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(54) VENTILATION PLATE FOR A LAUNDRY APPLIANCE

(57) A ventilation plate (22) for an appliance (10) includes a plate body (24) that has a first surface (92) and an opposing second surface (94). An outer rim (28) is defined by the first surface (92) and the opposing second surface (94). A plurality of holes (30) is defined along the first surface (92). A plurality of supplemental apertures (32) is positioned between the outer rim (28) and the plurality of holes (30) along the first surface (92) and is configured to minimize lint accumulation between the outer rim (28) and the plurality of holes (30). The plurality of holes (30) and the plurality of supplemental apertures (32) extend through the first and second surfaces (92, 94).

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Description

BACKGROUND OF THE DISCLOSURE

[0001] The present disclosure generally relates to a ventilation plate for a laundry appliance, and more specifically, to a plurality of extruded apertures for a ventilation plate.

SUMMARY OF THE DISCLOSURE

[0002] According to one aspect of the present disclosure, a laundry appliance includes a cabinet that has a rear wall that defines an opening. The cabinet includes a seal that is coupled to the rear wall. A drum is disposed within the cabinet. A ventilation plate is operably coupled to the drum that is proximate to the rear wall of the cabinet. The ventilation plate includes a plate body including a central portion and an outer rim. A plurality of holes is defined on the central portion of the plate body. A plurality of supplemental extruded apertures is positioned between the plurality of holes and the outer rim.

[0003] According to another aspect of the present disclosure, a ventilation plate for an appliance includes a plate body that has a first surface and an opposing second surface. An outer rim is defined by the first surface and the opposing second surface. A plurality of holes is defined along the first surface. A plurality of supplemental apertures is defined between the outer rim and the plurality of holes along the first surface and is configured to minimize lint accumulation between the outer rim and the plurality of holes. The plurality of holes and the plurality of supplemental apertures extend through the first and second surfaces.

[0004] According to yet another aspect of the present disclosure, a laundry appliance includes a cabinet that has a rear wall and a seal that is operably coupled to the rear wall. A drum is disposed within a body and defines a cavity. A plate is disposed within the cavity and is coupled to the drum. The plate defines a plurality of holes and a plurality of extruded apertures that are disposed around the plurality of holes. The plurality of extended apertures are configured to minimize lint accumulation.

[0005] These and other features, advantages, and objects of the present disclosure will be further understood and appreciated by those skilled in the art by reference to the following specification, claims, and appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] In the drawings:

FIG. 1 is a front perspective view of a laundry appliance of the present disclosure, with a lint filter shown removed;
FIG. 2 is a side cross-sectional view of a laundry appliance of the present disclosure;
FIG. 3 is a partial exploded view of a laundry appliance of the present disclosure including a ventilation plate;
FIG. 4 is a rear perspective exploded view of a drum and a ventilation plate of the present disclosure;
FIG. 5A is a front perspective view of a first surface of a ventilation plate of the present disclosure;
FIG. 5B is a rear perspective view of a second surface of the ventilation plate of FIG. 5A;
FIG. 6 is a side cross-sectional view of the ventilation plate of FIG. 5A, taken along line VI-VI;
FIG. 7 is an enlarged partial cross-sectional view of a hole of the present disclosure taken at area VII in FIG. 6;
FIG. 8 is an enlarged partial perspective view of an aspect of an extruded aperture of the present disclosure;
FIG. 9 is a side cross-sectional view of a laundry appliance of the present disclosure with an airflow directed from a heater into a drum;
FIG. 10 is an enlarged partial side cross-sectional view of an extruded aperture of FIG. 9, taken at area X;
FIG. 11 is an enlarged partial side cross-sectional view of a ventilation plate of the present disclosure with an embossed feature; and
FIG. 12 is an enlarged partial side cross-sectional view of the ventilation plate of FIG. 11 with the embossed feature formed into an extruded aperture.

[0007] The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles described herein.

DETAILED DESCRIPTION

[0008] The present illustrated embodiments reside primarily in combinations of method steps and apparatus components related to a ventilation plate. Accordingly, the apparatus components and method steps have been represented, where appropriate, by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein. Further, like numerals in the description and drawings represent like elements.

[0009] For purposes of description herein, the terms "upper," "lower," "right," "left," "rear," "front," "vertical," "horizontal," and derivatives thereof shall relate to the disclosure as oriented in FIG. 1. Unless stated otherwise, the term "front" shall refer to the surface of the element closer to an intended viewer, and the term "rear" shall refer to the surface of the element further from the intended viewer. However, it is to be understood that the disclosure may assume various alternative orientations, except where expressly specified to the contrary. It is

also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following specification are simply exemplary embodiments of the inventive concepts defined in the appended claims. Hence, specific dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting, unless the claims expressly state otherwise.

[0010] The terms "including," "comprises," "comprising," or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element proceeded by "comprises a ..." does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises the element.

[0011] Referring to FIGS. 1-12, reference numeral 10 generally designates a laundry appliance that includes a cabinet 12 having a rear wall 14 and that defines an opening 16. The cabinet 12 includes a seal 18 coupled to the rear wall 14, and a drum 20 is disposed within the cabinet 12. A ventilation plate 22 is operably coupled to the drum 20 proximate to the rear wall 14 of the cabinet 12. The ventilation plate 22 includes a plate body 24 that includes a central portion 26 and an outer rim 28. The ventilation plate 22 also includes a plurality of holes 30 defined on the central portion 26 of the plate body 24. A plurality of supplemental extruded apertures 32 are defined within the plate body 24 and positioned between the plurality of holes 30 and the outer rim 28.

[0012] Referring to FIGS. 1-3, the laundry appliance 10 includes the cabinet 12 that has a front panel 40 and an opposing rear panel 42 proximate to the rear wall 14. As illustrated in FIG. 1, the laundry appliance 10 is a front-load, horizontal-axis appliance. In addition, the laundry appliance 10 may be a combination washer and dryer. A door 44 is operably coupled to the front panel 40 of the laundry appliance 10 and is operable between opened and closed positions. The door 44 may be a flat panel door, a fishbowl style door, or a combination thereof. The door 44 is configured to provide access to the drum 20 positioned within the cabinet 12 when the door 44 is in the open position and encloses the drum 20 when the door 44 is in the closed position.

[0013] The drum 20 is disposed within the cabinet 12 and includes a body 46 that is generally positioned proximate to the rear wall 14 of the cabinet 12. The body 46 defines an access opening 48 into an inner cavity 50 defined by the body 46. The body 46 also defines a slot 52 in which a lint filter 54 can be disposed. Typically, as a user's clothing items are rotated and tumbled within the drum 20 of the laundry appliance 10, the clothing items may release fabric particles in the form of lint. The lint is generally collected on the lint filter 54 disposed within the slot 52 defined by the drum 20. A portion of the lint can pass through the ventilation plate 22, such that a small amount of accumulated lint is typically expelled proximate to the seal 18, as described in further detail below.

[0014] As generally mentioned above, the rear panel 42 of the cabinet 12 is proximate to the rear wall 14 of the cabinet 12. The rear wall 14 is disposed within the cabinet 12 between the body 46 of the drum 20 and the rear panel 42. The rear wall 14 is typically concealed by the rear panel 42 and the front panel 40, as well as the other panels that define the cabinet 12. A space 60 can be defined between the rear wall 14 and the rear panel 42, and a heater 62 can be disposed within the space 60.

[0015] With further reference to FIGS. 1-3, the rear wall 14 generally separates the heater 62 from the drum 20, such that the rear wall 14 can form a barrier between the heater 62 and the drum 20. The heater 62 includes a fan 64 and an elongated portion 66 that defines a channel 68. The elongated portion 66 is operably coupled to the rear wall 14 and is generally disposed around the opening 16 defined by the rear wall 14. Additionally or alternatively, the elongated portion 66 is positioned adjacent to the opening 16 to direct airflow 70 from the heater 62 toward the drum 20, rather than being coupled to the rear wall 14. As will be described in more detail below, the heater 62 generates the heated airflow 70 that passes through the channel 68 defined by the elongated portion 66 and into the drum 20 via the ventilation plate 22.

[0016] With reference to FIGS. 2-4, the seal 18 is disposed around an engagement portion 80 of the rear wall 14, which defines the opening 16. The engagement portion 80 includes an attachment feature 82 in addition to the seal 18, such that the seal 18 is disposed around the attachment feature 82 and the opening 16 to define the engagement portion 80. It is generally contemplated that the seal 18 and the engagement portion 80 can both have a generally circular shape that corresponds with the shape of the ventilation plate 22. However, it is also contemplated that the seal 18 and the engagement portion 80 may be rectangular, triangular, star, or any other shape generally known in the art.

