

(19)



(11)

EP 2 540 899 A1

(12)

EUROPEAN PATENT APPLICATION

(43)

Date of publication:
02.01.2013 Bulletin 2013/01

(51)

Int Cl.:
D06F 37/42 ^(2006.01) **D06F 58/04** ^(2006.01)
A47L 15/42 ^(2006.01)

(21)

Application number: **12075062.5**

(22)

Date of filing: **26.06.2012**

(84)

Designated Contracting States:
**AL 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 RS SE SI SK SM TR**
Designated Extension States:
BA ME

(71)

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Priority: **01.07.2011 NL 1038913**

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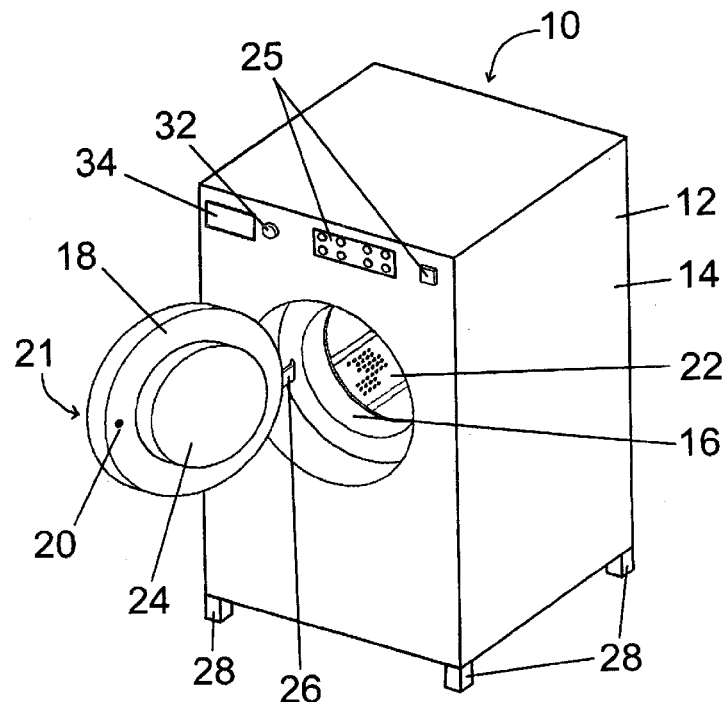
A machine for treating laundry or dishes , a door assembly for the machine and a kit of parts for the machine

(57)

A machine (10) for treating laundry which machine (10) comprises a cabinet having an outside wall (14) which has an opening (16) for introduction of laundry into the machine (10), a door (18) for closing the introduction opening (16), and a lock (20) for locking the door (18). The machine further comprises a safety device. The safety device is adapted to be activated as a result of,

and concurrently with, a person's action outside of the machine (10). In activated condition the safety device permits the lock to lock the unlocked door and in non-activated condition it prevents the lock from locking the unlocked door. Also claimed: a kit of parts for a machine (10) for treating laundry and a door (18) assembly for a machine (10) for treating laundry.

FIG. 1



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Description

[0001] The present invention relates to a machine for treating laundry or dishes, a door assembly for the machine and a kit of parts for the machine.

[0002] A machine for treating laundry or dishes may be, for example, a washing machine, a centrifuge or a dryer, or a dishwasher. Some types of machines for treating laundry combine some of the functionalities of washing, centrifuging and drying. The machine for treating laundry or dishes may comprise a cabinet having an outside wall, the outside wall having an opening for introduction of laundry or dishes into the machine, a door for closing the introduction opening, and a lock for locking the door. A rotatable drum designed for receiving and working laundry may be positioned inside the cabinet. The laundry is treated during the drum's action of tumbling and/or spinning.

[0003] Safety aspects of the machines for treating laundry or dishes have been considered already for a long period of time, in particular in respect of the safety for children. A child may become injured and even die as a result of contact with the interior of the machine when in operation. When not in operation, a child may climb into the machine. Frequently the door can lock automatically so that the child may become hidden and locked-up in the machine. The child may become injured or the child may even die when the machine is then started. However, also without the machine being started, the situation may be harmful to the child, as it has been reported that children suffocated when trapped in the machine.

