



(11) **EP 2 115 209 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
06.06.2012 Bulletin 2012/23

(21) Application number: **07858143.6**

(22) Date of filing: **26.12.2007**

(51) Int Cl.:
D06F 39/12 (2006.01)

(86) International application number:
PCT/EP2007/064546

(87) International publication number:
WO 2008/080920 (10.07.2008 Gazette 2008/28)

(54) **A WASHER/DRYER**
WASCHTROCKNER
LAVE-LINGE/SÈCHE-LINGE

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

(30) Priority: **29.12.2006 TR 200607691**

(43) Date of publication of application:
11.11.2009 Bulletin 2009/46

(73) Proprietor: **Arçelik Anonim Sirketi**
34950 Istanbul (TR)

(72) Inventors:
• **DAIOGLU, Orhan**
34950 Istanbul (TR)
• **AYDINAY, Alper**
34950 Istanbul (TR)

(56) References cited:
EP-A- 1 424 429 DE-U1- 8 710 553
US-A1- 2004 107 738 US-A1- 2004 244 439

EP 2 115 209 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a washer/dryer which allows an easy assembly and the damages that may occur during transportation are prevented.

[0002] In washer/dryers the outer cabin is formed by connecting together the rear, side and front walls by means of fastening elements such as screws etc. Forces from various directions affect on these screws and fastening elements during the impacts, toppling over that may occur while transporting. In the case the screw joints cannot counteract these forces, deformations or rupture of the metal sheet may result at those regions. In state of the art, various methods are utilized for allowing easy assembly of the outer cabinet and preventing the damages at the connection joints.

[0003] In the United States of America Patent No US2004/0244439, a cabinet for a home appliance, which permits an easy assembly, is explained. Projections and holes are provided on the side and rear panels forming the cabinet. The projections on the side panels are inserted into the holes on the front panel for fixing the front panel. The cabinet is completely locked by seating the latch in the base of the hole into the groove on the lower side of the projection.

[0004] In the United States of America Patent No US2004/0107738, an improvement in the assembly of the front panel to the side panels is explained. The flanges on the side panels are inserted into the notch recesses on the front panel for securing. Since a plurality of notch recesses is provided, the stress concentration on each joint is decreased.

[0005] The aim of the present invention is the realization of a washer/dryer that allows easy assembly and wherein the damages that may occur during transport are reduced.

[0006] The washer/dryer designed realized in order to attain the aim of the present invention is explicated in the claims.

[0007] In the washer/dryer of the present invention, at least one slot is disposed on both sides at the inner surface of the front wall and clutches corresponding to these slots on the side walls are provided for assembling the front wall on the side walls.

[0008] The clutches used in the preferred embodiment of the present invention, comprise a half-spherical head and a neck that connects this head to the side wall. On the other hand, the slots arranged on the front wall are configured to be wide enough for the head to pass at the upper portion, while the lower portion is sized to be as narrow as the neck. In this embodiment, passing the clutch to the slot is maintained by inserting the head to the wide portion of the slot and sliding the front wall upwards for seating the neck in the narrow portion of the slot. Thus, the clutch bears on the lowest point of the slot. The lower side of the slot serves as a barrier preventing the movement of the front wall in the upwards direction.

[0009] Locking of the front wall after the side walls are

fastened thereon is maintained by means of protuberances each formed oppositely on the front wall and side walls. The protuberances are configured to slide over each other during locking of the front wall and to provide locking such that movement in the reverse direction is not allowed after being seated in place.

[0010] In the preferred embodiment of the present invention, the protuberances are formed by the operation performed on the metal sheet on the front and side walls. The protruded portion forms the protuberance by going to the other side of the wall during the protrusion process. The protuberance comprises a slid surface whereon they bear on each other before the front wall is locked to the side walls. When the front wall is slid to maintain locking, the protuberances slide over each other along the slid surfaces. The protuberances furthermore comprise a resting surface whereon each leans on the other when the front wall is locked to the side walls. When the locking process is completed, the resting surfaces of the protuberances overlap one another by coming opposite to each other and prevent movement in the opposite direction of sliding.

