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- **Colin, Igor**
33080 Porcia (PN) (IT)
- **Del Pos, Maurizio**
33080 Porcia (PN) (IT)
- **Olivaro, Paolo**
33080 Porcia (PN) (IT)

(71) Applicant: **Electrolux Home Products Corporation N.V.**
1130 Brussels (BE)

(74) Representative: **Nardoni, Andrea**
Electrolux Italia S.p.A.
Corso Lino Zanussi, 30
33080 Porcia (PN) (IT)

(72) Inventors:
• **Bison, Alberto**
33080 Porcia (PN) (IT)

(54) **Appliance for drying laundry**

(57) A laundry drying appliance (100) comprising a cabinet (110), a rotatable drum (105) accommodated within the cabinet, and a laundry drying air circulation system for circulating drying air, the drying air circulation system comprising moisture condensing means (3605) operable for dehydrating moisture-laden drying air, characterized in that means (3625,3725,3635,4010,3640,

3740) operable for washing the moisture condensing means are provided, said means for washing comprising valve means (3625;3725) operable to selectively enable a load of water from a water main to which the laundry drying appliance is connectable, and a water circuit for delivering the loaded water from the valve means to the moisture condensing means.

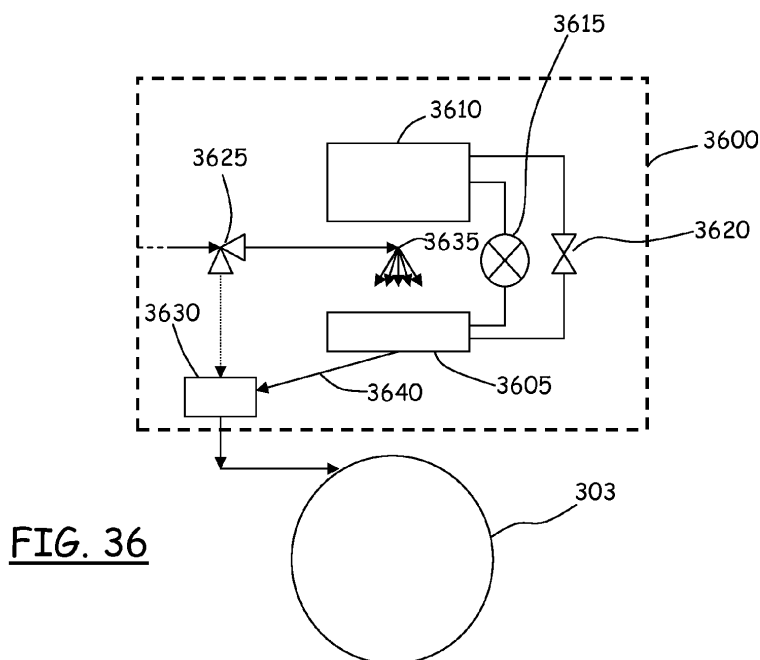


FIG. 36

Description**Background of the invention****Field of the invention**

[0001] The present invention generally relates to the field of household appliances for laundry and garments treatment. In particular, the present invention relates to appliances for drying laundry, such as laundry dryers and combined washers/dryers.

Discussion of the related art

[0002] Appliances for drying laundry, are adapted to dry clothes, garments, laundry in general, by circulating hot, dry air within a tumbler or drum. The drum is rotatably accommodated within a machine cabinet, and is designed to contain the articles to be dried. The rotation of the drum causes agitation of the articles to be dried, while they are hit by the drying air flow.

[0003] Combined laundry washer/dryer appliances combine the features of a washing machine with those of a dryer; in these appliances, the drum is rotatably accommodated within a washing tub.

[0004] In a known type of laundry dryers and washers/dryers, also referred to as "condenser dryer", the drying air flow is typically caused to pass through the drum, exiting therefrom from the front access opening, then it passes through a moisture condensing system, where the humid air is at least partially dehydrated, dried, and the dried air flow is heated up by means of a heating arrangement, like an electrical resistance; the heated drying air flow then passes again through the drum, and repeats the cycle.

[0005] The condensing system may be an air-air heat exchanger, exploiting air taken in from the outside. Examples of laundry dryers exploiting this type of condensing system are provided in EP 254018, EP 1584734, EP 2039819, GB 2075559.

[0006] Other known dryers and washers/dryers exploit a heat pump to dehydrate the drying air flow; in these dryers, the function of the heating arrangement may be performed by the heat pump itself, and the electrical resistance may thus not be provided for. Examples of laundry dryers exploiting a heat pump condenser are provided in JP2004135715, EP 1411163, EP 1634984.

[0007] Other known solutions exploit a water spray condenser for cooling the drying air. For example, EP 0552843 describes a washing and drying machine including, for the drying part, a steam condenser communicating with the inside of the washing container to receive the steam emanated by the washed laundry contained in the drum and with a nozzle for spraying cold water for the condensation of said steam, an aspirator associated with said condenser for the aspiration of the condensed steam formed in said condenser and for its conveyance to a drying area for the formation of dry hot

air and a recirculation conduit of dry hot air inside said container. A water spray condenser is also described in GB2248920.

Summary of the invention

[0008] The moisture condensing system, e.g. the heat pump, may in use become clogged by fluff released by the laundry being dried, and if this occurs their performance is degraded, and the moisture-laden drying air is not effectively demisterized; this as a consequence reduces the drying performance of the appliance.

[0009] The Applicant has faced the problem of how to avoid clogging by fluff of the moisture condensing system.

[0010] The Applicant has found that water taken in from water mains may be effectively exploited to wash the moisture condensing system. This solution is particularly easy to implement in laundry washers/dryers, wherein a connection to water mains is already provided, for taking in water to wash the laundry.

[0011] According to an aspect of the present invention, there is provided a laundry drying appliance comprising a cabinet, a rotatable drum accommodated within the cabinet, and a laundry drying air circulation system for circulating drying air, the drying air circulation system comprising moisture condensing means operable for dehydrating moisture-laden drying air.

[0012] Means operable for cleaning the moisture condensing means are provided, said means for cleaning comprising valve means operable to selectively enable a load of water from a water main to which the laundry drying appliance is connectable, and a water circuit for delivering the loaded water from the valve means to the moisture condensing means.

[0013] The water circuit may comprise at least one nozzle for sprinkling water onto the moisture condensing means.

[0014] Said moisture condensing means may comprise a first heat exchanger of a heat pump, said first heat exchanger being operable for cooling and dehydrating the moisture-laden drying air.

[0015] When the laundry drying appliance is a laundry washer/dryer, said drum is rotatably accommodated within a washing tub housed within the cabinet, and said valve means are operable to either load laundry washing water or to load the moisture condensing means cleaning water.

[0016] Control means of the appliance are adapted to selectively actuate the valve means for feeding water to the water circuit.

[0017] Said control means actuate the valve during a laundry washing phase of the appliance, the laundry drying appliance being a laundry washer/dryer.

[0018] Said control means actuate the valve during a laundry rinsing phase of the appliance, laundry drying appliance being a laundry washer/dryer

[0019] Said control means can be commanded by a

user, through a user interface of the appliance so that the actuation of a command button or the like enables the controller to actuate the valve means accordingly.

[0020] The appliance comprises visual and/or acoustic means for informing the user that the moisture condensing means are to be cleaned.

[0021] Control means of the appliance are adapted to calculate how many cycles have been performed from the last moisture condensing means cleaning and to operate the visual and/or acoustic means accordingly.

[0022] Said water circuit preferably comprises a water discharge circuit for discharging the water used to wash the moisture condensing means.

[0023] Said water discharge circuit may be fluidly connected to a detergent dispensing arrangement of the appliance, or the water discharge circuit may be fluidly connected to the tub of the appliance, or the water discharge circuit may be fluidly connected to a pump for draining the tub of the appliance.

[0024] Said drum is rotatably accommodated within a washing tub housed within the cabinet and said moisture condensing means are arranged between the tub and a top wall of the cabinet.

[0025] The laundry drying appliance comprising a cabinet having a top, a rotatable drying drum accommodated within the cabinet, and a laundry drying air circulation system for circulating drying air, wherein the top is adapted to match and close from above the cabinet, the top being formed as a ready-to-mount part ready to be mounted to the cabinet and forming a moisture condensing module for dehydrating drying air used to dry laundry within the drying drum, the top having a drying air inlet for receiving moisture-laden drying air, a drying air outlet for delivering dehydrated drying air, fluid passageways defined therein from said drying air inlet to said drying air outlet for the passage of the drying air to be dehydrated and moisture condensing means arranged inside said fluid passageways, wherein the drying air circulation system comprises a drying air drum outlet connectable to the drying air inlet of the top, and a drying air drum inlet connectable to the drying air outlet of the top.

Brief description of the drawings

[0026] These and other features and advantages of the present invention will better appear by reading the following detailed description of some embodiments thereof, provided merely by way of non-limitative examples, description that should be read in conjunction with the attached drawings, wherein:

Figure 1 is a perspective from the front of an appliance for drying laundry according to an embodiment of the present invention, with a worktop forming a ready-to-mount moisture condensing module for dehydrating drying air used to dry laundry within a drying drum of the laundry drying appliance;

Figure 2 shows in perspective the appliance of Figure 1 with the worktop unmounted;

Figure 3A shows in perspective from the rear the appliance of Figure 2, with lateral and rear walls of the cabinet removed;

Figure 3B shows a detail of Figure 3A from another point of view;

Figure 4 shows in enlarged scale a detail of a part of the appliance of Figure 3A;

Figure 5A shows in perspective exploded view a worktop of the appliance of Figure 2, in an embodiment of the present invention;

Figure 5B shows the worktop of Figure 5A from below;

Figure 6 shows a detail of the worktop of Figure 5A;

Figures 7A and 7B schematizes the path followed, within the worktop of Figure 5A, by laundry drying air to be dehydrated, and by cooling air used to cool down the drying air so as to remove moisture therefrom;

Figure 8 shows another detail of the worktop of **Figure 5A**;

Figure 9 shows still another detail of the worktop of **Figure 5A**, particularly an embodiment of mist separation means provided in the worktop;

Figure 10 shows a condense water drainage arrangement for draining condense water from the worktop of **Figures 5A** and **5B**;

Figure 11 schematically shows a detail of an alternative embodiment of the mist separation means of **Figure 9**;

Figure 12 shows still another alternative embodiment of the mist separation means;

Figure 13 schematically shows an arrangement for exploiting condense water released by the drying air for generating steam used for refreshing the items to be dried;

Figures 14A and **15** shows a solution for generating refreshing steam, in an embodiment of the present invention; in addition, **Figure 14A** also shown an alternative construction of a drying air circulation fan and drying air conduit for delivering drying air to the drum;

Figure 14B shows a detail of the fixation of the drying air circulation fan of **Figure 14A** to the machine cabinet;

Figure 16 shows schematically an embodiment of the worktop of **Figure 5A** adapted to define a drying surface for laying garments to be dried gently;

Figures 17 and 18 show an alternative construction of the worktop of **Figure 5A**;

Figures 19 and 20 show the implementation of the concept of **Figure 16** to the alternative worktop construction of **Figures 17 and 18**;

Figure 21 shows in exploded view a worktop according to another embodiment of the present invention, comprising a heat pump for dehydrating and then heating the drying air;

Figure 22A shows the worktop of **Figure 21** partially mounted, and schematizes the path followed by the drying air;

Figure 22B shows the worktop of **Figure 22A** from below;

Figure 23 shows the worktop of **Figure 21** partially sectioned, and also schematizes the path followed by the drying air;

Figure 24A shows a variant of the solution of **Figure 22**, with a compressor accommodated in the basement of the machine;

Figure 24B shows from below the worktop and compressor in the variant of **Figure 24A**;

Figure 25 shows a detail of the worktop of **Figure 21**;

Figure 26 shows an arrangement for draining condense water from the worktop of **Figure 25**;

Figure 27 shows a variant of the solution of **Figures 21 to 26**, with the heat pump accommodated in the basement of the appliance;

Figures 28-30 show in perspective and also in exploded views a worktop according to another embodiment of the present invention;

Figures 31A and 31 B shows in perspective view from below variants of the worktop of **Figures 1-27**, wherein part of a fan housing is integrally formed with the worktop;

Figures 32-34 show in perspective views a worktop according to another embodiment of the present in-

vention, wherein a seat for a detergent/softener container is also integrally formed in the worktop;

Figures 35A and 35B show an alternative construction for a defluff filter;

Figures 36-39 and 40 show schematically embodiments of the present invention which enable washing the evaporator exploiting water coming from a water main or condense water originating from the dehydration of the moisture-laden drying air; and

Figures 41-45 show an embodiment of the present invention according to which the moisture condensing module for dehydrating drying air used to dry laundry is realized as a rear panel of the machine, instead of in the form of a worktop.

Detailed description of embodiments of the invention

[0027] With reference to the drawings, a laundry drying appliance, particularly a washer/dryer according to an embodiment of the present invention is depicted in **Figure 1** in perspective. The washer/dryer, globally denoted as 100, comprises a drum 105 for the loading of the articles to be washed and/or dried, such as clothes, garments, linen, and similar articles. The drum 105 is a generically cylindrical body, for example made of stainless steel, and is rotatable within a tub housed in the machine casing or cabinet 110.

[0028] The cabinet 110 is generically a parallelepiped in shape, and has a front wall 113, two side walls 117, a rear wall, a basement and a worktop (top) 119. The front wall 113 is provided with an opening for accessing the drum 105 and with an associated door 115 for closing the opening. In the upper part of the front wall 113, a machine control panel 121 is located, and, aside the control panel 121, a drawer 123, part of a washing treatment products dispensing arrangement, for loading laundry washing treatment products like detergents and softeners. The top 119 closes the cabinet 110 from above, and defines a worktop.

[0029] In the washer/dryer 100, when operated in dryer mode, drying air is typically caused to flow through the drum 105, where the items to be dried are contained. After exiting the drum 105, the flow of moisture-laden drying air passes through a moisture condensing system, where the humid drying air is at least partially dried, dehydrated, and the dehydrated air flow is then heated and caused to pass again through the drum 105, and repeats the cycle.

[0030] In the following, several solutions according to embodiments of the present invention and possible variants thereof will be presented; essentially, the solutions that will be presented belong to either one of two general classes, mainly differing from each other for the type of moisture condensing system, which in one case com-

prises an air-air heat exchanger, whereas in the other case the moisture condensing system comprises a heat pump.

[0031] Figures 2 to 16 show, in different views, a solution according to an embodiment of the present invention, in which the moisture condensing system comprises, as mentioned, an air-air heat exchanger, described in detail in the following.

[0032] As visible in particular in Figures 2 and 3A, 3B, a drying air circulation system is provided in the washer/dryer 100. The drying air circulation system comprises a fan 205, for example arranged at the rear of the cabinet 110, near the right-top corner thereof. The fan 205, which is fixedly mounted to the cabinet 110, for example by means of a bracket 340 so as to be rigidly connected to the cabinet 110, has an air intake 210 facing upwards and which opens towards the top 119. The fan 205 has an outlet coupled to an inlet of an air duct 215 that runs at the top of the cabinet 110 from the rear to the front thereof, and, through a bellow (not visible in the drawings), conveys the drying air impelled by the fan 205 into the tub 303 and the drum 105 accommodated therein. In particular, in the shown embodiment the drying air enters the tub 303 and the drum 105 in correspondence of the front thereof (for this reason, since in the exemplary embodiment here considered the fan 205 is located at the rear of the appliance, the air duct 215 runs from the rear to the front of the cabinet 110); this however is just a matter of design and choice, and nothing prevents from having the drying air entrance into the tub 303 located in different positions, for example at the rear of the cabinet 110 (in which case, if the fan 205 is as well located at the rear, there is no need of having an air duct running from the rear to the front of the cabinet 110).

[0033] An air heater, for example an electrical resistor, is preferably accommodated within the air duct 215 for heating up the drying air before it enters the drum 105. The drying air circulation system further comprises a return air duct 305, arranged at the rear of the cabinet 110, near the left-top corner thereof and fixedly mounted to the cabinet 110, for example by means of a bracket 345, so as to be rigidly connected to the cabinet 110; the return air duct 305 receives the drying air exiting the drum 105 and the tub 303, and has an outlet 310 that faces upwards and opens towards the top 119; in particular, the drying air exits the drum 105 at the rear thereof, after having passed through the drum so as to hit the items to be dried that are present therein.

[0034] As visible in Figures 3A, 3B and 4, according to a preferred embodiment of the present invention, the return air duct 305 receives the drying air exiting from the drum 105 and the tub 303 through an opening in the tub 303 already provided for feeding thereto the laundry washing treatment products (detergents, softeners) and the clean water used to wash the laundry when the washer/dryer is operated in washing mode. In particular, a manifold 315 is provided, coupled to the opening in the tub 303. The manifold 315 has an inlet pipe 320 that is

coupled, by means of a bellow and a duct 323, to an arrangement 325 for dispensing to the tub 303 the laundry washing treatment products (the dispensing arrangement comprising for example a detergent/softener container, one or possibly two electrovalves for intaking cold and possibly hot water from water mains, possibly a mixing chamber for mixing treatment products and water). The manifold 315 has an outlet opening to which, by means of a bellow 316, the return air duct 305 is connected. Internally, the manifold 315 has a baffle 405 extending down from a top wall of the manifold 315 and defining a siphon: the siphon allows that part of the laundry washing treatment liquid (water mixed with the detergent of the softener, or, possibly, simply water) remains at the bottom of the manifold 315, thereby preventing that, when the appliance is operated in drying mode, the drying air exiting the tub 303 leaks into the treatment products dispensing arrangement 325, and that for this reason heat is lost, and, at the same time, that humid, moisture-laden air is released into the external environment (passing through the detergent container), which is regarded as undesired because the washer/dryer is installed in-house and humidity released in the environment may cause problems.

[0035] Part of the drying air circulation system is entirely accommodated within the top 119. As visible in the exploded view of **Figure 5A**, the top 119 comprises a base element 505, visible from below in **Figure 5B**, having shape and size adapted to match and close from above the cabinet 110 when the top 119 is mounted thereto. Proximate to the two rear corners thereof, the base element 505 has two openings 510 and 515 formed in its bottom wall; as better described in the following, when the top 119 is assembled and placed on top of the cabinet 110, the opening 510 matches the outlet 310 of the return air duct 305, whereas the opening 515 matches the air intake 210 of the fan 205.

[0036] As visible in **Figures 5A, 6 and 7A, 7B**, an air path for the drying air is defined in the base element 505 by means of a series of walls rising from the bottom wall. In particular, moisture-laden drying air, indicated by arrow 520 in **Figure 5A**, which comes from the drum 105 and the tub 303 through the return air duct 305, and enters into the top 119 through the opening 510, initially is caused to flow essentially parallel to the left side 525 of the top 119, from the rear to the front, and to pass through an air defluff filter that is removably accommodated within a respective filter seat 530 formed in the base element 505. Upon exiting the defluff filter, the drying air passes (arrow 533) through a moisture condenser comprising an air-air heat exchanger 535, so as to be cooled down and release moisture in the form of condense water. Advantageously, the air-air heat exchanger 535 is fully accommodated within the top 119, for example, as shown, in the central part thereof.

[0037] The air-air heat exchanger 535 comprises a corrugated sheet metal part 540, the undulations of which define channels for the passage of air. The corrugated

sheet metal part **540** rests, both at the front and at the rear edges thereof, on a pair of comb-like structures **705** and **710**, respectively arranged along a front wall **545** of the base element **505**, and along a rear wall **550** of the base element **505**. When assembled, the corrugated sheet metal part **540** is joined to the base element **505**, for example by means of glue in between the comb-like structures **705** and **710**. When the corrugated sheet metal part **540** rests on the comb-like structures **705** and **710**, the undulations define, on the underside of the sheet metal part **540**, channels for the flow of the drying air **533** to be cooled down, whereas on the upper side of the sheet metal part **540** the undulations define channels for the flow of cooling air **555** that, in the embodiment here considered, is taken in from the outside environment by means of a tangential fan **560** mounted to the rear wall **550** of the base element **505**. The glue used to attach the corrugated sheet metal part **540** also seals the upper and lower channels for the cooling and drying air. In this way, the drying air **533** that, after passing through the defluff filter, enters the air-air heat exchanger and flows under the corrugated sheet metal part **540**, releases heat to the cooling air **555** that flows above the corrugated sheet metal part **540**, and cools down, and the moisture present therein is condensed. The cooling air **555**, after passing through the air-air heat exchanger, exits from the front thereof, and is then discharged into the machine cabinet **110** through an aperture **570** provided in the base element **505**. In alternative to the tangential fan **560**, an axial fan might be provided in correspondence of the aperture **570** for circulating the cooling air.

[0038] After passing through the air-air heat exchanger **535**, the cooled drying air **573** exits therefrom at the right rear corner thereof, and then flows along a convoluted air path portion **575** to the opening **515** that is connected to the fan intake **210**. Along the convoluted air path portion **575**, mist/condense water droplets separation means are provided, for ensuring that mist, condense water droplets are removed from the drying air before it reaches the air fan **205**.

[0039] As visible in **Figure 9**, in an embodiment of the invention, the mist/condense water droplets separation means comprises a condense water collecting tank **905** formed along the convoluted air path portion **575**; droplets of condense water released by the drying air upon passing through the air-air heat exchanger are drawn by the aspiration effect of the fan **205** to the convoluted air path portion **575** and arrives at the tank **905**, where they are separated from the drying air and accumulate. At the bottom of the tank **905**, a condense water discharge conduit **910** is fluidly connected to the manifold **315**, by means of a piping **1005**, visible in **Figure 10**. In particular, the piping **1005** that connects the condense water discharge conduit **910** to the manifold **315** opens into the latter at a point below the free surface of the water that remains in the siphon defined by the baffle **405**; in this way, it is ensured that the condense water is not aspirated by the fan **205**. When, due to the discharged condense

water, the level of water in the manifold **315** raises excessively, the excess water is discharged into the tub **303**, in a position thereof such that the water does not enter the drum, but is instead directly conveyed, via the tub, to a liquid discharge circuit, comprising a water discharge pump (not shown), provided in the washer/dryer.

[0040] As an alternative to discharging the condense water into the manifold **315**, the condense water that accumulates in the tank **905** may be directly conveyed (through a piping not shown) to the water discharge pump of the machine.

[0041] Preferably, as schematically depicted in **Figure 11**, in order to avoid that the depression generated by the fan **205** may suck condense water that deposits in the tank **905**, the discharge conduit **910** of the tank **905** is fluidly connected, by a conduit **1105**, to a lower tank **1110**, located at a suitable lower quota with respect to the top **119**, for example at or near the basement of the washer/dryer. The lower tank **1110** is further fluidly connected, through a conduit **1115**, to a point of the convoluted air path portion **575** located downstream the tank **905**, for example close to the air intake **210** of the fan **205**. The bottom of the lower tank **1110** has a condense water discharge outlet **1120** that is fluidly connected to the water discharge circuit of the washer/dryer, and thus to the discharge pump.

[0042] A baffle **915** is preferably provided in the tank **905**, the baffle **915** defining a siphon; the presence of the baffle **915**, forming a barrier for the drying air flow, facilitates that water droplets that are transported by the flow of drying air fall into the tank **905**, preventing them from reaching the fan **205**.