[0017] The attachment feature 82 can be centrally disposed within the engagement portion 80 of the rear wall 14 proximate to the opening 16. The attachment feature 82 is configured to couple the ventilation plate 22 to the rear wall 14, such that the ventilation plate 22 selectively engages the seal 18. The seal 18 is disposed proximate to the central portion 26 of the plate body 24. The seal 18 generally seals with the ventilation plate 22, such that the airflow is generally retained along the central portion 26 of the plate body 24 by the seal 18.

[0018] The seal 18 can be formed from an elastically deformable and heat resistant material, such as silicone, that is generally flexible and pliable. It is contemplated that the seal 18 may be formed from other materials generally known in the art. The flexibility of the seal 18 is configured to, in part, accommodate the various movements of the drum 20 within the cabinet 12 during a laun-

dry cycle. By way of example, not limitation, the ventilation plate 22 engages the seal 18 during the laundry cycle in response to the rotation, and other movements of the drum 20 within the cabinet 12 relative to the rear wall 14.

[0019] Referring to FIGS. 1-4 and as mentioned above, the drum 20 includes the body 46 that includes a posterior surface 84 proximate to the rear wall 14 of the cabinet 12, in addition to the inner cavity 50 defined by the body 46. The body 46 of the drum 20 includes a baffle 86 operably coupled to an interior wall 87 of the body 46. The baffle 86 is configured to alter the rotation or general movement of clothing items within the inner cavity 50 of the drum 20. The ventilation plate 22 is coupled to the posterior surface 84 of the body 46. It is generally contemplated that the posterior surface 84 can be a flange extending from the body 46 and defining a void 88 that opens to the inner cavity 50 defined by the body 46.

[0020] The ventilation plate 22 generally closes off the inner cavity 50 of the drum 20 relative to the surrounding cabinet 12 by covering the void 88 defined by the posterior surface 84. The ventilation plate 22 and the posterior surface 84 typically define a back wall 90 of the drum 20. Additionally or alternatively, the ventilation plate 22 can be coupled to the body 46, such that the ventilation plate 22 defines the back wall 90 of the body 46. Stated differently, the ventilation plate 22 can close the void 88, such that the body 46 and the ventilation plate 22 form the drum 20. In either configuration, the ventilation plate 22 generally defines a large portion of the back wall 90 of the drum 20.

[0021] With reference to FIGS. 3-8, the ventilation plate 22 is operably coupled to the drum 20 proximate to the rear wall 14 of the cabinet 12 (FIG. 2), as the ventilation plate 22 generally forms the back wall 90 of the drum 20. The ventilation plate 22 includes the plate body 24 that defines a first surface 92 and an opposing second surface 94. The plate body 24 defines a plurality of reinforcing bands 96 that are defined between the outer rim 28 and the central portion 26. The plurality of bands 96 can be generally circular to follow the generally circular shape of the plate body 24. The plurality of bands 96 are typically stamped or embossed into the first and second surfaces 92, 94, such that the bands 96 define a generally corrugated pattern along the first and second surfaces 92, 94. Each of the plurality of bands 96 can have varying heights to define the generally corrugated first and second surfaces 92, 94. A ridge is formed by one of the first and second surfaces 92, 94 and a valley is formed by the other of the first and second surfaces 92, 94.

[0022] As mentioned above, the plate body 24 includes the outer rim 28 and the central portion 26 on which the plurality of holes 30 are positioned. The outer rim 28 generally defines a periphery of the ventilation plate 22. The central portion 26 includes a first circumference 106 proximate to the plurality of bands 96 and a second circumference 108 that is centrally positioned proximate to an attachment portion 110 of the central portion 26. It is generally contemplated that the attachment portion 110 can define a recessed surface 112 in which a plurality of fastening apertures 114 is defined. The attachment portion 110 can extend toward the rear wall 14 and couple to the attachment feature 82 defined within the engagement portion 80 of the rear wall 14. The ventilation plate 22 is rotationally coupled to the rear wall 14 via fasteners 116 that extend through the fastening apertures 114 defined by the recessed surface 112 and couple to the attachment feature 82 on the rear wall 14.

[0023] With further reference to FIGS. 3-8, the plurality of holes 30 are generally positioned around the attachment portion 110 of the central portion 26 on the plate body 24. Stated differently, the plurality of holes 30 surround the attachment portion 110 of the central portion 26 of the plate body 24. The plurality of holes 30 can be separated by elongated recesses 118 defined on the central portion 26 of the plate body 24. The plurality of holes 30 are typically separated into ventilation zones 120 along the central portion 26 of the plate body 24. Each of the ventilation zones 120 may include the plurality of holes 30 in a generally triangular or trapezoidal configuration, such that there may be fewer holes 30 positioned adjacent to the second circumference 108 of the plate body 24 than the number of holes 30 positioned proximate to the first circumference 106 of the central portion 26. Additionally or alternatively, more or less holes 30 may be positioned proximate to the attachment portion 110 and/or the outer rim 28 of the plate body 24.

[0024] Referring again to FIG. 9, it is generally contemplated that the central portion 26, proximate to the attachment portion 110, may lie in a similar or common plane with the outer rim 28 and is generally raised proud of the plurality of bands 96 positioned between the outer rim 28 and the central portion 26. This configuration may promote the circulation of the airflow 70 passing through the plurality of holes 30 and into the drum 20, such that the airflow 70 may be directed along the plurality of bands 96 within the laundry cavity 50 (FIG. 1). The airflow 70 may encounter a disruption of the airflow path as the airflow 70 is expelled from the plurality of holes 30 and off the plurality of bands 96 into the drum 20. The central portion 26, proximate to the attachment portion 110 of the plate body 24 slopes between the attachment portion 110 and the plurality of bands 96. Stated differently, a sloped surface 122 is defined between the second circumference 108 of the central portion 26 and the plurality of bands 96, which may aid in the airflow 70 circulation along the plate body 24 and into the drum 20.

[0025] Referring now to FIGS. 5A-10 and as mentioned above, the plate body 24 includes the first surface 92 and the second surface 94, such that the first surface 92 is positioned proximate to the drum 20 and the second surface 94 is positioned proximate to the rear wall 14 of the cabinet 12. It is generally contemplated that the plurality of holes 30 and the plurality of supplemental extruded apertures 32 are generally projecting inward relative to the first surface 92 of the plate body 24 and extend outward relative to the second surface 94 of the plate body

24 or vice versa.

[0026] Each of the plurality of supplemental extruded apertures 32 has a first end 130 defined by the plate body 24 and a second end 132 that opposes the first end 130. Each of the plurality of supplemental extruded apertures 32 includes a sloped body 134 that extends between the first and second ends 130, 132 of each extruded aperture 32. As described herein, the plurality of supplemental extruded apertures 32 can be referred to as the supplemental apertures, extruded apertures, or supplemental extruded apertures. The extruded apertures 32 extend toward the rear wall 14 of the cabinet 12 proximate to the seal 18 and may selectively engage the seal 18 during the laundry cycle.

[0027] The seal 18 can be proximate to the portion of the plate body 24 defined as the first circumference 106 of the central portion 26, such that the first circumference 106 is defined proximate to the seal 18. The plurality of bands 96 and the outer rim 28 may be defined on a portion of the plate body 24 that extends outside the engagement portion 80 of the rear wall 14. The extruded apertures 32 are positioned between the central portion 26 and the outer rim 28 and are disposed within the engagement portion 80 of the rear wall 14 proximate to the seal 18. Stated differently, the extruded apertures 32 are positioned proximate to the first circumference 106 between the plurality of holes 30 and the outer rim 28.

[0028] With further reference to FIGS. 5A-10, the second end 132 of the extruded apertures 32 can engage the seal 18 as the drum 20 and the ventilation plate 22 rotate within the cabinet 12. As the ventilation plate 22 and the drum 20 rotate, each of the extruded apertures 32 rotate within the engagement portion 80 of the rear wall 14 and at least partially engage the seal 18 in a rotational motion. It is generally contemplated that the extruded apertures 32 engage the seal 18 along the sloped body 134 defined by each of the extruded apertures 32, as described in more detail below. As illustrated, the plurality of extruded apertures 32 includes three extruded apertures 32. However, it is also contemplated that the plurality of extruded apertures 32 may include more than three extruded apertures 32 or less than three extruded apertures 32.

[0029] It is generally contemplated that a height H_1 of each of the extruded apertures 32 may be greater than a height H_2 of each of the plurality of holes 30. The height H_1 of the extruded apertures 32 may be approximately 11-millimeters. However, it is also contemplated that the height H_1 of the extruded apertures 32 may be less than 11-millimeters or greater than 11 millimeters. It is also contemplated that the extruded apertures 32 may have a diameter D_1 that is greater than a diameter D_2 of the plurality of holes 30. Additionally or alternatively, the diameter D_1 of the extruded apertures 32 may be smaller than or equal to the diameter D_2 of the plurality of holes 30. The height H_1 of the extruded apertures 32 is configured to minimize the lint accumulation along the second surface 94 of the plate body 24 between the outer rim 28 and the plurality of holes 30.

