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(54) Laundry treating machine

(57) The present invention relates to a laundry treating machine (1) comprising a casing (2) accommodating a laundry chamber (7) suitable for receiving laundry to be treated and a closing door (8) provided for allowing access to the chamber (7). The machine (1) is provided

with a cover (20) which is connected to the casing (2) by means of at least one hinge (30, 30') so that it can swing between a closed position and an opened position. The hinge (30, 30') is structured for detaching the cover (20) from the casing (2) when the cover (20) swings in a position beyond the opened position.

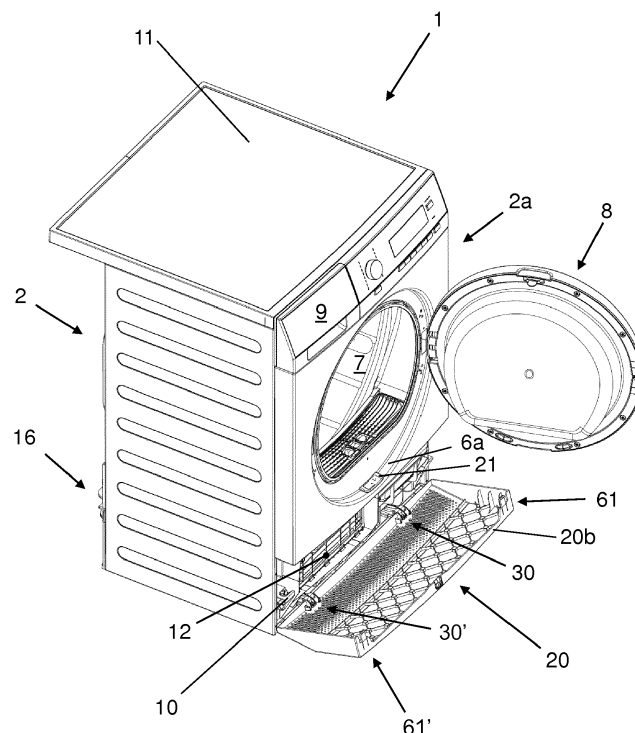


FIG. 2

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns the technical field of laundry treating machines. In particular, the present invention refers to laundry treating machines provided with a cover giving access to internal parts of the machine.

BACKGROUND ART

[0002] Laundry treating machines capable of carrying out a treating process on laundry generally comprise a casing that houses a laundry container, like a rotating drum, where laundry to be treated is received.

[0003] Laundry treating machines may comprise laundry washing machines, laundry drying machine or laundry washing and drying machines, i.e. machines provided for performing articles washing and drying operations in a single machine. Laundry treating machines of known type typically comprise, further to a main door for allowing access to the drum interior region to place laundry to be treated, a cover associated to the casing which may be opened to reach specific parts of the machine arranged inside the casing.

[0004] For example, in laundry washing machine of known type a cover is arranged on the lower part of the front upright side wall of the casing which gives access to the filter of the draining water circuit. The filter may advantageously be removed and cleaned.

[0005] Analogously, in laundry drying machine of condenser type, a cover is typically arranged on the lower part of the front upright side wall of the casing which gives access to a condensing device, like an air-air heat exchanger, or to a water condensing tank. When necessary, the condensing device may, advantageously, be removed and cleaned. Also the tank may be periodically removed and emptied.

[0006] Covers of known type are usually pivotally coupled to the front upright side wall of the machine casing along an horizontal pivoting axis.

[0007] Covers are typically connected to the casing by means of hinges.

[0008] The cover may therefore swing and be displaced between a first, or closed, position and a second, or opened, position. When the cover is in its opened position, it typically projects from the front up-side wall and rests on or close to the floor.

[0009] The covers above described belonging to the known art, however, pose some drawbacks.

[0010] One of such drawbacks lies in that a user may accidentally hit the cover when the latter lies in the open position because in this position the cover protrudes outwardly from the front upright side wall of the machine casing.

[0011] This may cause breaking of the cover and/or breaking of the hinges connecting the cover to the casing,

thus determining maintenance and repairing costs. Furthermore, the user hitting the cover may have physical injury.

[0012] Breaking of the cover, or of the hinges, may also happen when the cover in its opened position is incorrectly used as a shelf and the user accidentally puts heavy items on it.

[0013] This may happen, for example, when a laundry treating machine is placed on top of another laundry treating machine, typically when a laundry drying machine is placed on top of a laundry washing machine. The cover of the laundry drying machine in its opened position, in fact, projects horizontally as a shelf. Also, breaking of the cover may happen if accidentally a child hangs on the cover while it is in its opened position.

[0014] Breaking of a hinge connecting the cover to the casing is particularly frustrating because at least a part of it is formed as a member piece of a more complex component such as the laundry treating machine base, and therefore, such breaking is very often irreparable, unless the whole base is substituted. Another drawback of the cover of known type is represented by the fact that the cover may impede easy maintenance operations when it is required to access to the parts inside the machine even if in its opened position. A user or a maintenance worker has to keep him/herself at a certain distance from the machine so as not to hurt against the cover in its opened position. This position may limit the possibility to access the casing inner part behind the cover. So, it would be desirable to detach the cover from the casing.

[0015] Still another drawback of known covers lies in that the opening rotational movement of the cover itself about its hinges is quite sudden once a lock device keeping the cover in its closed position has been unlocked. This may cause the user to be hit by the cover and/ or the cover to hit the floor thereby damaging its front side.

[0016] The main object of the present invention is therefore to overcome said drawbacks.

[0017] In particular, it is one object of the present invention to provide a laundry treating machine with increased reliability compared to the machines of known type. Another object of the present invention is to provide a laundry treating machine which is safer compared to the machines of known type.

[0018] A further object of the present invention is to provide a laundry treating machine which is more user-friendly compared to the machines of known type.

[0019] Still another object of the invention is to provide a laundry treating machine which can be serviced and/or repaired in an easier manner.

[0020] 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 learned from practice of the invention.

DISCLOSURE OF INVENTION

[0021] The applicant has found that by providing a laundry treating machine comprising a casing accommodating a laundry chamber suitable for receiving laundry to be treated and a closing door provided for allowing access to the chamber, said machine being provided with a cover which is connected to said casing by means of at least one hinge so that it can swing between a closed position and an opened position and wherein said hinge is structured for detaching the cover from the casing without breaking when the cover swings in a position beyond said opened position, is possible to obtain a laundry treating machine having increased reliability compared to the machines of known type. The present invention, therefore, relates to such laundry treating machine.

[0022] In a preferred embodiment of the invention, the hinge comprises at least one elastically deformable portion.

[0023] Advantageously, the hinge comprises one or more cam elements associated to said cover and/or to said casing

[0024] Preferably, the cam elements comprise cam surfaces causing a deformation of the at least one elastically deformable portion when said cover swings from the closed position towards a position beyond said opened position. Advantageously, the at least one elastically deformable portion is deformed substantially along a rotational axis X of the hinge.

[0025] Preferably, the hinge comprises a couple of spaced apart elastically deformable portions whose spacing apart distance gets lower when said cover swings from the closed position towards a position beyond said opened position.

[0026] According to a preferred embodiment of the invention, said cam elements comprise at least one pin and at least a seat arranged for rotatably receiving said pin therein.

[0027] According to a further preferred embodiment of the invention, the cam surfaces are arranged on said pin and/or the seat and/or on a surface surrounding the pin and/or the seat.

[0028] Preferably, the at least one pin disengages the seat wherein it is received when said cover swings in a position beyond said opened position.

[0029] More preferably, the at least one elastically deformable portion comprise a tongue.

[0030] Opportunely, the hinge comprises a first body removably attachable to the casing.

[0031] Preferably, the first body 31 comprises at least one elastically deformable portion.

[0032] Advantageously, the cover gives access to internal parts arranged inside the casing.

[0033] In a preferred embodiment of the invention, the machine further comprises a stopping system structured for stopping the cover in an intermediate position between the closed position and the opened position.

[0034] Preferably, the stopping system comprises at

least one elastic tongue associated to the casing or to the cover and at least one hole associated to the cover or to the casing.

[0035] Advantageously, the cover is associated to an upright side wall of the casing. Preferably, the cover is associated to a bottom portion of the upright side wall. Opportunely, the at least one hinge and/or the cover are made of a polymeric material.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate a possible embodiment of the invention and together with the description serve to explain the principles of the invention. In the drawings, corresponding characteristics and/or components are identified by the same reference numbers. In particular:

- Figure 1 shows a perspective view of a laundry drying machine with a cover in its closed position according to a first preferred embodiment of the invention;
- Figure 2 shows the laundry drying machine of Figure 1 with the cover in the opened position;
- Figure 2A shows an enlarged view of a detail of Figure 2;
- Figure 2B shows a partial plan view from above of Figure 2A;
- Figure 3 shows an exploded view of Figure 2A;
- Figure 4 shows a plan view from above of Figure 3;
- Figure 5 shows a side view of a particular of the machine of Figure 1 with the cover in its closed position;
- Figure 6 shows the particular of Figure 5 with the cover in an intermediate position;
- Figure 7 shows the particular of Figure 5 with the cover in its opened position;
- Figure 8 shows the particular of Figure 5 with the cover in its disconnected position;
- Figure 9 shows a sectional view taken along line IX-IX of Figure 5
- Figure 10 shows a longitudinal sectional view of Figure 5;
- Figure 11 shows a sectional schematic view taken along line XI-XI of Figure 6;
- Figure 12 shows a sectional schematic view taken along line XII-XII of Figure 7;
- Figure 13 shows a sectional schematic view taken along line XIII-XIII of Figure 8;
- Figure 14 shows the laundry drying machine of Figure 1 with the cover in a further operating position;
- Figure 15 shows a sectional schematic view taken along line XV-XV of Figure 14;
- Figure 15A shows an enlarged view of a detail of Figure 15;
- Figure 16 shows a perspective bottom view of the laundry drying machine of Figure 1 with the cover in a partially opened position.

DETAILED DESCRIPTION OF THE INVENTION

[0037] The present invention has proved to be particularly successful when applied to a laundry drying machine of condenser type provided with an air-air heat exchanger and a collecting tank for the condensed water; however it is clear that the present invention can be applied to any type of laundry treating machine, such as laundry washing machines or laundry washing and drying machines, or laundry drying machines of heat pump or vented type having a cover which gives access to internal parts of the machine.

[0038] With reference to Figures 1 and 2 a laundry drying machine 1 according to a first embodiment of the invention is described.

[0039] The laundry drying machine 1, hereinafter referred to as dryer 1, comprises a casing 2 formed by a basement portion 10 from which two couples of upright side walls arranged perpendicularly one another, respectively on the dryer front and rear part, and on the lateral side thereof, extend upwardly. A top portion 11 closes the upper part of the box-like structure formed by the basement 10 and the upright side walls, thereby completing the machine casing 2.

[0040] A laundry container comprising a rotatably drum 7 is provided within the casing 2. A front door 8, pivotally coupled to the front upright side wall 2a, is provided for allowing access to the drum interior region to place laundry to be dried therein.

[0041] The dryer 1 also comprises a hot-air-generating device (not shown) for generating a drying air stream passing through the laundry drum 7 to dry the laundry.

[0042] The dryer 1 of the invention is of the condenser type, i.e. of the type in which drying air is re-circulated through the drum 7 in a closed loop, and comprises a condensing device 12 arranged along the drying air path downstream the laundry drum 7 considering the direction of the drying air flow. The hot air produced by the hot-air-generating device removes moisture from laundry in the drum 7 and the moist air then passes through the condensing device 12.

