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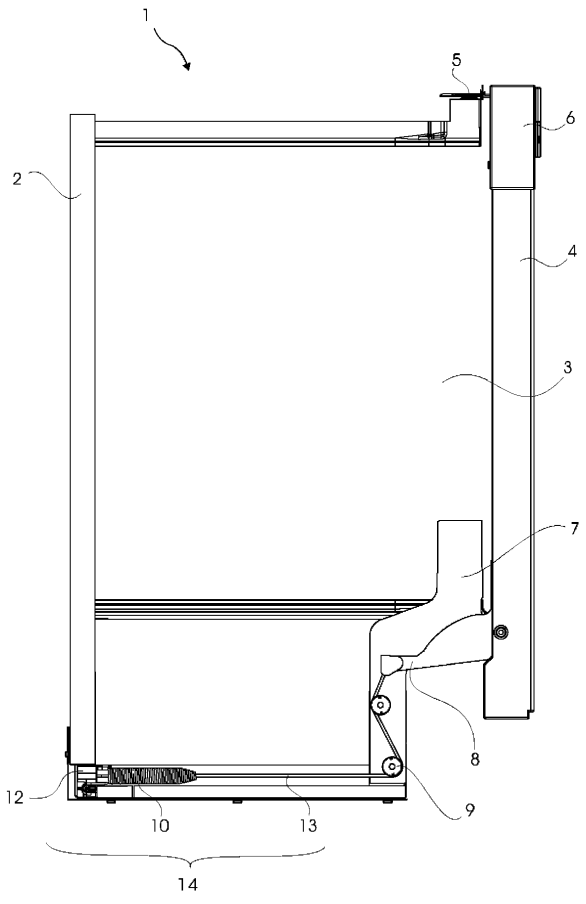
(54) **A DISHWASHER COMPRISING AN AUTOMATIC DOOR OPENING MECHANISM**

(57) The present invention relates to a dishwasher (1) comprising a body (2); a washing tub (3) provided in the body (2) and wherein the washing process is performed; a door (4) which enables the washing tub (3) to be isolated from the outer environment and which is opened from top to downwards by rotating around a horizontal axis; a locking mechanism (5) which enables the door (4) to be locked onto the body (2); a control unit (6) which enables the door (4) to be pushed and opened partially upon the completion of the washing and drying processes so as to be distanced for a certain amount from the body (2); a hinge (7) which enables the door (4) to be movably connected onto the body (2); and a hinge arm (8) which extends from the door (4) towards the bottom of the washing tub (3).

Figure 1



EP 3 841 946 A1

Description

[0001] The present invention relates to a dishwasher comprising an automatic door opening mechanism.

[0002] In dishwashers, the drying process is performed after the washing process. In some embodiments, upon the completion of the washing and drying processes, the door of the dishwasher can be partially opened automatically, the hot vapor therein is discharged to the outer environment and the washed items are enabled to dry faster. In dishwashers wherein the door is partially opened automatically at the end of the washing and drying processes, applying lower temperatures in the drying process is sufficient and thus, energy is saved. Opening of the dishwasher door automatically, furthermore, prevents the vapor getting cold from condensing and leaving stains on the washed items. In the state of the art, in order for the door to open automatically, door opening mechanisms are used, which extend from the body towards the door and enable the door to be partially opened by pushing the door with the activation of devices such as solenoid or electric motor. However, in order to effectively discharge the steam in the dishwasher, only the opening of the door is not sufficient, and a certain gap must remain between the door and the body to enable discharging of the steam outside.

[0003] In the state of the art European Patent No. EP1909631, a spring which balances the weight of the door by applying a force on the door of the dishwasher and an adjustment mechanism which adjusts the tension of the spring are disclosed.

[0004] The aim of the present invention is the realization of a dishwasher comprising a door opening mechanism which enable the door to be partially opened automatically.