[0011] During assembly, first of all the front wall is attached to the side walls by passing the protuberances on the front wall into the slots on the side walls. Then the protuberances are skipped over each other by the front wall sliding with stretching, maintaining the protuberance on the front wall to be above the protuberance on the side wall. While the outward inclined backsides of the protuberances bear on each other before sliding, the forces that may affect from various directions during transport are compensated more effectively since the upward and downward facing sides are opposite one another in the locking position.

[0012] In an embodiment of the present invention, the side walls are secured to the base and the ceiling by using additional fastening elements (nuts, screws etc.) after the assembly of the front wall to the side walls is completed.

[0013] The washer/dryer realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0014] Figure 1 - is the front schematic view of a washer/dryer.

[0015] Figure 2 - is the detailed perspective view of the protuberances used in a washer/dryer.

[0016] Figure 3 - is the detailed perspective view of the clutch and the slot used in a washer/dryer before assembling.

[0017] Figure 4 - is the detailed perspective view of the clutch and the slot used in a washer/dryer after assembling.

[0018] Figure 5 - is the cross-sectional view of the protuberances before locking.

[0019] Figure 6 - is the cross-sectional view of the protuberances after locking.

[0020] Figure 7 - is the perspective view of the protuberances after locking.

[0021] The elements illustrated in the figures are numbered as follows:

1. Washer/dryer
2. Side wall
3. Front wall
4. Slot
5. Clutch
6. , 60. Protuberance
7. Fastening elements
8. Head
9. Neck

[0022] The washer/dryer (1) comprises at least two side walls (2) that cover the volume containing the drum, wherein laundry is placed, and the other machine elements from the sides, a front wall (3) secured on the side walls (2), at least one slot (4) disposed on the inner surface of the front wall (3) for mounting the front wall (3) to the side walls (2) and at least one clutch (5) disposed on the outer surface of the side walls (2) for fastening the front wall (3) to the side walls (2) by inserting through the slot (4).

[0023] The washer/dryer (1) furthermore comprises protuberances (6, 60) disposed oppositely on the surfaces of the front wall (3) and the side walls (2) facing each other, that slide over one another while the front wall (3) is mounted to the side walls (2) and provide locking by not allowing movement in the reverse direction after the front wall (3) is secured in place.

[0024] The clutches (5) can be in the form of a hook, pin, latch etc. matching the shape of the slot (4).

[0025] The clutches (5) used in the preferred embodiment of the present invention, comprise a half spherical head (8) and a neck (9) with a width smaller than the diameter of the sphere that connects this head (8) to the side wall (2). In this embodiment, the upper part of the slots (4) to which the clutches (5) are mounted is wide enough for the head (8) to be inserted. The lower part of the slots (4) is wide enough for the neck (9) to be seated; however, sized for not allowing the head (8) to pass. Therefore, the clutch (5) is inserted through the wider part of the slot (4) such that the head (8) passes behind the front wall (3). Then the front wall (3) is slid upwards for seating the neck (9) in the narrow part of the slot (4).

[0026] The protuberances (6, 60) are formed on the front and side walls (2, 3) by the protrusion process. The portions protruded during the protrusion process form the protuberances (6, 60). The protuberances (6, 60) comprise a slid surface (A) whereon they bear on each

other before the front wall (3) is interlocked to the side walls (3). The protuberances (6, 60) slide over each other along the slid surfaces (A) when the front wall (3) is slid to maintain locking. The slid surface (A) can either be parallel to the plane formed by the protuberances (6, 60) or can be inclined. The protuberances (6, 60) comprise a resting surface (O) whereon each lean to the other after the front wall (3) is locked to the side walls (2). When the locking process is completed, the resting surfaces (O) of the protuberances (6, 60) overlap one another by facing oppositely and prevent movement in the opposite direction of sliding. The resting surface (O) is almost vertical to the plane whereon the protuberances (6, 60) are formed.

[0027] The clutches (5) restrict the back and forth movement of the front wall (3). Falling down of the front wall (3) is prevented by means of the locking provided with the protuberances (6, 60).

[0028] In a version of this embodiment, the slid surfaces (A) of the protuberances (6) on the front wall (3) are inclined in the downward direction; the slid surfaces (A) of the protuberances (6) on the side walls (3) are inclined in the upward direction. The slid surfaces (A) of the opposite protuberances (6, 60) bear on each other before the locking operation, therefore the protuberance (6) on the front wall (3) is almost at the same level with the protuberance (6) on the side wall (2) or somewhat lower.

