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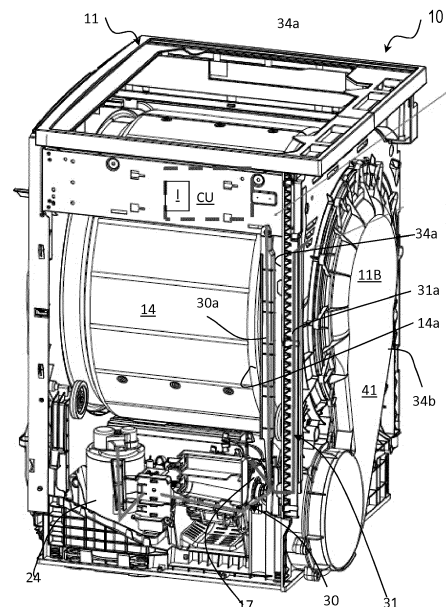
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(54) **LAUNDRY TREATING MACHINE**

(57) The present invention relates to a laundry treating machine (10), including:

- o a casing (11);
- o a first and a second electric loads (24, 17) positioned within said casing (11);
- o a first electrical cable (30) to power the first electric load (24) and a second electrical cable (31) to power the second electric load (17);
- o first guiding means (32) to channel a first portion (30a) of said first electrical cable (30) and second guiding means (33) to channel a second portion (31a) of said second electrical cable (31);
- o a first separating wall (11B) interposed between said first and said second portion (30a, 31a).

FIG. 5



Description

Technical field

[0001] The invention relates, in general, to the field of laundry treating machines. In particular, the invention relates to a laundry treating machine minimizing the electrical noise.

Background art

[0002] The laundry treating machine can be a laundry washing machine, a laundry dryer, or a laundry washing-drying machine, i.e. a washing machine having a drying function.

[0003] As is known, a laundry treating machine usually comprises a substantially parallelepiped-shaped casing, configured to rest on the floor and to house different components of the machine. A substantially cylindrical drum, which is configured to house the laundry to be treated, i.e. washed, dried or both, is fixed inside the casing to rotate about a rotational axis. The drum directly faces a laundry loading/unloading opening formed in a front or upper wall of the casing itself, and a porthole is hinged to the front or upper wall of the casing to rotate from an open position to a closed position, in which the porthole rests against the front or upper wall to close the laundry loading/unloading opening and tightly seal the drum. The laundry treating machine further comprises an electric motor for driving the drum into rotation about the afore-said rotational axis.

[0004] With reference in particular to a laundry dryer, it is also provided with an open-circuit or closed-circuit hot-air generator, which is housed within the casing and preferably supported by a support base, and with one or more electronic control units which control both the electric motor and the hot-air generator during the performing of user-selectable drying cycles stored in the central electronic control unit.

[0005] The open-circuit or closed-circuit hot-air generator is structured to circulate, in use, inside the drum a stream of hot air having a low moisture content, to dry the laundry placed inside the drum itself.

[0006] In today's laundry dryers, the hot-air generator is usually a closed-circuit, heat-pump type hot-air generator comprising: an air circulating conduit having its two ends connected to respective opposite sides of the drum; an electric fan located along the air circulating conduit to produce inside the latter an airflow which flows through the drum; a heat-pump assembly, having its two heat exchangers located one downstream of the other, along the air circulating conduit; and finally a manually-removable filtering element, which is placed at an inlet of the air circulating conduit located upstream of the two heat exchangers, and which is configured to retain lint or fluff carried by the drying air flow upstream of the two heat exchangers and of the electric fan.

[0007] Due to the market demand for laundry treating

machines which are more and more efficient and with reduced energy consumption, such machines are provided with one or more inverters configured to control the operation of a respective electrical motor, e.g. the electrical motor which rotates the drum housing the laundry to be washed and/or dried, an electrical motor which operates the centrifugal fan for circulating the airflow within the drum, and/or an electrical motor which operates a compressor of the heat-pump hot-air generator.

[0008] More specifically, an inverter is an electronic device or circuitry that changes direct current (DC) to alternating current (AC). The input voltage, output voltage and frequency, and overall power handling depend on the design of the specific device or circuitry. The inverter does not produce any power; the power is provided by the DC source. Inverter circuits designed to produce a variable output voltage range are often used within motor speed controllers. The DC power for the inverter section can be derived from a normal AC wall outlet or some other source. Control and feedback circuitry is used to adjust the final output of the inverter section which will ultimately determine the speed of the motor operating under its mechanical load.

[0009] When electrical motors are driven, inverters and the electrical cables transporting the power from the inverter emit electromagnetic radiations that can perturb other circuits of the machine or interfere with the environment where the machine is installed. This is due mainly to internal switching devices which generate conducted and radiated electromagnetic interference. To reduce these electromagnetic radiations, the laundry treating machine is typically provided with suitable devices, for example electric or electronic filters.

[0010] In addition, due to the provision of said further electromagnetic emissions filters, the laundry treating machine assembling process results more complicated and often some modifications of existing components, such as the support base, wiring supports and so on, are necessary to provide a holding device for receiving electric or electronic filters and/or ferrites. Indeed, to work properly, the electric or electronic filter and/or ferrites have to be placed close to the noise source, i.e. the inverters. This causes further complications and constraints when designing the arrangements of the internal machine components.

[0011] Further, another possibility to reduce the level of electromagnetic irradiation and noise is the provision of short electrical cables connecting the inverter to its respective motor. However this is also frequently impossible, due to the fact that the machine is "tightly packed" with a plurality of elements and device which have a fixed positioning which cannot be changed. Therefore, the length of the cables is dictated by the machine layout.

Summary of the invention

[0012] The present invention renders available a laundry treating machine which overcomes the problems out-

lined with reference to the prior art of record.

[0013] The main object of the present invention is to improve safety and reliability of a laundry treating machine while keeping low electromagnetic emissions.

[0014] A further object of the present invention is to provide a laundry treating machine provided with electrical cables connecting the loads, such as the engines or motors, in order to power the same, having the desired length, avoiding at the same time an increase in electromagnetic emissions.

[0015] An additional goal is to provide a laundry treating machine substantially free of complex electric or electronic filters and/or ferrites, or to minimize their use.

[0016] These and other advantages, objects, and features of the invention will be set forth in part in the description and drawings which follow and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learnt from practice of the invention. The objects and advantages of the invention may be reached and attained as particularly pointed out in the appended claims.

[0017] In a first aspect thereof, the present invention relates to a laundry treating machine including:

- o a casing;
- o a first and a second electric loads positioned within said casing;
- o a first electrical cable to power the first electric load and a second electrical cable to power the second electric load;
- o first guiding means to channel a first portion of said first electrical cable and second guiding means to channel a second portion of said second electrical cable;
- o a first separating wall interposed between said first and said second portion.

[0018] The laundry treating machine of the invention can be for example a washing machine, a dryer or a washer-dryer.

[0019] Preferably, the casing includes a laundry chamber which houses the laundry to be treated and it is apt to rotate around its axis, e.g. it is a drum.

[0020] The laundry treating machine comprises a casing preferably including a front wall, a rear wall, side walls and a base section or basement. The front wall may comprise a front top panel to command the functioning of the machine by the user. The casing defines the limit between the internal or inner side of the dryer and the external side of the dryer. Further, preferably, the casing includes a door hinged to the cabinet, e.g. to the front wall in case of a front loading dryer or a front loading washing machine, which is openable in order to introduce the laundry in the laundry chamber.

