Y more than in a second direction X which is perpendicular to the first direction Y and

to the mid-plane 200.

[0081] Alternatively, when the air filter 8 is in the closed condition, the first outer inflow portion 61 extends substantially in parallel to the mid-plane 200.

[0082] In a further example, when the air filter 8 is in the closed condition, the first outer inflow portion 61 is substantially parallel with a plane passing through the outer rotation axis "O" of the outer filtering element 9.

[0083] In yet a further alternative, when the air filter 8 is in the closed condition, the first outer inflow portion 61 is substantially extending along the same plane as the first outer outflow portion 71.

[0084] In advantageous embodiments, like the ones illustrated in attached figures, when the air filter 8 is in the closed condition, the first inner inflow portion 62 extends in the first direction Y more than in the second direction X perpendicular to the first direction Y and to the mid-plane 200.

[0085] Alternatively, when the air filter 8 is in the closed condition, the first inner inflow portion 62 extends substantially in parallel to the mid-plane 200.

[0086] In a further example, when the air filter 8 is in the closed condition, the first inner inflow portion 62 is substantially parallel with a plane passing through the inner rotation axis "I" of the inner filtering element 18.

[0087] In yet a further alternative, when the air filter 8 is in the closed condition, the first inner inflow portion 62 is substantially extending along the same plane as the first inner outflow portion 72.

[0088] In advantageous embodiments, like the ones illustrated in attached figures, when the air filter 8 is in the closed condition, the second outer inflow portion 63 extends in the first direction Y more than in the second direction X. In an advantageous embodiment, like the ones illustrated in attached figures, when the air filter 8 is in the closed condition, the second inner inflow portion 64 extends in the first direction Y more than in the second direction X.

[0089] In advantageous embodiments, like the ones illustrated in FIGs 3 to 20, parts of the outer filtering element 9, such as the first outer outflow portion 71 and the second outer outflow portion 73, and parts the inner filtering element 18, such as the first inner outflow portion 72 and the second inner outflow portion 74, are arranged in the outflow region 70, when the air filter 8 is in the operative position and the laundry dryer 1 is in the operative condition.

[0090] In advantageous embodiments, like the ones illustrated in FIGs 3 to 18, a part of the outer filtering element 9, such as the first outer inflow portion 61, and a part of the inner filtering element 18, such as the first inner inflow portion 62, are arranged in the inflow region 60.

[0091] In an advantageous embodiment, like the one of FIG 19, when the air filter 8 is in the closed condition, the first outer inflow portion 61 of the first outer half-shell 10 extends in the first direction Y more than the first inner half-shell 19. Thus, a part of the inner side 28 of the first

outer inflow portion 61 of the first outer half-shell 10 facing the first cavity 14 is accessible to a user's finger through the first access opening 17 without entering through the second access opening 26. In other words, part of the inner side 28 of the first outer inflow portion 61 of the first outer half-shell 10 is accessible to a user's finger above the second access opening 26, seen in the first direction Y. The unlocking portion 27 may be arranged on the part of the inner side 28 of the first outer inflow portion 61 of the first outer half-shell 10 accessible to a user's finger above the second access opening 26, seen in the first direction Y. In other words, the first unlocking portion 27 may be arranged at the part of the second outer half-shell 11 being above the second inner half-shell 20 in the first direction Y.

[0092] In a further embodiment of FIG 20, when the air filter 8 is in the closed condition, the first inner inflow portion 62 of the first inner half-shell 19 extends in the first direction Y as much as, or more than, the first outer inflow portion 61 of the first outer half-shell 10, the unlocking portion 27 may be arranged at the first inner inflow portion 62 of the first inner half-shell 19.

[0093] In further advantageous embodiments, like the ones illustrated in FIGs 3 to 8, 17, 18 and 20, when the air filter 8 is in the closed condition and the first inner inflow portion 62 of the first inner half-shell 19 extends in the first direction Y as much as, or more than, the first outer inflow portion 61 of the first outer half-shell 10, the unlocking portion 27 is arranged at the first outer inflow portion 61 of the first outer half-shell 10, and the first inner inflow portion 62 of the first inner half-shell 19 comprises an opening 30 facing the unlocking portion 27 of the first outer inflow portion 61 of the first outer half-shell 10, so as to at least partially delimit and to allow access to the unlocking portion 27.

[0094] In advantageous embodiments, like the ones illustrated in attached figures, when the air filter 8 is in the closed condition, the unlocking portion 27 is parallel, or substantially parallel, to the mid-plane 200. According to an alternative definition, when the air filter 8 is in the closed condition, the unlocking portion 27 is parallel, or substantially parallel, to a line or plane going through the unlocking portion 27 and the outer rotation axis "O".

[0095] In advantageous embodiments, like the ones illustrated in FIGs 3 to 15, the first inner outflow portion 72 of the first inner half-shell 19 comprises a first inner filter mesh 721, represented as transparent in attached FIGs 3 to 15, arranged in such a way to be passed through by the airflow 6 when the airflow 6 exits the inner filtering element 18 through the first inner outflow portion 72, and in such a way to trap within the inner filtering element 18 the lint introduced to the inner filtering element 18 by the airflow 6.

[0096] In advantageous embodiments, like the ones illustrated in FIGs 3 to 15, the second inner outflow portion 74 of the second inner half-shell 20 comprises a second inner filter mesh 741, represented as transparent in attached FIGs 3 to 15, arranged in such a way to be

passed through by the airflow 6 when the airflow 6 exits the inner filtering element 18 through the second inner outflow portion 74, and in such a way to trap within the inner filtering element 18 lint introduced to the inner filtering element 18 by the airflow 6.

[0097] In advantageous embodiments, like the ones illustrated in FIGs 3 to 15, the first outer outflow portion 71 of the first outer half-shell 10 comprises a first outer filter mesh 711, represented as transparent in attached FIGs 3 to 15, arranged in such a way to be passed through by the airflow 6 when the airflow 6 exits the outer filtering element 9 through the first outer outflow portion 71, and in such a way to trap within the outer filtering element 9 lint introduced to the outer filtering element 9 by the airflow 6.

[0098] In advantageous embodiments, like the ones illustrated in FIGs 3 to 15, the second outer outflow portion 73 of the second outer half-shell 11 comprises a second outer filter mesh 731, represented as transparent in attached FIGs 3 to 15, arranged in such a way to be passed through by the airflow 6 when the airflow 6 exits the outer filtering element 9 through the second outer outflow portion 73, and in such a way to trap within the outer filtering element 9 lint introduced to the outer filtering element 9 by the airflow 6.

[0099] In an advantageous embodiment, the air filter 8 comprises a second locking system configured to keep the inner filtering element 18 in a closed condition until a force of predetermined magnitude is applied to the first inner half-shell 19 for moving the first inner half-shell 19 away from the second inner half-shell 20 while holding the second inner half-shell 20, or a force of predetermined magnitude is applied to the second inner half-shell 20 for moving the second inner half-shell 20 away from the first inner half-shell 19 while holding the first inner half-shell 19.

[0100] Advantageously, a supporting shaft 40 comprises a free end 41 which is removably attached, when the air filter 8 is in the closed condition, to the first inner half-shell 19, if the supporting shaft 40 protrudes from the second inner half-shell 20, or is removably attached to the second inner half-shell 20, if the supporting shaft 40 protrudes from the first inner half-shell 19.

[0101] In an advantageous embodiment, like for example the one illustrated in FIGs 3 to 15, the second locking system advantageously comprises a male element 43, preferably provided on the free end 41 of the supporting shaft 40 or on the first inner half-shell 19 or second inner half-shell 20 to which the free end 41 is attachable. The male element 43 may be removably attachable, in a snap-on manner, to a female element 44 which is provided in the first inner half-shell 19 or in the second inner half-shell 20 to which the free end 41 is attachable, if the male element 43 is provided on the free end 41, or which is provided in the free end 41 of the supporting shaft 40 if the male element 43 is provided on the first inner half-shell 19 or on the second inner half-shell 20 to which the free end 41 is attachable. Advantageously, the male el-

ement 43 and the female element 44 are configured in such a way that, once they have been coupled to one another, they remain coupled until a force of predetermined magnitude is applied to the male element 43 (or to the female element 44) directed away from the female element 44 (or from the male element 43).

[0102] In advantageous embodiments, like the ones illustrated in FIGs 3 to 15, the air filter 8 comprises a scraper 39, movably associated to the air filter 8 in such a way to be able to slide on at least part of the first inner filter mesh 721, to scrape off possible lint or other foreign bodies accumulated on the first inner filter mesh 721.

[0103] In an advantageous embodiment, the scraper 39 is movably associated to the air filter 8 in such a way to be able to slide on at least part of the second inner filter mesh 741, to scrape off possible lint or other foreign bodies accumulated on the second inner filter mesh 741.

[0104] In an advantageous embodiment, the scraper 39 is rotatably attached to the first inner half-shell 19 or to the second inner half-shell 20.

[0105] In an advantageous embodiment, the unlocking portion 27 is arranged in such a way that, when the air filter 8 is in the closed condition, the scraper 39 is arranged between the unlocking portion 27 and the outflow region 70.

[0106] In an advantageous embodiment, like the one illustrated in FIGs 3 to 15, the scraper 39 is rotatably supported by a scraper connection system. The scraper connection system may comprise a supporting shaft 40 protruding from the first inner half-shell 19 or from the second inner half-shell 20, towards the internal of the second cavity 23.

[0107] The scraper connection system may be a part of the second locking mechanism or comprise the second locking mechanism.

[0108] However, in another example, not shown, the scraper connection system is not part of a second locking mechanism.

[0109] The scraper connection system advantageously comprises a male element 43, preferably provided on the free end 41 of the supporting shaft 40 or on the first inner half-shell 19 or second inner half-shell 20 to which the free end 41 is attachable. The male element 43 may be removably attachable, in a snap-on manner, to a female element 44 which is provided in the first inner half-shell 19 or in the second inner half-shell 20 to which the free end 41 is attachable, if the male element 43 is provided on the free end 41, or which is provided in the free end 41 of the supporting shaft 40 if the male element 43 is provided on the first inner half-shell 19 or on the second inner half-shell 20 to which the free end 41 is attachable. Advantageously, the male element 43 and the female element 44 are configured in such a way that, once they have been coupled to one another, they remain coupled until a force of predetermined magnitude is applied to the male element 43 (or to the female element 44) directed away from the female element 44 (or from the male element 43).

[0110] The scraper connection system may be arranged between the inflow region 60 and the outflow region 70, seen in the first direction Y. In other words, the scraper connection system may be attached to the inner filtering element 18 between the first inner inflow portion 62 and the first inner outflow portion 72 portion and/or between the second inner inflow portion 64 and the second inner outflow portion 74. When the scraper connection system is arranged in this way, the user's finger(s) can access the unlocking portion 27 above the scraper connection system, seen in the first direction Y. That is, the user's finger(s) can access the unlocking portion 27 without reaching the scraper connection system.

[0111] Alternatively, the scraper connection system may be attached to the inner filtering element 18 in the inflow region 60 between the unlocking portion 27 and the outflow region 70, seen in the first direction Y. In other words, the scraper connection system may be attached to the inner filtering element 18 at the first inner inflow portion 62 and/or at the second inner inflow portion 64, between the unlocking portion 27 and the outflow region 70, seen in the first direction Y. When the scraper connection system is arranged in this way, the user's finger(s) can access the unlocking portion 27 above the scraper connection system, seen in the first direction Y. That is, the user's finger(s) can access the unlocking portion 27 without reaching the scraper connection system.

[0112] In an advantageous embodiment, the unlocking portion 27 is arranged in such a way that, when the air filter 8 is in the closed condition, the supporting shaft 40 is arranged between the unlocking portion 27 and the outflow region 70.

[0113] In an advantageous embodiment, the scraper 39 comprises at least one contact portion 400, wherein each of the at least one contact portion 400 is contacting the first filter mesh 721 or the second inner filter mesh 741 when the air filter 8 is in the closed condition. In FIG 15, only one contact portion 400 is visible, although the respective side of the scraper 39, contacting the respective inner filter mesh 721, 741, may comprise a contact portion 400. The scraper may be made of polymer. Each contact portion 400 may be made of felt. Alternatively, each contact portion 400 may be covered with felt. In another example, the contact portions 400 may be made of or covered by rubber.

[0114] Preferably, the contact portion 400 has a rounded shape in order to improve the removal of lint, or other foreign bodies, from the first inner filter mesh 721 and/or the second inner filter mesh 741.