[0005] The dishwasher realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a body; a washing tub which is provided on the body; a door which enables the washing tub to be isolated from the outer environment; a locking mechanism which enables the door to be locked on the body; a control unit which enables the door to be opened partially upon the completion of the washing and drying processes; a hinge which enables the door to be connected to the body; and a hinge arm connected to the hinge. The kitchen utensils to be washed are placed into the washing tub. The door is closed such that the washing tub is isolated from the outer environment and the washing process is enabled to be performed. By means of the locking mechanism provided on the door, the door is fixed onto the body. By opening the door partially upon the completion of the main washing and drying steps, the humidity in the washing tub is enabled to be discharged. Thus, the drying process is performed more effectively. Furthermore, energy saving is provided. Upon the completion of the main washing and drying steps, the locking mechanism is triggered by means of the control unit such that the door is enabled to be opened partially. The door is connected onto the body by means of a hinge via the lower edge thereof. The door opens by rotating around the horizontal axis as connected to the body via the lower edge thereof, and the upper edge thereof moves away from the body.

[0006] The dishwasher of the present invention comprises the locking mechanism having at least one spool provided under the hinge arm, a first spring provided under the washing tub, a movement member which extends along the first spring, a stopper provided on the body and against which one end of the movement member bears and a transmission member which is connected to the hinge arm at one end and to the movement member at the other end. The transmission member extends from the hinge arm towards the spools. The transmission member which changes direction while passing the spools is connected to the movement member on the horizontal plane. The movement member moves in the first spring when the door is opened/closed. Thus, the transmission member exerts force onto the hinge arm.

[0007] In an embodiment of the present invention, the dishwasher comprises the cylindrical first channel, a second channel having a smaller diameter than that of the first channel, and an abutment arranged between the first channel and the second channel where the diameter changes. The first channel and the second channel are in the form of hollow cylinders. The end of the second channel which is not connected to the first channel may be conical. The transmission member is connected to the movement member via the first channel and the second channel.

[0008] In an embodiment of the present invention, the dishwasher comprises a compression member which presses the transmission member and enables the same to be moved. The transmission member moves between the first channel and the second channel.

[0009] In an embodiment of the present invention, the dishwasher comprises the conical compression member in the form of a cone. While the wider section of the compression member is on the first channel, the narrower section thereof moves on the second channel.

[0010] In an embodiment of the present invention, the dishwasher comprises a protrusion which is provided on the compression member. As the compression member moves towards the second channel, the protrusion contacts the abutment and stops at a predetermined position. Thus, the transmission member is prevented from being released from the movement member.

[0011] In an embodiment of the present invention, the dishwasher comprises the door which has a closed position, a partially open position and an open position. When the door is in the closed position, the protrusion is on the first channel. When the door is in the partially open position, the protrusion contacts the abutment. When the door is in the open position, the contact between the movement member and the stopper is interrupted, and the protrusion is removed from over the abutment so as to enable the movement member to move in the horizon-

tal plane.

[0012] In an embodiment of the present invention, the dishwasher comprises the first spring which is provided along the outer surface of the movement member and a second spring which is provided along the inner surface of the second channel. By means of the first spring, the movement moves in the horizontal plane and returns to its initial position. By means of the second spring, the compression member is enabled to move in the second channel and return to its initial position.

[0013] In an embodiment of the present invention, the dishwasher comprises the second spring which is stretched when the door is in the closed position and the first spring which is stretched when the door is in the open position. When the door is in the closed position, the second spring is stretched and the first spring is at rest, when the door is in the partially open position, the first spring and the second spring are at rest and when the door is in the open position, the first spring is stretched and the second spring is at rest.

[0014] In an embodiment of the present invention, the dishwasher comprises a tensioning member which enables the excess part of the transmission member to be wound. Thus, the transmission member is prevented from being released from the spools as the door changes position.

[0015] In an embodiment of the present invention, the dishwasher comprises the tensioning member which is in the form of a spring.

[0016] By means of the present invention, a dishwasher is realized, comprising a movement mechanism which enables the door to be opened and kept in the desired position upon the completion of the washing and drying processes. Thus, the drying effectiveness is improved and ease of use is provided.

[0017] A dishwasher realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the sideways view of the dishwasher.
Figure 2 - is the sideways view of the movement mechanism when the door is in the closed position.
Figure 3 - is the sideways view of the movement mechanism when the door is in the partially open position.
Figure 4 - is the view of the tensioning member on the movement mechanism.

