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(71) Applicant: **BSH Hausgeräte GmbH**
81739 München (DE)

(72) Inventors:
• **Cheng, Wei**
Chuzhou, 239016 (CN)
• **Yu, Jian(fck2)**
Chuzhou, 239016 (CN)

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(54) **HOUSEHOLD APPLIANCE**

(57) A household appliance (1), characterized by comprising:

a storage compartment (10), the storage compartment (10) having an access opening (101);

a drawer (11), having a first sliding portion (110), the drawer (11) being located in the storage compartment (10) and capable of being pulled out of or pushed back to the storage compartment (10); and

a guide rail (12), the guide rail (12) being located in the storage compartment (10), the guide rail (12) having a sliding slot (120), and the first sliding portion (110) being adapted to slide along the sliding slot (120), wherein

the sliding slot (120) comprises an inclined slot portion (121) tilting toward a sinking direction of the drawer (11) along a pull-out direction of the drawer (11).

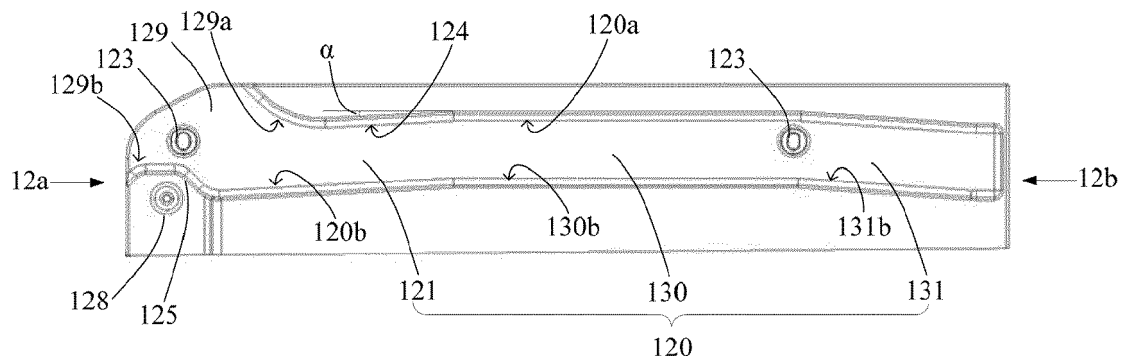


FIG. 3

Description

BACKGROUND

Technical Field

[0001] Embodiments of the present invention relate to the technical field of household appliances, and in particular, to a household appliance.

Related Art

[0002] For objectives such as partitioned storage and operation convenience, a household appliance usually includes one or more drawers, and the drawer is supported in the household appliance through guide rails and can be pulled out or pushed back along the guide rails.

[0003] However, during use of an existing drawer and an existing guide rail system that are applied to a household appliance, when the drawer is pulled out to a maximum stroke distance, because the center of gravity of the drawer exceeds front ends of guide rails, and there is a gap between a rear end of the drawer and the guide rails, a front end of the drawer tilts downward and sinks.

[0004] If the drawer carries more stored items, such a sinking phenomenon is severer. Excessive sinkage of the front end of the drawer may cause a collision between the drawer and another component of the household appliance under the drawer, and affect normal use of the household appliance.

SUMMARY

[0005] An objective of embodiments of the present invention is to provide an improved household appliance.

[0006] Therefore, an embodiment of the present invention provides a household appliance, including: a storage compartment, the storage compartment including an access opening; a drawer, having a first sliding portion, the drawer being located in the storage compartment and capable of being pulled out of or pushed back to the storage compartment; and a guide rail, the guide rail being located in the storage compartment, the guide rail having a sliding slot, and the first sliding portion being adapted to slide along the sliding slot, where the sliding slot includes an inclined slot portion tilting toward a sinking direction of the drawer along a pull-out direction of the drawer.

[0007] By using the solution of this embodiment, the inclined slot portion tilting toward the sinking direction of the drawer is provided at a front end of the guide rail, so that it is possible to reduce sinkage of the front end when the drawer is pulled out. Reduction of the sinkage is beneficial to avoiding collision between the front end of the drawer and another component of the household appliance when the drawer is pulled out. The front end of the guide rail refers to an end close to the access opening

of the storage compartment.

[0008] Optionally, the inclined slot portion has an upper slot wall, and the upper slot wall tilts toward the sinking direction along the pull-out direction. When the first sliding portion slides to the front end of the guide rail along the pull-out direction, the front end of the drawer sinks under the action of gravity, and the first sliding portion synchronously moves toward a direction opposite to the sinking direction. A distance by which the first sliding portion moves upward is restricted by the upper slot wall that tilts downward and is reduced, so that the distance by which the front end of the drawer tilts downward is also reduced.

[0009] Optionally, the upper slot wall is in a linear shape, an arc shape, or a step shape. Specifically, when the upper slot wall is in a linear shape, the drawer has a relatively smooth movement throughout the process of being pulled out of the storage compartment, and a user does not feel an obvious jamming.

[0010] Optionally, the sliding slot has a basically constant cross section to ensure that the first sliding portion can smoothly slide along the sliding slot, which is beneficial to reducing complexity of molds and optimizing a manufacturing process.

[0011] Optionally, the guide rail includes a stop structure, the stop structure is adapted to stop the drawer after the drawer is pulled out to a predetermined degree, and when the drawer is stopped, the first sliding portion is located at the inclined slot portion. Therefore, a maximum movement stroke of the drawer along the pull-out direction is restricted by using the stop structure, to prevent the drawer from being completely pulled out of the storage compartment.

[0012] Optionally, when the drawer is stopped, the first sliding portion abuts against the upper slot wall of the inclined slot portion, and the drawer is supported on a second sliding portion in front of the inclined slot portion. Therefore, the second sliding portion is used as a fulcrum, the front end of the drawer sinks naturally, and the first sliding portion tilts up synchronously in an opposite direction. In this process, because the inclined slot portion tilts toward the sinking direction along the pull-out direction, the first sliding portion that tilts up in the opposite direction may abut against the upper slot wall of the inclined slot portion earlier. Further, the first sliding portion and the inclined slot portion that abut against each other may prevent the front end of the drawer from continuously sinking. Moreover, the first sliding portion may abut against the inclined slot portion only by tilting up in the opposite direction at a small stroke, so that the sinkage of the front end of the drawer may also be effectively reduced.