[0115] In further advantageous embodiments, like for example the one illustrated in FIGs 3 to 15, the air filter 8 comprises a second unlocking portion 31, preferably arranged at the inner side 32 of the second outer half-shell 11 facing the internal of the first cavity 14, or arranged at the inner side 33 of the second inner half-shell 20 facing the internal of the second cavity 23.

[0116] When the air filter 8 is in the closed condition, the second unlocking portion 31 is accessible to a user's

finger through the first access opening 17 and/or through the second access opening 26, and is arranged in such a way that a user can place a finger on it for exerting on the second outer half-shell 11, while holding the first outer half-shell 10 or the first inner half-shell 19, a second opening force to move the second inlet end 16 of the second outer half-shell 11 away from the first inlet end 15 of the first outer half-shell 10, so as to unlock the first outer half-shell 10 from the second outer half-shell 11, and thereby to open the outer filtering element 9. Advantageously, the second unlocking portion 31 is arranged in the inflow region 60.

[0117] Advantageously, when the air filter 8 is in the closed condition, the second unlocking portion 31 is accessible to a user's finger through the first access opening 17 and/or through the second access opening 26, without passing through the second outer inflow portion 63 of the second outer half-shell 11.

[0118] In an advantageous embodiment, the second outer half-shell 11 extends in the first direction Y more than the second inner half-shell 20, wherein the second unlocking portion 31 is arranged at the inner side of the second outer half-shell 11, above the second inner half-shell 20, seen in the first direction Y.

[0119] In an advantageous embodiment, when the air filter 8 is in the closed condition, the second inner half-shell 20 extends in the first direction Y as much as, or more than, the second outer half-shell 11, and the second unlocking portion 31 is arranged at the second inner half-shell 20.

[0120] In a further advantageous embodiment, like the one illustrated in FIGs 3 to 15, when the air filter 8 is in the closed condition, the second inner half-shell 20 extends in the first direction Y as much as, or more than, the second outer half-shell 11, the second unlocking portion 31 may be arranged in or on the second outer half-shell 11, wherein the second inner half-shell 20 comprises a second opening 50 facing the second unlocking portion 31 of the second outer half-shell 11, so as to at least partially delimit and to allow access to the second unlocking portion 31.

[0121] Advantageously, when the air filter 8 is in the closed condition, the second unlocking portion 31 is parallel, or substantially parallel, to the mid-plane 200. According to an alternative definition, when the air filter 8 is in the closed condition, the second unlocking portion 31 is parallel, or substantially parallel, to a line or plane going through the second unlocking portion 31 and the outer rotation axis "O".

[0122] It is seen therefore how the invention achieves the proposed aim, there being provided a laundry dryer 1 comprising an air filter 8, which, thanks to the specific arrangement of the unlocking portion 27, can be opened in an easier way with respect to the above-described known air filters.

[0123] While the present invention has been described with reference to the particular embodiments shown in the figures, it should be noted that the present invention

is not limited to the specific embodiments illustrated and described herein; on the contrary, further variants of the embodiments described herein fall within the scope of the present invention, which is defined in the claims.

Claims

1. A laundry dryer (1), comprising:

- a casing (2) containing a rotatable drum (3) for holding laundry (4) to be dried;
- an air moving system (5) adapted to pass an airflow (6) through said drum (3), while said laundry dryer (1) is in an operative condition;
- an outlet duct (7), fluidly connected to said drum (3) for receiving said airflow (6) exiting said drum (3), while said laundry dryer (1) is in said operative condition;
- an air filter (8), arranged or arrangeable in said outlet duct (7), in an operative position, in which said air filter (8) is passed through by said airflow (6) exiting said drum (3), so as to trap lint, or other foreign bodies, dragged out of the laundry (4) by said airflow (6), while said laundry dryer (1) is in said operative condition;

wherein said air filter (8) comprises:

- an outer filtering element (9) comprising a first outer half-shell (10) and a second outer half-shell (11) being rotatably connected to each other in a book-like manner at a first connecting end (12) of said first outer half-shell (10) and at a second connecting end (13) of said second outer half-shell (11), respectively, so as to define a first cavity (14) between said first outer half-shell (10) and said second outer half-shell (11) when said air filter (8) is in a closed condition, in which closed condition a first inlet end (15) of said first outer half-shell (10), distinct from said first connecting end (12), is removably attached to a second inlet end (16) of said second outer half-shell (11), distinct from said second connecting end (13), said first cavity (14) being accessible to a user's finger by a first access opening (17) defined between said first inlet end (15) and said second inlet end (16);
- an inner filtering element (18) arranged at least partially within said first cavity (14), said inner filtering element (18) comprising a first inner half-shell (19) and a second inner half-shell (20) being rotatably connected to each other in a book-like manner at a first connection end (21) of said first inner half-shell (19) and at a second connection end (22) of said second inner half-shell (20), respectively, so as to define a second cavity (23) between said first inner half-shell (19)

and said second inner half-shell (20) when said air filter (8) is in a closed condition, in which closed condition a first entry end (24) of said first inner half-shell (19), distinct from said first connection end (22), is removably attached to a second entry end (25) of said second inner half-shell (20), distinct from said second connection end (22), said second cavity (23) being accessible to a user's finger by a second access opening (26) defined between said first entry end (24) and said second entry end (25);

characterized in that

said air filter (8) comprises an unlocking portion (27), arranged at the inner side (28) of said first outer half-shell (10) facing said first cavity (14), or arranged at the inner side (29) of said first inner half-shell (19) facing said second cavity (23), wherein, when said air filter (8) is in said closed condition, said unlocking portion (27) is accessible to a user's finger through said first access opening (17) and/or through said second access opening (26), and is arranged in such a way that a user can place a finger on said unlocking portion (27) for exerting on said first outer half-shell (10), while holding said second outer half-shell (11) or said second inner half-shell (20), a first opening force to move said first inlet end (15) of said first outer half-shell (10) away from said second inlet end (16) of said second outer half-shell (11), so as to unlock said first outer half-shell (10) from said second outer half-shell (11), and thereby to open said outer filtering element (9).

2. Laundry dryer (1), according to claim 1, wherein said air filter (8) comprises an inflow region (60), through which said airflow (6) enters said air filter (8) when said air filter (8) is in said operative position and said laundry dryer (1) is in said operative condition, and an outflow region (70), through which said airflow (6) exits said air filter (8) when said air filter (8) is in said operative position and said laundry dryer (1) is in said operative condition, wherein said unlocking portion (27) is arranged in said inflow region (60).

3. Laundry dryer (1), according to claim 2, wherein said air filter (8) comprises:

- a first outer inflow portion (61) of said first outer half-shell (10), arranged in said inflow region (60), through which first outer inflow portion (61) at least part of said airflow (6) enters said first cavity (14) of said outer filtering element (9) when said air filter (8) is in said operative condition and said laundry dryer (1) is in said operative condition,
- and
- a first outer outflow portion (71) of said first outer half-shell (10), arranged in said outflow re-

- gion (70), through which first outer outflow portion (71) at least part of said airflow (6) exits said first cavity (14) of said outer filtering element (9) when said air filter (8) is in said operative condition and said laundry dryer (1) is in said operative condition.
4. Laundry dryer (1), according to claim 3, wherein said unlocking portion (27) is arranged at the inner side (28) of said first outer inflow portion (61). 10
 5. Laundry dryer (1), according to claim 2 or claim 3, wherein said air filter (8) comprises:
 - a first inner inflow portion (62) of said first inner half-shell (19), arranged in said inflow region (60), through which first inner inflow portion (62) at least part of said airflow (6) enters said second cavity (23) of said inner filtering element (18) when said air filter (8) is in said operative position and said laundry dryer (1) is in said operative condition; 15
 - a first inner outflow portion (72) of said first inner half-shell (19), arranged in said outflow region (70), through which first inner outflow portion (72) at least part of said airflow (6) exits said second cavity (23) of said inner filtering element (18) when said air filter (8) is in said operative position and said laundry dryer (1) is in said operative condition; and 20
 - a second inner outflow portion (74) of said second inner half-shell (20), arranged in said outflow region (70), through which second inner outflow portion (74) at least part of said airflow (6) exits said second cavity (23) of said inner filtering element (18) when said air filter (8) is in said operative position and said laundry dryer (1) is in said operative condition. 25
 6. Laundry dryer (1), according to claim 5 when depending on claim 3, wherein said unlocking portion (27) is arranged at the inner side (29) of said first inner inflow portion (62). 30
 7. Laundry dryer (1), according to any of claims 2 to 6, wherein said first outer half-shell (10) comprises a first perimeter edge (101) extending at least partially along a first plane (102), wherein said second outer half-shell (11) comprises a second perimeter edge (111) extending at least partially along a second plane (112), wherein when said air filter (8) is in said closed condition, said first perimeter edge (101) is parallel to said second perimeter edge (111), such that the inner side (28) of the first outer half-shell (10) faces the inner side of said second outer half-shell (11), and said first plane (102) and said second plane (112) are both parallel or substantially parallel to a mid-plane (200), wherein a first direction (Y) is de- 35
 - finied, parallel to said mid-plane (200) and going from said outflow region (70) to said inflow region (60).
 8. Laundry dryer (1), according to claim 3 or claim 4, and claim 7, wherein, when said air filter (8) is in said closed condition, said first outer inflow portion (61) extends in said first direction (Y) more than in a second direction (X) which is perpendicular to said first direction (Y) and to said mid-plane (200). 40
 9. Laundry dryer (1), according to claim 7 or claim 8, wherein when said air filter (8) is in said closed condition, said first outer half-shell (10) extends in said first direction (Y) more than said first inner half-shell (19), such that, seen from said first direction (Y), an upper portion of said first outer inflow portion (61) extends above said first inner half-shell (19), such that said upper portion of said first outer inflow portion (61) is accessible to a user's finger through said first access opening (17) without entering said second access opening (26) and wherein said unlocking portion (27) is arranged in said upper portion of said first outer inflow portion (61). 45
 10. Laundry dryer (1), according to claim 7 or claim 8, wherein, when said air filter (8) is in said closed condition, said unlocking portion (27) is arranged at said first outer half-shell (10), and wherein said first inner half-shell (19) comprises an opening (30) facing, when said air filter (8) is in said closed condition, said unlocking portion (27) of said first outer half-shell (10), so as to allow access to said unlocking portion (27). 50
 11. Laundry dryer (1), according any of claims 7 to 10, wherein, when said air filter (8) is in said closed condition, said unlocking portion (27) is parallel, or substantially parallel, to said mid-plane (200). 55
 12. Laundry dryer (1), according to claim 5 or to a claim dependent on claim 5, wherein said first inner outflow portion (72) of said first inner half-shell (19) comprises a first inner filter mesh (721) arranged in such a way to be passed through by said airflow (6) when said airflow (6) exits said inner filtering element (18) through said first inner outflow portion (72), and in such a way to trap within said inner filtering element (18) lint, or other foreign bodies, introduced to said inner filtering element (18) by said airflow (6); and wherein said second inner outflow portion (74) of said second inner half-shell (20) comprises a second inner filter mesh (741) arranged in such a way to be passed through by said airflow (6) when said airflow (6) exits said inner filtering element (18) through said second inner outflow portion (74), and in such a way to trap within said inner filtering element (18) lint, or other foreign bodies, introduced to said inner filtering element (18) by said airflow (6).

13. Laundry dryer (1), according to claim 12, wherein said inner filtering element (18) comprises a scraper (39), movably associated to said inner filtering element (18) in such a way to be able to slide on at least part of said first inner filter mesh (721) and/or said second inner filter mesh (741), to scrape off possible lint or other foreign bodies accumulated on said first inner filter mesh (721) and/or said second inner filter mesh (741).
14. Laundry dryer (1), according to claim 13, wherein said inner filtering element (18) comprises a scraper connection system (43, 44) connected to said first inner half-shell (19) and/or said second inner half-shell (20), wherein said scraper (39) is rotatably attached to said scraper connection system (43, 44) and wherein said scraper connection system (43, 44) is arranged between said unlocking portion (27) and said outflow region (70).
15. Laundry dryer (1), according to any of the previous claims, wherein said air filter (8) comprises a first locking system (34A, 34B) configured to keep said air filter (8) in said closed condition until a force of predetermined magnitude, directed away from said second outer half shell (11), is applied to said first outer half-shell (10) while holding said second outer half-shell (11), or a force of predetermined magnitude, directed away from said first outer half-shell (10), is applied to said second outer half-shell (11) while holding said first outer half-shell (10).

