(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 141 277 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.01.2010 Bulletin 2010/01

(51) Int Cl.:
D06F 39/14 *(2006.01)* ***D06F 37/28*** *(2006.01)*

(21) Application number: **09163078.0**

(22) Date of filing: **18.06.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR

(30) Priority: **01.07.2008 IT TO20080513**

(71) Applicant: **Indesit Company S.p.A.**
60044 Fabriano (AN) (IT)

(72) Inventors:
- **Bongini, Dino**
  60044 Fabriano (Ancona) (IT)
- **Nocera, Fortunato**
  60044 Fabriano (Ancona) (IT)

(74) Representative: **Gallarotti, Franco**
Buzzi, Notare & Antonielli d'Oulx
Via Maria Vittoria, 18
10123 Milano (IT)

(54) Machine for treating textile items, in particular a washing machine

(57) A machine (1) for treating textile items comprising:
- an oscillating unit (3,4) including a tub (3) suitable for containing a washing and/or rinsing liquid;
- a cabinet (2) accommodating the oscillating unit (3,4);
- a first opening (3a), obtained on the tub (3) and suitable to allow a user of the machine (1) access into the tub (3);
- a second opening (2a), obtained on the cabinet (2) and suitable to allow the user access to the first opening (3a);
- a first door (7) suitable to close, in particular in a liquid tight manner, the first opening (3a), the first door (3) being able to acquire - with respect to the first opening (3a) - at least an open condition, an ajar condition and a closed and locked condition;
- a second door (8) adapted to close the second opening (2a), the second door (8) being able to acquire - with respect to the second opening (2a) - at least an open condition, a closed condition and a closed and locked condition.

The machine (1) further comprises:
- first closing means (11,16,16a,17a) prearranged to automatically bring the first door (7) from the respective ajar condition to the respective closed and locked condition, and vice versa;
- second closing means (20) prearranged to automatically bring the second door (8) from the respective closed condition to the respective closed and locked condition, and vice versa.

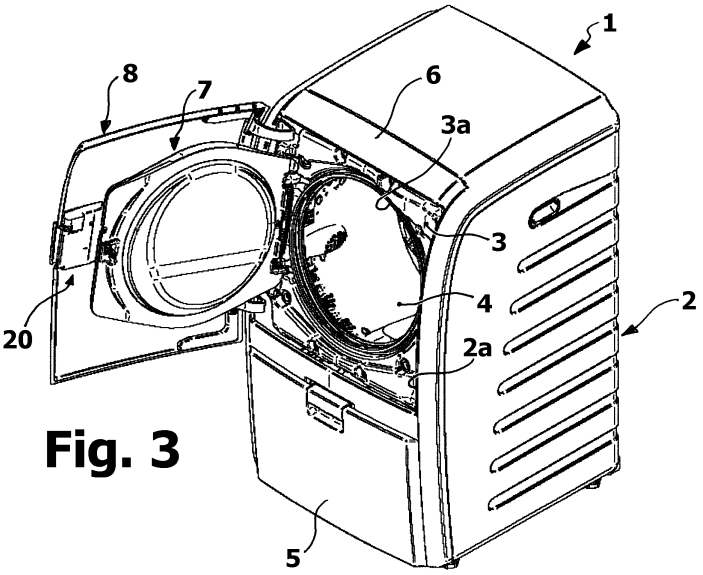


Fig. 3

EP 2 141 277 A1

Description

Field of the invention

[0001] The present invention refers to a machine for treating textile items, in particular a washing machine, according to the preamble of claim 1.

State of the art

[0002] It is known that the noise of a washing and/or drying machine may be lowered by reducing the vibrations that are transmitted to the respective cabinet during the operation. For such purpose, the machine may be structurally made in the form of a machine with two doors, i.e. comprising a first inner door, integral with the so-called "oscillating unit", and a second outer door, integral with the cabinet, the two doors not being at contact with respect to each other during the operation of the machine. Such configuration of the machine is functional to eliminate or minimise the points of contact between the cabinet and the oscillating unit and, consequently, to reduce the transmission of vibrations generated at the oscillating unit level to the cabinet. An example of the machines with two doors of the indicated type are described in EP-A-1319100 and WO 2006/072904. Both the aforementioned documents describe machines having the inconvenience entailing low comfort in use due to the fact that the user is required to perform two closing operations, successively operating on the two doors.

Summary of the invention

[0003] An aim of the present invention is that of overcoming the drawbacks of the machines with two doors of the prior art, and in particular of those described in the in the cited prior documents. Another aim of the invention is that of providing a machine for treating textile items of the previously indicated type with enhanced comfort in use. Another aim is that of providing a machine of the indicated type characterised by low noise, i.e. by low transmission of vibrations between the oscillating unit and the cabinet of the machine.

[0004] One or more of these aims are attained, according to the present invention, by means of the machine for treating textile items, in particular a washing machine, having the characteristics of the attached claims, whose content forms an integral part of the technical teaching provided herein in relation to the invention.

[0005] In summary, the idea on which the present invention is based is that of providing a machine for treating textile items, in particular a washing machine, having a system of two doors, comprising a first inner door, fixed to the oscillating unit, and a second outer door, fixed to the cabinet, and wherein the comfort in use is enhanced due to the fact that the user of the machine is required to perform only one operation with the aim of opening and/or closing the doors system. In particular, for such purpose, the abovementioned system is provided with first and second means for closing the two doors, configured in such a manner to determine an automatic variation of the condition of one of the two doors ensuing an operation performed on the other of the two doors, such operation being performed by the user or through actuation means of the machine.

[0006] The first closing means are adapted to bring the inner door from a respective ajar condition to a respective closed and locked condition, and vice versa, also causing a movement of the inner door. The second closing means are instead adapted to bring the outer door from a respective closed condition to a respective closed and locked condition, and vice versa. Preferably, the inner door passes from the closed condition to the ajar condition after the passage of the outer door from the respective open condition to the respective closed condition. The outer door passes from the closed condition to the closed and locked condition after the passage of the inner door from the ajar condition to the closed and locked condition; advantageously the outer door passes from the closed and locked condition to the closed condition after the passage of the inner door from the respective closed and locked condition to the respective ajar condition.

[0007] In an embodiment, the first closing means comprise a first door-lock device, having an actuation system which is supplied electrically and controlled through a control system of the machine. The first door-lock device preferably comprises a first movable hooking member, adapted to engage with a closing element borne by the first door, and means for causing, through said actuation system and when the first hooking member and the closing element are mutually engaged, a traction on the first inner door, in order to cause a displacement thereof from the respective ajar condition to the respective closed and locked condition; the abovementioned means preferably comprise the first hooking member, which is mounted in the door-lock device in such a manner to be able to perform both an angular movement, to engage with the closing element of the inner door, and a translation, to cause an angular movement or displacement of the inner door. The second closing means comprise a second door-lock device, preferably but not necessarily actuated only mechanically, i.e. without electric actuation means. This door-lock device may advantageously comprise a locking system switchable between a released condition and a locked condition, the locking system including a movable member which is constrained with respect to the outer door in a displaceable manner between a first and a second position, depending on the position of the inner door; when the inner door is in the respective closed and locked condition, the movable member is in its first position, with the locking system thus being maintained in the respective locked condition; on the contrary, when the inner door is in the respective ajar condition, the movable member is in its second position, with the locking system thus being in the respective released condition.

