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(54) **Laundry dryer**

(57) Laundry dryer (1) comprising an outer casing (2) having a front wall (2a) provided with a laundry loading/unloading pass-through opening, and an air-filtering cartridge (15) which is fitted in removable manner into an air-vent (10) which is passed through by a laundry drying airflow (f). the air-filtering cartridge (15) comprises a first substantially bag- or pocket-shaped, air-filtering shell or vessel (20, 120) which is dimensioned for being inserted/plugged into said air-vent (10) and is structured to restrain the fluff and/or lint particles in suspension into the airflow (f); the air-filtering cartridge (15) furthermore comprising a second substantially bag- or pocket-shaped, air-filtering shell or vessel (30, 130) which is fitted/recessed into said first air-filtering shell or vessel (20, 120) so as to be crossed by substantially the same airflow (f) that crosses the first air-filtering shell or vessel (20 120), is structured to restrain the fluff and/or lint particles in suspension into the airflow (f), and is mechanically coupled to said first air-filtering shell or vessel (20, 120) in sliding manner.

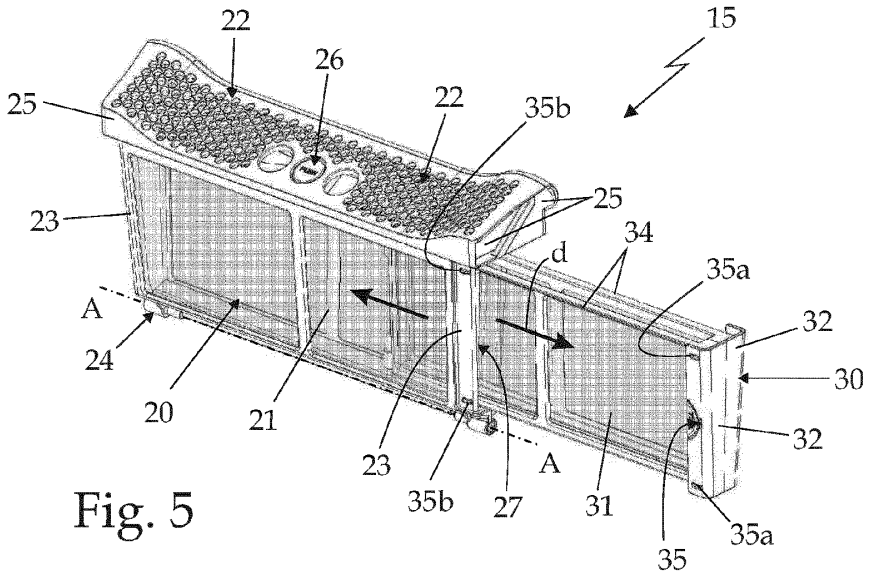

Fig. 5

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Description

[0001] The present invention relates to a laundry dryer.

[0002] More in particular, the present invention relates to a rotary-drum household laundry dryer to which the following description refers purely by way of example without implying any loss of generality.

[0003] As it is known, rotary-drum household laundry dryers currently on the market generally comprise: a substantially parallelepiped-shaped, outer boxlike casing structured for resting on the floor; a substantially cylindrical rotatable drum which is structured for housing the laundry to be dried and which is housed in axially rotating manner inside the casing so to rotate about a substantially horizontally-oriented longitudinal reference axis, directly facing a laundry loading/unloading opening formed in the front wall of the casing; a porthole door hinged to the front wall of the casing to rotate to and from a closing position in which the door rests completely against the front wall of the casing to close the laundry loading/unloading opening and airtight seal the rotatable drum; an electrically-powered motor assembly which is housed inside the casing and is structured for driving into rotation the rotatable drum about its longitudinal reference axis; a closed-circuit, hot-air generator which is housed inside the casing and is structured to circulate inside the rotatable drum a stream of hot air which has a very low moisture content and flows through the rotatable drum and over the laundry inside the drum to rapidly dry the laundry; and finally an electronic central control unit which controls both the motor assembly and the hot-air generator to perform, on command, one of the user-selectable drying cycles stored in the same central control unit.

[0004] In most of the rotary-drum household laundry dryers currently on the market, the rotatable drum furthermore consists in a substantially cylindrical, rigid tubular body which is generally made of metal material and extends substantially horizontally inside the boxlike casing, locally aligned to the laundry loading/unloading opening. This rigid tubular body may be furthermore structured for resting on a number of idle supporting rollers which are arranged at the two axial ends of the tubular body locally parallel to the drum longitudinal reference axis, and are fixed to the boxlike casing in free revolving manner so as to allow the tubular body to freely rotate about its horizontally-oriented longitudinal reference axis. The circular front rim of the tubular body surrounds the laundry loading/unloading opening and is coupled in substantially airtight and axially rotating manner to the front wall of the boxlike casing; whereas the circular rear rim of the tubular body abuts against the rear wall of the boxlike casing and is coupled in substantially airtight and axially rotating manner directly to said rear wall.

[0005] The closed-circuit, hot-air generator in turn comprises: an air recirculating conduit which extends on the bottom of the boxlike casing and has a first end directly connected to a first air-vent realized in the rear wall of the boxlike casing, within the perimeter of the rear rim of the tubular body, and a second end directly connected to a second air-vent realized on the annular frame that delimits the laundry loading/unloading opening on the front wall of the casing; and an electrically-powered centrifugal fan which is located along the air recirculating conduit and is structured to produce an airflow which flows in closed loop through the air recirculating conduit and the rotatable drum.

[0006] The stream of hot air produced by the hot-air generator generally enters into the tubular body via the first air-vent realized in the rear wall of the boxlike casing, flows inside the tubular body for the entire length of the latter, and finally comes out of the tubular body via the second air-vent realized on the annular frame that delimits the laundry loading/unloading opening on the front wall of the casing.

[0007] The closed-circuit, hot-air generator furthermore comprises: an air-cooling device which is located along the air recirculating conduit, and is structured to cool the moist air arriving from the rotatable drum, so as to cause the condensation of the surplus moisture inside the airflow; an air-heating device which is located along the air recirculating conduit, downstream of the air-cooling device, and which is structured for heating the dehumidified airflow arriving from the air-cooling device and directed back to the rotatable drum, so that the airflow directed back into the rotatable drum is heated to a temperature preferably, though not necessarily, higher than or equal to that of the moist air flowing out of the same rotatable drum.

[0008] The closed-circuit, hot-air generator is finally provided with an air-filtering member which is arranged along the air recirculating conduit, upstream of the air-cooling device, to prevent the fluff and/or lint particles from reaching and clogging up the air-cooling device, the air-heating device and the centrifugal fan.

[0009] In some of the rotary-drum household laundry dryers currently on the market, the air-filtering member consists in a substantially wedge-shaped filtering cartridge which is fitted in removable manner into the air-vent realized on the annular frame that delimits the laundry loading/unloading opening on the front wall of the casing, so to cover/close the whole air-vent. Thus, when the porthole door is in the wide-opened position, the user is allowed to manually extract the wedge-shaped filtering cartridge from the air-vent realized on the annular frame that delimits the laundry loading/unloading opening for periodical cleaning.

[0010] DE8437357U1 discloses a wedge-like filtering cartridge for laundry driers which consists in a substantially bag- or pocket-shaped rigid shell which has a V-shaped cross section and is dimensioned for being inserted/plugged into the air-vent realized on the annular frame that delimits the laundry loading/unloading opening, so as to cover/close the whole air-vent. This bag-shaped rigid shell is furthermore divided into two or four valve-like pieces which are laterally hinged to one another, so that the rigid shell is openable in a book-like or

leaflet-like manner. The flat central portion of each valve-like piece is provided with a large throughout opening which is completely covered with a close-mesh net capable to restrain the fluff and/or lint particles within the bag-shaped rigid shell.

[0011] Unluckily, periodical cleaning of the DE8437357U1 wedge-like filtering cartridge is particularly unpleasant to the user because the particular structure of the filtering cartridge allows the fluff and/or lint particles to accumulate on opposite faces of the inner and outer valve-like pieces, creating several problems at opening of the filtering cartridge.

[0012] Aim of the present invention is to provide a laundry dryer having an air-filtering cartridge which is easier to clean.

[0013] In compliance with the above aims, according to the present invention there is provided a laundry dryer having an air-filtering cartridge as claimed in Claim 1 and preferably, though not necessarily, in any one of the dependent Claims.

[0014] A non-limiting embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

- Figure 1 is a perspective view, with parts removed for clarity, of a rotary-drum household laundry dryer realized in accordance with the teachings of the present invention;
- Figure 2 is a section view of the Figure 1 laundry dryer with parts removed for clarity;
- Figure 3 is a perspective view of a first embodiment of the air-filtering member of the Figure 1 laundry dryer;
- Figures 4 is a section view of the Figure 3 air-filtering member;
- Figures 5 and 6 show two partly-exploded perspective views of the Figure 3 air-filtering member;
- Figure 7 is a perspective view of a second embodiment of the air-filtering member of the Figure 1 laundry dryer;
- Figure 8 is a section view of the Figure 7 air-filtering member;
- Figures 9 and 10 show two partly-exploded perspective views of the Figure 7 air-filtering member.
- Figures 11 and 12 show two partly-exploded perspective views of a third embodiment of the air-filtering member of the Figure 1 laundry dryer;

[0015] With reference to Figures 1 and 2, reference number 1 indicates as a whole a rotary-drum household laundry dryer which comprises: a preferably, though not necessarily, parallelepiped-shaped, outer boxlike casing 2 which is structured for resting on the floor and is provided with reciprocally-faced, substantially vertically-oriented, front and rear walls 2a and 2b; a substantially cylindrical rotatable drum 3 which is structured for housing the laundry to be dried, and is fixed in axially rotating manner inside the boxlike casing 2 directly facing a laundry loading/unloading pass-through opening formed on the front wall 2a of casing 2; and a porthole door 4 hinged to the front wall 2a of casing 2 so to be able to rotate about a preferably, though not necessarily, vertically-oriented reference axis, to and from a closing position in which the porthole door 4 rests completely against the front wall 2a to close the laundry loading/unloading opening and substantially airtight seal the rotatable drum 3.

[0016] Inside the boxlike casing 2, the laundry dryer 1 additionally comprises an electrically-powered motor assembly 5 structured for driving into rotation the rotatable drum 3 about its longitudinal reference axis; a closed-circuit, hot-air generator 6 which is structured to circulate through the rotatable drum 3 a stream of hot air having a low moisture level, and which flows over and rapidly dries the laundry located inside the drum 3; an electronic central control unit (not shown in the drawing) controls the motor assembly 5, the hot-air generator 6 to perform, on command, one of the user-selectable drying cycles preferably, though not necessarily, stored in the same central control unit, a further control unit 7 may be provided for controlling the operation of compressor 19.