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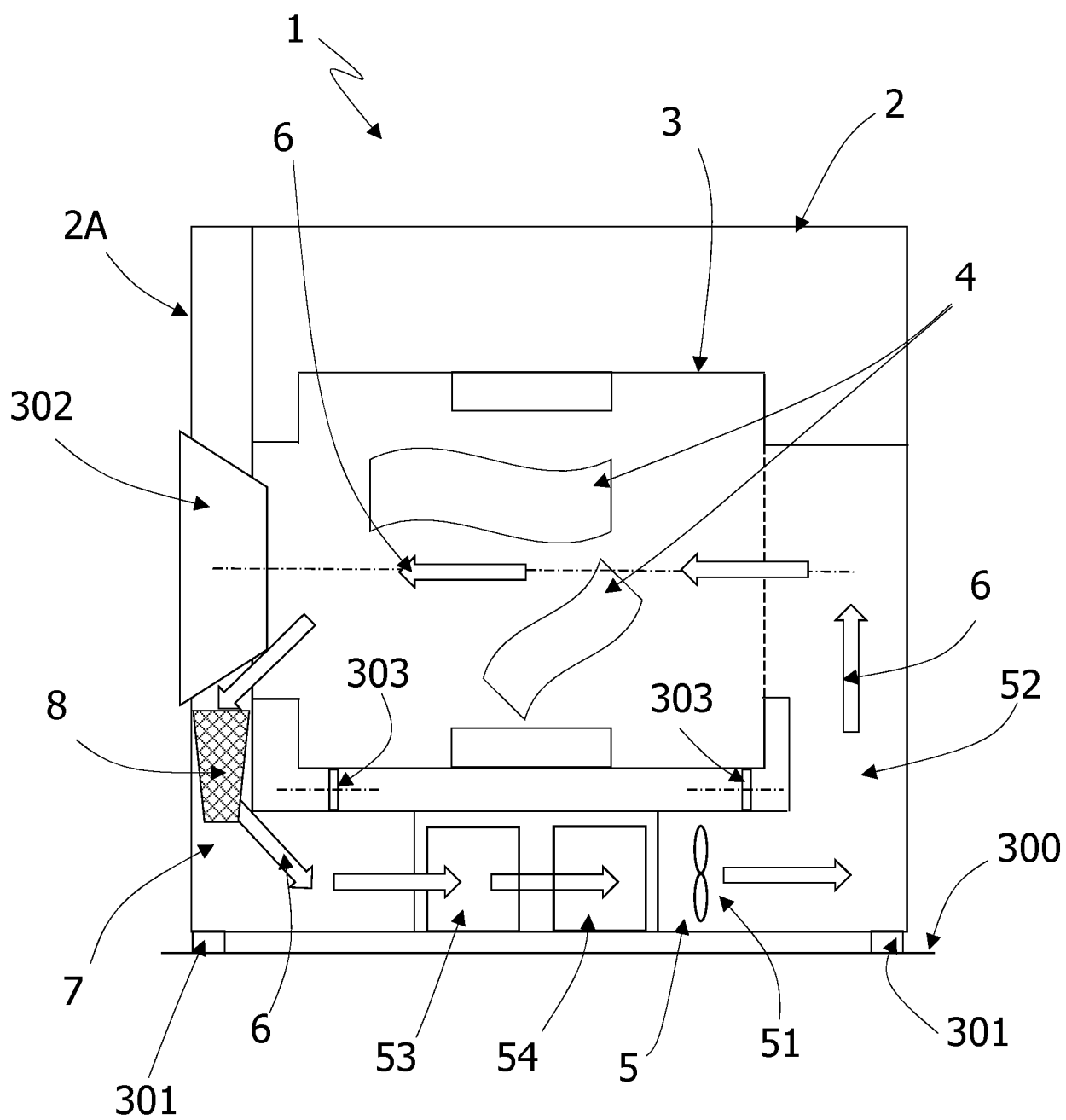


FIG 1A

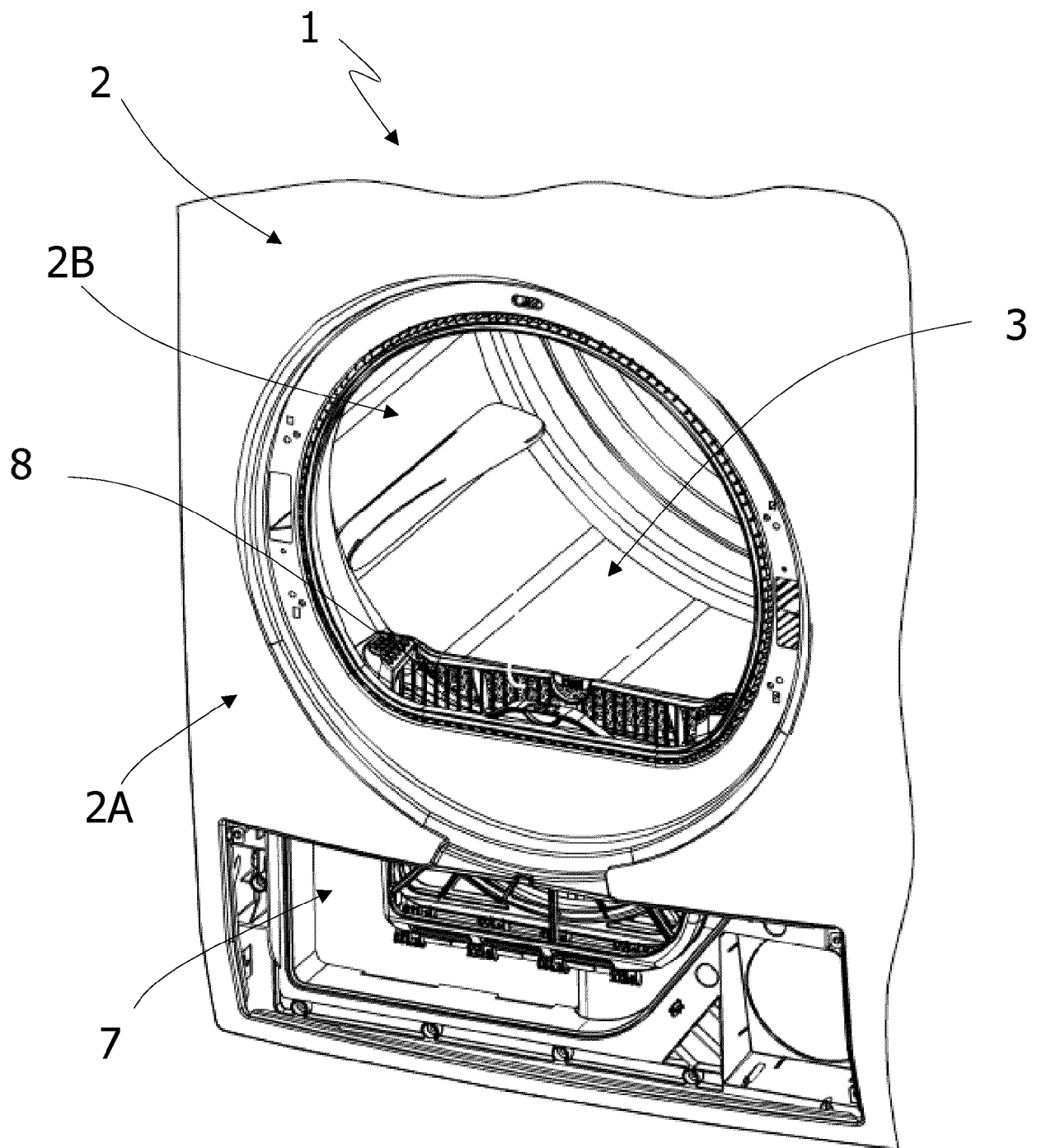


FIG 1B

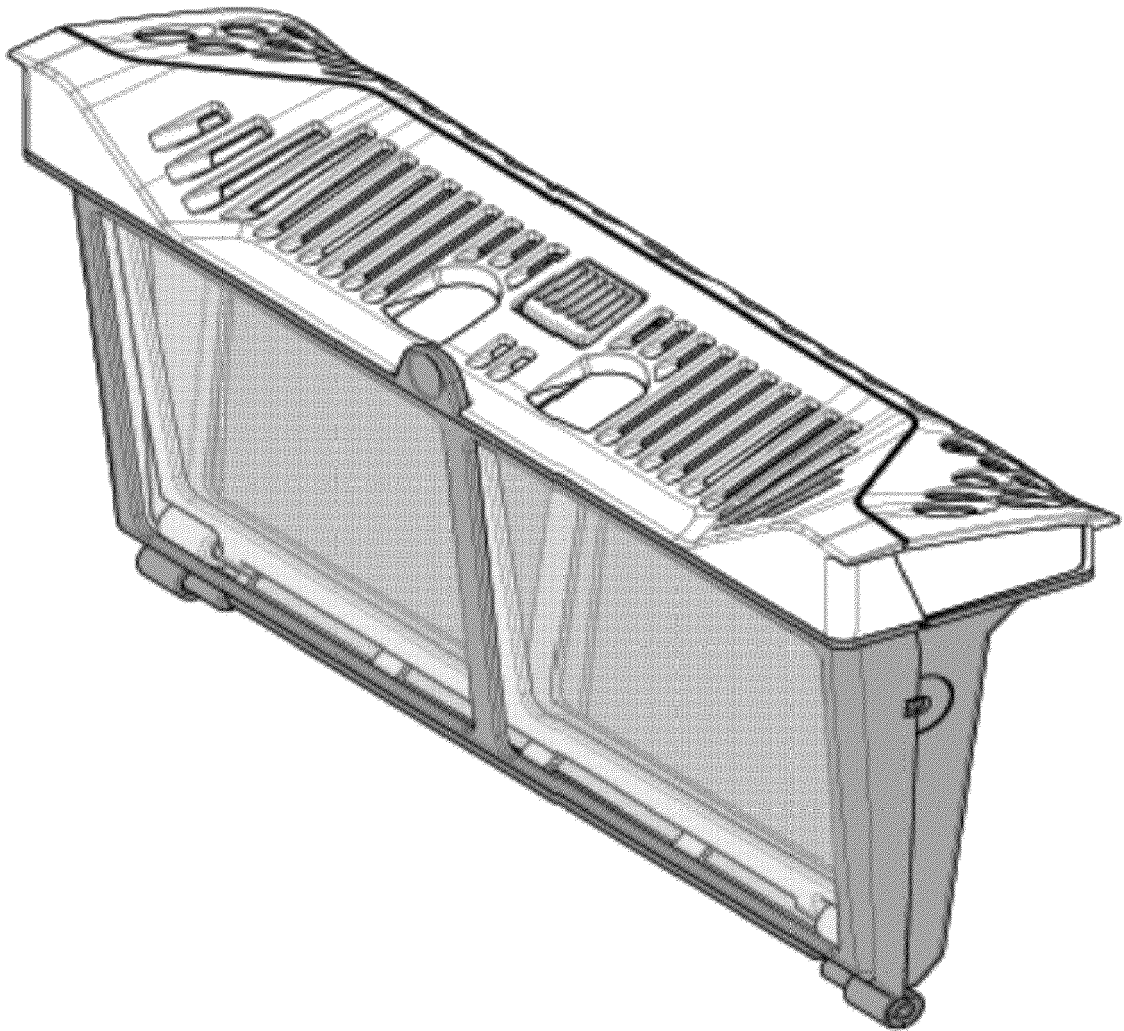


FIG 2A (PRIOR ART)