[0029] For assembling the front wall (3) to the side walls (3), first of all the clutches (5) are inserted through the slots (4) on the side walls (3). Then, the protuberances (6, 60) are skipped over each other by stretching the front wall (3) to slide upwards, maintaining the protuberance (6) on the front wall (3) to be above the protuberance (60) on the side wall (2). In this position, the resting surfaces (A) situated on the ends of the protuberances (6, 60) separating the surfaces of the front wall (3) and the side wall (2) are aligned and at least partially bear on each other. Consequently, the locking of the front wall (3) is maintained and the front wall (3) is connected to the side walls (2) without requiring a separate support from outside.

[0030] In an embodiment of the present invention, the side walls (2) are secured to the base and the ceiling by using additional fastening elements (nuts, screws etc.) after the assembly of the front wall (3) to the side walls (2) is completed.

[0031] In the washer/dryer (1) of the present invention, in the case excessive loads affect during transport, the load is shared by the clutches (5) and the protuberances (6, 60) on the front wall (3) and the side walls (2) preventing the region at the lower side connected by the fastening elements (7) to be forced to detach.

55 Claims

1. A washer/dryer (1) comprising at least two side walls (2) that cover the volume containing the drum,

- wherein laundry is placed, and the other machine elements from the sides, a front wall (3) secured on the side walls (2), at least one slot (4) disposed on the inner surface of the front wall (3) and at least one clutch (5) disposed on the outer surface of the side walls (2) for fastening the front wall (3) to the side walls (2) by inserting the clutch (5) through the slot (4) **and characterized by** the protuberances (6, 60) disposed oppositely on the surfaces of the front wall (3) and the side walls (2) facing each other, that slide over one another while the front wall (3) is mounted to the side walls (2) however not allowing movement in the reverse direction after the front wall (3) is secured in place by providing locking, the protuberances (6, 60) each comprising a slid surface (A) whereon they slide over each other when the front wall (3) is slid to maintain locking and a resting surface (O) whereon they overlap on another by facing each other and prevent movement in the opposite direction of sliding when the locking process is completed, wherein the upward and downward facing resting surfaces (O) are opposite one another in the locking position.
2. A washer/dryer (1) as in Claim 1, **characterized by** protuberances (6, 60) that are formed by the protrusion process.
 3. A washer/dryer (1) as in Claim 1 or 2, **characterized by** the clutch (5) comprising a half spherical head (8) and a neck (9) with a width smaller than the diameter of the sphere, that connects this head (8) to the side wall (2).
 4. A washer/dryer (1) as in any one of the above Claims, **characterized by** the slot (4) wherein the upper part is wide enough for the head (8) to be inserted, and the lower part is wide enough for the neck (9) to be seated but sized such that the head (8) is not allowed to pass.
 5. A washer/dryer (1) as in any one of the above Claims, **characterized by** the clutch (5) that can simultaneously restrict the frontward and downward movement of the front wall (3).
 6. A washer/dryer (1) as in any one of the above Claims, **characterized by** protuberances (6, 60) that are formed outwards on the side walls (2) and inwards on the front wall (3).
 7. A washer/dryer (1) as in any one of the above Claims, **characterized by** protuberances (6, 60) each comprising a slid surface (A) whereon they bear on each other before the front wall (3) is interlocked to the side walls (3).
 8. A washer/dryer (1) as in any one of the above Claims, **characterized by** protuberances (6, 60) comprising a resting surface (O) whereon they lean to each other after the front wall (3) is locked to the side walls (2).
 9. A washer/dryer (1) as in Claim 7, **characterized by** the slid surface (A) that is parallel to the plane whereon the protuberances (6, 60) are formed.
 10. A washer/dryer (1) as in Claim 7, **characterized by** the slid surface (A) that is inclined with respect to the plane whereon the protuberances (6, 60) are formed.
 11. A washer/dryer (1) as in Claim 7, **characterized by** the resting surface (O) is almost vertical to the plane whereon the protuberances (6, 60) are formed.