[0013] Optionally, along the pull-out direction of the drawer, a distance from a junction between the inclined slot portion and another portion of the sliding slot to the stop structure is greater than a distance from the first sliding portion to a stop portion of the drawer, where the stop portion of the drawer is adapted to fit with the stop

structure to stop the drawer. Therefore, it can be ensured that the first sliding portion is located at the inclined slot portion when the drawer is stopped, to reduce the sinkage of the front end of the drawer.

[0014] Optionally, a tilt angle of the inclined slot portion tilting toward the sinking direction along the pull-out direction is from 3 degrees to 10 degrees, and/or a length of the inclined slot portion along the pull-out direction of the drawer is at least one third of a length of the sliding slot along the pull-out direction of the drawer. By appropriately designing a downward tilt angle of the inclined slot portion and a length of the inclined slot portion, the sinkage is reduced while ensuring that the user does not feel an obvious jamming when pulling the drawer, to optimize user experience.

[0015] Optionally, the guide rail includes an inlet section located at the front end of the sliding slot along the pull-out direction of the drawer, the inlet section is located in front of the inclined slot portion, and at least one of an upper slot wall and a lower slot wall of the inlet section tilts, along the pull-out direction of the drawer, toward a direction gradually away from the other one of the upper slot wall and the lower slot wall. The inlet section is in a flare opening shape, which is beneficial to mounting the first sliding portion of the drawer into the sliding slot, and facilitates assembly of the drawer.

[0016] Optionally, the first sliding portion includes a first roller rotatably disposed on the drawer. Therefore, the first roller is adapted to support the drawer to roll on the sliding slot, to avoid dry friction between the drawer and the sliding slot, so that the user may pull the drawer more smoothly.

[0017] Optionally, the sliding slot includes a horizontal section located behind the inclined slot portion along the pull-out direction of the drawer, and a lower slot wall of the horizontal section is parallel to a horizontal direction. Therefore, the horizontal section is adapted to support the drawer to be pulled out of or pushed back to the storage compartment roughly along a horizontal direction, and guide the drawer to move to the inclined slot portion when the drawer is pulled out.

[0018] Optionally, a rear end of the sliding slot along the pull-out direction of the drawer has a tilting portion, and the tilting portion tilts toward the sinking direction along a push-back direction of the drawer. Therefore, the drawer that is pushed back to the tilting portion along the sliding slot has a tendency to continue to automatically move into the storage compartment, so that the drawer may automatically move to a final position after being pushed back to a predetermined degree.

[0019] Optionally, the first sliding portion is in contact with the upper slot wall of the inclined slot portion during at least a part of the stroke inside the inclined slot portion, so that the rear end of the drawer is restricted from continuously tilting up, thereby acting on the front end of the drawer to reduce the sinkage.

[0020] Optionally, the sliding slot has an opening facing the drawer, and the first sliding portion extends from the

opening into the sliding slot and is supported on the sliding slot, so that the first sliding portion may effectively support the drawer to slide along the sliding slot.

5 BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

FIG. 1 is a partial schematic diagram of a household appliance according to an embodiment of the present invention;

FIG. 2 is a schematic diagram of a guide rail of the household appliance shown in FIG. 1;

FIG. 3 is a side view of the guide rail shown in FIG. 2;

FIG. 4 is a schematic diagram of a drawer of the household appliance shown in FIG. 1 being pushed back to a storage compartment along the guide rail shown in FIG. 2; and

FIG. 5 is a schematic diagram of a drawer of the household appliance shown in FIG. 1 being pulled out of a storage compartment along the guide rail shown in FIG. 2.

[0022] In the accompanying drawings:

1-household appliance; 10-storage compartment; 101-access opening; 11-drawer; 11a-front end of the drawer; 11b-rear end of the drawer; 110-first sliding portion; 111-first roller; 112-stop portion; 12-guide rail; 12a-front end of the guide rail; 12b-rear end of the guide rail; 120-sliding slot; 121-inclined slot portion; 122-opening; 123-mounting hole; 124-upper slot wall; 125-stop structure; 126-second sliding portion; 127-second roller; 128-pivot portion; 129-inlet section; 129a-upper slot wall of the inlet section; 129b-lower slot wall of the inlet section; 130-horizontal section; 130b-lower slot wall of the horizontal section; 131-tilting portion; 131b-lower slot wall of the tilting portion; L1-distance from a junction between the inclined slot portion and another portion of the sliding slot to the stop structure; L2-distance from the first sliding portion to a stop portion; a-tilt angle of the inclined slot portion tilting toward the sinking direction along the pull-out direction; x-width direction of the household appliance; y-depth direction of the household appliance; and z-height direction of the household appliance.

50 DETAILED DESCRIPTION

[0023] As described in the related art, when a drawer of an existing household appliance is pulled out of a storage compartment, a front end of the drawer sinks significantly under the action of gravity, and is very likely to collide with another component of the household appliance and cause damage.

[0024] To resolve the foregoing technical problem, an

embodiment of the present invention provides a household appliance, including: a storage compartment, the storage compartment including a forward opening; a drawer, having a first sliding portion, the drawer being located in the storage compartment and capable of being pulled out of or pushed back to the storage compartment; and a guide rail, the guide rail being located in the storage compartment, the guide rail having a sliding slot, and the first sliding portion being adapted to slide along the sliding slot, where the sliding slot includes an inclined slot portion tilting toward a sinking direction of the drawer along a pull-out direction of the drawer.

[0025] By using the solution of this embodiment, the inclined slot portion tilting toward the sinking direction of the drawer is provided at a front end of the guide rail, so that it is possible to reduce sinkage of the front end when the drawer is pulled out. Reduction of the sinkage is beneficial to avoiding collision between the front end of the drawer and another component of the household appliance when the drawer is pulled out. The front end of the guide rail refers to an end close to the opening of the storage compartment.

[0026] To make the foregoing objectives, characteristics, and advantages of the present invention clearer and easier to understand, specific embodiments of the present invention are described below in detail with reference to accompanying drawings.