[0021] An electrical load is an electrical component or portion of a circuit that consumes electric power. The laundry treating machine of the invention includes at least two electric loads, called first load and second load; how-

ever any number of loads bigger or equal to two can be present in the machine of the invention.

[0022] An electrical load could be for example a motor, a transformer, a capacitor, an electric heater, etc.

[0023] In order to function, the load should be powered by means of an electric current or voltage. Therefore, electrical cables are placed within the machine in order to transport an electrical power to the loads. A first electrical cable is used to power a first load and a second electrical cable is used to power a second load.

[0024] The first and the second electrical cable are supposed to run from the place where the electrical signal is distributed, for example from the location of a control unit or the location of an inverter, to the load itself. The longer this cables length is, and the longer the portions of different cables to the different loads which are in proximity one to the other, the greater the electromagnetic interference is.

[0025] In order to minimize this, a first portion of the first electrical cable and a second portion of the second electrical cable are channeled by means of respective guiding means. Each electrical cable, either first or second, has a portion, either first or second, respectively, which is restricted within guiding means. The guiding means delimit the path of the cable within the machine from the power distributor or source to the load. The portion of the first and second electrical cable which is guided could be the majority of the length of the cable or just a minor part of it. In a preferred embodiment, the first portion and the second portion of the first and second cable, respectively, are those portions of the two cables which are running within the machine in proximity one to the other, that is, the portions of the electrical cables which are generally responsible for most of the electromagnetic noise. Preferably, most of the first and second electrical cable is channeled within guiding means.

[0026] The guiding means could for example include guides, for example realized in polymeric material, which may form a conduit or a channel in which the first/second cable is inserted. The guiding means can be a separated piece from the casing of the machine or they can be realized integrally with an element of the casing itself, for example by means of molding. Raceways, trucks, sleeves, etc. can all be used as well as guiding means. Preferably, the guiding means are realized in polymeric material.

[0027] In order to minimize the electromagnetic interference, a separating wall is interposed between the first and the second channeled portions of the first and second electrical cable. The separating wall is apt to shield, at least partially, the electromagnetic radiation. In this way the electrical cables can be located one close to the other avoiding or minimizing crosstalk phenomena.

[0028] Preferably, the separating wall is realized in polymeric material, in order to have electric insulating properties.

[0029] Preferably, said casing includes a front wall, a back wall and two lateral walls, and wherein said sepa-

rating wall includes a part of one of the walls of said casing.

[0030] In order to limit the number of components forming the machine, the separating wall is not an additional wall added to the casing, but a portion of an already present wall which is used to separate the two - first and second - portions of the electrical cables. In this way, there is substantially no added component to the machine itself.

[0031] Advantageously, said separating wall is realized in polymeric material.

[0032] In this way, although the two different electrical cables are at the opposite sides of the separating wall and possibly also in contact with the separating wall itself, being plastic an electric insulator, it minimizes the possibility of short circuits.

[0033] Advantageously, said separating wall includes a part of a back wall of said casing.

[0034] In order for the wall of the casing to separate the two channelled portions of cables, one portion should run on the external side of the wall and one portion on the internal side. For safety reasons, it is preferable that the user has no direct access to electrical cables or wiring, therefore, using the back wall of the casing put the cables at the farthest location with respect to the user.

[0035] More preferably, said separating wall defines an internal surface facing the interior of the casing and an external surface, opposite to the internal one, said first portion facing said internal surface and said second portion facing said external surface.

[0036] In a preferred embodiment, said separating wall includes a first and a second passing-through aperture, said first aperture realized higher than said second aperture in a vertical direction, said second electrical cable being inserted in said first aperture from the inside of said casing, run in contact to or in proximity of the external surface of said back wall and inserted in said second aperture to re-enter the interior of said casing.

[0037] The electrical cables to power the loads are generally located within the casing, i.e. in the inner space defined by the casing itself, because the various elements of the machine, such as the control unit and/or the loads, are located in the inner part of the casing. If one of the walls of the casing is separating the first and second portions of the first and second electrical cables, respectively, the cable running on the external surface of the casing wall, for example of the back wall, needs to exit the casing itself at least for the channelled portion. For this purpose, a first aperture is realized in the separating wall. However, the loads are still located within the casing, so the cable which is running along the external surface of the separating wall needs to return inside the casing itself. For this purpose, a second aperture is realized in the separating wall.

[0038] Preferably, said separating wall integrally includes said first and/or second guiding means within which said first and/or second electrical cable is located and/or a cover to cover said first and/or second electrical

cable.

[0039] In order to minimize the number of components present in the machine, the guiding means are integrally realized in a single step construction with the separating wall, for example they include a channel element which is integrally formed with the separating wall itself so that the first and/or the second electrical cable is inserted in the channel element and run along the internal/external surface of the separating wall. Further, in particular if the cable running within these integral guiding means is the second electrical cable running on the external surface of the separating wall, it is preferred to cover the electrical cable itself by means of a cover.

[0040] Advantageously, said first and/or second electric load includes a motor powered by an inverter.

[0041] More preferably, motor is one of the following: a fan motor, a heat-pump compressor motor, a motor to rotate a drum.

[0042] Preferably, motors present in a laundry treating machine include an inverter. If the machine is a drying machine, many motors may be present, such as the motor to rotate the drum, the motor to command a fan to blow the process air to dry clothes, a pump motor, etc. If the dryer is a heat-pump dryer, a motor is present for the operation of the compressor as well. Further, an additional fan to cool the compressor can also be present, which also includes a motor. All these motors, and/or others, can be powered by the first and/or the second electrical cables of the invention.

[0043] In an embodiment, the laundry treating machine includes a third electric load, a third electrical cable to power the third electric load, third guiding means to channel a portion of said third electrical cable, and a second separating wall, said first and second separating wall being interposed between any two of the first, second and third portion of said first, second and third electrical cable, respectively.

[0044] As mentioned above, many loads can be present in a laundry treating machine. In order to minimize the electromagnetic emissions, all different electrical cables powering the different loads - and which are channelled for at least a portion - are separated, in correspondence of the channelled portion, one from the others, by a separating wall. Therefore, in general, given N cables, N-1 separating walls are preferably present.

[0045] Advantageously, the laundry treating machine includes a control unit, said first and second electrical cables connecting said control unit to said first and second load, respectively.

[0046] More preferably, the laundry treating machine includes a control unit and an inverter, said inverter being integrated in said control unit and being apt to power said first or said second load.

[0047] Preferably, a single "control unit" controlling most of the functions of the machine is present. In this way, all commands are sent by a single unit, simplifying the overall circuitry.

[0048] Advantageously, said casing includes a base-

ment and defines an upper portion, said first and said second load being located within said basement, and said first and second electrical cables extending from the upper portion to the basement of said casing.

[0049] More preferably, said control unit is located in said upper portion of said casing.

[0050] Commonly, electric loads such as motors are "heavy and bulky items" which are located in the basement of the machine, where some available volume for their location is present. The control unit, on the other end, is frequently located on the top part of the machine. Electrical cables therefore are rather long in order to span the whole height of the casing from top to bottom. In this situation, the shielding of the separating wall is even more important.