Patentansprüche

1. Wasch-/Trockenmaschine (1), umfassend wenigstens zwei Seitenwände (2), die den Innenraum abdecken, der die Trommel enthält, in die die Wäsche gegeben wird, sowie die anderen Maschinenelemente von den Seiten, eine Vorderwand (3), die an den Seitenwänden (2) gesichert ist, wenigstens einen Schlitz (4), der an der Innenfläche der Vorderwand (3) angeordnet ist, und wenigstens ein Kuppelungselement (5), das an der Außenfläche der Seitenwände (2) angeordnet ist, um die Vorderwand (3) an den Seitenwänden (2) zu befestigen, indem das Kuppelungselement (5) durch den Schlitz (4) geführt wird, **gekennzeichnet durch** die Ausstülpungen (6, 60), die einander zugewandt an den Flächen der Vorderwand (3) und der Seitenwände (2) angeordnet sind und übereinander gleiten, während die Vorderwand (3) an den Seitenwänden (2) angebracht ist, aber keine Bewegung in die umgekehrte Richtung zulassen, sobald die Vorderwand (3) in ihrer Position gesichert ist, indem sie Verriegelung bereitstellen, wobei die Ausstülpungen (6, 60) jeweils eine Gleitfläche (A), an der sie übereinander gleiten, wenn die Vorderwand (3) verschoben wird, um die Verriegelung aufrechtzuerhalten, und eine Ruhefläche (O) umfassen, an der sie einander überlagern, indem sie einander zugewandt sind, und eine Bewegung in die Bewegung entgegen der Verschieberichtung verhindern, wenn der Verriegelungsvorgang abgeschlossen ist, wobei die nach oben und unten gewandten Ruheflächen (O) in der Verriegelungsposition einander gegenüber angeordnet sind.
2. Wasch-/Trockenmaschine (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Ausstülpungen (6, 60) durch den Ausstülpungsvorgang gebildet sind.
3. Wasch-/Trockenmaschine (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Kuppelungs-

element (5) einen halbkugelförmigen Kopf (8) und einem Hals (9) mit einem geringeren Durchmesser als dem der Kugel umfasst, der den Kopf (8) mit der Seitenwand (2) verbindet.

4. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** bei dem Schlitz (4) der obere Teil breit genug ist, damit der Kopf (8) darin eingeführt werden kann, und der untere Teil breit genug ist, damit der Hals (9) darin sitzt, aber derart abgemessen ist, dass der Kopf (8) nicht hindurchtreten kann.
5. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Kupplungselement (5) zugleich die Vorwärts- und die Abwärtsbewegung der Vorderwand (3) beschränken kann.
6. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Ausstülpungen (6, 60) an den Seitenwänden (2) nach außen und an der Vorderwand (3) nach innen ausgebildet sind.
7. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Ausstülpungen (6, 60) jeweils eine Gleitfläche (A) umfassen, an der sie aneinander anliegen, bevor die Vorderwand (3) mit den Seitenwänden (2) verriegelt wird.
8. 10. Wasch-/Trockenmaschine (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Ausstülpungen (6, 60) eine Ruhefläche (O) umfassen, an der sie aneinander lehnen, nachdem die Vorderwand (3) mit den Seitenwänden (2) verriegelt wurde.
9. Wasch-/Trockenmaschine (1) nach Anspruch 7, **dadurch gekennzeichnet, dass** die Gleitfläche (A) parallel zu der Ebene ist, an der die Ausstülpungen (6, 60) ausgebildet sind.
10. Wasch-/Trockenmaschine (1) nach Anspruch 7, **dadurch gekennzeichnet, dass** die Gleitfläche (A) in Bezug auf die Ebene geneigt ist, an der die Ausstülpungen (6, 60) ausgebildet sind.
11. Wasch-/Trockenmaschine (1) nach Anspruch 7, **dadurch gekennzeichnet, dass** die Ruhefläche (O) vertikal zu der Ebene ist, an der die Ausstülpungen (6, 60) ausgebildet sind.