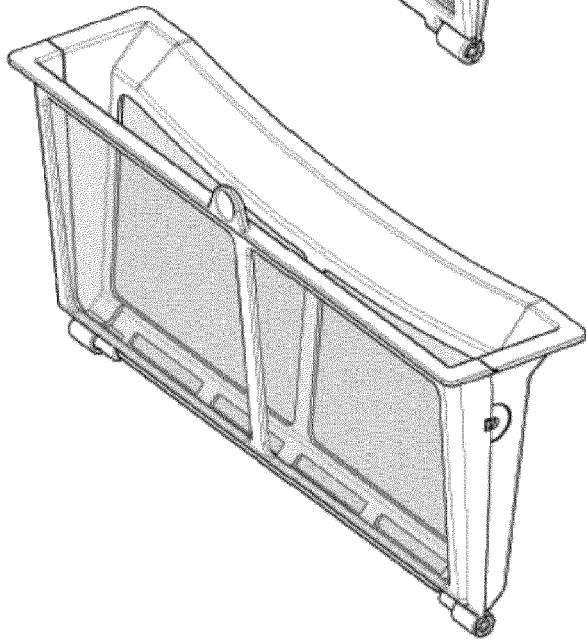
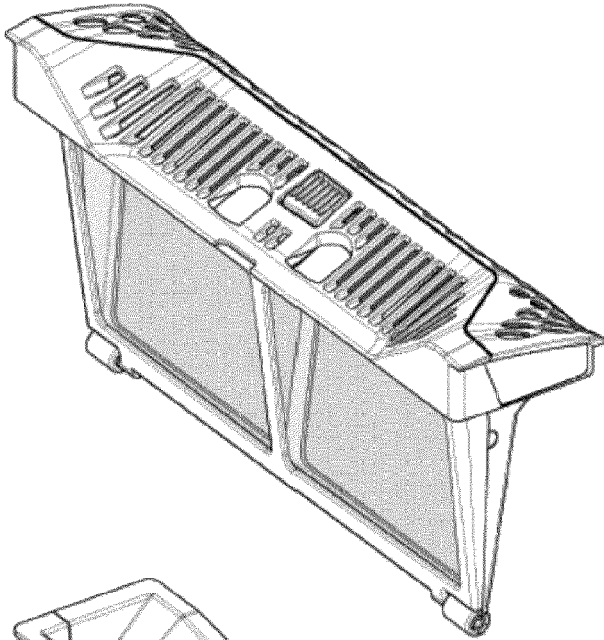


FIG 2B (PRIOR ART)

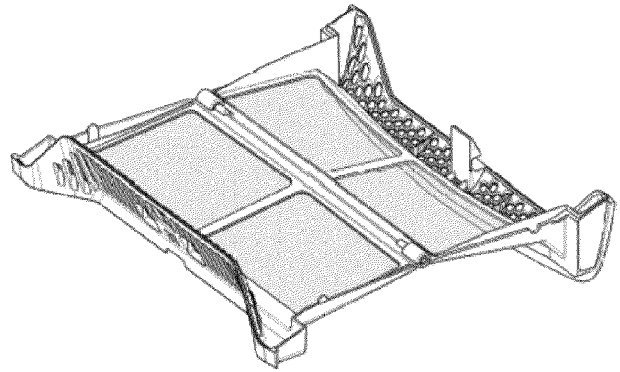


FIG 2C (PRIOR ART)

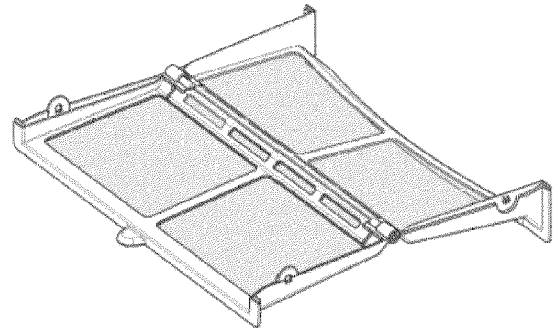


FIG 2D (PRIOR ART)

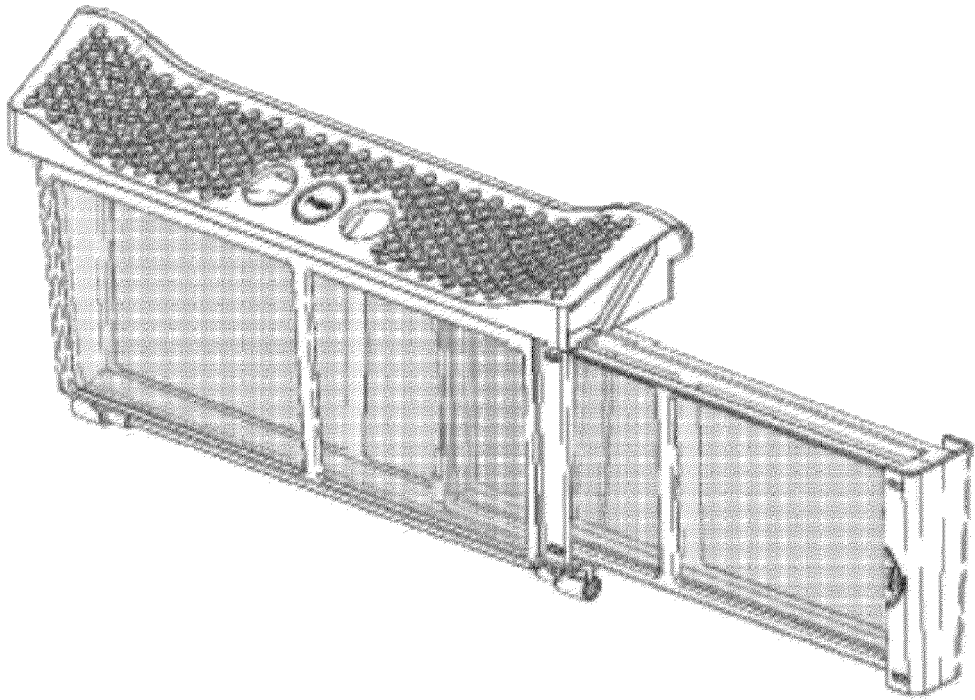


FIG 2E (PRIOR ART)

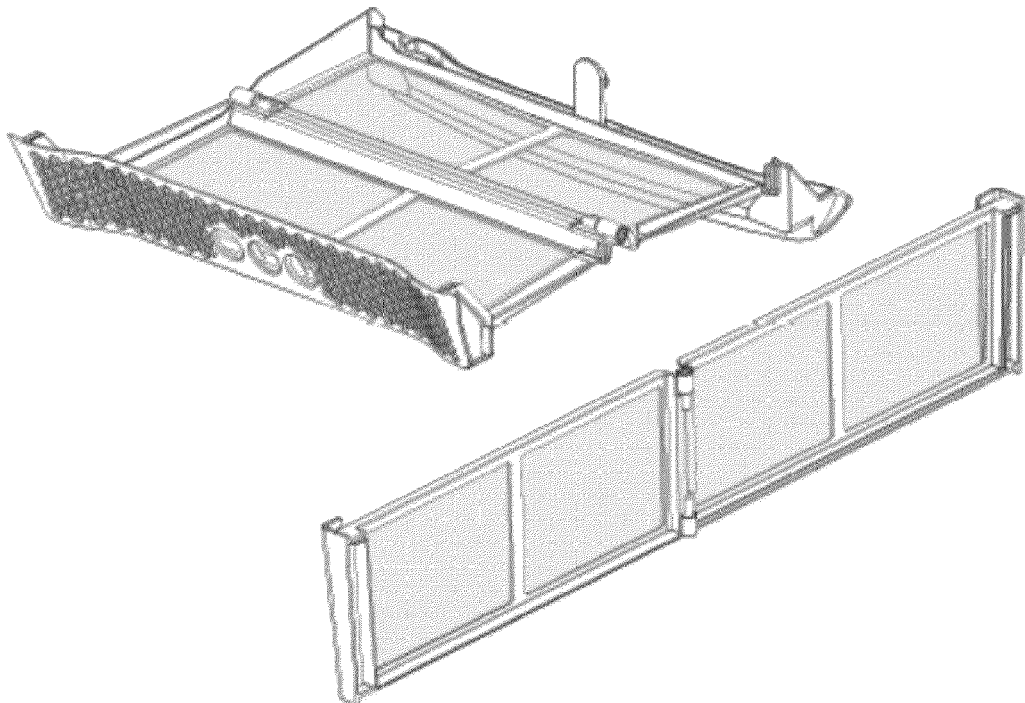


FIG 2F (PRIOR ART)