[0043] As an alternative to the provision of the baffle **915** shown in **Figures 9** and **11**, a mist separator element **1205** may be accommodated in the tank **905**, as depicted in **Figure 12**, for promoting the removal of moist droplets from the drying air. The mist separator element **1205** may for example be formed of a plurality of metal or plastic plates bent to define a winding path. Also in this case, the lower tank **1110** may be provided.

[0044] The path followed in the top **119** by the moisten-laden drying air is also schematized in **Figure 7A**, and indicated therein as **700**. The drying air passes through the defluff filter vertically, from the top to the bottom filter surfaces, and exits the filter seat **530** (for then entering into the air-air heat exchanger) passing through an opening **701** formed along a bottom of a side wall of the filter seat **530**. In **Figure 7B**, there is instead schematized (reference **701**) the path followed by the cooling air.

[0045] The condense water that accumulates in the tank **905** may be exploited for generating steam used for refreshing the items to be dried during the drying cycle. As schematized in **Figures 13** and **14A**, the tank **905** may be shaped so as to have a deeper portion **1305**, defining a reservoir for water used to generate steam. A pump **1310** has an inlet connected to the tank deeper portion **1305**; the pump **1310** has an outlet fluidly connected to a nozzle **1405** arranged to spray inside the air duct **215**,

preferably in a point thereof where there is the electrical resistor provided for heating the drying air; in this way, the heat generated by the resistor cause the water sprayed by the pump **1305** to vaporize, and steam is generated that is useful for refreshing the items being dried. The resistor may be mounted internally or externally to the air duct **215**; in case the resistor is mounted within the air duct **215**, an armoured resistor should be used. For a more efficient operation, as depicted in **Figure 15**, the drying air heating resistor **1505** may be associated with a heat dissipater/radiator **1510** having fins, that is accommodated within the air duct **215**. In this way, the effect of drying air heating and of vaporisation of the water sprayed by the pump **1310** is enhanced.

[0046] In **Figures 14A** and **14B** there is also shown a variant of the construction of the fan **205** and air duct **215**, in which the air duct **215** is shaped so as to also define a shell forming a housing for the fan **205**, particularly for the fan rotor **1410**; the air duct is made of two half-shells, and is fixedly, rigidly mounted to the cabinet **110** by means of the bracket **340**, as visible in **Figure 14B**.

[0047] Referring back to **Figure 5A**, a pair of panels **580** and **585** are provided in the top **119** for closing from above the air path for the drying air defined in the base element **505**. The top **119** is completed by a further panel **590**, having also aesthetic function, that is superimposed to the two panels **580** and **585** and that also covers the corrugated sheet metal plate **540**, and by a frame **595** (the panel **590** and the frame **595** are not depicted in **Figure 2**). The panels **580**, **585** and **590** are secured to the base element **505** for example by means of screws. Acoustic absorbing material can be inserted in the top **119**, for example between the panels **580**, **585** and the panel **590**.

[0048] In an embodiment of the present invention, shown in **Figure 16** (and similarly in **Figures 19** and **20**, although the latter drawings relate to a variant of the top here described, that will be described later on), the panel **590** has an elongated aperture **1605** extending parallel to the front of the top **119**, from which opening **1605** the cooling air **555**, after having passed through the air-air heat exchanger **535**, exits. Above the panel **590**, a perforated panel **1610** rests, slightly spaced apart from the panel **590**, so as to leave an air gap between the two panels **590** and **1610**. The cooling air **555**, heated by the heat released by the drying air **533**, exits from the perforations in the panel **1610**. In this way, the top **119** may be exploited for laying thereon delicate garments to be dried that, due to their nature, cannot be dried within the tumbling drum without being damaged. The top **119** thus defines thereinside a path for the drying air to be cooled down, and another path for the cooling air which is also exploited for drying delicate garments by laying them on the perforated surface of the panel **1610**.

[0049] The top **119**, once assembled, forms a unit that is ready to be mounted to the cabinet **110**, simply by placing it in the correct alignment, so that the openings

510 and **515** matches the outlet **310** of the return air duct **305** and, respectively, the intake **210** of the air circulation fan **205**. As mentioned in the foregoing, both the return air duct **305** and the fan **205** are fixed, rigidly connected to the machine cabinet **110**; in this way, the outlet **310** of the return air duct **305** and the air intake **210** of the air circulation fan **205** act as automatic positioning and centering means for the top **119**, thereby greatly simplifying the mounting thereof. The operation of mounting of the top onto the cabinet simply consists in laying the top **119** on the cabinet properly positioning it with the help of the self-centering action achieved by the matching of the openings **510** and **515** with the outlet **310** and air intake **210**; in this way, all the necessary connections for the drying air circulation circuit are completed, and there is no need to perform any additional connection (exception made for the connection of the condense water discharge piping **1005**). The top **119** may then be secured to the cabinet **110** by conventional means (e.g., screws, or by snap-fit engagement). Thanks to the fact that several components of the drying air circulation system, particularly the moisture condensing system, are accommodated within the top **119**, several problems of space within the cabinet **110** are overcome; essentially, only the fan **205**, the air duct **215**, and the return air duct **305** need to be accommodated within the cabinet **110**. This reduces problems of space within the cabinet **110**, and makes it easier to exploit an already existing design of a washing machine to transform it into a washer/dryer, without having to make substantial changes.

[0050] A top **119** according to a variant of the embodiment just described is depicted in **Figures 17 - 20**. In this case, the drying air to be cooled down for releasing the moisture and be dehydrated passes through the air-air heat exchanger twice, once going from the front towards the rear, and then back towards the front, as schematized in **Figure 18**. This double passage improves the action of cooling of the drying air by the cooling air, and thus improves the release of moisture. In particular, the drying air, entering into the top **119** through the opening **510**, flows along a substantially rectilinear path **1705** defined in the base element along the left side thereof, from the back to the front, and then enters a defluff filter **1710**, which in this alternative is accommodated along the front side of the base element **505**. The drying air passes through the defluff filter (from the top to the bottom thereof), and then enters the air-air heat exchanger. As in the previously described embodiment, the air-air heat exchanger comprises a corrugated sheet metal part **1805**, the undulations defining channels for the passage of the drying air (under the corrugated sheet metal part **1805**) and for the cooling air (above the corrugated sheet metal part **1805**). The region of the base element **505** intended to accommodate the corrugated sheet metal part **1805** is divided in two parts **1810a**, **1810b**, separated by a wall **1815** extending parallel to the side walls of the base element **505**. The drying air passes from the filter to the air-air heat exchanger flowing through a passage **1820**

formed at the bottom of a wall **1825** that separates the filter lodging from the region of the air-air heat exchanger, said passage being located on the left side of the base element. The drying air flows under the corrugated sheet metal part **1805** in the first part **1810a** of the base element **505**, then, at the rear of the base element **505**, the drying air passes to the second part **1810b** of the base element passing through a passage **1830** formed at the bottom of the wall **1815**. The drying air then flows under the corrugated sheet metal part **1805** in the second part **1810b** of the base element **505** to the front, and exits the air-air heat exchanger passing through an aperture **1835** below a lateral wall **1840** of the base element **505** that delimits the region thereof accommodating the corrugated sheet metal part **1805**. The cooled drying air thus exits the air-air heat exchanger from the front-right corner thereof, then the drying air flows along an essentially straight air path **1845** towards the opening **515**, where there is the intake **210** of the fan **205**. For the discharge of the condense water that is released by the drying air, solutions similar to those described above are exploitable. As shown in **Figures 19** and **20**, the top panel **1905** of the top **119** may also in this case be perforated, for the passage of the cooling air, so as to provide a working surface for lying delicate garments that are not suitable to be dried by putting them into the tumbling drum of the machine. The top **119** defines thereinside a path for the drying air **1910** to be cooled down, and another path for the cooling air **2005** which is also exploited for drying delicate garments by laying them on the perforated surface of the panel **1905**.

[0051] **Figures 21** to **26** show, in different views, a solution according to another embodiment of the present invention, in which the condensing system is almost completely accommodated within the top **119** and comprises, as mentioned in the foregoing, a heat pump, instead of an air-air heat exchanger.

[0052] Also in this case, the top **119** comprises a base element **2105**, which has two openings **2205** and **2210** formed in its bottom wall, the former opening **2205** being located in correspondence of the outlet **310** of the return air duct **305**, the latter opening **2210** being located in correspondence of the intake **210** of the fan **205**. In the region of the base element **2105** near the front-left corner thereof, a defluff filter arrangement **2110** is located, for example in the form of a drawer hinged at one end to the base element **2105** and pivotable so as to allow its extraction for cleaning purposes. The defluff filter may comprises a pair of superimposed meshes that can be separated for being cleaned.

[0053] A moisture condensing system is accommodated in the central region of the base element **2105**, the moisture condensing system includes a heat pump circuit comprising a first heat exchanger **2115**, for cooling and dehydrating the moisture-laden drying air, and a second heat exchanger **2120**, downstream the first heat exchanger **2115**, for heating the drying air. Depending on the refrigerating fluid used in the heat pump, the first heat

exchanger **2115** may be an evaporator or a gas heater (the latter, in case the refrigerant operates at supercritical pressure), and the second heat exchanger **2120** may be a condenser or a gas cooler (the latter in case the refrigerant operates at supercritical pressure); in the following it will be assumed that the heat pump comprises an evaporator and a condenser, but this is not to be construed as a limitation. The evaporator **2115** has the function of dehydrating the drying air, by cooling it down; the condenser **2120** has instead the function of heating the dehydrated drying air. A compressor **2125** for the heat pump is attached to the underside of the base element **1405** in correspondence of the front-right corner thereof, the compressor body protruding from below the base element **2105**. In an alternative embodiment, shown in **Figures 24A** and **24B**, the compressor **2125** may be located at the bottom of the cabinet **110**, attached to the machine basement, and be fluidly connected to the moisture condensing system accommodated in the top **119** by means of flexible pipes **2405** than run along a rear corner of the cabinet **110**.

[0054] The compressor may be a variable-speed compressor, allowing to trade off required power and available space.

[0055] The base element **2105** is covered by a first panel **2130**, that covers essentially just the evaporator **2115**, and a second panel **2135**, that also covers the condenser **2120** and the filter **2110**. The top **119** is completed by the top panel **590** and the frame **595**. Acoustic absorbing material can be inserted in the top **119**, for example between the panels **2135** and **590**.

[0056] The base element **2105** and the two panels **2115** and **2135** define a first air path that conveys the drying air coming from the return air duct **305** to the defluff filter, preventing the drying air from entering the evaporator, and a second air path that, from the defluff filter, goes to the condenser passing through the evaporator.

[0057] The drying air passes through the filter **2110** from the top to the bottom of it, and then enters the evaporator **2115**. The panel **2130** has, along an edge thereof that runs along the border between the filter **2110** region and the evaporator **2115** region, a downwardly projecting lip **2135** that prevents the drying air to enter the evaporator region from above the filter **2110**.

[0058] In the region of the base element **2105** under the evaporator **2115**, there are provided mist/condense water droplets separation means; in particular, the base element **2105** is slanted towards a baffle **2305** that separates the area of the base element **2105** where the evaporator **2115** is accommodated, from the area where the condenser **2120** is placed. The baffle **2305** forms a barrier for the condense water that drops from the drying air when it passes through the evaporator **2115**. Preferably, transversal channels **2505** are formed in the bottom wall of the base element **2105** in the area corresponding to the evaporator **2115**, to facilitate the drainage of the condense water. A condense water drainage hole **2510** is formed in the area of the base element bottom wall cor-

responding to the evaporator **2115**; the drainage hole **2510** is fluidly connected, through a conduit **2605**, to the manifold **315**, for discharging the condense water. The conduit **2605** opens into the manifold **315** at a point below the surface of the water that remains in the manifold **315**, for avoiding that, due to the depression created by the fan **205**, the condense water is aspirated back. Also in this case, the excess condense water that accumulates in the manifold **315** discharges into the tub, in a manner such as not to enter into the drum, and then goes to the water discharge circuit of the machine. Alternatively the drainage hole **2510** may be fluidly connected to the water discharge circuit (e.g., to the discharge pump) directly.

[0059] Also in this second embodiment, the top **119**, once assembled, forms a unit that is ready to be mounted to the cabinet **110**, simply by placing it in the correct alignment, so that the openings **2205** and **2210** matches the outlet **310** of the return air duct **305** and, respectively, the intake **210** of the fan **205**. The top **119** may then be secured to the cabinet **110** by conventional means (e.g., screws or snap-fit engagement). No further connections need to be made, exception made for the connection of the drainage hole **2510** to the manifold **315**; in the variant having the compressor located in the basement, the top **119** may be preassembled with the pipes **2405** attached to the heat pump; after placing the top on the cabinet, the pipes **2405** are connected to the compressor.

[0060] The solution exploiting an air-air-heat exchanger as a condensing means for removing moisture from the drying air achieves a significant saving of water compared to the solutions known in the art exploiting a water spray condenser; in fact, water spray condensers waste several liters of waters, that is taken in from the water main.

[0061] The solution exploiting the heat pump, in addition to achieving a saving of water as that exploiting the air-air-heat exchanger, also allows saving electrical energy, because the electrical resistor for heating the drying air may be dispensed for (the heating of the drying air being carried out by the condenser); in any case, nothing prevents from providing also in this embodiment the resistor air heater: for example, it may be useful for the starting phases of the drying cycle, when the condenser in the heat pump has not yet reached the full working temperature, or for the generation of steam for refreshing the items being dried, as in the solution described above.

[0062] In **Figure 27** there is shown a variant of the heat pump solution in which the heat pump **2705**, instead of being accommodated within the top **119**, is placed at the base of the cabinet (the compressor being in this accommodated at the bottom of the machine); air ducts **2710** and **2715** extending along the rear wall of the cabinet are provided for conveying the drying air exiting the drum to the heat pump, and for conveying back the demineralized drying air to an air intake of the air circulation fan **205**. Also in this case, the heat pump may be realized in the form of an assembly ready to be mounted.

[0063] Several modifications to the embodiments de-

scribed in the foregoing can be envisaged.

[0064] For example, the rotary defluff filter described in connection with the second embodiment could be implemented as well in the first embodiment.

[0065] In **Figures 28-30** another embodiment of the present invention is depicted. In this embodiment, instead of having the two openings **510** and **515** formed in the bottom wall of the top base element **505** like in the embodiment of **Figures 1-20**, or the two openings **2205** and **2210** formed in the bottom wall of the top base element **2105** like in the embodiment of **Figures 21-27**, which openings **510** and **515**, **2205** and **2210** match the outlet **310** of the return air duct **305** and, respectively, the air intake **210** of the fan **205**, the top **119** has a base element **2805** in which two openings **2810** and **2815** are formed in a rear wall **2820** of a frame that surrounds the bottom wall of the top base element **2805**. To the opening **2810**, an end of a flexible hose **2825** is connected, which hose **2825**, at the other end, is connected to an opening in the tub **303**, which may for example be the opening provided for feeding the laundry washing treatment products, or the hose **2825** may be connected to the manifold **315**, like the return air duct **305** in the previously described embodiments. The opening **2815** is connected, through a flexible hose **2905**, to an air intake **3005** of a fan **2910**. Differently from the previously described embodiments, the fan air intake **3005** is formed at the rear of a fan housing **3010**. It is underlined that even if **Figures 28-30** relate to a moisture condensing system implemented by a heat pump, nothing prevents from adopting this same arrangement of openings **2810** and **2815** at the back of the base element **2805** also in connection with a moisture condensing system comprising an air-air heat exchanger. Also, nothing prevents that the hose **2825** is connected to the tub **303** at the front, instead of at the rear.

[0066] At least part of the fan housing may be formed integrally to the top (preferably, at least a part of the top and at least part of the fan housing form a single piece construction, for example made by injection moulding process); for example, as visible in **Figure 30**, an upper half-shell **3010** of the fan housing is formed integrally with the base element **2805**, below the bottom wall **2915** of the base element **2805**. A fan wheel **3015** is rotatably accommodated in a space delimited by the upper half-shell and a bottom half-shell **3020** of the fan housing, and a fan motor **3023** is mounted outside the bottom half-shell **3020**. In the embodiment shown in **Figure 30**, an air delivery duct **3025** delivering the air impelled by the fan wheel to the tub **303** is formed integrally with the bottom half-shell **3015**. **Figure 31A** shows that, identically to **Figure 30**, the integration of at least part of the fan housing is possible as well in a top **119** according to the embodiments of **Figures 1-20** or of **Figures 21-27**, with the two openings **510** and **515** or **2205** and **2210** formed in the base element **3105a** of the top. **Figure 31B** shows an embodiment in which the air delivery conduit **3125** is integral to the upper half-shell **3110**, i.e. integral

with the base element **3105b**; it is intended that the same solution can be applied to the top of **Figures 28-30**, with the rear openings **2810** and **2815**. Further, it is to be noted that the air delivery duct **3025** described above can be fluidly connected to a rear part of the tub **303** instead of being connected to a front part of the tub **303** as depicted in **Figures 28-31B**.

[0067] **Figures 32-34** show another embodiment of top **119** according to the present invention, in which a seat **3210** for a container of detergents/softener is also formed integrally to the top **119**, particularly integrally to the base element **3205** (preferably, at least a part of the top and the seat form a single piece construction, for example made by injection moulding process). The detergent container (not shown in the drawings) may be in the usual form of a drawer, slidably accommodated within the seat **3210**. The seat **3210** projects below the bottom wall of the base element **3205** and is open on the above, being closed by a removable water delivery assembly **3215** comprising means for delivering water selectively into different compartments of the detergent drawer. Above the assembly **3215**, a drying air line is arranged for conveying drying air from opening **2205** to the evaporator and the defluff filter is arranged along the drying air line upstream the evaporator as described for the embodiments of **Figure 21, 22A, 23**, the filter being extractable from the machine through the slot **3515** provided at the front wall of the top.

[0068] Advantageously, as shown in **Figure 34**, a support **3405** for water inlet electrovalves **3410a, 3410b** is also formed integrally to the base element **3205** (preferably, at least a part of the top and the support form a single piece construction, for example made by injection moulding process), with pipes **3413a, 3413b** that fluidly connects the electrovalve outlets to the water delivery assembly **3215**. Also formed integrally to the base element may be a bracket **3415** for supporting a pipe union **3420** for the connection (through a conventional hose) to a socket of a water main. In an alternative embodiment, the water inlet electrovalves **3410a, 3410b** can be supported by the bracket **3415**. Preferably, at least a part of the top and the support form a single piece construction, for example made by injection moulding process.

[0069] Also visible in **Figures 32 and 33** is a variant of the solution shown in **Figure 25** for facilitating the drainage of condense water dripping from the evaporator of the heat pump of the moisture condensing system. The area of the base element **3205** under the evaporator is concave and has a drainage hole **3220** formed essentially at the center thereof; ribs **3225** depart approximately radially from the drainage hole **3220**, upon which ribs **3225** the evaporator lies. The area of the base element **3205** under the evaporator, the drainage hole **3220** and the ribs **3225** are integrally provided to the top and preferably, at least a part of the top the area of the base element **3205** under the evaporator and/or the drainage hole **3220** and/or the ribs **3225** form a single piece construction for example by injection moulding.

[0070] The drainage hole **3220** is, as shown in **Figure 34**, connected through a hose **3425** to the seat **3210** for the detergent container, so that the condense water can be discharged into the manifold **315** or directly into the tub **303** via the seat **3210** for the detergent container.

[0071] **Figures 35A and 35B** show a variant of the defluff filter located upstream the evaporator and described in connection with the previous embodiments. The defluff filter **3500** has a foldable construction, with a first wing **3505a** connected to a handle **3510** and a second wing **3505b** hinged to the first wing. The defluff filter **3500** can be extracted from its seat in the top **119** through a slot **3515** provided in a front wall of the base element of the top, and be unfolded for being cleaned.

[0072] **Figures 36-39** schematically show some variants of a solution for automatically cleaning the evaporator of the heat pump of the moisture condensing system, in order to remove possible fluff that is not retained by the defluff filter, or to allow dispensing for the need of providing the defluff filter. In **Figures 36-39**, the parts within the dashed rectangle **3600** are intended to be accommodated within the ready-to-mount top **119** or to be mounted thereto; reference numerals **3605, 3610, 3615** and **3620** denote the main components of the heat pump, i.e., respectively, the evaporator **3605**, the condenser **3610**, the compressor **3615** and a lamination valve **3620** (however, the compressor may in some embodiments be external the top).

[0073] In the variant of **Figure 36**, a three-way valve **3625** (for example) can be provided, which is operable to divert the water entering the appliance from the water main to either the detergent container **3630** (which, in the non-limitative example herein considered, may be for example a drawer slidably accommodated in a seat integrally formed in the top **119**, like for example shown in **Figures 32-34**) or to a nozzle **3635** arranged in the area of the top **119** where the evaporator **3605** is accommodated, in order to sprinkle water onto it; the three-way valve **3625** may be mounted directly to the top **119**. The nozzle **3635**, as shown in **Figure 40**, may be a hole formed in a wall **4005** of the top base element where the evaporator is accommodated, and the evaporator can be covered by a perforated panel **4010**, so that a space is provided above the evaporator to contain and dispense the water intended to flush the evaporator. The water used to wash the evaporator **3605** then returns, through a discharge duct **3640**, to the detergent container **3630**. In this case, the pressure of the water in the water main is exploited. It is to be noted that to remove efficiently the fluff from the evaporator it is possible to wash with water only the end portion of the evaporator that first meets the drying air stream, which portion tends obviously to collect most of the fluff present in the drying air.

[0074] The variant of **Figure 37** differs from that of **Figure 36** mainly in that the discharge of the water used to wash the evaporator is made directly into the washing tub **303**, through a discharge duct **3740**; in **Figure 37** the detergent container **3630** and the three-way valve **3725**

are depicted as not integrally formed with the top 119, but nothing prevents from having one or both of them integrated.

[0075] The variants of **Figures 38 and 39** differ from those of **Figures 36 and 37** in that the water used to wash the evaporator is condense water that is collected in a basin 3805 properly arranged in the top 119 so as to collect condense water dropping from the evaporator 3605. Condense water collected in the basin 3805 is recirculated, by a pump 3810, from the basin 3805 to the nozzle 3635, from where it is sprinkled onto the evaporator 3605, and then is collected back in the basin 3805. The condense water in the basin 3805 may be discharged either into the detergent container 3630 (**Figure 38**) or directly into the tub 303 (**Figure 39**), in any case a valve 3815 being provided for selectively enabling the discharge of the condense water present in the basin 3805. The presence of the pump 3810 is in this case preferable because no advantage can be taken of the pressure of the water of the water main. Preferably, a filter may be provided to retain the fluff contained in the condensed water and preferably the filter is arranged upstream the pump 3810.

[0076] Preferably the basin 3805 is formed integrally to the ready-to-mount top, preferably, at least a part of the top and the basin form a single piece construction, for example made by injection moulding process)

[0077] In an alternative embodiment the basin 3805 can be fluidly connected directly either to the seat 3210 of the detergent container or to the tub 303 by means of a siphon-like system without the need of the valve 3815 so that when the level of the condensed water in the basin 3805 is higher than a predetermined level the excess of water flow by gravity towards the seat 3210 of the detergent container or the tub 303. The basin 3805 is shaped and sized so as to guarantee that the amount of condensed water to be contained in it is appropriate to clean/wash the evaporator.