[0008] In a preferred embodiment the second door-lock device is mounted on the outer door and comprises a second hooking member, having a hooking part suitable to be engaged with respect to a fixed part of the cabinet, and a manual actuation member cooperating with the second hooking member, the manual actuation member being movable to cause the displacement of the second hooking member from an operative position to an inoperative position, where in the operative position the hooking part of the second hooking member is engaged to said fixed part of the cabinet and in the inoperative position the hooking part of the second hooking member is released with respect to said fixed part of the cabinet; the second hooking member is preferably biased towards the respective operative position by a mechanical energy accumulator, such as a spring. In the currently preferred embodiment, the abovementioned locking system of the second door-lock device includes a catch element, adapted to acquire a locked position and a released position, in the locked position the catch element preventing the passage of the second hooking member from its operative position to its inoperative position, and in the released position the catch element allowing the passage of the second hooking member from its operative position to its inoperative position. The abovementioned movable member of the locking system is constrained with respect to the outer door in a displaceable manner between its first and its second position to consequently cause the displacement of the catch element between the respective lock and release positions; the movable member is biased towards the respective first position by a mechanical energy accumulator, such as a spring, and the displacement between the first and the second position of the movable member preferably depends on the contact or absence of contact, respectively, between the movable member and the inner door. The second hooking member, the manual actuation member, the catch element and the movable member preferably rotate around respective axis, which are substantially parallel.

Brief description of the drawings

[0009] Further objects, characteristics and advantages of the machine for treating textile items subject of the present invention shall be more apparent from the following detailed description and from the figures attached thereto, strictly provided for exemplifying and non-limiting purposes, wherein:

- figure 1 is a front view of a washing machine according to the present invention, as it appears when both doors thereof are in closed and locked condition, or when its inner door is in ajar condition and its outer door is in closed condition;
- figure 2 is a front view of the machine of figure 1, as it appears when both doors thereof are in open condition;
- figure 3 is an axonometric view of the washing machine of figure 1, in a slightly enlarged scale with respect to figures 1 and 2, in a condition similar to that of figure 2;
- figures 4 and 5 are detailed views of a first and a second particular of figure 3, while figure 6 is a detailed view of a particular of figure 2;
- figure 7 is a partially exploded view of the outer door of the machine of figures 1-3;
- figure 8 is an exploded view, in enlarged scale, of a door-lock device of the door of figure 7;
- figures 9-11 are schematic representations of the door-lock device of figure 7, in assembled condition and in three different positions.

Detailed description of preferred embodiments of the invention

[0010] In the present description and in the attached claims, the following terms referring to the doors of the machine subject of the invention have the following meanings:

- door "open" condition indicates a condition in which a door of the machine is in such a position not to hinder a respective opening;
- door "closed" condition indicates a condition in which a door of the machine is in a position such to hinder the respective opening, the door being openable through a manual operation of the user;
- door "ajar" condition indicates a condition in which a door is in an intermediate position between those of the door open and door closed, which is proximal to the closed position, in particular with an opening angle smaller than a predetermined value, preferably smaller than about 5° or even more preferably smaller than about 1°;
- "closed and locked" condition indicates a condition in which a door is maintained locked, through a door-lock device, in a position such to hinder the respective opening, the door not being openable through a manual operation of a user.

[0011] It is further specified that in the present description and in the attached drawings reference shall be made only to elements indispensable for the understanding of the invention, without prejudice to the fact that the machine for treating textile items described comprises all the elements known for its normal operation (motor, counterweights, gaskets, pumps, washing agents dispensers, control system, etcetera).

[0012] Figures 1 - 3 illustrate a machine for treating textile items according to the invention. In the illustrated example, the machine, indicated in its entirety with 1, is a washing machine 1 and comprises a cabinet 2, defining a space adapted to accommodate an oscillating unit therein. The aforementioned oscillating unit comprises at least one tub 3 suitable to hold a washing and/or rinsing liquid, particularly water with the possible addition of

washing or rinsing agents, accommodating a basket 4 therein adapted to contain items to be treated. The lower part of the cabinet defines an opening having a drawer 5, for example of the type described in EP-A-1462562, while fixed at the upper part of the cabinet 2 is a control panel 6, advantageously of the type described in EP-A-1924000. The machine 1 comprises a first door 7 and a second door 8, hereinafter also referred to as inner door and outer door, respectively. The inner door 7 is associated to the oscillating unit and, in particular, to the tub 3, while the outer door 8 is associated to the cabinet 2. The doors 7 and 8 are adapted to close corresponding openings 3a and 2a, respectively obtained on the tub 3 and on the cabinet 2; at least the door 7 allows watertight sealing of the respective opening, through suitable seal means, such as an annular gasket mounted peripherally with respect to the opening 3a.

[0013] As observable also in figure 4, the inner door 7 is connected to the tub 3 by means of a first hinge, indicated in its entirety with 9, so as to allow the opening and the closing of the door itself. In the illustrated non-limiting example, the first hinge 9 comprises a pin 10 engaged in corresponding seats obtained on the tub 3 and on the inner door 7: in such case, the opening and closing of the inner door 7 occur through rotation of the same around the pin 10. The hinge 9 comprises a spring 11, mounted substantially coaxial with respect to the pin 10, which is adapted to determine an assisted or automated movement of the inner door 7, once it has been unlocked. Such assisted opening movement is obtained through first abutment means obtained on the spring 11, for example made in form of a pair of appendages 12, which abut against the outer surface of the tub 3, and second abutment means obtained on the spring 11, for example made in form of a central protrusion 13, which abut against the inner surface of the inner door 7.

[0014] The outer door 8 is connected to the cabinet 2 by means of a respective second hinge 14, that allows opening and closure thereof. In the illustrated non-limiting example the hinge 14 comprises a pair of guide elements 15 (see also figure 7), fixed for example by means of screws to the inner surface of the outer door 8, and capable of rotating around a pair of pins constrained inside the cabinet 2, not shown. In order to close and close lock the system of the doors 7 and 8, the machine 1 is provided with a system of closing means, comprising:

- first closing means, suitable to bring the inner door 7 from the respective door ajar condition to the door closed and locked condition, and vice versa;
- second closing means, suitable to cause the passage of the outer door 8 from the respective door closed condition to the door closed and locked condition, and vice versa.