[0043] The moist air passing through the condensing device 12 is cooled by a separate air cooling flow passing through the condensing device 12 itself. The cooled and dehumidified air is then conveyed again to the drum 7 in a closed loop circuit. Therefore, the condensing device 12 condenses the water vapour of the moist air and the water formed therein is collected in a housing arranged below the condensing device, not illustrated.

[0044] In the preferred embodiment of the invention here described the condensing device 12 comprises an air-air heat exchanger. In a further preferred embodiment of the invention the condensing device may comprise an evaporator of a heat pump. In this case moist air passes the evaporator and is cooled by the evaporator itself. The evaporator condenses the water vapour of the moist air and the water formed therein is collected in a housing arranged below the evaporator. Condensation water

from the collecting housing is preferably conveyed to an extractable moisture tank 9 located at the upper portion of the dryer 1.

[0045] The moisture tank 9 is preferably in the form of a drawer slidably arranged on said upper portion of the dryer 1 so that it can be easily and periodically emptied by a user.

[0046] Condensation water from the collecting housing is conveyed to the extractable moisture tank 9 by means of a water-removing unit, not illustrated, associated to the collecting housing.

[0047] In different embodiments, the moisture tank may be arranged below the condensing device 12, more preferably in the form of a slidable tank.

[0048] The condensing device 12 is preferably arranged on the bottom part 16 of the dryer 1. More preferably the condensing device 12 is received on a basement 10 arranged in a bottom part of the casing 2. The condensing device 12 is preferably slidably arranged on the basement 10 of the dryer 1 so that it can be easily and periodically extracted by a user for its cleaning.

[0049] According to the invention, preferably on the bottom part 16 of the dryer 1, a cover 20 is provided for allowing/preventing access to the condensing device 12.

The cover 20 is usually maintained in a first operating condition, or closed position, as illustrated for example in Figure 1 and Figure 5. In such position the access to the inner operational parts of the machine is prevented.

[0050] The cover 20 is preferably kept locked safely in this position by means of a lock device, not visible in the figures. The lock device may be de-activated in order to allow the opening of the cover 20 by acting on a sliding switch 21 arranged on the casing 2, preferably on an edge 6a of the receiving seat 6 of the door 8. In this case, de-activation of the lock device takes advantageously place only when the door 8 is open.

[0051] In different embodiments, nevertheless, the lock device may be of different type or even absent. In the last, the cover 20 may be kept in its closed position by any possible way, for example by means of a snap-in device.

[0052] When the condensing device 12 has to be extracted for its cleaning, the cover 20 is moved in a second operating condition, or opened position, as illustrated for example in Figure 2 and Figure 7.

[0053] The cover 20, therefore, swings from the closed position to the opened position, and vice-versa.

[0054] For this purpose, the dryer 1 preferably comprises two hinges 30, 30' which connect the cover 20 to the casing 2.

[0055] The two hinges 30, 30' are preferably identical one to the other, apart from the position. For this reason only one of the two hinges 30, 30' will be described in detail hereinafter.

[0056] The hinges 30, 30' allow the cover 20 to be rotated from the closed position to the opened position and, vice-versa, from the opened position to the closed position about a rotation axis X.

[0057] In Figure 6, an intermediate position of the cover 20 between the closed and the opened positions is illustrated.

[0058] According to the present invention, when the cover 20 moves beyond the opened position, as for example illustrated in Figure 8, the cover 20 is safely disconnected from the casing 2.

[0059] With "safely disconnected" it is meant that the cover 20 is detached from the casing 2 without any damaging to its structure or to the casing 2 structure, i.e. without breaking, as will be better described later.

[0060] It is clear that the cover 20 may be moved beyond the maximum opened position if the dryer 1 does not rest on the floor. As illustrated in Figure 8, in fact, the cover 20 may move beyond the opened position when the dryer 1 is positioned on top of another appliance, for example on top of a laundry washing machine. Once the cover 20 has been safely detached, it may be advantageously re-attached to the casing 2 thus integrally restoring its functionality. Advantageously, if someone accidentally puts heavy items on the cover 20 when it is in its opened position or hits the cover 20, as in Figure 7, the cover 20 safely detaches from the casing 2, without any damaging. Analogously, if accidentally a child hangs on the cover 20, the cover 20 safely detaches from the casing 2 without any damaging.

[0061] Furthermore, even if the cover 20 is in its opened position it could be an obstacle to the removal of the condensing device 12, or an obstacle to further maintenance operations inside the casing. In this case, advantageously, the cover 20 may be preferably intentionally detached from the casing 2 by rotating it beyond the maximum opened position and re-attached when operations are concluded.

[0062] The same advantages above mentioned may be obtained in different embodiments in which the cover opens differently, for example when the cover is connected to the casing with hinges positioned vertically so that the cover swings with respect to a vertical axis instead of a horizontal axis.

[0063] In this case, if the user accidentally hits the cover, the cover is safely detached from the casing without damaging of the cover or the hinges and without any physical injury for the user.

[0064] Furthermore, the cover may be still intentionally detached from the casing through its rotation beyond the opened position.

[0065] Hereinafter, construction and functioning of a preferred embodiment of the hinge 30 according to the invention is described.

[0066] The hinge 30 preferably comprises a first body 31 which is removably connected to the casing 2, preferably on the basement portion 10 thereof. The first body 31 is advantageously connected to the casing 2 through its insertion along an insertion direction A (Figures 4 and 10), into a receiving seat 32 opportunely realized on the basement 10 of the casing 2, as illustrated in Figure 2B. The first body 31 is preferably slidably arranged in the

receiving seat 32 and here maintained by means of a blocking tongue 33 realized at an end 31a of the first body 31, as better visible in Figure 10. In this way, the first body 31 may be easily attached or detached from the casing 2. This facilitates mounting and/or substitution of the first body 31. It is clear that in different embodiments the connection of the first body to the casing may be obtained in any other ways, for example by means of screws, adhesives, snap-in fasteners, etc..

[0067] The hinge 30 comprises a first couple of pins 35, 36, arranged at a free end 31b of the first body 31, which are received in respective seats 37, 38 projecting from the lower edge 20a of the cover 20 on a back side thereof.

[0068] The two pins 35, 36, hereinafter indicated as the first pin 35 and the second pin 36, are substantially aligned along a main axis X, which coincides with the rotation axis X of the cover 20 around the casing 2. The first and the second pin 35, 36 are preferably cylindrically shaped and are formed on respective elastically deformable portions 39, 40 of the main body 31. Such portions 39, 40 are preferably embodied as first and second tongues.

[0069] The first and the second pin 35, 36 protrude from respective sloped surfaces 39a, 40a of the first and the second tongues 39, 40, as better visible in Figure 4. Surfaces 39a, 40a are inclined relative to the rotational axis X and they are convergent along the direction of insertion (arrow A in Figures 4 and 10) of the first body 31 into the receiving seat 32. The provision of sloped surfaces 39a, 40a configures the first and the second tongues 39, 40 as cam elements.

[0070] The tongues 39, 40, as better described later, can elastically deform so that they may move, without breaking, substantially in the direction of the main axis X. Analogously, the two seats 37, 38, hereinafter indicated as the first seat 37 and the second seat 38, are substantially aligned along the main axis X.

[0071] The first and the second seat 37, 38 are surrounded by sloped surfaces 41a, 42a which face the sloped surfaces 39a, 40a of the first and the second tongues 39, 40. Surfaces 41a, 42a are inclined relative to the rotational axis X and also relative to surfaces 39a, 40a. Surfaces 41a, 42a, as viewed when the cover 20 is in its closed position, are divergent along the direction of insertion (arrow A in Figures 4 and 10) of the first body 31 into the receiving seat 32. In this way when cover 20 rotates relative to the first body 31, surfaces 41a, 42a interfere with surfaces 39a, 40a.

[0072] The sloped surfaces 39a, 40a and 41a, 42a of cam elements 39, 40 and 37, 38, respectively, form cam surfaces whose effect on the first and the second tongues 39, 40 when moving the cover 20 from its closed position to its opened position and beyond the latter will be described in greater detail here below. In different embodiments not illustrated in the Figures, the sloped surfaces may be formed only either on the elastically deformable portions 39, 40 or on a region surrounding the first and

the second seat 37, 38. In that case the sloped surfaces rest, i.e. abut, on substantially flat surfaces.

[0073] The hinge 30 further comprises a second couple of pins 45, 46 formed on respective tongues 49, 50 projecting from the lower edge 20a of the cover 20 on a back side thereof. The pins 45, 46 are received in respective seats 47, 48 realized at the free end 31b of the first body 31.

[0074] The two pins 45, 46, hereinafter indicated as the third pin 45 and the fourth pin 46, are substantially aligned along the main axis X.

[0075] The tongues 49, 50, as better described later, are elastically deformable so that they may move, without breaking, substantially in the direction of the main axis X.

[0076] Analogously, the two seats 47, 48, hereinafter indicated as the third seat 47 and the fourth seat 48, are substantially aligned along the main axis X.

[0077] The third and the fourth pin 45, 46 and/or the third and the fourth seats 47, 48 define respective cam elements each having a cam surface 45a, 46a; 47a, 48a which is eccentric with respect to the main axis X. For example, an eccentric cam surface relative the main axis X may be formed on pins 45, 46 while seats 47, 48 may comprise a surface having a constant radius of curvature, i.e. a portion of cylindrical surface. The effect of such cam elements on tongues 49, 50 when moving the cover 20 from its closed position to its opened position and beyond the latter will be described in greater detail here below. According to an alternative embodiment not shown in the Figures, in a region surrounding the third and the fourth pin 45, 46 and/or in a region surrounding the third and the fourth seats 47, 48, a cam surface like a sloped surface may be provided so as to deform the elastically deformable elements 49, 50 while the cover 20 moves from the closed position towards the open position and beyond the latter.

[0078] With reference to Figures from 5 to 13, the operation of the hinge 30 is hereinafter described.

[0079] When the cover 20 is in its closed position (Figures 5 and 9), the first and the second pins 35, 36 are received in the first and the second seats 37, 38 and the third and the fourth pins 45, 46 are received in the third and the fourth seats 37, 38.

[0080] The sloped surfaces 41a, 42a of the first and the second seats 37, 38 face the sloped surfaces 39a, 40a of the first and the second tongues 39, 40 and the cam surfaces 45a, 46a; 47a, 48a provided respectively on the third and the fourth pins 45, 46 and/or on the third and the fourth seats 47, 48 are in contact with each other.

[0081] When the cover 20 is moved towards its opened position, as illustrated in the intermediate position of Figures 6 and 11, the cover 20 rotates about the main axis X.

[0082] The sloped surfaces 41a, 42a of the first and the second seats 37, 38 come into contact with the sloped surfaces 39a, 40a of the first and the second tongues 39, 40 causing deflection of the first and the second tongues 39, 40 which move along the main axis X towards tongues 49, 50, as indicated with dashed lines in Figure 11.

[0083] Analogously, the eccentric cam surfaces 45a, 46a; 47a, 48a provided respectively on the third and the fourth pins 45, 46 and/or on the third and the fourth seats 47, 48 interfere one with the other causing deflection of the tongues 49, 50 which move along the main axis X towards tongues 39, 40, as indicated with dashed lines in Figure 11. In this way, the distance that spaces apart tongue 39 from tongue 49 and tongue 40 from tongue 50, when the cover 20 is in the closed position, gets lower while the cover 20 swings towards a position beyond said opened position.