[0078] Essentially, the variants of **Figures 36-39** share the common feature that at least part of a water circuit for providing water to clean/wash the evaporator is arranged/integrated in the top, preferably, at least a part of the top and at least a part of the water circuit form a single piece construction, for example made by injection moulding process. The seat for the detergent container 3630 can be not integrally formed in the top 119. Further the valve 3625 or the pump 3810 can be simply connected or connectable to the water circuit for cleaning the evaporator but not provided integrally with the top (i.e. arranged inside or at the top like the valves 3410a and 3410b depicted in **Figures 34**), which means that once the top is coupled to the cabinet of laundry drying appliance, the water circuit is to be connected to the valve 3625 or to the pump 3810 already present in the cabinet of laundry drying appliance or, as an alternative, the valve 3625 or the pump 3810 are connected to the water circuit of the top and when the top is to be coupled to the cabinet of laundry drying appliance, the valve 3625 and the pump

3810 are to be arranged at appropriate seats provided in the cabinet of laundry drying appliance.

[0079] It is pointed out that the underlying principle of the solutions shown in **Figures 36-39** of automatically washing the evaporator exploiting water coming from the water main or the condense water dripping from the evaporator itself, is not necessarily linked to the fact that the heat pump (as well as other components of the dryer) is integrated in a ready-to-mount worktop.

[0080] The washing of the evaporator may take place automatically at any time, or during a washing phase of the appliance, for example during the rinsing. For this purpose the laundry appliance comprises a controller adapted to selectively actuate at least a valve (for example the valve 3625 described above) for feeding water to a water circuit, which conveys water to the evaporator to remove the fluff. Preferably, the controller actuates the valve during a laundry washing phase of the appliance and still preferably, during a rinsing phase. Alternatively or additionally the washing of the evaporator may also be commanded by a user, through the user interface of the appliance, for example the evaporator cleaning can be activated by means of a button or the like provided on the user interface. The actuation of the button enables the controller to actuate the valve accordingly. Further, the appliance can comprise visual and/or acoustic means (display, loudspeaker and similar) for informing the user that the evaporator needs to be cleaned and that the evaporator cleaning mode shall be carried out. Preferably the electronic circuit of the appliance is adapted to calculate how many cycles have been performed from the last evaporator cleaning (i.e. last actuation of the valve for feeding the water to the water circuit) and to operate the visual and/or acoustic means accordingly. The water used to clean the evaporator can be directed to the seat of the detergent container, or to the tub, or to a drain pump

[0081] Finally, **Figures 41-45** show an embodiment wherein the moisture condensing module of the dryer, instead of being formed as a ready-to-mount top, is formed as a ready-to-mount lateral panel of the appliance cabinet 110, for example a rear panel 4110, as in the example shown. In particular, in **Figures 41-45** the moisture condensing module is assumed to comprise, as moisture condensing means, a heat pump, which, in a way totally similar to what shown in **Figures 21-26**, includes an evaporator 4405, a condenser 4410, a compressor 4415; however, nothing prevents from integrating in the lateral (e.g. rear) panel a moisture condensing module like that of **Figures 1-20**, including as moisture condensing means an air-air heat exchanger. Openings 4105 and 4115 are provided in the panel 4110, which, similarly to the openings 510, 515, allows the entrance and exit of the drying air into/from the moisture condensing module. The compressor 4415 may, in a variant, be attached to the panel 4410.

[0082] It is underlined that the various embodiments and variants here described are independent one from the other and may also be implemented in various com-

binations.

Claims

1. A laundry drying appliance (100) comprising a cabinet (110), a rotatable drum (105) accommodated within the cabinet, and a laundry drying air circulation system for circulating drying air, the drying air circulation system comprising moisture condensing means (3605) operable for dehydrating moisture-laden drying air, **characterized in that** means (3625;3725;3635;4010;3640;3740) operable for cleaning the moisture condensing means are provided, said means for cleaning comprising valve means (3625;3725) operable to selectively enable a load of water from a water main to which the laundry drying appliance is connectable, and a water circuit for delivering the loaded water from the valve means to the moisture condensing means. 5
2. The laundry drying appliance of claim 1, wherein the water circuit comprises at least one nozzle (3635) for sprinkling water onto the moisture condensing means. 10
3. The laundry drying appliance of claim 1 or 2, wherein said moisture condensing means comprises a first heat exchanger of a heat pump, said first heat exchanger being operable for cooling and dehydrating the moisture-laden drying air. 15
4. The laundry drying appliance according to any of the preceding claims, wherein the laundry drying appliance is a laundry washer/dryer, said drum being rotatably accommodated within a washing tub housed within the cabinet, and wherein said valve means (3625;3725) are operable to either load laundry washing water or to load the moisture condensing means cleaning water. 20
5. The laundry drying appliance according to any of the preceding claims, wherein control means are adapted to selectively actuate the valve means (3625;3725) for feeding water to the water circuit. 25
6. The laundry drying appliance according to any of the preceding claims, wherein the control means actuate the valve means (3625;3725) during a laundry washing phase of the appliance. 30
7. The laundry drying appliance according to claim 6, wherein the control means actuate the valve means (3625;3725) during a laundry rinsing phase of the appliance. 35
8. The laundry drying appliance according to any of the preceding claims, wherein the control means can be 40
9. The laundry drying appliance according to claim 8, wherein the appliance comprises visual and/or acoustic means for informing the user that the moisture condensing means are to be cleaned. 45
10. The laundry drying appliance according to claim 9, wherein the control means of the appliance are adapted to calculate how many cycles have been performed from the last moisture condensing means cleaning and to operate the visual and/or acoustic means accordingly. 50
11. The laundry drying appliance according to any of the preceding claims, wherein said water circuit comprises a water discharge circuit (3640;3740) for discharging the water used to wash the moisture condensing means. 55
12. The laundry drying appliance of claim 11, wherein said water discharge circuit is fluidly connected to a detergent dispensing arrangement of the appliance.
13. The laundry drying appliance of claim 11, wherein said water discharge circuit is fluidly connected to a tub of the appliance or to a pump for draining the tub of the appliance.
14. The laundry drying appliance according to any of the preceding claims, wherein said drum is rotatably accommodated within a washing tub housed within the cabinet and said moisture condensing means are arranged between the tub and a top wall of the cabinet.
15. The laundry drying appliance (100) according to any of the preceding claims, comprising a cabinet (110) having a top (119), a rotatable drying drum (105) accommodated within the cabinet, and a laundry drying air circulation system for circulating drying air, wherein the top (119) is adapted to match and close from above the cabinet (110), the top being formed as a ready-to-mount part ready to be mounted to the cabinet and forming a moisture condensing module for dehydrating drying air used to dry laundry within the drying drum, the top having a drying air inlet (510; 2810) for receiving moisture-laden drying air, a drying air outlet (515;2815) for delivering dehydrated drying air, fluid passageways defined therein for the passage of the drying air to be dehydrated and moisture condensing means arranged inside said fluid passageways, wherein the drying air circulation system comprises a drying air drum outlet connect-

able to the drying air inlet of the top, and a drying air drum inlet connectable to the drying air outlet of the top.

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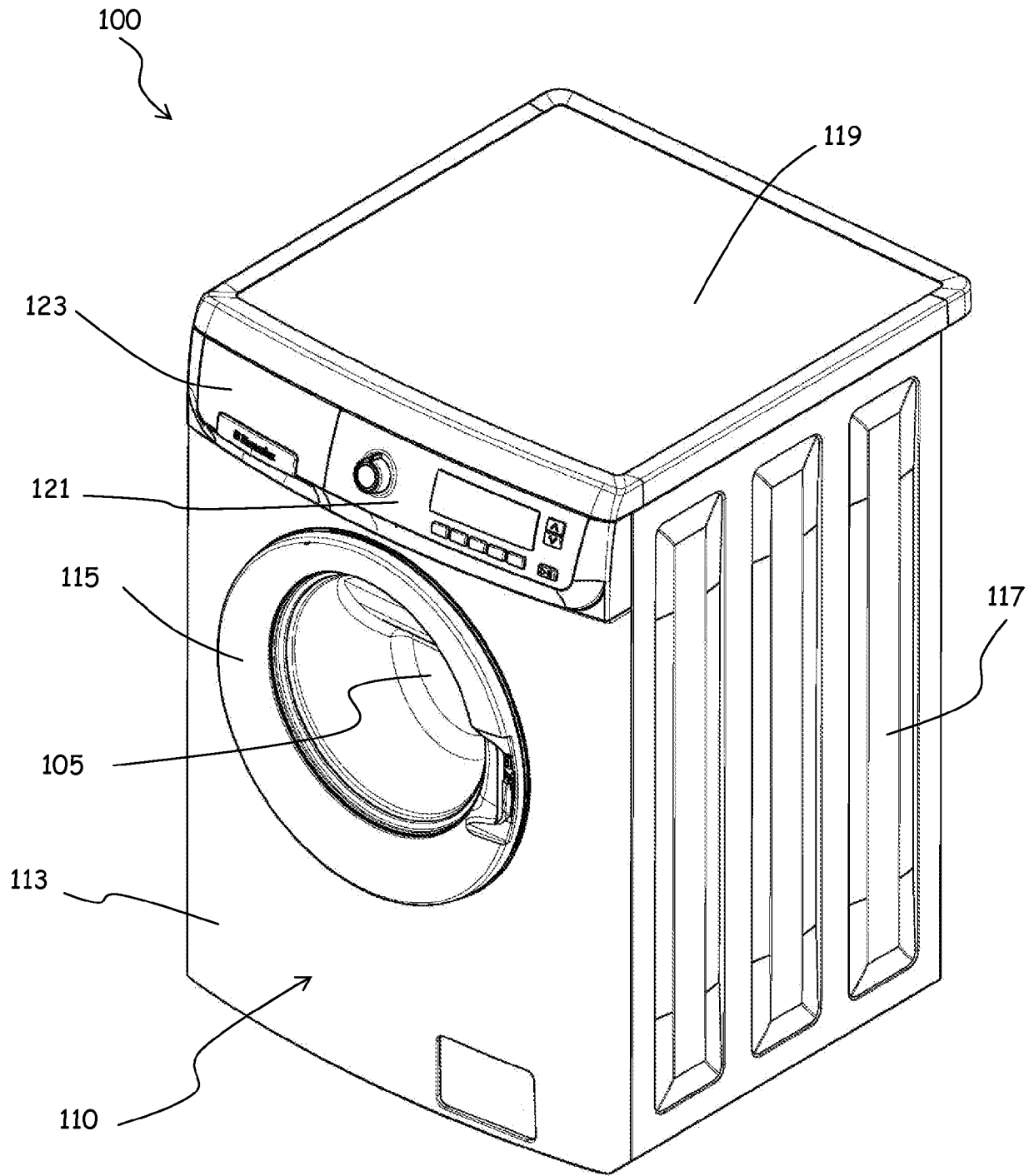


FIG. 1

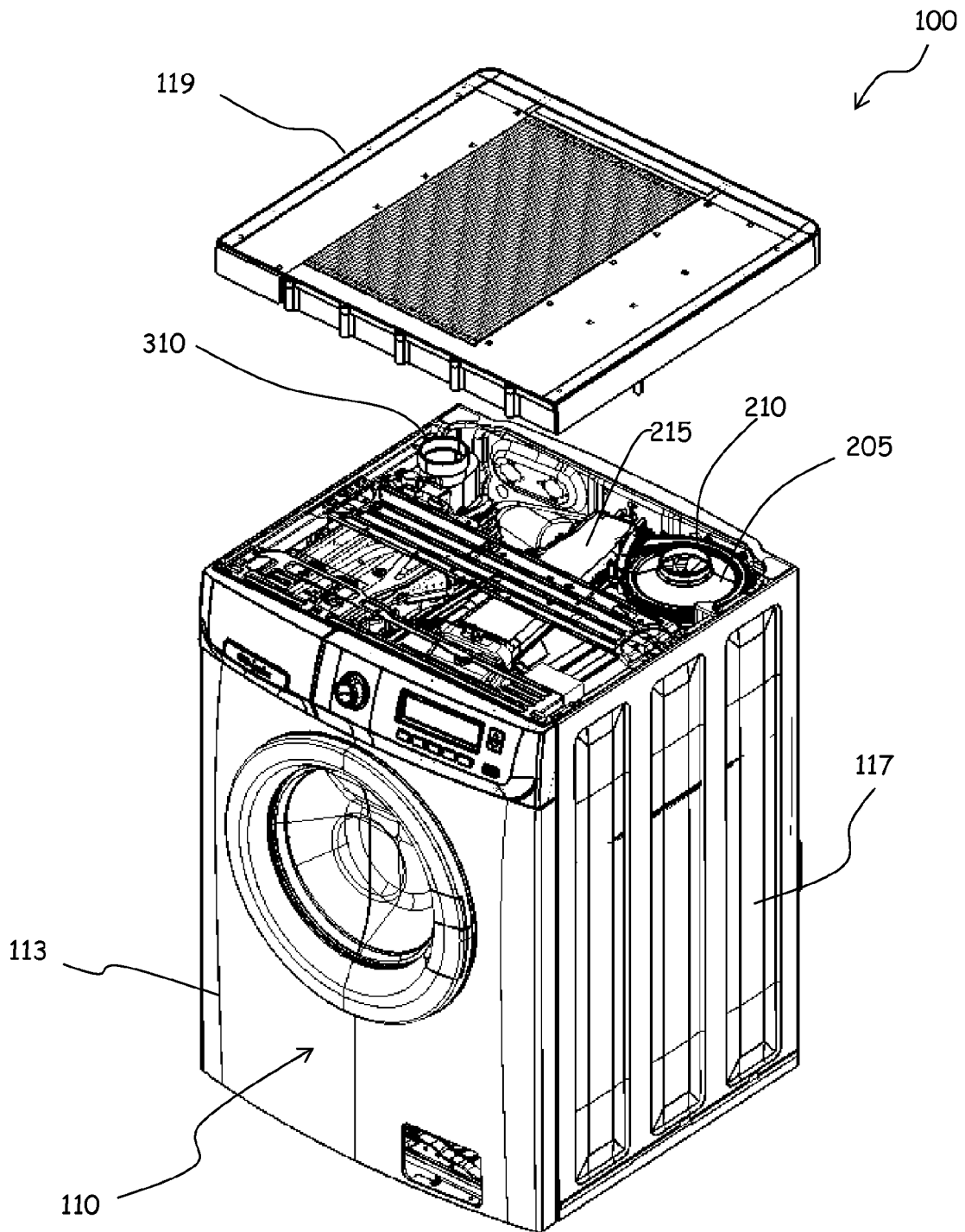
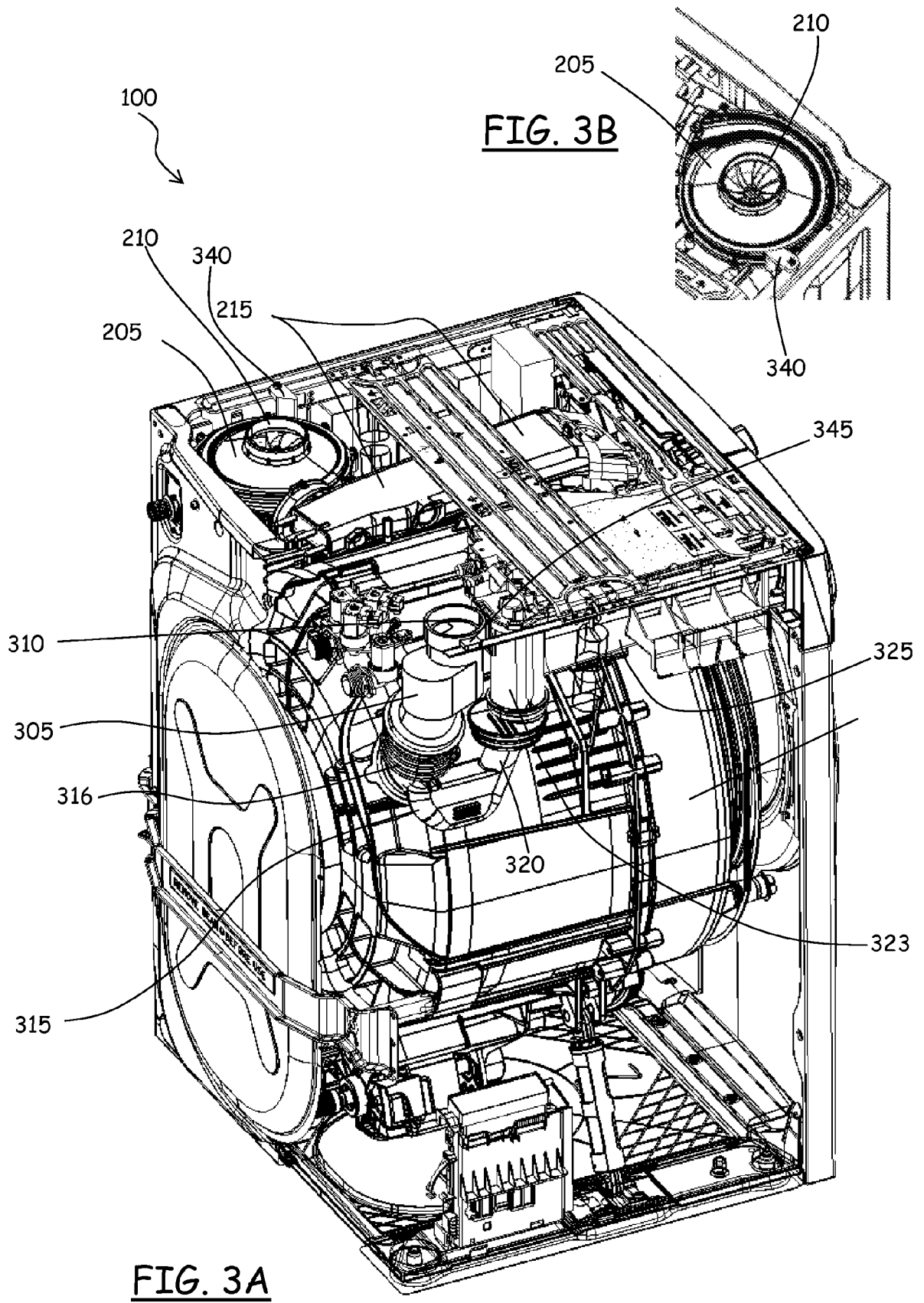


FIG. 2



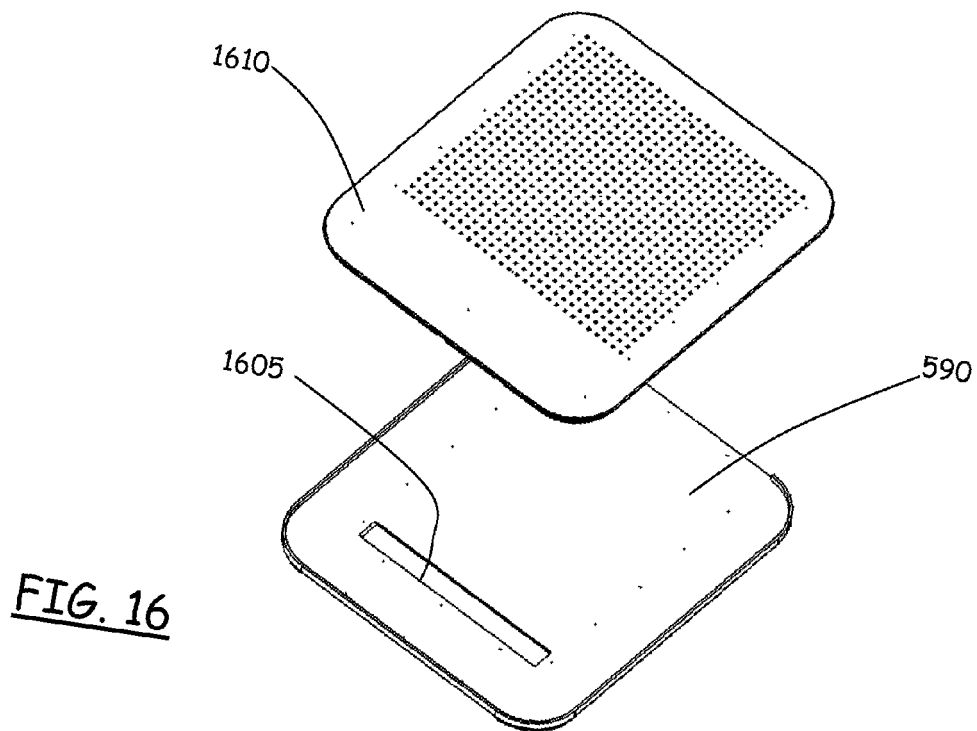
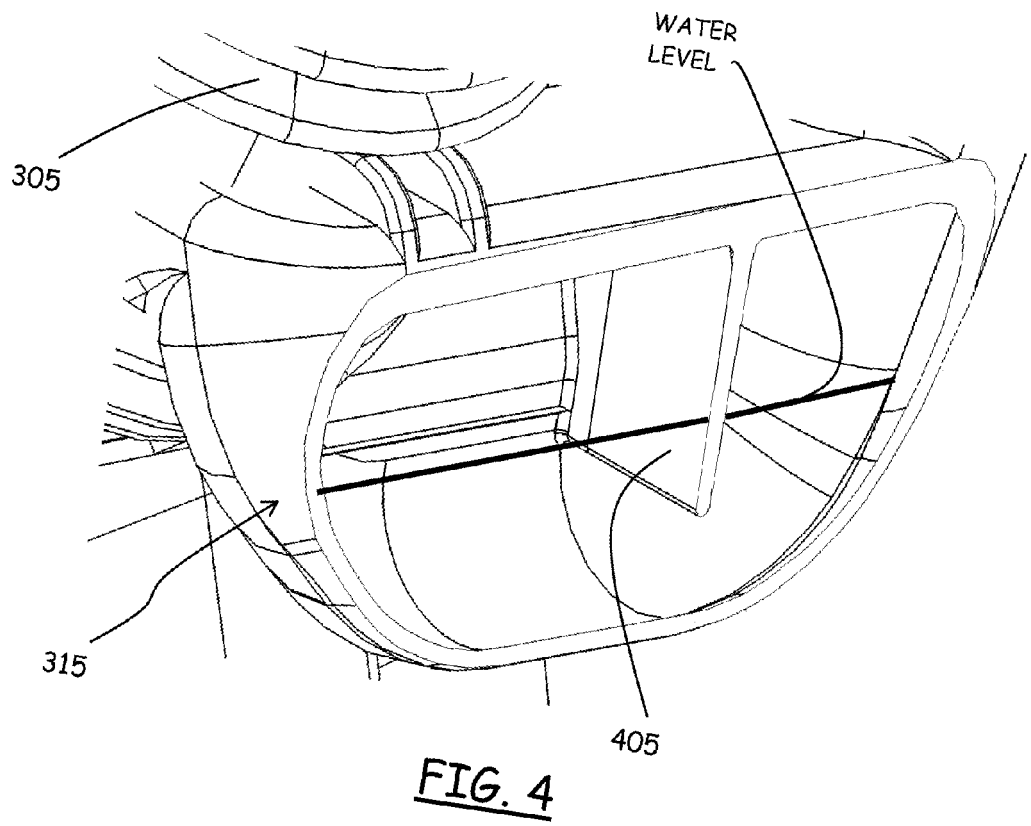