[0004] US-A-3803725 discloses a starting switch effecting that the machine can operate only when the door is closed. GB-A-2317002, KR-A-20050019474 (English language abstract), KR-A- 20100046950 (English language abstract) and DE-C-4304086 disclose a door having a lock which can be opened from the interior. However, this would require an action from a child to free itself from its lock-up position. GB-A-2293610 discloses a plastic disc for covering the window of a washing machine to prevent a child climbing up on top of the machine. None of these references address the danger that children may suffocate in a machine for treating laundry or dishes.

[0005] The present invention provides a machine for treating laundry or dishes which machine comprises

- a cabinet having an outside wall, the outside wall having an opening for introduction of laundry or dishes into the machine,
- a door for closing the introduction opening,
- a lock for locking the door, and
- a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition prevents at times that there is no person's action, and the door

is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.

[0006] In a preferred embodiment, the present invention provides a machine for treating laundry or dishes, in particular a machine for treating laundry, which machine comprises

- a cabinet having an outside wall, the outside wall having an opening for introduction of laundry or dishes, in particular laundry, into the machine,
- a door for closing the introduction opening,
- a lock for locking the door, and
- a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition

(1) prevents the lock from locking the unlocked door, and

(2) prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.

[0007] The invention also provides a door assembly for a machine for treating laundry or dishes, which door assembly comprises

- a door for closing an introduction opening of the machine, which introduction opening is suitable for introducing laundry or dishes into the machine,
- a lock for locking the door, and
- a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.

[0008] In a preferred embodiment, the invention also provides a door assembly for a machine for treating laundry or dishes, in particular a machine for treating laundry, which door assembly comprises

- a door for closing an introduction opening of the machine, which introduction opening is suitable for introducing laundry or dishes, in particular laundry, into the machine,
- a lock for locking the door, and
- a safety device which is adapted to be activated as a result of, and concurrently with, a person's action

outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition

(1) prevents the lock from locking the unlocked door, and

(2) prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.

[0009] The invention also provides a kit of parts for a machine for treating laundry or dishes, which kit of parts comprises

- a door for closing an introduction opening of the machine, which introduction opening is suitable for introducing laundry or dishes into the machine,
- a lock for locking the door, and
- a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.

[0010] In a preferred embodiment, the invention also provides a kit of parts for a machine for treating laundry or dishes, in particular a machine for treating laundry, which kit of parts comprises

- a door for closing an introduction opening of the machine, which introduction opening is suitable for introducing laundry or dishes, in particular laundry, into the machine,
- a lock for locking the door, and
- a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition

(1) prevents the lock from locking the unlocked door, and

(2) prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.

[0011] The safety device of this invention is effective in eliminating the possibility that children suffocate in a machine for treating laundry or dishes. It is surprising that no earlier an effective solution for this pressing and long-

lasting problem has been proposed. As it will become apparent from the description hereinafter, the safety device of this invention is a simple device and easy to implement in the design of a machine for treating laundry or dishes.

FIG. 1 provides a perspective view of an embodiment of the machine in accordance with this invention.

FIG. 2 provides a cross-sectional view of a detail of an embodiment of the machine in accordance with this invention, in particular the safety device, in a position that the door is almost closed and the door is unlocked.

FIG. 3 provides a cross-sectional view of the safety device shown in FIG. 2, but in a position that the door is closed and locked.

FIG. 4 provides a cross-sectional view of a detail of an embodiment of the machine in accordance with this invention, in particular the safety device, in a position that the door is almost closed and the door is unlocked.

FIG. 5 provides a cross-sectional view of the safety device shown in FIG. 4, but in a position that the door is closed.

FIG. 6 provides a cross-sectional view of a detail of a preferred embodiment of the safety device shown in FIG. 4, in a position that the door is closed and locked.

FIG. 7 provides a schematic of a portion of the electrical circuit of an embodiment of the machine in accordance with this invention.