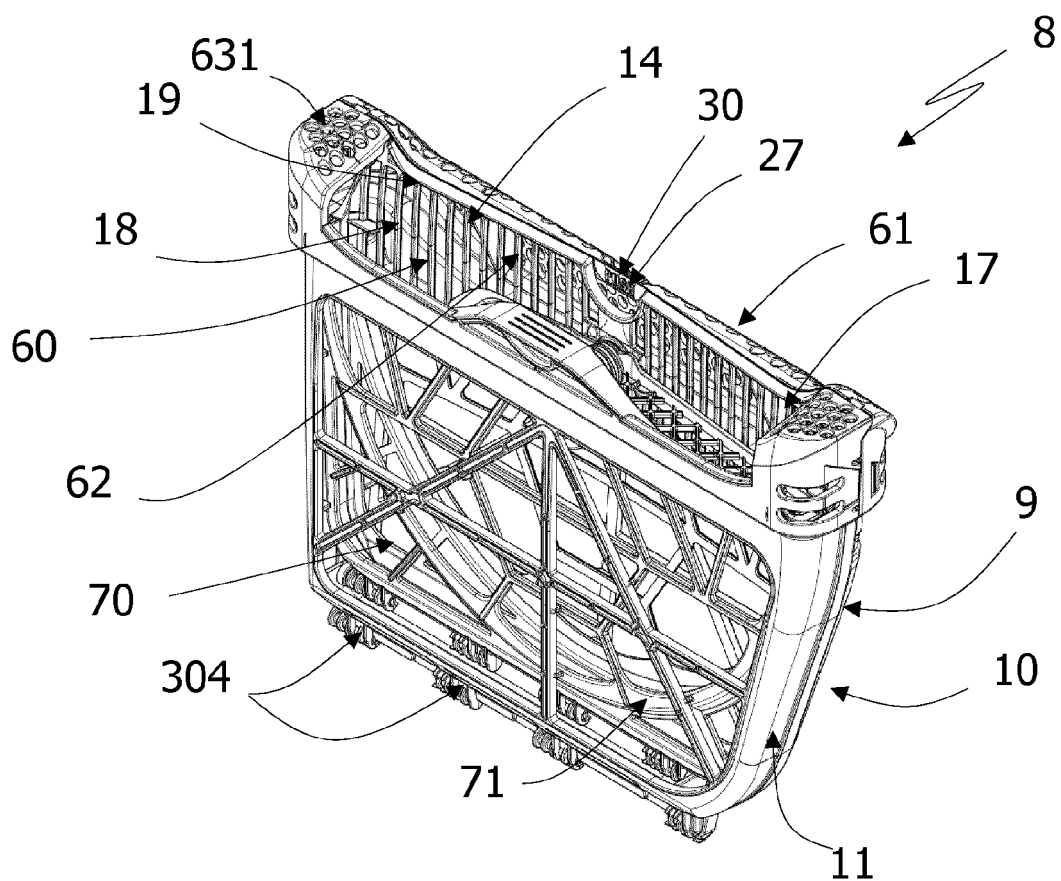


FIG 3

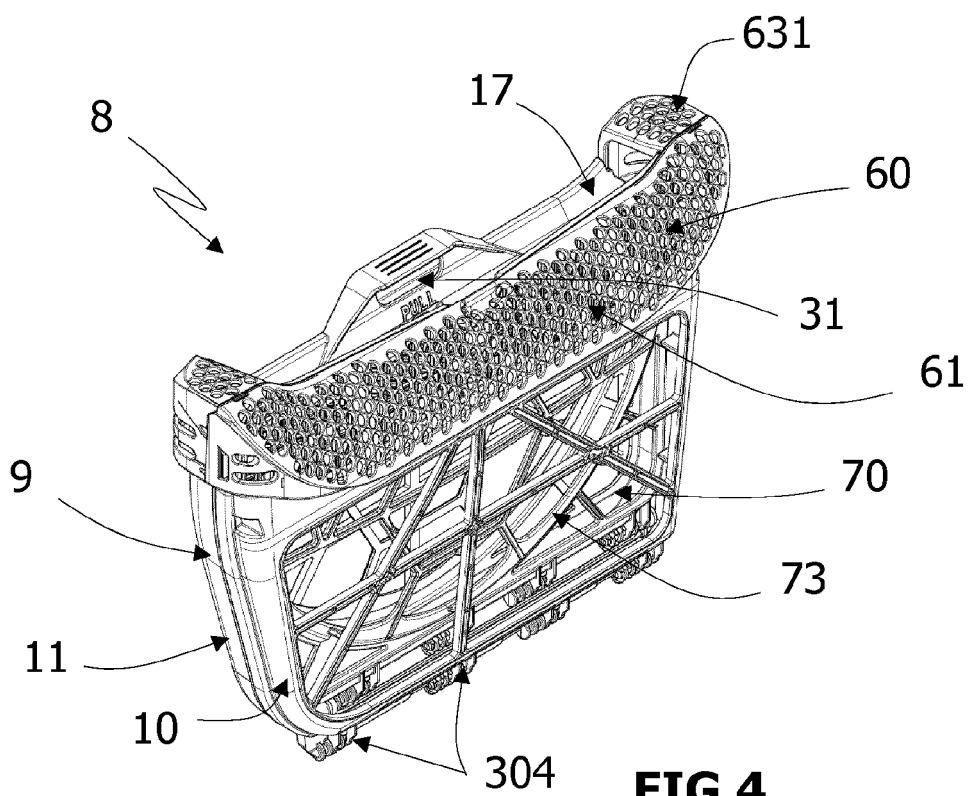


FIG 4

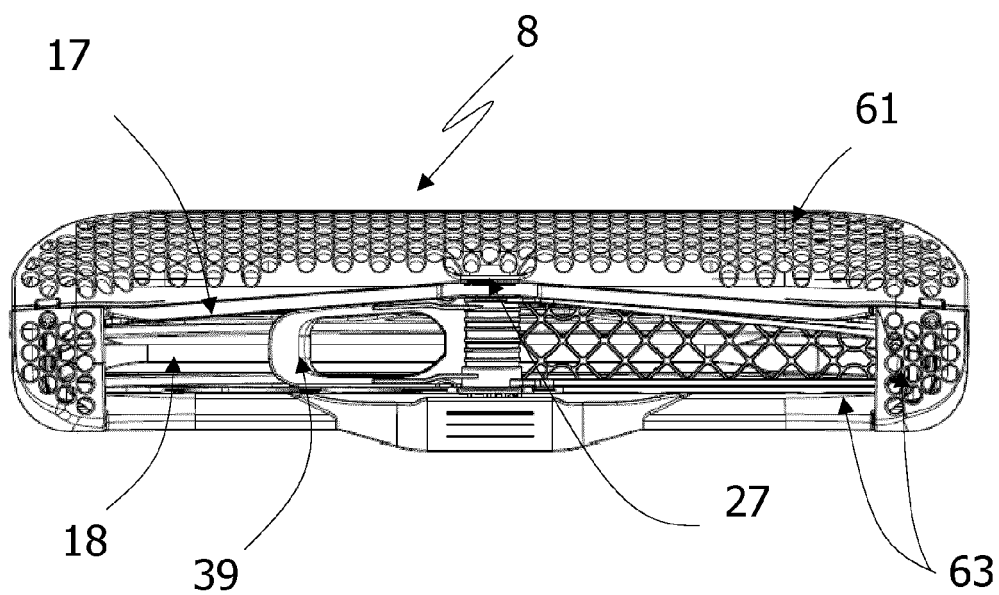


FIG 5

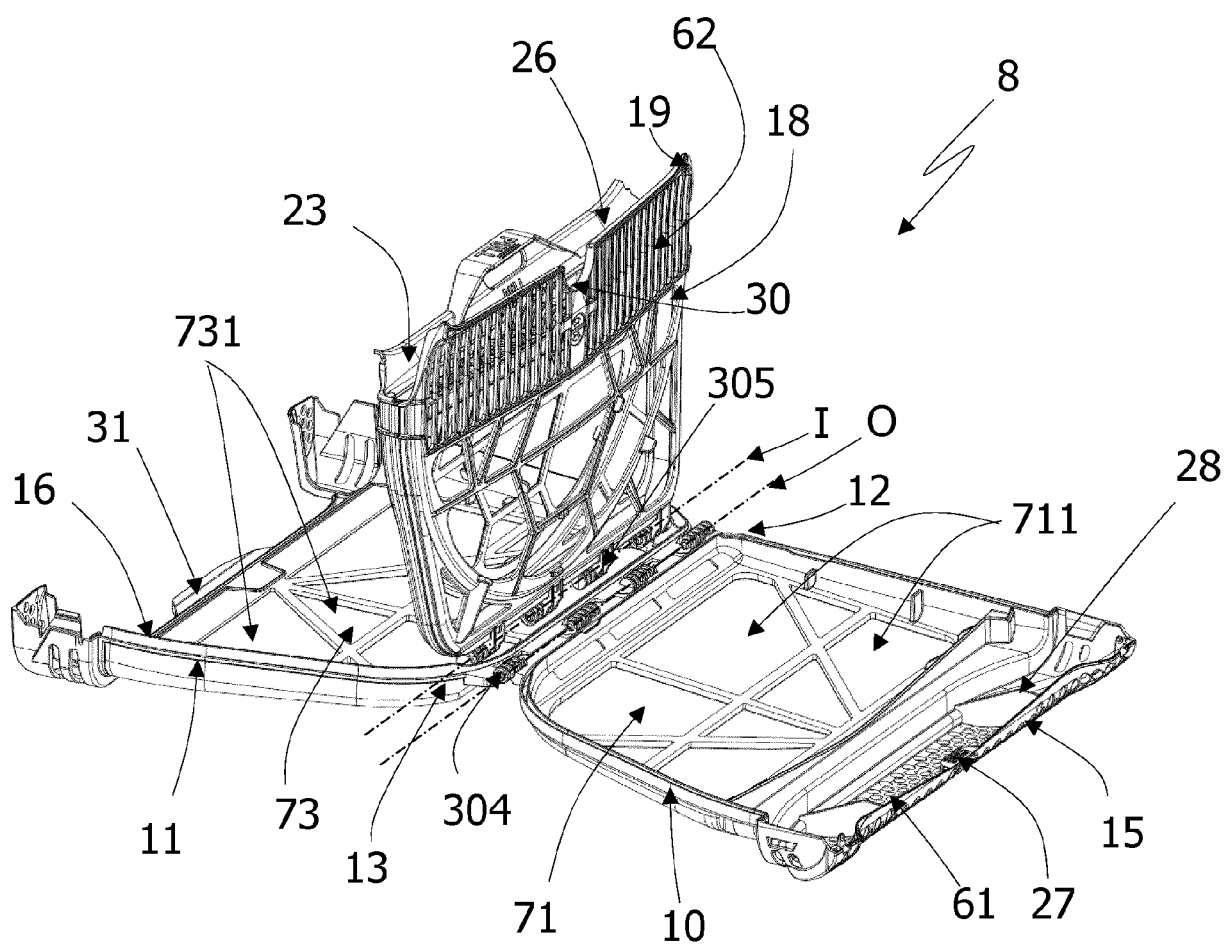
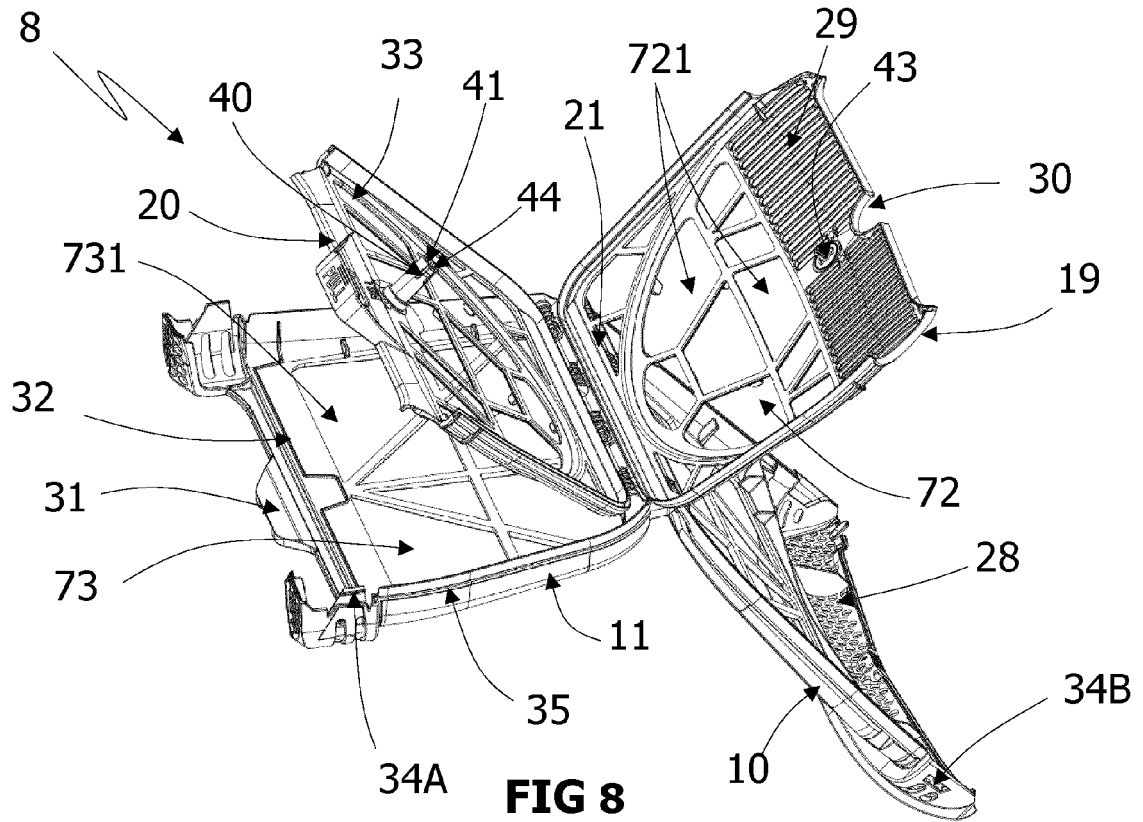
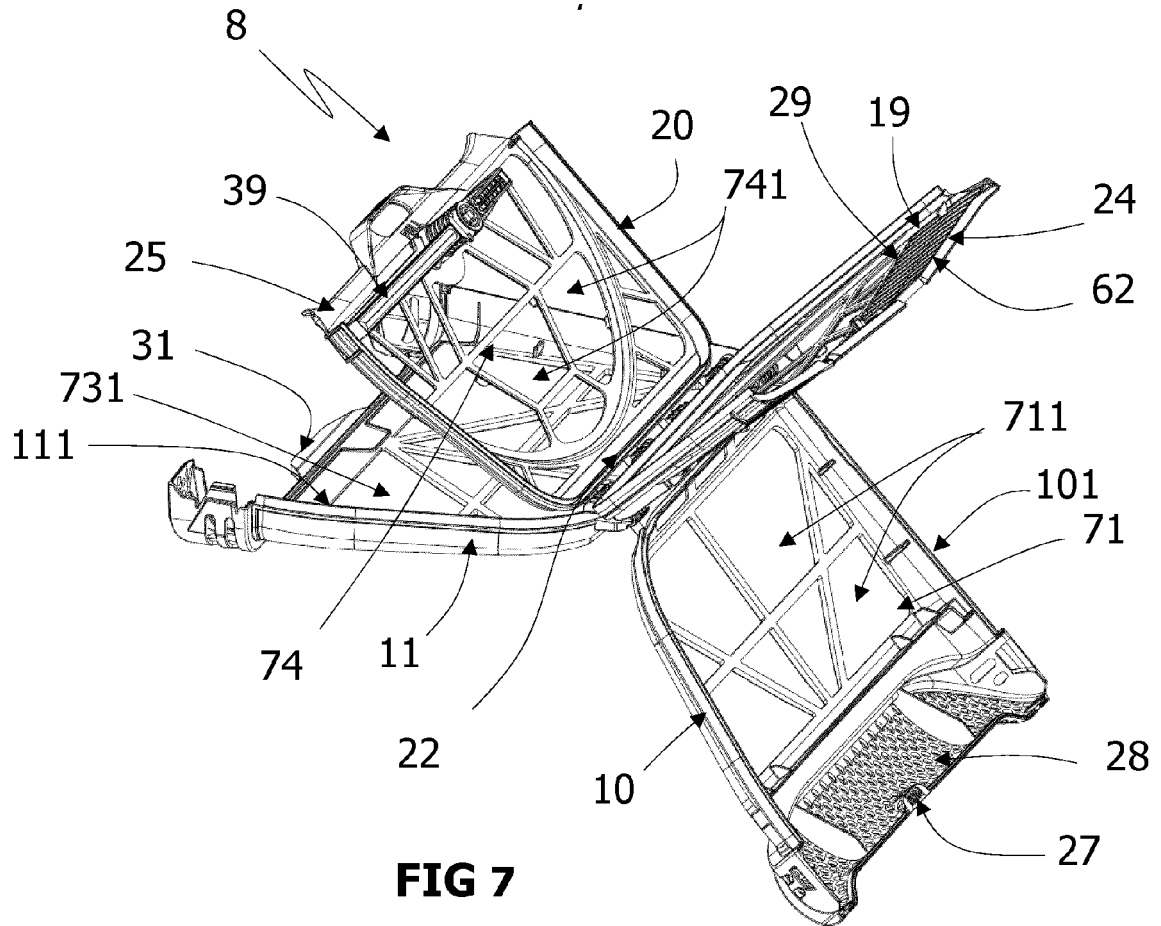