[0018] The elements illustrated in the figures are numbered as follows:

1. Dishwasher
2. Body
3. Washing tub
4. Door
5. Locking mechanism
6. Control unit 7. Hinge
8. Hinge arm
9. Spool
10. First spring
11. Movement member
12. Stopper
13. Transmission member
14. Movement mechanism
15. First channel
16. Second channel
17. Abutment
18. Compression member
19. Protrusion
20. Second spring
21. Tensioning member

a. Open position

YA- Partially open position

K- Closed position

[0019] The dishwasher (1) comprises a body (2); a washing tub (3) provided in the body (2) and wherein the washing process is performed; a door (4) which enables the washing tub (3) to be isolated from the outer environment and which is opened from top to downwards by rotating around the horizontal axis; a locking mechanism (5) which enables the door (4) to be locked onto the body (2); a control unit (6) which enables the door (4) to be pushed and opened partially upon the completion of the washing and drying processes so as to be distanced for a certain amount from the body (2); a hinge (7) which enables the door (4) to be movably connected onto the body (2); and a hinge arm (8) which extends from the door (4) towards the bottom of the washing tub (3). The kitchen items to be washed are placed into the washing tub (3). The door (4) is closed and the washing process is started. By means of the locking mechanism (5), the door (4) is enabled to be locked. The locking mechanism (5) is triggered by means of the control unit (6) upon the completion of the washing and drying processes, and the door (4) is enabled to be opened. The door (4) is connected onto the body (2) by means of the hinge (7) so as to be opened or closed by being rotated around the horizontal axis. The hinge arms (8) extend from the hinge (7) towards the bottom of the washing tub (3).

[0020] The dishwasher (1) of the present invention comprises a locking mechanism (5) having at least one spool (9) provided under the hinge arm (8), a first spring (10) provided in the horizontal plane under the washing tub (3), a movement member (11) which is positioned in the first spring (10), a stopper (12) against which one end of the movement member (11) bears, and a transmission member (13) which is connected to the hinge arm (8) at one end and which is connected to the movement member (11) at the other end by passing through the spools (9). One end of the movement member (11) bears against the stopper (12). The other end thereof is connected to the transmission member (13). The first spring (10) extends along the movement member (11) and surrounds

the movement member (11) from outside. One end of the transmission member (13) is on the hinge arm (8) and the other end thereof is on the movement member (11). Thus, the door (4) is enabled to be retained in the desired position.

[0021] In an embodiment of the present invention, the dishwasher (1) comprises the movement member (11) having a first channel (15) which is in the form of a hollow cylinder, a second channel (16) in the form of a hollow cylinder having a smaller diameter than that of the first channel (15), and an abutment (17) which is arranged between the first channel (15) and the second channel (16). The first channel (15) and the second channel (16) are in the form of a hollow cylinder. The diameter of the second channel (16) is smaller than that of the first channel (15). The abutment (17) is provided in the passage between the first channel (15) and the second channel (16). The end of the second channel (16) which is not connected to the first channel (15) may be conical.

[0022] In an embodiment of the present invention, the dishwasher (1) comprises a compression member (18) which moves between the first channel (15) and the second channel (16) and which presses the transmission member (13) so as to enable the same to move along the movement member (11). One end of the transmission member (13) is placed into the compression member (18). Thus, the transmission member (13) is enabled to move in the first channel (15) and the second channel (16). The transmission member (13) moves in the horizontal plane and enables the hinge arm (8) to retain its position.

[0023] In an embodiment of the present invention, the dishwasher (1) comprises the compression member (18) in the form of a cone. The wider section of the compression member (18) is on the first channel (15) and the narrower section thereof is on the second channel (16). The conical form of the compression member (18) facilitates the movement of the same in the movement member (11).

[0024] In an embodiment of the present invention, the dishwasher (1) comprises a protrusion (19) which is provided on the compression member (18) and which contacts the abutment (17) so as to prevent the transmission member (13) from being released from the locking mechanism (5). During the movement of the compression member (18) in the movement member (11), the protrusion (19) contacts the abutment (17) and prevents the compression member (18) from moving further towards the second channel (16).