[0027] FIG. 1 is a partial schematic diagram of a household appliance according to an embodiment of the present invention.

[0028] To show the solution of this embodiment more clearly, FIG. 1 illustratively shows only an area where the drawer of the household appliance is located.

[0029] In this embodiment, the household appliance may be a refrigerator/freezer, and may alternatively be a dishwasher, a wardrobe, or the like.

[0030] Specifically, referring to FIG. 1, a household appliance 1 may include: a storage compartment 10, the storage compartment 10 having a forward access opening 101.

[0031] Further, the household appliance 1 may further include: a drawer 11, having a first sliding portion 110 (as shown in FIG. 4 and FIG. 5), the drawer 11 being located in the storage compartment 10 and capable of being pulled out of or pushed back to the storage compartment 10.

[0032] A width direction of the household appliance 1 is referred to as a direction x, a depth direction is referred to as a direction y, and a height direction is referred to as a direction z. The drawer 11 may be pulled out of or pushed back to the storage compartment 10 along the direction y. The forward access opening 101 of the storage compartment 10 refers to the access opening 101 provided on a front side of the household appliance 1 along a pull-out direction of the drawer 11, where the front side of the household appliance 1 refers to a side facing a user during use, and in FIG. 1, the front side is the direction y.

[0033] The drawer 11 being pushed back to the storage compartment 10 along an opposite direction of the direction y is adapted to close the access opening 101 of the storage compartment 10. The drawer 11 being pulling out of the storage compartment 10 along the direction y is adapted to expose the access opening 101, and the drawer 11 may have an upward opening (not shown in the figure), the user can take a stored item placed in the drawer 11 from the opening, and can also put a stored item into the drawer 11 from the opening.

[0034] In a variant embodiment, the drawer 11 may be a drawer door, the drawer door may be slidably supported on a guide rail 12 and open or close the access opening 101 of the storage compartment 10 in a push-pull manner. When the access opening 101 is opened, the stored items may be put into or taken out of a cavity exposed by the access opening 101.

[0035] Further, referring to FIG. 2 and FIG. 3, the household appliance 1 may further include the guide rail 12, the guide rail 12 is located in the storage compartment 10, the guide rail 12 may have a sliding slot 120, and a first sliding portion 110 is adapted to slide along the sliding slot 120.

[0036] For example, the guide rail 12 may be made of plastic material.

[0037] Further, the sliding slot 120 may include an inclined slot portion 121 tilting toward a sinking direction of the drawer 11 along a pull-out direction (the direction y shown in the figure) of the drawer 11. FIG. 2 is a schematic diagram of the guide rail 12 of the household appliance 1 shown in FIG. 1; and FIG. 3 is a side view of the guide rail 12 shown in FIG. 2.

[0038] The sinking direction of the drawer 11 may be the direction of gravity. For the drawer 11 that is pulled out of or pushed back to the storage compartment 10 along the direction y shown in FIG. 1, the sinking direction of the drawer 11 may be the opposite direction of the direction z shown in the figure.

[0039] In a specific embodiment, a quantity of the guide rails 12 may be two, and the guide rails 12 are disposed opposite to each other on two inner side walls, left and right inner side walls, of the storage compartment 10 along the direction x, and FIG. 4 and FIG. 5 show combined schematic diagrams of the drawer 11 supported on one of the guide rails 12. FIG. 4 is a schematic diagram of the drawer 11 of the household appliance 1 shown in FIG. 1 being pushed back to the storage compartment 10 along the guide rail 12 shown in FIG. 2; and FIG. 5 is a schematic diagram of the drawer 11 of the household appliance 1 shown in FIG. 1 being pulled out of the storage compartment 10 along the guide rail 12 shown in FIG. 2.

[0040] In a specific embodiment, an extending direction of the sliding slot 120 may be roughly parallel to the pull-out direction of the drawer 11 (the direction y shown in the figure), so that the drawer supported on the guide rail 12 through the first sliding portion 110 may be smoothly pulled out of or pushed back to the storage compartment 10.

ment 10.

[0041] In a specific embodiment, the sliding slot 120 may have an opening 122 facing the drawer 11, and the first sliding portion 110 extends from the opening 122 into the sliding slot 120 and is supported on the sliding slot 120, so that the first sliding portion 110 may be effectively supported on the drawer 11 to slide along the sliding slot 120.

[0042] In a specific embodiment, the first sliding portion 110 may include a first roller 111 rotatably disposed on the drawer 11. Therefore, the first roller 111 is adapted to support the drawer 11 to roll on the sliding slot 120, to avoid dry friction between the drawer 11 and the sliding slot 120, so that the user may pull the drawer 11 more smoothly.

[0043] In a variant embodiment, the first sliding portion 110 may include an external flange formed by bending an upper edge of the side wall of the drawer 11 along a direction far away from the opening of the drawer 11, and the external flange is supported on the sliding slot 120, and may slide back and forth on the sliding slot 120 along the direction y.

[0044] In a specific embodiment, the drawer 11 along the direction y has a front end 11a and a rear end 11b opposite to each other. The front end 11a refers to an end near the access opening 101 when the drawer 11 is located in the storage compartment 10, and the rear end 11b refers to the end far away from the access opening 101 when the drawer 11 is located in the storage compartment 10.

[0045] The guide rail 12 along the direction y has a front end 12a and a rear end 12b opposite to each other. The front end 12a refers to the end near the access opening 101 of the storage compartment 10, and the rear end 12b refers to the end far away from the access opening 101.

[0046] In a specific embodiment, the first sliding portion 110 may be disposed at the rear end 11b of the drawer 11.

[0047] In a specific embodiment, the guide rail 12 may be provided with one or more mounting holes 123, and the guide rail 12 is adapted to be fixed on the inner side wall of the storage compartment 10. For example, when mounting, the guide rail 12 may be fixed in the storage compartment 10 through the mounting hole 123 by a method of using a bolt or other methods.

[0048] An example in which the household appliance 1 is the refrigerator, the guide rail 12 may be fixed to an inner container of a refrigerating chamber or a freezing chamber.