FIG 6



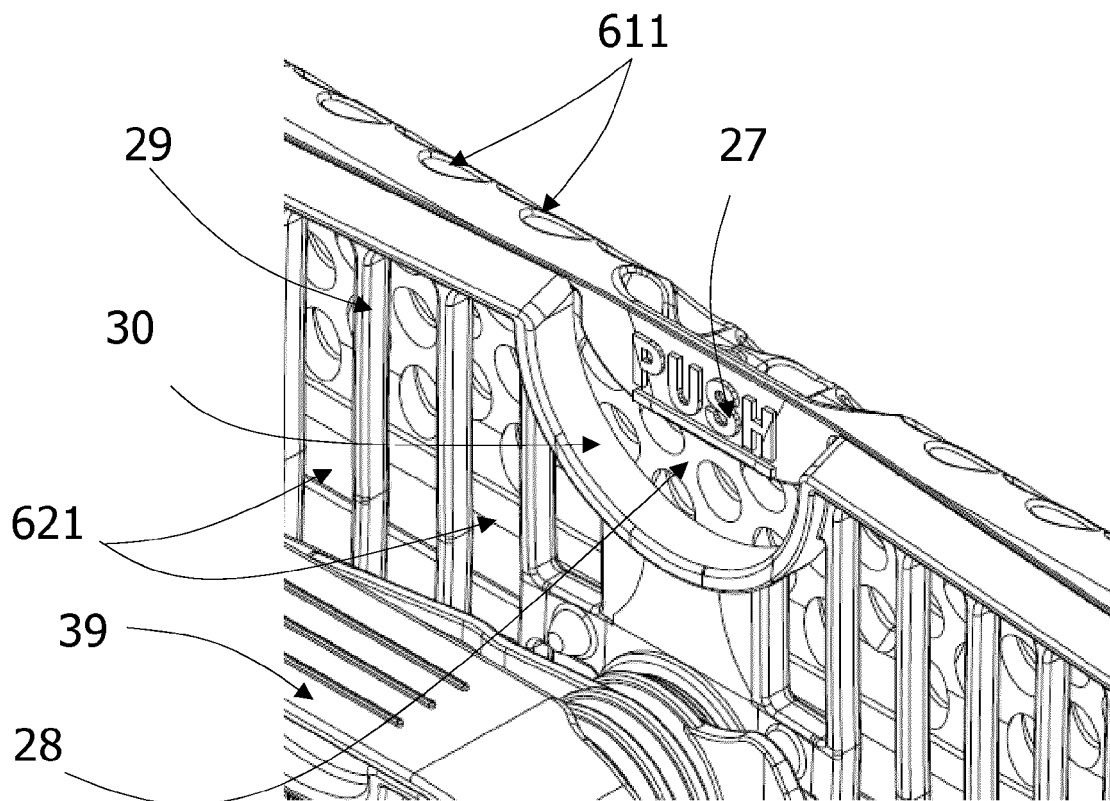


FIG 9

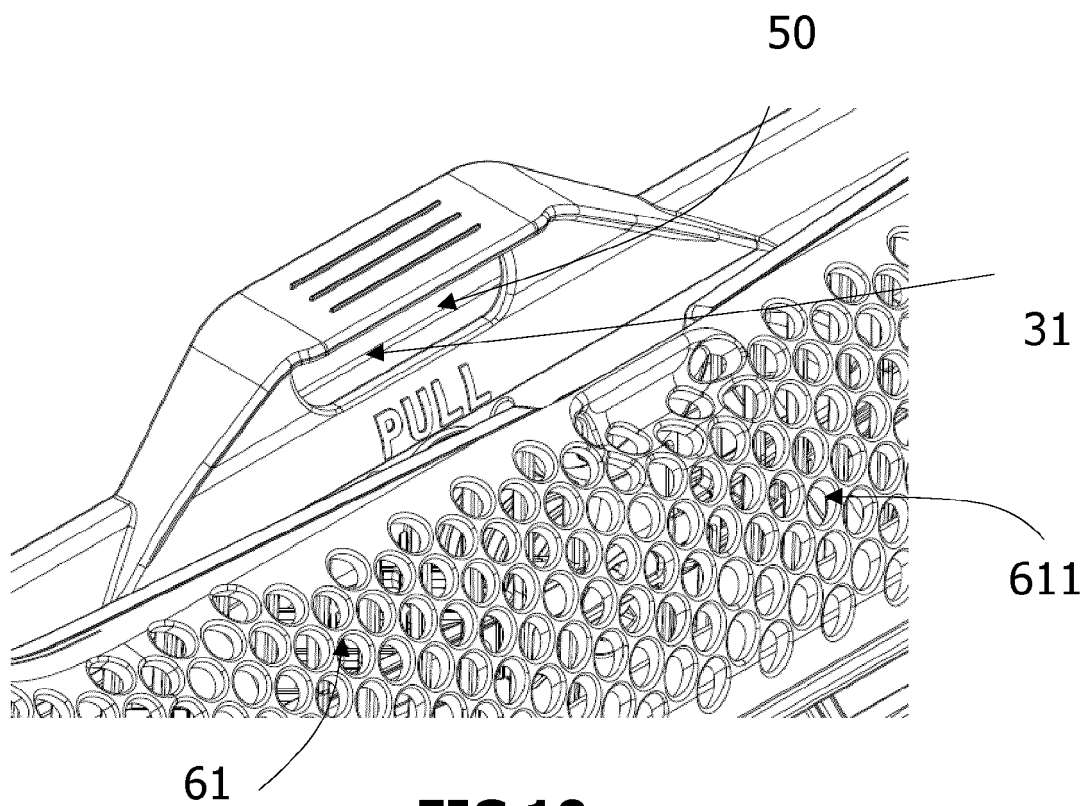


FIG 10

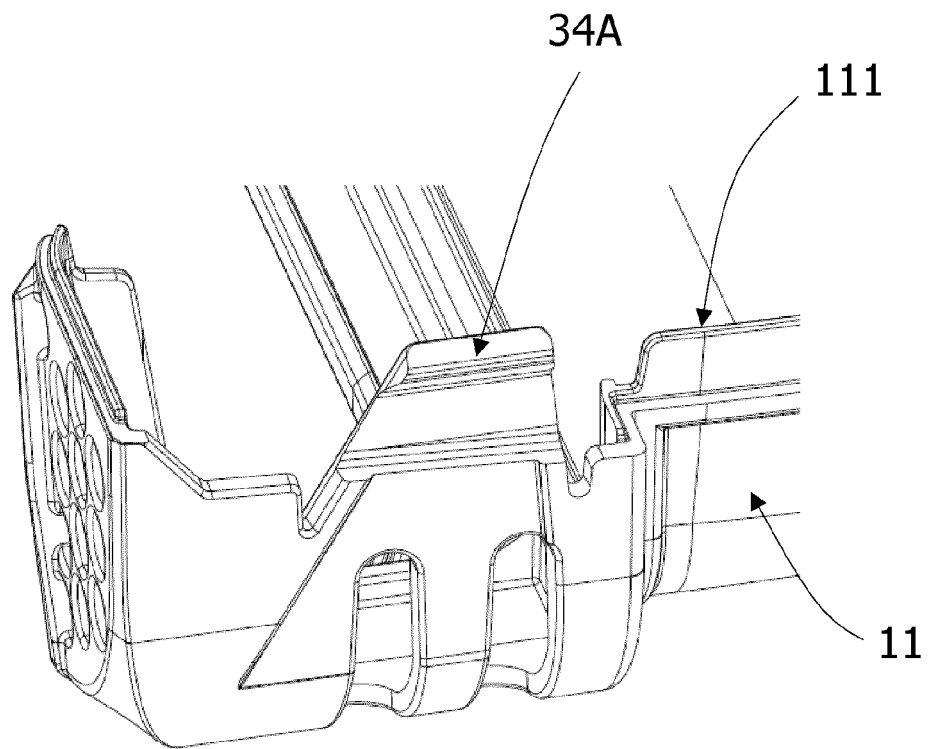


FIG 11

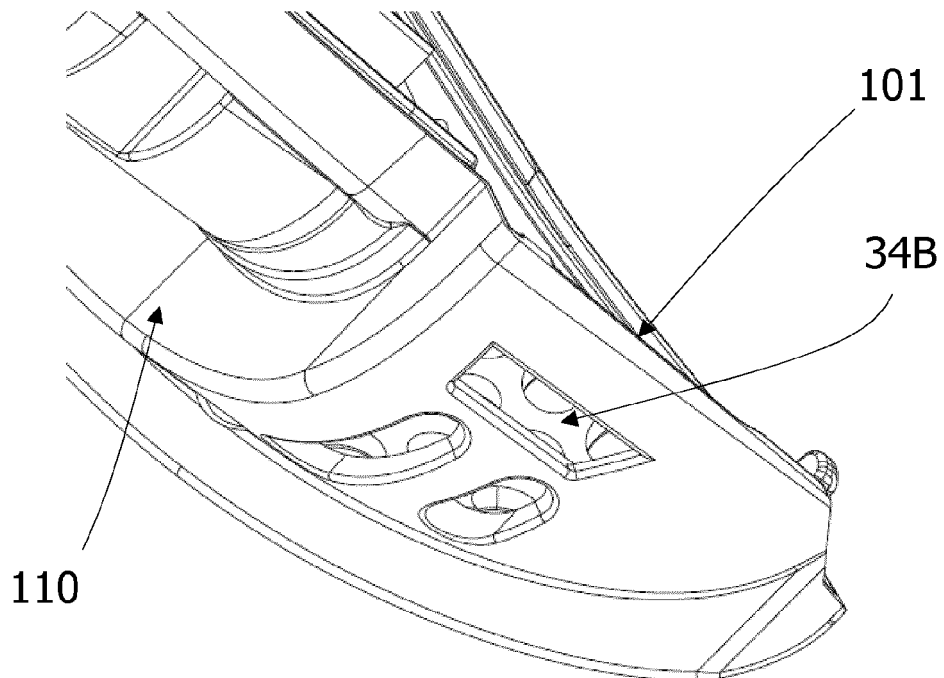
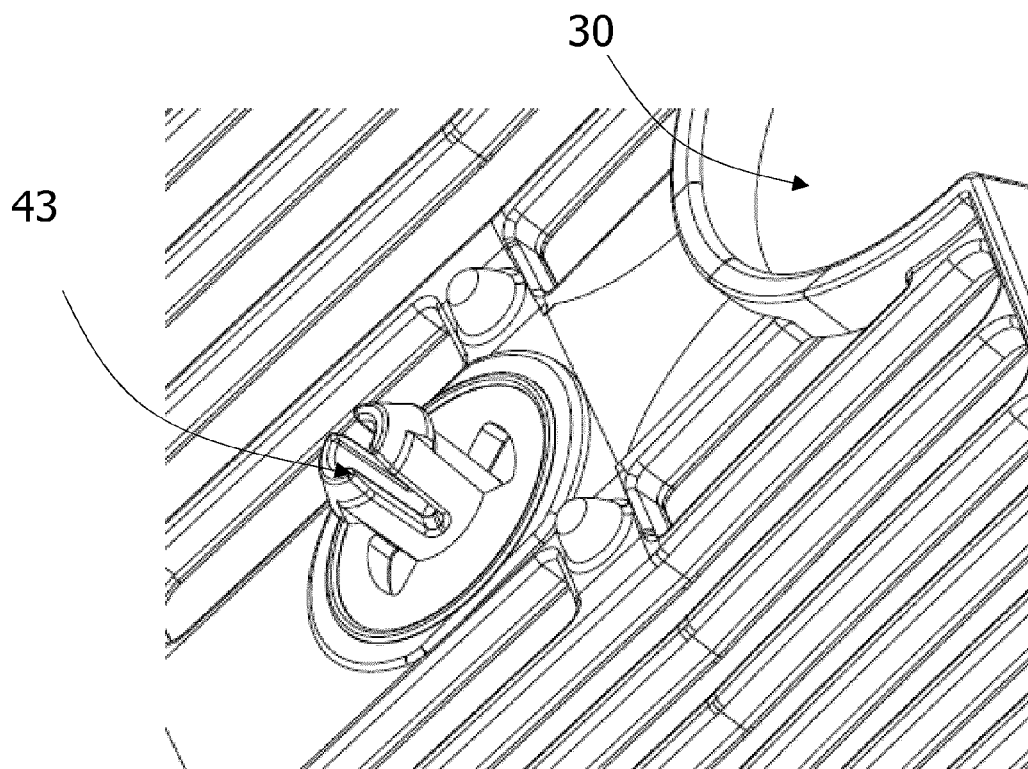
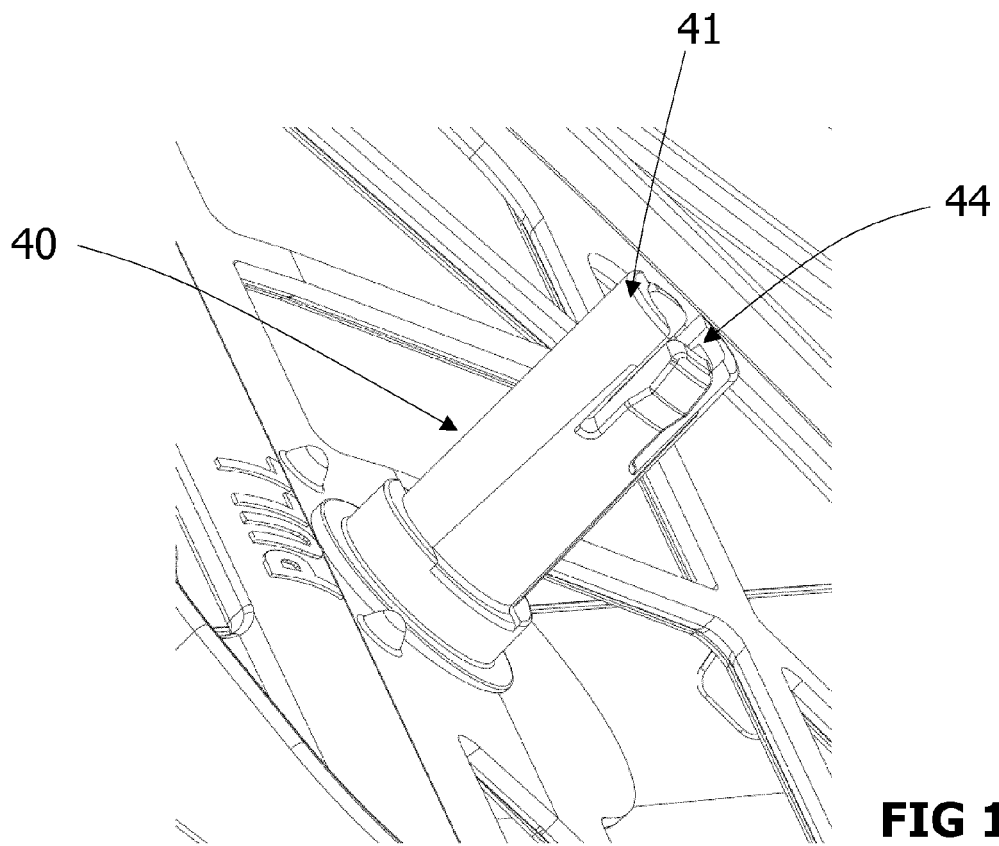