[0017] With reference to Figure 2, in particular, the rotatable drum 3 preferably consists in a substantially cylindrical-shaped, rigid tubular body 3 which is preferably made of metal material and extends inside the boxlike casing 2 coaxial to a preferably substantially horizontally-oriented, longitudinal reference axis L while remaining locally substantially aligned to the laundry loading/unloading opening on the front wall 2a of the boxlike casing 2. The substantially cylindrical-shaped, rigid tubular body 3 is furthermore preferably structured for resting on a number of idle supporting rollers 8 which are arranged approximately at the two axial ends of the tubular body 3 with their rotation axis locally substantially parallel to the longitudinal reference axis L of tubular body 3, and are fixed to the boxlike casing 2 in free revolving manner so as to allow the tubular body 3 to freely rotate about its longitudinal reference axis L inside the boxlike casing 2. Even if it is here described a drum supported by rotatable rollers, it should be understood that the present invention covers also an arrangement wherein the drum is supported by a shaft mechanically connected to the drum rear wall, i.e. the wall opposite to the drum front wall which is provided with an opening for loading/unloading laundry into/from the drum. Said shaft is also provided to rotate the drum.

[0018] The circular front rim 3f of tubular body 3 surrounds the laundry loading/unloading opening realized on the front wall 2a of boxlike casing 2 and is coupled in substantially airtight and axially rotating manner to the front wall 2a, preferably with the interposition of a first circular sealing gasket. The circular rear rim 3r of tubular body 3 instead abuts against the rear wall 2b of boxlike casing 2 and is coupled in substantially airtight and axially rotating manner directly to said rear wall 2b with the interposition of a second circular sealing gasket. Front and rear circular sealing gaskets are therefore substantially

coaxial to the longitudinal reference axis L of tubular body 3.

[0019] The stream of hot air produced by the hot-air generator 6 preferably enters into tubular body 3 through the rear mouth of tubular body 3, i.e. the mouth of tubular body 3 delimited by the rear rim 3r, flows inside tubular body 3 for the entire length of the latter, and finally comes out of tubular body 3 through the front mouth of tubular body 3, i.e. the mouth of tubular body 3 delimited by the front rim 3f, or vice versa.

[0020] In other words, the stream of hot air produced by the hot-air generator 6 preferably enters into tubular body 3 via a first air-vent 9 which is incorporated in the rear wall 2b of casing 2 locally aligned/faced to the rear mouth of tubular body 3, i.e. within the perimeter of the rear rim 3r of tubular body 3, and comes out of tubular body 3 via a second substantially slot-shaped, air-vent 10 which is preferably incorporated in the annular frame that, on front wall 2a, delimits the laundry loading/unloading opening of boxlike casing 2.

[0021] With reference to Figures 1 and 2, the hot-air generator 6 in turn is structured for gradually drawing air from rotatable drum 3; cooling down the air arriving from rotatable drum 3 so to extract and retain the surplus moisture in the air drawn from rotatable drum 3; heating the dehumidified air to a predetermined temperature, normally higher than the temperature of the air from rotatable drum 3; and finally feeding the heated, dehumidified air back into the rotatable drum 3, where it flows over, to rapidly dry, the laundry inside the drum.

[0022] In other words, hot-air generator 6 provides for continually dehumidifying and heating the air circulating inside rotatable drum 3 to rapidly dry the laundry inside the drum, and substantially comprises:

- an air recirculating conduit 11 which has a first end in direct communication with, i.e. fluidly connected to, the air-vent 9 located in rear wall 2b of casing 2, and a second end in direct communication with, i.e. fluidly connected to, the air-vent 10 preferably located in the annular frame that delimits the laundry loading/unloading opening on front wall 2a;
- an electrically-powered centrifugal fan 12 (part of its volute is shown in Figures 1 and 2) or other type of air circulating pump, which is located along recirculating conduit 11 to produce, inside recirculating conduit 11, an airflow f which flows through rotatable drum 3 and over the laundry inside drum 3;
- air-cooling device 13 which is located along the air recirculating conduit 11 preferably, though not necessarily, upstream of the centrifugal fan 12, and is structured to cool the moist air arriving from rotatable drum 3 so as to cause the quick condensation of the surplus moisture inside the airflow f; and
- air-heating device 14 which is located along the air recirculating conduit 11, downstream of the air-cooling device 13 and preferably also upstream of the centrifugal fan 12, and which is structured for heating the dehumidified airflow f arriving from the air-cooling device 13 and directed back to rotatable drum 3, so that the airflow f directed back into the rotatable drum 3 is heated to a temperature preferably, though not necessarily, higher than or equal to that of the moist air flowing out of the same rotatable drum 3.

[0023] With reference to Figure 2, the hot-air generator 6 lastly comprises a preferably substantially wedge-shaped, air-filtering cartridge 15 which is fitted in removable manner into the air-vent 10 preferably realized on the annular frame that delimits, on front wall 2a, the laundry loading/unloading opening of casing 2. This air-filtering cartridge 15 is dimensioned so as to cover/close the whole air-vent 10, i.e. the entrance of air recirculating conduit 11, and it is structured to restrain the fluff and/or lint particles in suspension into the airflow f so to prevent the same fluff and/or lint particles from reaching and clogging up the air-cooling device 13, the air-heating device 14 and the centrifugal fan 12 located along the air recirculating conduit 11.

[0024] With reference to Figures 1 and 2, in the example shown, in particular, the outer boxlike casing 2 preferably, though not necessarily, comprises a substantially parallelepiped-shaped lower supporting basement 16 which is structured for resting on the floor; and a substantially parallelepiped-shaped upper boxlike cabinet 17 which is rigidly fixed to the top of the lower supporting basement 16 and it is structured so as to house the rotatable drum 3.

[0025] In other words, the rotatable drum 3 extends inside the upper boxlike cabinet 17, immediately above the supporting basement 16; the laundry loading/unloading opening of boxlike casing 2 is realized in the front wall of the upper boxlike cabinet 17; and the porthole door 4 is hinged to the front wall of the same upper boxlike cabinet 17.

[0026] The lower supporting basement 16, in turn, is preferably, though not necessarily, structured for internally housing a central/intermediate section of air recirculating conduit 11, and the air-cooling device 13, the air-heating device 14 and the centrifugal fan 12 of hot-air generator 6 are preferably located inside said central/intermediate section of the air recirculating conduit 11. Thus the lower supporting basement 16 is preferably, though not necessarily, structured for internally housing part of the hot-air generator 6.

[0027] Preferably, though not necessarily, the lower supporting basement 16 is moreover structured to directly support the drum-supporting rollers 8. In other words, the idle rollers 8 that support in free revolving manner the tubular body 3 are preferably fixed in axially rotating manner directly to the top of the lower supporting basement 16.

[0028] With reference to Figures 1 and 2, the hot-air generator 6 preferably, though not necessarily, consists in a heat-pump type, closed-circuit, hot-air generator 6, thus it is provided with a heat-pump circuit 18 which com-

prises a first and a second air/refrigerant heat exchanger, both located inside the air recirculating conduit 11 preferably upstream of the centrifugal fan 12.

[0029] The first air/refrigerant heat exchanger, traditionally referred to as the "evaporator" of the heat-pump circuit, is located inside the air recirculating conduit 11, and it is structured to remove/absorb heat from the airflow f arriving from rotatable drum 3, thus forming the air-cooling device 13 of the hot-air generator 6. The second air/refrigerant heat exchanger, traditionally referred to as the "condenser" of the heat-pump circuit, is instead located inside the air recirculating conduit 11 downstream of the first air/refrigerant heat exchanger 13, and it is structured to release heat to the airflow f arriving from the first air/refrigerant heat exchanger 13, thus forming the air-heating device 14 of the hot-air generator 6.

[0030] In the example shown, in particular, the first and second air/refrigerant heat exchangers 13 and 14 are arranged one after the other along the section of air recirculating conduit 11 which is integrated into the lower supporting basement 16 of boxlike casing 2.

[0031] In addition to the above, the heat-pump circuit 18 furthermore comprises: an electrically-powered refrigerant compressing device 19 which is interposed between the refrigerant-outlet of air/refrigerant heat exchanger 13 and the refrigerant-inlet of air/refrigerant heat exchanger 14, and it is structured for compressing the gaseous-state refrigerant directed towards heat exchanger 14 so that refrigerant pressure and temperature are much higher at the refrigerant-inlet of heat exchanger 14 than at the refrigerant-outlet of heat exchanger 13; and an expansion valve or similar known passive/operated refrigerant expansion device (for example a capillary tube, a thermostatic valve or an electrically-controlled expansion valve) which is interposed between the refrigerant-outlet of air/refrigerant heat exchanger 14 and the refrigerant-inlet of air/refrigerant heat exchanger 13, and it is structured so as to cause a rapid expansion of the refrigerant directed towards the air/refrigerant heat exchanger 13, so that refrigerant pressure and temperature are much higher at the refrigerant-outlet of heat exchanger 14 than at the refrigerant-inlet of air/refrigerant heat exchanger 13.

[0032] According to a different embodiment not shown, the hot air generator 6 may comprise an electric heater as air-heating device 14 and an air-air type heat exchanger as air-cooling device 13, where the airflow f is cooled by air taken from and exhausted to the environment surrounding the laundry machine. An appropriate air pumping device is further arranged to pump ambient air through the air-air type heat exchanger.

[0033] With reference to Figures 1 and 2, the centrifugal fan 12 of hot-air generator 6, in turn, is preferably, though not necessarily, located on the back of the supporting basement 16, i.e. on the rear wall 2b of the boxlike casing 2, and it is structured so as to produce an airflow f that flows from the central/intermediate section of the air recirculating conduit 11 to the air-vent 9 located in rear wall 2b of casing 2.

[0034] In the example shown, the centrifugal fan 12 of the hot-air generator 6 is preferably at least partly housed/recessed into the lower supporting basement 16 of casing 2, i.e. into the rear wall 2b of the boxlike casing 2, roughly at the end of the central/intermediate section of the air recirculating conduit 11, and the outer volute or impeller housing of the centrifugal fan 12 is shaped/structured so as to directly communicate with, i.e. be fluidly connected to, both the central/ intermediate section of the air recirculating conduit 11 and with the air-vent 9 integrated in the rear wall 2b of casing 2.