[0049] In a specific embodiment, the inclined slot portion 121 may have an upper slot wall 124, the upper slot wall 124 is tilted toward the sinking direction (the direction y shown in the figure) along the pull-out direction (the opposite direction to the direction z shown in the figure), to form an extending obliquely downward guide surface along the direction y.

[0050] When the first sliding portion 110 slides to the front end 12a of the guide rail 12 along the pull-out direc-

tion (the direction y shown in the figure), the front end 11a of the drawer 11 sinks under the action of gravity, and the first sliding portion 110 synchronously moves toward the direction (the direction z shown in the figure) opposite to the sinking direction. A distance by which the first sliding portion 110 moves upward is restricted by the upper slot wall 124 that tilts downward and is reduced, so that the distance by which the front end 11a of the drawer 11 tilts downward is also reduced.

[0051] In a specific embodiment, the upper slot wall 124 may be in a linear shape, as shown in FIG. 3, so that the drawer 11 has a relatively smooth movement throughout the process of being pulled out of the storage compartment 10, and the user does not feel an obvious jamming.

[0052] In a variation, the upper slot wall 124 may alternatively be in an arc shape roughly extending toward the sinking direction along the direction y, and the arc shape may bulge toward the sinking direction. Alternatively, the arc shape may bulge toward the direction z shown in the figure.

[0053] In a specific embodiment, the upper slot wall 124 may be in a step shape roughly extending toward the sinking direction along the direction y, to reduce the sinkage of the front end 11a of the drawer 11 while producing a deceleration effect to some extent, to prevent the drawer 11 from being pulled too quickly and causing a safety accident.

[0054] In a specific embodiment, the sliding slot 120 may have a basically constant cross section to ensure that the first sliding portion 110 can smoothly slide along the sliding slot 120, which is beneficial to reducing complexity of molds and optimizing a manufacturing process. The cross section refers to a cross section on a plane formed by the direction x and the direction z.

[0055] In a specific embodiment, the sliding slot 120 has an upper slot wall 120a and a lower slot wall 120b opposite to each other along the direction z. For any point of the sliding slot 120 along the direction y, along the direction z, the distance from the upper slot wall 120a to the lower slot wall 120b of the sliding slot 120 may be roughly the same.

[0056] When the drawer 11 is pulled out of or pushed back to the storage compartment 10, the first sliding portion 110 is supported on the lower slot wall 120b of the sliding slot 120 most of the time and slides along the lower slot wall 120b.

[0057] When the drawer 11 moves long the pull-out direction until the center of gravity exceeds the guide rail 12, the drawer 11 sinks under the action of gravity, so that the first sliding portion 110 tilts up along the direction z and is in contact with the upper slot wall 120a of the sliding slot 120.

[0058] When the drawer 11 continues to move toward the pull-out direction, the first sliding portion 110 slides to the upper slot wall 124 of the inclined slot portion 121 along the upper slot wall 120a of the sliding slot 120. Certainly, a length of the inclined slot portion 121 along

the direction y may be suitable for enabling the first sliding portion 110 to switch to the upper slot wall 124 of the inclined slot portion 121 when the first sliding portion 110 separates from the lower slot wall 120b of the sliding slot 120.

[0059] In a specific embodiment, the upper slot wall 124 of the inclined slot portion 121 may be formed by the upper slot wall 120a of the sliding slot 120. For example, for the upper slot wall 120a of the sliding slot 120 extending along the direction y, an extending direction of part of the upper slot wall 120a located in the middle of the sliding slot 120 and near the rear end 12b of the guide rail 12 may be roughly parallel to a horizontal direction (the direction y shown in the figure), and the part of the upper slot wall 120a located at the sliding slot 120 and near the front end 12a of the guide rail 12 is adapted to form the upper slot wall 124 of the inclined slot portion 121.

[0060] In a variant embodiment, the upper slot wall 124 of the inclined slot portion 121 may be an independent baffle, and is connected to the upper slot wall 120a of the sliding slot 120. For example, an end of the upper slot wall 124 of the inclined slot portion 121 far away from the front end 12a of the guide rail 12 may be connected to the upper slot wall 120a of the sliding slot 120, and an end of the upper slot wall 124 of the inclined slot portion 121 near the front end 12a of the guide rail 12 may extend toward the sinking direction. Therefore, the inclined slot portion 121 may be mounted on a guide rail of the existing household appliance in a form of an independent component.

[0061] In a specific embodiment, the guide rail 12 may include a stop structure 125, where the stop structure 125 is adapted to stop the drawer 11 after the drawer 11 is pulled out to a predetermined degree. When the drawer 11 is stopped, the first sliding portion 110 is located in the inclined slot portion 121, as shown in FIG. 5. Therefore, a maximum movement stroke of the drawer 11 along the pull-out direction (the direction y in the figure) is restricted by using the stop structure 125, to prevent the drawer 11 from being completely pulled out of the storage compartment 10.

[0062] For example, the predetermined degree may be determined according to the length of the inclined slot portion 121 along the direction y.

[0063] In a specific embodiment, a side wall of the drawer 11 may be provided with a stop portion 112, where the stop portion 112 is adapted to fit with the stop structure 125, to stop the drawer 11.

[0064] For example, the stop structure 125 may be in an arc shape structure bulging toward the direction z, the stop portion 112 may be a matching arc-shaped notch, and stop the drawer 11 when the drawer 11 moves to the stop portion 112 along the direction y and abuts against the stop structure 125.

[0065] In a specific embodiment, when the drawer 11 is stopped, the first sliding portion 110 abuts against the upper slot wall 124 of the inclined slot portion 121, and

the drawer 11 is supported on a second sliding portion 126 in front of the inclined slot portion 121.

[0066] For example, the second sliding portion 126 may include a second roller 127, and a support may be correspondingly disposed on a side wall of the drawer 11, so that the drawer 11 may be supported on the second roller 127 to move when being pulled out of or pushed back to the storage compartment 10, thereby reducing friction and optimizing a movement effect of the drawer 11.

[0067] A radian of an outer contour of the second roller 127 may match a shape of the stop structure 125, and the stop portion 112 of the drawer 11 may match at least one of the second roller 127 and the stop structure 125, to effectively produce a stop effect.

