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(54) WASHING MACHINE INCLUDING DRAWER

(57) The present application discloses a washing machine including a drawer. The washing machine includes a housing (2) accommodating the drawer (1), where the drawer includes a panel (11) and a tray (12) connected to the panel, a linearly movable lock body (31) is provided on the tray, the lock body further includes a first slope (35) inclined relative to a movement direction of the lock body, the panel includes a fixed portion (13) and a moving portion (14) movable relative to the fixed portion, the moving portion includes a push rod (142), and a head portion (143) of the push rod is located in a recess (36) at the bottom of the first slope when the lock body is in an unlocked position. A user can implement unlocking and locking functions respectively by pushing the moving portion on the panel of the drawer, or can push the fixed portion to close and lock the drawer.

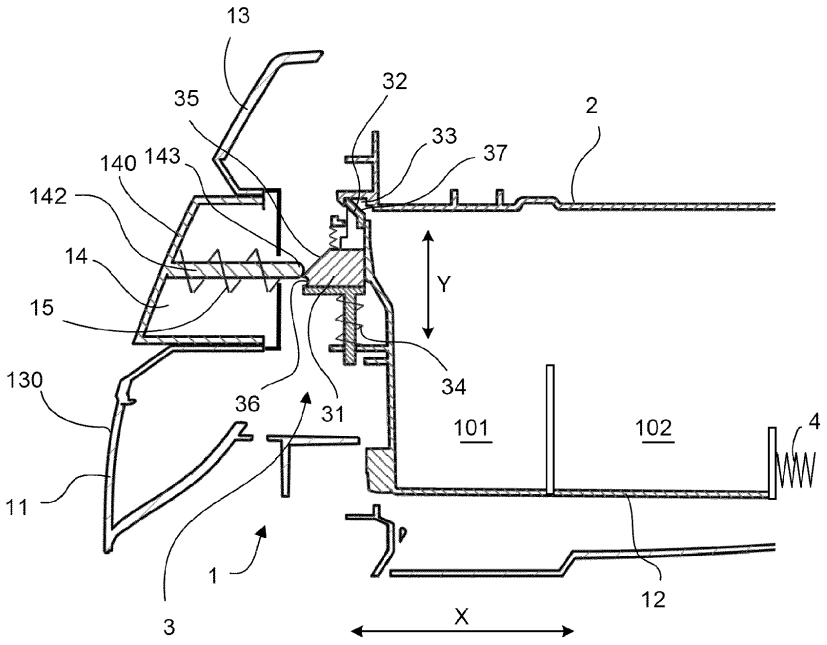

FIG. 1

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Description

[0001] The present invention relates to a washing machine including a drawer, and in particular, to a device for locking or unlocking a drawer.

[0002] Some washing machines include drawer structures, where the drawers have accommodation spaces, configured to store or temporarily hold items or clothing treating agents. Some drawers are further provided with locking devices so that the drawers may be locked in closed positions and may be opened after being unlocked.

[0003] It is known that unlocking buttons are disposed on panels of some drawers, and users may unlock the drawers by pressing the buttons, and close the drawers and lock the locking devices by pressing the remaining parts of the panels. As a result, the design of the panel is limited by the size of the button to ensure that a sufficient fixed portion of the panel is left to push the drawer. With increasingly simplified appearance design, the structure of the button becomes an obstacle to simplification of the panel design.

[0004] An object of the present invention is to provide a washing machine that is an improvement on the existing technologies.

[0005] An embodiment of the present invention includes a washing machine including a drawer, where the washing machine includes a housing accommodating the drawer, where the drawer includes a panel and a tray connected to the panel, a linearly movable lock body is provided on the tray, the lock body includes a tongue portion, the housing includes a lock slot capable of accommodating the tongue portion to restrict movement of the drawer, and a first spring acts on the lock body and applies a force to the lock body in a direction that causes the tongue portion to be inserted into the lock slot, where the lock body further includes a first slope inclined relative to a movement direction of the lock body, the panel includes a fixed portion and a moving portion movable relative to the fixed portion, the moving portion includes a push rod, a head portion of the push rod faces the first slope when the lock body is in a locked position, that is, when the tongue portion is located in the lock slot, and the head portion of the push rod is located in a recess at the bottom of the first slope when the lock body is in an unlocked position, that is, when the tongue portion is detached from the lock slot and the first spring releases a thrust to push the lock body to move to a pre-mounting position; and the tongue portion has a second slope facing a push-in direction of the drawer.