[0030] With reference to FIGS. 11 and 12, the extruded apertures 32 are defined on the ventilation plate 22 using a two-step process. The first step includes embossing the extruded apertures 32 along the first surface 92 using a forming machine. The forming machine is configured to evenly distribute a force F along the first surface 92 to define the extruded apertures 32 while minimizing counteracting forces that may otherwise bend or deform the ventilation plate 22. Stated differently, the forming machine utilized to emboss the extruded apertures 32 on the ventilation plate 22 keeps the ventilation plate 22 free from deformation or other bending during the embossing process.

[0031] The second step includes utilizing the forming machine to punch out a portion of the plate body 24 that was embossed in step one. The punching process forms the extruded apertures 32 and simultaneously folds the second end 132 of the extruded apertures 32 to minimize any potential rough edges. The two-step punching process improves the overall efficiency of forming the ventilation plate 22 and improves the overall performance of the ventilation plate 22 by minimizing potential deformation of the plate body 24 during the formation of the extruded apertures 32.

[0032] In conventional appliances, the lint released by clothing may pass through the rear plate and without the other accommodations the lint may accumulate on a portion of the plate generally proximate to the heater. The accumulation of the lint may build-up overtime and may eventually release from the plate into the heater.

[0033] Referring to FIGS. 8-12, during operation of the laundry appliance 10, small pieces of lint are typically expelled from the inner cavity 50 of the drum 20 and enter the area between the second surface 94 of the ventilation plate 22 and the rear wall 14. The extruded apertures 32 generally rotate around the engagement portion 80 proximate to the seal 18 and remove the accumulated lint. The extruded apertures 32 can engage the seal 18 to loosen or remove the accumulated excess lint from the seal 18. In addition, the sloped body 134 of each of the extruded apertures 32 minimize the lint accumulation along the second surface 94 of the plate body 24. The sloped body 134 may result in the lint sliding off the respective extruded aperture 32 in order to minimize the overall accumulation of lint along the second surface 94 of the plate body 24. In addition to minimizing the overall lint accumulation along the second surface 94 and the seal 18, the extruded apertures 32 are also configured to generate turbulence or a disruption of the airflow 70 along the plate body 24 that serves to loosen or dislodge any accumulated lint near the seal 18.

[0034] As mentioned above, the heater 62 expels the airflow 70 along the channel 68 defined by the elongated portion 66 coupled to the rear wall 14 and disposed around the opening 16 (FIG. 3). The airflow 70 enters the inner cavity 50 through the plurality of holes 30. The drum 20 rotates within the cabinet 12 and may alter the

airflow 70 minimally, such that airflow recirculation zones 136 are defined along the second surface 94 of the plate body 24. The airflow recirculation zones 136 may be defined between the rear wall 14 of the cabinet 12 and the ventilation plate 22, specifically between the outer rim 28 of the plate body 24 and the plurality of holes 30. The airflow recirculation zones 136 can result in an inefficient distribution of the airflow 70 within the inner cavity 50 of the drum 20. The extruded apertures 32 are configured to minimize the airflow recirculation zones 136 defined along the second surface 94 of the plate body 24 by generating turbulence defined when the airflow 70 engages the sloped body 134 of each of the extruded apertures 32.

[0035] With further reference to FIGS. 8-12, it is generally contemplated that the sloped body 134 defines an interference surface 138 that is configured to disrupt the airflow recirculation zones 136 that are defined between the outer rim 28 and the plurality of holes 30 along the second surface 94 of the plate body 24. The engagement of the airflow 70 with the interference surface 138 helps break up and redistribute the airflow 70 along the second surface 94 of the plate body 24. As a result, the airflow 70 can be efficiently distributed through the plurality of holes 30 to heat the inner cavity 50 of the drum 20.

[0036] Referring again to FIGS. 1-12, the inclusion of the plurality of extruded apertures 32 along the plate body 24 helps improve the overall airflow 70 along the ventilation plate 22. The extruded apertures 32 further helps to minimize and remove lint accumulation along the second surface 94 of the plate body 24. Moreover, the extruded apertures 32 are configured to remove excess lint disposed proximate to the seal 18. The extruded apertures 32 supplement the plurality of holes 30 and provide the ventilation plate 22 with an improved circulation of the airflow 70 and overall removal of lint accumulation between the ventilation plate 22 and the rear wall 14 of the cabinet 12.

[0037] The invention disclosed herein is further summarized in the following paragraphs and is further characterized by combinations of any and all of the various aspects described therein.

[0038] According to one aspect of the present disclosure, a laundry appliance includes a cabinet that has a rear wall that defines an opening. The cabinet includes a seal that is coupled to the rear wall. A drum is disposed within the cabinet. A ventilation plate is operably coupled to the drum that is proximate to the rear wall of the cabinet. The ventilation plate includes a plate body including a central portion and an outer rim. A plurality of holes is defined on the central portion of the plate body. A plurality of supplemental extruded apertures is positioned between the plurality of holes and the outer rim.

[0039] According to another aspect, airflow circulation zones are defined between a rear wall of a cabinet and a ventilation plate. The airflow circulation zones are further defined between an outer rim of a plate body and a plurality of holes.

[0040] According to another aspect, a plurality of supplemental extruded apertures minimize airflow recirculation zones between an outer rim and a plurality of holes.

[0041] According to another aspect, a plurality of supplemental extruded apertures remove excess lint disposed proximate to a seal.

[0042] According to another aspect, a plurality of supplemental extruded apertures extend toward a rear wall of a cabinet and proximate to a seal.

[0043] According to another aspect, each of a plurality of supplemental extruded apertures have a first end that is defined by a plate body, a second end that is opposed the first end, and a sloped body that is defined between the first end and a second end.

[0044] According to another aspect, a sloped body minimizes lint accumulation on a plate body between an outer rim and a plurality of holes.

[0045] According to another aspect of the present disclosure, a ventilation plate for an appliance includes a plate body that has a first surface and an opposing second surface. An outer rim is defined by the first surface and the opposing second surface. A plurality of holes is defined along the first surface. A plurality of supplemental apertures is positioned between the outer rim and the plurality of holes along the first surface and is configured to minimize lint accumulation between the outer rim and the plurality of holes. The plurality of holes and the plurality of supplemental apertures extend through the first and second surfaces.

[0046] According to another aspect, a plurality of supplemental apertures includes at least three supplemental apertures that are extruded from a first surface of a plate body.

[0047] According to another aspect, a height of each of a plurality of supplemental apertures is configured to minimize lint accumulation along a second surface of a plate body that is between an outer rim and a plurality of holes.

[0048] According to another aspect, a plurality of supplemental apertures each have a diameter that is greater than a diameter of each of the plurality of holes.

[0049] According to another aspect, a plurality of supplemental apertures each have a body that defines an interference surface that is configured to disrupt an airflow recirculation zone that is defined between an outer rim and a plurality of holes along a second surface of a plate body.

[0050] According to yet another aspect of the present disclosure, a laundry appliance includes a cabinet that has a rear wall and a seal that is operably coupled to the rear wall. A drum is disposed within a body and defines a cavity. A plate is disposed within the cavity and is coupled to the drum. The plate defines a plurality of holes and a plurality of extruded apertures that are disposed around the plurality of holes. The plurality of extended apertures are configured to minimize lint accumulation.

[0051] According to another aspect, a plurality of extruded apertures are configured to remove excess lint that is proximate to a seal.

[0052] According to another aspect, a plurality of extruded apertures include at least three extruded apertures.

[0053] According to another aspect, a plate includes an outer rim, wherein airflow recirculation zones are defined between an outer rim and a plurality of holes.

[0054] According to another aspect, a plurality of extruded apertures have a height that is greater than a height of a plurality of holes. The height of the plurality of extruded apertures minimize airflow recirculation zones that are defined between an outer rim and the plurality of holes.

[0055] According to another aspect, a plurality of extruded apertures are positioned between an outer rim and a plurality of holes. The plurality of extruded apertures minimize lint accumulation between an outer rim and a plurality of holes.

[0056] According to another aspect, a heater is operably coupled to a cabinet and is configured to direct an airflow through a plurality of holes. The airflow is recirculated around the plurality of holes between a drum and a rear wall of the cabinet. A plurality of extruded apertures disrupt the recirculated airflow.

Claims

1. A laundry appliance (10), comprising:

a cabinet (12) having a rear wall (14) and a seal (18) operably coupled to the rear wall (14);
a drum (20) disposed around the cabinet (12) and defining a cavity (50); and
a plate (22) disposed within the cavity (50) and coupled to the drum (20), the plate (22) defining a plurality of holes (30) and a plurality of extruded apertures (32) disposed around the plurality of holes (30), the plurality of extruded apertures (32) configured to minimize lint accumulation.