[0084] When the cover 20 is further moved in its opened position, as illustrated in Figures 7 and 12, interference between the sloped surfaces 41a, 42a, 39a, 40a and the cam surfaces 47a, 48a, 45a, 46a increases while deflection of the tongues 39, 40, 49, 50 increases accordingly.

[0085] Nevertheless, the first and the second pins 35, 36 are still partially received in the first and the second seats 37, 38 and the third and the fourth pins 45, 46 are still partially received in the third and the fourth seats 37, 38.

[0086] The cover 20, therefore, is still connected to the casing 20.

[0087] When the cover 20 is moved beyond its opened position, as illustrated in Figures 8 and 13, interference between the sloped surfaces 41a, 42a, 39a, 40a and the cam surfaces 47a, 48a, 45a, 46a increases until the first and the second pins 45, 46 come out from the first and the second seats 37, 38 and the third and the fourth pins 45, 46 come out from the third and the fourth seats 47, 48.

[0088] The cover 20, therefore, is safely detached from the casing 2 without any breaking or damage to the hinge, cover or casing structure.

[0089] The cover 20 may be easily re-attached to the casing 2 by forcing the pins 35, 36, 45, 46 in the respective seats 37, 38, 47, 48 thanks to the elasticity of the tongues 39, 40, 49, 50.

[0090] With reference to figures from 14 to 16 a further aspect of the invention is described.

[0091] The dryer 1, in fact, is further provided with a stopping system 60 which prevents the cover 20 to fall down immediately due its weight when the opening operation starts, in particular when the sliding switch 21 is moved to de-activate the lock device.

[0092] The cover 20, in fact, under its weight could fall down and contacting heavily the floor. This may cause scratching on the outer surface of the cover 20 and also damaging of the cover 20 and/or of the hinges 30, 30'.

[0093] The stopping system 60 stops the cover 20 in a safe position, as indicate in Figures 14 and 15.

[0094] The stopping system 60 preferably comprises a couple of elastic stopping tongues 61, 61', both better visible in Figure 2, which are arranged on the top edge 20b of the cover 20. In the closed position of the cover 20, the stopping tongues 61, 61' are received in respective holes, only one 62 of them visible in Figures 15 and 16.

[0095] When the cover 20 from its closed position moves towards its opened position, the stopping tongue 61 abuts against a front edge 62a of the hole 62, as illustrated in the detail of Figure 15A. The cover 20 is therefore prevented from falling down and remains in a safe position comprised between the closed and the opened position of the cover 20.

[0096] The opening operation of the cover 20 may continue after intervention of the user which may slightly deform the tongues 61, 61' thus pushing them out of the holes 62. The cover 20 may then be carefully moved towards the opened position by the user.

[0097] In different embodiments the stopping system may be subjected to variations, for example only one stopping tongue may be provided in any position along the top edge of the cover. Further, at least one stopping tongue may be provided in the casing which is received in a respective hole on the cover.

[0098] Advantageously, the cover 20 and/or the hinge 30 of the invention are made of a plastic, i.e. polymeric material, more preferably made with an injection moulding process.

[0099] It has thus been shown that the present invention allows all the set objects to be achieved. In particular, it makes it possible to obtain a laundry treating machine with increased reliability compared to the machines of known type.

[0100] Clearly, changes may be made to the cover and the treating machine as described herein. For example, the cover could be positioned in any lateral side of the machine and it could open rotating about an axis with any desired direction other than the horizontal one as here described.

[0101] Furthermore, the hinge here described advantageously comprises two couples of pins and two respective couples of seats. In different embodiments, nevertheless, the number of pins and seats may be different, even just one pin and one seat. Although an illustrative embodiment of the present invention have been described herein with reference to the accompany drawings, it is to be understood that the present invention is not limited to the specific embodiment illustrated and described herein, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope of the invention. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

Claims

1. A laundry treating machine (1) comprising a casing (2) accommodating a laundry chamber (7) suitable for receiving laundry to be treated and a closing door (8) provided for allowing access to the chamber (7), said machine (1) being provided with a cover (20) which is connected to said casing (2) by means of

at least one hinge (30, 30') so that it can swing between a closed position and an opened position; **characterized in that** said hinge (30, 30') is structured for detaching the cover (20) from the casing (2) without breaking when the cover (20) swings in a position beyond said opened position.

2. A machine (1) according to claim 1, **characterized in that** said hinge (30, 30') comprises at least one elastically deformable portion (37, 38, 39, 40).

3. A machine (1) according to any preceding claim, **characterized in that** said hinge (30, 30') comprises one or more cam elements (37, 38; 39, 40; 45, 46; 47, 48) associated to said cover (20) and/or to said casing (2).

4. A machine (1) according to claim 2 and 3, **characterized in that** said cam elements (37, 38; 39, 40; 45, 46; 47, 48) comprise cam surfaces (39a, 40a, 41a, 42a, 45a, 46a, 47a, 48a) causing a deformation of said at least one elastically deformable portion (37, 38, 39, 40) when said cover (20) swings from the closed position towards a position beyond said opened position.

5. A machine (1) according to claim 4, **characterized in that** said at least one elastically deformable portion (37, 38, 39, 40) is deformed substantially along a rotational axis (X) of the hinge (30, 30').

6. A machine (1) according to claim 5, **characterized by** comprising a couple of spaced apart elastically deformable portions (37, 38, 39, 40) whose spacing apart distance gets lower when said cover (20) swings from the closed position towards a position beyond said opened position.

7. A machine (1) according to any claim 3 to 6, **characterized in that** said cam elements comprise at least one pin (35, 36, 45, 46) and at least a seat (37, 38, 47, 48) arranged for rotatably receiving said pin (35, 36, 45, 46) therein.

8. A machine (1) according to any claim 4 to 6 and claim 7, **characterized in that** said cam surfaces (39a, 40a, 41a, 42a, 45a, 46a, 47a, 48a) are arranged on the pin (35, 36, 45, 46) and/or the seat (37, 38, 47, 48) and/or on a surface surrounding the pin (35, 36, 45, 46) and/or the seat (37, 38, 47, 48).

9. A machine (1) according to claim 7 or 8, **characterized in that** said at least one pin (35, 36, 45, 46) disengages the seat (37, 38, 39, 40) wherein it is received when said cover (20) swings in a position beyond said opened position.

10. A machine (1) according to any claim dependent to

claim 2, **characterized in that** said at least one elastically deformable portion (37, 38, 39, 40) comprise a tongue.

11. A machine (1) according to any preceding claim, **characterized in that** said hinge (30, 30') comprises a first body (31) removably attachable to said casing (2). 5
12. A machine (1) according to claim 11, **characterized in that** the first body (31) comprises at least one elastically deformable portion (39, 40). 10
13. A machine (1) according to any preceding claim, **characterized in that** it further comprises a stopping system (60) structured for stopping said cover (20) in an intermediate position between said closed position and said opened position. 15
14. A machine (1) according to claim 13, **characterized in that** said stopping system (60) comprises at least one elastic tongue (61, 61') associated to said casing (2) or to said cover (20) and at least one hole (62) associated to said cover (20) or to said casing (2). 20
15. A machine (1) according to any preceding claim, **characterized in that** said cover (20) is associated to an upright side wall (2a) or to a basement portion (10) of said casing (2). 25

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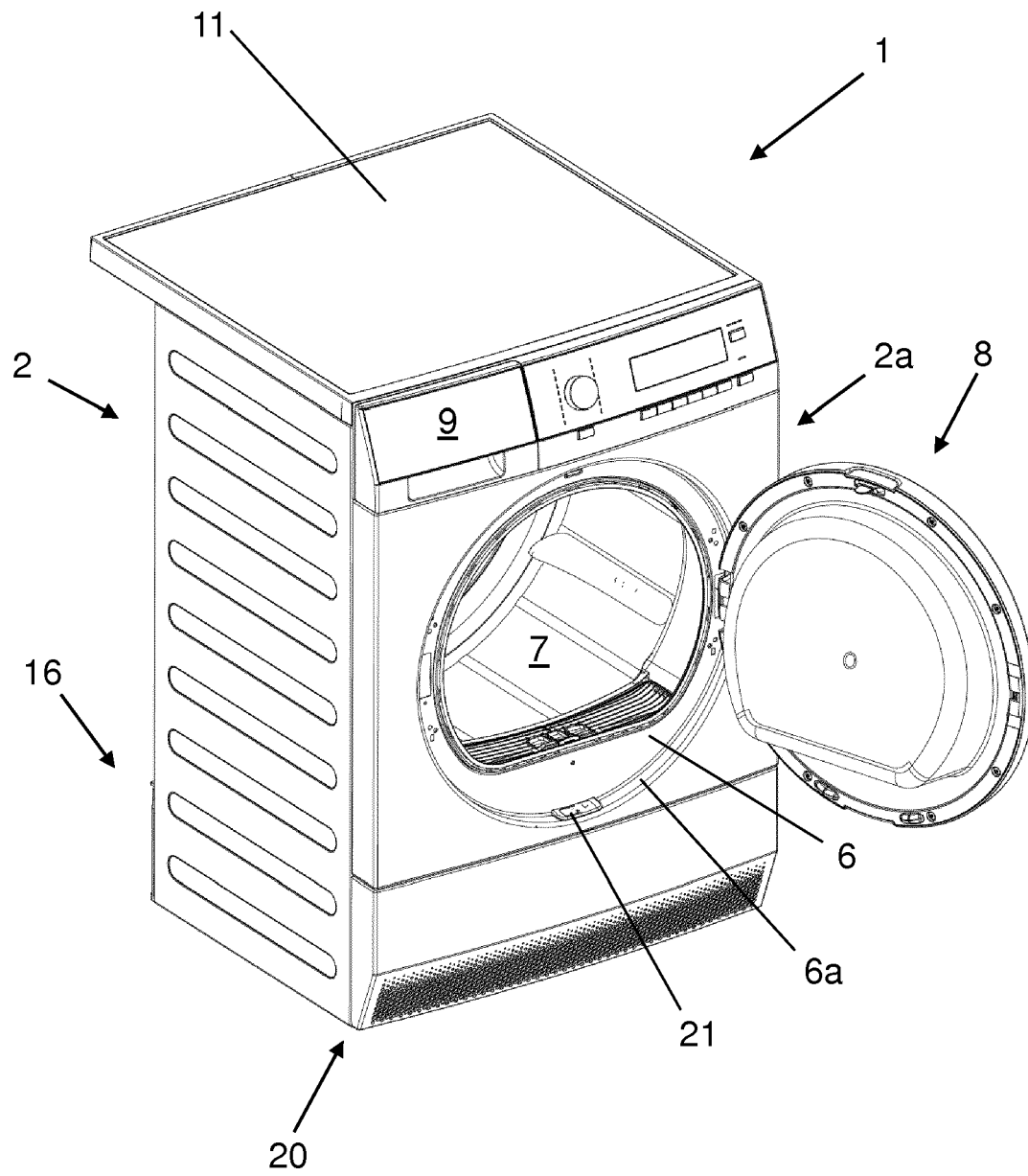