[0006] In this embodiment, when the lock body is in the locked position, since the head portion of the push rod faces the first slope, a user may push the moving portion to drive the push rod to push the first slope of the lock body. In this way, the lock body compresses the first spring to leave the locked position, the tongue portion exits from the lock slot to implement unlocking. In this way, the drawer may be opened. When the lock body is in the unlocked position, the head portion of the push rod is restricted by the recess, so that by pushing the moving portion on the panel, the lock body and the tray connected to the lock body may be pushed to move along a direction of closing the drawer. After the tray is pushed to such an extent that the second slope of the tongue portion of the lock body is close to the lock slot, the lock body is pressed downward along the second slope and continues to move forward to eventually make the tongue portion enter the lock slot to implement locking.

[0007] Therefore, it can be seen that, the user can implement unlocking and locking functions respectively by pushing the moving portion on the panel of the drawer, or can push the fixed portion to close and lock the drawer. Therefore, the design of the moving portion is very free, and also makes it easy for the user to operate the drawer.

[0008] In some embodiments, the drawer is provided inside with a compartment accommodating a clothing treating agent.

[0009] In some embodiments, a second spring applies a pressure to the moving portion.

[0010] In some embodiments, the recess is of a curved-surface concave structure, and the head portion of the push rod has a curved-surface convex structure adapted to the recess. The fit between the curved-surface convexity and the curved-surface concavity makes the push rod and the lock body have a necessary bonding force so that the tray can be pushed. In addition, the head portion of the push rod may be detached from the fit with the recess when the second slope of the tongue portion is subjected to a force to press the lock body downward so that the lock body may move to implement locking.

[0011] In some embodiments, the moving portion moves along a first direction, the lock body moves along a second direction, and the first direction is approximately perpendicular to the second direction.

[0012] In some embodiments, the moving portion of the panel includes a first surface away from the tray, the fixed portion of the panel includes a second surface away from the tray, and the area of the first surface is greater than the area of the second surface. In this way, the user can operate the moving portion more easily. Additionally, when the first surface is large enough, the panel is more integral, facilitating the exertion and expansion of industrial design work.

[0013] The structure of the present invention and other inventive objectives and beneficial effects thereof will become more comprehensible from the description of the exemplary embodiments with reference to the accompanying drawings.

[0014] The following accompanying drawings, as a part of the specification and provided to further understand the present invention, describe specific implementations of the present invention and are used to describe the principle of the present invention along with the specification, where:

FIG. 1 is a schematic cross-sectional view of a draw-

er of a washing machine in a locked state; and

FIG. 2 is a schematic cross-sectional view of a drawer of a washing machine in a pulled-out state.

[0015] As shown in FIG. 1 and FIG. 2, a washing machine includes a drawer 1 and a housing 2 accommodating the drawer 1. In the housing 2, the drawer 1 may move back and forth along a first direction X. The drawer 1 may be a clothing treating agent addition box, a strainer or a storage box. When the drawer 1 is used as a clothing treating agent addition box, compartments 101 and 102 accommodating a clothing treating agent are disposed inside the drawer 1. The drawer 1 and the housing 2 may be interlocked by a locking device 3. After unlocking, the drawer 1 is opened under the action of an elastic driving device 4. The elastic driving device 4 may be implemented as a spring.

[0016] The drawer 1 includes a panel 11 and a tray 12 connected to the panel 11. The locking device 3 includes a lock body 31 that is disposed on the tray 12 and that is linearly movable in a second direction Y. The second direction Y is approximately perpendicular to the first direction X. The lock body 31 includes a tongue portion 32 located on an end. The locking device 3 further includes a lock slot 33 that is disposed on the housing 2 and that may accommodate the tongue portion 32 to limit the movement of the drawer. A first spring 34 is compressed to act on the lock body 31 and is located on a side opposite to the tongue portion 32, thereby applying a force to the lock body 31 in a direction that causes the tongue portion 32 to be inserted into the lock slot 33.