[0012] The machine in accordance with this invention may typically be a washing machine, a centrifuge or a dryer, or it may be a machine which combines some of these functionalities. For example, it may be a washing machine, which also incorporates the capability of centrifuging laundry and optionally also drying. Alternatively, the machine in accordance with this invention may be a dishwasher. Such machines, per se, are known in the art, for example, from the references cited hereinbefore.

[0013] The machine comprises a cabinet having an outside wall, the outside wall having an opening for introduction of laundry or dishes into the machine, a door for closing the introduction opening, and a lock for locking the door. A skilled person will appreciate that in general the machine additionally comprises additional components and parts, such as movable parts for working the laundry or the dishes, an electric motor for driving such movable parts, an electric power supply unit, programming equipment, control knobs, electric heating equipment, a support, such as legs and/or wheels, and utility connections for, for example, electricity, water supply, waste water discharge, ambient air supply and waste air discharge, depending of the functionality of the machine. As a matter of definition, the bottom side of the machine is the side which is intended to have contact with a supporting floor by means of the support; the top side is the

side opposite to the bottom side; the back side is the side which during use of the machine is intended to be positioned adjacent to a wall; and the front side is the side opposite to the back side. A skilled person will immediately recognise the back side of the machine as the back-side locates most, if not all, of the utility connections and the back side is less well finished than the other sides of the machine, except the bottom side.

[0014] The introduction opening may be located in the top side of the machine (a so-called top loading machine), or in the front side of the machine (a so-called front loading machine). When the machine is a machine for treating laundry, the moving parts of the machine which work the laundry may be a drum, usually having perforations, or a propeller shaped agitator. A drum is preferred, but when the machine is a top loading washing machine the propeller shaped agitator is preferred.

[0015] The door for closing the introduction opening may have a hinge connecting the door to the cabinet. The hinge allows the door to be opened, typically in a direction away from the cabinet, and closed. The door may have a window which permits viewing the laundry or dishes during operation of the machine. The lock may comprise components located in the door, preferably located at the end of the door opposite to the hinge. The cabinet may comprise components capable of receiving components of the lock when the door is locked and to the effect that the door becomes locked.

[0016] The safety device in accordance with this invention is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine. In activated condition the safety device permits the lock to lock the unlocked door and in non-activated condition the safety device prevents the lock from locking the unlocked door. The person's action may comprise acting upon an input device located on the exterior of the machine. The input device may be, for example, a knob, a button, a lever, a microphone or a key together with a device for receiving the key. Such key may be separate from the machine, whereas the device for receiving the key may be located on the exterior of the machine. The person's action may be, for example, pushing, pulling, squeezing, speaking, touching, or introducing and/or turning a key. Preferably, the person's action is pushing or pulling a knob, pushing or pulling a lever, touching a soft button, or introducing a key into the device for receiving the key and/or turning the key in the device for receiving the key.

[0017] The input device may be adapted to communicate with an action device. The action device may be, for example, a rod, a bolt, a solenoid magnet, or a plate, such as a disc or a segment of a disc. The action device may be movable relative to the portion of the machine to which it is attached. Such communication may be, for example, mechanical, electrical, or electromechanical. The action device may be adapted to act upon one or more components of the lock or interact otherwise with the lock, permitting the lock to lock the unlocked door (activated condition), or preventing the lock to lock the

unlocked door (non-activated condition). The action or interaction of the action device preventing the lock to lock the door may be concurrently with the person's action and during the person's action. The action device may be adapted such that at times that there is no person's action, and the door is unlocked, the action device prevents the lock to lock the door, so that a child hidden in the machine will not be trapped in the machine. The safety device is adapted such that at times that there is no person's action, and the door is unlocked, the safety device prevents the door to be closed entirely, leaving at least a gap between the interior and the exterior of the machine. In preferred embodiments, the action device may be adapted such that at times that there is no person's action, and the door is unlocked, the action device prevents the door to be closed entirely, leaving at least a gap between the interior and the exterior of the machine.

[0018] In preferred embodiments components of the safety device may be integrated with the lock or components of the lock.

[0019] Specific embodiments of the invention will now be described with reference to the Figures. The same parts or components will be given the same reference symbols throughout the Figures.