FIG. 5A

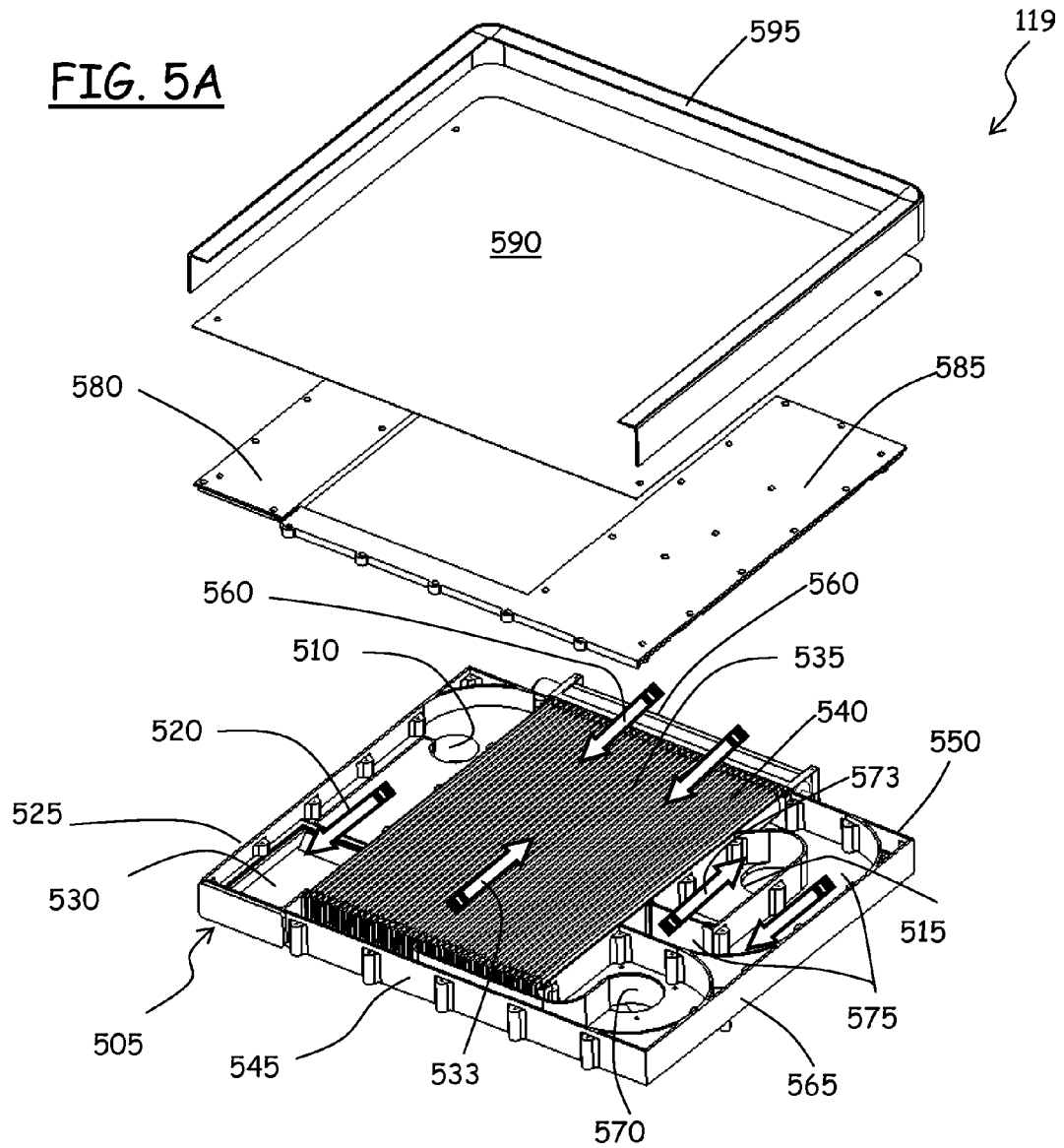
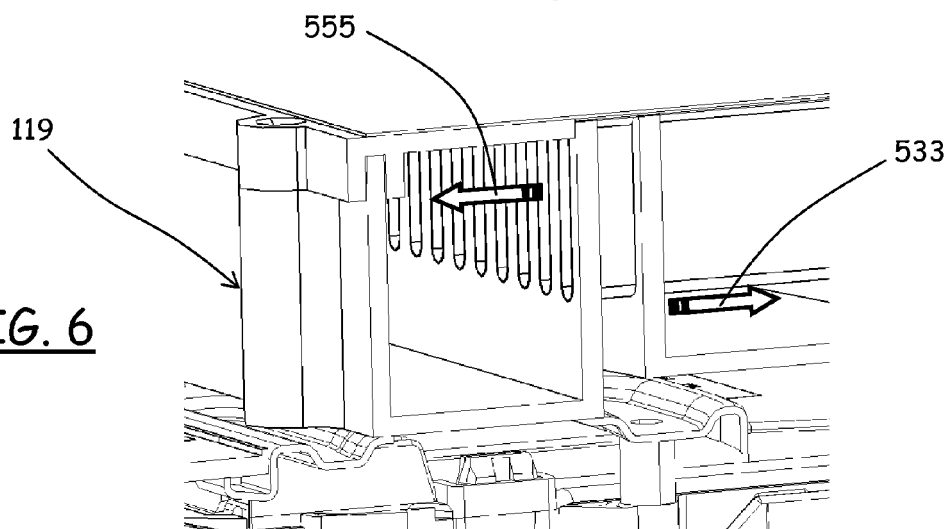
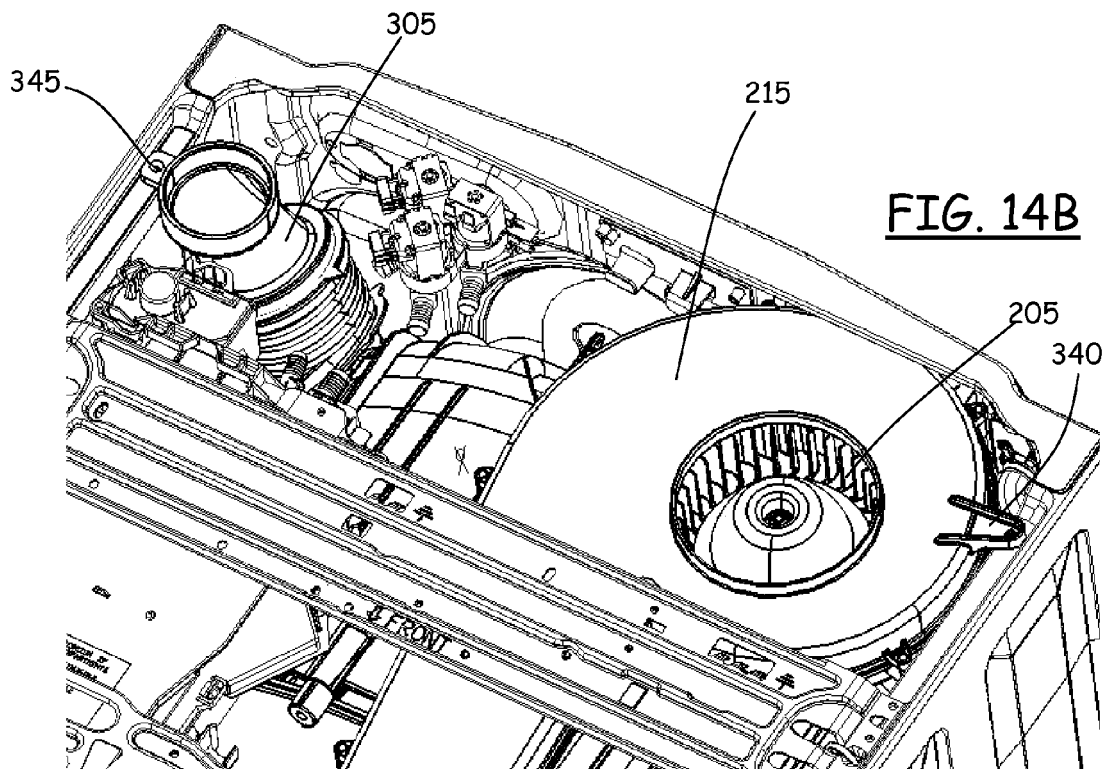
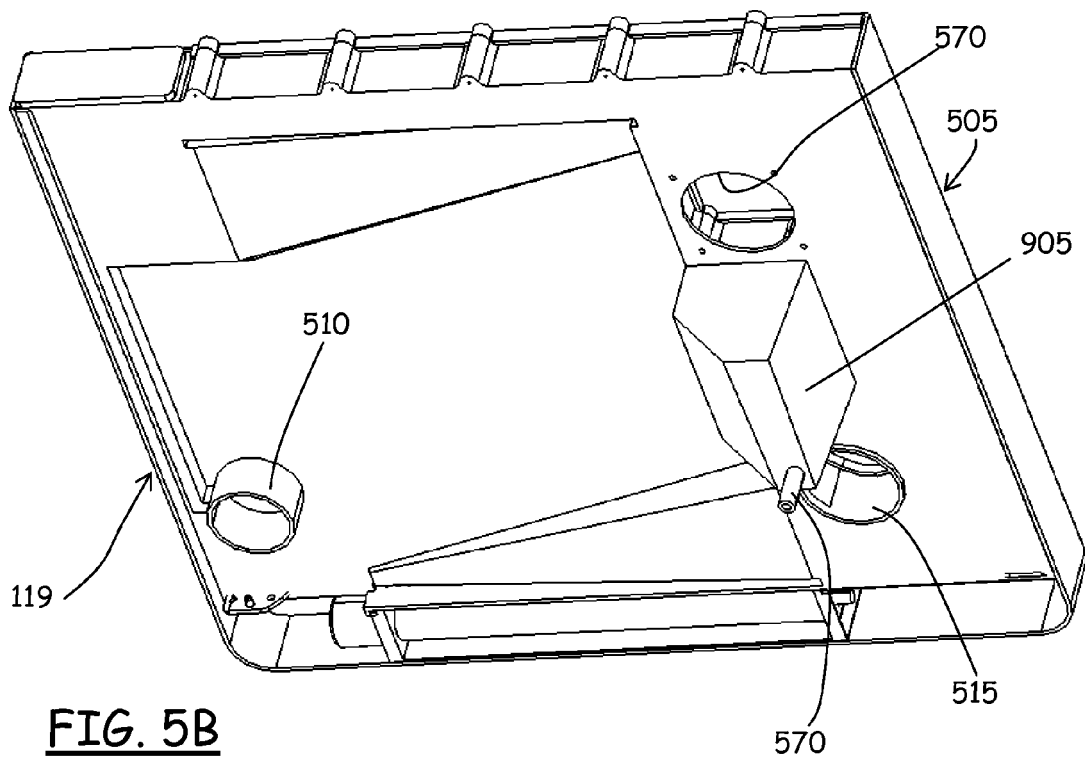
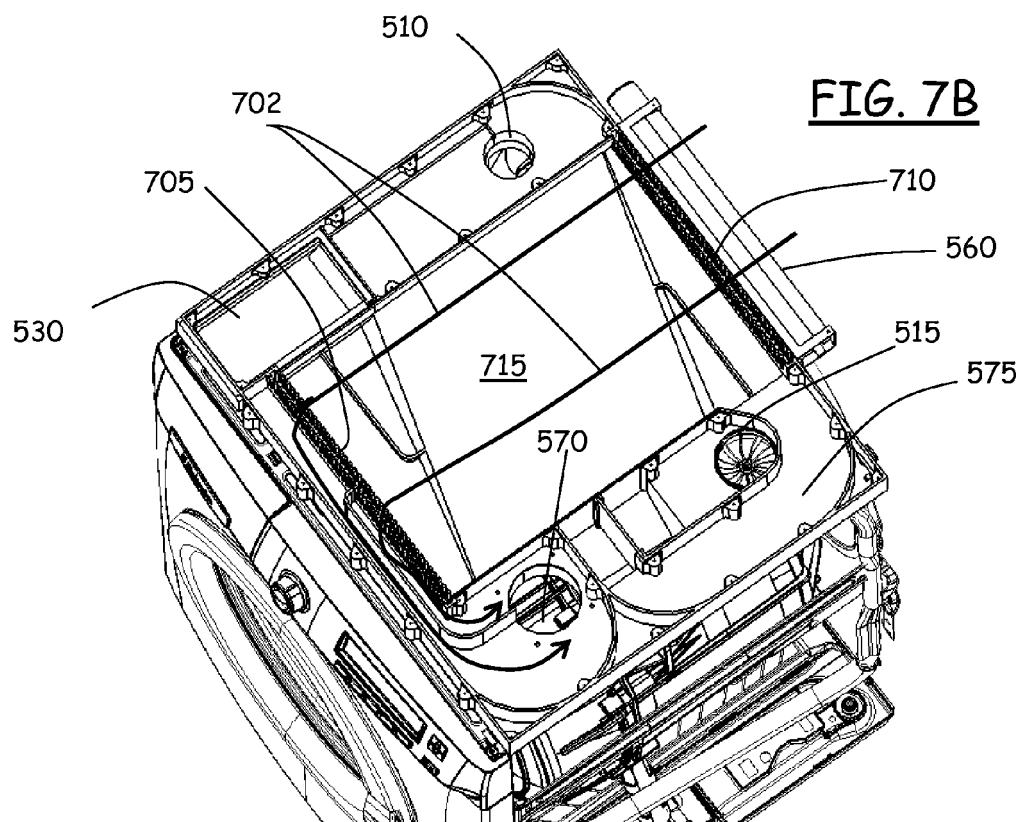
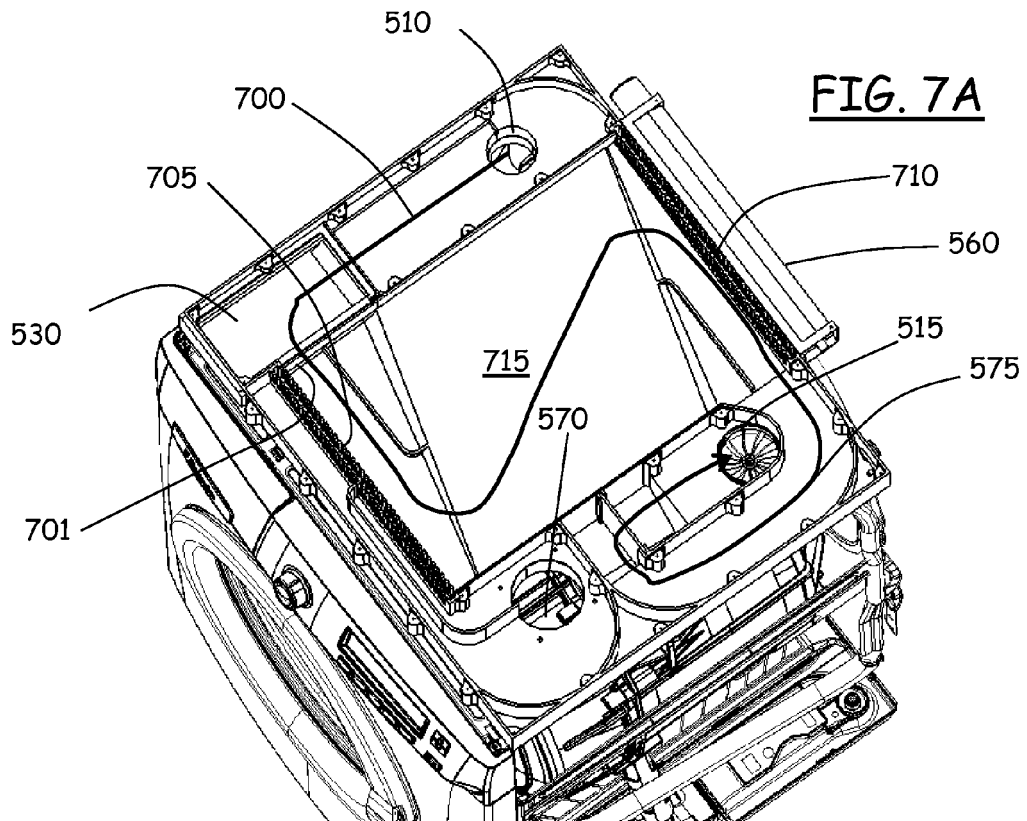
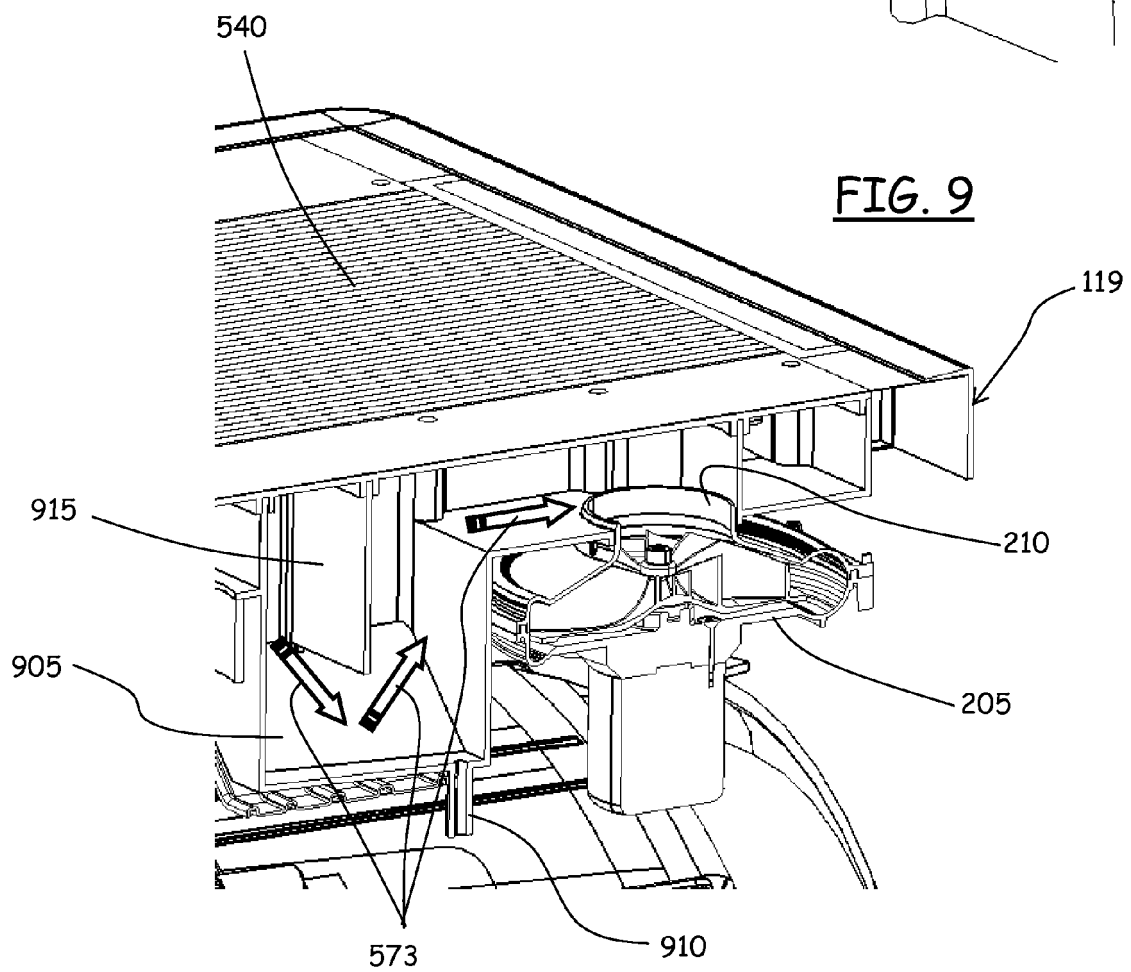
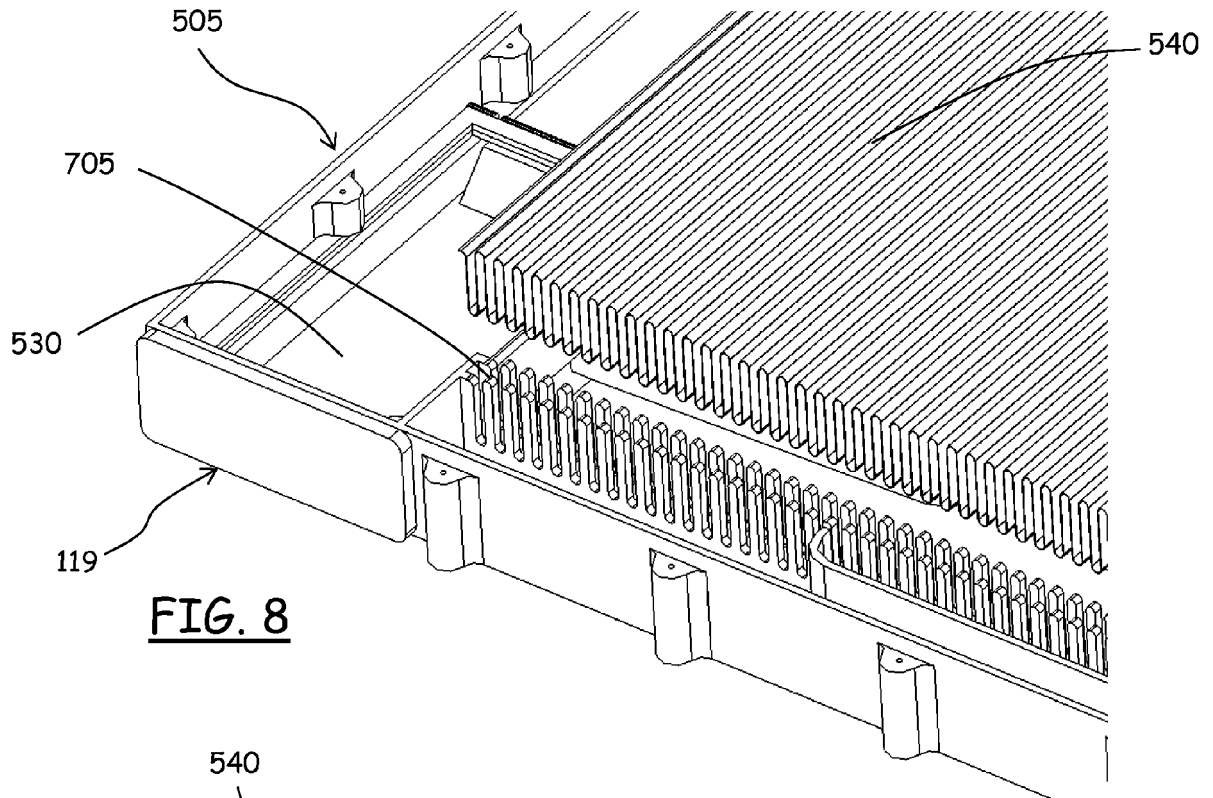