[0015] In the illustrated embodiment the abovementioned first closing means comprise a closing element or nosepiece, indicated with 16 in figure 5, made in which is a slot 17, fixed to the inner surface of the inner door 7, substantially at the end opposite to that hinged to the tub 3, as well as a seat obtained on the tub 3, indicated with 16a in figures 2 and 6, suitable to receive the nosepiece 16, or at least a part thereof, when the door 7 is in ajar condition and/or in closed and locked condition. The first closing means also comprise a hooking member, indicated with 17a in figure 6, for example in form of a hook mounted in movable manner on the tub 3, at the seat 16a. The hook 17a is configured in such a manner to be engaged in the slot 17, when the door 7 is in ajar condition, thence determining the closing and locking of the door 7. For such purpose, the hook 17a is part of a door-lock device, not represented in its entirety, which is suitable to acquire at least two positions: an idle position, wherein the hook 17a does not engage the slot 17, and an operative position, in cui the hook 17a engages the slot 17. The door-lock device is configured in such a manner that, following its actuation controlled through the control system of the machine, and with the hook 17a in the abovementioned operative position, the hook itself exerts a traction on the inner door 7, in such a manner that the nosepiece 16 occupies a respective operative position in the seat 16a, thus determining, alongside a movement of the inner door 7, also the passage of the same from the respective ajar condition to the respective closed and locked condition. The change of position of the hook, for performing the abovementioned traction, may be obtained by using a suitable actuation system. In a possible solution, for example the hook 17a and a first electrical actuator, serving to generate the angular movement of the hook itself, are mounted on a slide member, which is movable in a linear manner through a second electrical actuator, so as to generate a translation of the hook which determines the movement of the door and hence its passage to the closed and locked condition. It is however clear to a man skilled in the art that, through a suitable kinematic system, for example based on the use of cam members, the hook may be mounted at the seat 16a in such a manner that its angular movement and its successive translation are obtainable by means of a single electrical actuator; possibly used in this second case may be a silent actuation member, capable of operating as a linear motor and comprising an element, such as a wire, made of shape memory material.

[0016] The second closing means comprise a hook element in form of a tooth, indicated with 18 in figure 5, suitable to be engaged on the edge of the cabinet 2 which delimits the second opening 2a, when the second door 8 is in closed condition or closed and locked, and a manual actuation member, represented by a handle 19, through which the user may manually disengage and open the outer door 8. The tooth 18 and the handle 19 are part of a mechanical door-lock device of the outer door 8, indicated with 20 in figure 5 and shown exploded in figures 7 and 8. As observable in figure 7, the outer door 8 is provided, on the edge thereof opposite to the side provided with the hinge elements 15, of a recessed

seat 8a, at which the device 20 is mounted, in such a manner that the handle 19 is partially accessible even when the door 8 is closed (see for example figure 1). With particular reference to figure 8, the door-lock device 20 comprises a base plate 21, intended for fixing the door 8 onto the inner front, for example by means of through screws, into respective sleeve formations 22 of the plate 21. Orthogonally rising from the general plane of the plate 21 are two lateral walls 23, defined on which are first and second seats 23a, 23b for the ends of the two pins, indicated with 24 and 25. In its central region, the plate 21 also has two orthogonal appendages 21 a, provided with holes in which the pin 25 passes through. The pin 24 is used for hinging - to the plate 21 - a cover, indicated with 26, if necessary provided with seats for receiving ends of the pin 24 (one of such seats is indicated with 26a). The cover is thus mounted in such a manner to be able to rotate with respect to the plate 21, around the axis represented by the pin 24. Preferably provided for are mechanical means for stopping the angular movement allowed to the cover 26; for such purpose, in the represented example the plate 21 has a further sleeve formation 22a, intended to receive an end portion of a stop screw, not represented, inserted as a through screw into a hole provided for in the cover 26; formed at such hole is a flared seat, indicated with 26b in which the head of the abovementioned stop screw may be positioned. The cover 26 is provided with a slot 26c, through which the tooth 18 may project outside the device 20; in proximity to such slot, the cover 26 has - in its inner part - an appendage 26d, intended to cooperate with an appendage of a catch element, described hereinafter.

[0017] The pin 25 is used for hinging - to the plate 21 - the handle 19, which - if required - is provided with arms 19a having through holes 19b. Made in the handle 19 is a lateral seat 19c, for example in form of a blind hole. Partially inserted into the seat 19c is a peg 27, which is thus substantially parallel to the rotation axis of the handle 19 represented by the pin 25. In the assembled condition of the device 20, an end portion of the peg 27 projects laterally from the handle 19 and it is inserted into a slot guide 28 which is formed in a front projection of one of the walls 23 of the plate. Formed on this projection is a first through seat 29, for the positioning of the pin 30a of a rocker element 30, to which also the tooth 18 belongs. In addition, obtained on the abovementioned projection is a second through hole 31, adapted to receive the hinge pin 32a of a catch element 32, provided with an appendage 32b intended to cooperate with the appendage 26d of the cover 26. As observable, the rotation axes of the pins 30a and 32a, of the rocker element 30 and of the catch element 32, are substantially parallel to each other and with respect to the rotation axes of the cover (pin 24) and the handle 19 (pin 25). Intended to be mounted on the pin 25 is a first torsion spring 33, whose end arms respectively abut against the surface above the plate 21 and the inner surface, not shown in figure 8, of the cover 26. The spring 33 is thus operative to cause an anticlockwise rotation of the cover 26, i.e. in a diverged position with respect to the plate 21, whose maximum limit is determined by the previously mentioned stop means; by exerting a pressure on the cover 26 such to overcome the elastic reaction of the spring 33 it is possible to bring the cover itself to a position closer to the plate 21. Furthermore, intended to be mounted on the pin 25 is a second torsion spring 34, having an end arm cooperating with the rocker element 30, so as to cause the latter to rotate clockwise; the opposite end arm of the spring 34 instead cooperates with the catch element 32, so as to cause the latter to rotate anticlockwise.

[0018] In the assembled condition of the device 20, the peg 27 borne by the handle 19 cooperates with the rocker element 30, so as to determine a rotation such that the tooth 18 moves to a position that allows the manual opening of the second door 8, by rotating the handle clockwise. The catch element 32 has instead the function to become operatively interposed between the peg 27 and the balance element 30 or, more precisely, the general function to take off the rotational degree of freedom from the handle 19. The catch element 32 is automatically deactivated when the inner door 7 exerts a pressure on the cover 26: in particular, the pressure exerted by the door 7 causes a clockwise rotation of the cover 26, which thus nears the plate 21. In this manner, the appendage 26c of the cover 26 ends up in abutment against the appendage 32b of the catch element, which is thus caused to rotate clockwise, up to a position in which the catch element no longer represents a constraint for the movement of the peg 27, and thus the handle 19, and hence the rocker element 30.

[0019] Figures 9-11 schematically illustrate the door-lock device 20 in three different conditions; it should be observed that, in these figures, some details of the device are represented transparent, for further clarity.