[0035] With reference to Figures 3, 4, 5 and 6, the air-filtering cartridge 15 in turn comprises:

- a first substantially bag- or pocket-shaped, air-filtering shell or vessel 20 which is dimensioned for being inserted/plugged in manually extractable manner into the air-vent 10 which is preferably realized on the annular frame that delimits, on front wall 2a, the laundry loading/unloading opening of casing 2, so as to substantially fill up the whole clear section of the air-vent 10, and which is provided with two preferably substantially flat, reciprocally-faced, permeable-to-air sidewalls 21 which are structured to restrain the fluff and/or lint particles in suspension into the airflow f that enters into the air recirculating conduit 11 through the air-vent 10; and preferably also
- a permeable-to-air, preferably substantially plate like-shaped, upper lid 22 which is rigidly associated/fixed to the bag-shaped, air-filtering shell or vessel 20 so as to close the upper mouth of the same bag-shaped, air-filtering shell or vessel 20, and which is furthermore shaped/dimensioned so as to close/cover the whole air-vent 10.

[0036] In the example shown, the air-filtering walls 21 of shell 20 are preferably, though not necessarily, substantially specularly inclined to the center-plane M of the air-filtering shell or vessel 20, so that the air-filtering shell or vessel 20 has a substantially V- or U-shaped cross section.

[0037] The substantially bag- or pocket-shaped, air-filtering shell or vessel 20 is moreover divided into two complementary valve-like pieces 23 which are selectively separable to one another, and each valve-like piece 23 preferably incorporates a respective permeable-to-air sidewall 21 of the air-filtering shell or vessel 20. Preferably the two valve-like pieces 23 are furthermore laterally hinged to one another approximately at the bottom of the air-filtering shell or vessel 20, i.e. opposite to the upper mouth of the air-filtering shell or vessel 20, for reciprocal rotation about a transversal reference axis A which is preferably substantially parallel to the permeable-to-air sidewalls 21 of the air-filtering shell or vessel 20, so that the whole air-filtering shell or vessel 20 is openable in a book-like manner about reference axis A.

[0038] In the example shown, the two valve-like pieces

23 of the air-filtering shell or vessel 20 are preferably pivotally jointed to one another via a pair of connecting hinges 24 which are aligned to the reference axis A and are located approximately on the bottom of the air-filtering shell or vessel 20, i.e. opposite to the upper mouth of the air-filtering shell or vessel 20. Furthermore the articulation axis of the two connecting hinges 24, i.e. the rotation axis A of the two valve-like pieces 23, preferably substantially lies on the center-plane M of the air-filtering shell or vessel 20, and further preferably, it extends transversally relative to the direction of the airflow f passing through the air-filtering cartridge 15..

[0039] With reference to Figures 3, 4, 5 and 6, similarly to the air-filtering shell or vessel 20, the permeable-to-air upper lid 22 of the air-filtering cartridge 15 is preferably divided into two permeable-to-air complementary pieces 25 which are preferably substantially plate-like shaped and selectively separable to one another, and each of which is permanently rigidly fixed to a respective valve-like piece 23 of the bag-shaped, air-filtering shell or vessel 20, so as to allow the bag-shaped, air-filtering shell or vessel 20 to open in a book-like manner.

[0040] Preferably, the two pieces 25 of the upper lid 22 furthermore incorporate a manually-operable snap-on locking mechanism 26 which is structured for selectively rigidly anchoring the two pieces 25 to one another when they are reciprocally coupled to form/compose the permeable-to-air upper lid 22, thus preventing any unintended opening of the first air-filtering shell or vessel 20.

[0041] In the example shown, each permeable-to-air, preferably substantially plate-like-shaped piece 25 of the upper lid 22 is preferably realized in one piece with a respective valve-like piece 23 of the bag-shaped, air-filtering shell or vessel 20.

[0042] As an alternative, the permeable-to-air upper lid 22 of the air-filtering cartridge 15 may be permanently rigidly associated/fixed to one of the two valve-like pieces 23 of the air-filtering shell or vessel 20, and be structured for selectively couple in a rigid and stable, though easily releasable manner to the edge of the other valve-like piece 23 of the air-filtering shell or vessel 20.

[0043] With reference to Figures 3, 4, 5 and 6, the air-filtering cartridge 15 furthermore comprises a second substantially bag- or pocket-shaped, air-filtering shell or vessel 30 which is fitted/recessed into the first substantially bag-shaped, air-filtering shell or vessel 20, beneath the upper lid 22, so as to be crossed by substantially the same airflow f that crosses the filtering shell 20, and which is provided with two preferably substantially flat, reciprocally-faced, permeable-to-air sidewalls 31, each of which is structured to restrain the fluff and/or lint particles in suspension into the airflow f and is locally faced and superimposed to a respective permeable-to-air sidewall 21 of the air-filtering shell or vessel 20. According to the invention, the airflow f, after having passed through the upper lid 22, passes first through the second substantially bag- or pocket-shaped, air-filtering shell or vessel 30 and then through the first bag- or pocket-shaped, air-filtering shell or vessel 20.

[0044] Preferably, though not necessarily, the permeable-to-air sidewalls 31 of the second air-filtering shell or vessel 30 are furthemore structured to restrain fluff and/or lint particles having smaller dimensions than that restrained by the permeable-to-air sidewalls 21 of the first air-filtering shell or vessel 20.

[0045] Second air-filtering shell or vessel 30 is mechanically slidingly coupled to the first air-filtering shell or vessel 20, so that the permeable-to-air sidewalls 31 of the second air-filtering shell or vessel 30 are able to slide sideways with respect to the corresponding permeable-to-air sidewalls 21 of the first air-filtering shell or vessel 20.

[0046] In other words, the second air-filtering shell or vessel 30 is mechanically coupled to the first air-filtering shell or vessel 20 in sliding manner, so that each permeable-to-air sidewall 31 of the second air-filtering shell or vessel 30 is able to slide sideways with respect to the corresponding permeable-to-air sidewall 21 of the first air-filtering shell or vessel 20, in a direction d which is substantially parallel to the same permeable-to-air sidewall 21 of the first air-filtering shell or vessel 20.

[0047] With reference to Figures 3, 4 and 5, in the example shown, the second air-filtering shell or vessel 30 is preferably shaped/structured so as to be manually extractable in drawer-like manner from the first air-filtering shell or vessel 20, though a specific pass-through opening or slot 27 formed on a side of the same first air-filtering shell or vessel 20.

[0048] Preferably, the pass-through opening or slot 27 is delimited by the peripheral borders of the two valve-like pieces 23 of the first air-filtering shell or vessel 20.

[0049] The second air-filtering shell or vessel 30 is preferably shaped/structured so as to be manually extractable in drawer-like manner from the first air-filtering shell or vessel 20, in a direction d which is substantially parallel to the rotation axis A of the two valve-like pieces 23 of the air-filtering shell or vessel 20.

[0050] The second, substantially bag-shaped, air-filtering shell or vessel 30, similarly to the first bag-shaped air-filtering shell or vessel 20, is preferably divided into two complementary valve-like pieces 32 which are selectively separable to one another, and each of the two valve-like pieces 32 incorporates a respective permeable-to-air sidewall 31 of the air-filtering shell or vessel 30. Furthermore the two valve-like pieces 32 of air-filtering shell or vessel 30 are preferably laterally hinged to one another so that the whole bag-shaped, air-filtering shell or vessel 30 is openable in a book-like manner.

[0051] With reference to Figure 6, in the example shown, the two valve-like pieces 32 of the air-filtering shell or vessel 30 are pivotally jointed to one another via a pair of connecting hinges 33 which are located on a side edge of the air-filtering shell or vessel 30. Furthermore, the reference axis of the two connecting hinges 34, i.e. the rotation axis B of the two valve-like pieces 32, is substantially perpendicular to the rotation axis A of the

valve-like pieces 23 of the air-filtering shell or vessel 20. If preferred, the pair of connecting hinges 33 and their rotational axis B may be arranged parallel to the rotation axis A of the valve-like pieces 23 of the air-filtering shell or vessel 20.

[0052] Preferably, each valve-like piece 32 of the second air-filtering shell or vessel 30 is furthermore shaped/structured so to mechanically couple with a respective valve-like piece 23 of the first air-filtering shell or vessel 20, so as to be able to slide with respect to the same respective valve-like piece 23 in a direction d which is both substantially parallel to the reference laying plane of the same valve-like piece 23 of the first air-filtering shell or vessel 20, and also substantially parallel to the rotation axis A of the two valve-like pieces 23 of the air-filtering shell or vessel 20.

[0053] With reference to Figures 4 and 6, each valve-like piece 32 of the second air-filtering shell or vessel 30 is preferably provided with at least one transversal drawer runner 34 which is shaped so as to engage in axially sliding manner a corresponding rectilinear groove 34a realized on the corresponding valve-like piece 23 of the first air-filtering shell or vessel 20. The rectilinear groove 34a extends parallel to the rotation axis A of the two valve-like pieces 23 of the air-filtering shell or vessel 20. Guiding surfaces 34, 34a are coupled in a sliding manner such that the second air-filtering shell or vessel 30 is slidably movable relative to the first air-filtering shell or vessel 20 between a first position wherein a permeable-to-air sidewall 21 of the first air-filtering shell or vessel 20 is facing and superimposed to a permeable-to-air sidewall 31 of the second air-filtering shell or vessel 30, and a second position wherein the superimposition of the permeable-to-air sidewalls 21, 31 of the first and second air-filtering shell or vessel 20, 30 is removed. In the second position, the second air-filtering shell or vessel 30 is extracted from the first air-filtering shell or vessel 20. In said first position a gap 40 separates the permeable-to-air sidewalls 21 of the first air-filtering shell or vessel 20 from the permeable-to-air sidewalls 31 of the second air-filtering shell or vessel 30.