FIG. 6









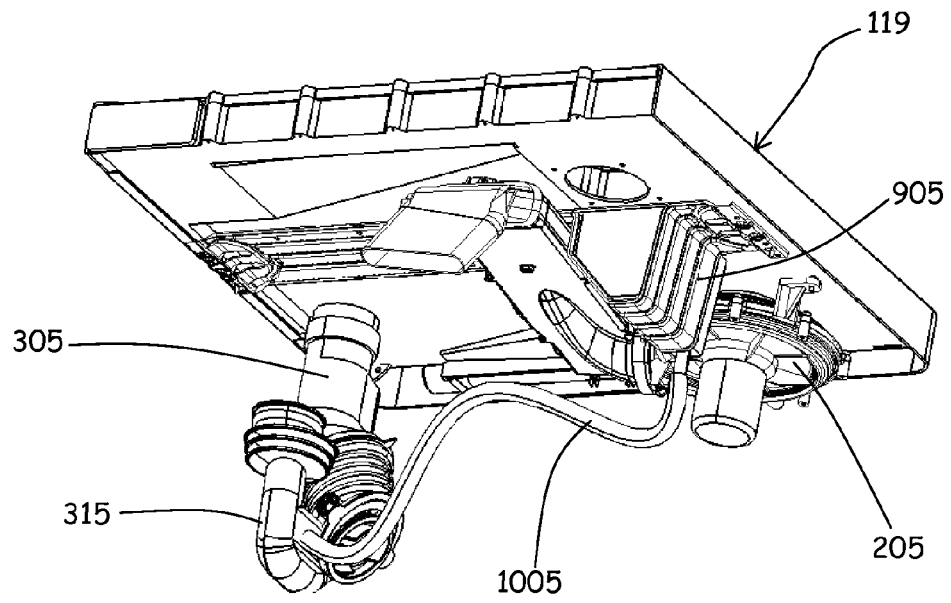


FIG. 10

FIG. 12

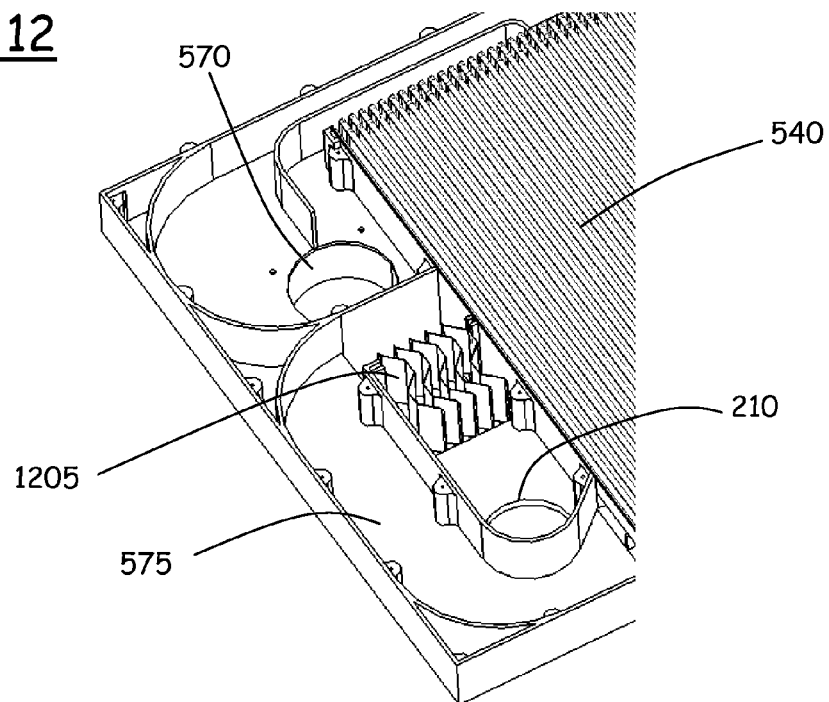
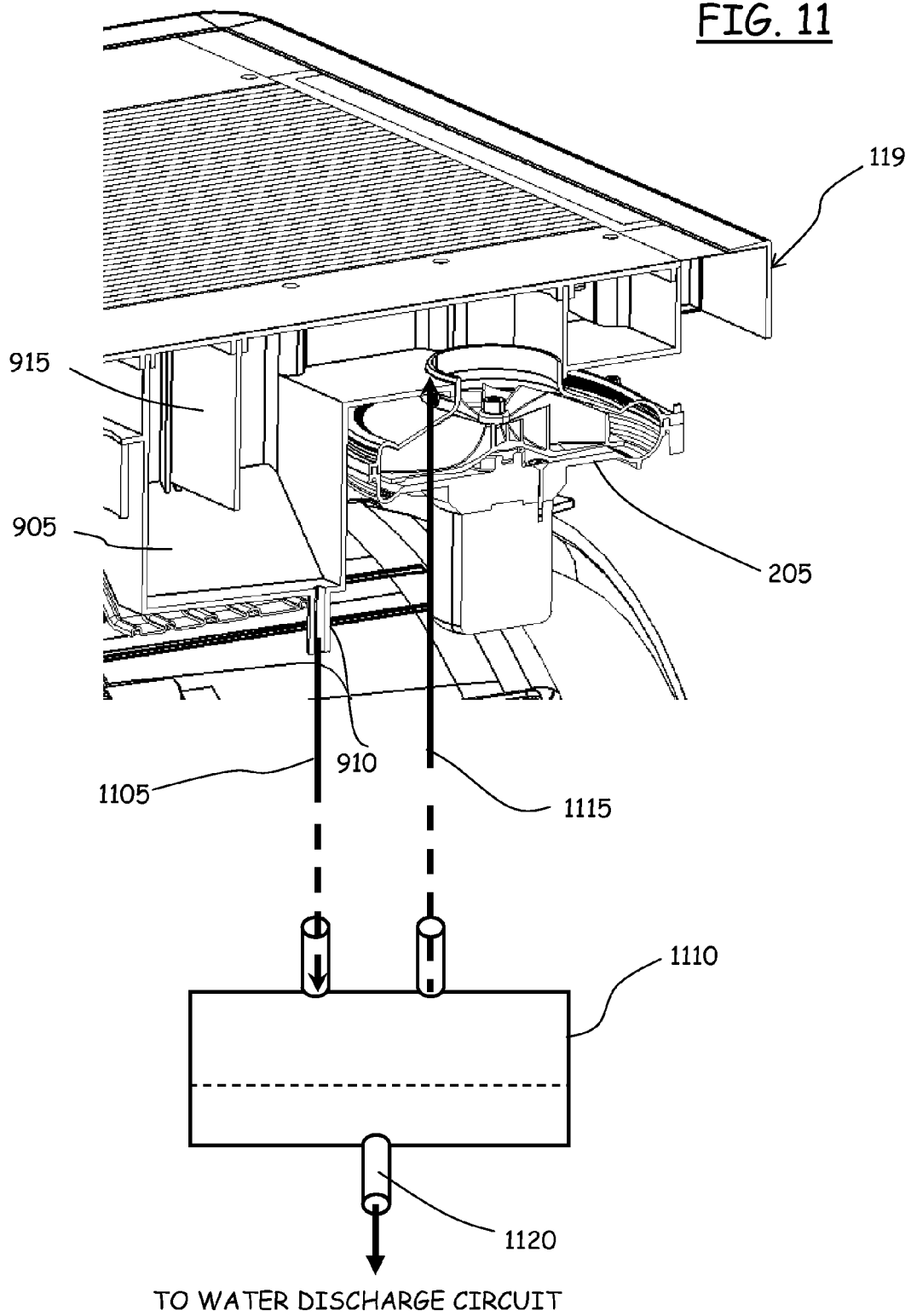
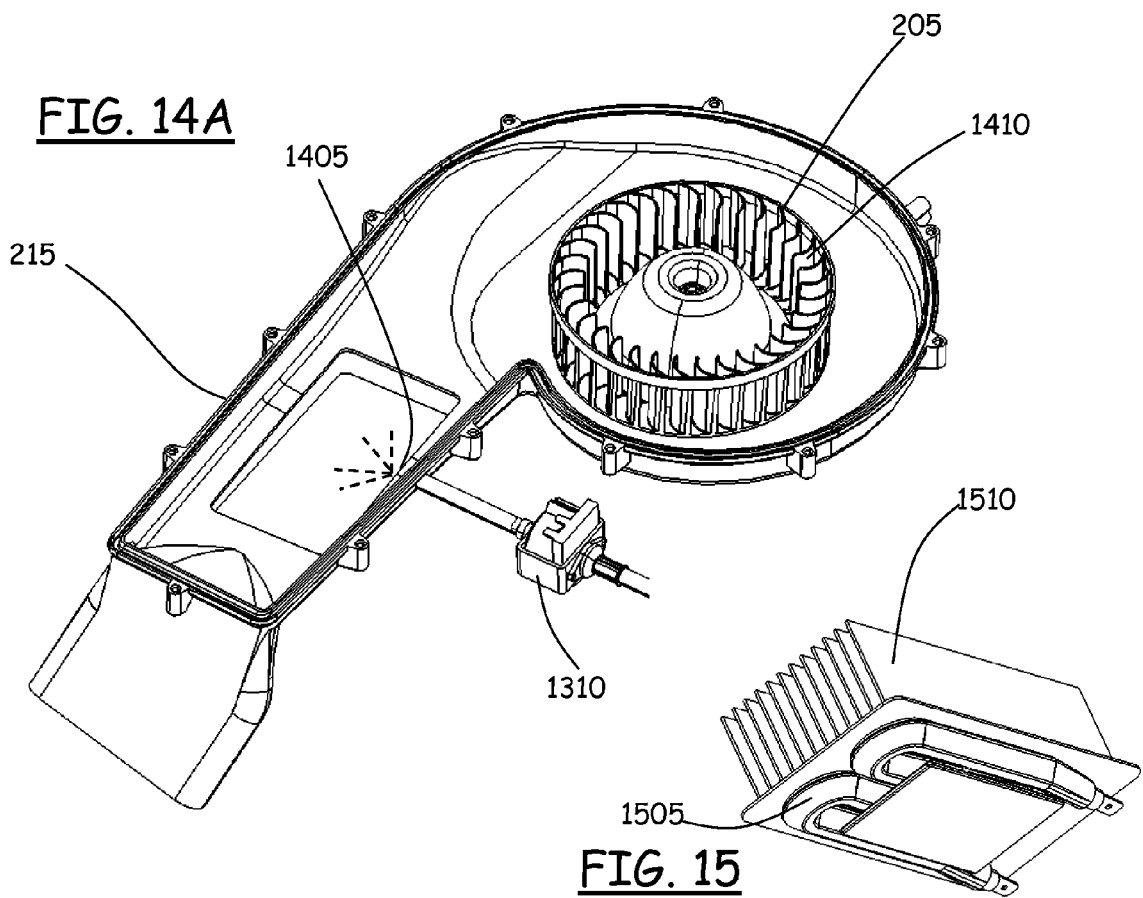
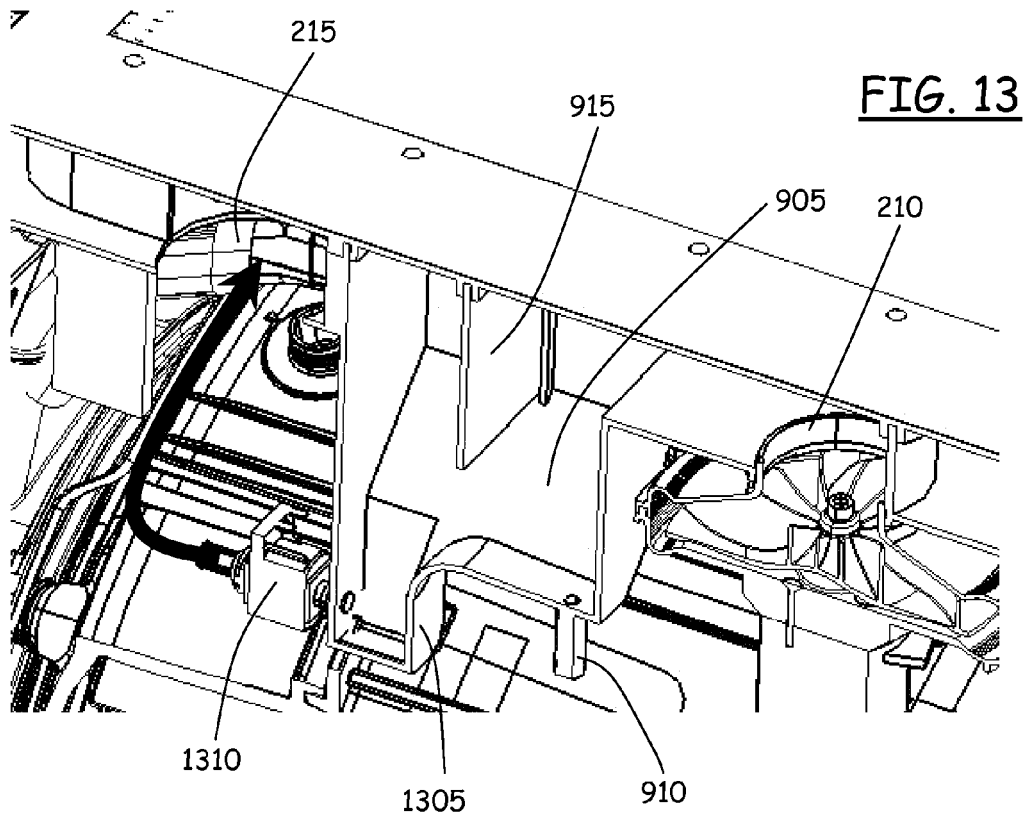


FIG. 11





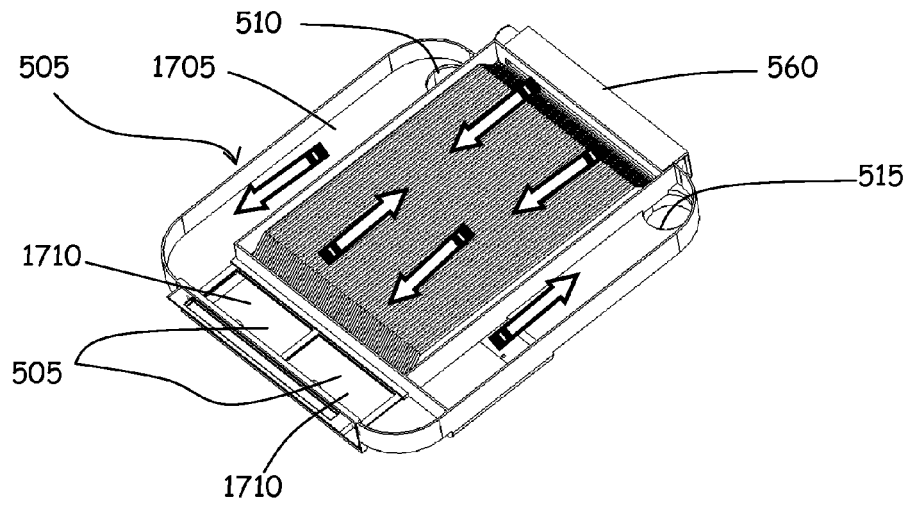


FIG. 17

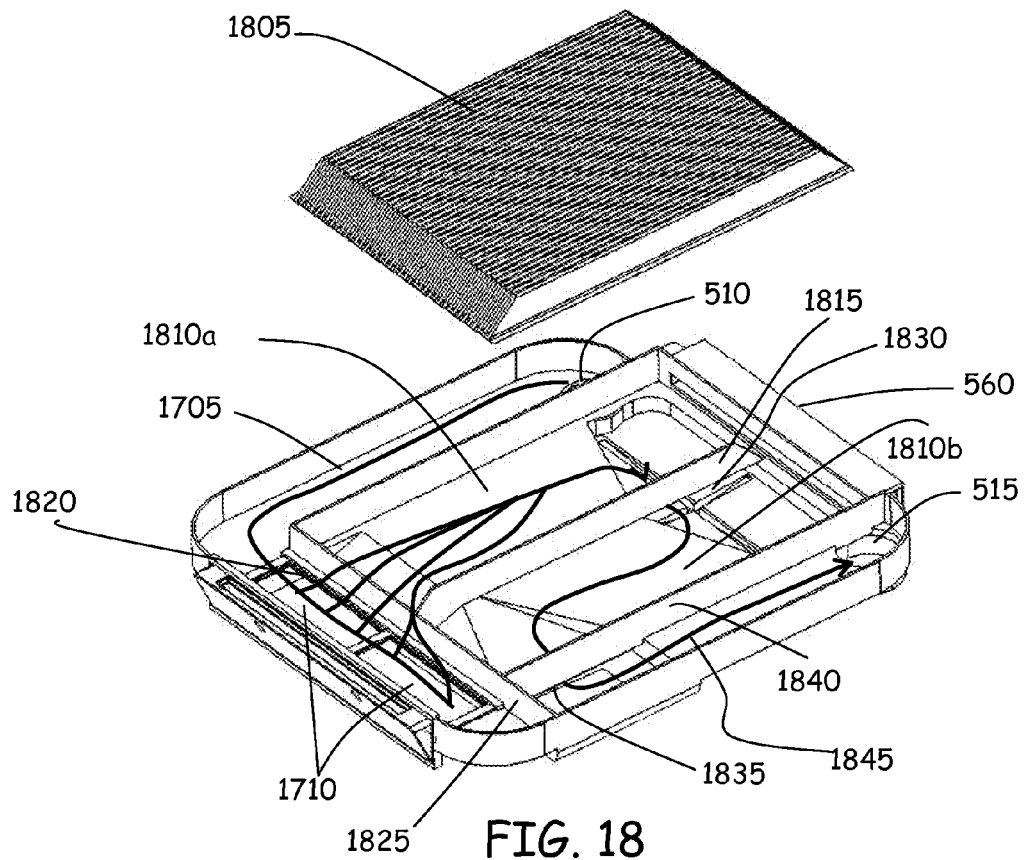


FIG. 18

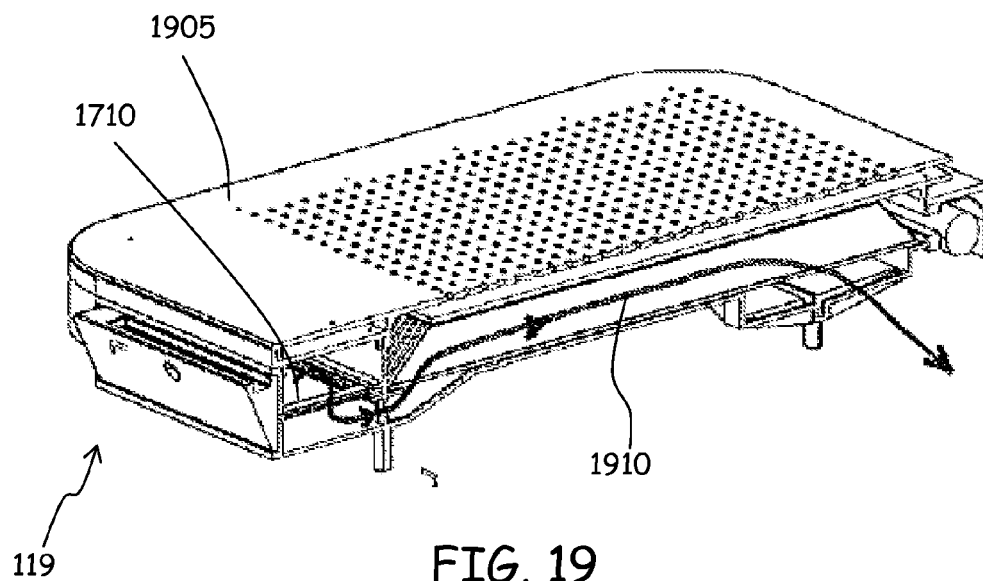


FIG. 19

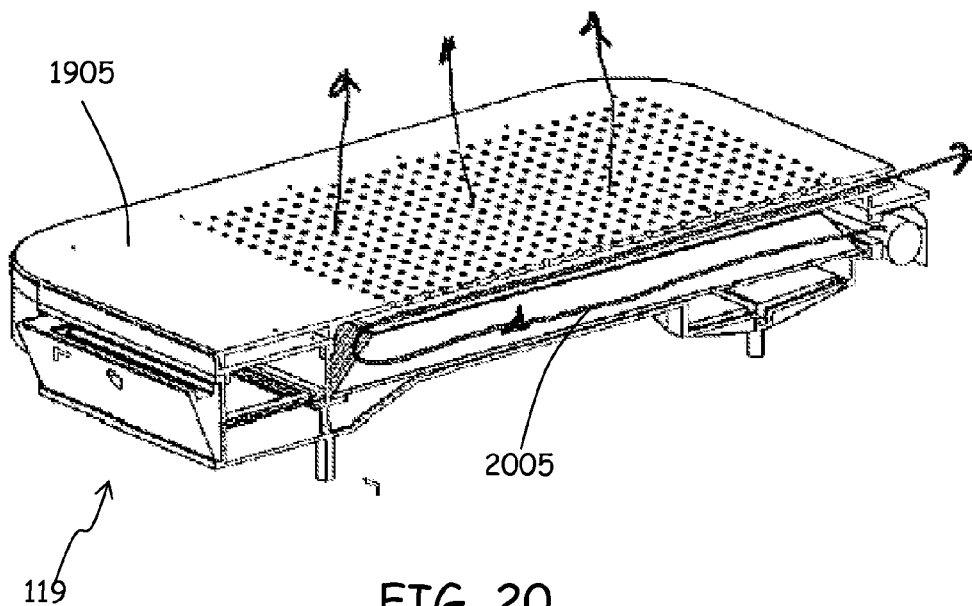


FIG. 20

FIG. 21

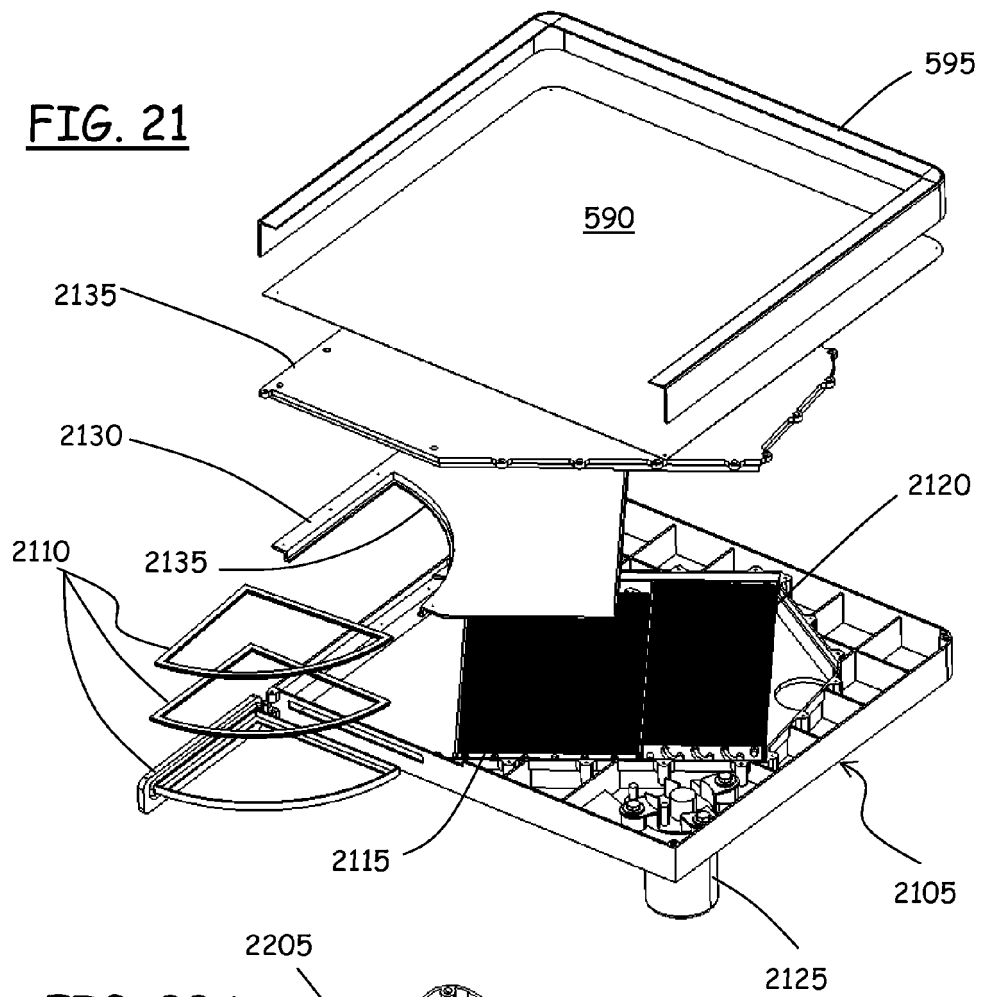
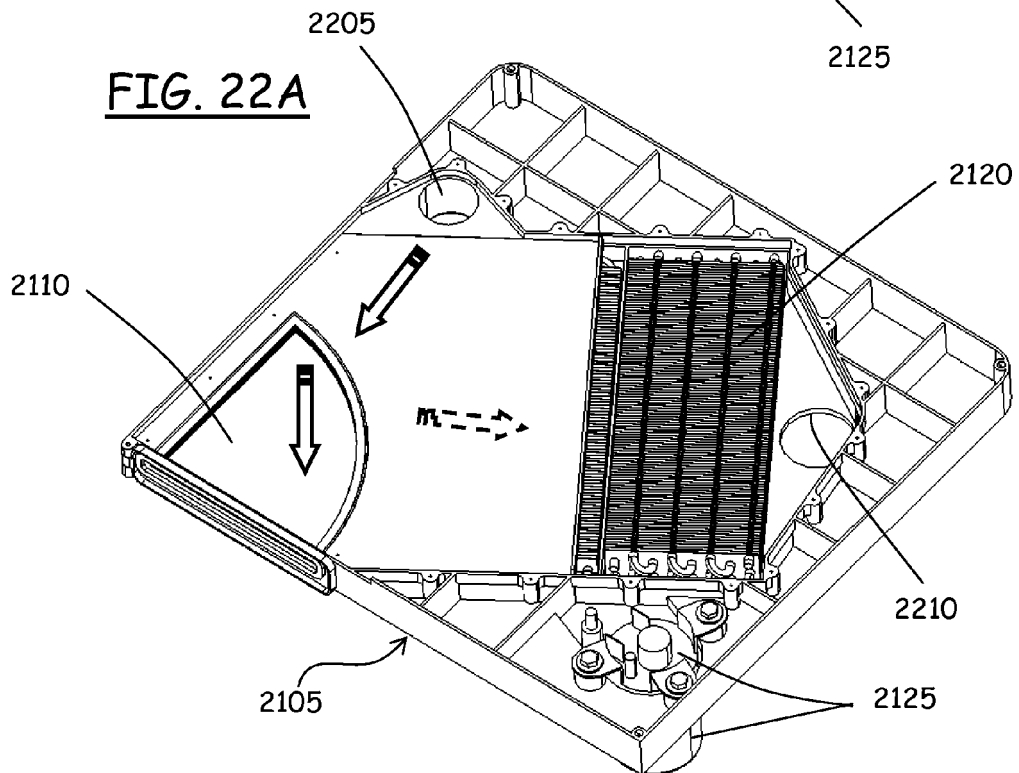