2. The laundry appliance (10) of claim 1, wherein the plate (22) includes an outer rim (28), and wherein airflow recirculation zones (136) are defined between the outer rim (28) and the plurality of holes (30).

3. The laundry appliance (10) of claim 2, wherein the airflow recirculation zones (136) are defined between the rear wall (14) of the cabinet (12) and the plate (22).

4. The laundry appliance (10) of any one or more of claims 2 and 3, wherein the plurality of extruded apertures (32) minimize the airflow recirculation zones (136) between the outer rim (28) and the plurality of holes (30).

5. The laundry appliance (10) of any one or more of claims 2-4, wherein the plurality of extruded apertures (32) are positioned between the outer rim (28) and the plurality of holes (30), and wherein the plurality of extruded apertures (32) minimize the lint accumulation between the outer rim (28) and the plurality of holes (30).

6. The laundry appliance (10) of any one or more of claims 2-5, wherein the plurality of extruded apertures (32) have a height that is greater than a height of the plurality of holes (30), and wherein the height of the plurality of extruded apertures (32) minimizes the airflow recirculation zones (136) defined between the outer rim (28) and the plurality of holes (30).

7. The laundry appliance (10) of claim 6, wherein the height of each of the plurality of extruded apertures (32) is configured to minimize lint accumulation along a second surface (94) of the plate (22) between the outer rim (28) and the plurality of holes (30).

8. The laundry appliance (10) of any one or more of claims 1-7, wherein each of the plurality of supplemental extruded apertures (32) has a first end (130) defined by a plate body (24) of the plate (22), a second end (132) opposing the first end (130), and a sloped body (134) defined between the first end (130) and the second end (132).

9. The laundry appliance (10) of claim 8, wherein the sloped body (134) minimizes lint accumulation on the plate body (24) between the outer rim (28) and the plurality of holes (30).

10. The laundry appliance (10) of any one or more of claims 1-5, wherein a height of each of the plurality of holes (30) is less than a height of each of the plurality of supplemental apertures (32).

11. The laundry appliance (10) of any one or more of claims 1-10, wherein the plurality of extruded apertures (32) are configured to remove excess lint proximate to the seal (18).

12. The laundry appliance (10) of any one or more of claims 1-11, wherein the plurality of extruded apertures (32) includes at least three extruded apertures (32).

13. The laundry appliance (10) of any one or more of claims 1-12, wherein the plurality of supplemental extruded apertures (32) extend toward the rear wall (14) of the cabinet (12) and proximate to the seal (18).

14. The laundry appliance (10) of any one or more of claims 1-13, further comprising:

a heater (62) operably coupled to the cabinet (12) and configured to direct an airflow through the plurality of holes (30), wherein the airflow (70) is recirculated around the plurality of holes (30) between the drum (20) and the rear wall (14) of the cabinet (12), and wherein the plurality of extruded apertures (32) disrupt the recirculated airflow (70).

15. The laundry appliance (10) of any one or more of claims 1-14, wherein the plurality of extruded apertures (32) each have a diameter greater than a diameter of each of the plurality of holes (30).