[0051] In a preferred embodiment, the laundry treating machine includes a control unit and further said casing defines a horizontal plane and includes a front and a back wall, a plane perpendicular to said horizontal plane and dividing the front and the back walls in two separates the casing in a first and a second half, said control unit and said first and second electric load being located all in either the first or in the second half.

[0052] Although the electrical cables need to span, in an embodiment, the height of the casing from top to bottom, is preferred not to further increase their length, thus the electric loads and the control unit are located within the same "horizontal half" of the casing, that is either both on the left or both on the right of a plane diving the casing in two along a vertical direction.

Brief description of the drawings

[0053] In the following description and in the accompanying drawings reference is made to a laundry dryer provided with a closed-circuit, heat-pump type hot-air generator. However, it is understood that the invention applies to a laundry dryer provided with a heater for heating drying process air and optionally with an air-air type heat exchanger for removing moisture from process air, instead of a heat-pump type hot-air generator, as well as to a laundry washing machine and to a laundry washing-drying machine.

[0054] The present invention will now be described with reference to the accompanying drawings that illustrate non-limiting embodiments thereof, wherein:

Figure 1 is a perspective view, with part removed, of a laundry dryer according to the invention, having a door arrangement for allowing access to a drying air circuit;

Figure 2 shows a side view with a portion of the casing removed of the laundry dryer of Figure 1;

Figure 3 is a perspective view, with parts removed, of the basement of the laundry dryer of Figure 1 showing in detail the closed-circuit, heat-pump type

hot-air generator of the laundry dryer;

Figures 4a and 4b are two back view of the laundry dryer of fig. 1 with and without an element on the back wall;

Figure 5 is a perspective view, analog to fig. 1, schematically depicting an embodiment of the invention;

Figures 6a and 6b are two perspective views similar to figures 4a and 4b;

Figure 7 shows of a detail of the basement of fig. 3; and

Figures 8a-8f are views of a component of the dryer of fig. 1.

[0055] The Figures show a laundry treating machine, indicated as a whole with the reference numeral 10, which, in this embodiment, is a heat-pump type laundry dryer. The following description referring to a laundry dryer operating with a heat pump remains however valid even if other known operating technologies are used, as in the case of a condensing laundry dryer with a condenser consisting of an air-to-air type heat exchanger.

[0056] The heat-pump type laundry dryer 10 has a substantially parallelepiped-shaped casing 11 configured to rest on the floor and preferably a power supply (not shown) to power the machine 10. In particular, the casing 11 comprises a first pair of upright walls 11A, 11B arranged at a front and at a rear of the laundry treating machine 10, a second pair of upright walls 11C, 11D arranged at lateral sides of such machine 10, an upper wall 12 and a bottom wall 13.

[0057] Preferably one or more of the walls 11A, 11B, 11C, 11D, 12, 13 is realized in plastic material. More preferably, the back wall 11B is realized in plastic material.

[0058] Further, casing 11 defines in a three-dimensional space a horizontal plane (X,Y), which is substantially the plane of the ground on which the casing 11 is resting, and a vertical axis Z, which is the axis along which the casing 11 extends from the ground.

[0059] A substantially cylindrical laundry treating chamber or drum 14 configured to house the laundry to be treated is fixed in a rotating manner inside the casing 11, directly facing a laundry loading/unloading through opening formed in the front upright wall 11A of the casing 11. A porthole 15 is hinged to the front upright wall 11A of the casing 11 to rotate away from an open position to a closed position in which the porthole door 15 rests completely against the front upright side wall 11A to close the laundry loading/unloading through opening and substantially tightly seal the drum 14. Alternatively, the laundry loading/unloading through opening and the porthole 15 configured to open/close the laundry loading/unloading through opening can be formed in the upper wall 12 of the casing 11.

[0060] Preferably, as visible in figures 4a, 4b, 6a and 6b, back wall 11B includes an aperture 40, which faces a rear wall 14a of the drum 14. Aperture 40 is closed by a lid 41. Further, back wall 11B includes a further aperture 50, which is located below aperture 40 along the Z vertical axis. Aperture 50 is preferably closed by the same lid 41 closing aperture 40, the lid 41 thus forming a channel 42 fluidly connecting aperture 50 with aperture 40.

[0061] Preferably, the casing 11 further comprises a substantially parallelepiped-shaped lower support base or basement 16, which is structured for resting on the ground. The basement 16 may be provided with a bottom wall 13 facing the floor on which the laundry dryer is placed. The basement 16 houses an electrical motor 17 and a closed-circuit hot-air generator 18. Further, basement 16 preferably includes other additional components of the dryer 10, as better detailed below.

[0062] Preferably the basement 16 is realized in plastic material and more preferably in a molding process.

[0063] The electrical motor 17 is preferably a variable speed motor controlled by an inverter I and is mechanically connected to the drum 14 for driving the drum 14 into rotation about its rotational axis.

[0064] The closed-circuit hot-air generator 18 is configured to circulate air through the drum 14 for drying laundry, cooling down the air arriving from drum 14 in order to extract and retain the surplus moisture in the air itself, heating the dehumidified air to a predetermined temperature, and finally feeding the heated, dehumidified air back into the drum 14, to dry the laundry contained therein.

[0065] In order to be fed back to the drum 14, the air which exits the basement 16 enters channel 42 defined by lid 41 which brings back air to the drum 14.

[0066] A control unit CU is preferably arranged in an upper portion of the casing 11, for example close to the front upright wall 11A of the casing 11, and is configured to control both the electrical motor 17 and the closed-circuit hot-air generator 18 while performing the user-selectable drying cycles preferably, but not necessarily, stored in the same central control unit CU. Such control unit CU may be in signal communication with further control units to provide said control of the electrical motor 17 and the closed-circuit hot-air generator 18 and/or to further motors and electric loads present in the casing.

[0067] With reference in particular to Figure 3, the closed-circuit hot-air generator 18 consists of a heat-pump type, hot-air generator comprising; an air circulating conduit 19 in fluid communication with the drum 14; an electric fan 20 which is located along the air circulating conduit 19 to produce, inside the air circulating conduit 19 itself, an airflow f which flows through the drum 14, and through the laundry located inside the drum 14; and a heat-pump assembly 21 which is able to cool the airflow f coming out from the drum 14 for condensing and retaining the surplus moisture in the airflow f itself, and to heat the airflow f returning back to the drum 14, so that the airflow f entering the drum 14 is at a temperature higher

than or equal to that of the airflow f coming out of the drum 14. To return into the drum 14 the air exits the basement, as depicted in figure 3, sucked by the fan 20. The location of the fan 20 represents also the location of the exit for the air from the basement. In the position of the fan 20, the back wall 11B includes the aperture 50, and lid 41 forms, together with the back wall 11B, a housing for the fan itself. The air therefore exits the basement 16, enters the fan housing and it is channeled into the drum 14 by means of mentioned channel 42 formed by the lid 41 till aperture 40 is reached (also covered by lid 41). Air preferably enters into drum 14 by via holes (not depicted) realized in the rear wall of drum 14.

[0068] In particular, the heat-pump assembly 21 comprises a first heat exchanger 22, a second heat exchanger 23, an electrically-powered refrigerant compressing device 24, and an expansion valve or similar passive or active operated refrigerant expansion device (not shown in Figures), for example a capillary tube, a thermostatic valve or an electrically-controlled expansion valve.