[0020] FIG. 1 shows machine 10 in accordance with this invention comprising cabinet 12, outside wall 14, opening 16 for introduction of laundry or dishes into the machine, door 18 for closing introduction opening 16, and lock 20 for locking door 18. Lock 20 may be operated by means of hand hold 21 (not visible in FIG. 1). Machine 10 may be a machine for treating laundry, in which case machine 10 may have a perforated drum 22. Machine 10 may have window 24 and control knobs 25. Hinge 26 may connect door 18 to cabinet 12. As drawn, machine 10 is a front loading machine. Machine 10 may be supported by legs 28. Machine 10 comprises a safety device comprising an action device (not visible) and input device 32 which can communicate with the action device. Machine 10 may be a washing machine for laundry or dishes, in which case machine 10 may comprise a detergent loading device 34.

[0021] FIGS. 2 and 3 show details of a machine in accordance with this invention, in particular a cross-section in a plane parallel with the top side of the machine, showing door 18 in the vicinity of lock 20 (FIG. 1), and cabinet 12 in the vicinity of opening 16. Door 18 may comprise window 24. Lock 20 comprises rod 40 positioned in hole 41 in door 18. Rod 40 can rotate around axis 42, to the extent as determined by stoppers 44 and 46 attached to door 18. Axis 42 is fixed in the body of door 18. In its rest position rod 40 rests against stopper 44, forced by the elastic force of a spring, for example a torsion spring (not drawn) located around axis 42. Notch 48 in rod 40 has a flat surface 50 perpendicular to the axial direction of rod 40 and facing towards axis 42. At one end, rod 40 has a flat surface 52 perpendicular to the axial direction of rod 40. At the opposite end, rod 40 is attached to, or integrat-

ed in, hand hold 21. Disc 54 attached to the inside of cabinet 12 has hole 56. Hole 58 in cabinet 12 overlaps entirely with hole 56.

[0022] FIG. 2 shows door 18 in a position of having almost been closed and being unlocked. Disc 54 is positioned such that, in the position of door 18 shown in FIG. 2, rod 40 encounters disc 54. Disc 54 and rod 40 prevent door 18 to close entirely and they prevent lock 20 to lock door 18 (non-activated condition). In the position shown a person's action may be to pull hand hold 21 in the direction of arrow A against the elastic force of the torsion spring. The position of disc 54 is also such that, while pulling, surface 52 can face hole 56 in disc 54 (activated condition). Then, door 18 may be pushed from the outside so that the end of rod 40 passes hole 56 and the door can be closed entirely. In this position hand hold 21 may be released so that door will become locked, as shown in FIG. 3.

[0023] FIG. 3 shows door 18 in a position of having been closed and locked. Notch 48 has received the inner side of disc 54. In locked position, elastic band 57 may provide a water tide seal. In the position shown in FIG. 2, there is space 59 between elastic band 57 and cabinet 12, leaving a gap between the interior and the exterior of the machine so that venting of air can prevent a child hidden in the machine from suffocating.

[0024] FIGS. 4, 5 and 6 show details of a machine in accordance with this invention, in particular a cross-section in a plane perpendicular to the front side of the machine, showing action device 60, door 18 and cabinet 12. Action device 60 may be located at door 18 in the vicinity of lock 20 (FIG. 1). Action device 60 comprises rod 62 attached to door 18. Rod 62 can pass through hole 64 in cabinet 12 and hole 64 is located such that it can receive rod 62. Action device 60 also comprises rod shaped stopper 63. Stopper 63 is slidably mounted in guide 66 which allows movement of stopper 63 in its axial direction. Guide 66 is attached to cabinet 12. In the position shown in FIG. 4 rod 62 encounters stopper 63, preventing door 18 to close entirely and lock 20 (FIG. 1) to lock door 18 (non-activated condition). Rod 62 is inserted in hole 64 and rests against stopper 63. The length of rod 62 is such that the position of door 18 prevents a lock (not drawn) to lock door 18. Stopper 63 may move into the direction of arrow B by the action of, for example, a solenoid magnet (not drawn), a lever (not drawn) or a Bowden cable (not drawn) against the elastic force of an extension spring (not drawn). The solenoid magnet, the lever or the Bowden cable communicate with an input device as described hereinbefore (not drawn), to the effect that the person's action causes stopper 63 to move into the direction of arrow B and to be held in that position during the person's action, the movement of stopper 63 being sufficient to allow rod 62 to pass stopper 63, so that door 18 can be closed and lock 20 (FIG. 1) can lock door 18 (activated condition).