[0068] The front end 12a of the guide rail 12 may be provided with a pivot portion 128, and the second roller 127 may be rotatably disposed on the pivot portion 128.

[0069] The second roller 127 may be fixed to the guide rail 12 or located in front of the guide rail 12.

[0070] Therefore, the second sliding portion 126 is used as a fulcrum, the front end 11a of the drawer 11 sinks naturally, and the first sliding portion 110 tilts up synchronously in an opposite direction. In this process, because the inclined slot portion 121 tilts toward the sinking direction along the pull-out direction, the first sliding portion 110 that tilts up in the opposite direction may abut against the upper slot wall 124 of the inclined slot portion 121 earlier. Further, the first sliding portion 110 and the inclined slot portion 121 that abut against each other may prevent the front end 11a of the drawer 11 from continuously sinking. Moreover, the first sliding portion 110 may abut against the inclined slot portion 121 only by tilting up in the opposite direction at a small stroke, so that the sinkage of the front end 11a of the drawer 11 may also be effectively reduced.

[0071] In a specific embodiment, referring to FIG. 5, along the pull-out direction (the direction y in the figure) of the drawer 11, a distance L1 from a junction between the inclined slot portion 121 and another portion of the sliding slot 120 to the stop structure 125 is greater than a distance L2 from the first sliding portion 110 to a stop portion 112 of the drawer 11. Therefore, it can be ensured that the first sliding portion 110 is located at the inclined slot portion 121 when the drawer 11 is stopped, to reduce the sinkage of the front end 11a of the drawer 11.

[0072] Specifically, the junction between the inclined slot portion 121 and another portion of the sliding slot 120 may refer to the junction between the upper slot wall 120a of the sliding slot 120 and the upper slot wall 124 of the inclined slot portion 121.

[0073] In a specific embodiment, a tilt angle (a tilt angle α in the figure) of the inclined slot portion 121 tilting toward the sinking direction along the pull-out direction (the direction y in the figure) may be from 3 degrees to 10 degrees. The tilt angle α refers to an angle between the extending direction of the upper slot wall 124 of the inclined slot portion 121 and the direction y.

[0074] In a specific embodiment, the length of the inclined slot portion 121 along the pull-out direction (the direction y in the figure) of the drawer 11 is at least one third of the length of the sliding slot 120 along the pull-out direction (the direction y in the figure) of the drawer 11.

[0075] Therefore, by appropriately designing a downward tilt angle of the inclined slot portion 121 and the length of the inclined slot portion 121, the sinkage is reduced while ensuring that the user does not feel an obvious jamming when pulling the drawer 11, to optimize user experience.

[0076] In a specific embodiment, the guide rail 12 may include an inlet section 129 located at the front end of the sliding slot 120 along the pull-out direction (the direction y in the figure) of the drawer 11, and the inlet section 129 is located in front of the inclined slot portion 121. For example, the inlet section 129 may be closer to the front end 12a of the guide rail 12 than the inclined slot portion 121.

[0077] In a specific embodiment, at least one of an upper slot wall 129a and a lower slot wall 129b of the inlet section 129 tilts, along the pull-out direction (the direction y in the figure) of the drawer 11, toward the direction gradually away from the other one of the upper slot wall 129a and the lower slot wall 129b.

[0078] Therefore, the inlet section 129 is in a flare opening shape, which is beneficial to mounting the first sliding portion 110 of the drawer 11 into the sliding slot 120, and facilitates assembly of the drawer 11.

[0079] For example, the upper slot wall 129a of the inlet section 129 may be formed by the upper slot wall 120a of the sliding slot 120, and the lower slot wall 129b of the inlet section 129 may be formed by the lower slot wall 120b of the sliding slot 120.

[0080] In a specific embodiment, the sliding slot 120 may include a horizontal section 130 located behind the inclined slot portion 121 along the pull-out direction (the direction y in the figure) of the drawer 11, and a lower slot wall 130b of the horizontal section 130 is parallel to the horizontal direction (the direction y in the figure). Therefore, the horizontal section 130 is adapted to support the drawer 11 to be pulled out of or pushed back to the storage compartment 10 roughly along the horizontal direction, and guide the drawer 11 to move to the inclined slot portion 121 when the drawer 11 is pulled out.

[0081] For example, the lower slot wall 130b of the horizontal section 130 may be formed by the lower slot wall 120b of the sliding slot 120.

[0082] In a specific embodiment, the rear end of the sliding slot 120 along the pull-out direction (the direction y in the figure) of the drawer 11 may have a tilting portion 131, and the tilting portion 131 tilts toward the sinking direction along a push-back direction (the opposite direction to the direction y shown in the figure) of the drawer 11.

[0083] Therefore, the drawer 11 that is pushed back to the tilting portion 131 along the sliding slot 120 has a tendency to continue to automatically move into the storage compartment 10, so that the drawer 11 may auto-

matically move to a final position after being pushed back to the predetermined degree.

[0084] For example, the tilting portion 131 may include a lower slot wall 131b, the lower slot wall 131b of the tilting portion 131 may be formed by the lower slot wall 120b of the sliding slot 120.

[0085] In a specific embodiment, along the direction y, the sliding slot 120 may sequentially include the tilting portion 131, the horizontal section 130, the inclined slot portion 121, and the inlet section 129. Each of the components may include an upper slot wall and a lower slot wall opposite to each other, a transition between upper slot walls of the two adjacent components is smooth, and a transition between lower slot walls of the two adjacent components is also smooth. The upper slot wall of each component is adapted to form the upper slot wall 120a of the sliding slot 120, and the lower slot wall of each component is adapted to form the lower slot wall 120b of the sliding slot 120.

[0086] Specifically, the upper slot wall 129a and the lower slot wall 129b of the inlet section 129 extend in directions away from each other along the direction y, to form a flare opening to help the first sliding portion 110 to extend into the sliding slot 120.

[0087] The inclined slot portion 121 located behind the inlet section 129 along the direction y may have an upper slot wall 124 that tilts downward and extends along the direction y. Correspondingly, the lower slot wall of the inclined slot portion 121 may be parallel to the upper slot wall 124 thereof, to ensure that a height of the inclined slot portion 121 along the direction z is roughly constant.