[0069] The first heat exchanger 22, which is conventionally referred to as the "evaporator", is located along the air circulating conduit 19 and is configured to rapidly cool down the airflow f arriving from the drum 14 to condense and retain the surplus moisture in the airflow f itself.

[0070] The second heat exchanger 23, which is conventionally referred to as the "condenser", is located along the air circulating conduit 19, downstream of the first heat exchanger 22 and is configured to rapidly heat the airflow f arriving from the first heat exchanger 22 and directed back to the drum 14, so that the airflow f reentering the drum 14 is at a temperature higher than or equal to that of the airflow exiting the drum 14.

[0071] The electrically-powered refrigerant compressing device 24 or compressor is interposed between an outlet of the evaporator 22 and an inlet of the condenser 23 and has the function of compressing the refrigerant provided in a gaseous state from the evaporator 22 so that the refrigerant pressure and temperature are much higher at the inlet of the condenser 23 than at the outlet of the evaporator 22.

[0072] The expansion valve is interposed between the outlet of the condenser 23 and the inlet of the evaporator 22, and is structured so as to cause a rapid expansion of the refrigerant directed towards the evaporator 22, so that the refrigerant pressure and temperature are much higher at the outlet of the condenser 23 than at the inlet of the evaporator 22.

[0073] The compressing device 24, or compressor, includes a motor (not visible) which is preferably housed in a shell of the compressor itself. Further, the electric fan 20 is also moved by means of a motor, also not shown. In an embodiment, such as the one shown in the figures, the motor of the fan 20 coincides with the motor 17 of the drum 14, which is the same motor drives in rotation both drum 14 and fan 20. Motor of the fan 20 and motor of the compressor 24 are also preferably commanded by control unit CU from which they receive electrical signals to

power the same.

[0074] Preferably control unit CU (visible in a schematic way in figures 1 and 5) receives the power from the power source, such as the mains, and in turn powers two or more of the electric loads of the dryer 10, such as the motor of the drum, and/or of the fan, and/or of the compressor, and/or additional motors, such as a motor of an auxiliary fan to cool the compressor, or other electric loads such as an electric heater (not depicted in the drawings) which is used to speed up the drying cycle in addition to the use of the heat pump. Further, preferably one of these motors includes an inverter I. Even more preferably, all these motors include an inverter. In a preferred embodiment, the one or more inverters I is integral to the control unit itself. In figures 1 and 5 only a single inverter I is depicted, however a number of inverter equal to the number of electric loads powered by the control unit CU motors can be present as well.

[0075] In order to command at least two of the above mentioned electric loads, for example the motor of the compressor 24 and the motor 17 of the drum 14, a first and a second electrical cable 30 and 31, visible in figures 5 and 7, run from the control unit CU position to the motors position. As mentioned, both compressor 24 housing its motor and the motor 17 of the drum 14 are located within the basement 16 of the dryer 10, while the control unit CU is located on the top part of the dryer 10, as shown schematically in figures 1 and 5.

[0076] Therefore, both first and second electrical cables 30 and 31, in this embodiment, need to run for a relatively long length from the top to the bottom of the dryer 10 along the vertical direction Z, as better visible in figure 5. Further, the first and second electrical cables 30, 31 extend for a part of their length rather close one to the other, due to the fact that their starting point is the same and the locations of the compressor 24 and the motor 17 of the fan/drum are also close by. This arrangement may cause electromagnetic noise and interference.

[0077] According to the invention, a first portion 30a of the first electrical cable 30 and a second portion 31a of the second electrical cable 31 are channeled in first and second guiding means 32, 33, respectively. In other words, a first portion of the length of the first cable and a second portion of the length of the second cable are "constrained" by means of guiding means which define their respective paths.

[0078] As visible in figure 7, in a preferred embodiment the first guiding means 32 for the first portion 30a of the first electric cable 30 include a guide, preferably made in polymeric material, in which the first electrical cable 30 is inserted for its first portion 30a. In the depicted embodiment, the guide 32 is running substantially vertically from the top to the bottom of the casing 11 or at least for a substantially vertical length of the casing 11. Preferably, the guide 32 is located inside the casing 11 and more preferably it is in contact to or in close proximity to the back wall 11B. Thus, the channeled portion 30a runs at least for a part along the back wall 11B, on its inner side,

that is along a back wall surface 34a facing the internal part of the casing 11.

[0079] Second guiding means 33 which channel the second portion 31a of the second electrical cable 31 include a channel or groove. Preferably, channel or groove 33 is realized integral to the back wall 11B. More preferably, the channel or groove is realized on an outer or external surface 34b of the back wall 11B, which is on the surface of the back wall facing the exterior to the casing 11.

[0080] Further, preferably back wall 11B includes a first and a second aperture 60, 61 realized preferably one above the other at different heights along the Z axis. Advantageously, the first and second aperture 60, 61 are positioned at two axial ends 33a, 33b of the second guiding means 33. In this way the second electrical cable 31 can exit the casing 11 through the first aperture 60 which is the closest to the control unit CU located at the upper portion of the casing 11 and then it can re-enter the casing 11 through the second aperture 61 which is preferably located at the height of the basement 16, that is, at the height of the compressor 24 which is powered by the second electrical cable 31.

[0081] Further, preferably the second electrical cable 31 is for its second portion 31a running in the outside of the casing channeled by the second guiding means 33, thus is contact or in close proximity to the external surface 34b of the back wall 11B. The second guiding means 33 further include a cover 35, to close the channel and thus to cover cable 31 to avoid any unintentional contact with the second electrical cable 31 itself.

[0082] The channeled portion 30a of the first electrical cable 30 and the channeled portion 31a of the second electrical cable 31 are thus running substantially parallel one to the other, in the depicted embodiment from the top to the bottom of the casing 11, but the two portions 30a, 31a are always separated by a separating wall, which - in this preferred embodiment - includes a portion of the back wall 11B of the casing 11. The back wall 11B thus separated the guiding means 32, 33 and in turn the portions 30a, 31a of the first and the second cables 30, 31 channeled by the guiding means 32, 33.

[0083] As seen, the first and second guiding means 32, 33 are in the depicted embodiment different one to the other, one integral to the back wall and one as a separated element, however also the first guiding means 32 could be realized as integral to the back wall 11B.

[0084] Further, cover 35, which is better depicted in figures 8a-8f, is fixed to the back wall 11B and in particular to the external wall 34b of the same to cover the channeled portion 31a of the second electrical cable 31 inserted in the second guiding means 33. For this purpose, the cover 35 includes a plate like element 36, which protects the second electrical cable 31 and close the channel defined by the second guiding means 33, and includes a plurality of flaps, all indicated with 37, extending from the plate-like element 36, to be fixed to the back wall 11B.

[0085] Flaps 37 are inserted into corresponding seats

38 formed in the back wall 11B. Seats 38 may be formed as hooks or a screw could be inserted in a hole 39 formed in each flap 36 to block the latter into the seat 38.

Claims

1. Laundry treating machine (10), including:

- o a casing (11);
- o a first and a second electric load (24, 17) positioned within said casing;
- o a first electrical cable (30) to power the first electric load (24) and a second electrical cable (31) to power the second electric load (17);
- o first guiding means (32) to channel a first portion (30a) of said first electrical cable (30) and second guiding means (33) to channel a second portion (31a) of said second electrical cable (31);
- o a first separating wall (11B) interposed between said first and said second portion (30a, 31a).