[0054] The second, substantially bag-shaped, air-filtering shell or vessel 30 is preferably also provided with a manually-operated, snap-on locking mechanism 35 which is structured for selectively rigidly anchoring the second air-filtering shell or vessel 30 to the first air-filtering shell or vessel 20, so to prevent any unintended extraction of the second air-filtering shell or vessel 30 from the first air-filtering shell or vessel 20. The snap-on locking mechanism 35 comprises one or more recesses 35a formed in one or both valve-like piece 32 of the second air-filtering shell or vessel 30 and one or more protrusions 35b correspondingly located on one or both valve-like piece 23 of the first air-filtering shell or vessel 20. Each protrusion 35b engages a corresponding recess 35a when the second air-filtering shell or vessel 30 is completely inserted into the first air-filtering shell or vessel 20

[0055] With reference to Figures 7, 8, 9 and 10, according to an alternative embodiment, the air-filtering cartridge 15 comprises:

- a first substantially bag- or pocket-shaped, air-filtering shell or vessel 120 which is dimensioned for being inserted/plugged in manually extractable manner into the air-vent 10 preferably realized on the annular frame that delimits, on front wall 2a, the laundry loading/unloading opening of casing 2, so as to substantially fill up the whole clear section of the air-vent 10, and which is provided with two preferably substantially flat, reciprocally-faced, permeable-to-air sidewalls 121 which are structured to restrain the fluff and/or lint particles in suspension into the airflow f that enters into the air recirculating conduit 11 through the air-vent 10;
- a second substantially bag- or pocket-shaped, air-filtering shell or vessel 130 which is fitted/recessed into the first substantially bag-shaped, air-filtering shell or vessel 120, so as to be crossed by substantially the same airflow f that crosses the filtering shell 120, and which is provided with two preferably substantially flat, reciprocally-faced, permeable-to-air sidewalls 131, each of which is structured to restrain the fluff and/or lint particles in suspension into the airflow f and is locally faced and superimposed to a respective permeable-to-air sidewall 121 of the air-filtering shell or vessel 120

[0056] The air filtering cartridge further comprises a permeable-to-air upper lid 122 which is rigidly associated/fixed to the second, substantially bag-shaped, air-filtering shell or vessel 130, so as to contemporaneously close the upper mouth of the second air-filtering shell or vessel 130 and the upper mouth of the first air-filtering shell or vessel 120. According to the invention, the airflow f, after having passed through the upper lid 122, passes first through the second substantially bag- or pocket-shaped, air-filtering shell or vessel 130 and then through the first bag- or pocket-shaped, air-filtering shell or vessel 120.

[0057] Again the second air-filtering shell or vessel 130 is mechanically slidingly coupled to the first air-filtering shell or vessel 120, so that the permeable-to-air sidewalls 131 of the second air-filtering shell or vessel 130 are able to slide sideways with respect to the corresponding permeable-to-air sidewalls 121 of the first air-filtering shell or vessel 120.

[0058] The substantially bag-shaped, air-filtering shell or vessel 120 is divided into two complementary valve-like pieces 123 which are selectively separable to one another, and each of the two valve-like pieces 123 incorporates a respective permeable-to-air sidewall 121 of the air-filtering shell or vessel 120. Furthermore the two valve-like pieces 123 of air-filtering shell or vessel 120 are preferably laterally hinged to one another so that the whole bag-shaped, air-filtering shell or vessel 120 is openable in a book-like manner.

[0059] Similarly to the air-filtering shell or vessel 120, the second, substantially bag-shaped, air-filtering shell or vessel 130 is divided into two complementary valve-like pieces 132 which are selectively separable to one another, and each of which incorporates a respective permeable-to-air sidewall 131 of the air-filtering shell or vessel 130.

[0060] Each of the two valve-like pieces 132 of the second air-filtering shell or vessel 130 is furthermore mechanically slidingly coupled to a respective valve-like piece 123 of the first air-filtering shell or vessel 120, so as to be able to slide with respect to the valve-like piece 123 in a direction d' which is both substantially parallel to the reference laying plane of the permeable-to-air sidewall 121 of the same valve-like piece 123, and also substantially perpendicular to the permeable-to-air upper lid 122, i.e. substantially perpendicular to the upper mouth of the first and second air-filtering shells or vessels 120 and 130.

[0061] With reference to Figures 9 and 10, each valve-like piece 132 of the second air-filtering shell or vessel 130 is preferably permanently mechanically slidingly coupled by means of guiding surfaces 134, 134a to a respective valve-like piece 123 of the first air-filtering shell or vessel 120, so as to be able to slide with respect to the valve-like piece 123 between a first operating position (see Figures 7, 8 and 9) in which the permeable-to-air sidewall 131 of the valve-like piece 132 is superimposed to the permeable-to-air sidewall 121 of the corresponding valve-like piece 123; and a second operating position (see Figure 10) in which the permeable-to-air sidewall 131 of the valve-like piece 132 is arranged beside the permeable-to-air sidewall 121 of the corresponding valve-like piece 123. In said first position the permeable-to-air sidewalls 121 of the first air-filtering shell or vessel 120 mates the permeable-to-air sidewalls 131 of the second air-filtering shell or vessel 130, so as to be locally parallel thereto and preferably substantially adherent thereto. In said second position the superimposition between the permeable-to-air sidewalls 121, 131 of the first and second air-filtering shell or vessel 120, 130 is removed.

[0062] With reference to Figures 7 to 10, in the example shown, the two valve-like pieces 123 of the first air-filtering shell or vessel 120 are pivotally jointed to one another by means of a pair of connecting hinges 124 located approximately on the bottom of the air-filtering shell or vessel 120, i.e. opposite to the upper lid 122. Furthermore the reference axis of the two connecting hinges 124, i.e. the rotation axis A' of the two valve-like pieces 123, preferably substantially lies on the center-plane N of the air-filtering shell or vessel 120.

[0063] The second, substantially bag-shaped, air-filtering shell or vessel 130, in turn, is divided into two complementary valve-like pieces 132 each of which is mechanically slidingly coupled by means of guiding surfaces 134, 134a to a respective valve-like piece 123 of the first air-filtering shell or vessel 120, so as to be able to slide with respect to the valve-like piece 123 in a direction d' which is substantially perpendicular to the rotation axis A' of the two valve-like pieces 123 of the air-filtering shell or vessel 120. Guiding surfaces 134, 134a are formed, respectively, on each valve-like piece 132 of the second air-filtering shell or vessel 130 and on each valve-like piece 123 of the first air-filtering shell or vessel 120.

[0064] With reference to Figures 7 and 8, in the example shown, the air-filtering walls 121 of the first air-filtering shell or vessel 120 and the air-filtering walls 131 of second air-filtering shell or vessel 130 are preferably substantially specularly inclined to the center-plane N of the air-filtering shell or vessel 120, so that the both air-filtering shells or vessels 120 and 130 has a substantially V- or U-shaped cross section.

[0065] Preferably, though not necessarily, the permeable-to-air sidewalls 131 of the second air-filtering shell or vessel 130 are furthermore structured to restrain fluff and/or lint particles having smaller dimensions than that restrained by the permeable-to-air sidewalls 121 of the first air-filtering shell or vessel 120.

[0066] With reference to Figures 7 to 10, similarly to the air-filtering shells or vessels 120 and 130, the permeable-to-air upper lid 122 of the air-filtering cartridge 15 is preferably divided into two permeable-to-air, preferably substantially plate-like-shaped, complementary pieces 125 which are selectively separable to one another, and each of which is permanently rigidly fixed to a respective valve-like piece 132 of the second air-filtering shell or vessel 130, so as to allow the two substantially bag-shaped, air-filtering shells or vessels 120 and 130 to open in a book-like manner.

[0067] Preferably, the two pieces 125 of the upper lid 122 furthermore incorporate a manually-operable snap-on locking mechanism 126 which is structured for selectively rigidly anchoring the two pieces 125 to one another when they are reciprocally coupled to form/compose the permeable-to-air upper lid 122, thus preventing any unintended opening of both air-filtering shells or vessels 120 and 130.

[0068] In the example shown, each permeable-to-air piece 125 of the upper lid 122 is preferably realized in one piece with a respective valve-like piece 132 of the second air-filtering shell or vessel 130.

[0069] As an alternative, the permeable-to-air upper lid 122 of the air-filtering cartridge 15 may be permanently rigidly associated/fixed to one of the two valve-like pieces 132 of the second air-filtering shell or vessel 130, and be structured for selectively coupling in a rigid and stable, though easily releasable manner to the edge of the other valve-like piece 132 of the air-filtering shell or vessel 130.

[0070] With reference to Figures 11 and 12, a third embodiment, according to an alternative embodiment, the air-filtering cartridge 15 comprises:

- a first substantially bag- or pocket-shaped, air-filtering shell or vessel 220 which is dimensioned for being inserted/plugged in manually extractable manner

into the air-vent 10 preferably realized on the annular frame that delimits, on front wall 2a, the laundry loading/unloading opening of casing 2, so as to substantially fill up the whole clear section of the air-vent 10, and which is provided with two preferably substantially flat, reciprocally-faced, permeable-to-air sidewalls 221 which are structured to restrain the fluff and/or lint particles in suspension into the airflow f that enters into the air recirculating conduit 11 through the air-vent 10;

- a second substantially bag- or pocket-shaped, air-filtering shell or vessel 230 which is fitted/recessed into the first substantially bag-shaped, air-filtering shell or vessel 220, so as to be crossed by substantially the same airflow f that crosses the filtering shell 220, and which is provided with two preferably substantially flat, reciprocally-faced, permeable-to-air sidewalls 231, each of which is structured to restrain the fluff and/or lint particles in suspension into the airflow f and is locally faced and superimposed to a respective permeable-to-air sidewall 221 of the air-filtering shell or vessel 220

[0071] The air filtering cartridge further comprises a permeable-to-air upper lid 222 which is rigidly associated/fixed to the first, substantially bag-shaped, air-filtering shell or vessel 220, so as to contemporaneously close the upper mouth of the first air-filtering shell or vessel 220 and the upper mouth of the second air-filtering shell or vessel 230. According to the invention, the airflow f, after having passed through the upper lid 222, passes first through the second substantially bag- or pocket-shaped, air-filtering shell or vessel 230 and then through the first bag- or pocket-shaped, air-filtering shell or vessel 220.

[0072] The first air-filtering shell or vessel 220 is mechanically slidingly coupled to the second air-filtering shell or vessel 230, so that the permeable-to-air sidewalls 221 of the first air-filtering shell or vessel 220 are able to slide sideways with respect to the corresponding permeable-to-air sidewalls 231 of the second air-filtering shell or vessel 230.

[0073] The second substantially bag-shaped, air-filtering shell or vessel 230 is divided into two complementary valve-like pieces 232 which are selectively separable to one another, and each of the two valve-like pieces 232 incorporates a respective permeable-to-air sidewall 231 of the air-filtering shell or vessel 230. Furthermore the two valve-like pieces 232 of air-filtering shell or vessel 230 are preferably laterally hinged to one another so that the whole bag-shaped, air-filtering shell or vessel 230 is openable in a book-like manner.