FIG. 1

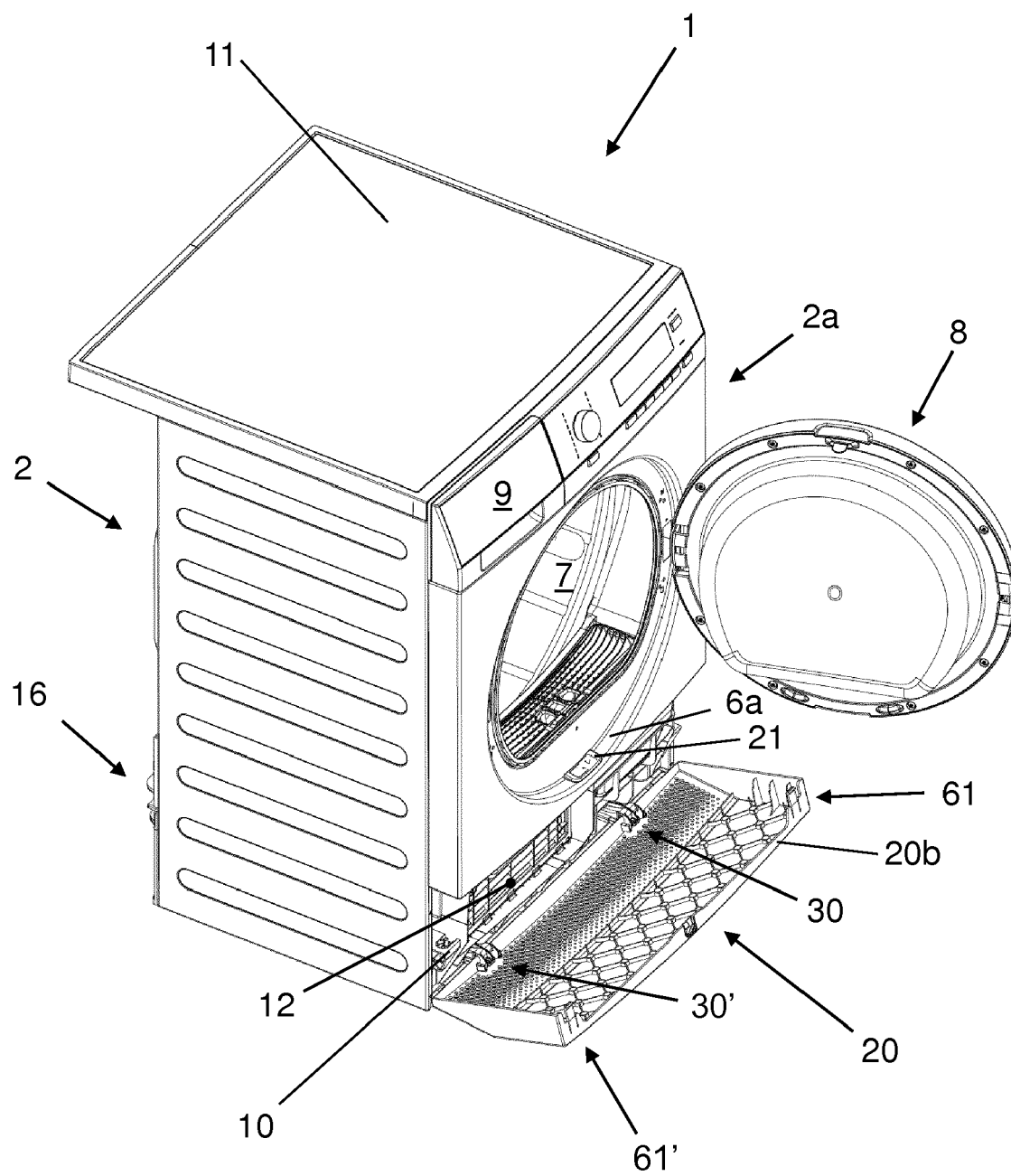
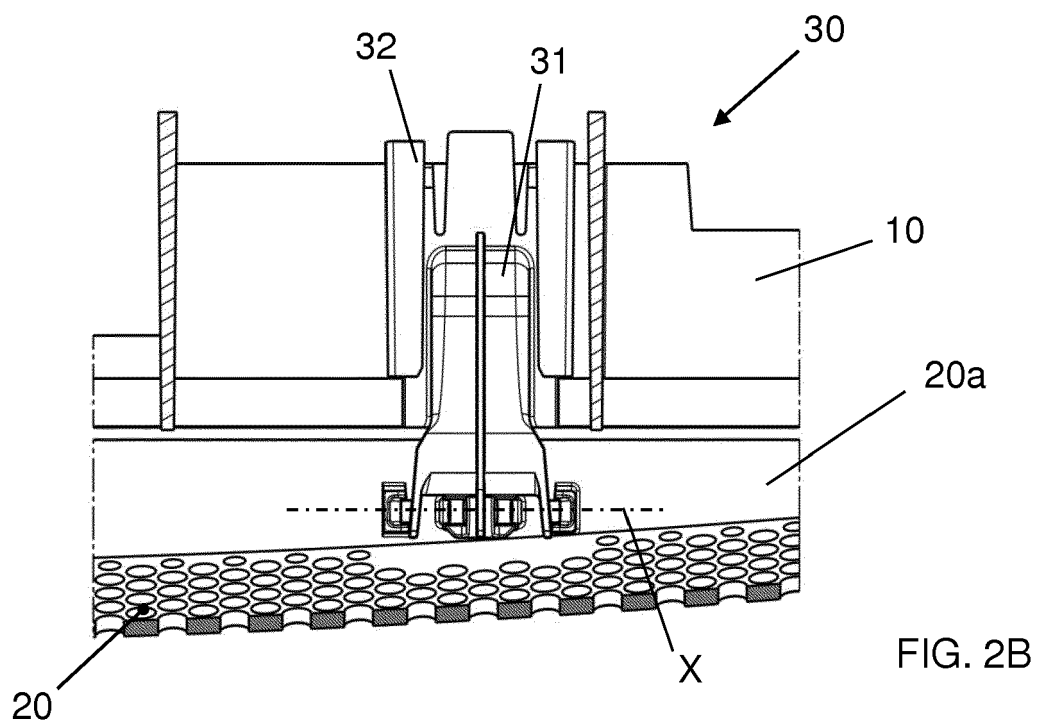
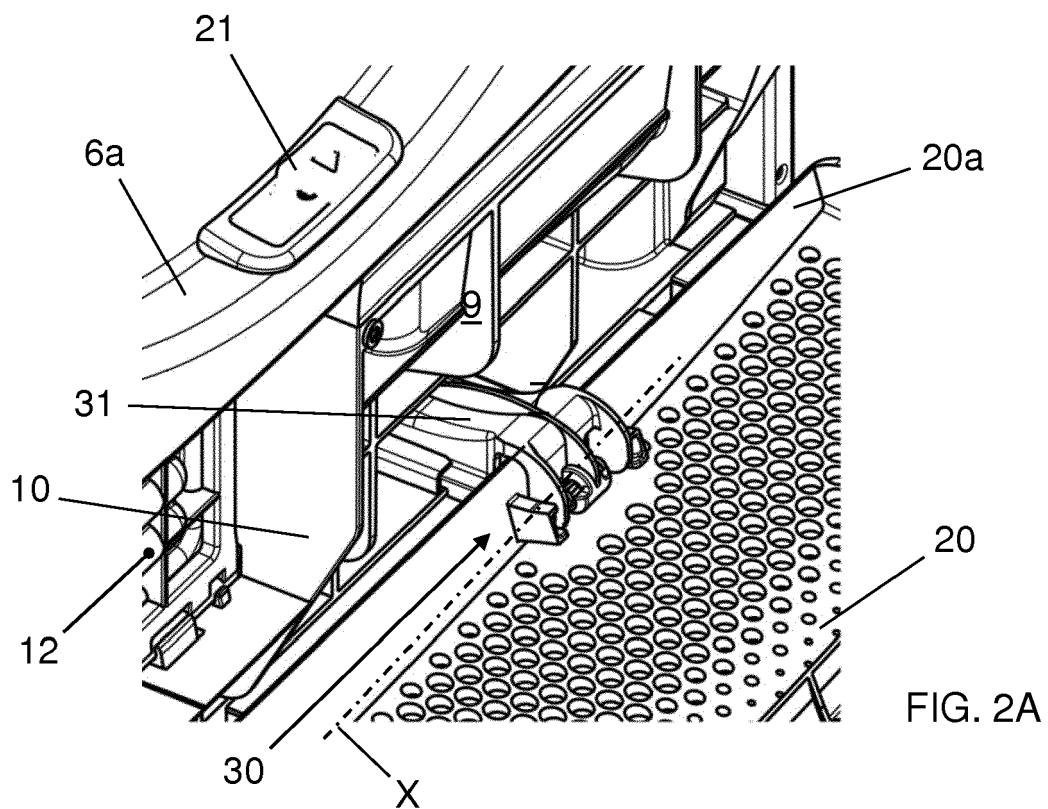
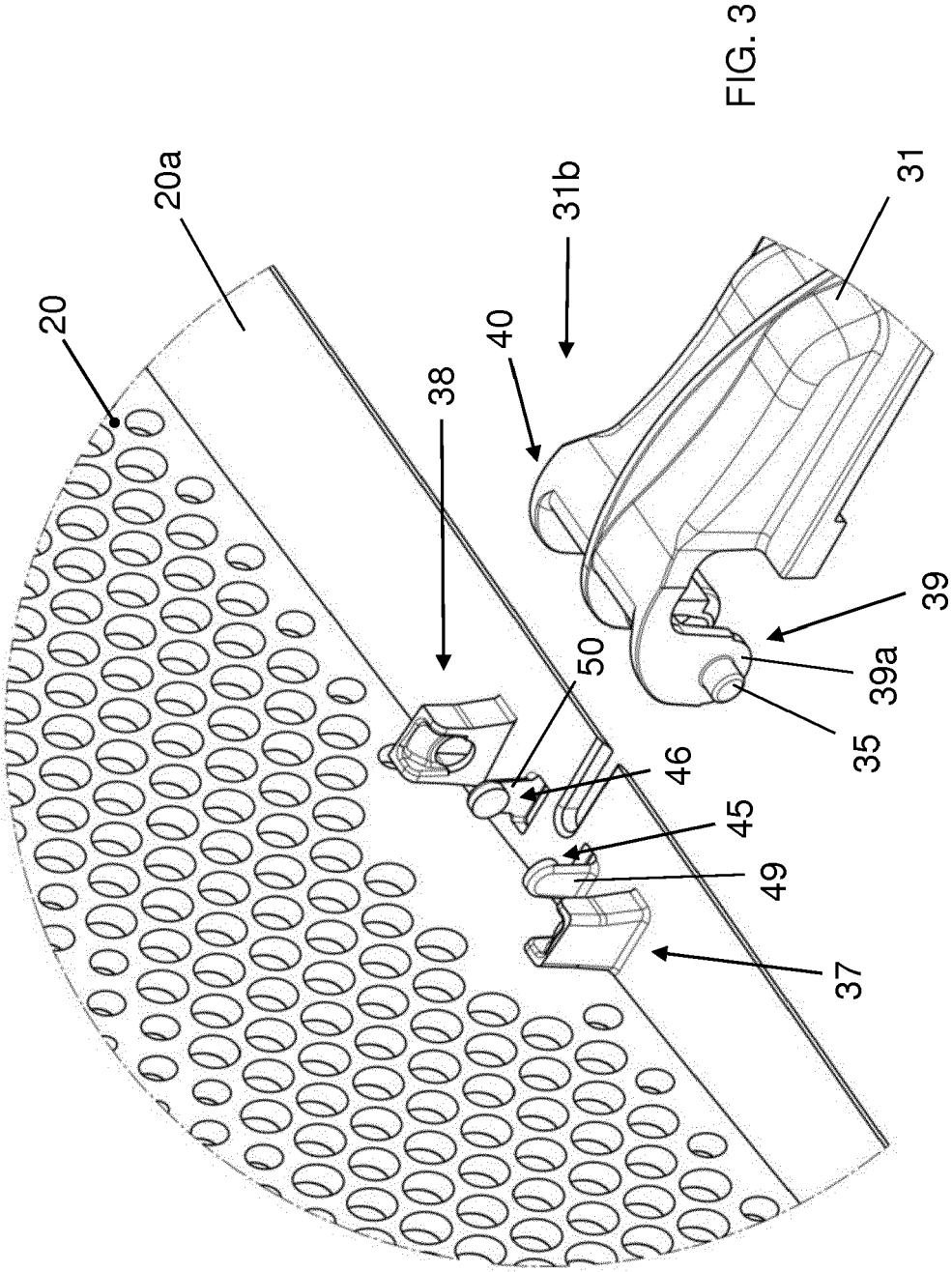