[0025] In an embodiment of the present invention, the dishwasher (1) comprises the door (4) which has a closed position wherein the protrusion (19) is on the first channel (15), a partially open position wherein the protrusion (19) contacts the abutment (17) and an open position wherein the contact between the movement member (11) and the stopper (12) is interrupted. When the protrusion (19) moves along the first channel (15), the door (4) is in the closed position and the door (4) is enabled to be retained in the partially open position when the protrusion (19) contacts the abutment (17). When the movement member (11) moves in the horizontal plane such the contract thereof with the stopper (12) is interrupted, the door (4) shifts to the open position.

[0026] In an embodiment of the present invention, the dishwasher (1) comprises the first spring (10) which is provided along the outer surface of the movement member (11) and a second spring (20) which is provided along the inner surface of the second channel (16). The first spring (10) extends along the outer surface of the movement member (11). The movement member (11) which moves when the door (4) shifts to the open position returns to the initial position by means of the first spring (10). The second spring (20) extends along the inner surface of the second channel (16). By means of the second spring (20), the compression member (18) which moves into the second channel (16) is enabled to retain its initial position.

[0027] In an embodiment of the present invention, the dishwasher (1) comprises the second spring (20) which is stretched and the first spring (10) which is at rest when the door (4) is in the closed position, the first spring (10) and the second spring (20) which are at rest when the door (4) is in the partially open position and the first spring (10) which is stretched and the second spring (20) at rest when the door (4) is in the open position. When the door (4) is in the closed position, the second spring (20) is stretched and the first spring (10) is stationary. When the door (4) is in the partially open position, the first spring (10) and the second spring (20) are stationary. Thus, the door (4) is enabled to be kept in the partially open position. When the door (4) shifts to the open position, the first spring (10) is stretched and the movement member (11) is allowed to move in the horizontal plane. In this position, the second spring (20) is at rest.

[0028] In an embodiment of the present invention, the dishwasher (1) comprises a tensioning member (21) which enables the transmission member (13) remain tensioned at all times. By means of the tensioning member (21), the transmission member (12) is kept tensioned when the door (4) shifts position and prevented from being released from the spools (9).

[0029] In an embodiment of the present invention, the dishwasher (1) comprises the tensioning member (21) which is in the form of a spring. The tensioning member (21) can be in the form of a spring or it can have a metal, plastic or elastomer structure which keeps the transmission member (13) tensioned.

[0030] By means of the present invention, a dishwasher (1) is realized, comprising a movement mechanism (14) which enables the door (4) to be moved between the open position, closed position and the partially open position and kept stationary in said positions. Thereby, the drying performance is improved and time and energy saving is provided.

Claims

1. A dishwasher (1) comprising a body (2); a washing tub (3) provided in the body (2) and wherein the washing process is performed; a door (4) which enables the washing tub (3) to be isolated from the outer environment and which is opened from top to downwards by rotating around the horizontal axis; a locking mechanism (5) which enables the door (4) to be locked onto the body (2); a control unit (6) which enables the door (4) to be pushed and opened partially upon the completion of the washing and drying processes so as to be distanced for a certain amount from the body (2); a hinge (7) which enables the door (4) to be movably connected onto the body (2); and a hinge arm (8) which extends from the door (4) towards the bottom of the washing tub (3), **characterized by** the locking mechanism (5) comprising at least one spool (9) provided under the hinge arm (8), a first spring (10) provided in the horizontal plane under the washing tub (3), a movement member (11) which is positioned in the first spring (10), a stopper (12) against which one end of the movement member (11) bears, and a transmission member (13) which is connected to the hinge arm (8) at one end and which is connected to the movement member (11) at the other end by passing through the spools (9).

2. A dishwasher (1) as in Claim 1, **characterized by** the movement member (11) comprising a first channel (15) which is in the form of a hollow cylinder, a second channel (16) in the form of a hollow cylinder having a smaller diameter than that of the first channel (15), and an abutment (17) which is arranged between the first channel (15) and the second channel (16).

3. A dishwasher (1) as in Claim 2, **characterized by** a compression member (18) which moves between the first channel (15) and the second channel (16) and which presses the transmission member (13) so as to enable the same to move along the movement member (11).