[0088] The horizontal section 130 located behind the inclined slot portion 121 along the direction y may have the upper slot wall and the lower slot wall 130b that both roughly extend along the direction y.

[0089] The tilting portion 131 located behind the horizontal section 130 along the direction y may have a lower slot wall 131b that tilts downward and extends along the opposite direction of the direction y. Correspondingly, the upper slot wall of the tilting portion 131 may be parallel to the lower slot wall 131b thereof, to ensure that a height of the tilting portion 131 along the direction z is roughly constant.

[0090] When the drawer 11 is located in the storage compartment 10, as shown in FIG. 4, the first sliding portion 110 is supported on the lower slot wall 131b of the tilting portion 131. When the drawer 11 is pulled out of the storage compartment 10 from a position shown in FIG. 4, the first sliding portion 110 slides along the lower slot wall 120b of the sliding slot 120, and sequentially passes through the lower slot wall 131b of the tilting portion 131 and a most part of the lower slot wall 130b of the horizontal portion 130.

[0091] When the drawer 11 is pulled out near a position shown in FIG. 5, under the action of gravity, the front end 11a of the drawer 11 sinks, so that the first sliding portion 110 is detached from the lower slot wall 120b of the sliding slot 120 and tilts up to abut against the upper slot wall

124 of the inclined slot portion 121.

[0092] As the drawer 11 is continuously pulled out, the stop portion 112 of the drawer 11 abuts against the stop structure 125 disposed on the guide rail 12, and when the drawer 11 is stopped, a position of the drawer 11 is shown in FIG. 5.

[0093] When the drawer 11 is pushed back to the storage compartment 10 from the position shown in FIG. 5, the first sliding portion 110 changes from sliding along the upper slot wall 124 of the inclined slot portion 121 to sliding along the lower slot wall 130b of the horizontal section 130.

[0094] As the drawer 11 is continuously pushed back, the first sliding portion 110 slides to the lower slot wall 131b of the tilting portion 131. In this case, even if the drawer 11 no longer receives a thrust along the opposite direction of the direction y, under the action of gravity, the first sliding portion 110 can still slide toward the rear end 12b of the guide rail 12 along the lower slot wall 131b of the tilting portion 131. Therefore, the drawer 11 may automatically move to the position shown in FIG. 4.

[0095] In a specific embodiment, the first sliding portion 110 is in contact with the upper slot wall 124 of the inclined slot portion 121 during at least a part of a stroke inside the inclined slot portion 121, so that the rear end 11b of the drawer 11 is restricted from continuously tilting up, thereby acting on the front end 11a of the drawer 11 to reduce the sinkage.

[0096] In view of the above, by using the solution of this embodiment, the inclined slot portion 121 tilting toward the sinking direction of the drawer 11 is provided at the front end 12a of the guide rail 12, so that it is possible to reduce the sinkage of the front end 11a when the drawer 11 is pulled out. Reduction of the sinkage is beneficial to avoiding collision between the front end 11a of the drawer 11 and another component (as the drawer 11 located below in FIG. 1) of the household appliance 1 when the drawer 11 is pulled out.

[0097] Although specific implementations have been described above, these implementations are not intended to limit the scope of the present disclosure, even if only one implementation is described with respect to specific features. The feature example provided in the present disclosure is intended to illustrate, but not limit, unless otherwise stated. In specific embodiments, the technical features of one or more dependent claims may be combined with the technical features of the independent claims, and the technical features from the corresponding independent claims may be combined in any appropriate manner, rather than only in the specific combinations listed in the claims.

[0098] Although the present invention is disclosed above, the present invention is not limited thereto. Any person skilled in the art can make various variations and modifications without departing from the spirit and scope of the present disclosure. Therefore, the protection scope of the present disclosure should be subject to the scope defined by the claims.

Claims

1. A household appliance (1), **characterized by** comprising:
 - a storage compartment (10), the storage compartment (10) having an access opening (101);
 - a drawer (11), having a first sliding portion (110), the drawer (11) being located in the storage compartment (10) and capable of being pulled out of or pushed back to the storage compartment (10); and
 - a guide rail (12), the guide rail (12) being located in the storage compartment (10), the guide rail (12) having a sliding slot (120), and the first sliding portion (110) being adapted to slide along the sliding slot (120), wherein the sliding slot (120) comprises an inclined slot portion (121) tilting toward a sinking direction of the drawer (11) along a pull-out direction of the drawer (11).
2. The household appliance (1) according to claim 1, **characterized in that** the inclined slot portion (121) has an upper slot wall (124), and the upper slot wall (124) tilts toward the sinking direction along the pull-out direction.
3. The household appliance (1) according to any one or more of claims 1 to 2, **characterized in that** the sliding slot (120) has a basically constant cross section.
4. The household appliance (1) according to any one or more of claims 1 to 3, **characterized in that** the guide rail (12) comprises a stop structure (125), the stop structure (125) is adapted to stop the drawer (11) after the drawer (11) is pulled out to a predetermined degree, and when the drawer (11) is stopped, the first sliding portion (110) is located in the inclined slot portion (121).
5. The household appliance (1) according to one or more of claims 2 to 4, **characterized in that** when the drawer (11) is stopped, the first sliding portion (110) abuts against the upper slot wall (124) of the inclined slot portion (121), and the drawer (11) is supported on a second sliding portion (126) in front of the inclined slot portion (121).
6. The household appliance (1) according to one or more of claims 4 to 5, **characterized in that** along the pull-out direction of the drawer (11), a distance (L1) from a junction between the inclined slot portion (121) and another portion of the sliding slot (120) to the stop structure (125) is greater than a distance (L2) from the first sliding portion (110) to a stop portion (112) of the drawer (11), wherein the stop portion

(112) of the drawer (11) is adapted to fit with the stop structure (125) to stop the drawer (11).

(120) and is supported on the sliding slot (120).