[0020] Figure 9 represents the device 20 in a condition corresponding to the condition of the outer door closed and locked and the inner door closed and locked. Supposing that, after loading the machine the textile items to be treated, the user closes the doors system. Practically, all the user is required to do is push the outer door 8 in the respective closed condition. During such operation, the outer door 8 pushes the inner door 7 in the respective ajar condition, in particular with the cover 26 of the device 20 that is pressed against the external surface of the inner door 7, also due to the counter action exerted by the spring 11 of figure 4; at the end of the operation, the tooth 19 of the device 20 is engaged with the edge of the opening 2a of the cabinet 2. Then, the user starts the machine 1 and/or starts the desired washing cycle, operating on the control panel 6. The control system of the machine controls the actuation of the door-lock device of the inner door 7. Substantially, as mentioned previously, the hook of the device first engages the slot 17 of the nosepiece 16 of figure 5 and then the actuator of the device exerts, through the same hook, a traction on the nosepiece 16, and thus on the door 7, up to the re-

spective closed and locked condition, overcoming the reaction force of the spring 11 of figure 4. In this manner, the inner door 7 is moved away from the outer door 8, and thus the outer surface of the door 7 moves away from the cover 26. Due to the action of the spring 33 of figure 8, the cover rotates anticlockwise, around the axis represented by the pin 24 and in this manner also the catch element 32 is free to rotate anticlockwise, due to the action of the spring 34, moving to the position observable in figure 9. In this condition, the lower part of the catch element 32 is fitted beneath the peg 27, in such a manner that the handle 19 cannot move anticlockwise around the respective pin 25. Therefore, in other words, even if one were to operate on the handle 19, it is not possible to rotate the balance element 30 clockwise, and thus disengage the tooth 19 from the edge of the opening 2a of the cabinet 2.

[0021] Figure 10 represents the device 20 in a condition corresponding to the condition of the outer door closed and the inner door ajar. For such purpose, at the end of the washing cycle mentioned above, the control system of the machine 1 controls the door-lock device of the door 7, described previously, in such a manner that the hook frees the nosepiece 16 of figure 5. In this condition the spring 11 of figure 4 pushes the inner door 7 towards the outer door 8, which is closed by means of the device 20; more particularly, an outer surface of the door 7 presses the cover 26 the device 20. Given that the elastic reaction of spring 11 is greater with respect to the reaction force of springs 33 and 34, the door 7 causes an clockwise rotation of the cover 26, up to a position close to the plate 21, represented in figure 10. In this step (see figure 8) the appendage 26d of the cover 26 cooperates with the appendage of the catch element 32, causing a clockwise rotation thereof. In this manner, the lower part of the catch element 32 is no longer beneath the peg 27 borne by the handle 19, which can thus be rotated clockwise manually.

[0022] The successive figure 11 illustrates the condition in which the handle 19 was rotated clockwise and the inner door 7, due to the elastic reaction force of the spring 11, continues to exert its pressure on the cover 26. In this manner, the peg 27 pushes against an arm of the rocker element 30 opposite to the tooth 18, thus causing an anticlockwise rotation of the same element 30 therewith: the tooth 18 is thus disengaged from the edge of the opening 2a of the cabinet 2. At this point, the outer door 8 and the inner door 7 may achieve the respective open conditions. The movement in question may be manually accompanied by the user, on the outer door 8, while an automatic opening movement of the inner door 7 is partially or entirely generated due to the action of the spring 11 of figure 4.

[0023] As observable, the present invention has the advantage of allowing the user to have a machine 1 on which he is substantially required to perform only one operation (i.e. only one manoeuvre on the outer door 8) so as to obtain both the closure and the opening of both doors 7 and 8. It shall be observed that, through the configuration outlined for exemplifying purposes, the door-lock device of the inner door 7 does not require any manual actuation means, such as a handle.

[0024] In summary, the operation of closing the doors system provides for the following sequence of steps:

a) closure of the outer door 8 through a manual action of the user who, pushing the outer door 8, causes the latter to draw the inner door 7 in its movement; at the end of such step, the tooth 18 engages the wall of the cabinet 2, and the inner door 7 - contacting the outer door 8 - automatically achieves the respective door ajar condition;

b) locking, through an automatic action of the machine 1, the inner door 7, by means of actuation of the respective door-lock device, whose hook is engaged in the slot 17 and causes the nosepiece 16 to occupy the respective operative position in the seat 16a; at the end of such step, the outer door 8 automatically achieves the respective closed and locked condition, by means of the device 20, whose catch element 32 hinders the movement of the handle 19.

[0025] The operation of opening the doors system provides for the following sequence of steps:

a) unlocking the inner door 7 through the automatic action of the washing machine 1, and specifically its control system which controls the door-lock device of the door 7 such that the respective hook is disengaged from the slot 17; at the end of such step the inner door 7 automatically achieves the door ajar condition, by means of the action of the spring 11, and the outer door 8 automatically achieves the door closed condition, the inner door 7 contacting the rear surface of the cover 26;

b) opening the outer door 8 through the manual action of the user who operates on the handle 19; at the end of such step, both doors are in open condition, the opening of the inner door 7 being ensured or facilitated by the spring 11.

[0026] The present invention allows overcoming the drawbacks of the aforementioned prior art and it is suitable to be implemented, alongside according to the example described previously, also according to numerous variants that fall within the same invention concept defined by the claims that follow.

[0027] The specific configuration of the door-lock devices for the inner door 7 and the outer door 8 may obviously vary with respect to the one described or illustrated previously, being freely useable by the man skilled in the art in the form deemed most suitable for the specific application, without prejudice to the functionalities described previously. In the preferred embodiment, the door-lock device for the inner door shall preferably be an

electrically actuated device, controlled by the control system of the machine, while the door-lock device for the outer door shall preferably be a solely mechanical device, i.e. not requiring electrical actuation.

Claims

1. A machine for treating textile items, in particular a washing machine, comprising:

- an oscillating unit (3, 4) including a tub (3) suitable for containing a washing and/or rinsing liquid;
- a cabinet (2) housing the oscillating unit (3, 4);
- a first opening (3a), obtained in the tub (3) and suitable for allowing a user of the machine to have access to the inside of the tub (3);
- a second opening (2a), obtained in the cabinet (2) and suitable for allowing the user to have access to the first opening (3a);
- a first door (7) suitable for closing the first opening (3a), in particular in a watertight manner, the first door (3) being able to take at least one open condition, one ajar condition and one closed and locked condition relative to the first opening (3a);
- a second door (8) suitable for closing the second opening (2a), the second door (8) being able to take at least one open condition, one closed condition and one closed and locked condition relative to the second opening (2a);

characterized by further comprising:

- first closing means (11, 16, 16a, 17a) prearranged to bring in an automated manner the first door (7) from the respective ajar condition to the respective closed and locked condition, and vice versa;
- second closing means (20) prearranged to cause in an automated manner passing of the second door (8) from the respective closed condition to the respective closed and locked condition, and vice versa.