FIG. 22A



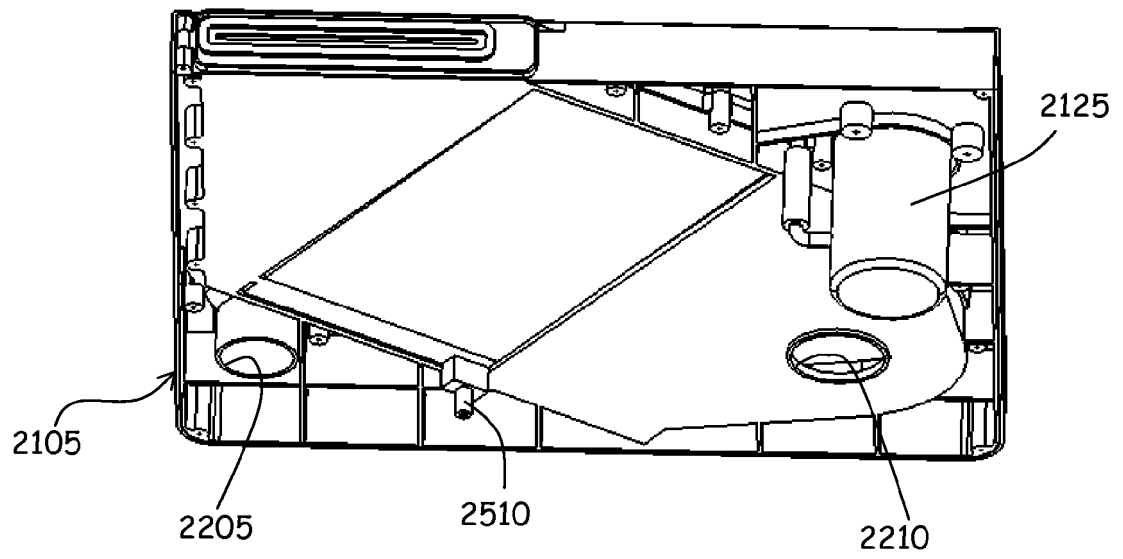


FIG. 22B

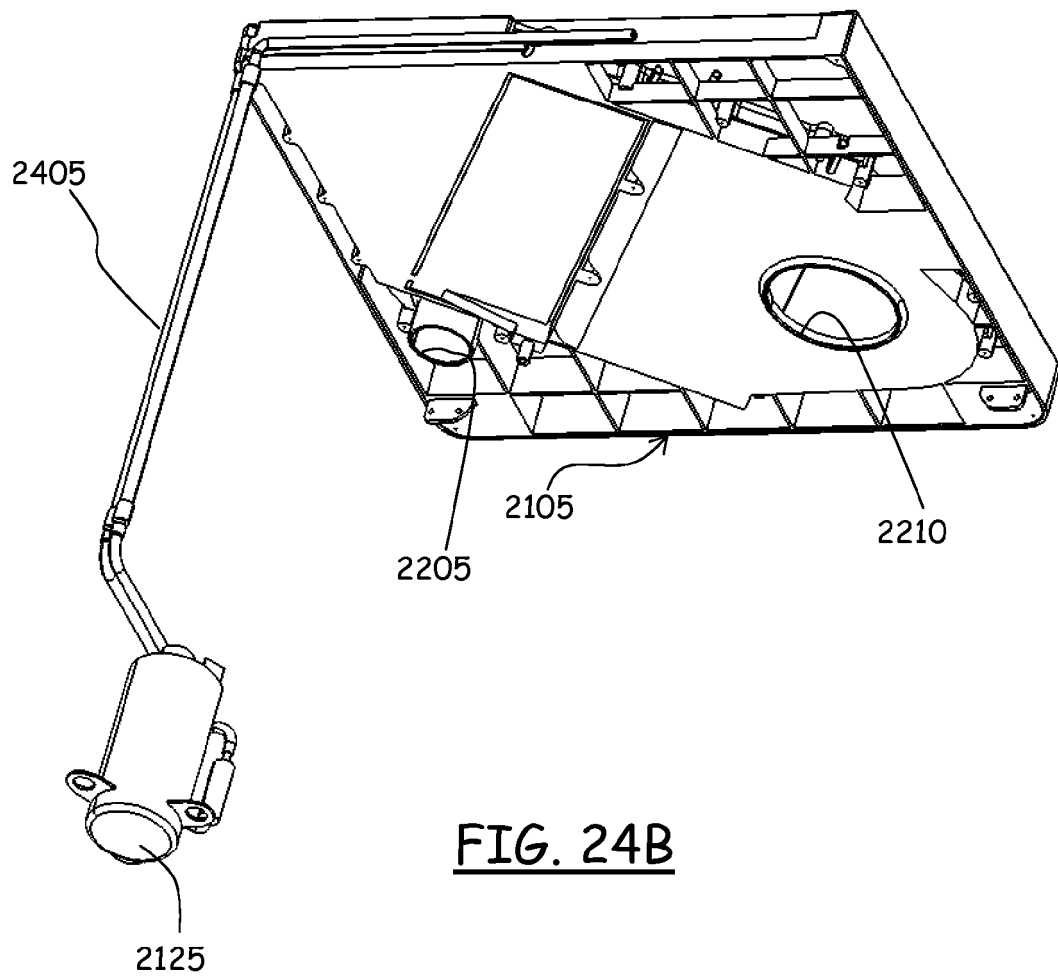


FIG. 24B

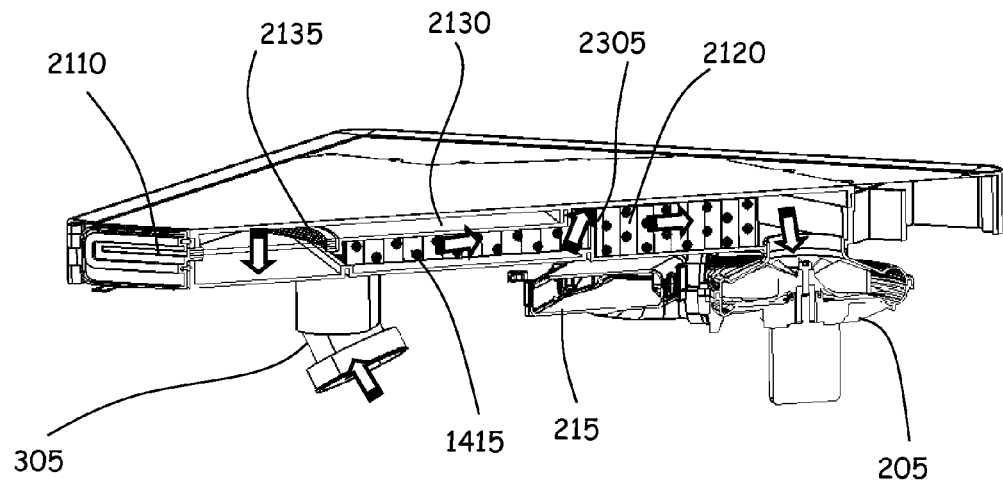


FIG. 23

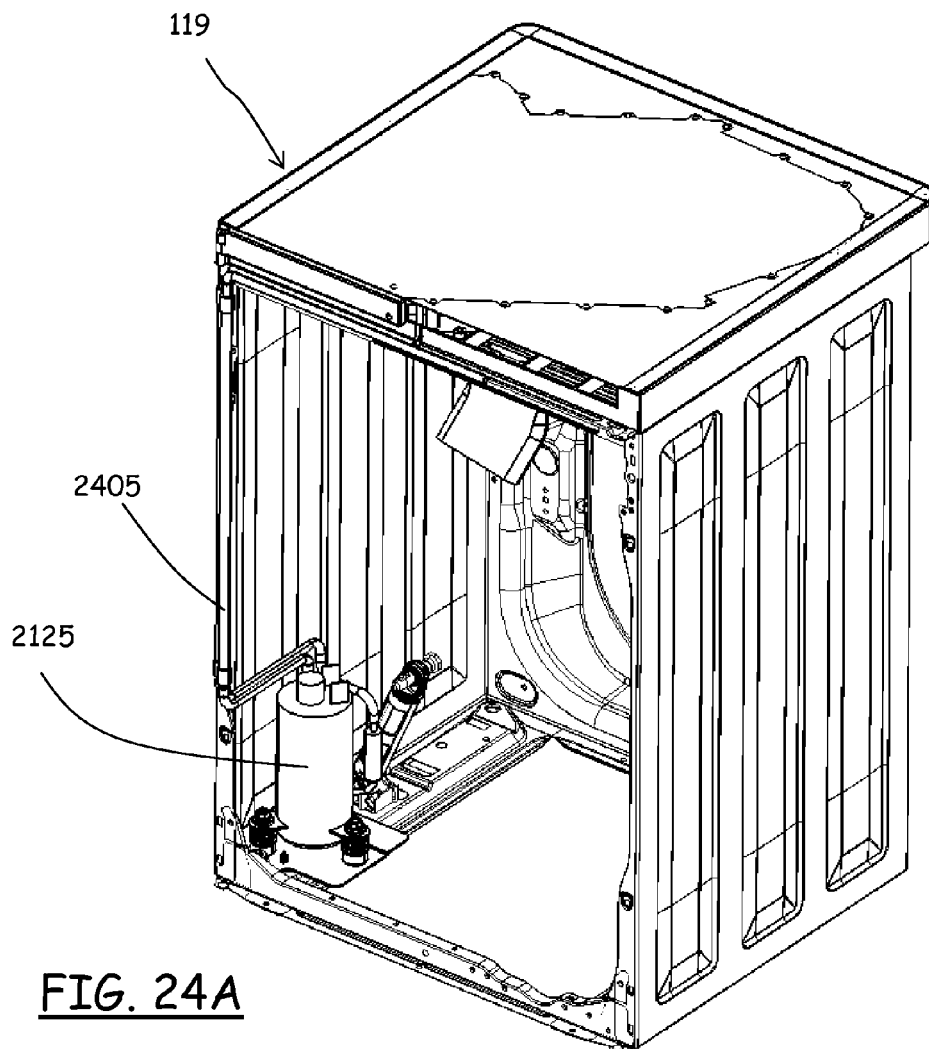


FIG. 24A

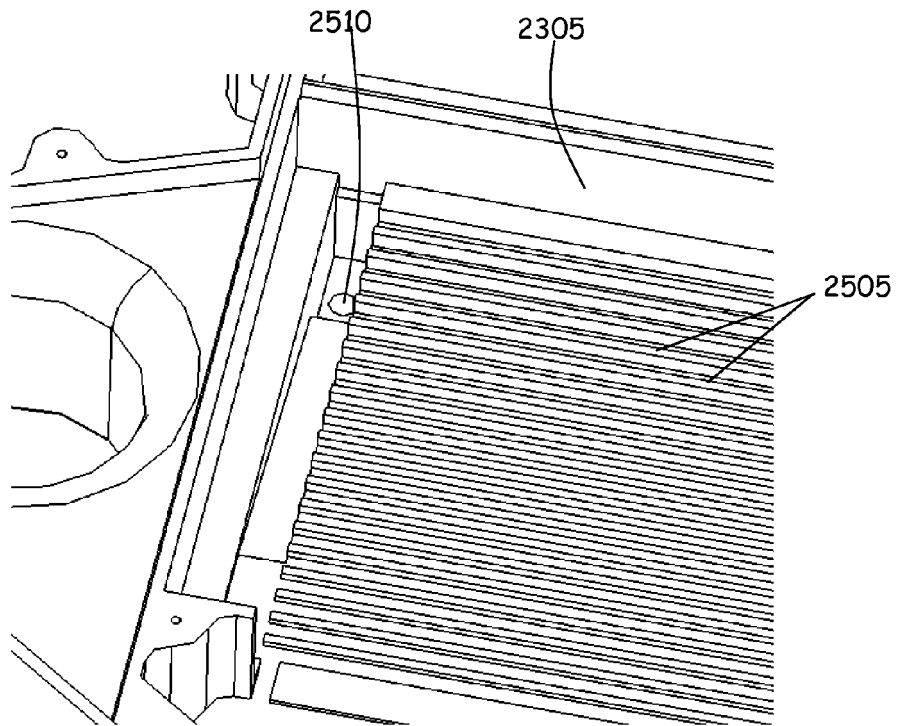


FIG. 25

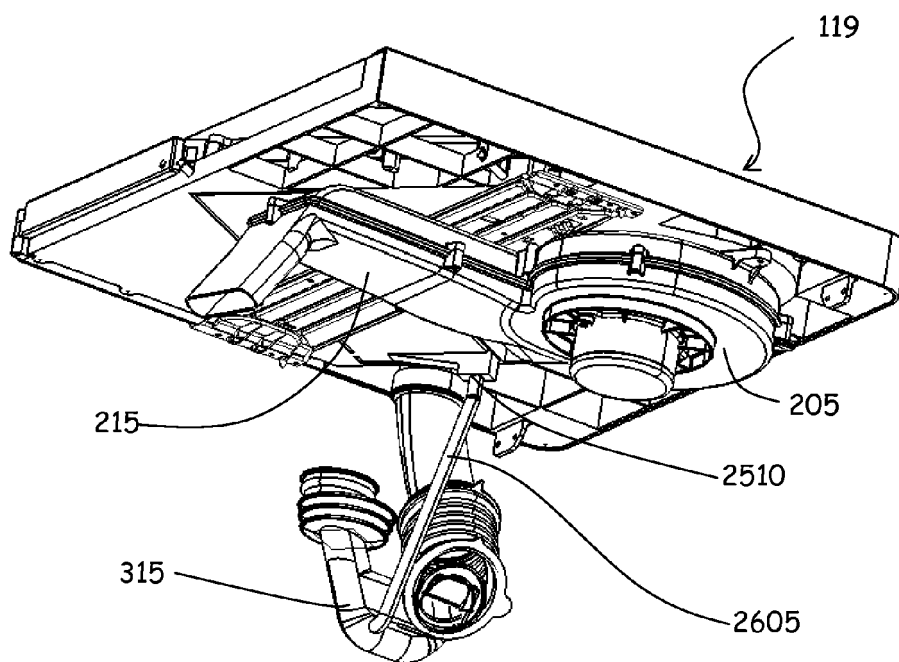


FIG. 26

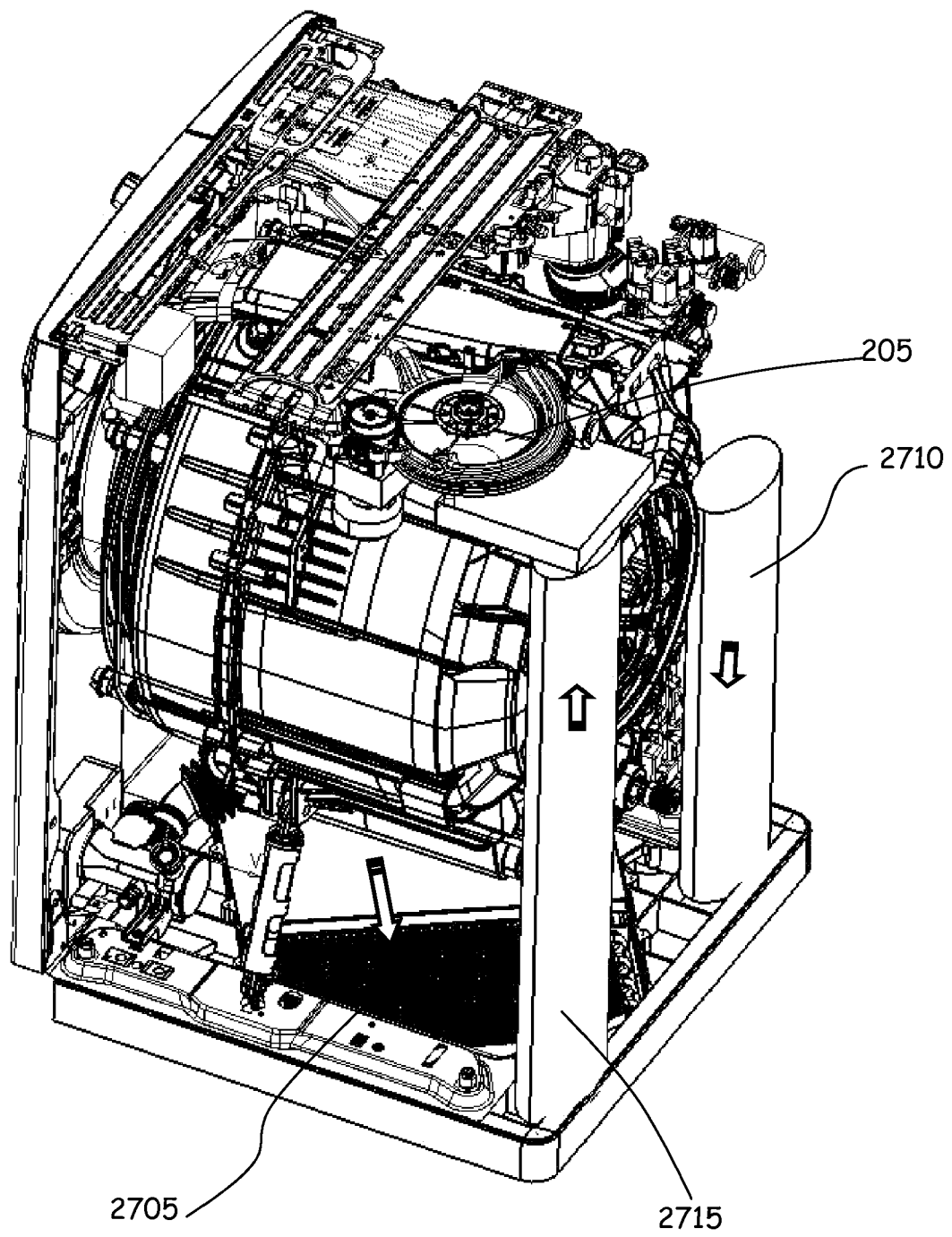
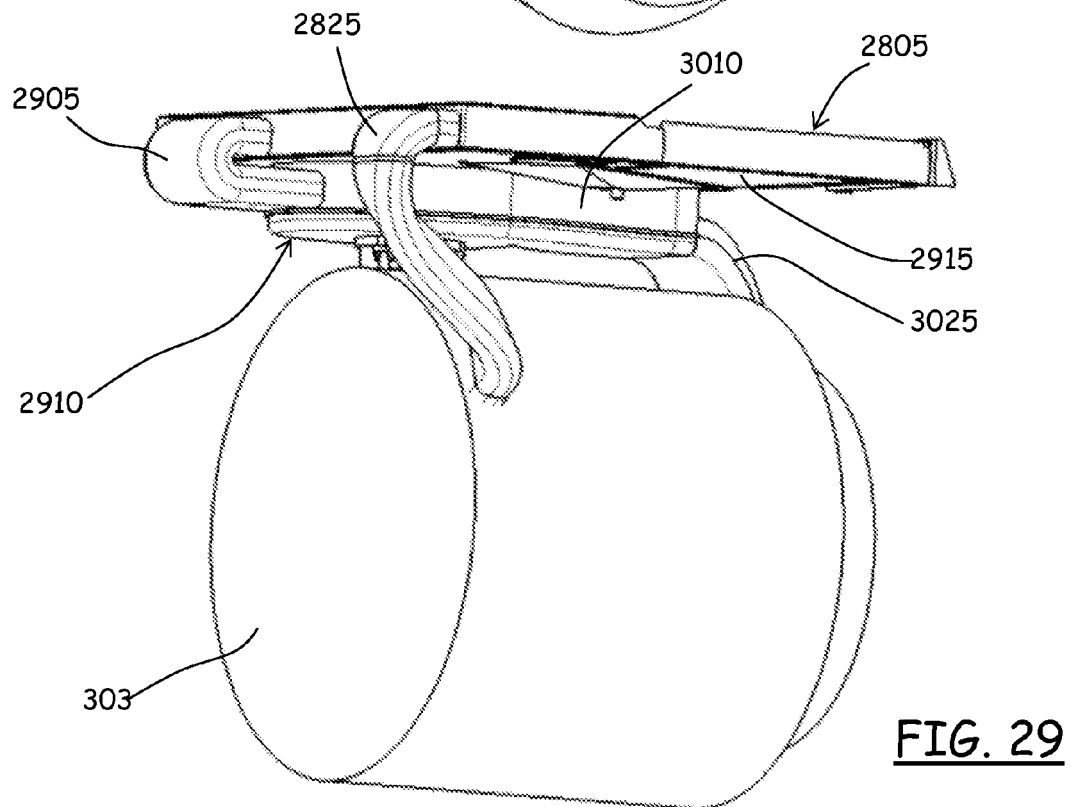
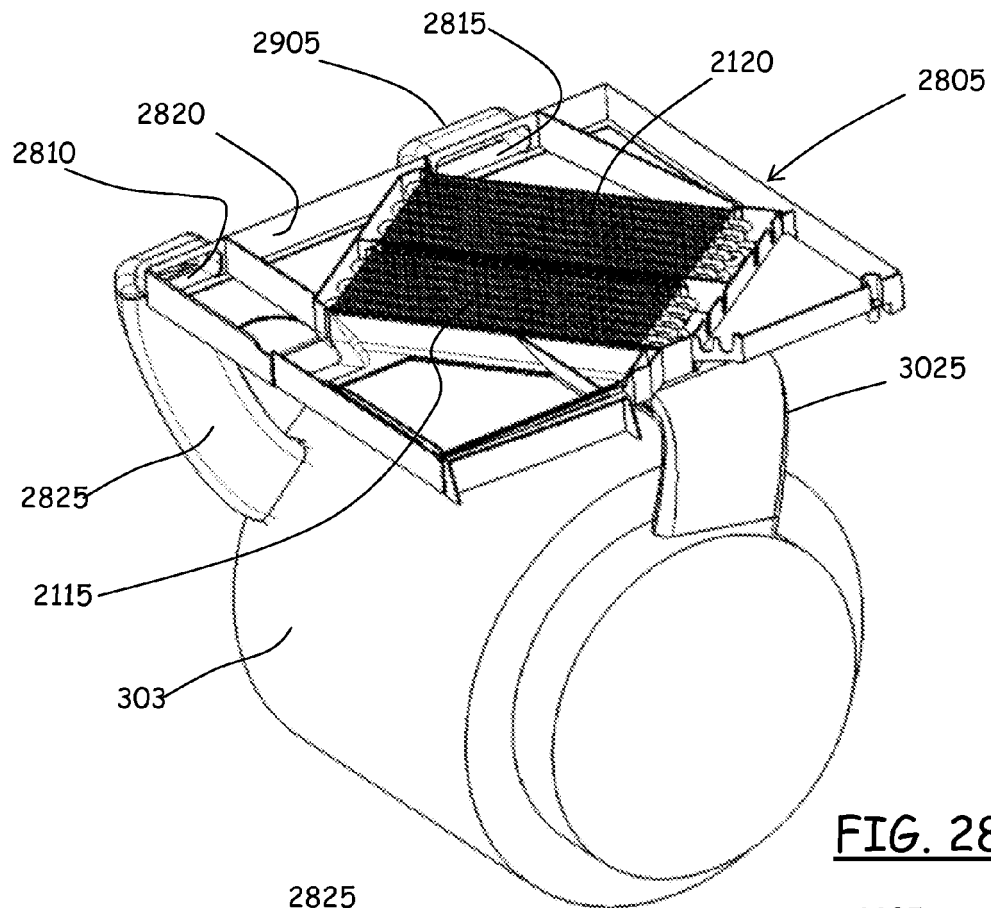