7. The household appliance (1) according to one or more of claims 1 to 6, **characterized in that** a tilt angle of the inclined slot portion (121) tilting toward the sinking direction along the pull-out direction is from 3 degrees to 10 degrees, and/or a length of the inclined slot portion (121) along the pull-out direction of the drawer (11) is at least one third of a length of the sliding slot (120) along the pull-out direction of the drawer (11). 5 10
8. The household appliance (1) according to one or more of claims 1 to 7, **characterized in that** the guide rail (12) comprises an inlet section (129) located at a front end of the sliding slot (120) along the pull-out direction of the drawer (11), the inlet section (129) is located in front of the inclined slot portion (121), and at least one of an upper slot wall (129a) and a lower slot wall (129b) of the inlet section (129) tilts, along the pull-out direction of the drawer (11), toward a direction gradually away from the other one of the upper slot wall (129a) and the lower slot wall (129b). 15 20 25
9. The household appliance (1) according to one or more of claims 1 to 8, **characterized in that** the first sliding portion (110) comprises a first roller (111) rotatably disposed on the drawer (11). 30
10. The household appliance (1) according to one or more of claims 1 to 9, **characterized in that** the sliding slot (120) comprises a horizontal section (130) located behind the inclined slot portion (121) along the pull-out direction of the drawer (11), and a lower slot wall (130b) of the horizontal section (130) is parallel to a horizontal direction. 35
11. The household appliance (1) according to one or more of claims 1 to 10, **characterized in that** a rear end of the sliding slot (120) along the pull-out direction of the drawer (11) has a tilting portion (131), and the tilting portion (131) tilts toward the sinking direction along a push-back direction of the drawer (11). 40 45
12. The household appliance (1) according to one or more of claims 1 to 11, **characterized in that** the first sliding portion (110) is in contact with the upper slot wall (124) of the inclined slot portion (121) during at least a part of a stroke inside the inclined slot portion (121). 50
13. The household appliance (1) according to one or more of claims 1 to 12, **characterized in that** the sliding slot (120) has an opening (122) facing the drawer (11), and the first sliding portion (110) extends from the opening (122) into the sliding slot 55