2. Laundry treating machine (10) according to claim 1, wherein said casing (11) includes a front wall (11A), a back wall (11B) and two lateral walls (11C, 11D), and wherein said separating wall (11B) includes a part of one of the walls of said casing (11).

3. Laundry treating machine (10) according to claim 2, wherein said separating wall (11B) is realized in polymeric material.

4. Laundry treating machine (10) according to claim 2 or 3, wherein said separating wall (11B) includes a part of a back wall (11B) of said casing.

5. Laundry treating machine (10) according to any of claims 2 - 4, wherein said separating wall (11B) defines an internal surface (34a) facing the interior of the casing (11) and an external surface (34b), opposite to the internal one, said first portion (30a) facing said internal surface (34a) and said second portion (31a) facing said external surface (34b).

6. Laundry treating machine (10) according to claim 5, wherein said separating wall (11B) includes a first and a second passing-through aperture (60, 61), said first aperture (60) realized higher than said second aperture (61) in a vertical direction (Z), said second electrical cable (31) being inserted in said first aperture (60) from the inside of said casing (11), run in contact to or in proximity of the external surface (34b) of said separating wall (11B) and inserted in said second aperture (61) to re-enter the interior of said casing (11).

7. Laundry treating machine (10) according to claim 5

or 6, wherein said separating wall integrally includes said first and/or second guiding means (32, 33) within which said first and/or second electrical cable (30, 31) is located for said first and/or second portion (30a, 31a) and/or a cover (35) to cover said first and/or second electrical cable (30, 31).

8. Laundry treating machine (10) according to any of the preceding claims, wherein said first and/or second electric load (17, 24) includes a motor powered by an inverter (I).

9. Laundry treating machine (10) according to claim 9, wherein said motor is one of the following: a fan motor, a heat-pump compressor (24) motor, a motor (17) to rotate a drum.

10. Laundry treating machine (10) according to any of the preceding claims, including a third electric load, a third electrical cable to power the third electric load, third guiding means to channel a portion of said third electrical cable, and a second separating wall, said first and second separating wall being interposed between any two of the first, second and third portion of said first, second and third electrical cable, respectively.

11. Laundry treating machine (10) according to any of the preceding claims, including a control unit (CU), said first and second electrical cables (30, 31) connecting said control unit (CU) to said first and second load (24, 17), respectively.

12. Laundry treating machine (10) according to any of the preceding claims, including a control unit (CU) and an inverter (I), said inverter (I) being integrated in said control unit and being apt to power said first or said second electric load (24, 17).

13. Laundry treating machine (10) according to any of the preceding claims, wherein said casing (11) includes a basement (16) and defines an upper portion, said first and said second electric load (24, 17) being located within said basement (16), and said first and second electrical cables (30, 31) extending from the upper portion to the basement (16) of said casing (11).

14. Laundry treating machine (10) according to claim 12 and 13, wherein said control unit (CU) is located in said upper portion of said casing (11).

15. Laundry treating machine (10) according to any of the preceding claims, including a control unit (CU) and wherein said casing (11) defines a horizontal plane (X,Y) and includes a front and a back wall (11A, 11B), a plane perpendicular to said horizontal plane and dividing the front and the back walls in two sep-

arates the casing in a first and a second half, said control unit (CU) and said first and second electric load (24, 17) being located all in either the first or in the second half.

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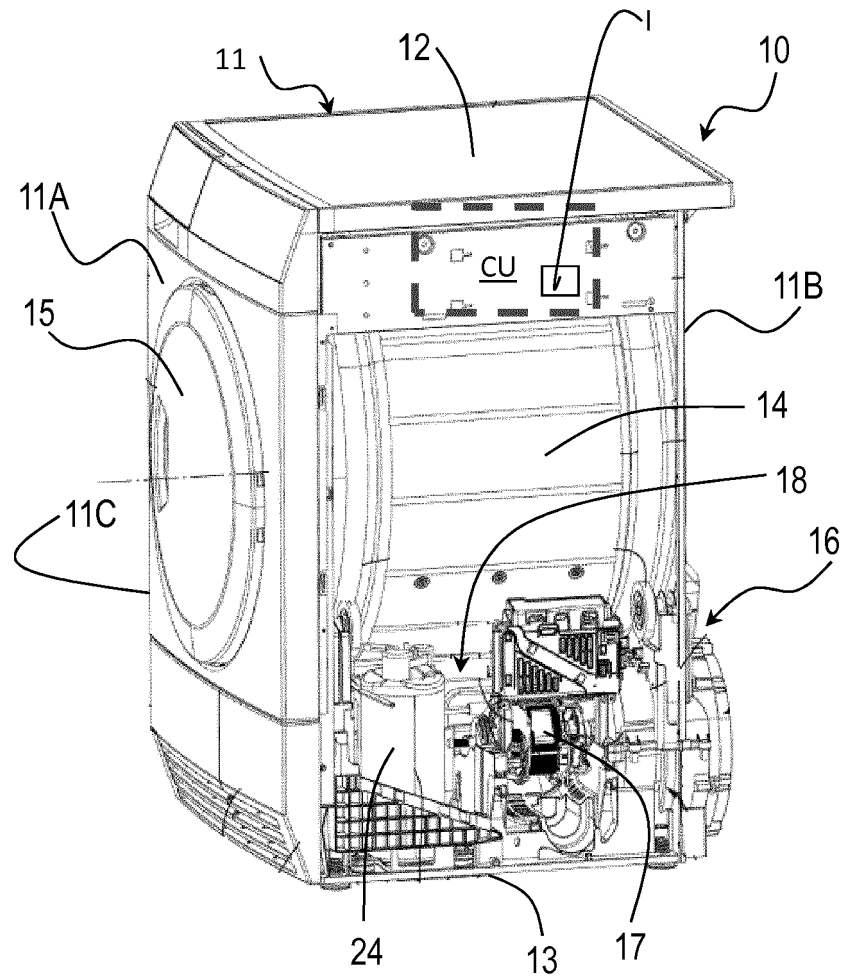
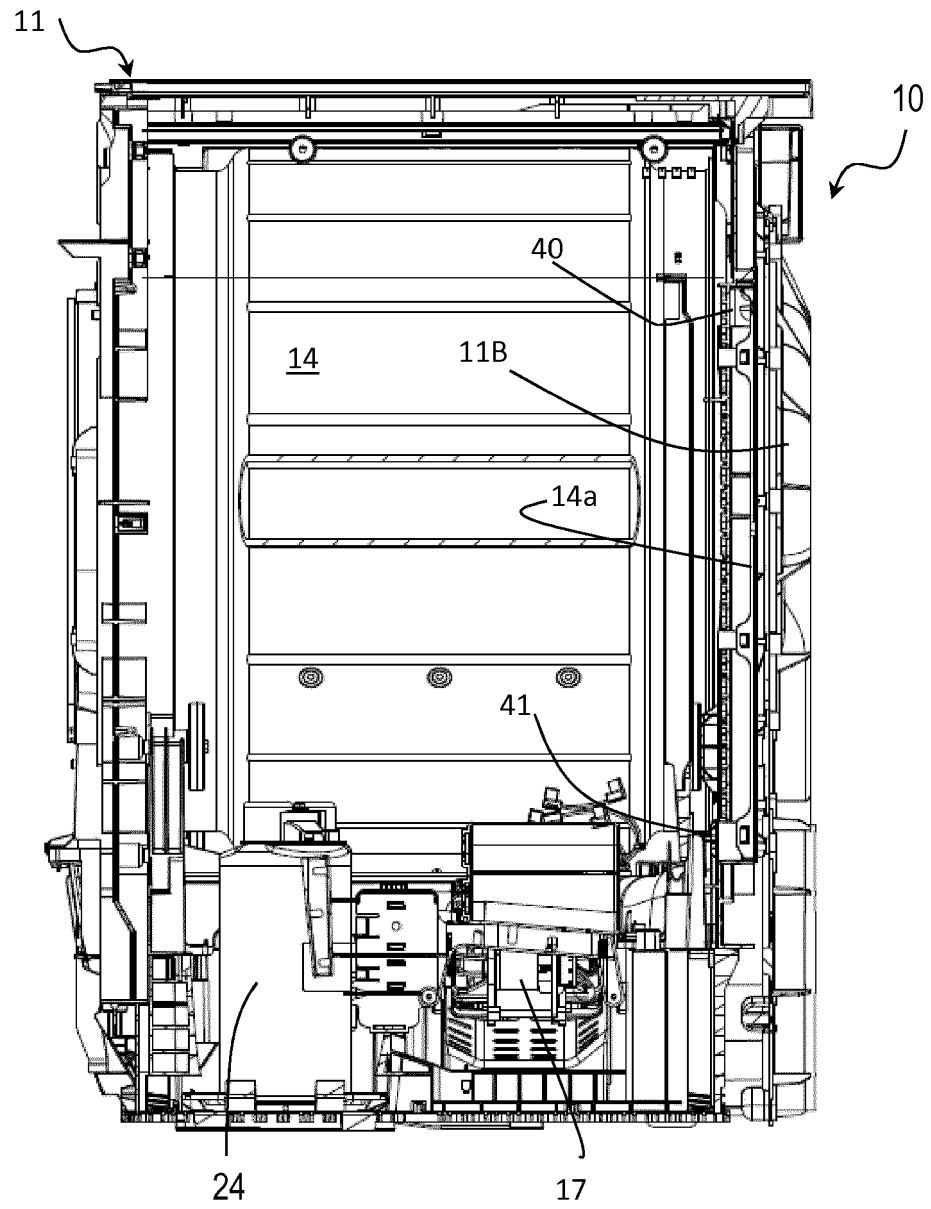