Revendications

1. Une machine à laver/sécher (1) comprenant au

moins deux parois latérales (2) qui couvrent le volume contenant le tambour, dans lequel le linge est placé, et les autres éléments de la machine des côtés, une paroi avant (3) fixée sur les parois latérales (2), au moins une fente (4) fournie sur la surface intérieure de la paroi avant (3) et au moins un élément de connexion (5) disposé sur la surface extérieure des parois latérales (2) pour fixer la paroi avant (3) aux parois latérales (2) par l'insertion de l'élément de connexion (5) à travers la fente (4), **caractérisée par** des protubérances (6, 60) disposées de manière opposée sur les surface de la paroi avant (3) et des parois latérales (2) tout en faisant face l'une à l'autre, qui glissent l'une sur l'autre tandis que la paroi avant (3) est montée sur les parois latérales (2) mais qui ne permettent pas un mouvement en sens inverse après que la paroi avant (3) est fixée en place en permettant de verrouillage, les protubérances (6, 60) chacune comprenant une surface de glissement (A) sur laquelle elles glissent l'une sur l'autre lorsque la paroi avant (3) est glissée pour maintenir de verrouillage et une surface de support (O) sur laquelle elles font face l'une à l'autre et se chevauchent et empêchent un mouvement dans la direction opposée à celle de glissement lorsque le processus de verrouillage est terminé, où les surfaces de support (O) faisant face vers le haut et vers le bas sont opposées l'une à l'autre dans la position de verrouillage.

2. Une machine à laver/sécher (1) selon la Revendication 1, **caractérisée par** des protubérances (6, 60) qui sont formées par le procédé de protubérance.
3. Une machine à laver/sécher (1) as in Claim 1 ou 2, **caractérisée par** l'élément de connexion (5) comprenant une tête semi-sphérique (8) et un cou (9) avec une largeur plus petite que le diamètre de la sphère, qui relie cette tête (8) à la paroi latérale (2).
4. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** la fente (4), dont la partie supérieure est suffisamment large pour la tête (8) d'être insérée, et la partie inférieure est suffisamment large pour le cou (9) d'être placé mais est dimensionnée de telle sorte que la tête (8) n'est pas permise de passer.
5. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** l'élément de connexion (5) qui peut limiter simultanément le mouvement vers l'avant et vers le bas de la paroi avant (3).
6. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** des protubérances (6, 60) qui sont formées vers l'extérieur sur les parois latérales (2) et vers l'inté-

rieur sur la paroi avant (3).

7. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** des protubérances (6, 60), chacune comprenant une surface de glissement (A) par laquelle elles s'appuient l'une sur l'autre avant que la paroi avant (3) est verrouillée sur les parois latérales (2). 5
8. Une machine à laver/sécher (1) selon l'une quelconque des revendications précédentes, **caractérisée par** des protubérances (6, 60), chacune comprenant une surface de support (O) par laquelle elles supportent l'une à l'autre après que la paroi avant (3) est verrouillée sur les parois latérales (2). 10
15
9. Une machine à laver/sécher (1) selon la Revendication 7, **caractérisée par** la surface de glissement (A) qui est parallèle au plan sur lequel les protubérances (6, 60) sont formées. 20
10. Une machine à laver/sécher (1) selon la Revendication 7, **caractérisée par** la surface de glissement (A) qui est inclinée par rapport au plan sur lequel les protubérances (6, 60) sont formées. 25
11. Une machine à laver/sécher (1) selon la Revendication 7, **caractérisée par** la surface de support (O) qui est presque verticale au plan sur lequel les protubérances (6, 60) sont formées. 30