FIG. 2





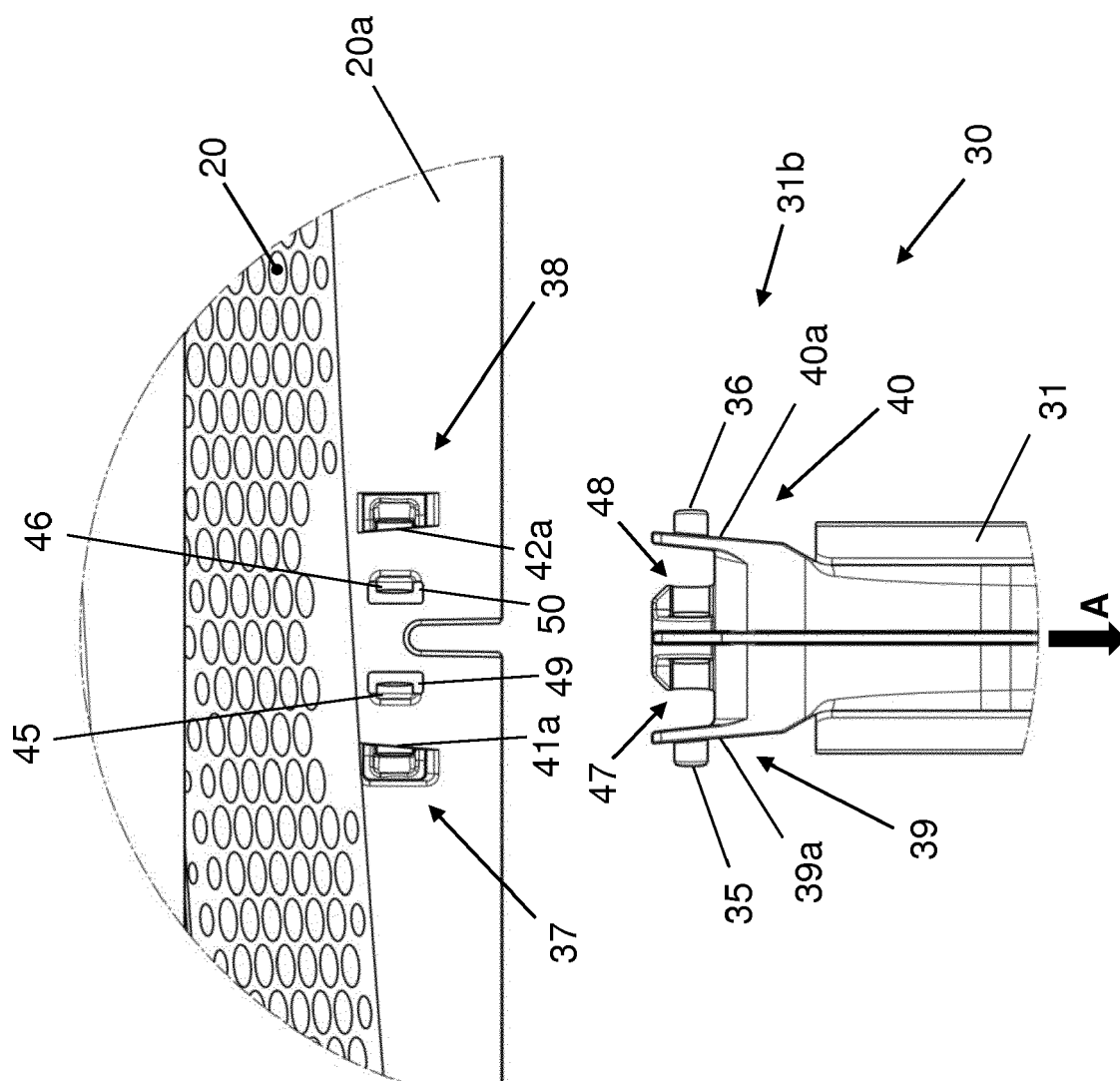
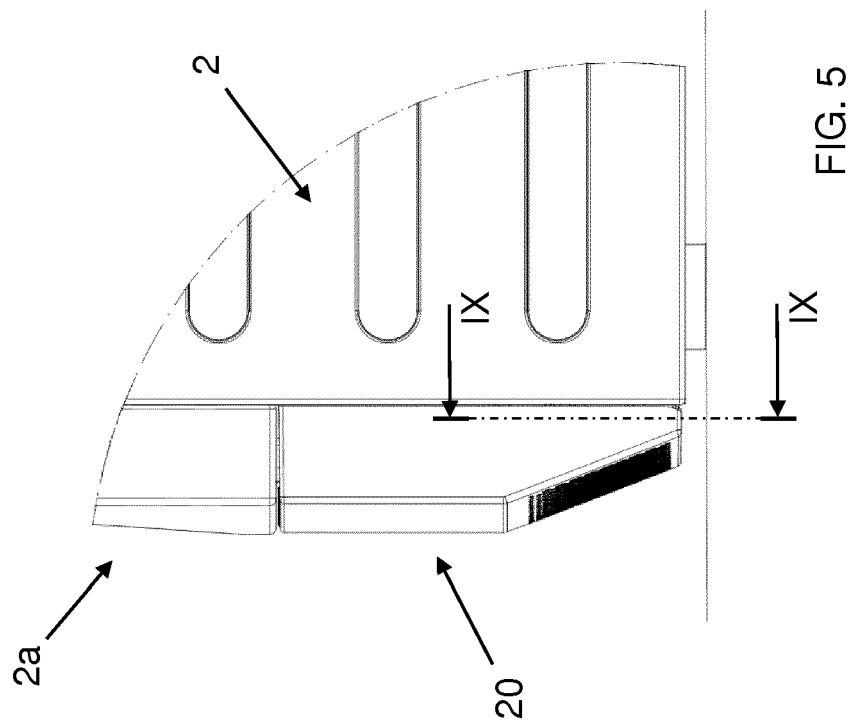
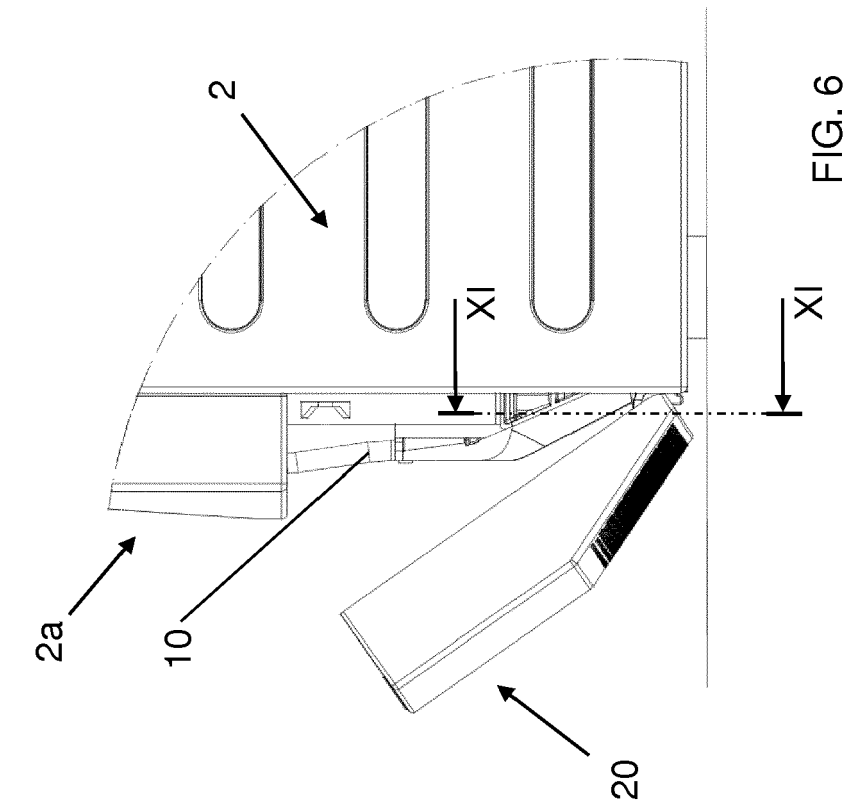
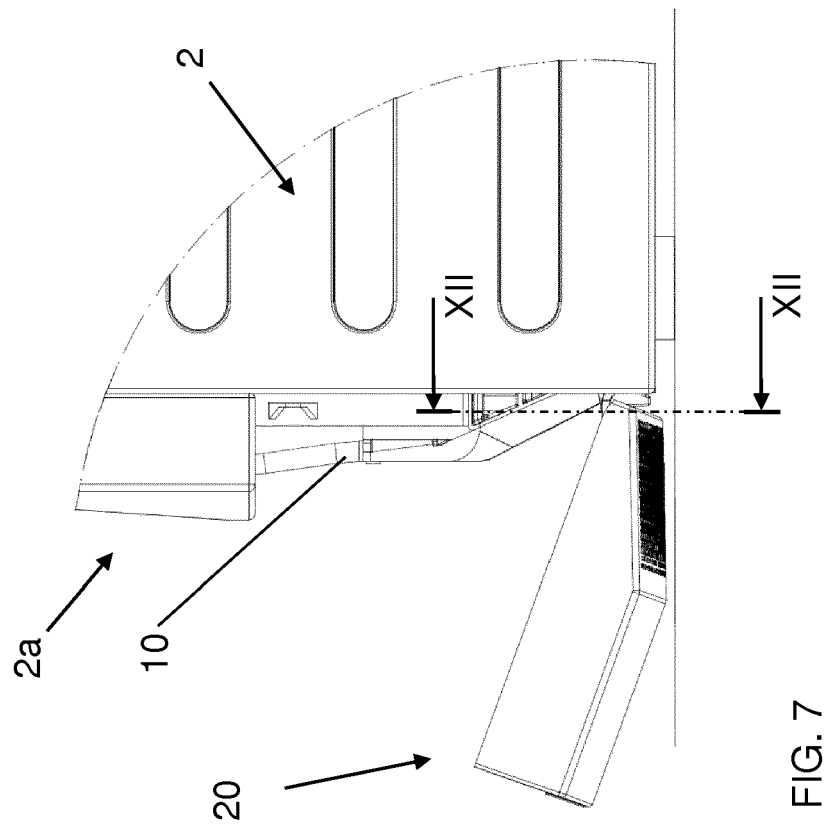
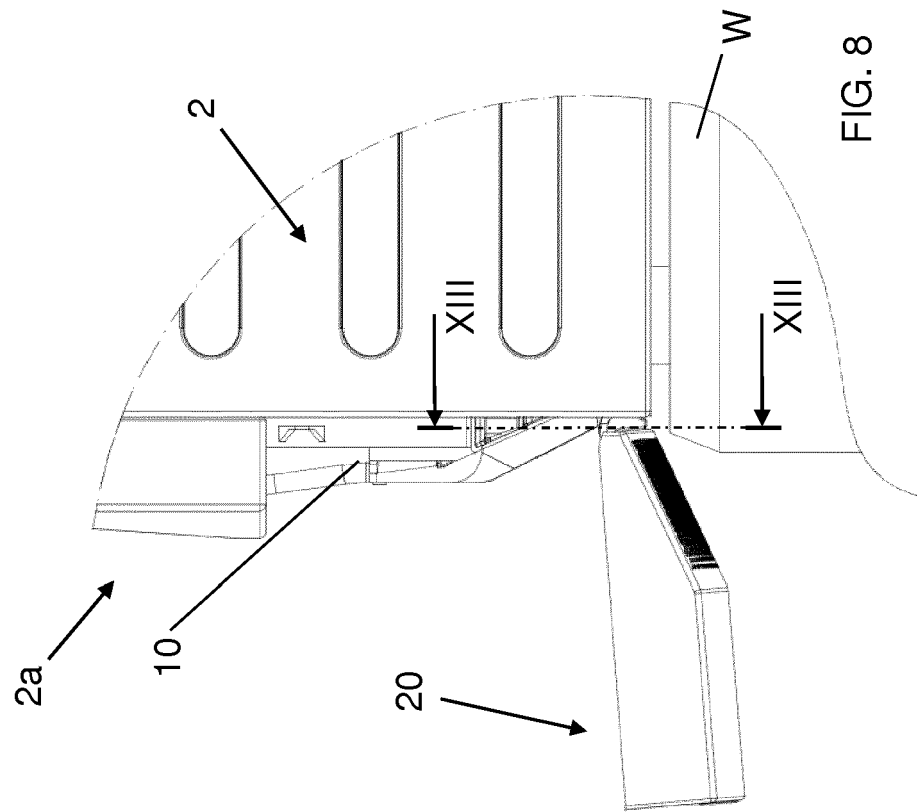