FIG. 27



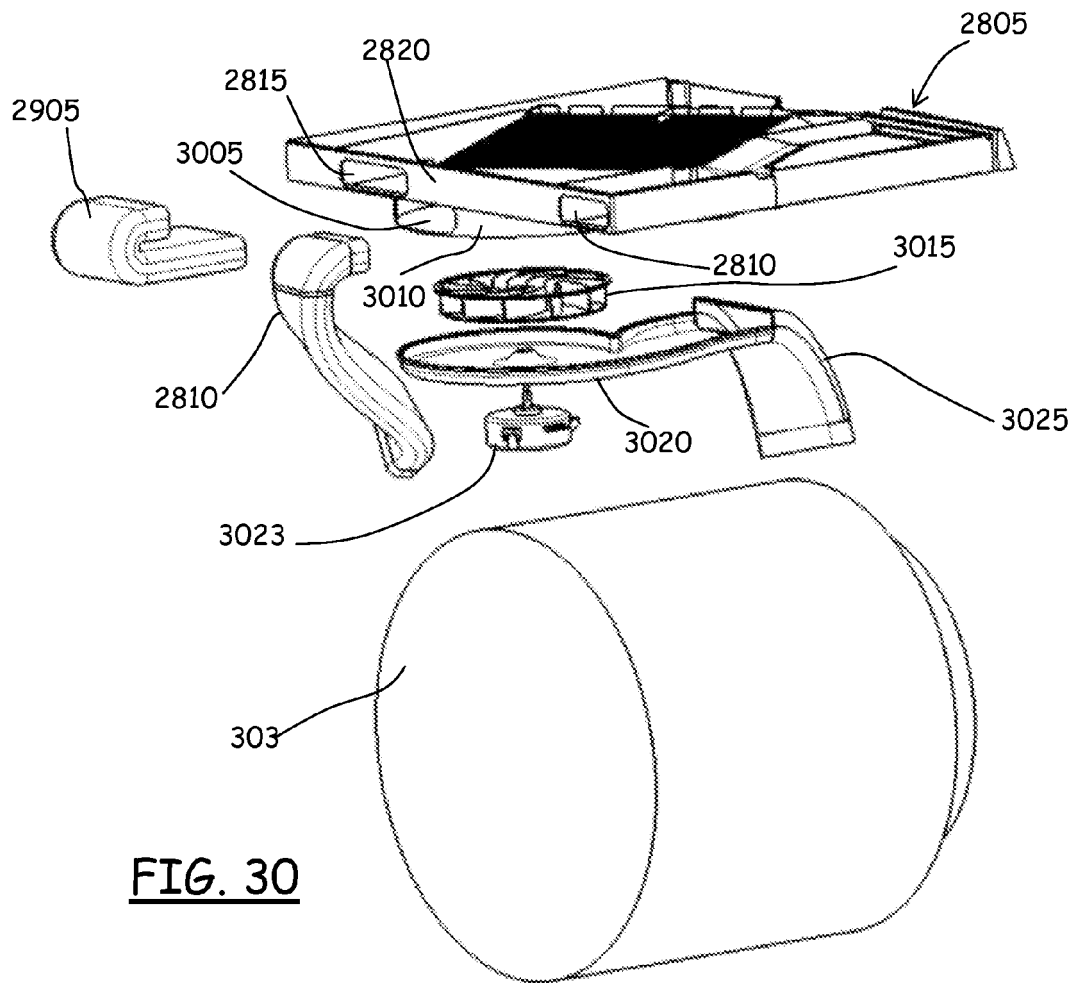


FIG. 30

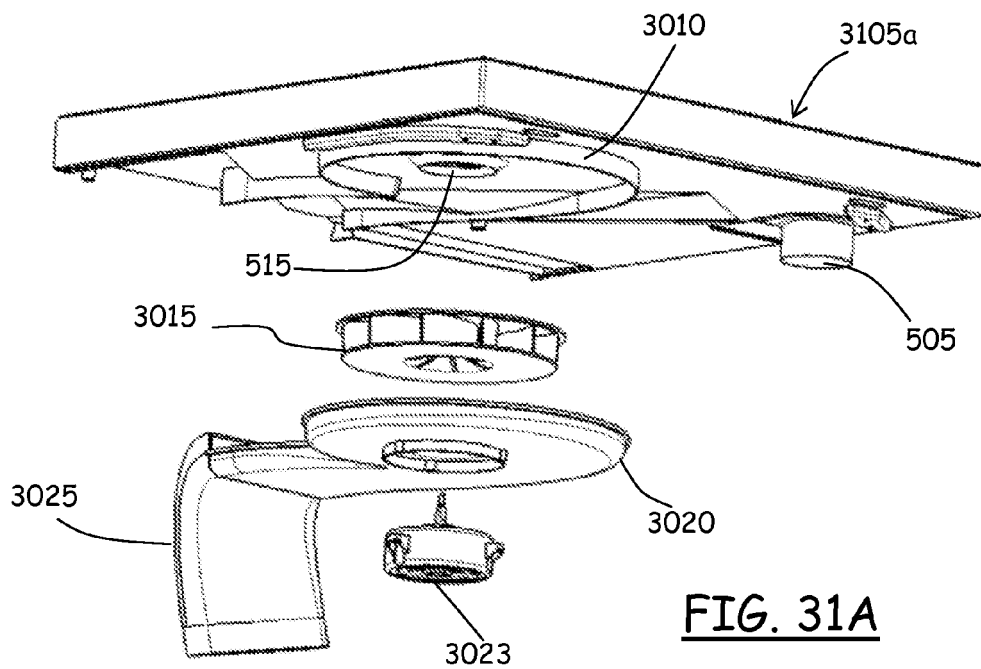


FIG. 31A

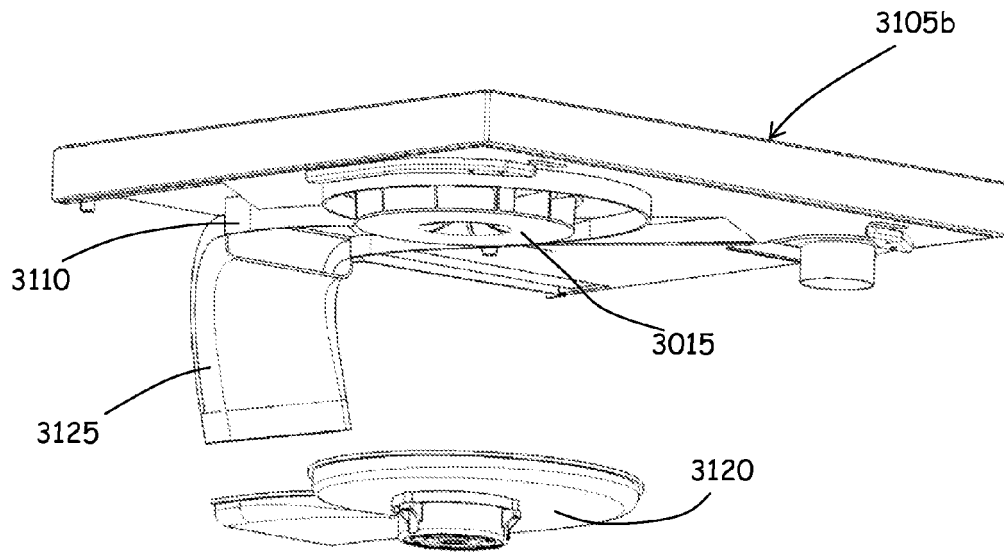


FIG. 31B

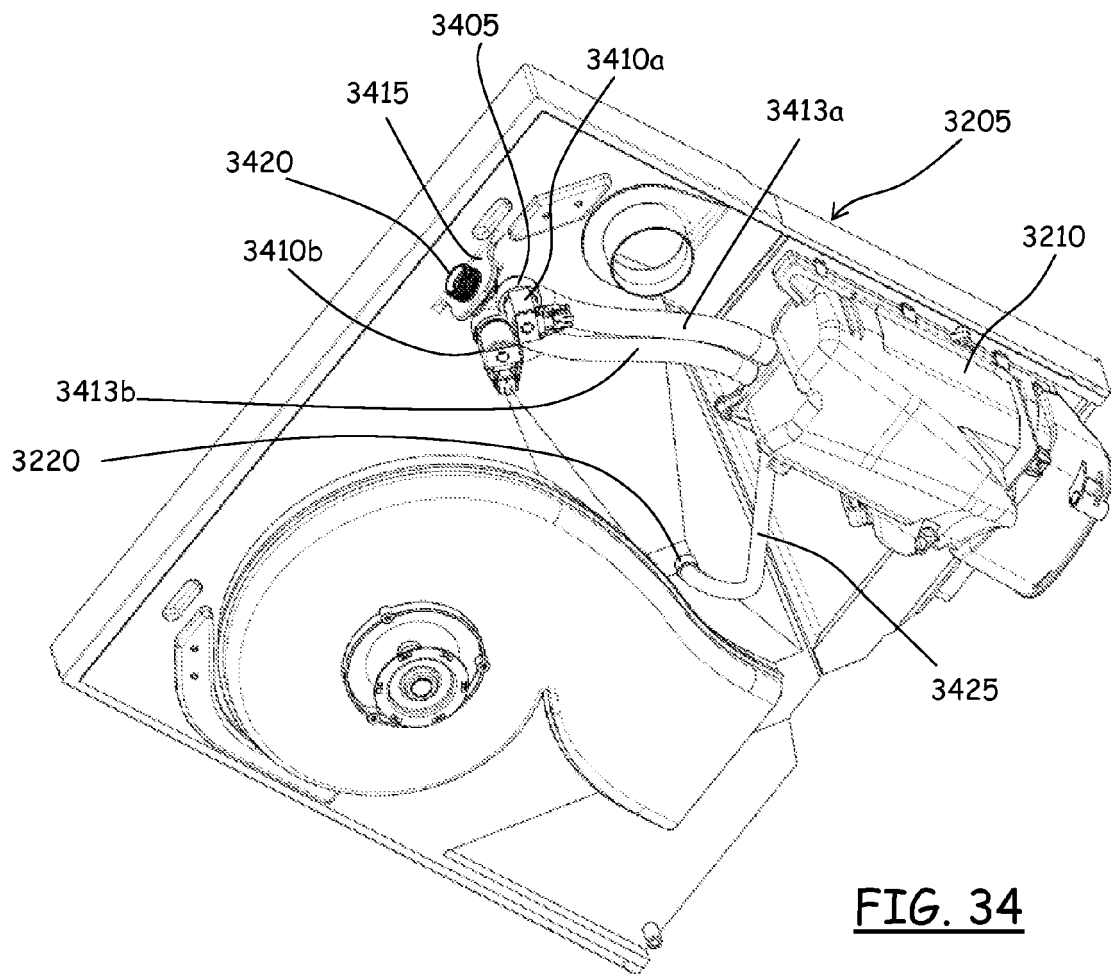
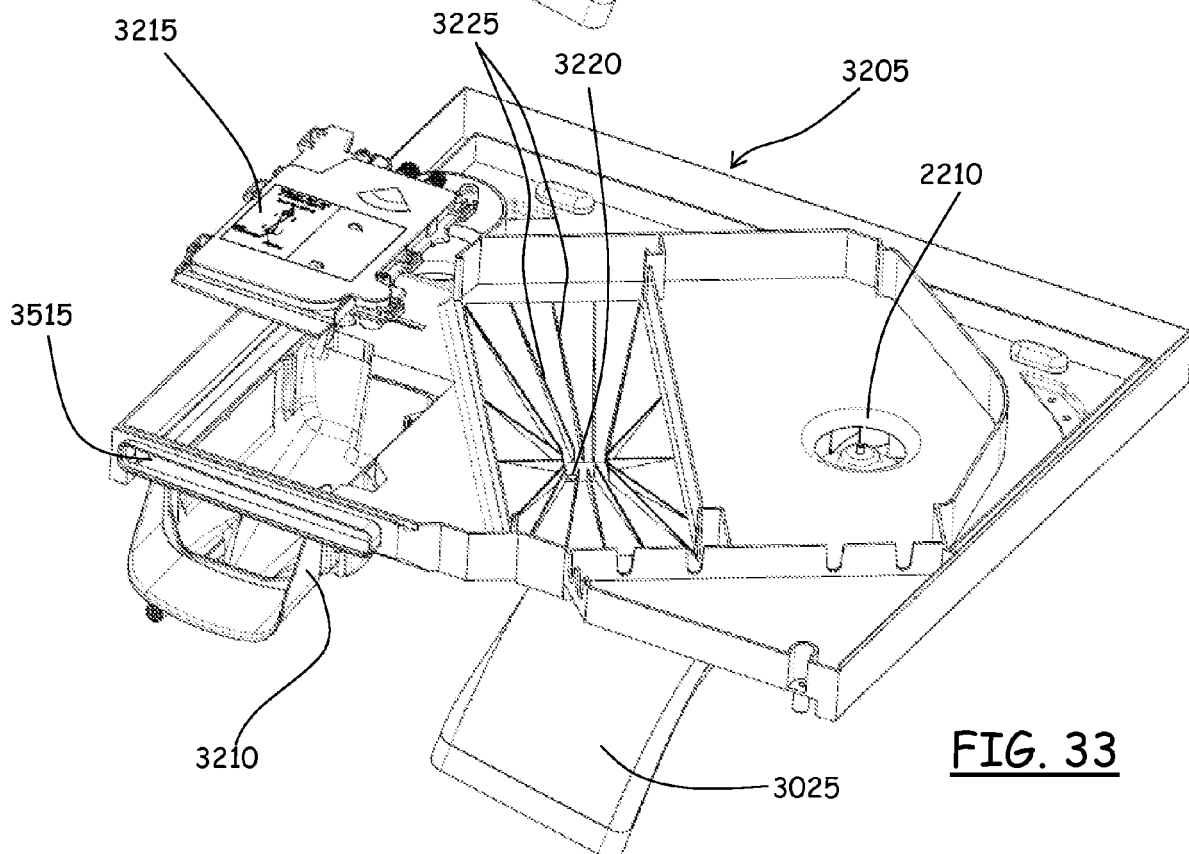
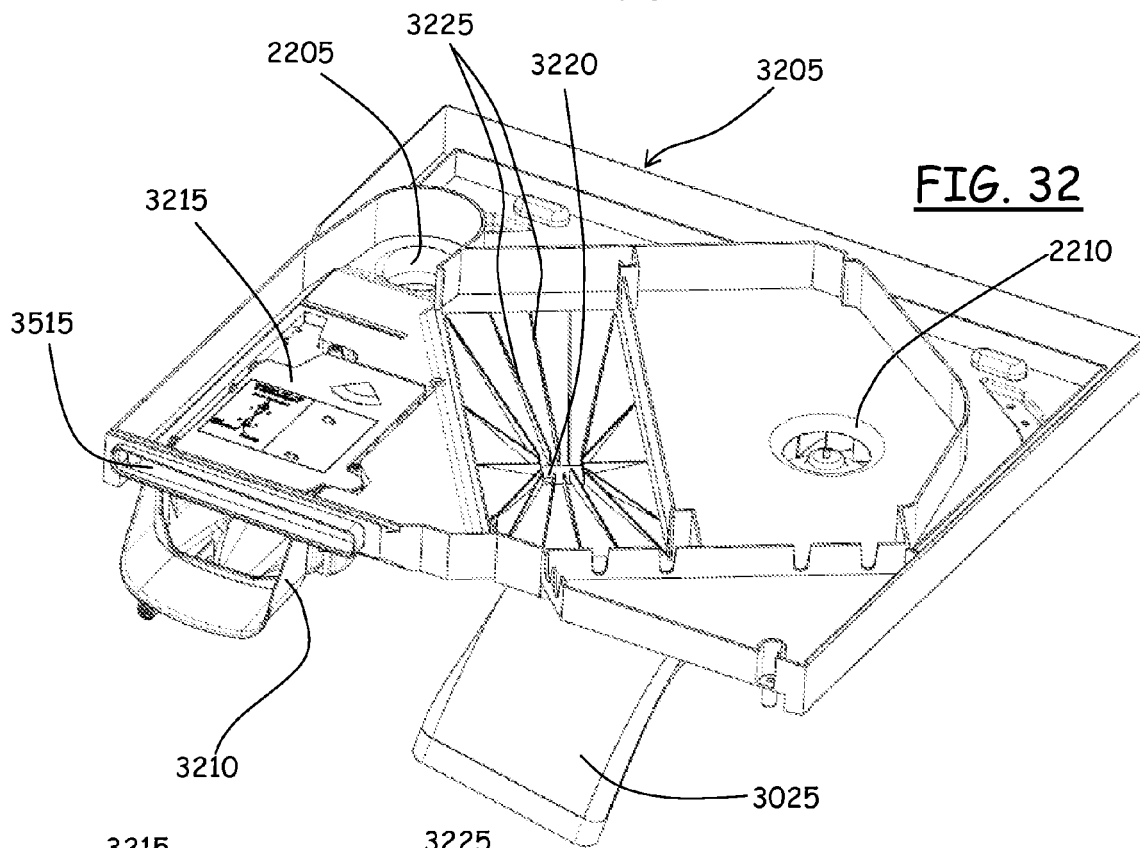
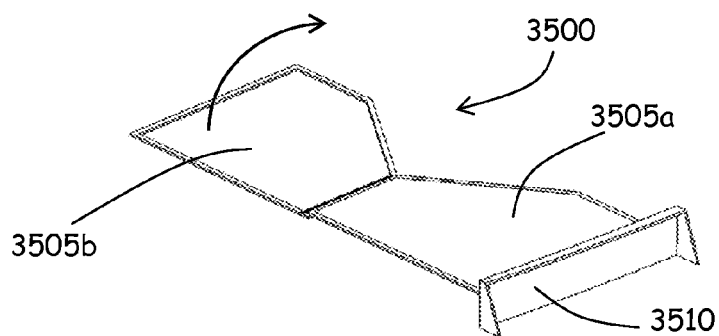
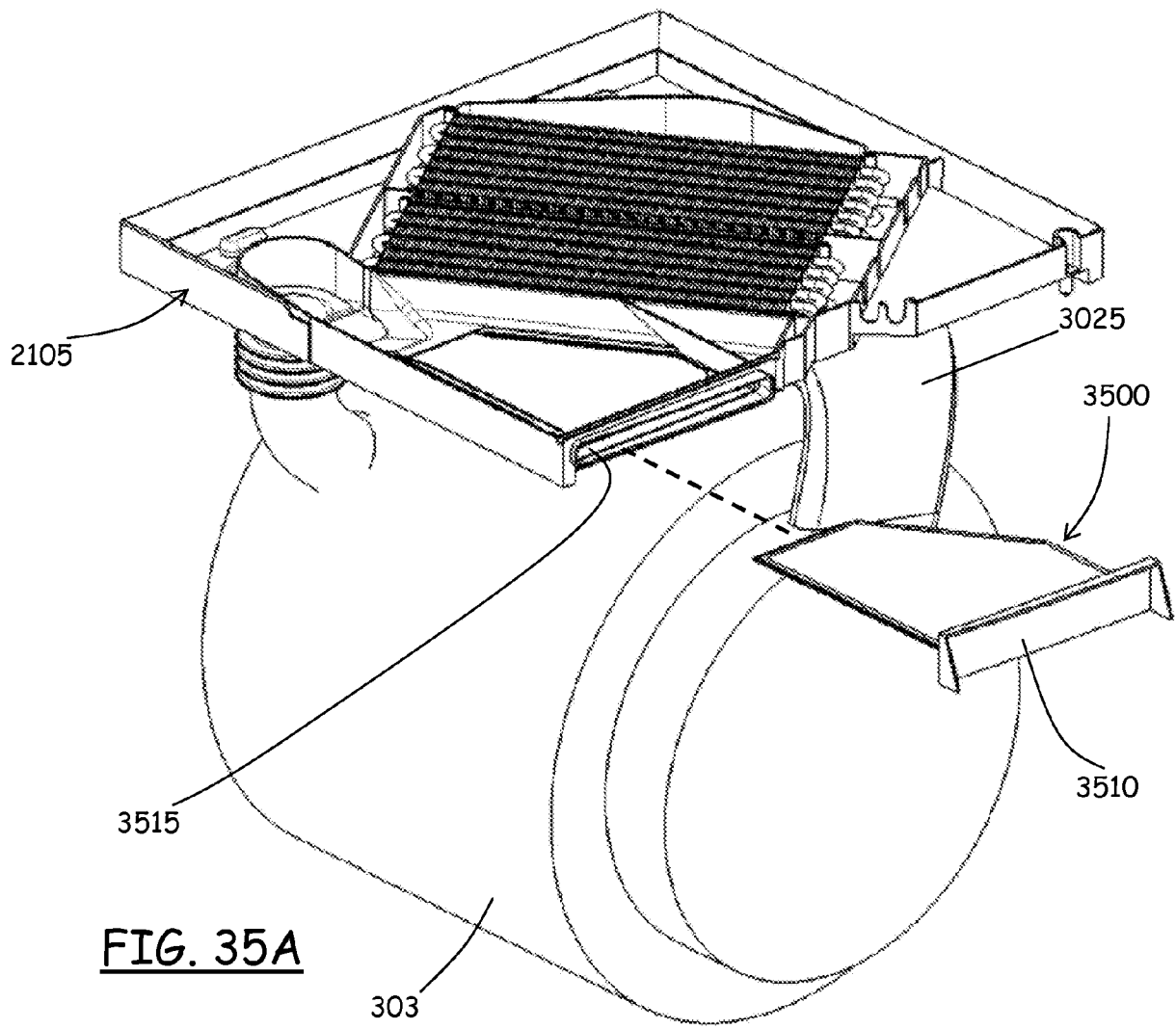