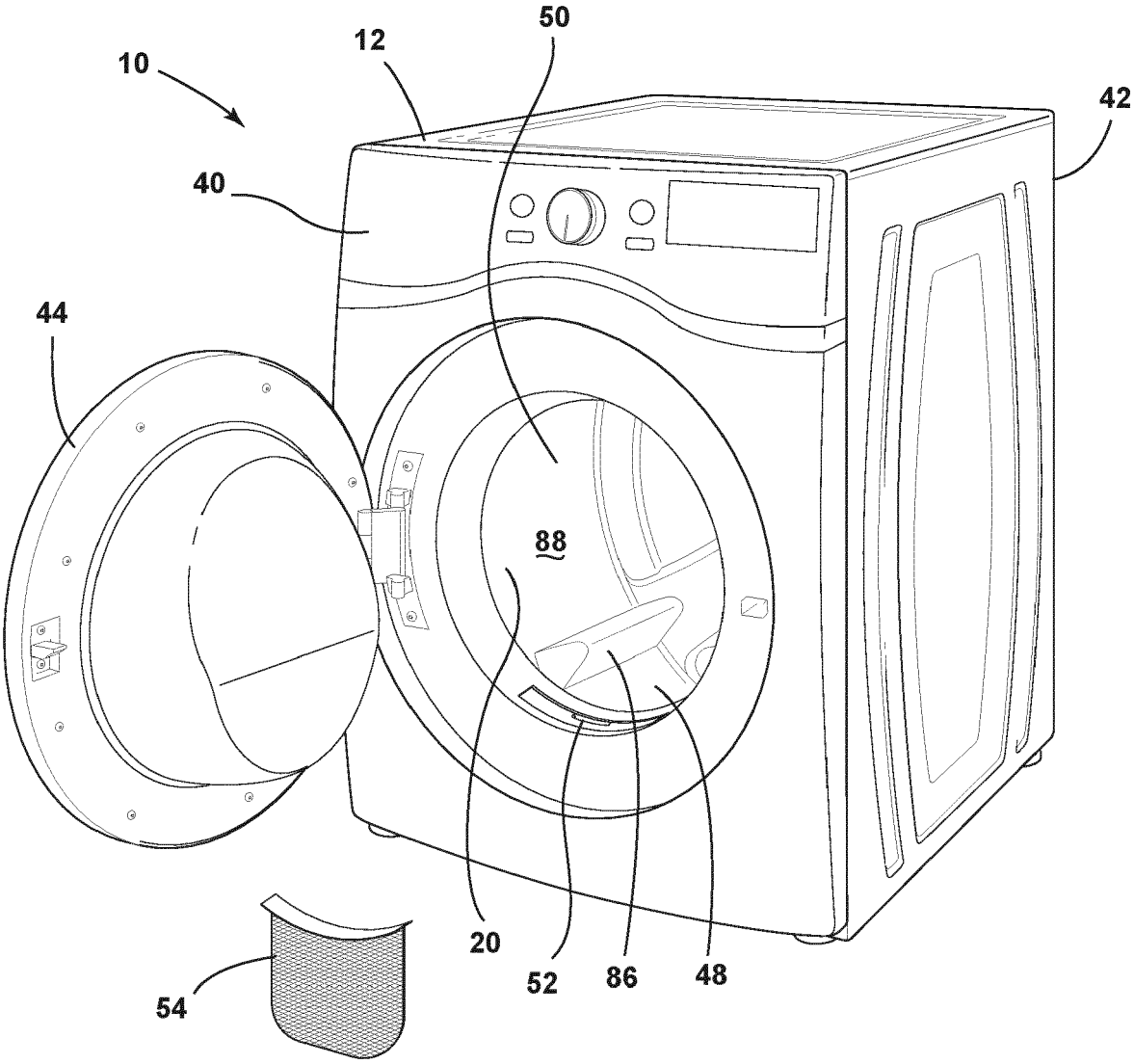

FIG. 1

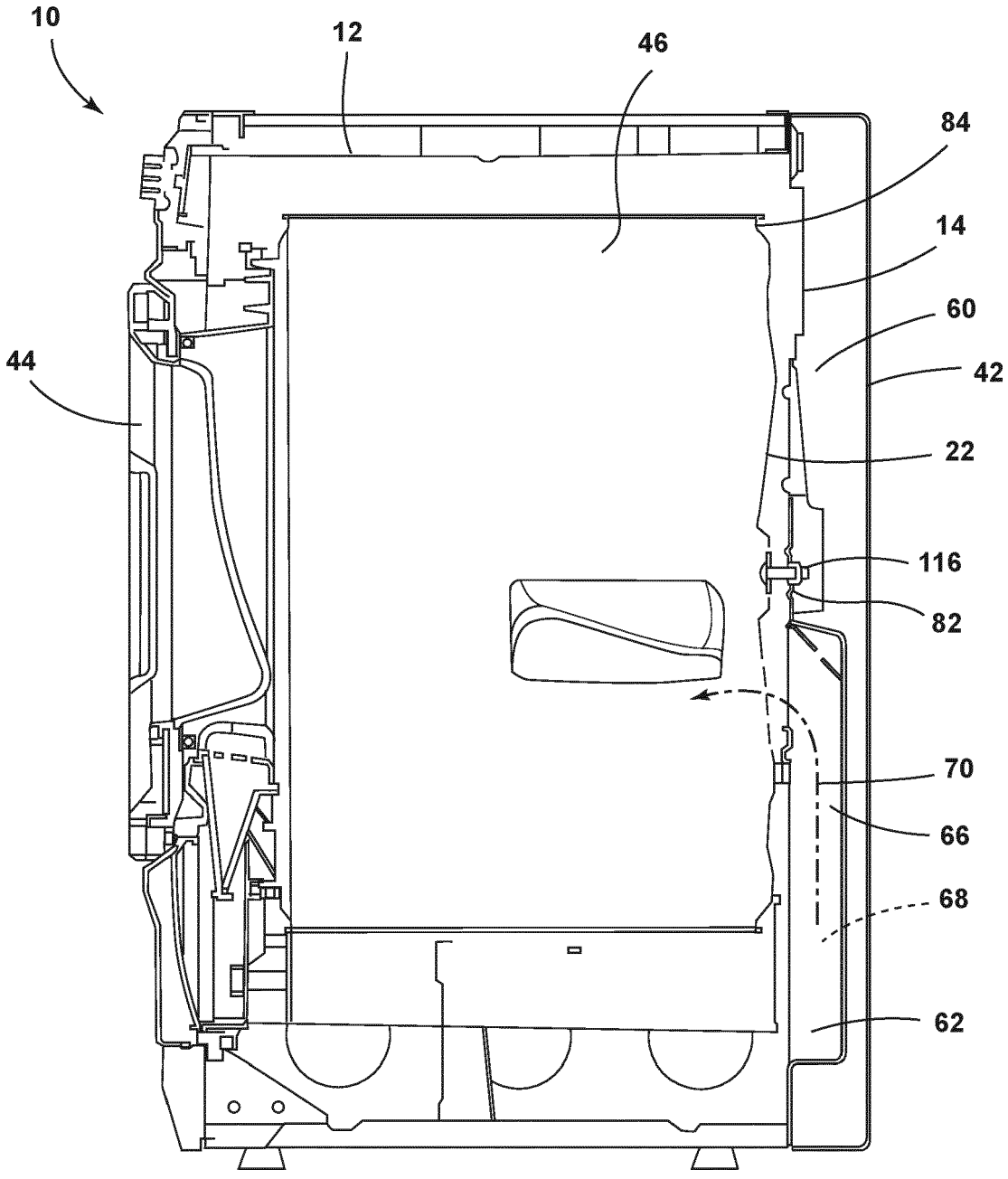

FIG. 2

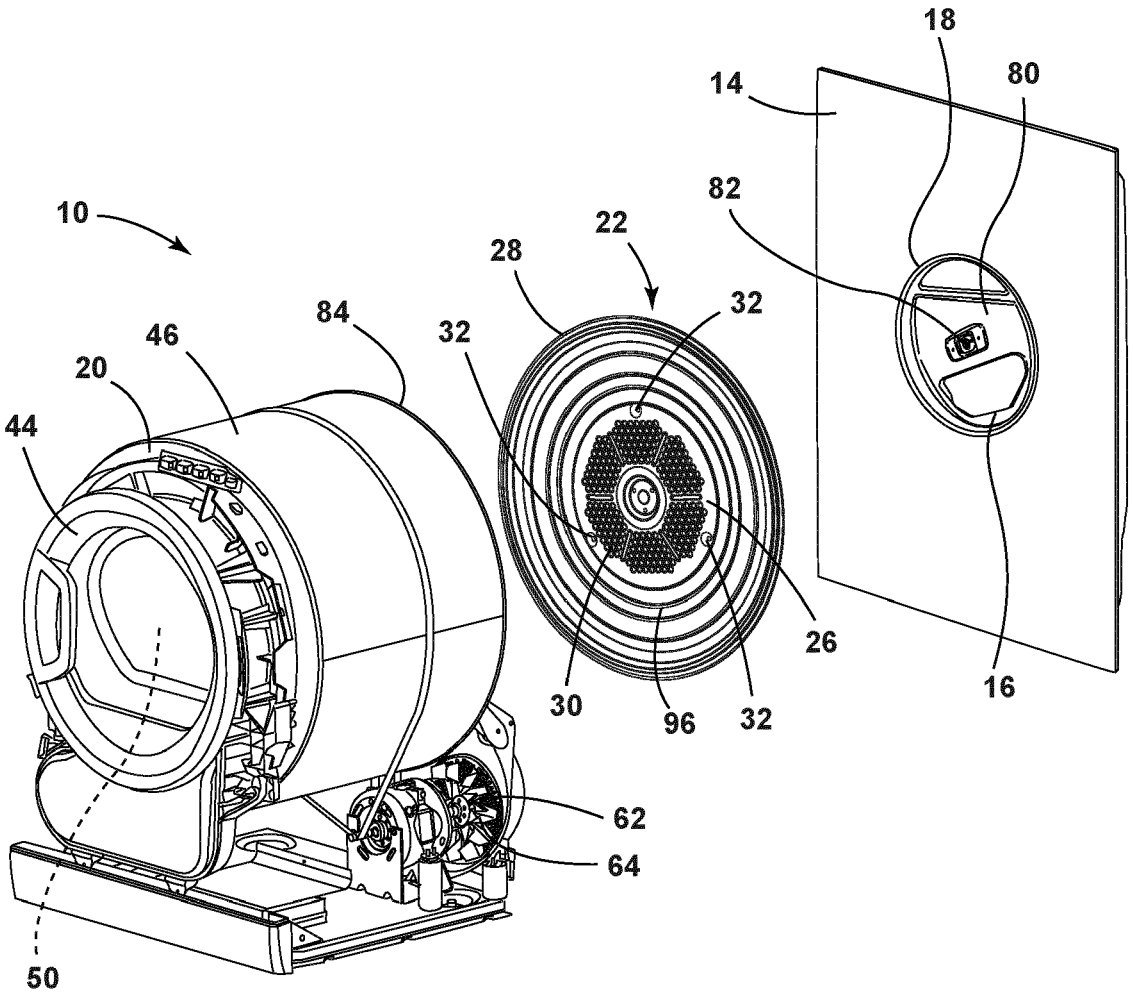

FIG. 3

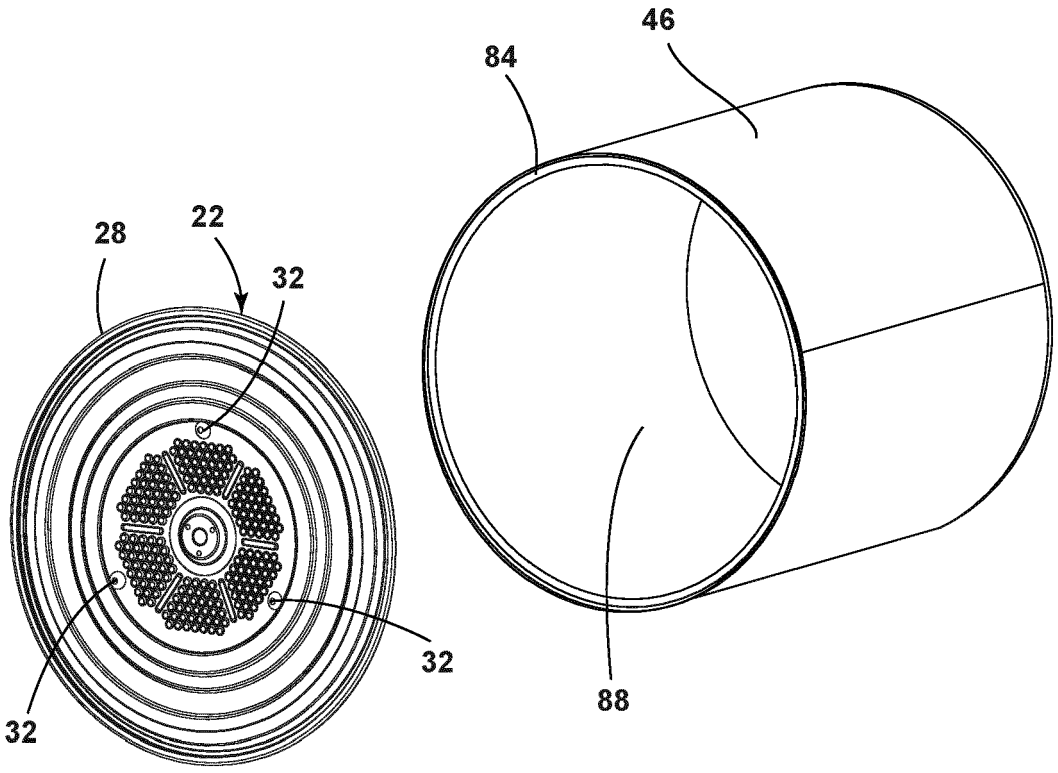

FIG. 4

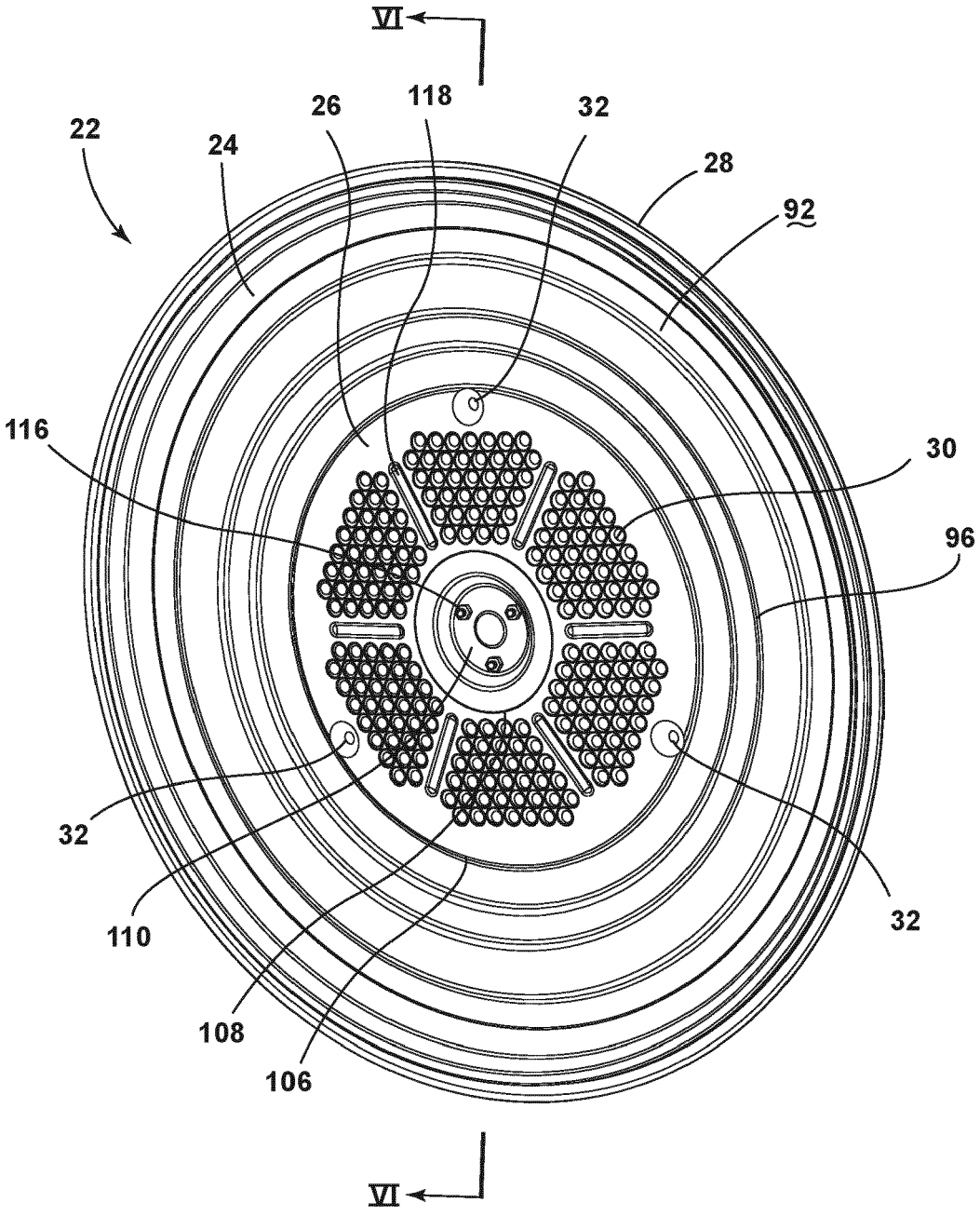

FIG. 5A

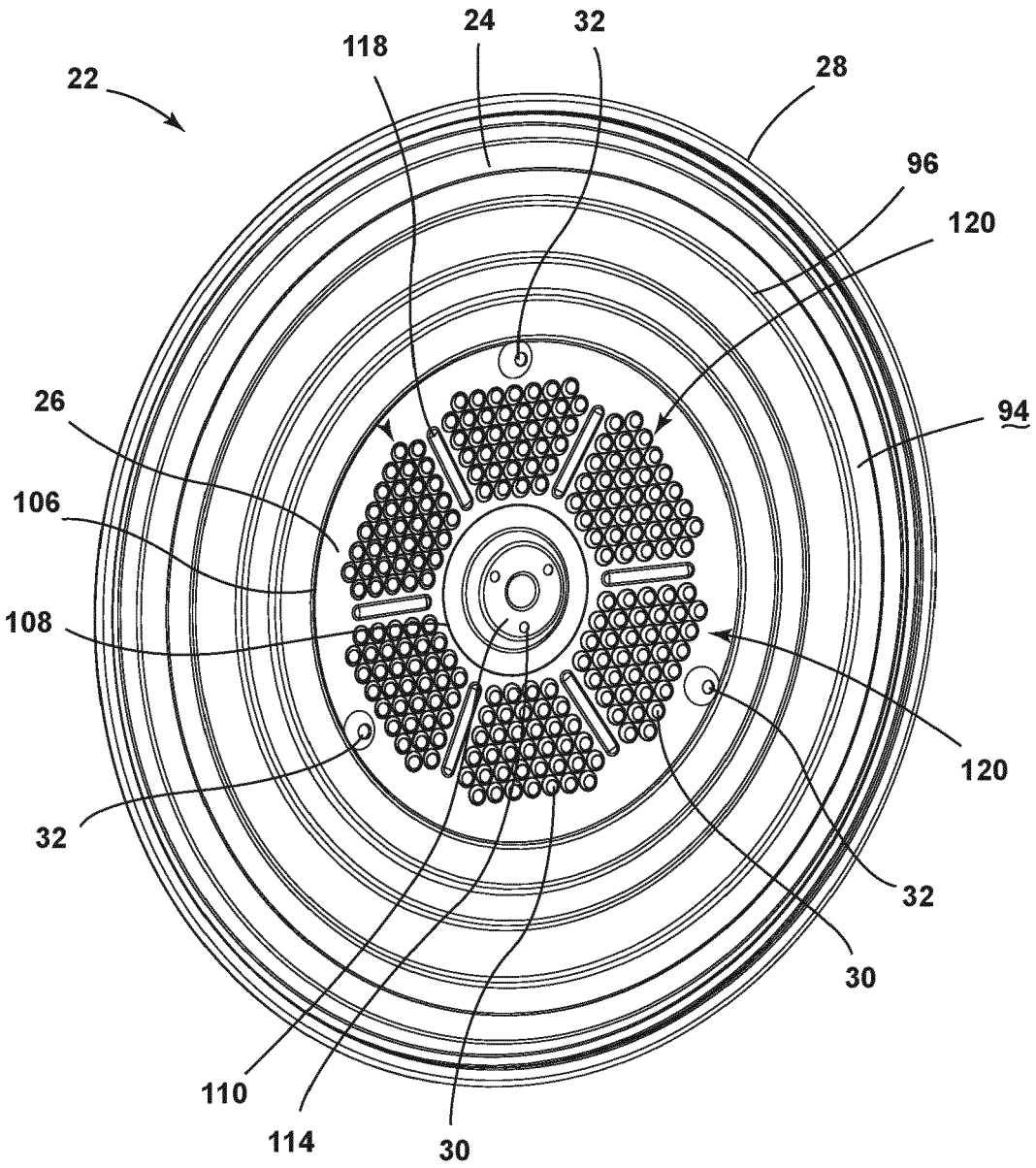

FIG. 5B

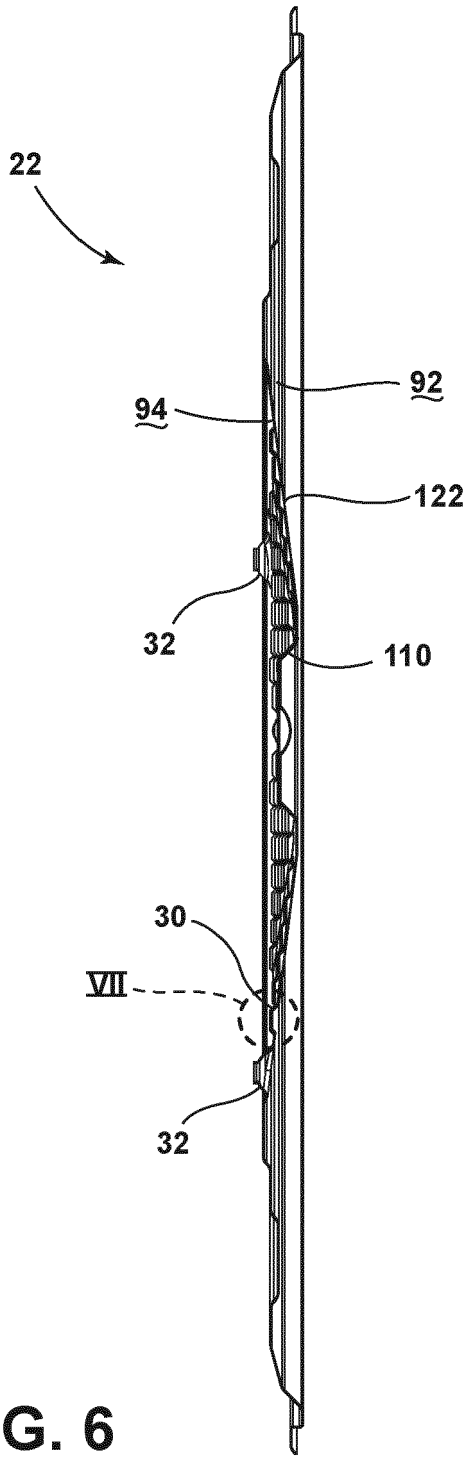

FIG. 6

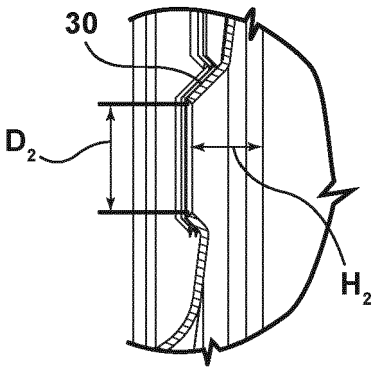

FIG. 7

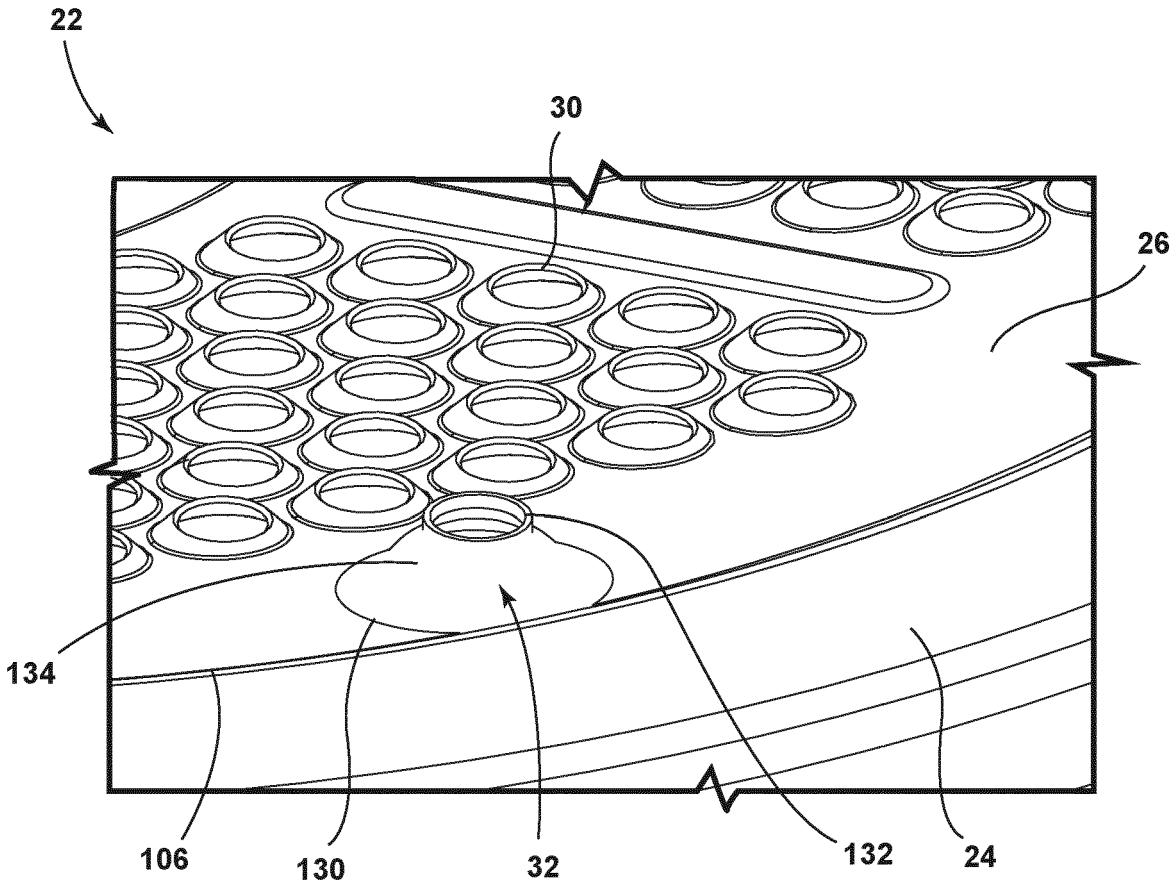

FIG. 8

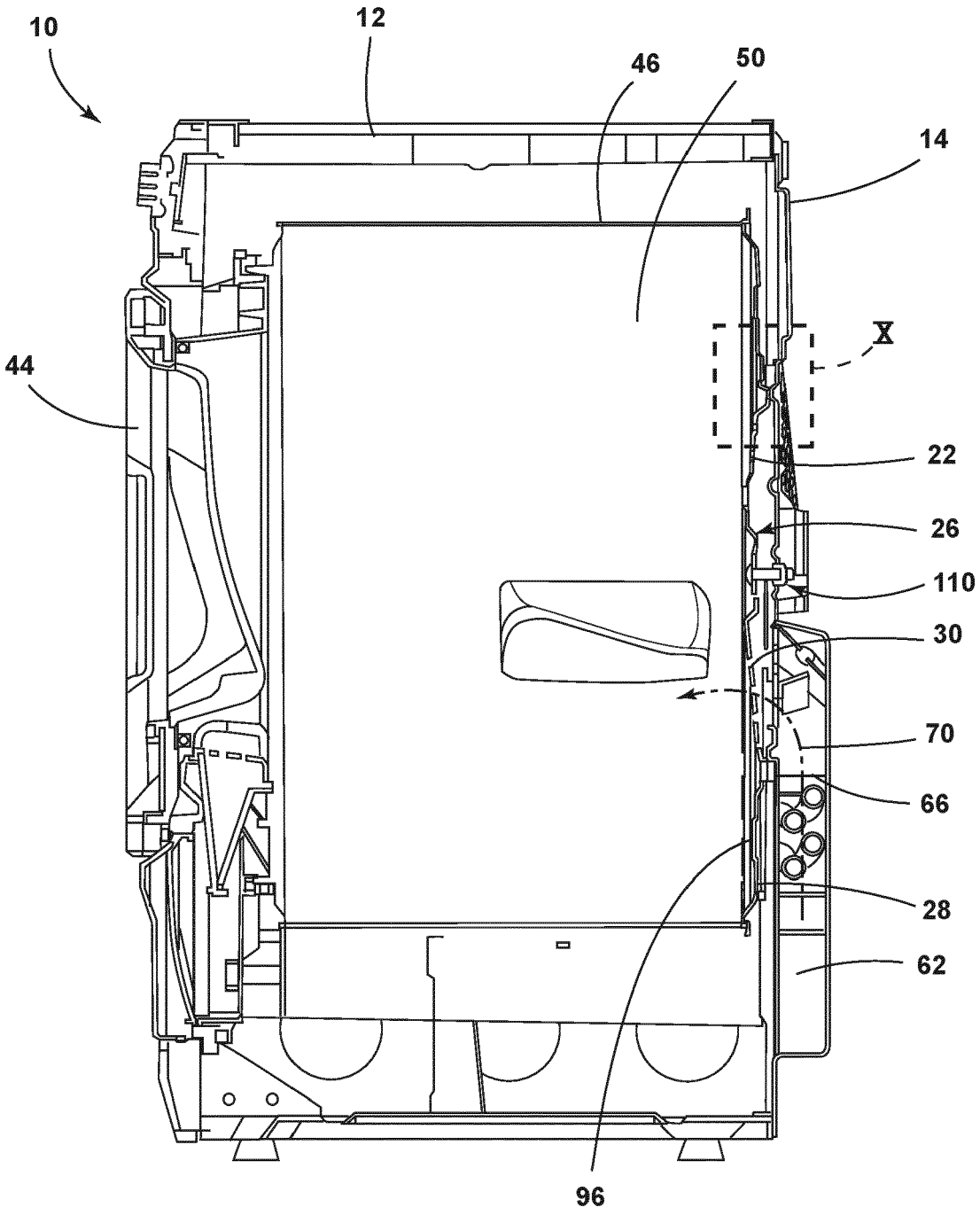

FIG. 9