[0017] The lock body 31 further includes a first slope 35 inclined relative to a movement direction of the lock body. The panel 11 includes a fixed portion 13 and a moving portion 14 that is movable relative to the fixed portion 13. The fixed portion 13 may be disposed as a frame and the moving portion 14 covers most of the panel 11, so that the panel is visually more integral. Specifically, the moving portion 14 of the panel 11 includes a first surface 140 away from the tray 12, the fixed portion 13 of the panel 11 includes a second surface 130 away from the tray 12, and the area of the first surface 140 is greater than the area of the second surface 130.

[0018] The moving portion 14 includes a push rod 142 extending toward the lock body 31. When the lock body 31 is in a locked position, that is, the tongue portion 32 is located in the lock slot 33, a head portion 143 of the push rod 142 faces and is close to the first slope 35 of the lock body 31. When the lock body 31 is in an unlocked position, that is, the tongue portion 32 is detached from the lock slot 33 and the first spring 34 releases a thrust to push the lock body 31 to move to a pre-mounting position, the head portion 143 of the push rod 142 is located in a recess 36 at the bottom of the first slope 35. The pre-mounting position can be understood as a position in which the lock body 31 and the first spring 34 are in a stable state after the assembly is completed.

[0019] The tongue portion 32 has a second slope 37 facing a push-in direction of the drawer 1.

[0020] The recess 36 is of a curved-surface concave structure. The head portion 143 of the push rod 142 has a curved-surface convex structure adapted to the recess 36. The fit between the curved-surface convexity and the curved-surface concavity makes the push rod 142 and the lock body 31 have a necessary bonding force so that the tray 12 can be pushed. In addition, when the second slope 37 of the tongue portion 32 is subjected to a force to press the lock body 31 downward, and when the pressure reaches a necessary magnitude, the head portion 143 of the push rod 142 may be detached from the fit with the recess 36, so that the lock body 31 can move back and forth freely.

[0021] The moving portion 14 may move relative to the fixed portion 13 after being pushed, and the movement direction is approximately the same as or similar to an overall movement direction of the drawer 1, that is, the first direction X. A second spring 15 acts on the moving portion 14 to reset the moving portion 14 without being subjected to any external force.

[0022] Therefore, when the lock body 31 is in the locked position, since the head portion 143 of the push rod 142 faces and is close to the first slope 35, a user may push the moving portion 14 to cause the push rod 142 to push the first slope 35 of the lock body 31.

[0023] Under the action of a downward component force, the lock body 31 compresses the first spring 34 and leaves the locked position, driving the tongue portion 32 to exit from the lock slot 33 to implement unlocking. In this case, the drawer 1 is pushed and pulled to the open position by the action of the elastic driving device 4.

[0024] When the lock body 31 is in the unlocked position, the head portion 143 of the push rod 142 is restricted by the recess 36, so that by pushing the moving portion 14 on the panel 11, the lock body 31 and the tray 12 connected to the lock body 31 may be pushed to move along a direction of closing the drawer 1. After the tray 12 is pushed to such an extent that the tongue portion 32 of the lock body 31 is close to the lock slot 33, the second slope 37 of the tongue portion 32 pushes the housing 2. As the housing 2 is fixed, the second slope 37 of the tongue portion 32 slides downward along an edge of the housing 2, so that the lock body 31 moves downward, forcing the head portion 143 of the push rod 142 to be detached from the fit with the recess 36.

[0025] In this case, as the moving portion 14 continues to be subjected to a thrust, after being detached from the recess 36, the head portion 143 of the push rod 142 butts against the first slope 35. In this case, the lock body 31 is acted upon by both the push rod 142 and the housing 2, to compress the first spring 34 and move downward. When the lock body 31 moves to such an extent that the top of the tongue portion 32 reaches a lower edge of the lock slot 33, the lock body 31 stops moving downward and integrally moves in a push-in direction of the drawer to make the tongue portion 32 enter the lock slot 33. In

this case, due to the action of the first spring 34, the lock body 31 moves upward and the tongue portion 32 is inserted into the lock slot 33 to lock the drawer 1.