FIG. 34





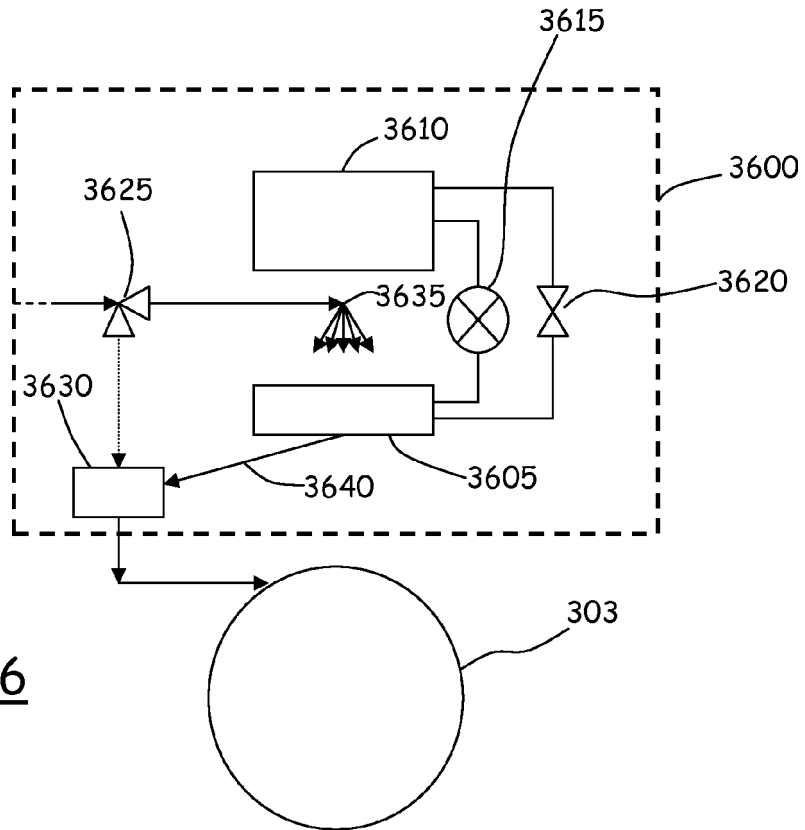


FIG. 36

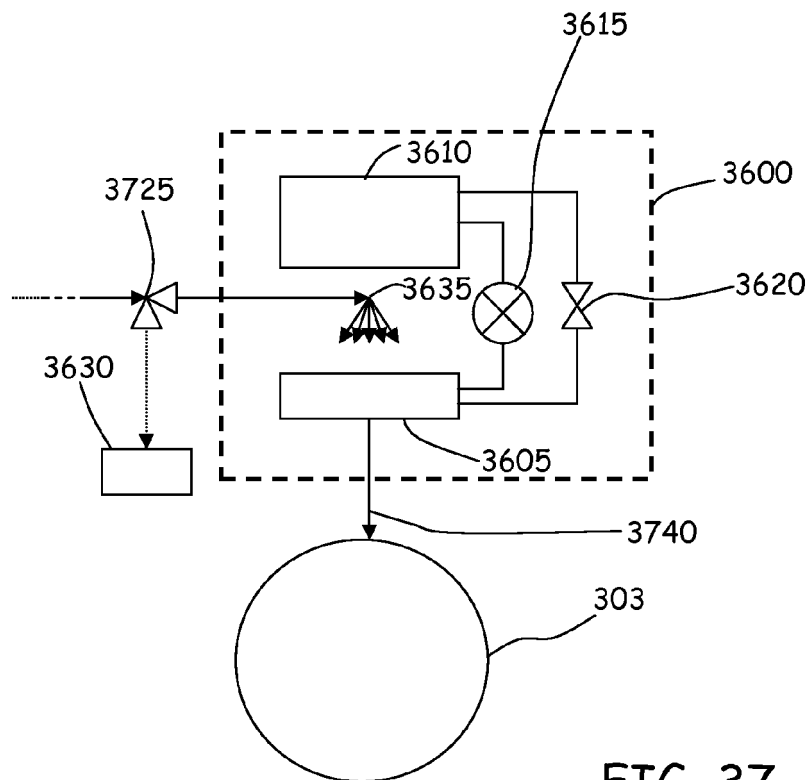


FIG. 37

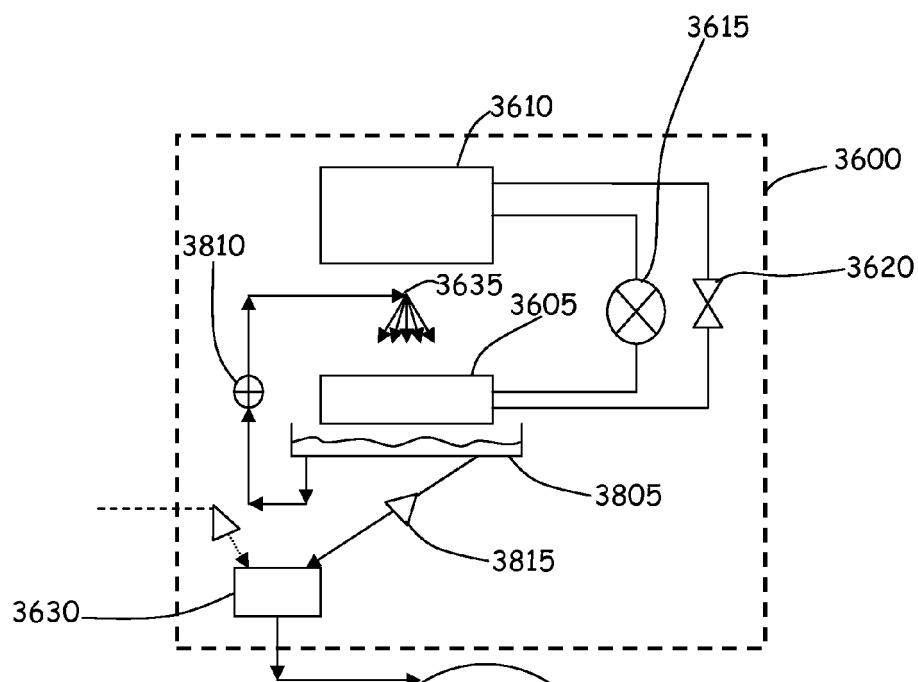


FIG. 38

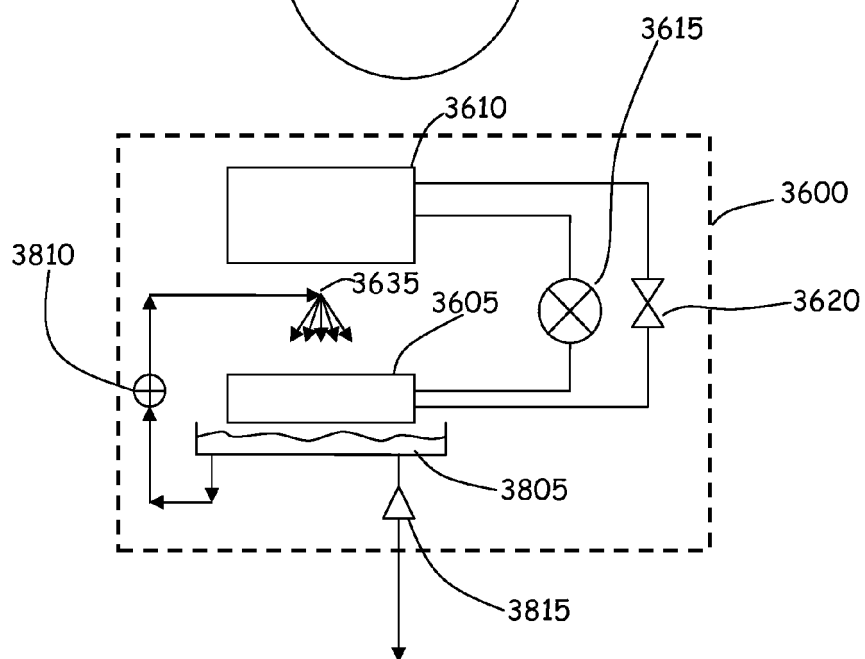


FIG. 39

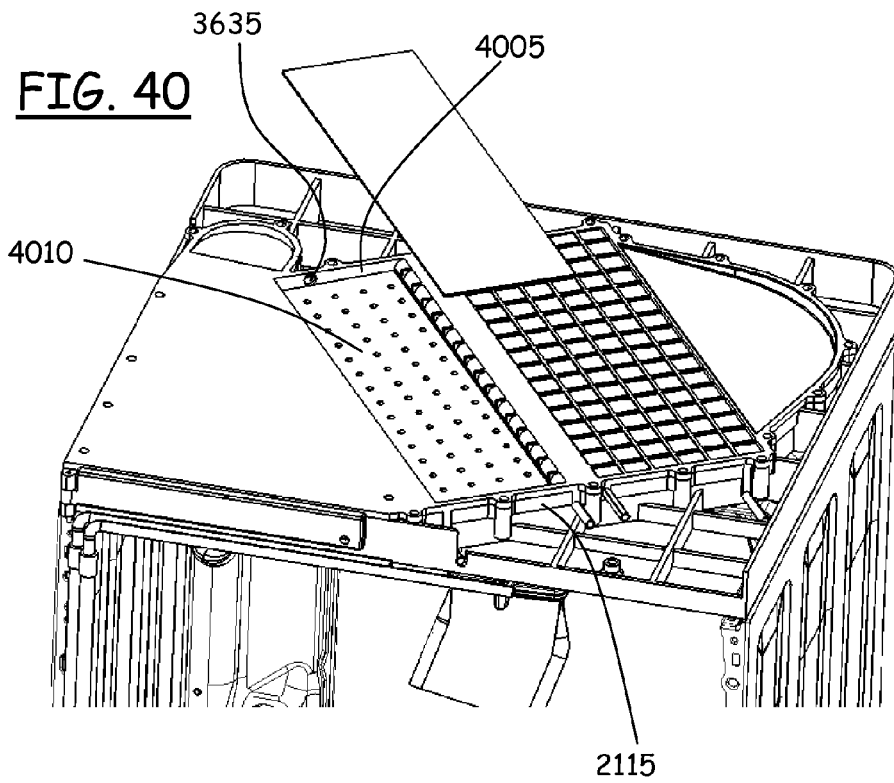


FIG. 41

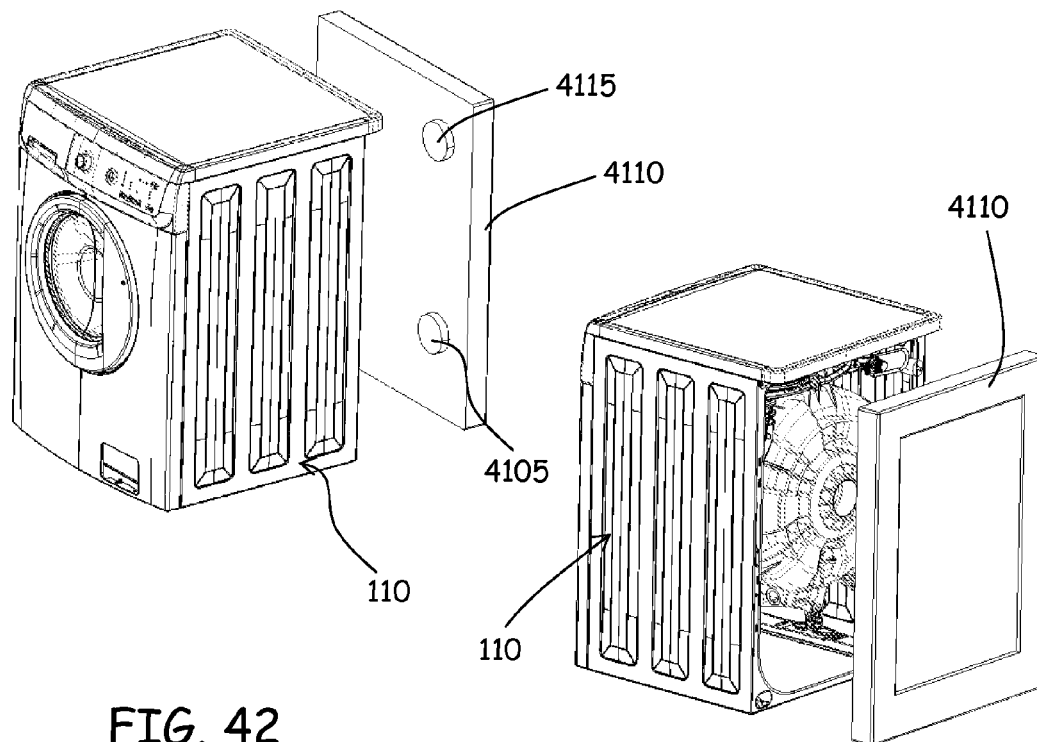
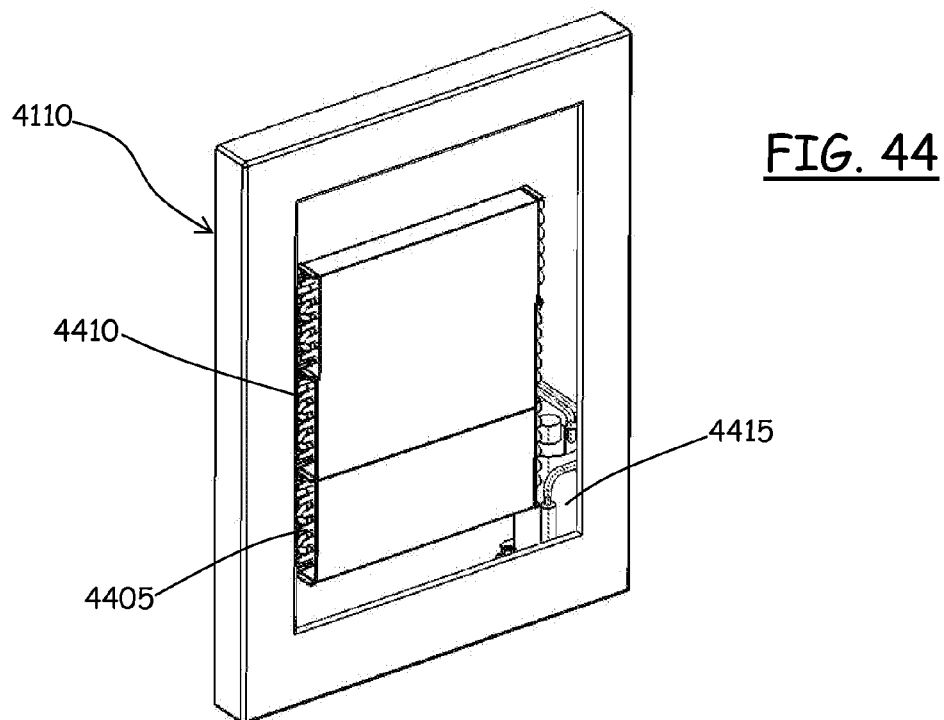
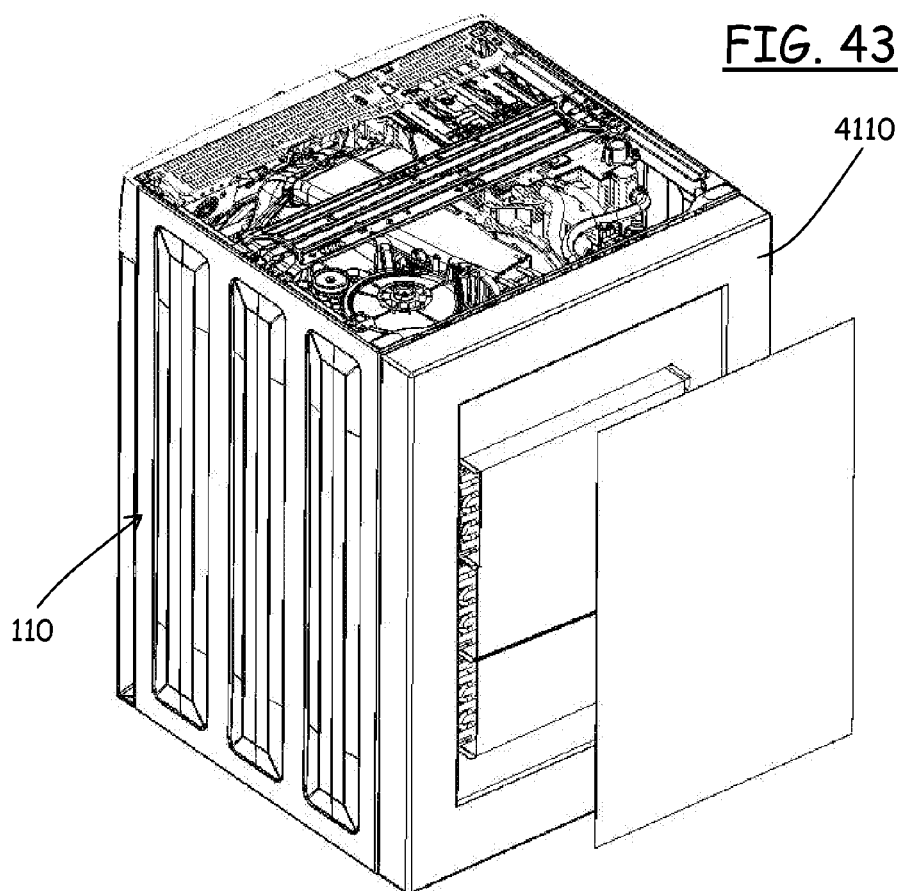


FIG. 42



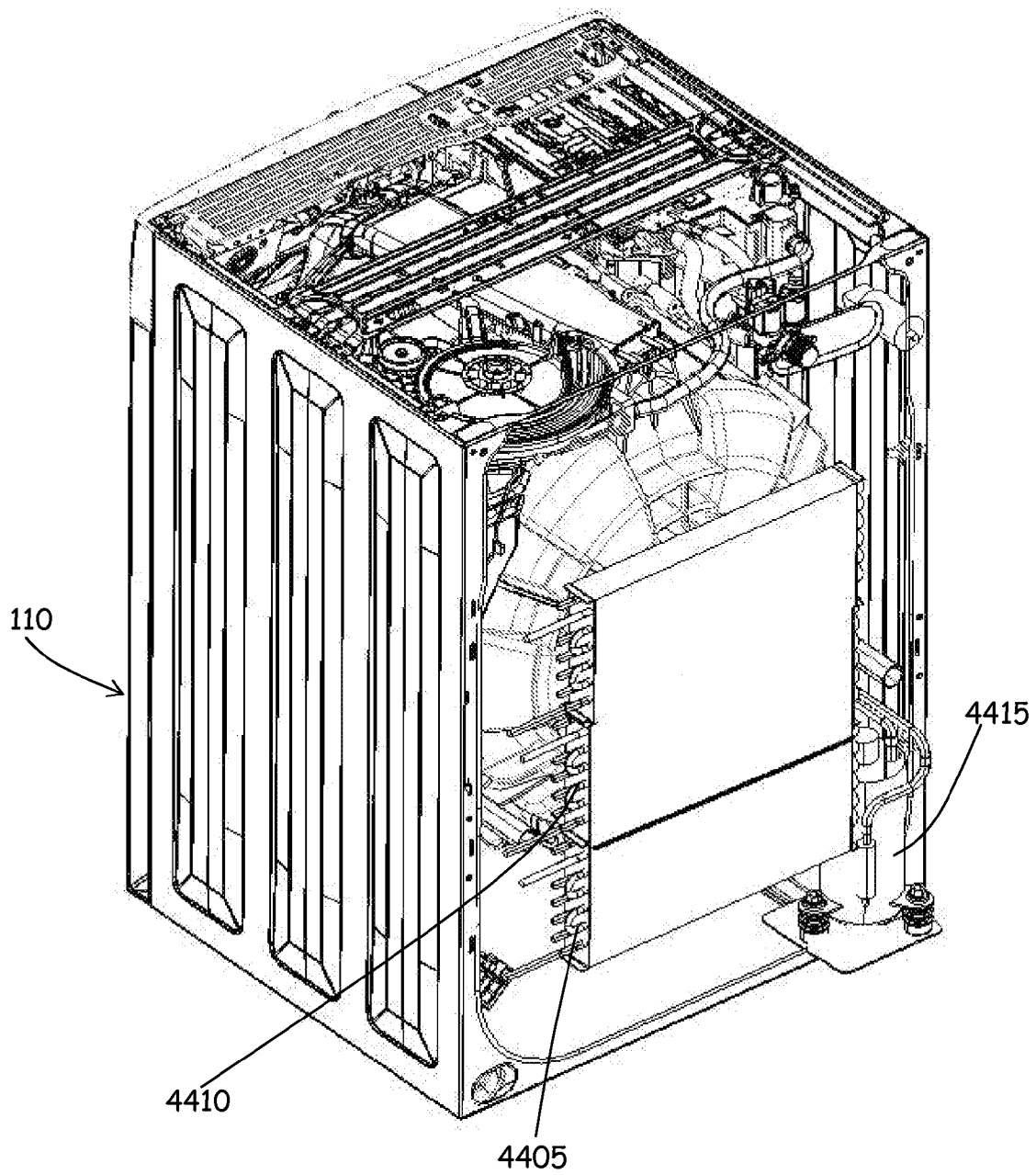


FIG. 45



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 0055

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 July 2011	Examiner Weinberg, Ekkehard
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document 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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EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 0055

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 July 2011	Examiner Weinberg, Ekkehard
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document 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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EPO FORM 1503 03.82 (P04C01)

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