2. The machine according to claim 1, wherein the second closing means (20) are configured such that the second door (8) passes from the respective closed condition to the respective closed and locked condition in consequence of a passing of the first door (7) from the respective ajar condition to the respective closed and locked condition.

3. The machine according to claim 1 or 2, wherein the first and the second doors (7, 8) are configured and positioned such that the first door (7) passes from the respective open condition to the respective ajar condition in consequence of a passing of the second door (8) from the respective open condition to the respective closed condition.

4. The machine according to claim 2, wherein the second closing means (20) are also configured such that the second door (8) passes from the respective closed and locked condition to the respective closed condition in consequence of a passing of the first door (7) from the respective closed and locked condition to the respective ajar condition.

5. The machine according to at least one of the preceding claims, wherein the first closing means comprises a first door-lock device (16a, 17a) having an actuation system which is electrically supplied and controlled through a control system (6) of the machine (1).

6. The machine according to at least one of the preceding claims, wherein the second closing means comprises a second door-lock device (20) being mechanically actuated or free of electric actuation means.

7. The machine according to claim 5, wherein the first door-lock device comprises a first movable hooking member (17a), adapted to engage with a closing element (16) carried by the first door (7), and means for causing, through said actuation system and when the first hooking member (17a) and the closing element (16) are mutually engaged, a traction on the first door (7), in order to cause a displacement thereof from the respective ajar condition to the respective closed and locked condition.

8. The machine according to claim 6, wherein the second door-lock device (20) comprises a locking system (26, 32), which is switchable between a released position and a locked position, the locking system (26, 32) including a movable member (26) which is bound relative to the second door (8) to be displaceable between a first and a second position, which correspond to the above said released and locked positions, the position of the movable member (26) depending upon the position of the first door (7).

9. The machine according to claim 6, wherein the second door-lock device (20) comprises a second hooking member (30), having an hooking part (19) adapted to engage with respect to a fixed part of the cabinet (2), and a manual actuation member (19, 27) cooperating with the second hooking member (30), and wherein the locking system (26, 32) comprises a catch element (32) which is displaceable by means of the movable member (26), where in particular the second hooking member (30), the manual actuation member (19, 27), the catch element (32) and the movable member (26) are rotatable around respec-

tive axes (30a, 25, 32a, 24), these axes being substantially parallel to each other.

10. The machine according to one or more of the preceding claims, wherein the first closing means (11, 16, 16a) include a mechanical energy accumulator (11), such as a spring, for constantly biasing the first door (7) toward the respective open condition.