35

40

45

50

55

Figure 1

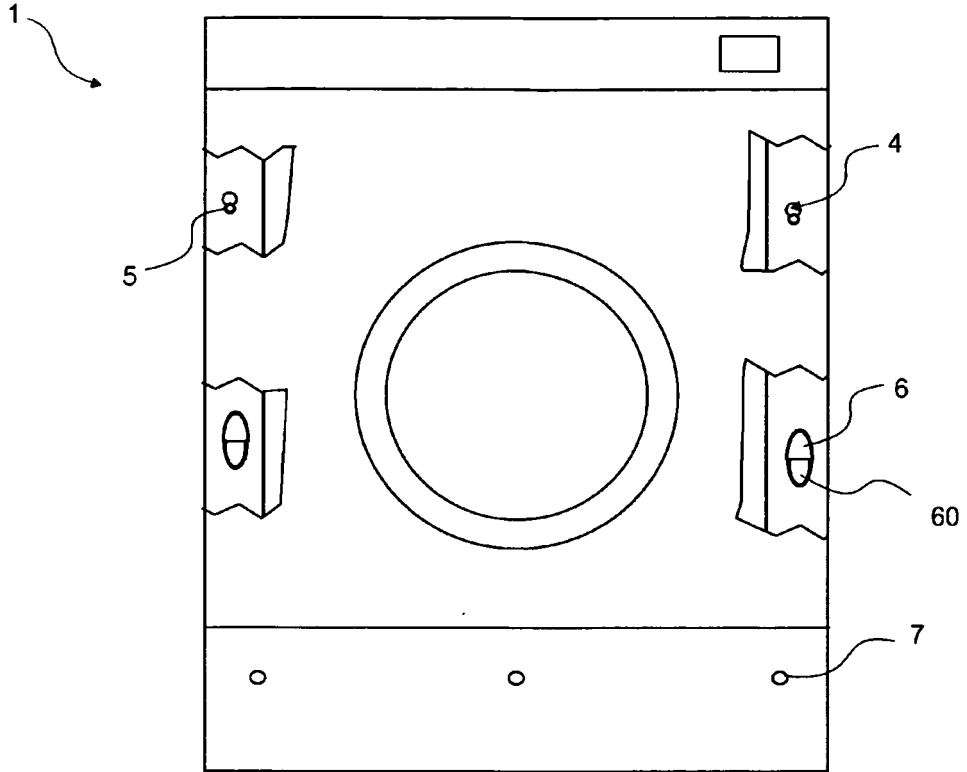


Figure 2

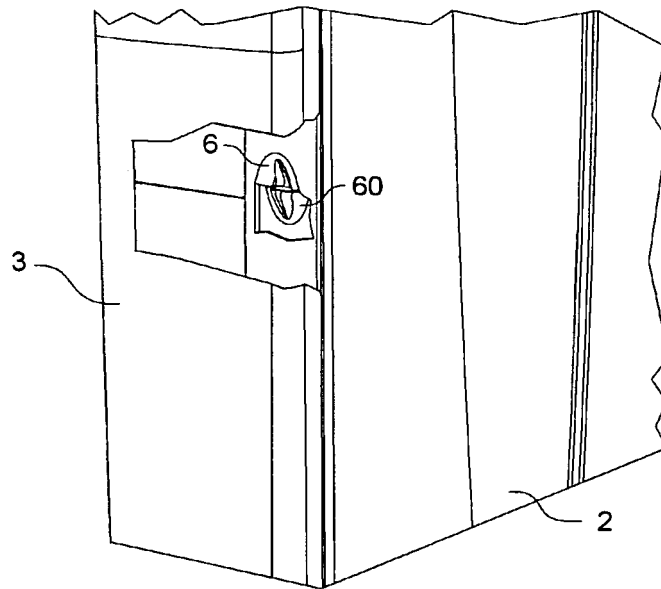


Figure 3

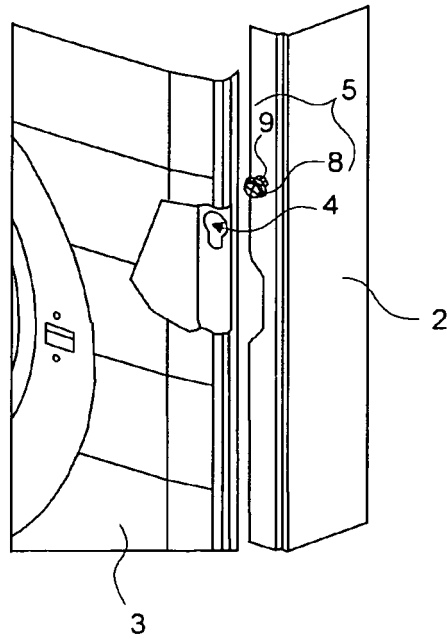


Figure 4

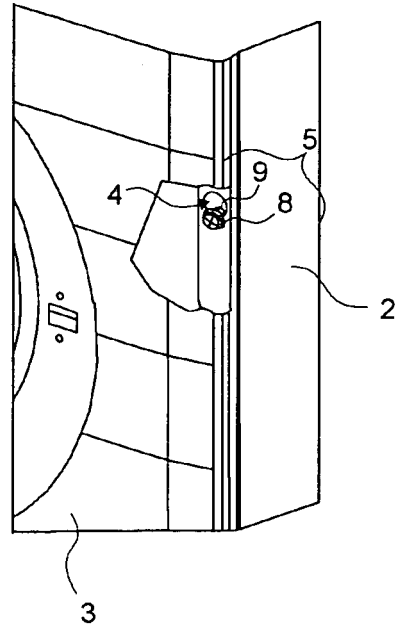


Figure 5