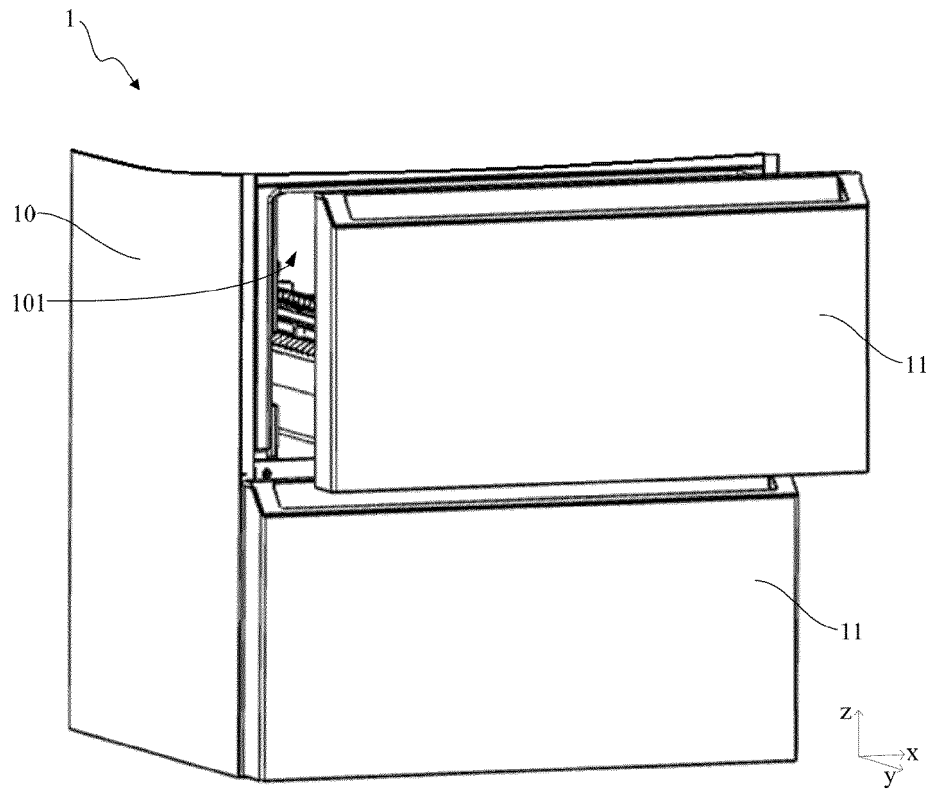


FIG. 1

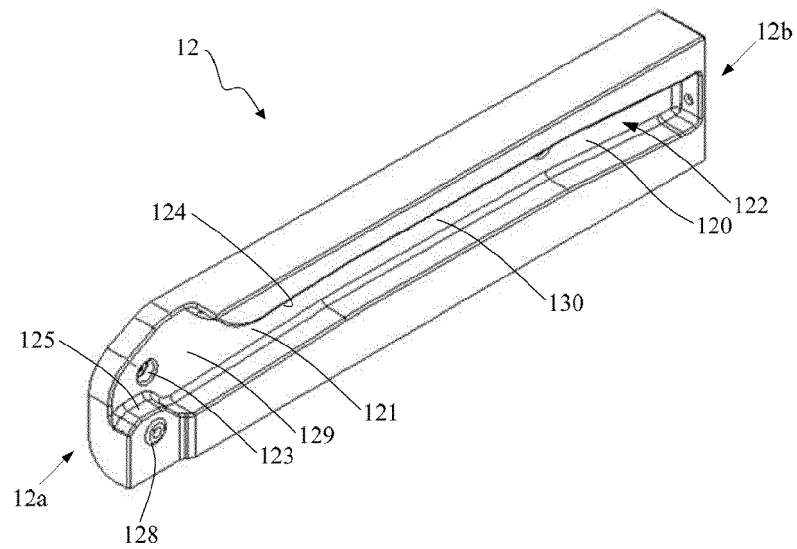


FIG. 2

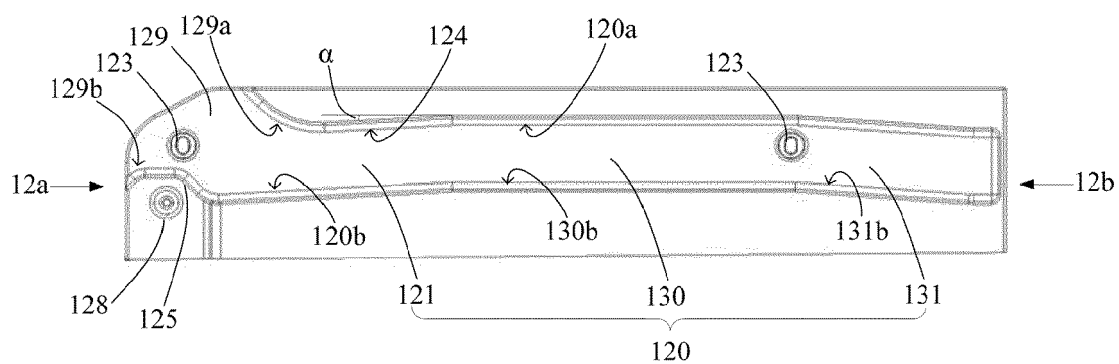


FIG. 3

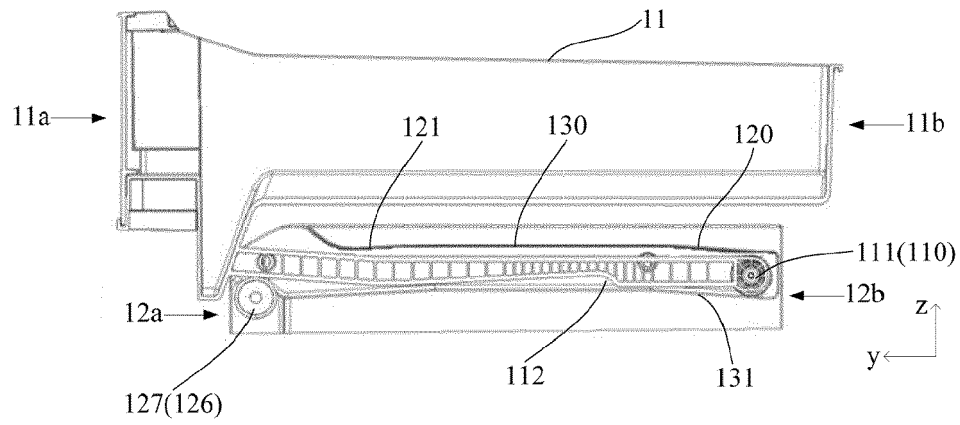


FIG. 4

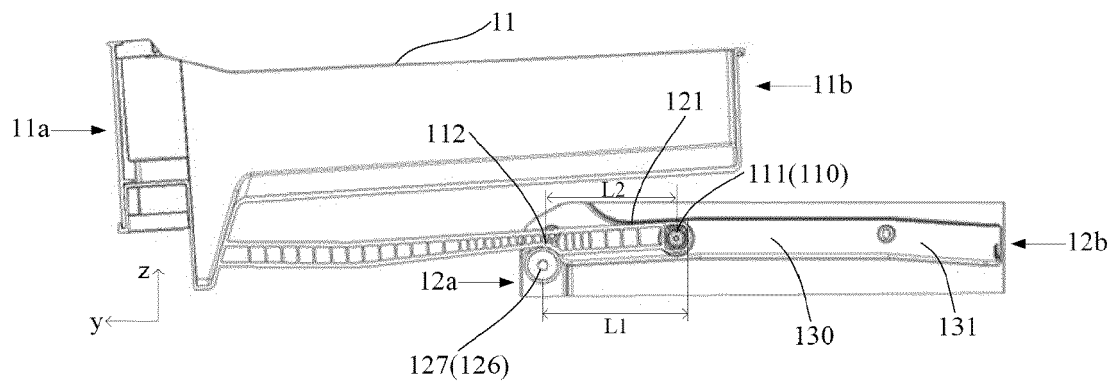


FIG. 5



EUROPEAN SEARCH REPORT

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EPO FORM 1503 03.82 (P04C01)

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 S55 56392 U (MITSUBISHI ELECTRIC CORPORATION) 16 April 1980 (1980-04-16) * paragraphs [0001], [0002]; figures 1-5 *	1-8, 10-13	INV. F25D25/02 A47L15/00 A47L15/50 D06F39/02 F24C15/16
X	US 2012/273504 A1 (RACKLEY TIMOTHY BRYAN [US] ET AL) 1 November 2012 (2012-11-01) * paragraphs [0024] - [0031]; figures 1-9 *	1,4-10, 12,13	
X	KR 2010 0019305 A (HITACHI APPLIANCES INC [JP]) 18 February 2010 (2010-02-18) * paragraphs [0023] - [0069]; figures 1-13 *	1-3,7,8, 11-13	
X	EP 2 629 034 A1 (INDESIT CO SPA [IT]) 21 August 2013 (2013-08-21) * paragraphs [0014] - [0048]; figures 1-4 *	1,3,7,8, 10-13	
X	WO 2008/015181 A2 (ARCELIK AS [TR]; OZYUKSEL EMRE [TR] ET AL.) 7 February 2008 (2008-02-07) * paragraphs [0030] - [0038]; figures 1-9 *	1-3,7, 12,13	TECHNICAL FIELDS SEARCHED (IPC) F25D D06F F24C A47L
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 May 2021	Examiner Kolev, Ivelin
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	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP S5556392 U	16-04-1980	JP S596393 Y2	27-02-1984
		JP S5556392 U	16-04-1980
US 2012273504 A1	01-11-2012	AU 2012250112 A1	07-11-2013
		BR 112013027716 A2	27-12-2016
		CN 103620327 A	05-03-2014
		EP 2702337 A2	05-03-2014
		US 2012273504 A1	01-11-2012
		WO 2012148674 A2	01-11-2012
KR 20100019305 A	18-02-2010	CN 101644520 A	10-02-2010
		JP 4778993 B2	21-09-2011
		JP 2010038499 A	18-02-2010
		KR 20100019305 A	18-02-2010
EP 2629034 A1	21-08-2013	NONE	
WO 2008015181 A2	07-02-2008	CN 101523142 A	02-09-2009
		EP 2049853 A2	22-04-2009
		ES 2525224 T3	19-12-2014
		RU 2009107201 A	10-09-2010
		WO 2008015181 A2	07-02-2008