[0074] Similarly to the air-filtering shell or vessel 230, the first substantially bag-shaped, air-filtering shell or vessel 220 is divided into two complementary valve-like pieces 223 which are selectively separable to one another, and each of which incorporates a respective permeable-to-air sidewall 221 of the air-filtering shell or vessel 230.

[0075] Each of the two valve-like pieces 223 of the first air-filtering shell or vessel 220 is furthermore mechanically slidingly coupled to a respective valve-like piece 232 of the second air-filtering shell or vessel 230, so as to be able to slide with respect to the valve-like piece 232 in a direction d' which is both substantially parallel to the reference laying plane of the permeable-to-air sidewall 231 of the same valve-like piece 232, and also substantially perpendicular to the permeable-to-air upper lid 222, i.e. substantially perpendicular to the upper mouth of the first and second air-filtering shells or vessels 220 and 230.

[0076] With reference to Figures 11 and 12, each valve-like piece 223 of the first air-filtering shell or vessel 220 is preferably permanently mechanically slidingly coupled by means of guiding surfaces 234, 234a to a respective valve-like piece 232 of the second air-filtering shell or vessel 230, so as to be able to slide with respect to the valve-like piece 232 between a first operating position (see Figure 11) in which the permeable-to-air sidewall 221 of the valve-like piece 223 is superimposed to the permeable-to-air sidewall 231 of the corresponding valve-like piece 232; and a second operating position (see Figure 12) in which the permeable-to-air sidewall 221 of the valve-like piece 223 is arranged beside the permeable-to-air sidewall 231 of the corresponding valve-like piece 232. In said first position the permeable-to-air sidewalls 221 of the first air-filtering shell or vessel 230 mates the permeable-to-air sidewalls 231 of the second air-filtering shell or vessel 230, so as to be locally parallel thereto and preferably substantially adherent thereto. In said second position the superimposition between the permeable-to-air sidewalls 221, 231 of the first and second air-filtering shell or vessel 220, 230 is removed.

[0077] With reference to Figures 11 and 12, in the example shown, the two valve-like pieces 232 of the second air-filtering shell or vessel 230 are pivotally jointed to one another by means of a pair of connecting hinges 224 located approximately on the bottom of the air-filtering shell or vessel 230, i.e. opposite to the upper lid 222. Furthermore the reference axis of the two connecting hinges 224, i.e. the rotation axis A' of the two valve-like pieces 232, preferably substantially lies on the centerplane of the air-filtering shell or vessel 220 as viewed in a cross section view like that of Figure 8.

[0078] The first, substantially bag-shaped, air-filtering shell or vessel 220, in turn, is divided into two complementary valve-like pieces 223 each of which is mechanically slidingly coupled by means of guiding surfaces 234, 234a to a respective valve-like piece 232 of the second air-filtering shell or vessel 230, so as to be able to slide with respect to the valve-like piece 232 in a direction d' which is substantially perpendicular to the rotation axis A' of the two valve-like pieces 232 of the air-filtering shell or vessel 230. Guiding surfaces 234, 234a are formed, respectively, on each valve-like piece 232 of the second

air-filtering shell or vessel 230 and on each valve-like piece 223 of the first air-filtering shell or vessel 220.

[0079] With reference to Figures 11 and 12, in the example shown, the air-filtering walls 221 of the first air-filtering shell or vessel 220 and the air-filtering walls 231 of second air-filtering shell or vessel 230 are preferably substantially specularly inclined to the center-plane of the air-filtering shell or vessel 220 as viewed in a cross section view like that of Figure 8, so that the both air-filtering shells or vessels 220 and 230 has a substantially V- or U-shaped cross section.

[0080] Preferably, though not necessarily, the permeable-to-air sidewalls 231 of the second air-filtering shell or vessel 230 are furthermore structured to restrain fluff and/or lint particles having smaller dimensions than that restrained by the permeable-to-air sidewalls 221 of the first air-filtering shell or vessel 220.

[0081] With reference to Figures 11 and 12, similarly to the air-filtering shells or vessels 220 and 230, the permeable-to-air upper lid 222 of the air-filtering cartridge 15 is preferably divided into two permeable-to-air, preferably substantially plate-like-shaped, complementary pieces 225 which are selectively separable to one another, and each of which is permanently rigidly fixed to a respective valve-like piece 223 of the first air-filtering shell or vessel 220, so as to allow the two substantially bag-shaped, air-filtering shells or vessels 220 and 230 to open in a book-like manner.

[0082] Preferably, the two pieces 225 of the upper lid 222 furthermore incorporate a manually-operable snap-on locking mechanism 226 which is structured for selectively rigidly anchoring the two pieces 225 to one another when they are reciprocally coupled to form/compose the permeable-to-air upper lid 222, thus preventing any unintended opening of both air-filtering shells or vessels 220 and 230.

[0083] In the example shown, each permeable-to-air piece 225 of the upper lid 222 is preferably realized in one piece with a respective valve-like piece 223 of the first air-filtering shell or vessel 220.

[0084] In the inner face side of one valve-like piece 232 of the second air-filtering shell or vessel 230, a spacer 241 may be provided to keep valve-like pieces 232 spaced one another at a predetermined distance when the second air-filtering shell or vessel 230 is in a closed position, i.e. the two valve-like pieces 232 are coupled. The spacer 241 allows the valve-like pieces 232 to be pressed against the valve-like pieces 223 of the first air-filtering shell or vessel 220 to eliminate or reduce the possibility that the airflow f can flow between the first and second air-filtering shells or vessels 220, 230 rather than through the second air-filtering shell or vessel 230 first.

[0085] General operation of the rotary-drum household laundry drier 1 is clearly inferable from the above description, with no further explanation required.

[0086] The advantages connected to the particular structure of the substantially air-filtering cartridge 15 are large in number.

[0087] In the air-filtering cartridge 15, in fact, the fluff and/or lint particles tends to accumulate/settle on the inner face of the air-filtering walls 21, 31; 121, 131, 221, 231 of both air-filtering shells or vessels 20, 120, 220 and 30, 130, 230 thus the fluff and/or lint particles remains inside the air-filtering shells or vessels 20, 120, 220 and 30, 130, 220 when the user disassembles/ opens the air-filtering cartridge 15 for periodical cleaning.

[0088] Clearly, changes may be made to the rotary-drum household laundry drier 1 as described herein without, however, departing from the scope of the present invention.

[0089] For example, the air-cooling device 13 of hot-air generator 6 may comprise an air/air heat exchanger which is located inside the air recirculating conduit 11, preferably upstream of the centrifugal fan 12, and is structured for using the external fresh air to cool down the airflow f arriving from rotatable drum 3; whereas the air-heating device 14 of hot-air generator 6 may consists in a resistor which is located inside the air recirculating conduit 11, downstream of the air/air heat exchanger and preferably also downstream of centrifugal fan 12.

Claims

1. Laundry dryer (1) comprising an outer casing (2) having a front wall (2a) provided with a laundry loading/unloading pass-through opening, and an air-filtering cartridge (15) which is fitted in removable manner into an air-vent (10) which is passed through by a laundry drying airflow (f), said air-filtering cartridge (15) comprising a first substantially bag- or pocket-shaped, air-filtering shell or vessel (20, 120, 220) which is dimensioned for being inserted/plugged into said air-vent (10) and is structured to restrain fluff and/or lint particles in suspension into the airflow (f); the laundry dryer being **characterized in that** the air-filtering cartridge (15) further comprises a second substantially bag- or pocket-shaped, air-filtering shell or vessel (30, 130, 230) which

   - is fitted/recessed into said first air-filtering shell or vessel (20, 120, 220) so as to be crossed by substantially the same airflow (f) that crosses the first air-filtering shell or vessel (20, 120, 220),
   - is structured to restrain the fluff and/or lint particles in suspension into the airflow (f); and is
   - mechanically coupled to said first air-filtering shell or vessel (20, 120) in sliding manner.

2. Laundry dryer (1) according to claim 1, **characterized in that** the first and the second air-filtering shell or vessel (20, 30; 120, 130; 220, 230) comprise permeable-to-air sidewalls (21, 31; 121, 131; 221, 231) structured for restraining fluff and/or lint particles in suspension into the airflow (f) and further comprise guiding surfaces (34, 34a; 134, 134a; 234, 234a) re-

ciprocally coupled in a sliding manner such that one between the first and the second air-filtering shell or vessel (20, 30, 120, 130; 220, 230) is slidably movable relative to the other air-filtering shell or vessel (30, 20, 130, 120; 230, 220) between a first position wherein a permeable-to-air sidewall (21, 121, 221) of the first air-filtering shell or vessel (20, 120, 220) is facing and superimposed to a permeable-to-air sidewall (31, 131, 231) of the second air-filtering shell or vessel (30, 130, 230), and a second position wherein the superimposition of the permeable-to-air sidewalls (21, 31; 121, 131; 221, 231) of the first and second air-filtering shell or vessel (20, 30, 120, 130, 220, 230) is removed.

3. Laundry dryer according to any one of the foregoing claims, **characterized in that** the air-filtering cartridge (15) additionally comprises a permeable-to-air, upper lid (22, 122, 222) which is rigidly associated/fixed to either the first (20, 220) or to the second air-filtering shell or vessel (130), so as to close the upper mouth of said first (20, 220) or second air-filtering shell or vessel (130).

4. Laundry dryer according to Claim 3, **characterized in that** said permeable-to-air upper lid (22, 122, 222) is divided into two complementary pieces (25, 125, 225) which are selectively separable to one another, and each of which is permanently rigidly fixed to a respective valve-like piece (23, 132, 223) either of the first air-filtering shell or vessel (20, 220) or of second air-filtering shell or vessel (130), so as to allow said first (20, 220) or second air-filtering shell or vessel (130) to open in a book-like manner.

5. Laundry dryer according to Claim 4, **characterized in that** the two complementary pieces (25, 125, 225) of the permeable-to-air upper lid (22, 122, 222) incorporate a manually-operable snap-on locking mechanism (26, 126, 226) which is structured for selectively rigidly anchoring the two complementary pieces (25, 125, 225) to one another when they are reciprocally coupled to form/compose the permeable-to-air upper lid (22, 122, 222).

6. Laundry dryer (1) according to any one of the foregoing claims, **characterized in that** the first and the second air-filtering shell or vessel (20, 30; 120, 130; 220, 230) are divided into two complementary valve-like pieces (23, 123, 223; 32, 132, 232) which are separable to one another, the valve-like pieces of the first and/or the second air filtering shell or vessel (20, 30; 120, 130; 220, 230) being hinged to one another to rotate about a rotational axis (A, A', B) so that the first and/or the second air-filtering shell or vessel (20, 30; 120, 130; 220, 230) are openable in a book-like manner.