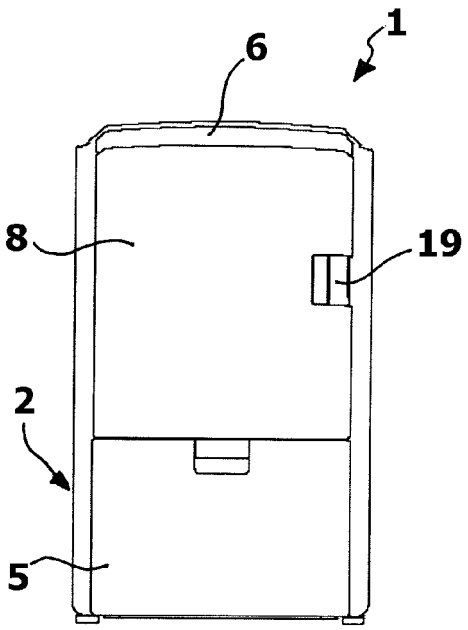


Fig. 1

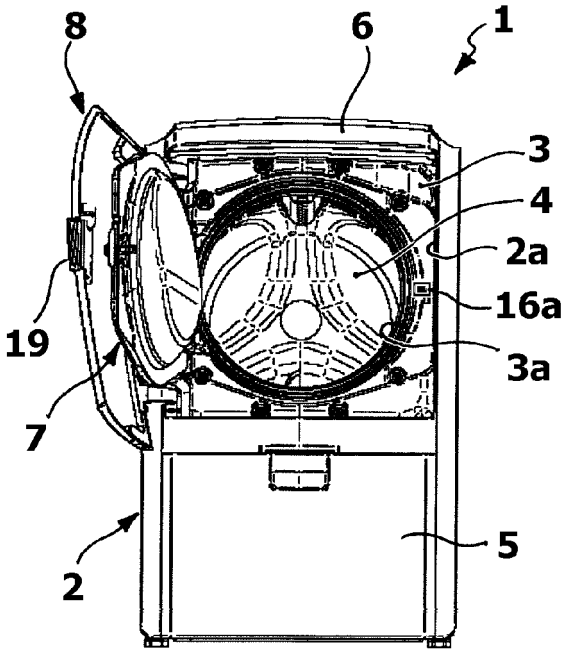


Fig. 2

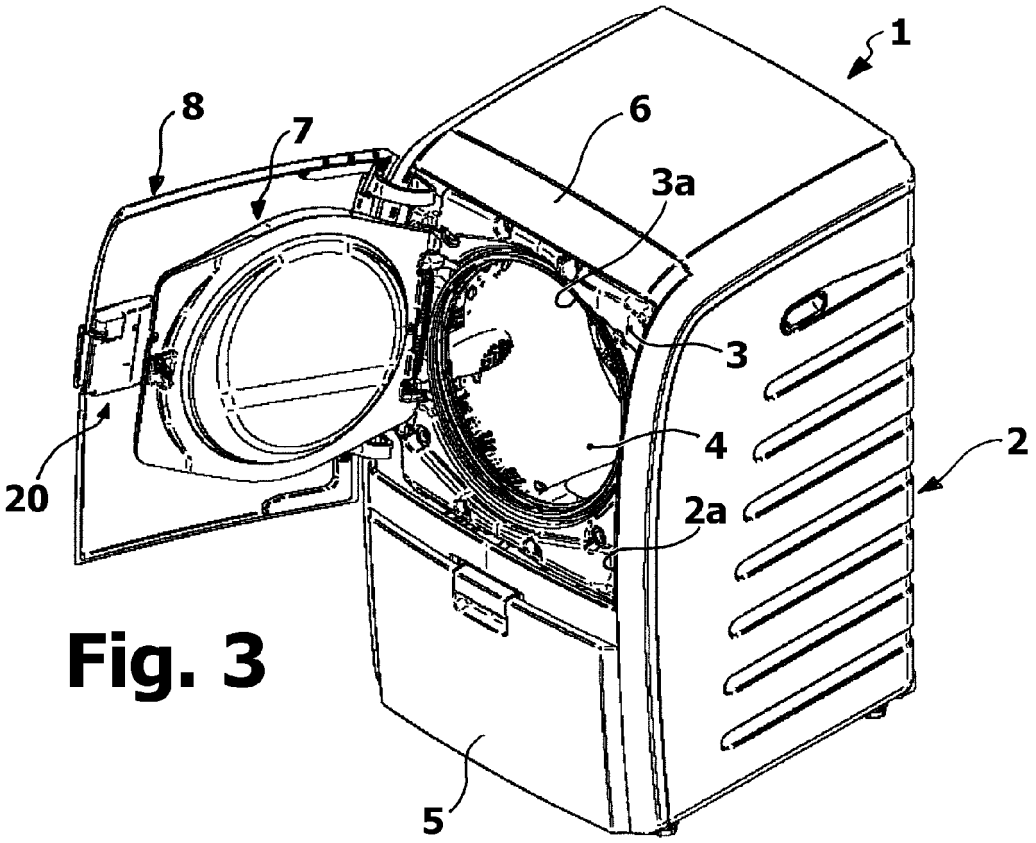


Fig. 3

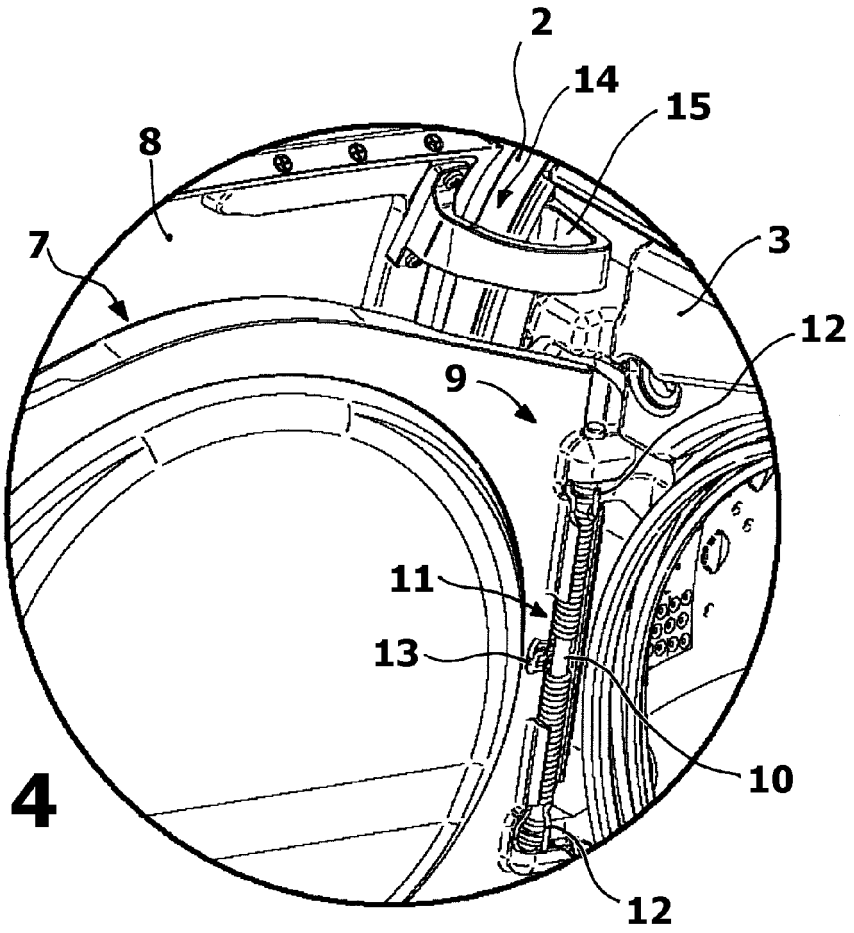


Fig. 4

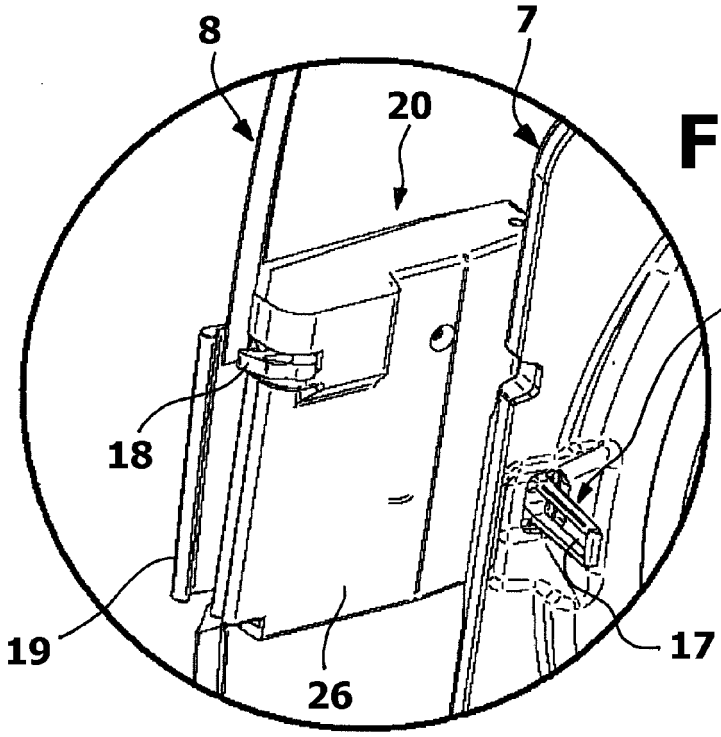


Fig. 5