[0025] FIG. 4 shows door 18 in a position of having almost been closed and being unlocked. Movement of

stopper 63 in the direction of arrow B allows door 18 to be closed. FIG. 5 shows door 18 in a position of having been closed. In the absence of the person's action, the elastic force of the extension spring brings stopper 63 in a position that it rests against rod 62. In the position shown in FIG. 5 the lock is no longer prevented from locking door 18. When door 18 is locked, an elastic band (not drawn) provides a water tide seal between door 18 and cabinet 12. In the position shown in FIG. 4, there is a space between the elastic band and cabinet 12, leaving a gap between the interior and the exterior of the machine so that venting of air can prevent a child hidden in the machine from suffocating.

[0026] In a more preferred embodiment of the safety device of FIG. 4, shown in FIG. 6, rod 62 has hole 67 which is capable of receiving stopper 63. In closed position, as shown in FIG. 6, and in the absence of the person's action, the elastic force of the extension spring causes stopper 63 to slide into hole 67 of rod 62, causing door 18 to be locked. The person's action can unlock door 18 again by causing stopper 63 to move into the direction of arrow B (FIG. 4). In this embodiment, the action device is integrated with the lock.

[0027] FIG. 7 shows portion 70 of an electric circuit of an embodiment of the machine of this invention. An electric power supply (not drawn) is connected to connecting points 72. Portion 70 further comprises push-button 74 and solenoid magnet 76. Solenoid magnet 76 communicates mechanically with, for example, stopper 63 shown in FIGS 4, 5 and 6, to the effect that, when pushed during the person's action, push-button 74 closes the circuit and solenoid magnet 76 causes stopper 63 to move in the direction of arrow B (FIG. 4) (activated condition).

Claims

1. A machine for treating laundry or dishes which machine comprises
 - a cabinet having an outside wall, the outside wall having an opening for introduction of laundry or dishes into the machine,
 - a door for closing the introduction opening,
 - a lock for locking the door, and
 - a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.
2. A machine as claimed in claim 1, wherein the safety device in non-activated condition

- (1) prevents the lock from locking the unlocked door, and
 (2) prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.
- 5
3. A machine as claimed in claim 1 or 2, wherein the safety device comprises an input device and an action device, and wherein the input device is adapted to communicate mechanically, electrically, or electromechanically with the action device.
- 10
4. A machine as claimed in claim 3, wherein the input device is a knob, a button, a lever, a microphone, or a key and a device for receiving the key, and the person's action comprises pushing, pulling, squeezing, speaking, touching, or introducing and/or turning a key.
- 15
5. A machine as claimed in claim 3 or 4, wherein the action device is a rod, a bolt, a solenoid magnet, or a plate, for example a disc or a segment of a disc.
- 20
6. A machine as claimed in any of claims 3-5, wherein the action device is adapted to act upon one or more components of the lock.
- 25
7. A machine as claimed in any of claims 3-6, of which machine the action device is adapted to prevent the door to be closed entirely, leaving at least a gap between the interior and the exterior of the machine, at times that there is no person's action and the door is unlocked.
- 30
- 35
8. A machine as claimed in any of claims 1-7, which machine is a machine for treating laundry.
- 40
9. A machine as claimed in claim 8, which machine is a washing machine, a centrifuge or a dryer, or combines at least two of the functionalities of a washing machine, a centrifuge or a dryer.
- 45
10. A kit of parts for a machine for treating laundry or dishes, which kit of parts comprises
- 50
- a door for closing an introduction opening of the machine, which introduction opening is suitable for introducing laundry or dishes into the machine,
 - a lock for locking the door, and
 - a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition prevents at times that there is no person's
- 55
- action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.
11. A kit of parts as claimed in claim 10, wherein the safety device in non-activated condition
- (1) prevents the lock from locking the unlocked door, and
 (2) prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.
12. A kit of parts as claimed in claim 10 or 11, wherein the machine is a machine for treating laundry.
13. A kit of parts as claimed in claim 12, wherein the machine is a washing machine, a centrifuge or a dryer, or combines at least two of the functionalities of a washing machine, a centrifuge or a dryer.
14. A door assembly for a machine for treating laundry or dishes, which door assembly comprises
- a door for closing an introduction opening of the machine, which introduction opening is suitable for introducing laundry or dishes into the machine,
 - a lock for locking the door, and
 - a safety device which is adapted to be activated as a result of, and concurrently with, a person's action outside of the machine, and which safety device in activated condition permits the lock to lock the unlocked door and in non-activated condition prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.
15. A door assembly as claimed in claim 14, wherein the machine is a machine for treating laundry and wherein the safety device in non-activated condition
- (1) prevents the lock from locking the unlocked door, and
 (2) prevents at times that there is no person's action, and the door is unlocked, the door from being closed entirely, leaving at least a gap between the interior and the exterior of the machine.