4. A dishwasher (1) as in Claim 3, **characterized by** the compression member (18) which is conical.

5. A dishwasher (1) as in any one of Claims 3 to 4, **characterized by** a protrusion (19) which is provided on the compression member (18) and which contacts the abutment (17) so as to prevent the transmission member (13) from being released from the locking mechanism (5).

6. A dishwasher (1) as in Claim 5, **characterized by** the door (4) which has a closed position wherein the protrusion (19) is on the first channel (15), a partially open position wherein the protrusion (19) contacts the abutment (17) and an open position wherein the contact between the movement member (11) and the stopper (12) is interrupted.

7. A dishwasher (1) in any one of Claims 2 to 6, **characterized by** the first spring (10) which is provided along the outer surface of the movement member (11) and a second spring (20) which is provided along the inner surface of the second channel (16).

8. A dishwasher (1) as in Claim 7, **characterized by** the second spring (20) which is stretched and the first spring (10) which is at rest when the door (4) is in the closed position, the first spring (10) and the second spring (20) which are at rest when the door (4) is in the partially open position and the first spring (10) which is stretched and the second spring (20) at rest when the door (4) is in the open position.

9. A dishwasher (1) as in any one of the above claims, **characterized by** a tensioning member (21) which enables the transmission member (13) remain tensioned at all times.