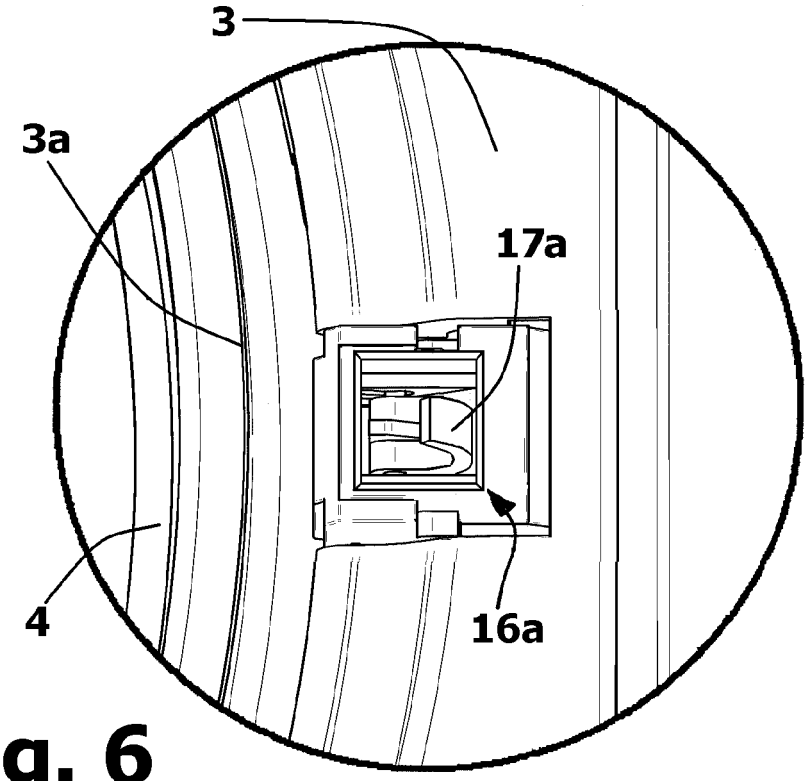


Fig. 6

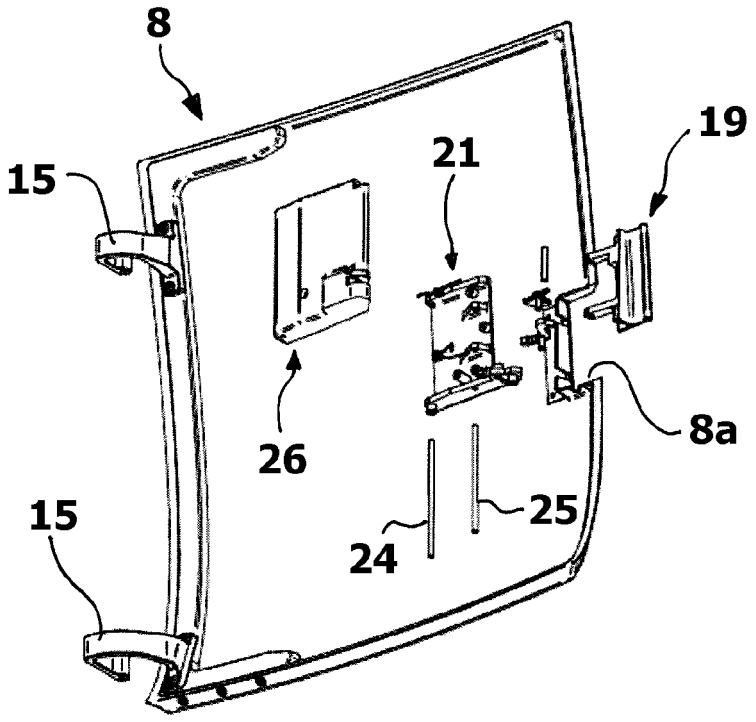


Fig. 7

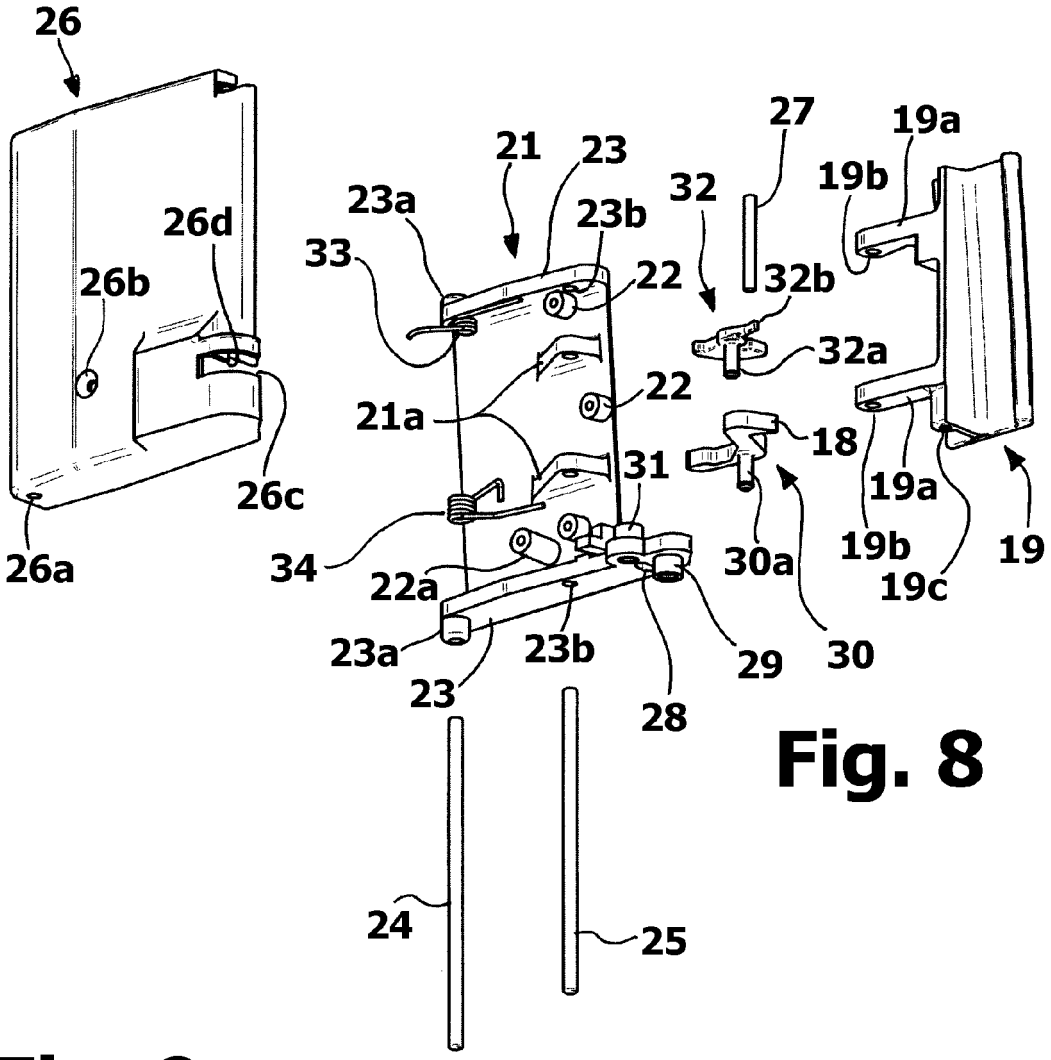

26
26d
26b
26c
26a
21
23
23a
23b
33
22
27
32
32b
32a
19a
19b
21a
22
18
31
19a
19b
19c
19
34
22a
30a
23a
23b
29
30
23
28
24
25