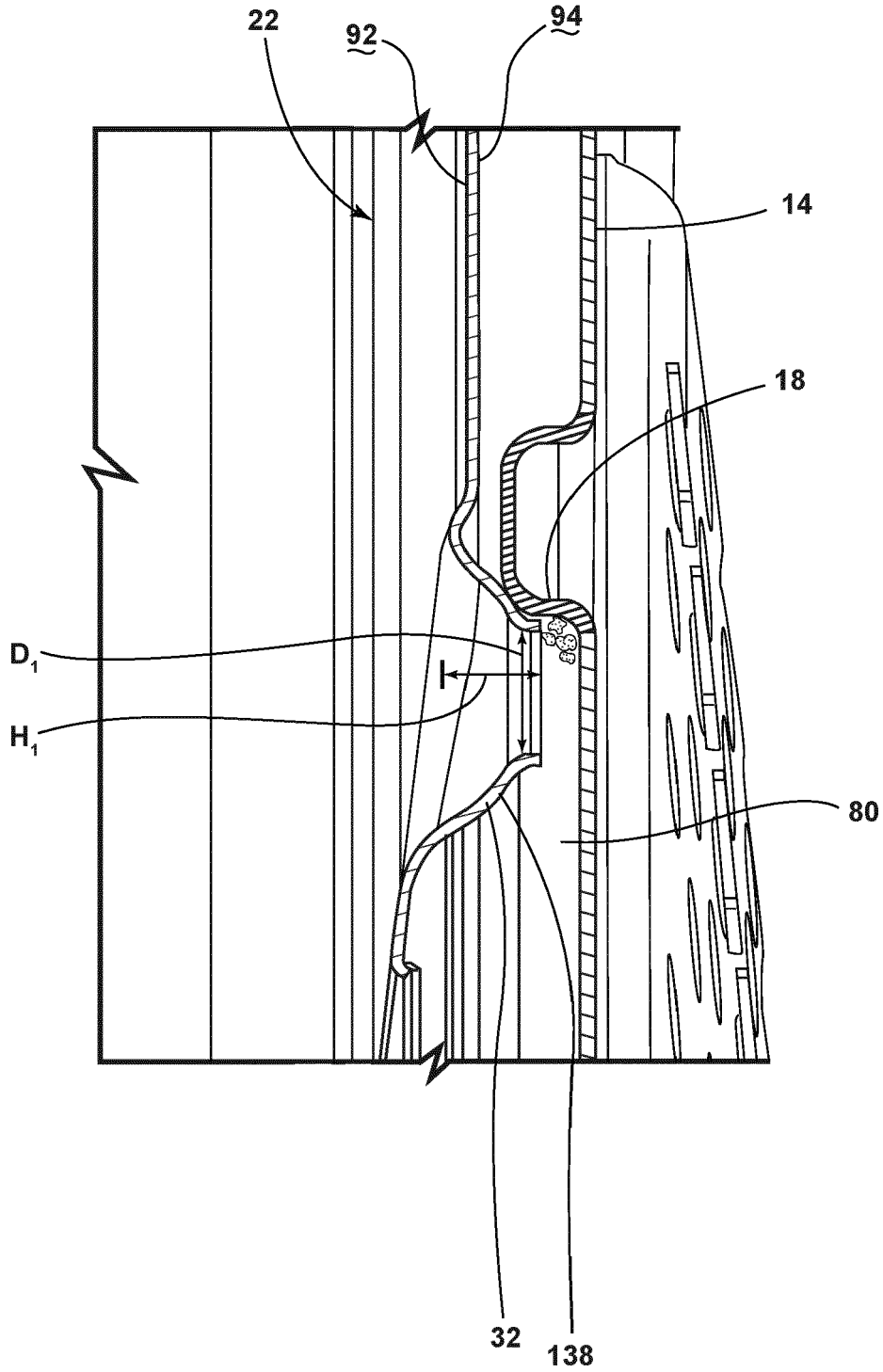

FIG. 10

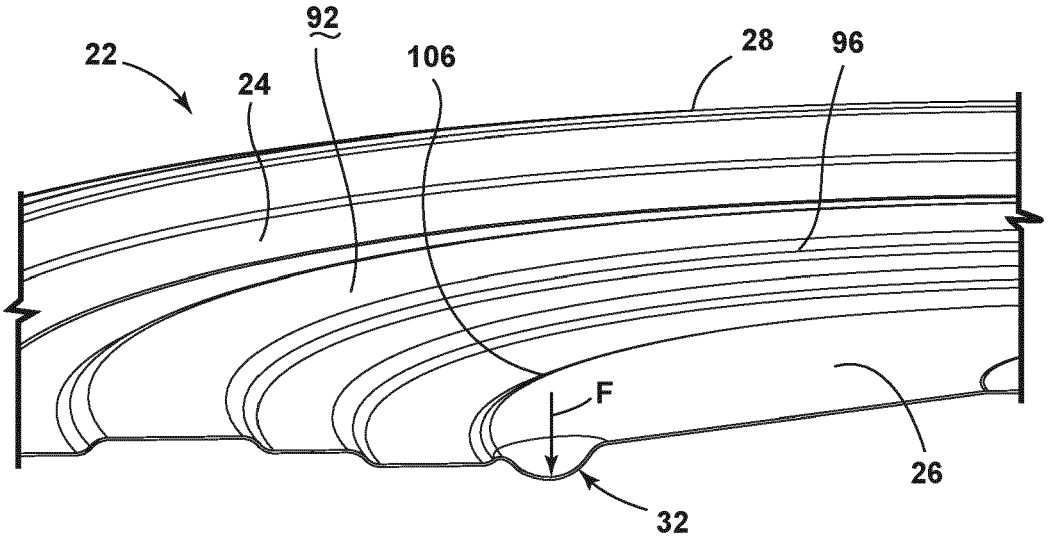

FIG. 11

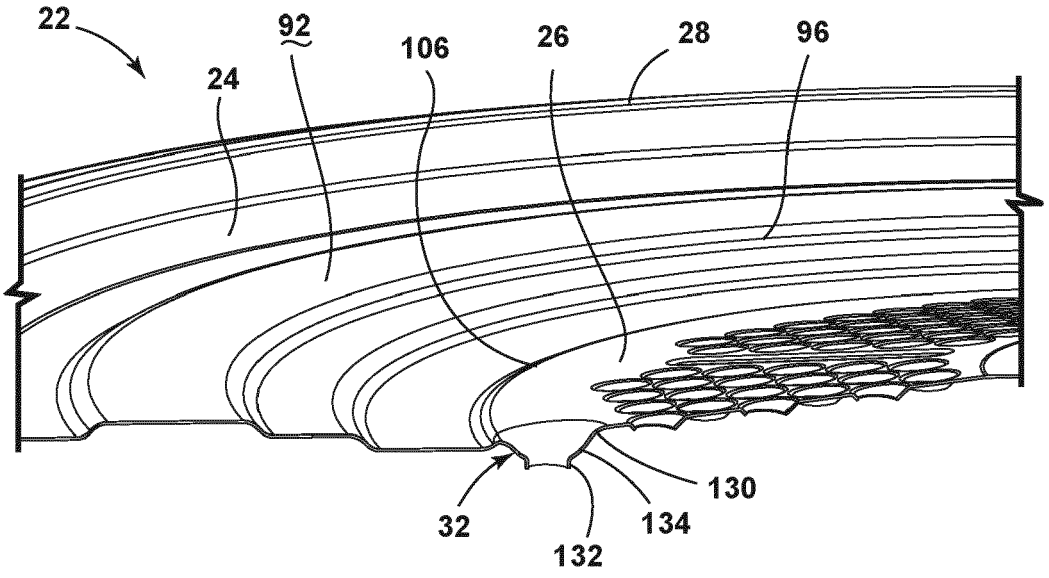

FIG. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 20 20 4994

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 843 114 A1 (ELECTROLUX APPLIANCES AB [SE]) 4 March 2015 (2015-03-04) * paragraph [0020]; figure 4 * -----	1-15	INV. D06F58/22 D06F58/04
A	US 2009/000145 A1 (CAO CHUNHUA [CN] ET AL) 1 January 2009 (2009-01-01) * paragraphs [0033] - [0035]; figures * -----	1-15	
A	EP 2 990 519 A1 (ELECTROLUX APPLIANCES AB [SE]) 2 March 2016 (2016-03-02) * paragraphs [0116] - [0121]; figures * -----	1-15	
A	CN 103 882 661 B (HAIER GROUP CO LTD; QINDAO HAIER WASHING MACHINE) 23 February 2018 (2018-02-23) * the whole document * -----	1-15	
			TECHNICAL FIELDS SEARCHED (IPC) D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 April 2021	Stroppa, Giovanni

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16-04-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2843114 A1	04-03-2015	AU 2014314503 A1	10-03-2016
		CN 105492682 A	13-04-2016
		EP 2843114 A1	04-03-2015
		WO 2015028231 A1	05-03-2015
US 2009000145 A1	01-01-2009	CN 101333761 A	31-12-2008
		US 2009000145 A1	01-01-2009
EP 2990519 A1	02-03-2016	AU 2015309202 A1	02-02-2017
		CN 106574426 A	19-04-2017
		EP 2990519 A1	02-03-2016
		PL 2990519 T3	18-05-2020
		WO 2016030118 A1	03-03-2016
CN 103882661 B	23-02-2018	NONE	

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