7. Laundry dryer according to claim 6, **characterized in that** each valve-like piece (32, 132, 232) of the second air-filtering shell or vessel (30, 130, 230) is shaped/structured so to mechanically couple with a respective valve-like piece (23, 123, 223) of the first air-filtering shell or vessel (20, 120, 220), so as to be able to slide one (32, 132, 223) relative to the other (23, 123, 232).

8. Laundry dryer according to claim 6 or 7, **characterized in that** the two valve-like pieces (32) of the second air-filtering shell or vessel (30) are laterally hinged to one another to rotate along a rotational axis (B) which is substantially perpendicular or parallel to said rotational axis (A) so that the second air-filtering shell or vessel (20) is openable in a book-like manner.

9. Laundry dryer according to any claim 6 to 8, **characterized in that** the second air-filtering shell or vessel (30) is shaped/structured so as to be manually extractable in drawer-like manner from the first air-filtering shell or vessel (20), through a pass-through opening or slot (27) formed on a side of the same first air-filtering shell or vessel (20), the second air-filtering shell or vessel (30) being extractable in a direction (d) which is parallel to the rotation axis (A) of the two valve-like pieces (23) of the first air-filtering shell or vessel (20).

10. Laundry dryer according to Claim 8 or 9, **characterized in that** the second air-filtering shell or vessel (30) is also provided with a manually-operable, snap-on locking mechanism (35) which is structured for selectively rigidly anchoring the second air-filtering shell or vessel (30) to the first air-filtering shell or vessel (20).

11. Laundry dryer according to Claim 2 and any Claim 8 to 10, **characterized in that** in said first position a gap separates the permeable-to-air sidewalls (21) of the first air-filtering shell or vessel (20) from the permeable-to-air sidewalls (31) of the second air-filtering shell or vessel (30).

12. Laundry dryer according to Claim 7, **characterized in that** valve-like pieces (123, 132; 223, 232) of the first and second air-filtering shell or vessel (120, 130; 220, 230) are slidable relative one another in a direction (d') which is substantially perpendicular to the rotation axis (A').

13. Laundry dryer according to Claim 12, **characterized in that** the valve-like pieces (123, 132; 223, 232) of the first and second air-filtering shell or vessel (120, 130; 220, 230) are slidable relative one another between a first operating position in which a permeable-to-air sidewall (131, 231) of a valve-like piece (132,

232) of the second air-filtering shell or vessel (130, 230) is superimposed to a permeable-to-air sidewall (121, 221) of the corresponding valve-like piece (123, 223) of the first air-filtering shell or vessel (120, 220); and a second operating position in which the superimposition of the permeable-to-air sidewalls (121, 131; 221, 231) of the first and second air-filtering shell or vessel (120, 130, 220, 230) is removed..

14. Laundry dryer according to Claim 2 and Claim 12 or 13, **characterized in that** in said first position the permeable-to-air sidewalls (121, 221) of the first air-filtering shell or vessel (120, 220) mates the permeable-to-air sidewalls (131, 231) of the second air-filtering shell or vessel (130, 230), so as to be locally parallel thereto.

15. Laundry dryer according to any one of the foregoing claims, **characterized in that** a heat pump system (18) is arranged in fluid communication with the airflow (f) to remove moisture therefrom and to release heat to said airflow (f).

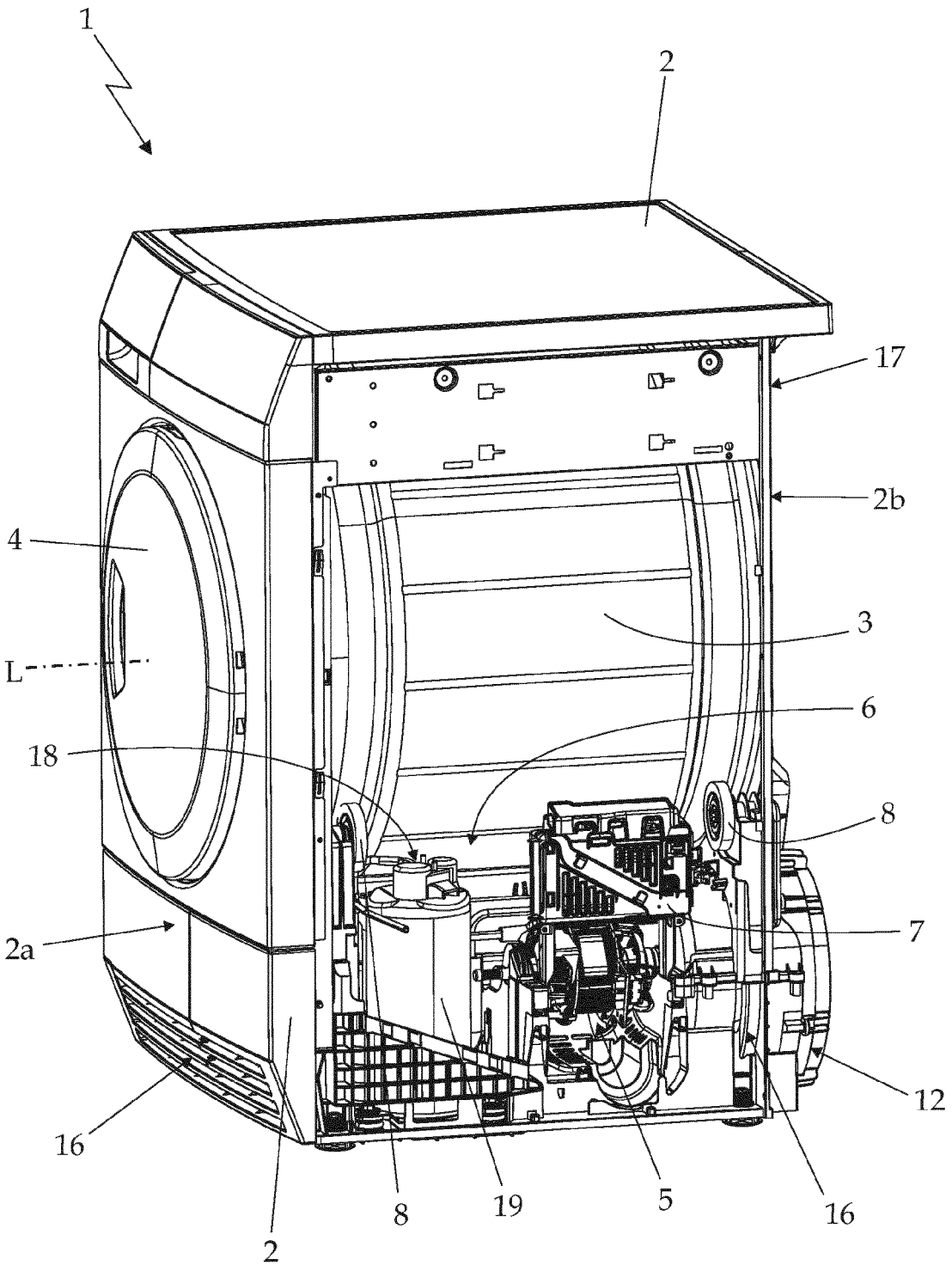

Fig. 1

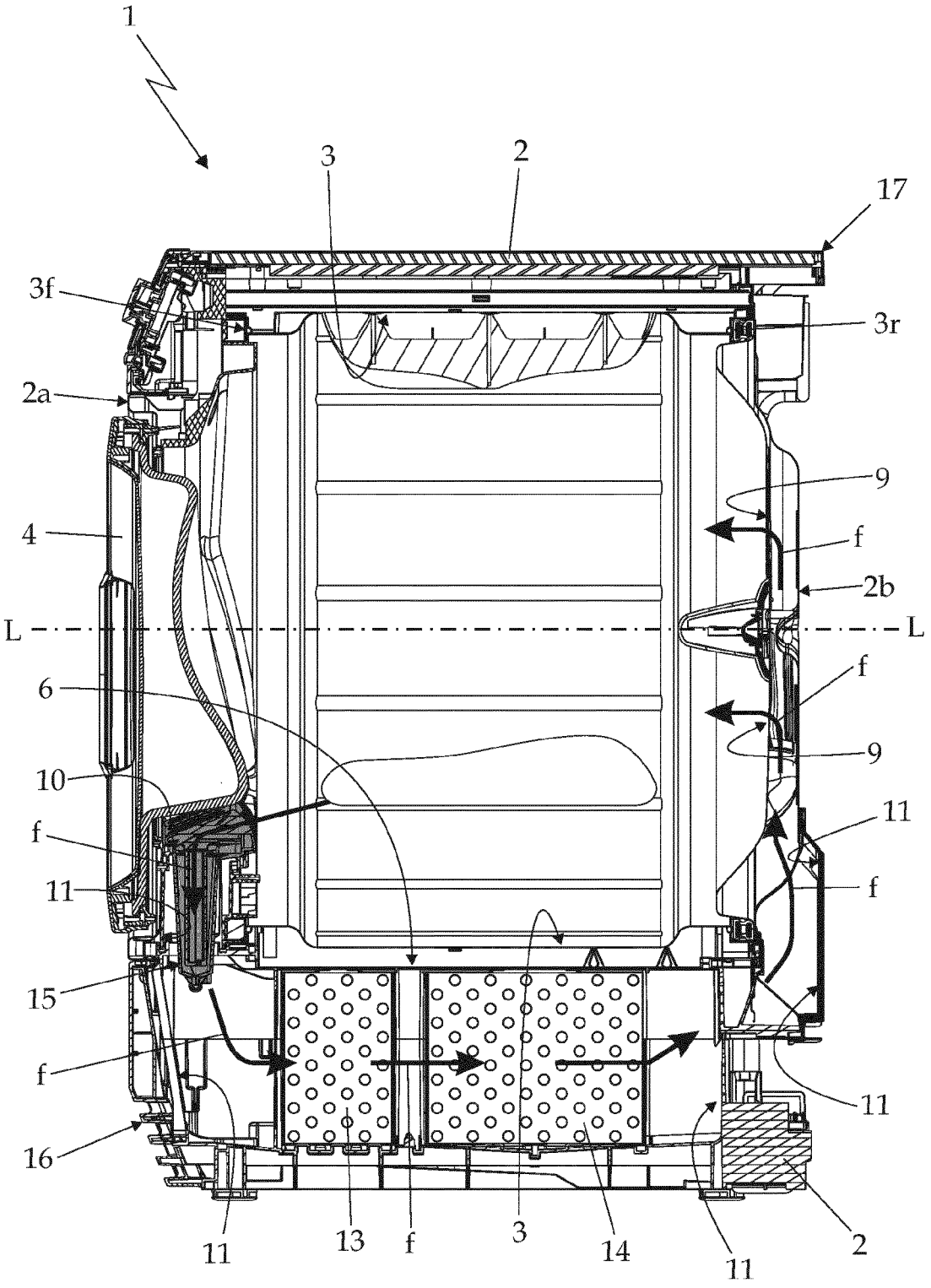

Fig. 2

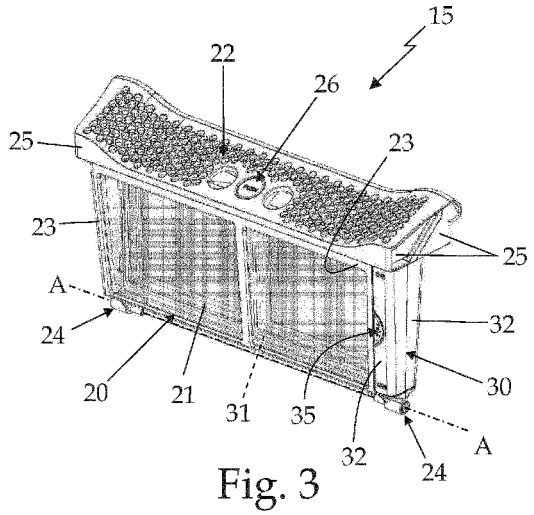
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Fig. 3