Fig. 8

Fig. 9

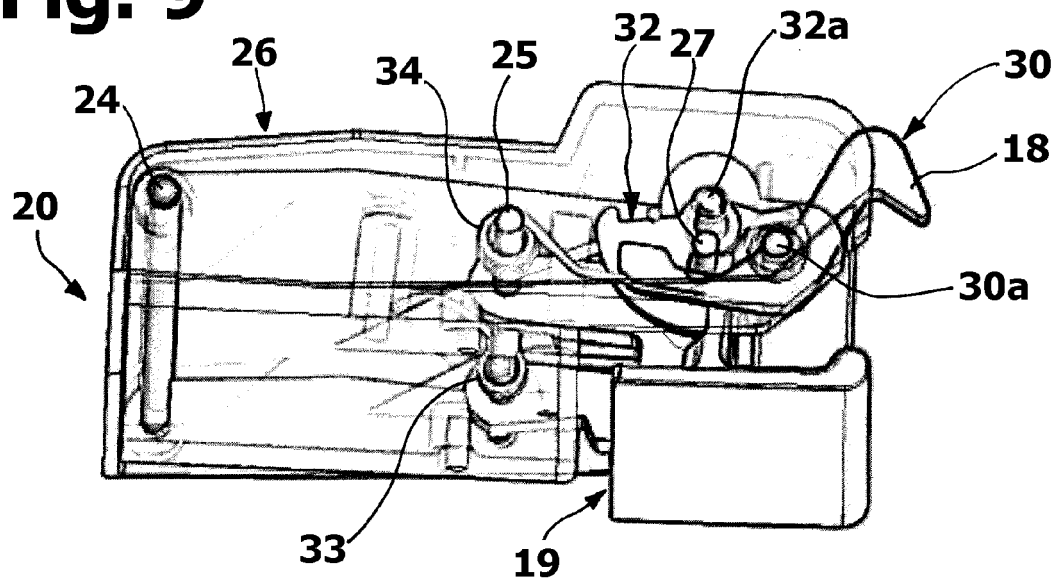
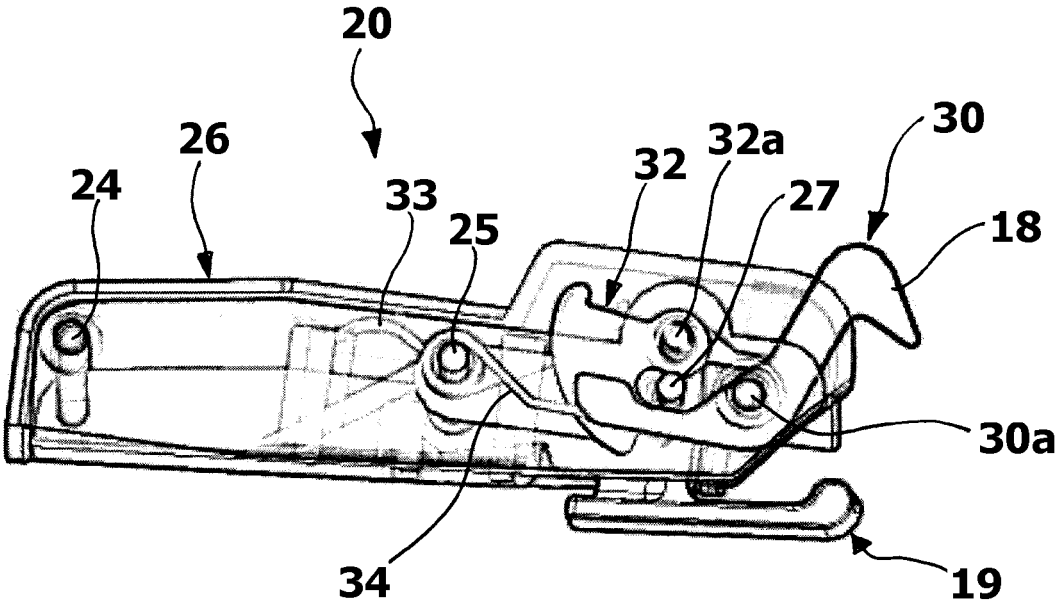

26
24
34
25
32
27
32a
30
18
20
30a
33
19

Fig. 10


20
26
24
33
25
32
32a
27
30
18
30a
34
19

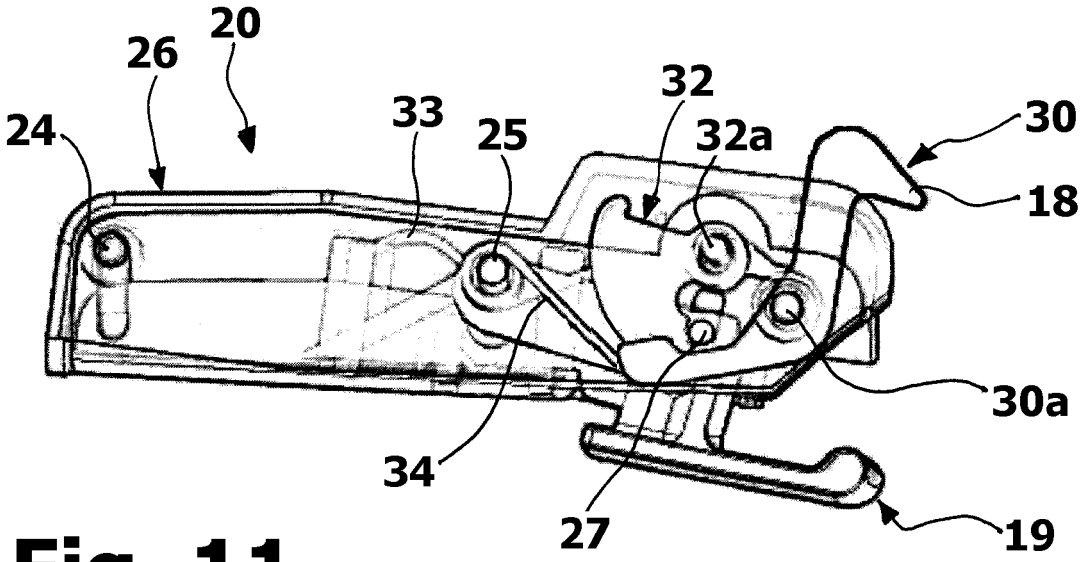

20
26
24
33
25
32
32a
30
18
30a
34
27
19

Fig. 11

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 09 16 3078

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	GB 979 170 A (CONSTRUCTA WERKE GMBH) 1 January 1965 (1965-01-01) * page 1, line 65 - page 2, line 101; claims 1,2; figures *	1-10	INV. D06F39/14 D06F37/28
A,D	WO 2006/072904 A (ARCELIK ANONIM SIRKETI [TR]; OZDEMIR YASEMIN [TR]; GULAY ERSAN [TR]; A) 13 July 2006 (2006-07-13) * paragraphs [0016] - [0024]; figures *	1-10	
A	JP 2003 093789 A (NAKAGAWA DENKI KOGYO) 2 April 2003 (2003-04-02) * paragraphs [0001] - [0010], [0016], [0017], [0064]; figures *	1-10	

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	14 September 2009	Clivio, Eugenio

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 16 3078

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-09-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 979170 A	01-01-1965	AT 244892 B	25-01-1966
WO 2006072904 A	13-07-2006	NONE	
JP 2003093789 A	02-04-2003	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1319100 A **[0002]**
- WO 2006072904 A **[0002]**
- EP 1462562 A **[0012]**
- EP 1924000 A **[0012]**