FIG. 1

FIG. 2



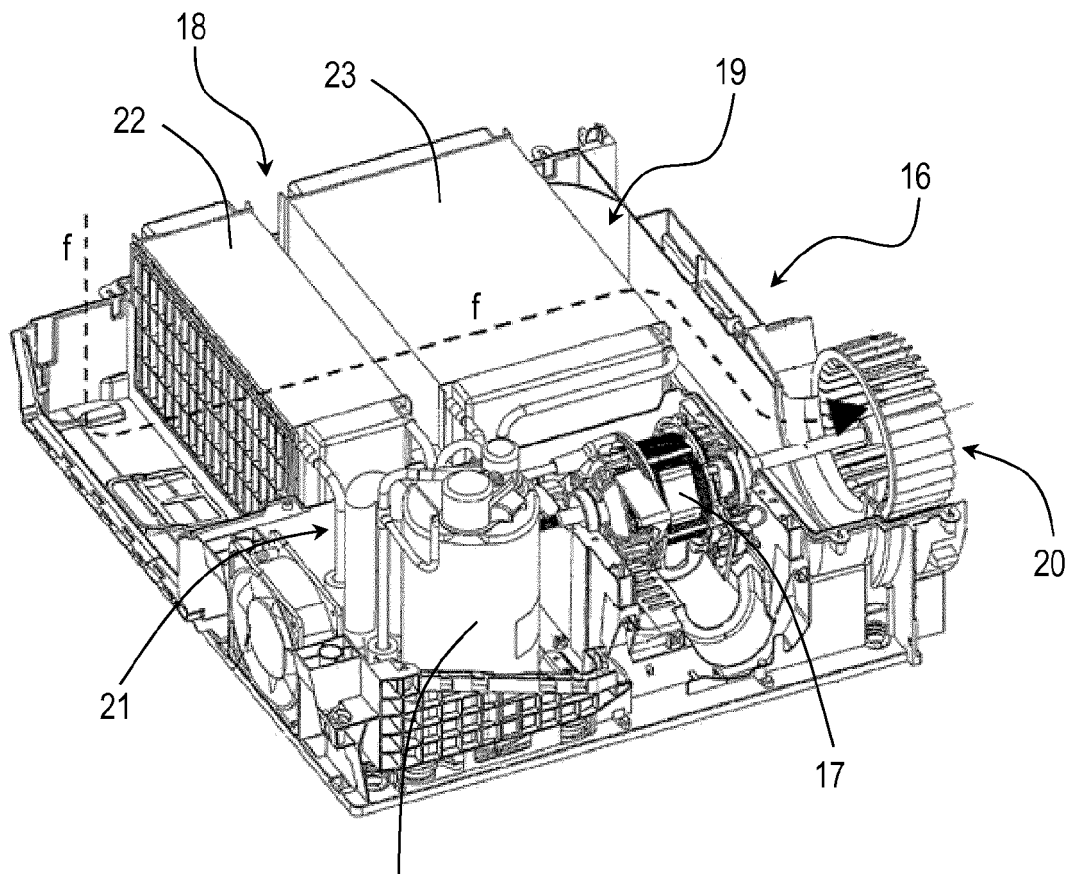


FIG. 3

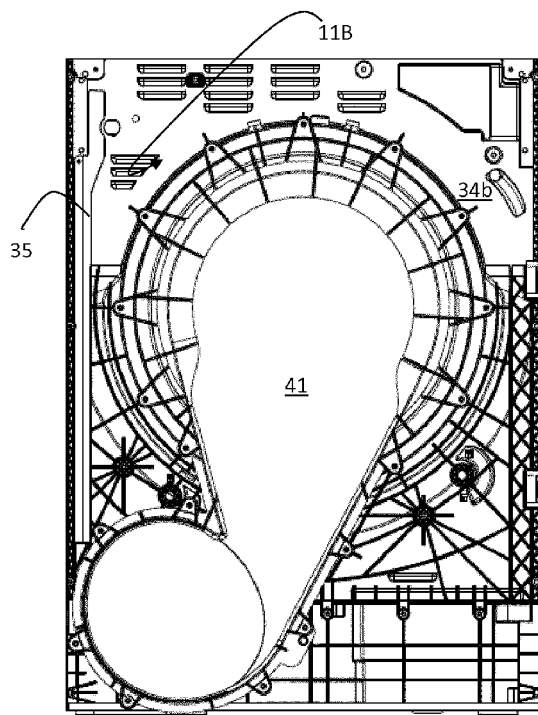