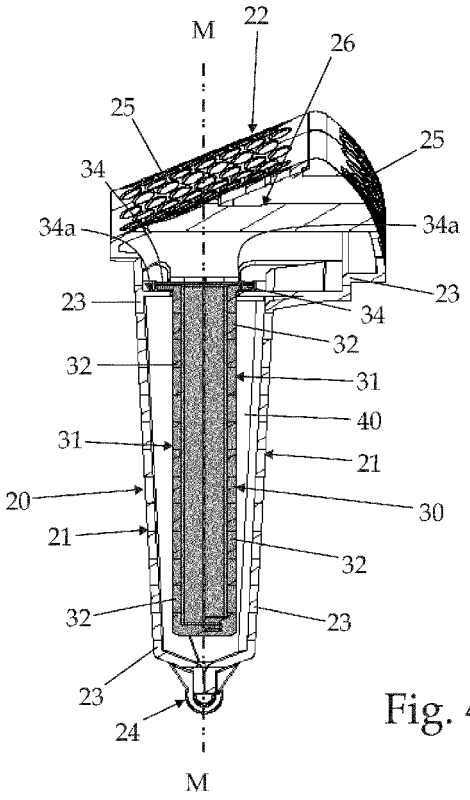
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Fig. 4

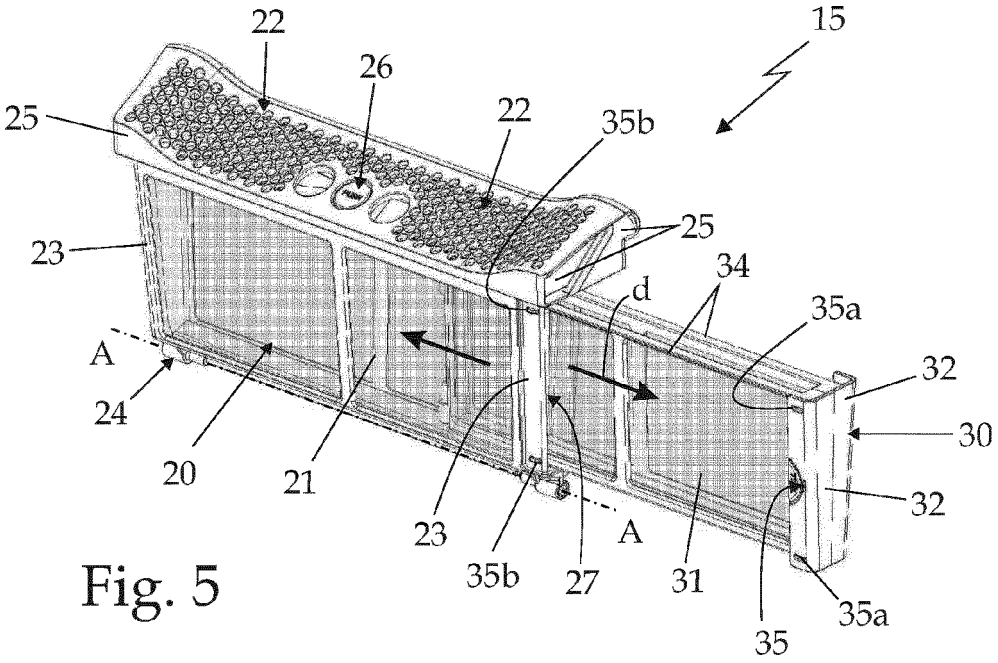
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Fig. 5

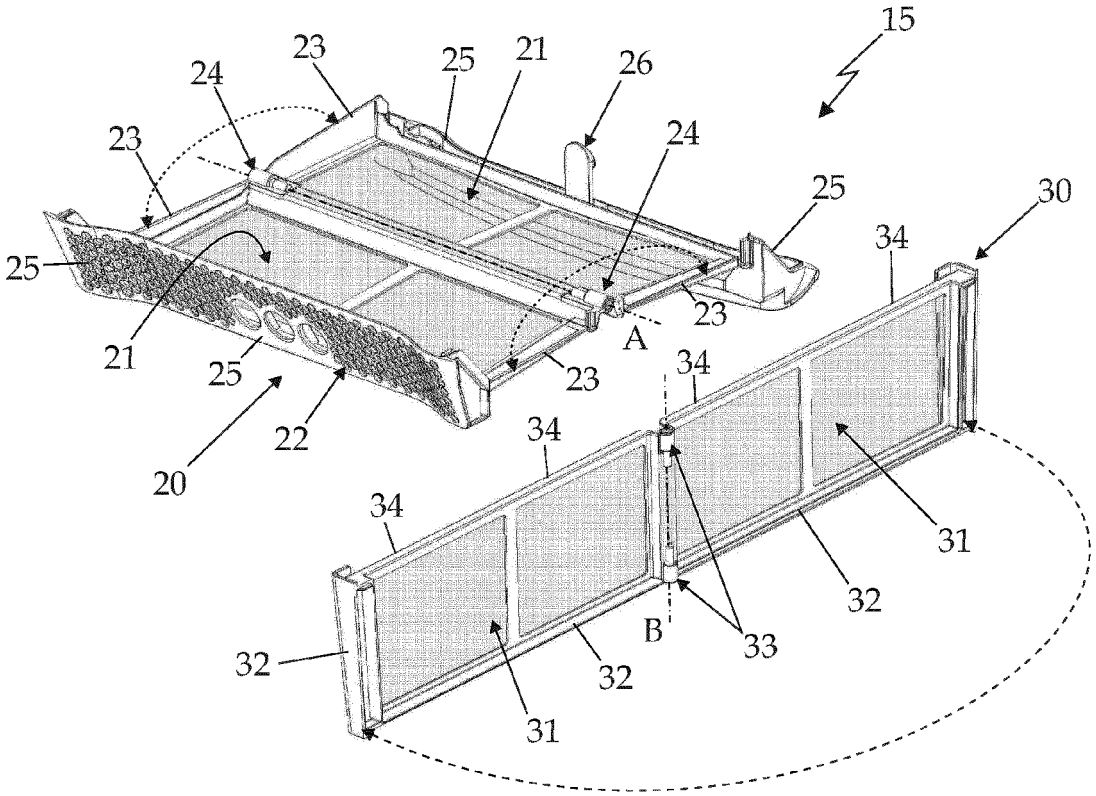
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Fig. 6

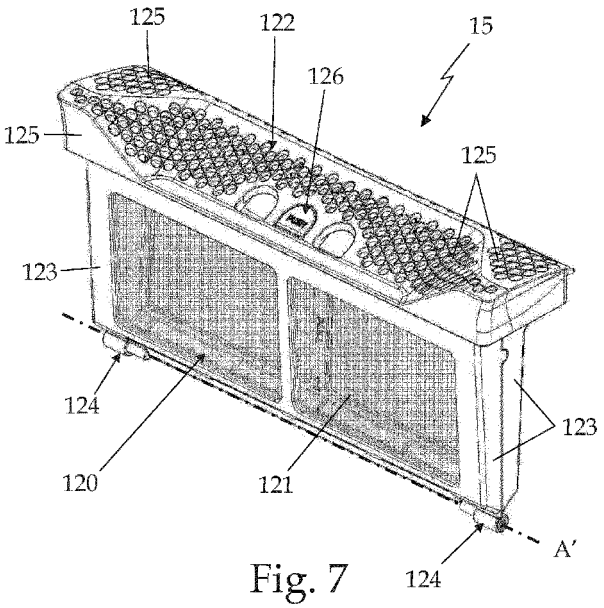
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Fig. 7

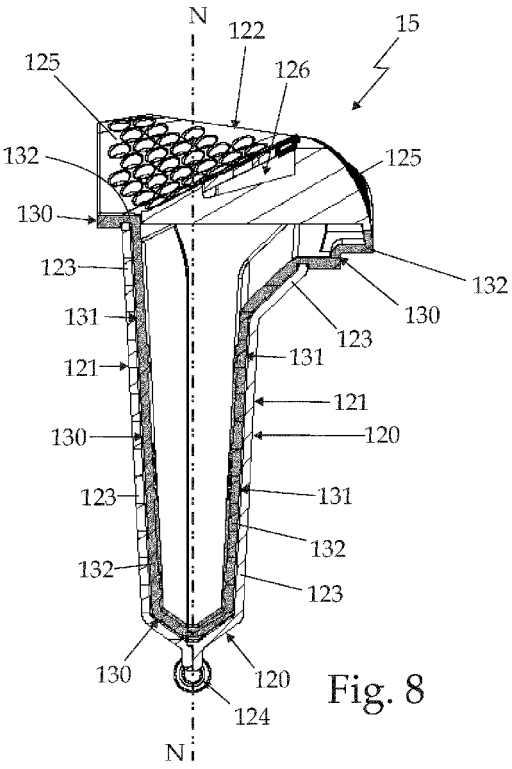
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Fig. 8