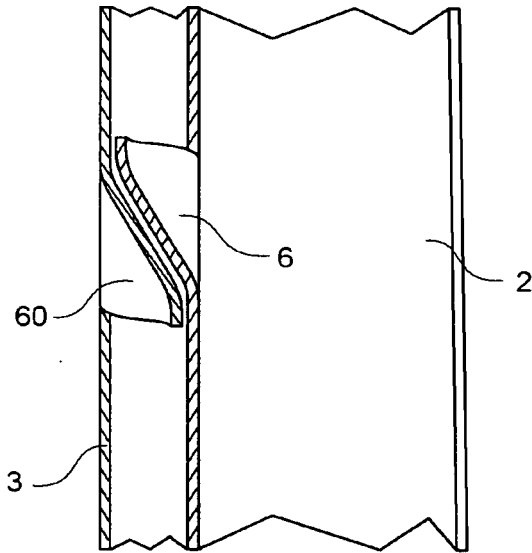


Figure 6

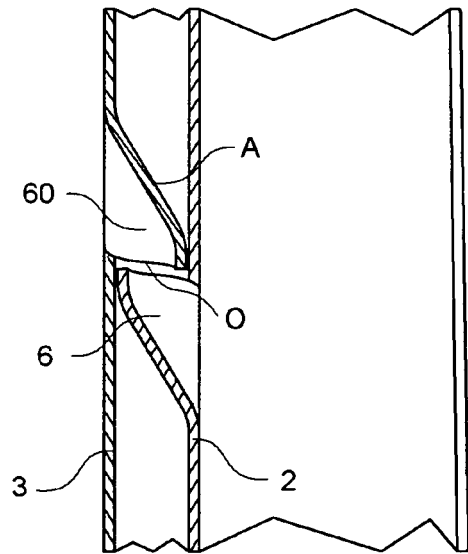
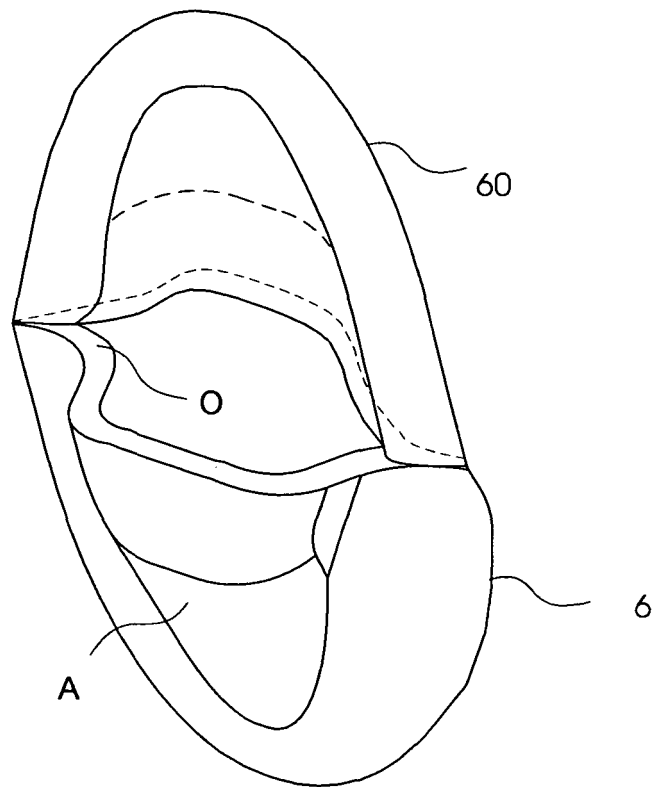


Figure 7



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

- US 20040244439 A [0003]
- US 20040107738 A [0004]