FIG. 4a

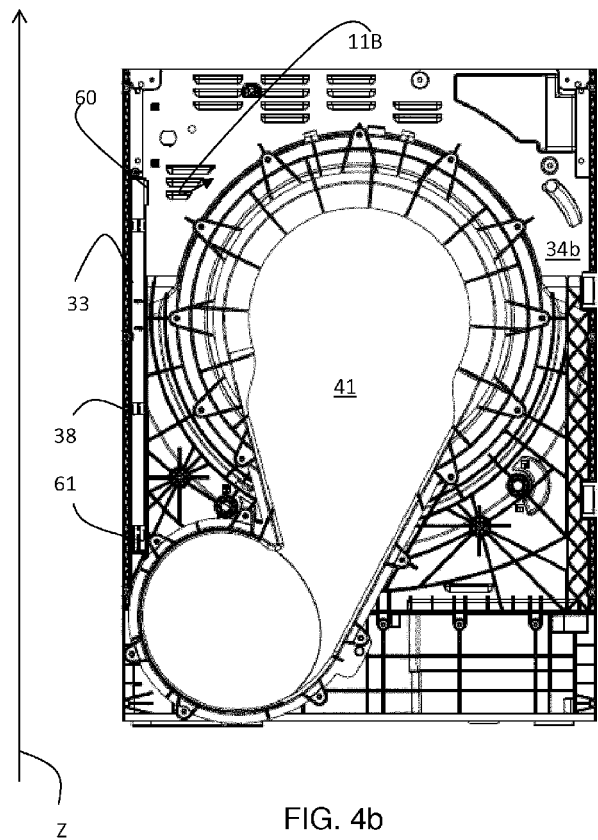
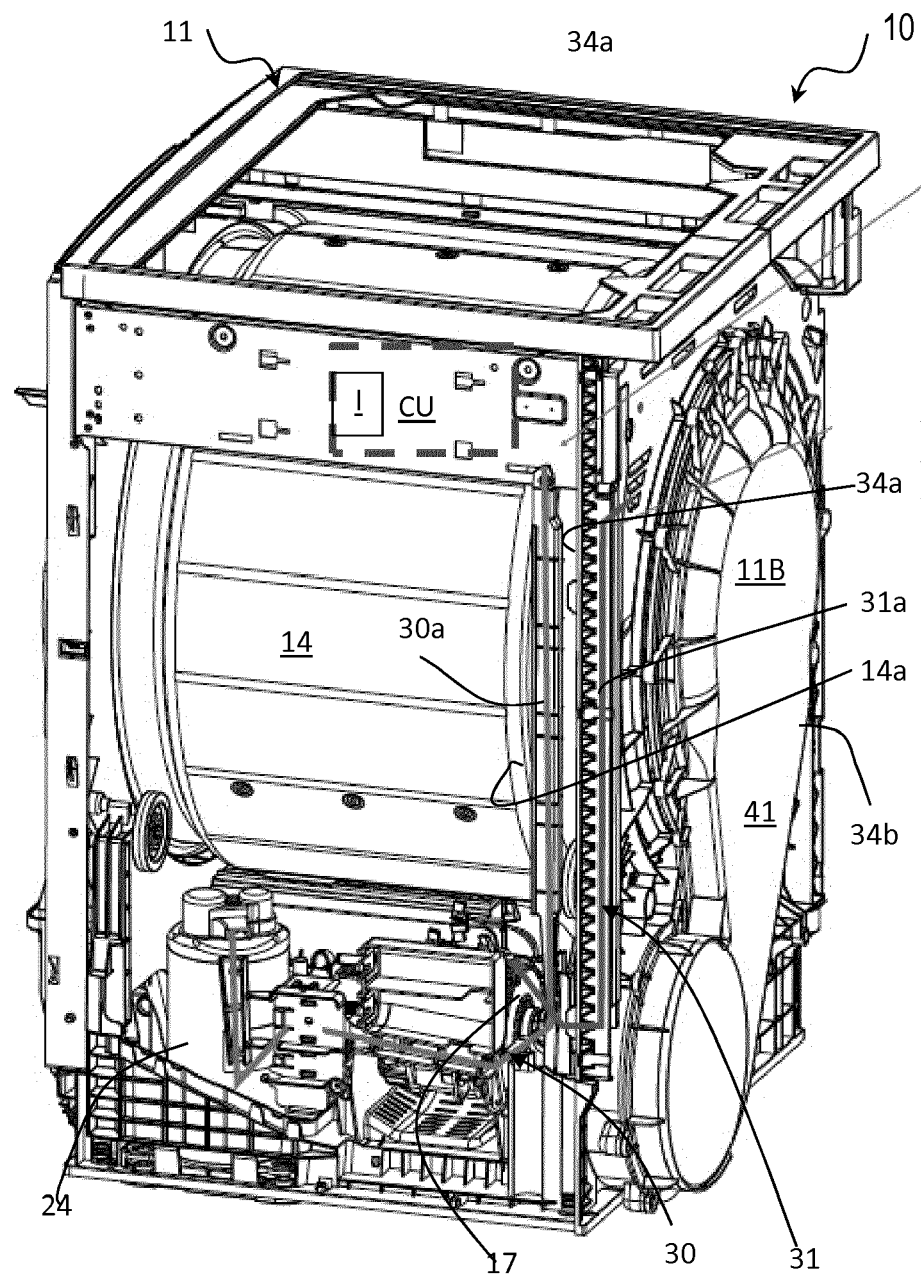