Claims

1. A washing machine comprising a drawer, comprising a housing (2) accommodating the drawer (1), wherein the drawer comprises a panel (11) and a tray (12) connected to the panel, a linearly movable lock body (31) is provided on the tray, the lock body comprises a tongue portion (32), the housing comprises a lock slot (33) capable of accommodating the tongue portion to restrict movement of the drawer, and a first spring (34) acts on the lock body and applies a force to the lock body in a direction that causes the tongue portion to be inserted into the lock slot, **characterized in that** the lock body further comprises a first slope (35) inclined relative to a movement direction of the lock body, the panel comprises a fixed portion (13) and a moving portion (14) movable relative to the fixed portion, the moving portion comprises a push rod (142), a head portion (143) of the push rod faces the first slope when the lock body is in a locked position, that is, when the tongue portion is located in the lock slot, and the head portion of the push rod is located in a recess (36) at the bottom of the first slope when the lock body is in an unlocked position, that is, when the tongue portion is detached from the lock slot and the first spring releases a thrust to push the lock body to move to a pre-mounting position; and the tongue portion has a second slope (37) facing a push-in direction of the drawer.

2. The washing machine according to claim 1, **characterized in that** compartments (101, 102) are disposed in the drawer to accommodate a clothing treating agent.

3. The washing machine according to claim 1 or 2, **characterized in that** a second spring (15) applies a pressure to the moving portion.

4. The washing machine according to any of claim 1 to 3, **characterized in that** the recess is of a curved-surface concave structure, and the head portion of the push rod has a curved-surface convex structure adapted to the recess.

5. The washing machine according to any of claim 1 to 4, **characterized in that** the moving portion moves along a first direction (X), the lock body moves along a second direction (Y), and the first direction is approximately perpendicular to the second direction.

6. The washing machine according to any of claim 1 to 5, **characterized in that** the moving portion of the panel comprises a first surface (140) away from the tray, the fixed portion of the panel comprises a second surface (130) away from the tray, and the area of the first surface is greater than the area of the second surface.