FIG. 4





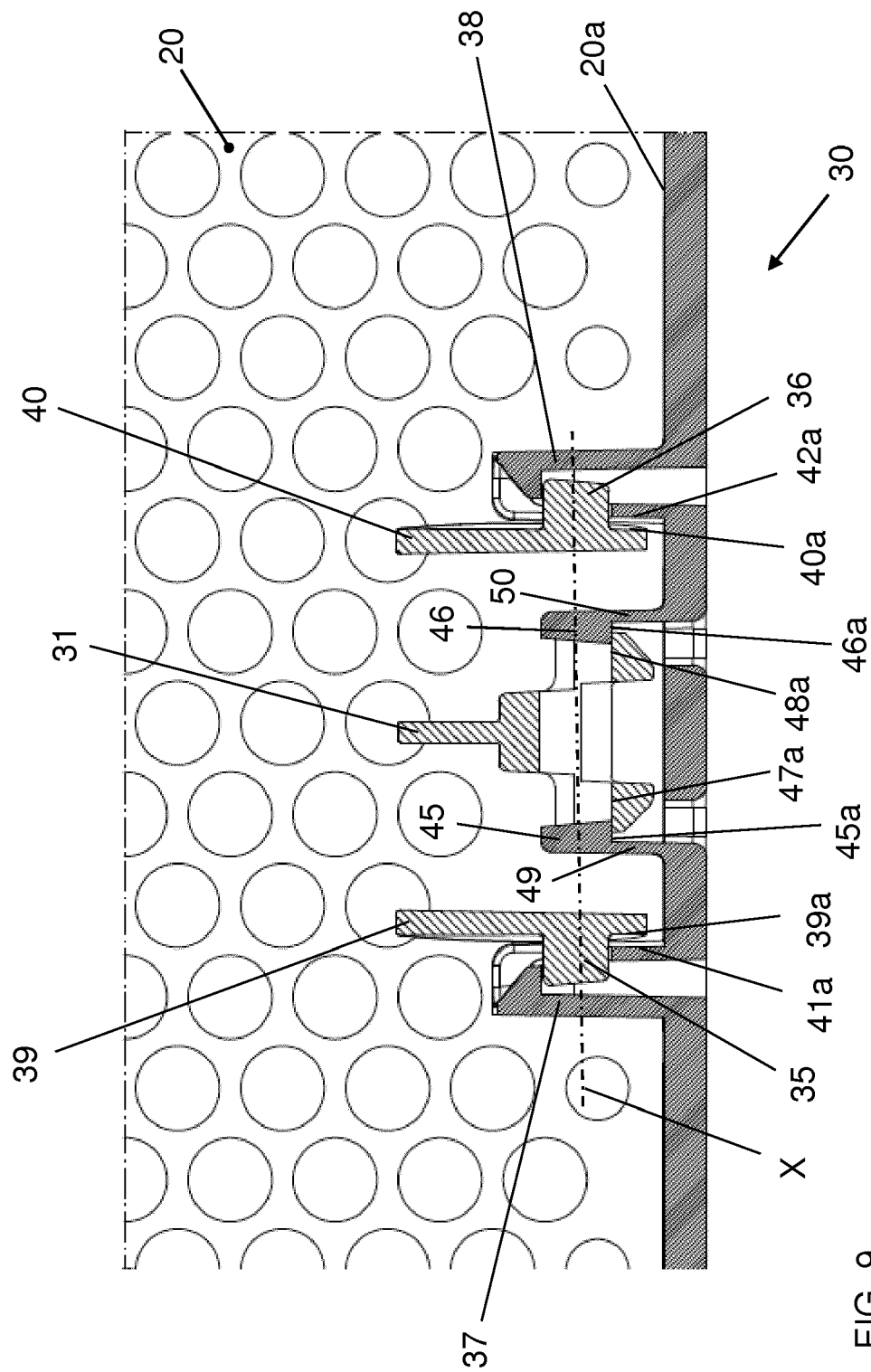


FIG. 9

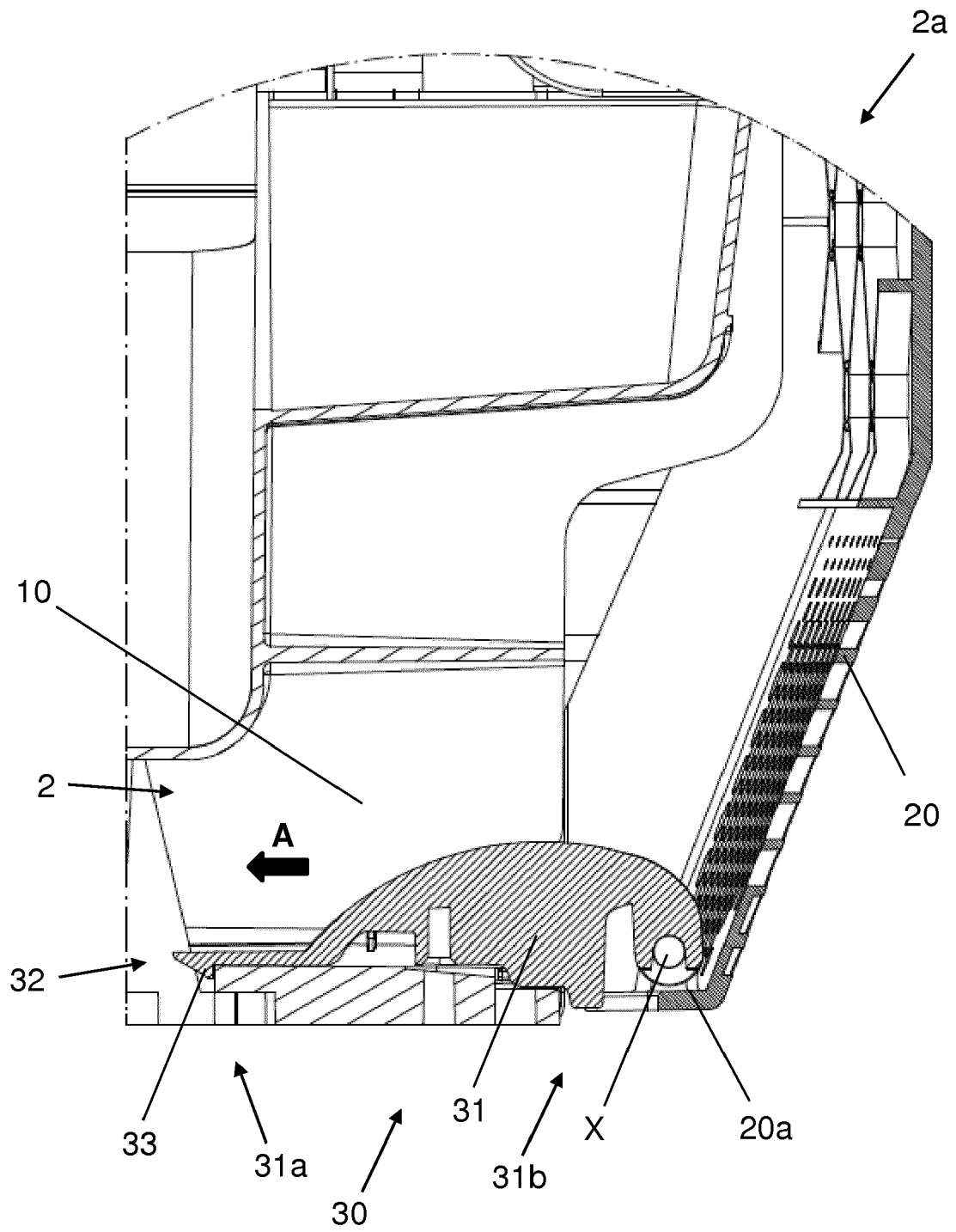


FIG. 10

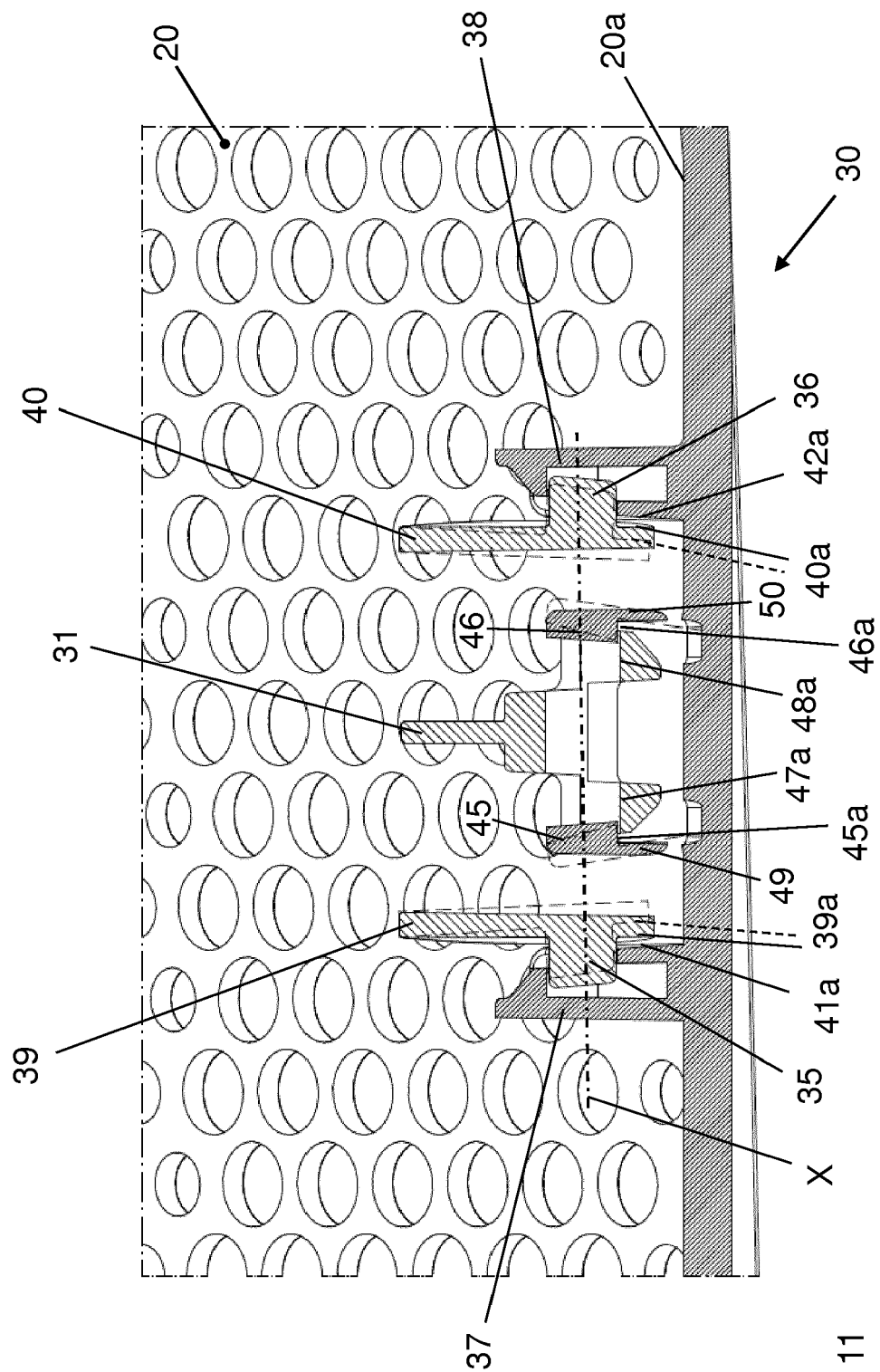


FIG. 11

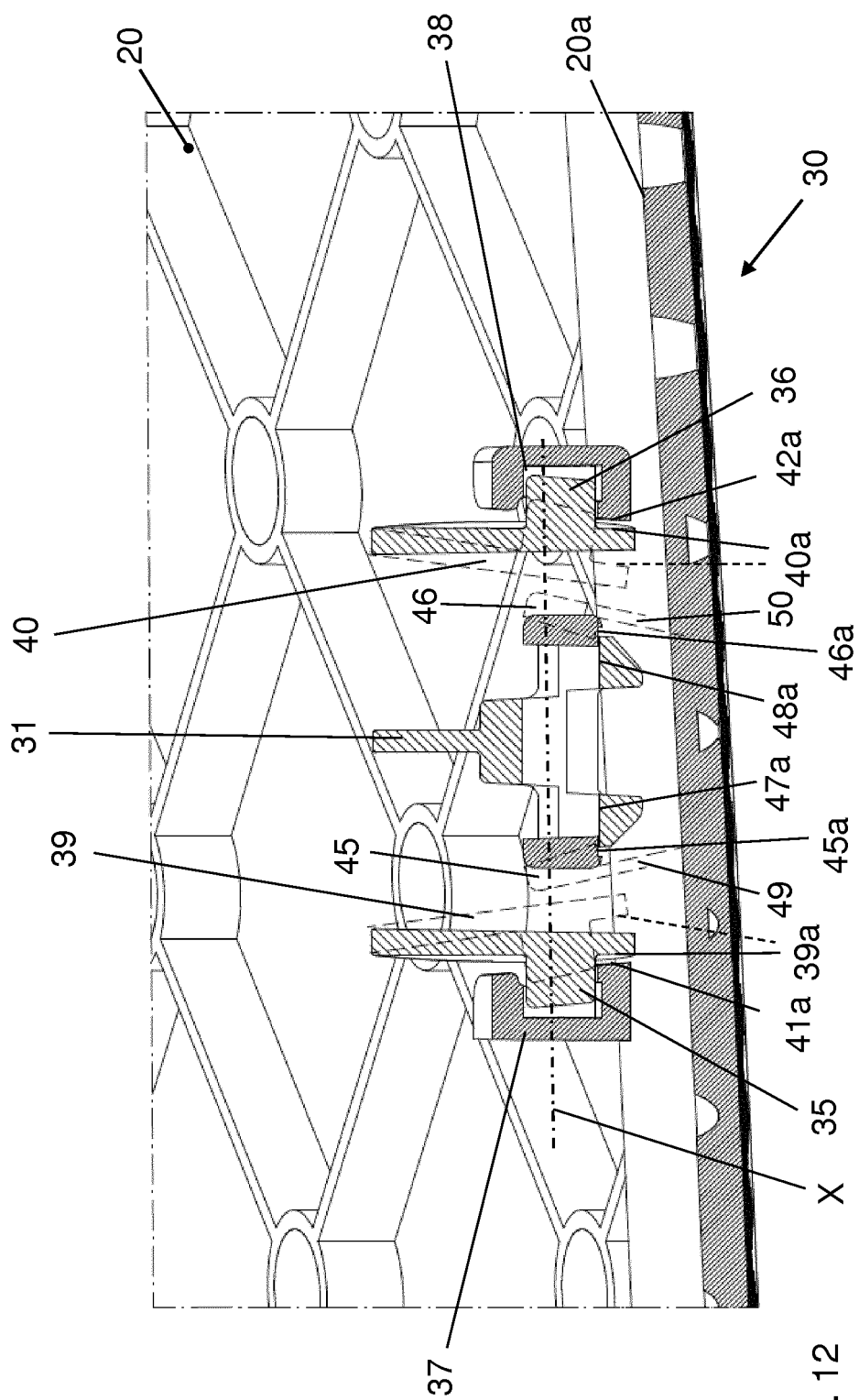


FIG. 12

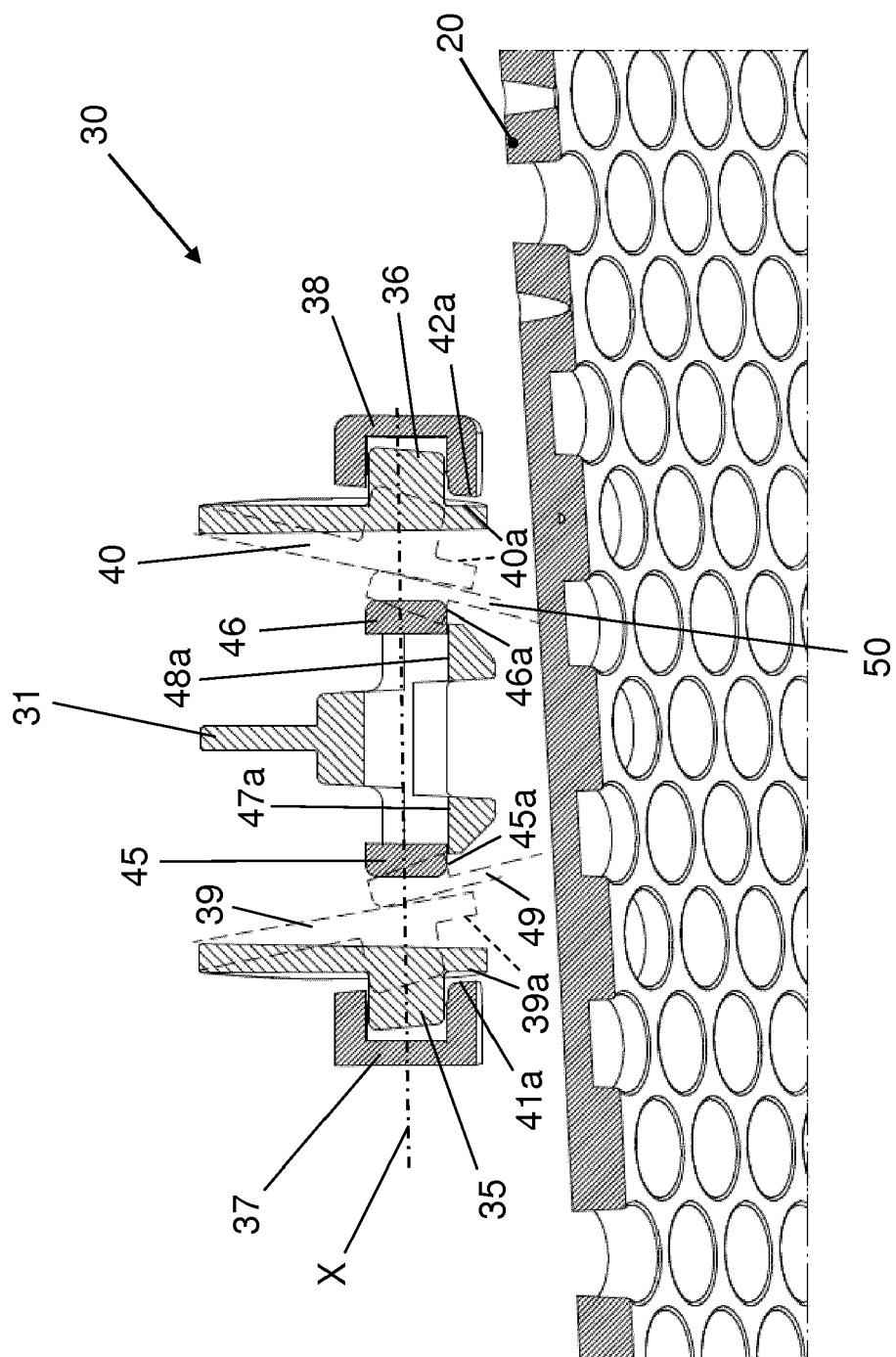


FIG. 13

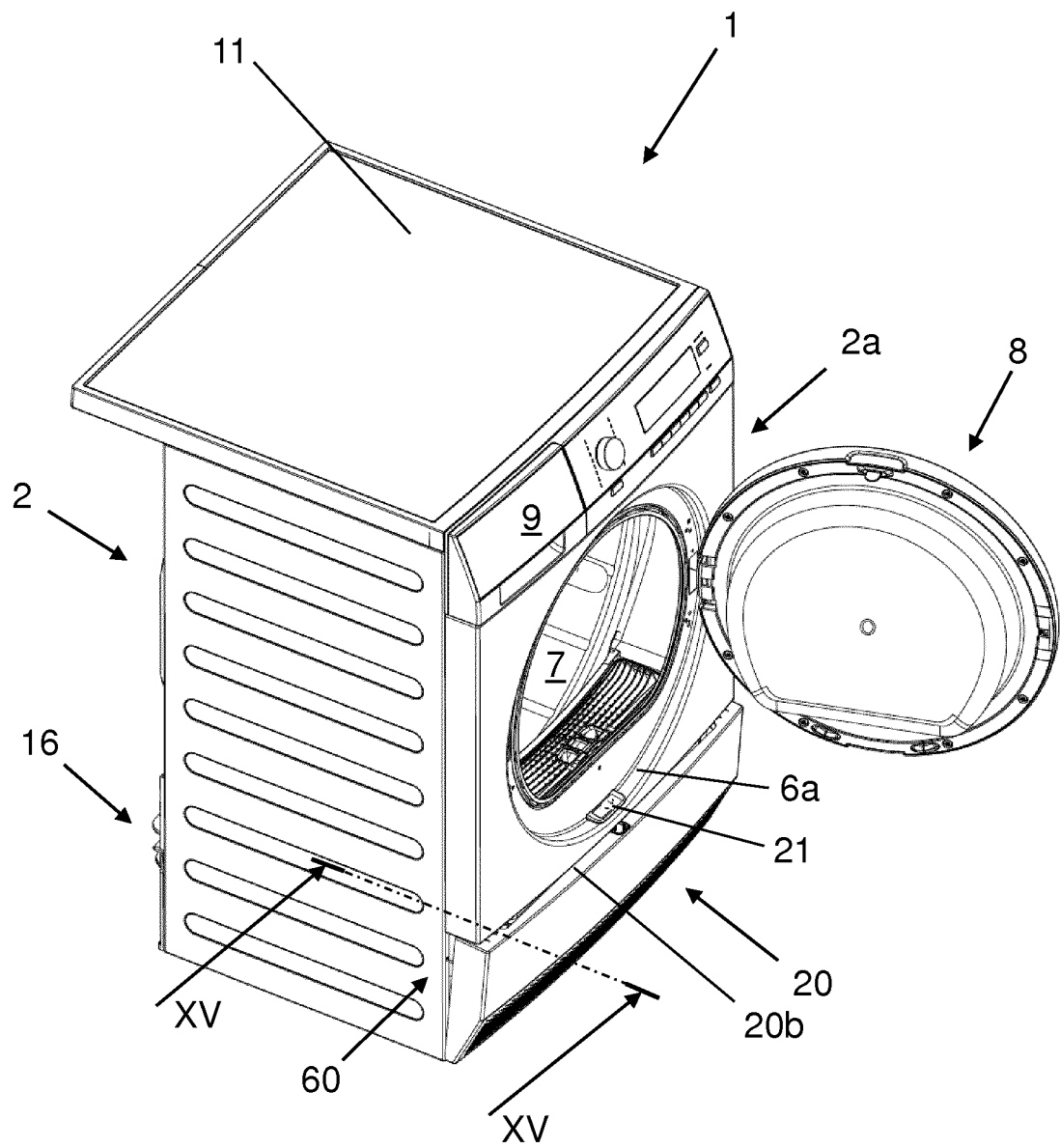


FIG. 14

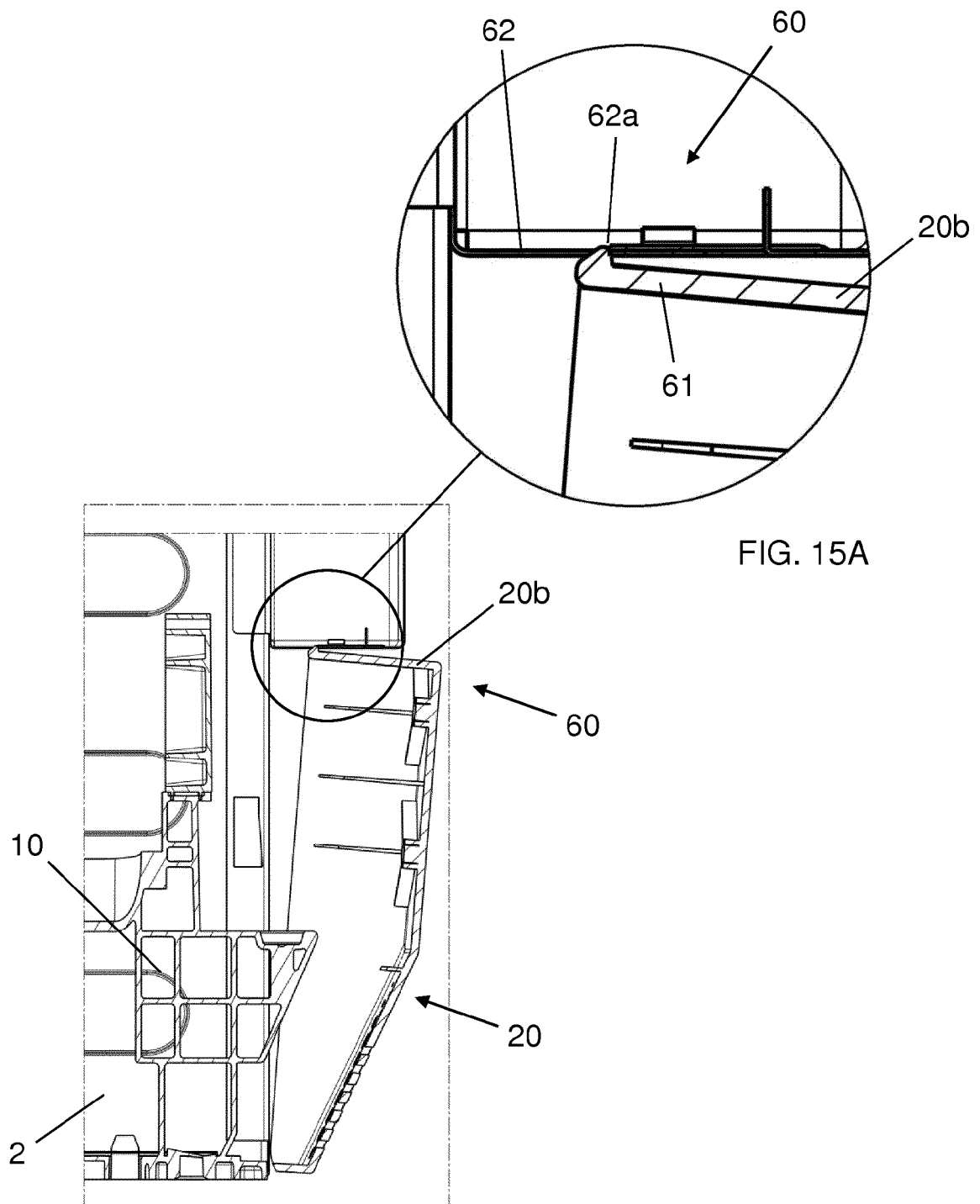


FIG. 15

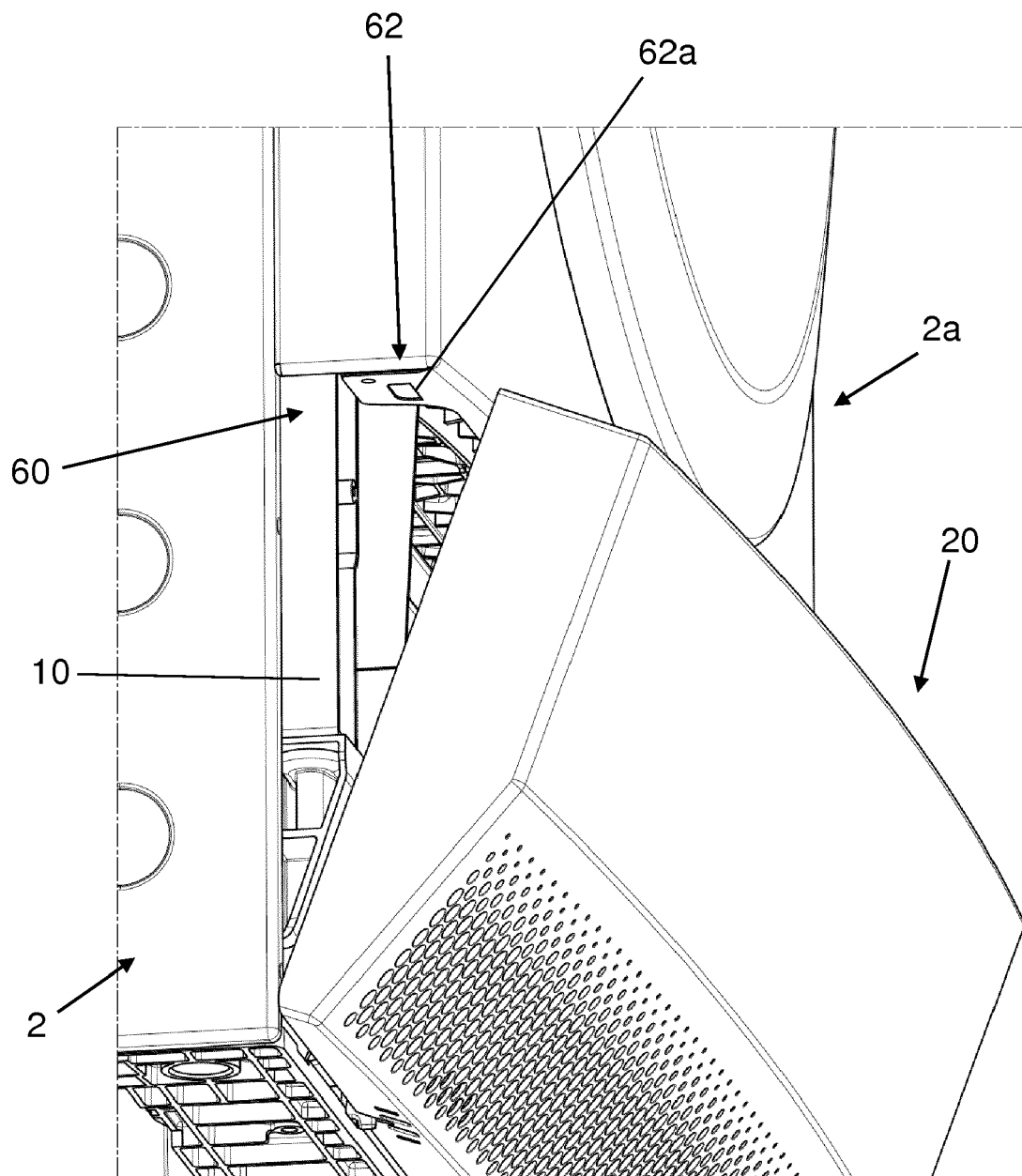


FIG. 16



EUROPEAN SEARCH REPORT

Application Number
EP 12 18 2601

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 3 191995 A (MATSUSHITA ELECTRIC IND CO LTD) 21 August 1991 (1991-08-21)	1,2	INV. D06F39/14
Y	* abstract; figures 1,2 *	3-15	

Y	US 2009/229316 A1 (YOO SANG HEE [KR] ET AL) 17 September 2009 (2009-09-17)	3-15	
	* page 4, paragraph 76 - paragraph 86; figures 4-6 *		

			TECHNICAL FIELDS SEARCHED (IPC)
			D06F A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 January 2013	Examiner Engelhardt, Helmut
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 18 2601

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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14-01-2013

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		US 2009229316 A1	17-09-2009