FIG. 4b

FIG. 5



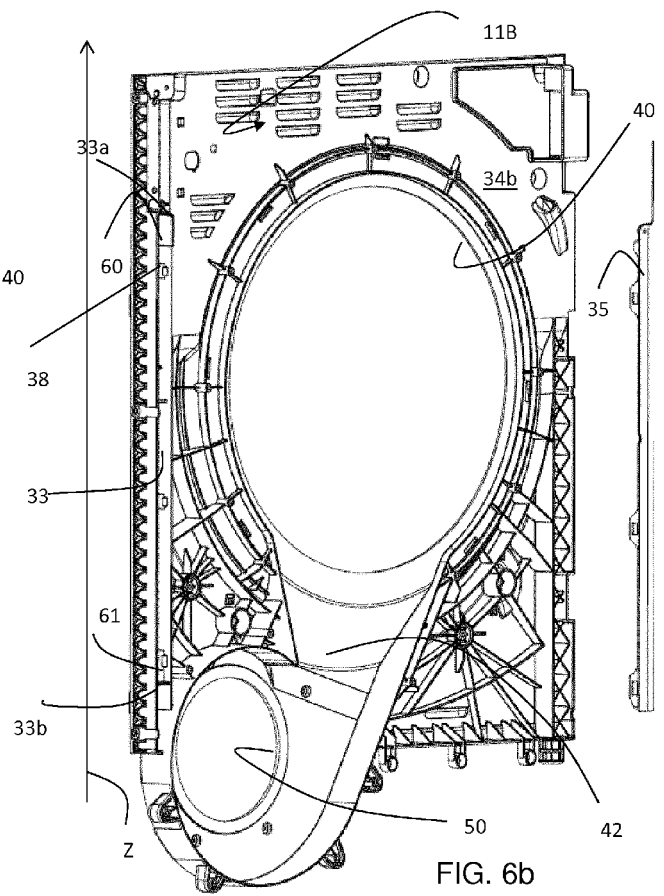
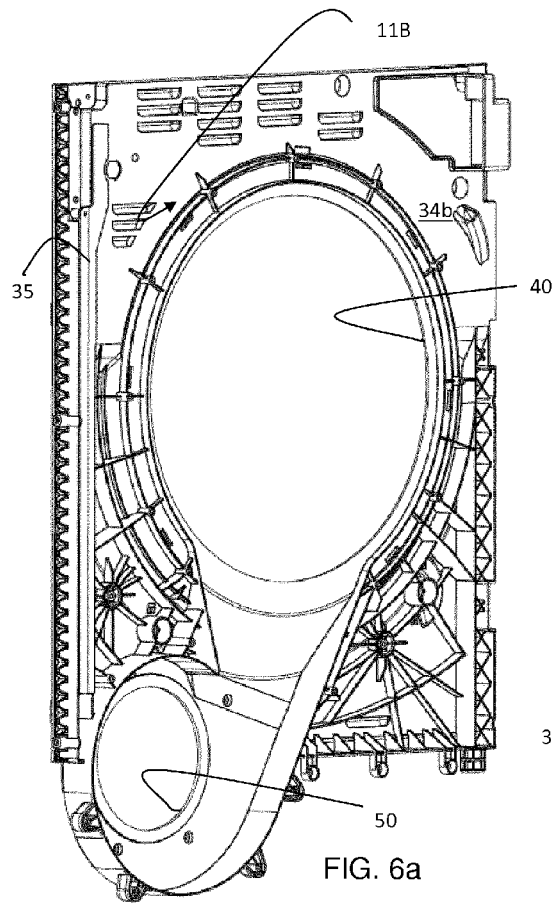
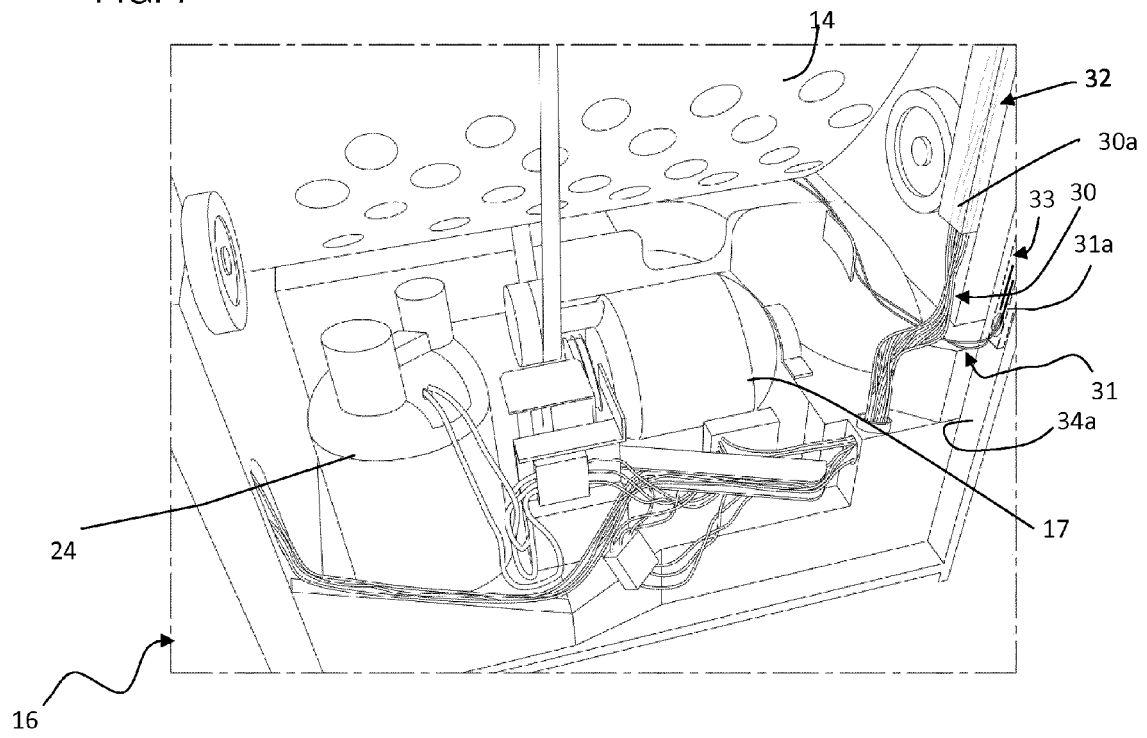


FIG. 7



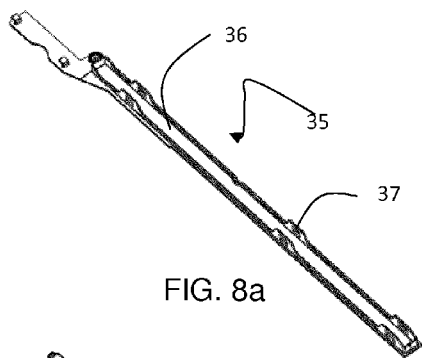


FIG. 8a

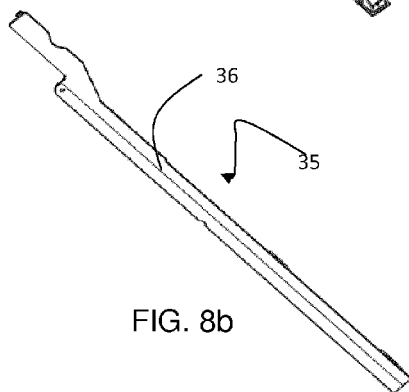


FIG. 8b

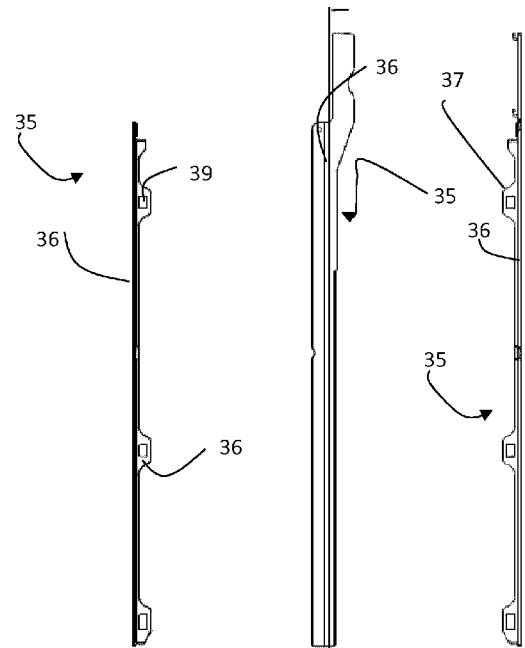


FIG. 8c

FIG. 8d

FIG. 8e

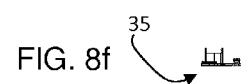


FIG. 8f



EUROPEAN SEARCH REPORT

 Application Number
 EP 15 17 8400

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A	* column 1, lines 36-40, 48-51; figures 4-8 * * column 4, line 37 - column 5, line 40 *	2-9,12,15	D06F58/28 D06F39/12
A	EP 2 397 601 A1 (PAS DEUTSCHLAND GMBH [DE]) 21 December 2011 (2011-12-21) * paragraphs [0051], [0052]; figure 4 *	1-15	
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A	CN 201 082 933 Y (MATSUSHITA ELECTRIC IND CO LTD [JP]) 9 July 2008 (2008-07-09) * figure 7 *	1	
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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 22 September 2015	Examiner Kirner, Katharina
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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EP 15 17 8400

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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