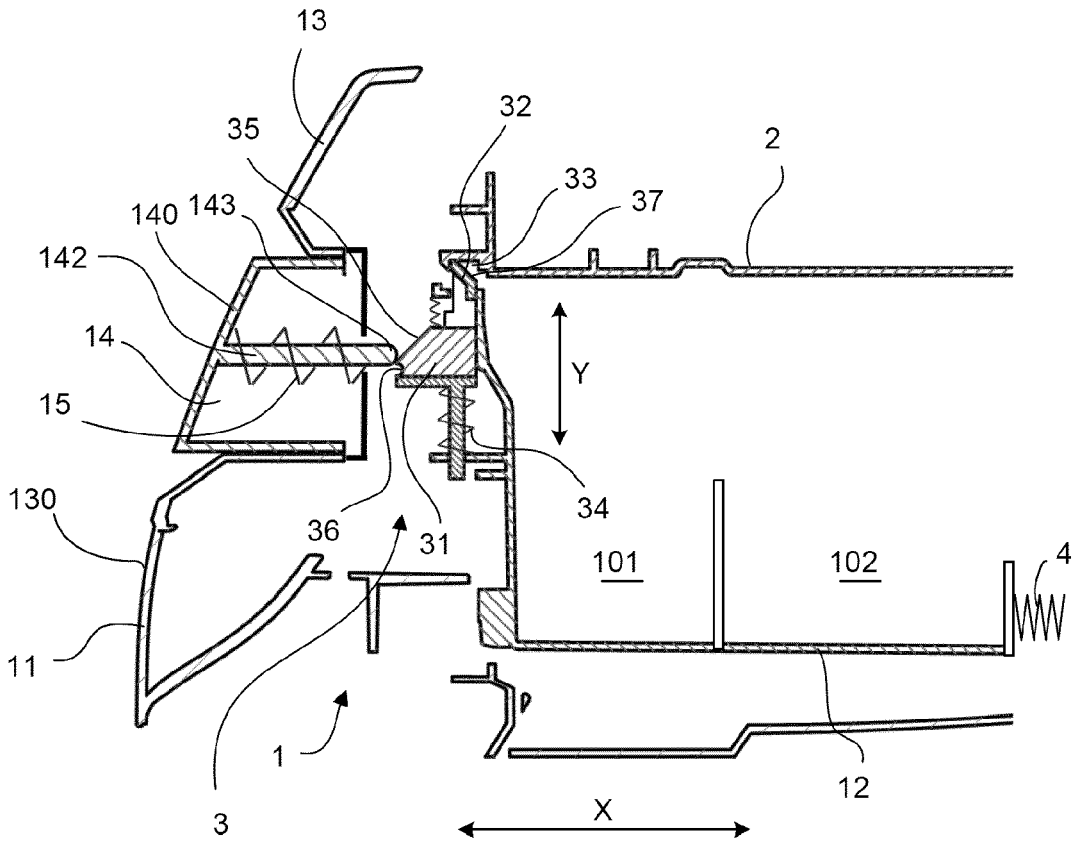

FIG. 1

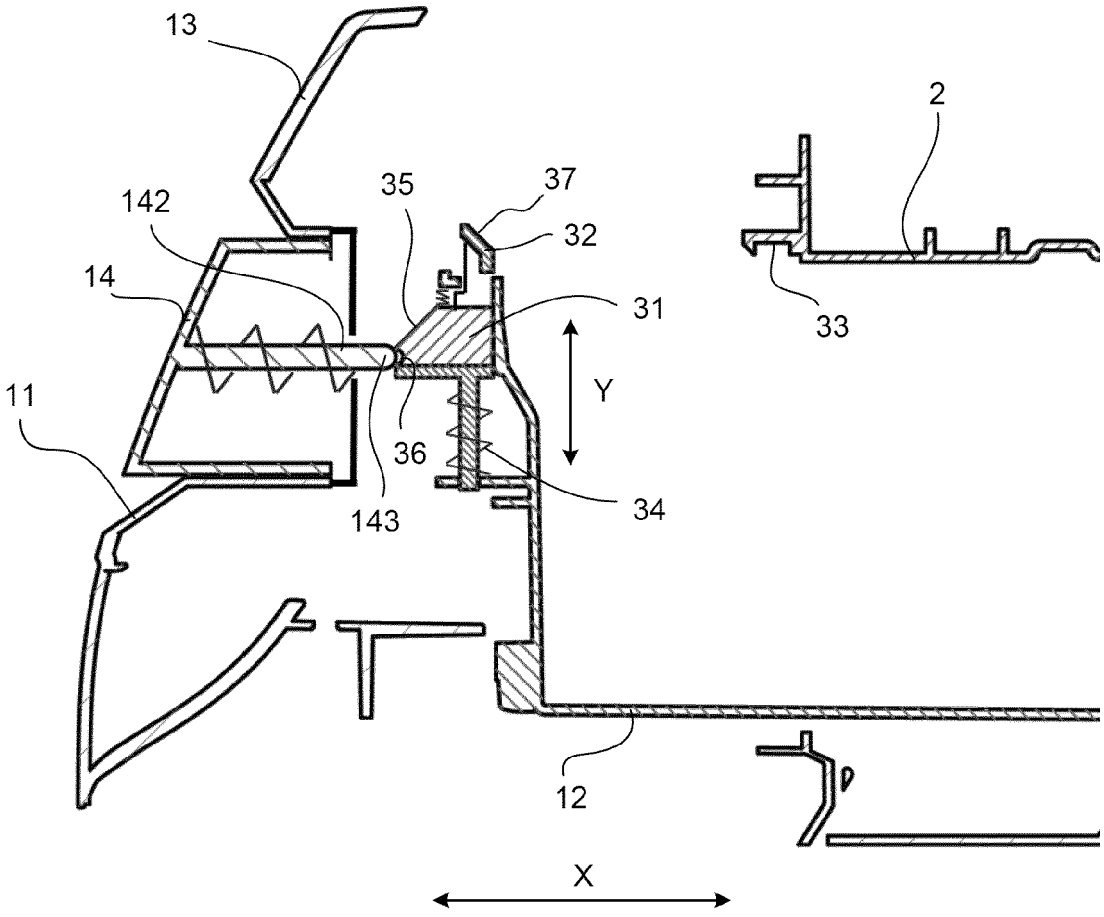

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 8104

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2016/140489 A1 (LG ELECTRONICS INC [KR]) 9 September 2016 (2016-09-09) * paragraph [0023] * * paragraphs [0034] - [0038] * * paragraphs [0060] - [0086] * * figures 1-3 *	1-6	INV. D06F39/02
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 September 2021	Weidner, Maximilian

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 16 8104

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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