10. A dishwasher (1) as in Claim 9, **characterized by** the tensioning member (21) which is in the form of a spring.

Figure 1

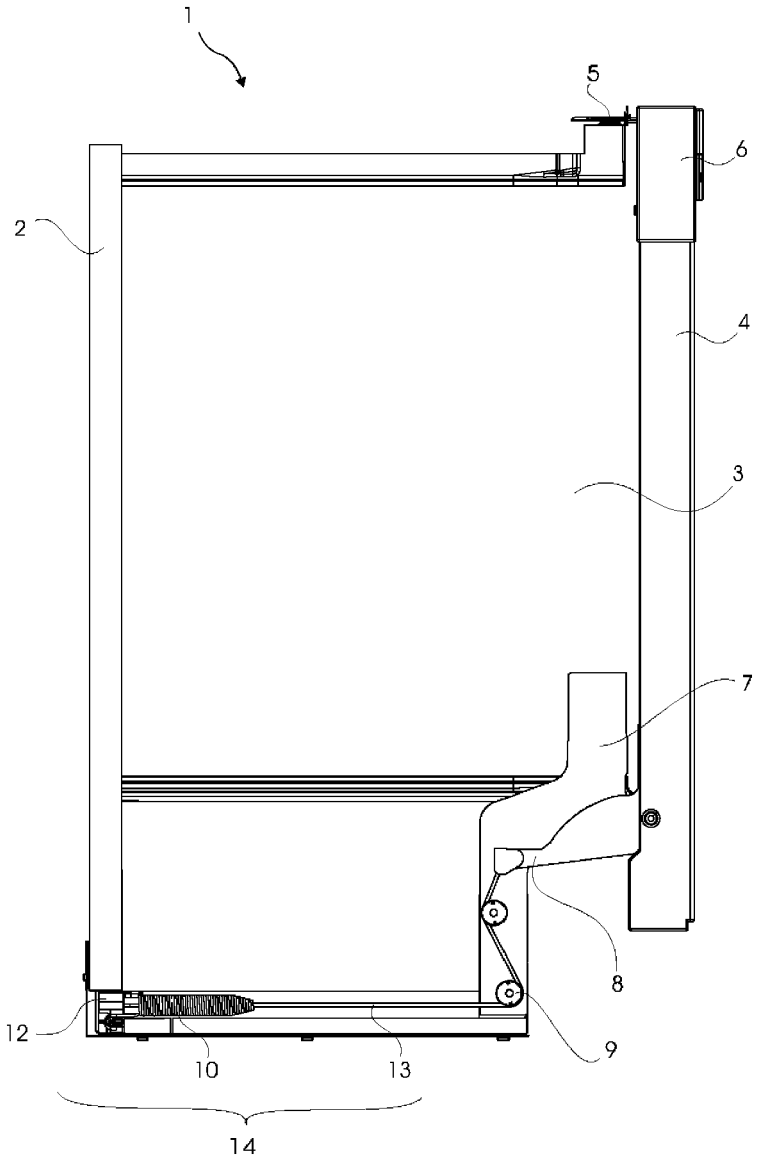


Figure 2

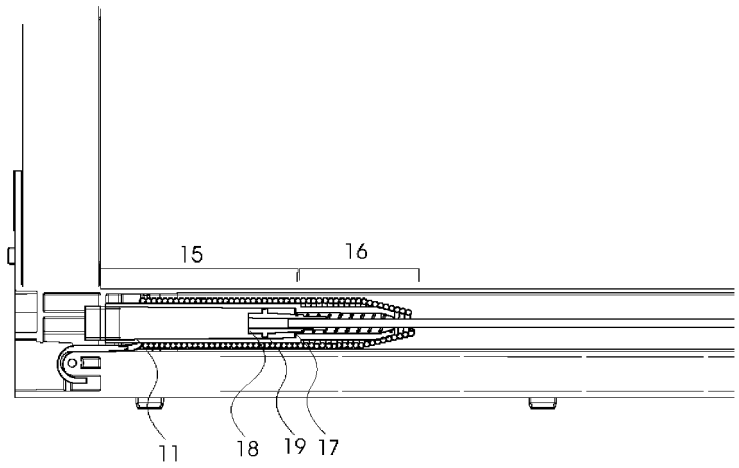


Figure 3

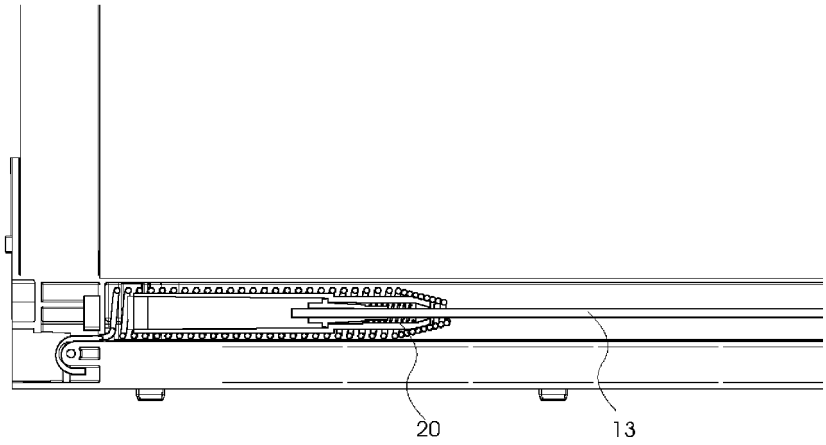
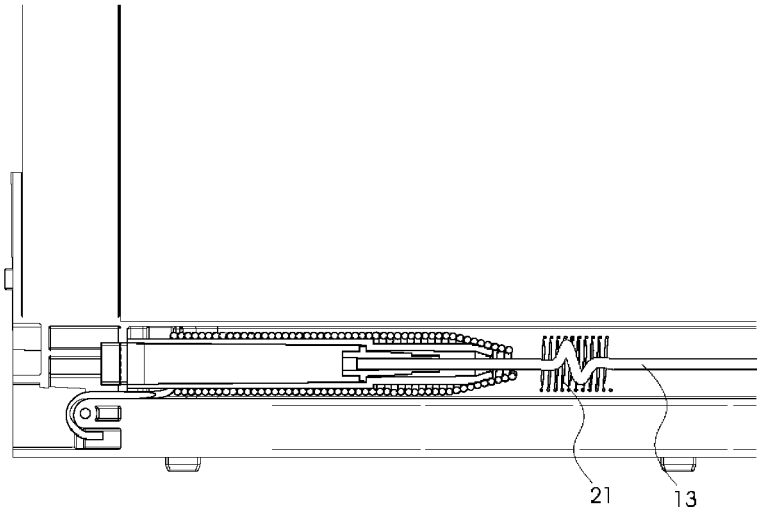


Figure 4



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EUROPEAN SEARCH REPORT

Application Number
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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
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CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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