FIG. 1

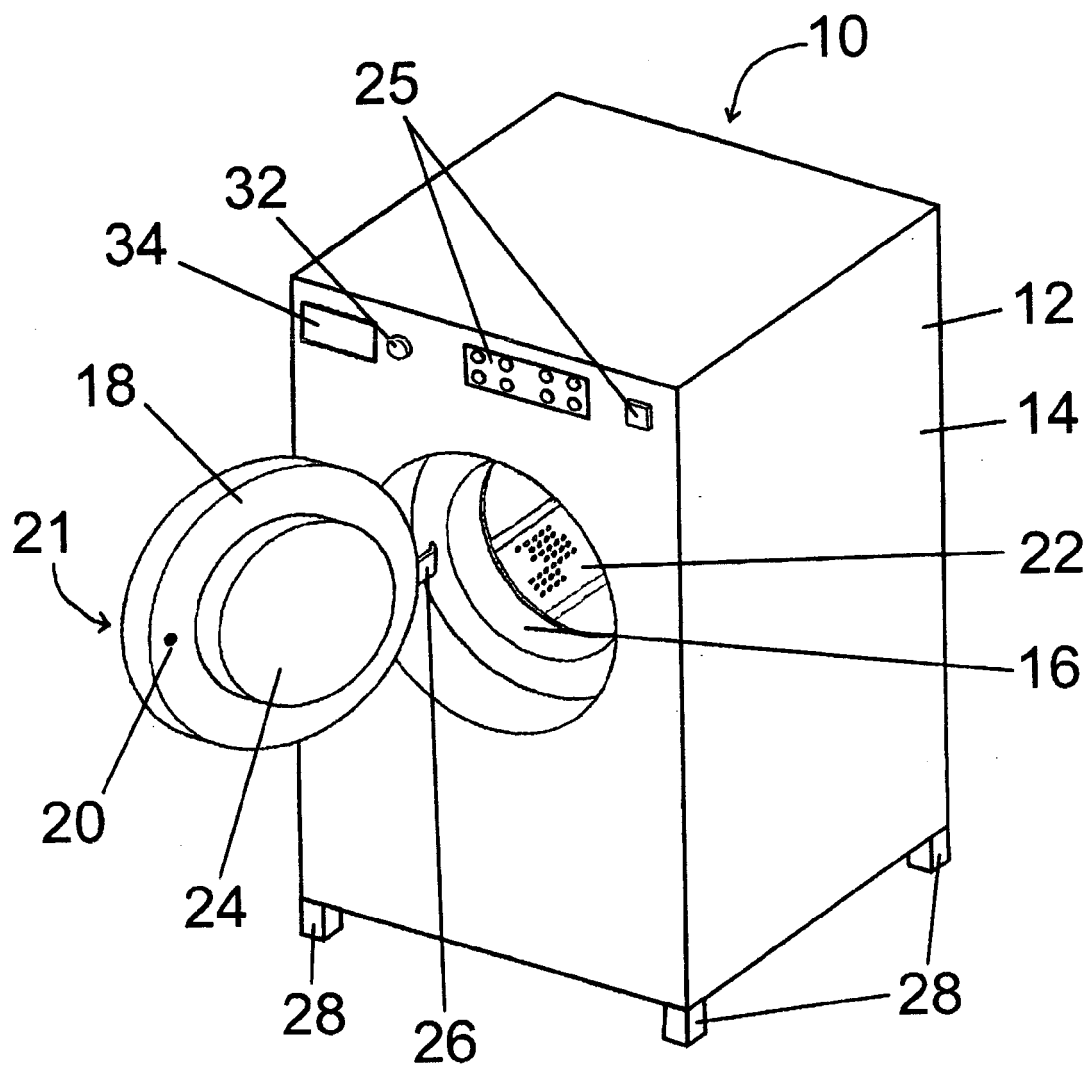


FIG. 2

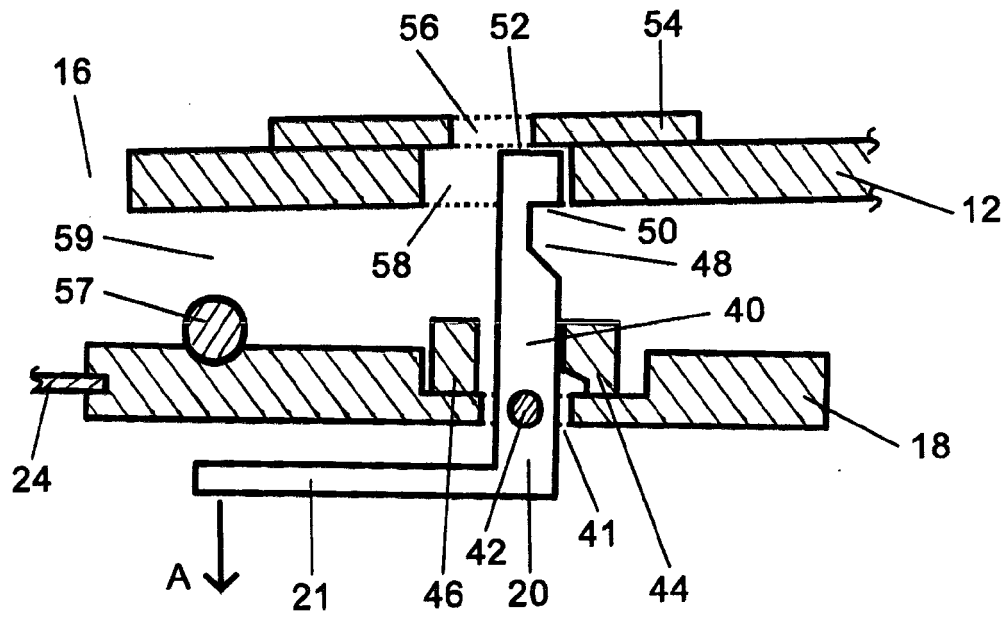


FIG. 3

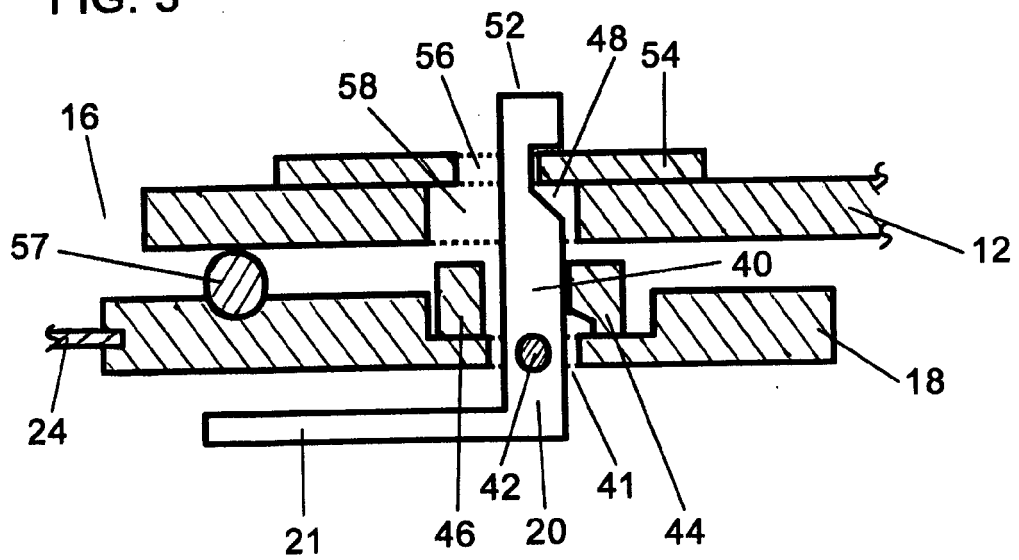


FIG. 4

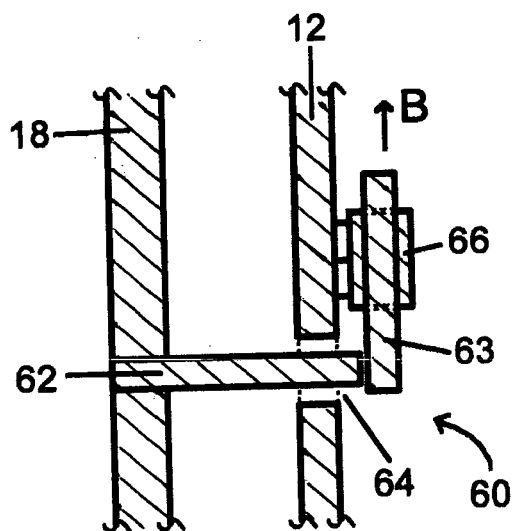


FIG. 5

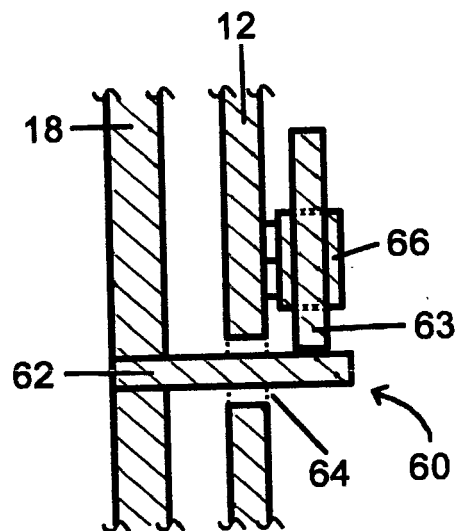


FIG. 6

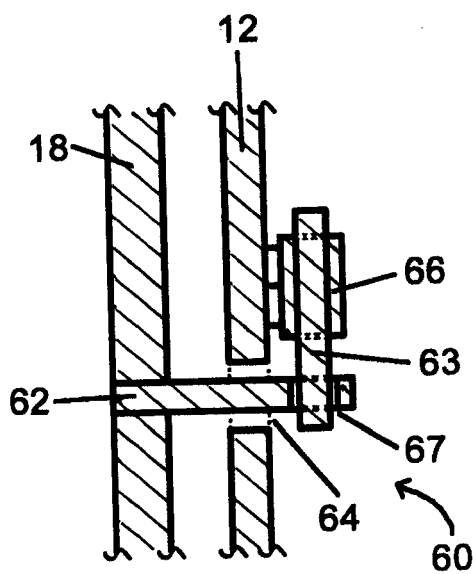
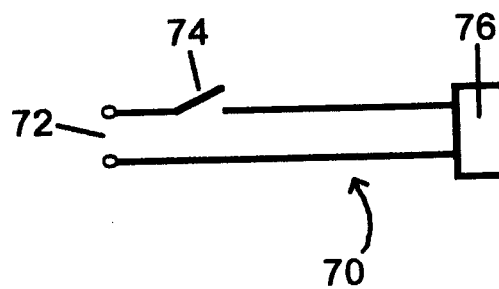


FIG. 7





EUROPEAN SEARCH REPORT

Application Number
EP 12 07 5062

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 August 2012	Examiner Kising, Axel
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			

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EPO FORM 1503 03.82 (P04C01)

**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.
The members are as contained in the European Patent Office EDP file on
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REFERENCES CITED IN THE DESCRIPTION

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