FIG 12



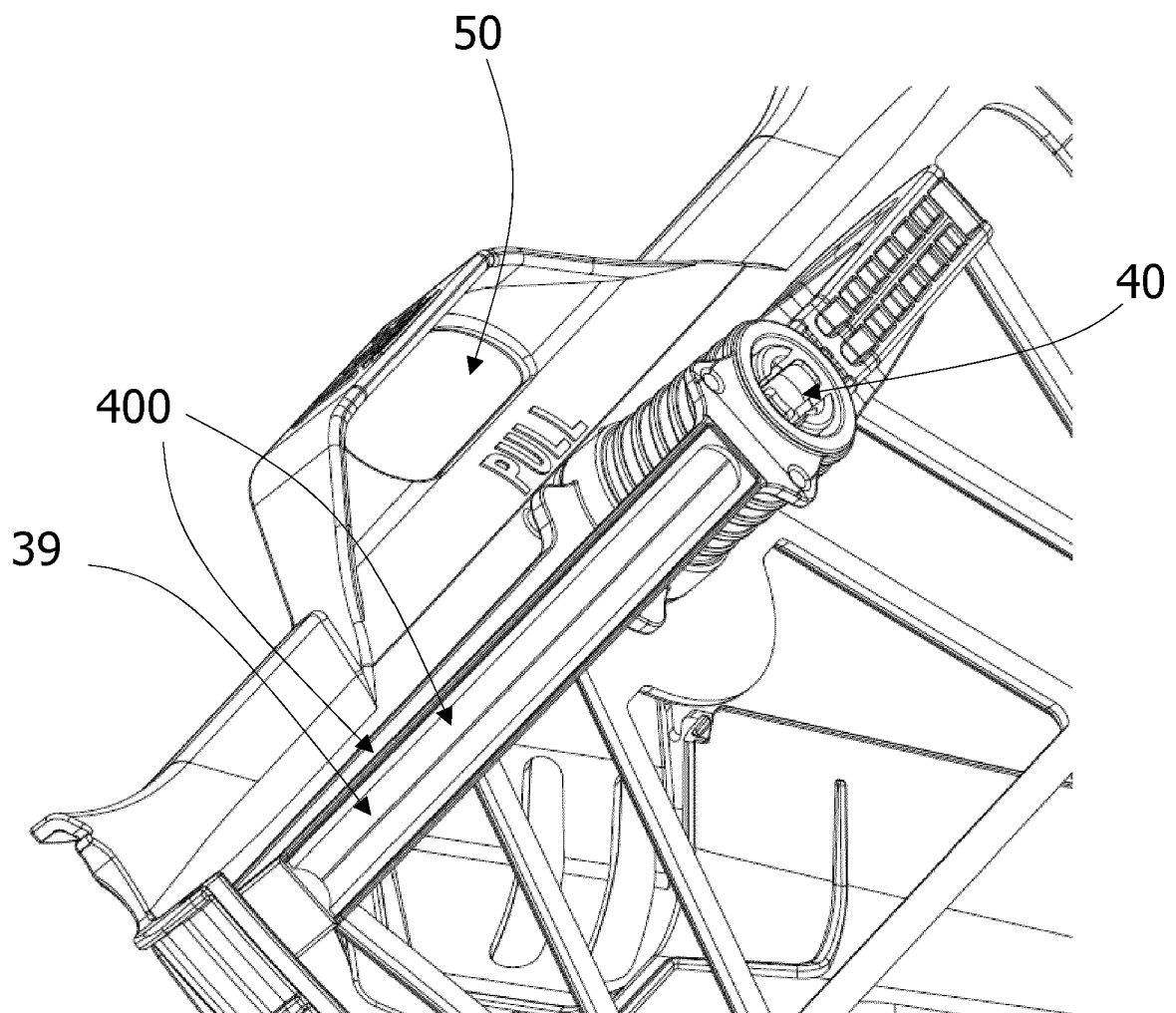


FIG 15

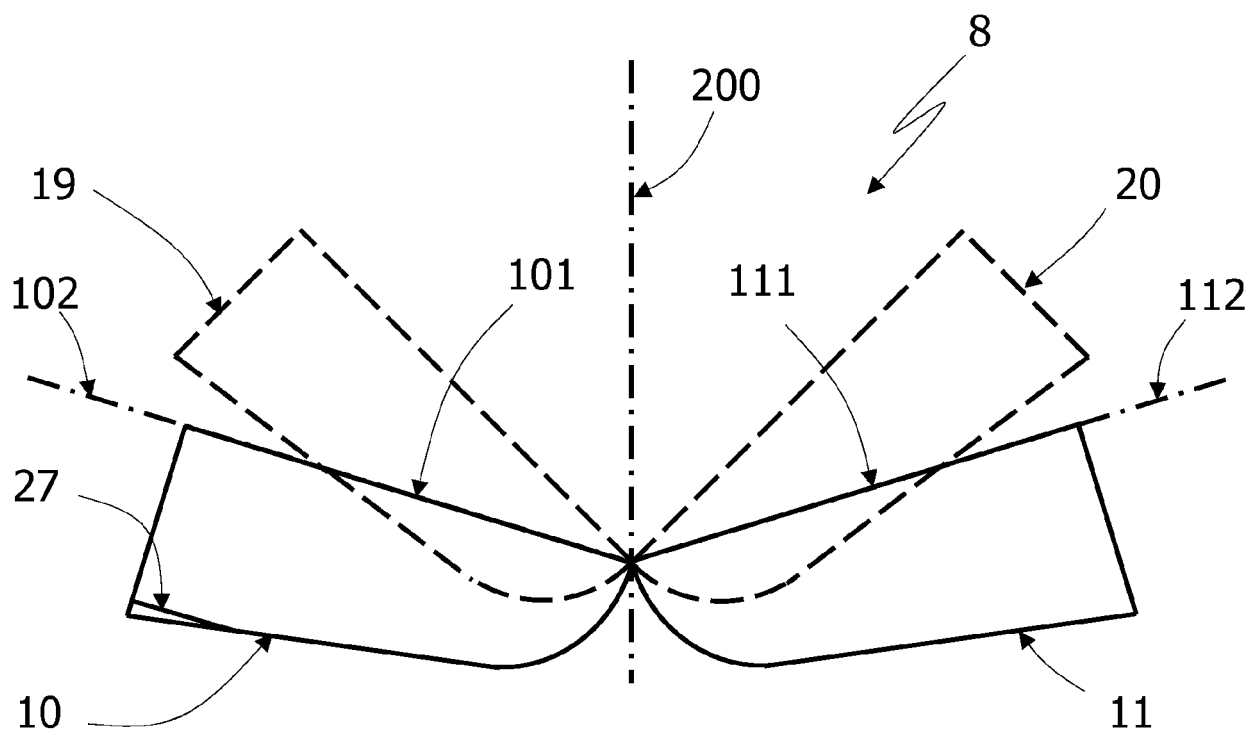


FIG 16

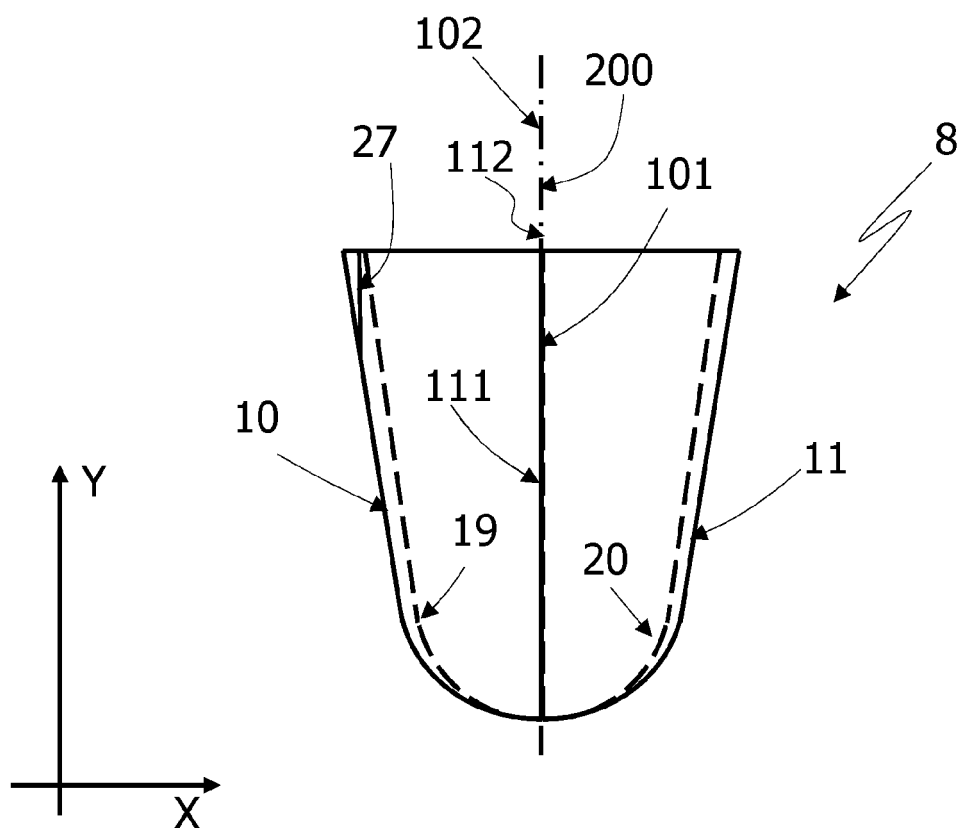


FIG 17

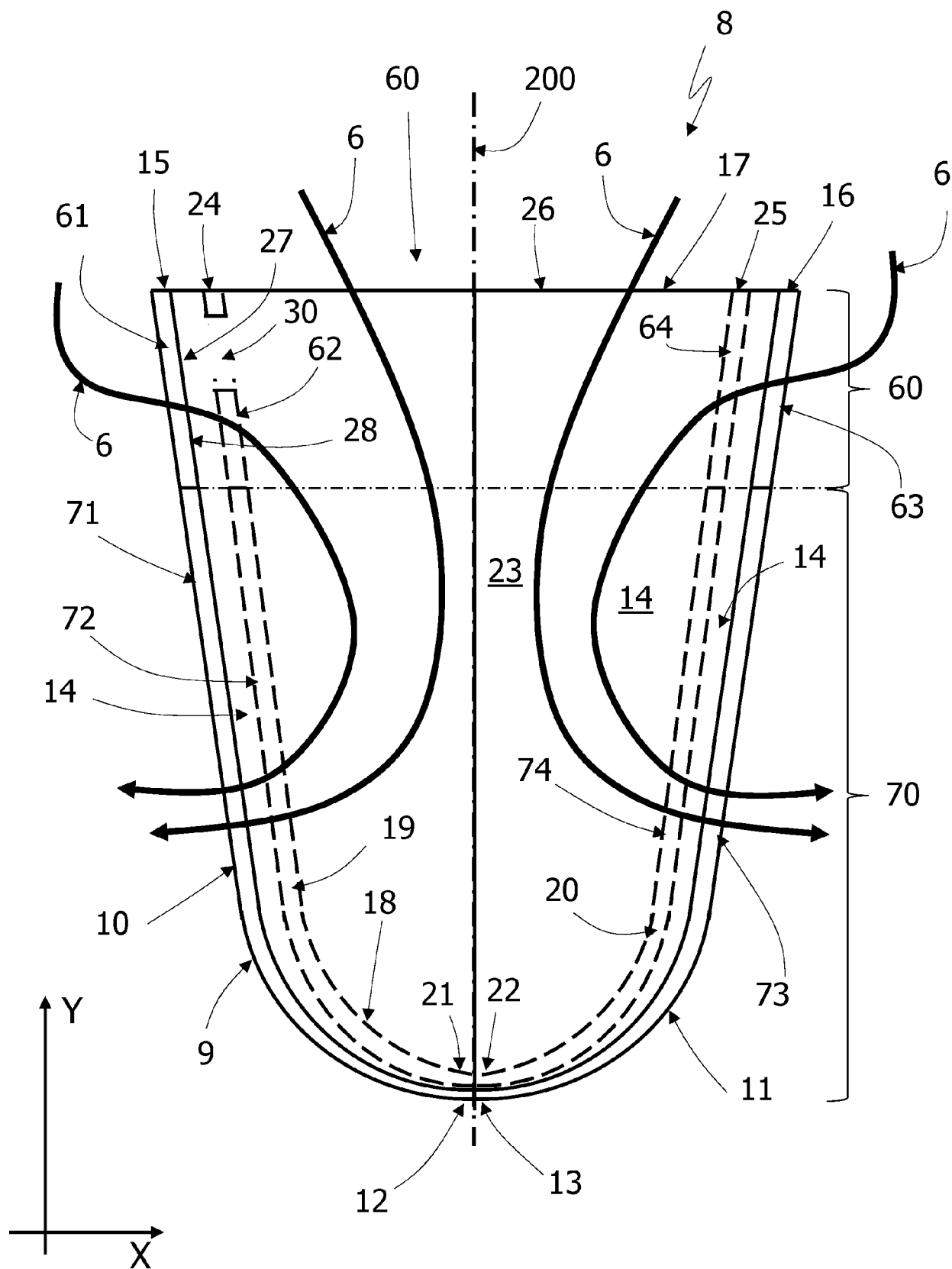


FIG 18

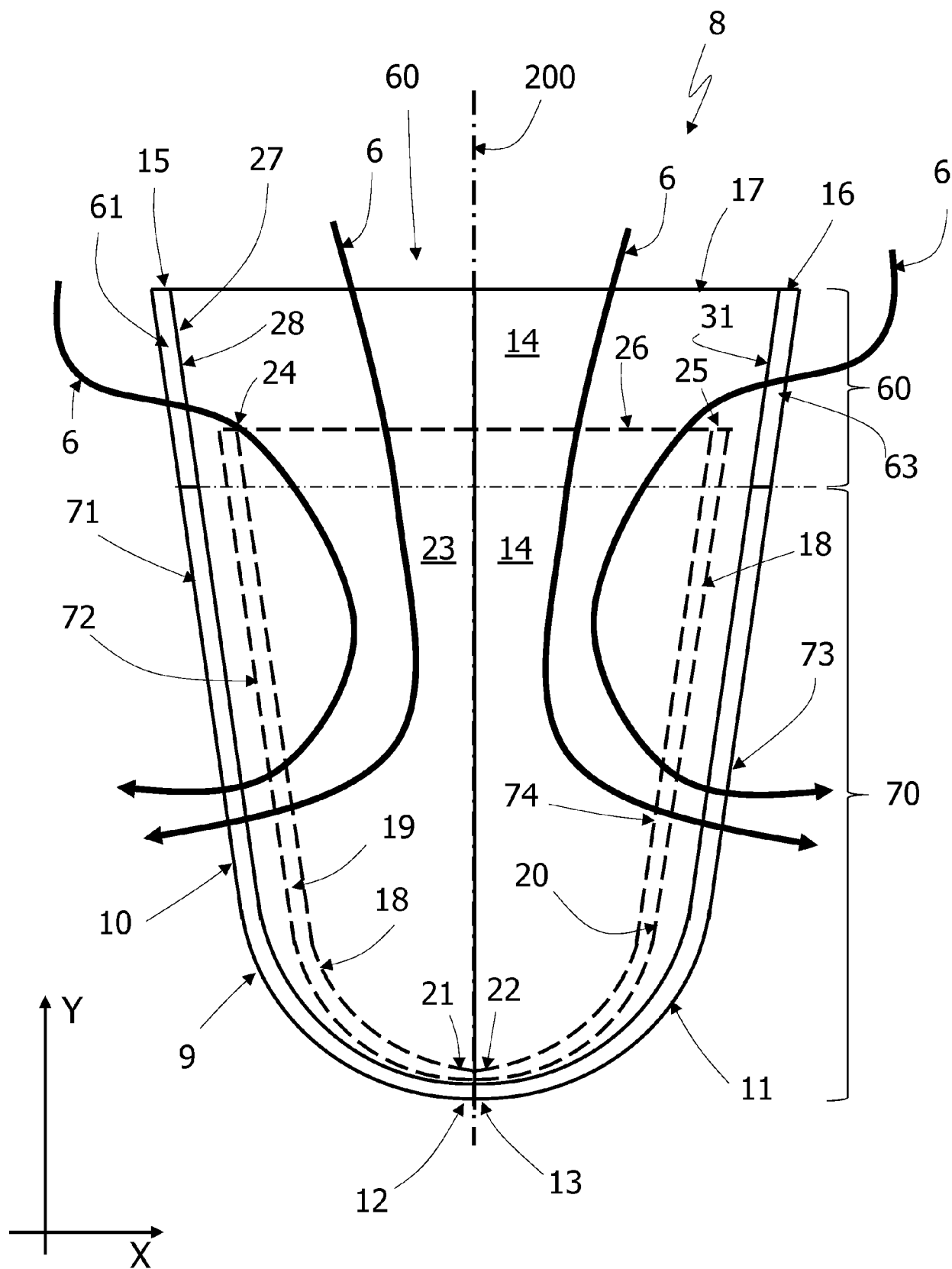
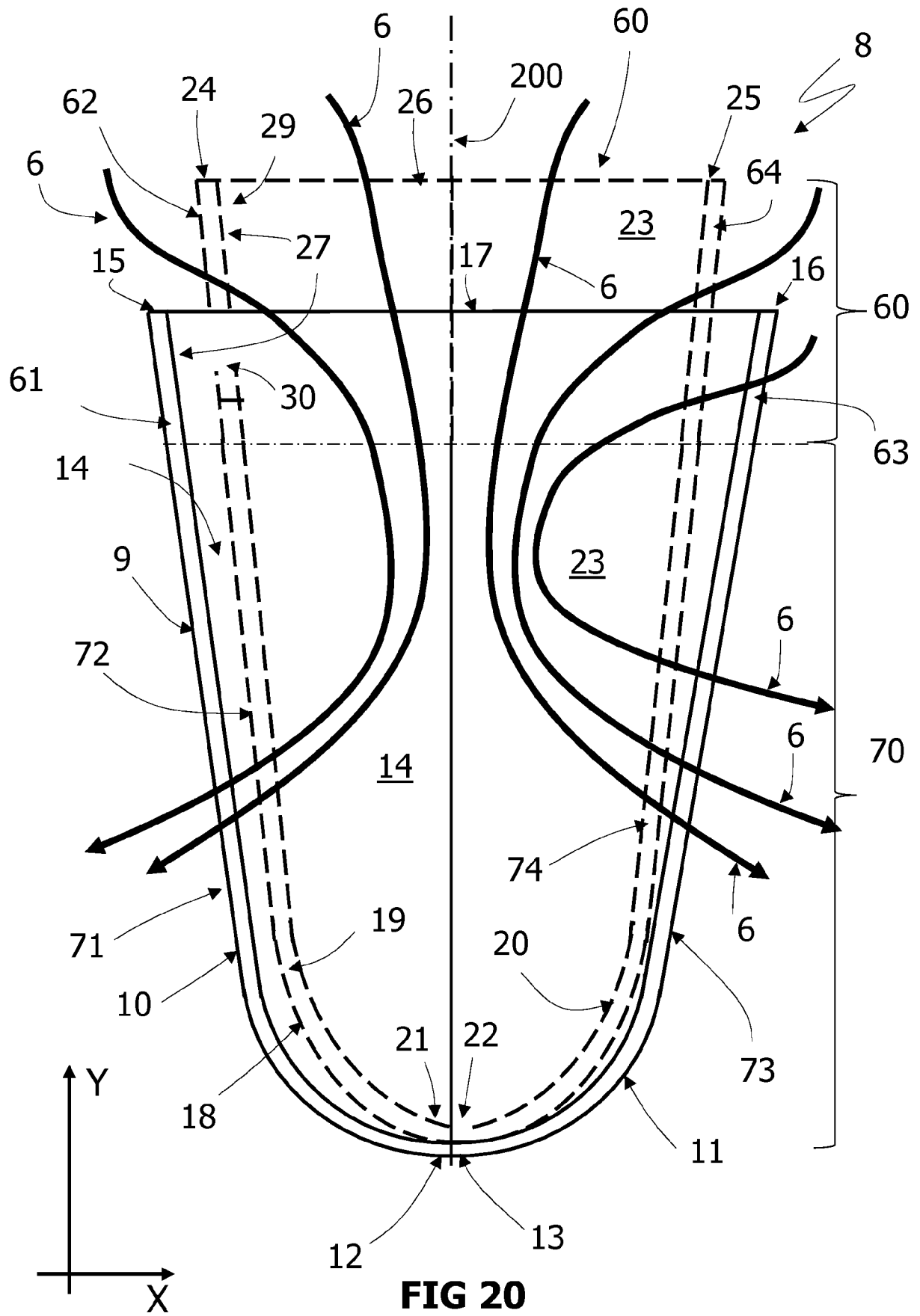


FIG 19





EUROPEAN SEARCH REPORT

Application Number

EP 23 16 5205

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A	WO 2019/184726 A1 (QINGDAO HAIER DRUM WASHING MACHINE CO LTD [CN]) 3 October 2019 (2019-10-03) * abstract *	1-15	
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			D06F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		13 September 2023	Stroppa, Giovanni
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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