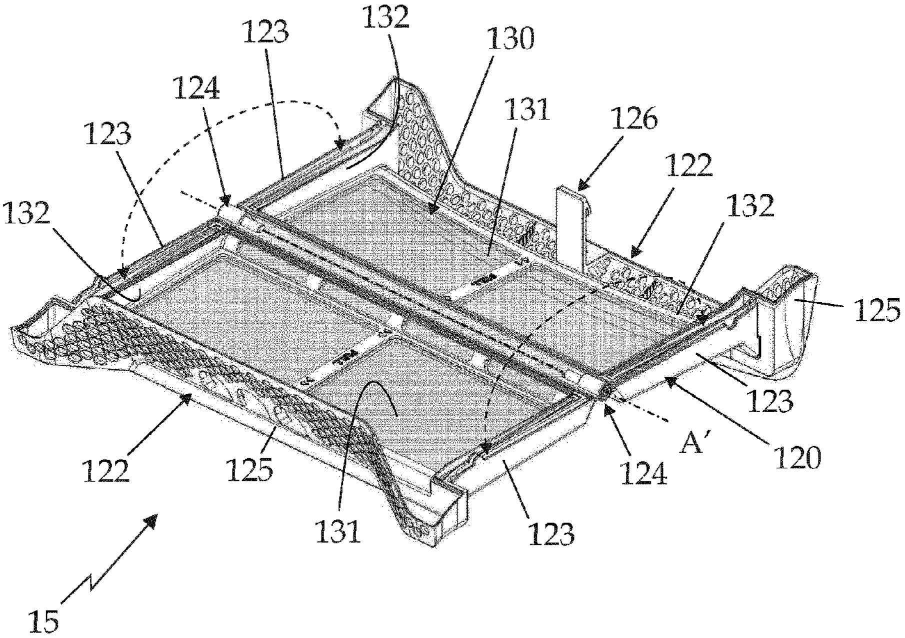
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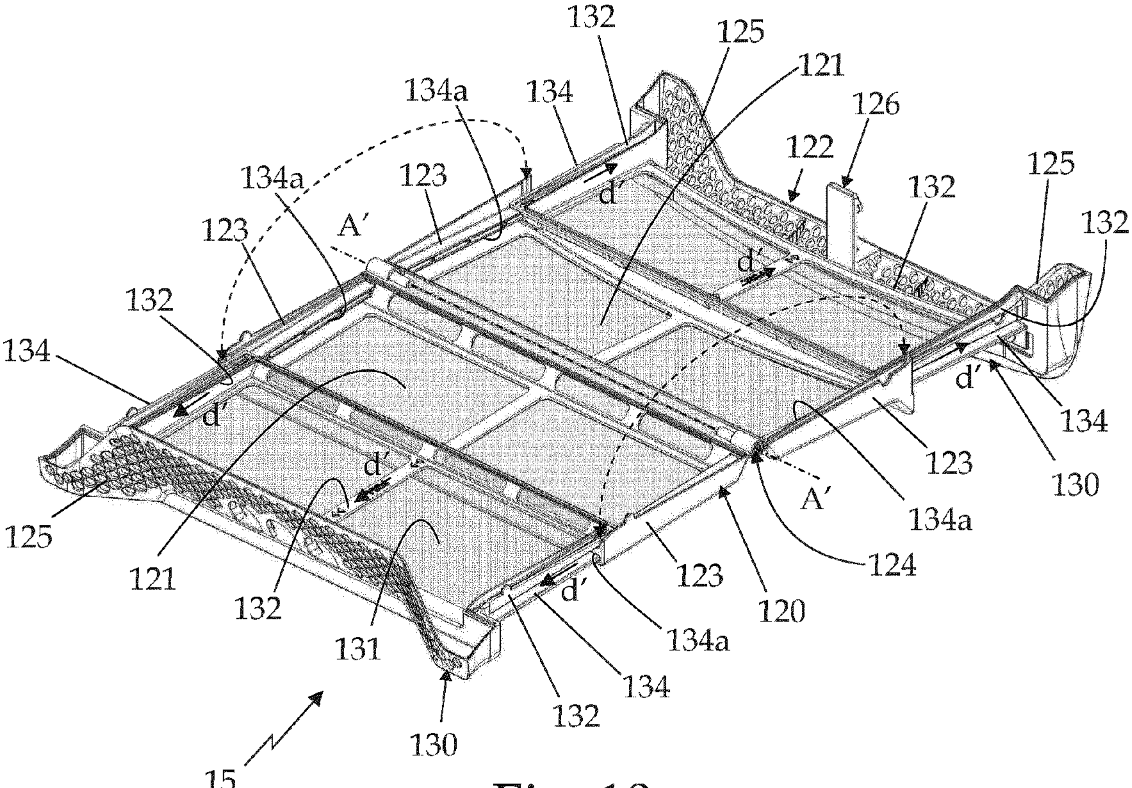
Fig. 9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d'
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A'
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d'
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Fig. 10

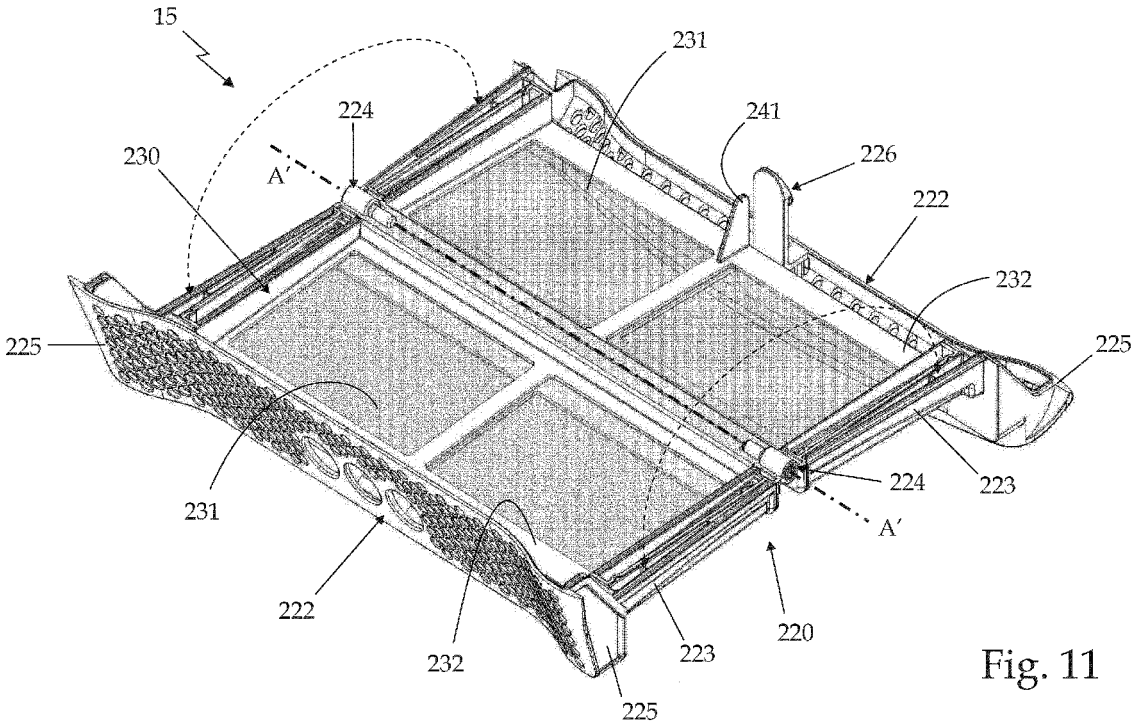
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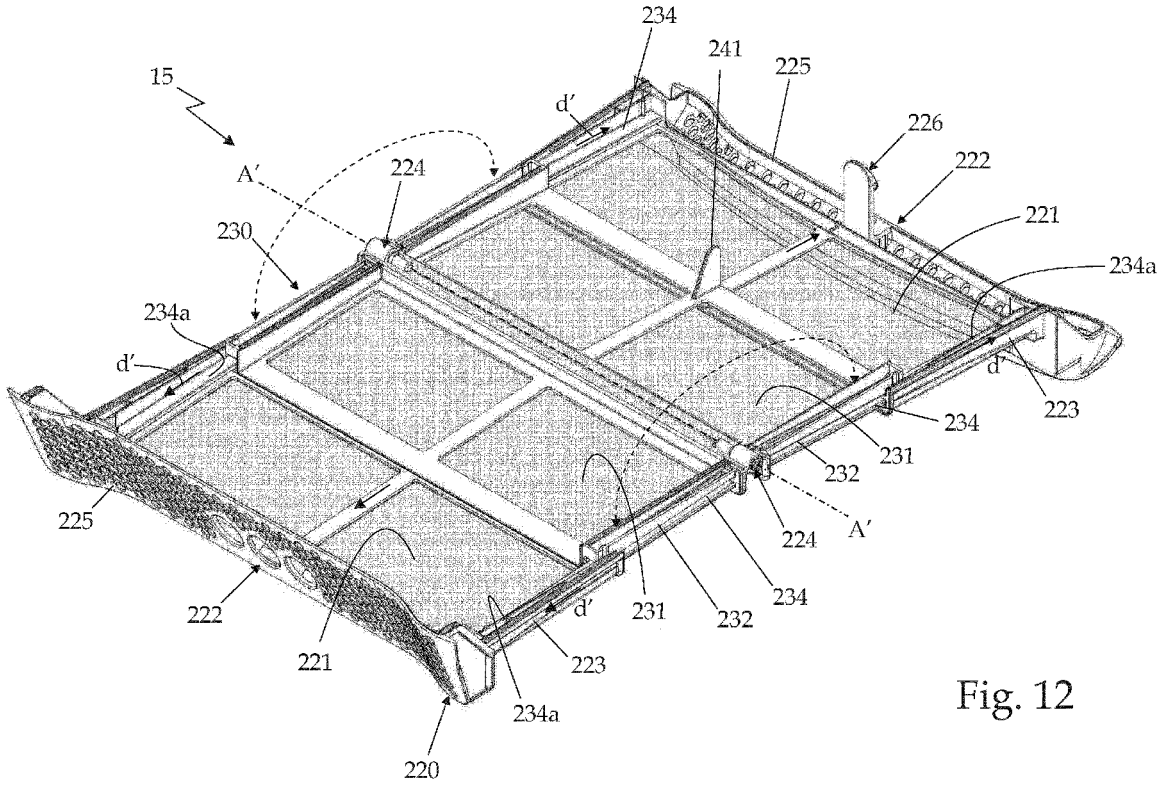
Fig. 11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A'
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231
d'

Fig. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 12 17 5287

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D06F
B01D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 February 2013	Kising, Axel

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