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

(11) **EP 1 854 394 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.11.2007 Bulletin 2007/46

(51) Int Cl.:
A47L 15/50 *(2006.01)*

(21) Application number: **06113618.0**

(22) Date of filing: **08.05.2006**

(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 NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(71) Applicant: **Vestel Beyaz Esya Sanayi Ve Ticaret A.S.**
45030 Manisa (TR)

(72) Inventors:
- **Eldem, Mehmet**
  45030 Manisa (TR)
- **Eroglu, Erkan**
  45030 Manisa (TR)
- **Haspolat, Erdal**
  45030 Manisa (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Inc.
Koza Sokak No: 60/6
GOP
06700 Ankara (TR)

(54) Dishwasher rack or basket level adjustment mechanism

(57) The inventive level adjustment mechanism (A) comprises a support frame (1) which contains wheels (3) that allow it to move back and forth on the rails in a white good; an adjustment frame (2) which can slide up and down on the support frame (1) and which can be connected to the rack or basket of which level adjustment is required; a rail (4) which is secured to the support frame (1) and which performs the bearing task for the up and down movement of the adjustment frame (2); a slide (5) which can move up and down inside said rail (4) and which is connected to the adjustment frame (2); a shaft (7) which is inserted into a slot on said rail (4) together with the retaining ring (8) thereon and a thumb lock (6) which is attached to the shaft (7) such that it can rotate thereon.

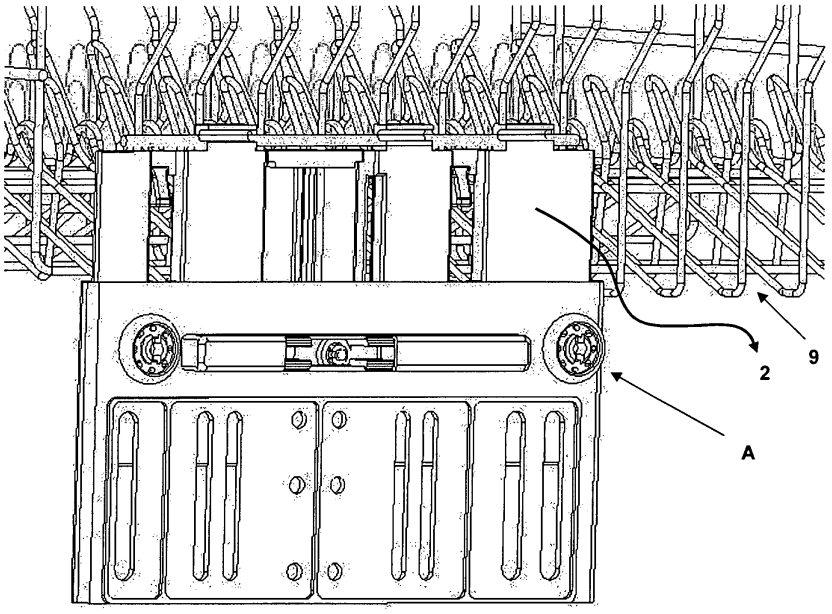


Figure – 12

EP 1 854 394 A1

Description

Technical Field

[0001] This invention relates to a level adjustment mechanism used to adjust the vertical position of the parts in white goods such as rack, basket, etc. which are located therein.

Prior Art

[0002] The height of the basket can be adjusted by the user depending on the sizes and heights of the goods which are to be placed into the lower and upper baskets located in white goods. The heights of the baskets located in white goods can be adjusted through various mechanisms. In general, these mechanisms enable the basket to be secured in two different positions.

[0003] In a system described in the published patent document WO 02/087408, a latched and wheeled mechanism is mounted on the side of the basket such that it allows the up and down movement of the basket within the machine. After the basket is raised to an upper position by the user, a spring lock which is located on the mechanism rests against one of the horizontal wires of the basket in order to maintain this position. In order to bring the basket down to a lower position, a latch located on the mechanism is pressed towards the basket, thus allowing the lock to disengage from the side wires of the basket against which the lock rests, and the basket is secured at a lower position. In this system, the basket is secured at an upper position after the lock rests against the basket wires. However, in such a system, there is a possibility that the lock mechanism of the basket disengages from the wires and falls. In order to bring the basket down to a lower position, the basket should also be moved while pressing the latch at the same time.

[0004] In the published patent document US5595200, there is a mechanism which is attached to the side of the upper basket. The part to which the wheels allowing the movement of the basket on a rail are connected is assembled to this mechanism with a sliding joint. During up and down movement of the basket, the pin which is located inside the part on the rail moves within a slot with special geometry, which is located inside the part on the basket. The pin which comes to the fixing point of the slot is inserted here, thus allowing the system to be secured. By raising the basket to some extent, it is ensured that the slot disengages from the pin, and the basket comes to a lower position.

[0005] The level adjustment mechanism of the invention has been developed unlike the prior art mentioned above. In this invention, in order to raise a rack or a basket in a white good to an upper position, these parts are pulled up and remain in this position by attaching a thumb lock mechanism when they reach an upper position. If it is required to be brought down to a lower position, it is sufficient to pull it up somewhat more and then bring it down.

Aim of the invention

[0006] An aim of this invention is to ensure that the heights of the racks or baskets in a white good are adjusted such that they can remain at two different positions.

[0007] Another aim of this invention is to ensure that when the rack or basket is pulled up to an upper position, they jam in a lock mechanism under their own weights and remain in this position.

[0008] Yet another aim of the invention is to ensure that the basket or rack is brought down to a lower position by raising it somewhat and then re-lowering it.

Description of the Drawings

[0009] The basket level adjustment mechanism of the invention is shown in the attached drawings, wherein:

Fig. 1 is an assembled perspective view of the inventive level adjustment mechanism.
Fig. 2 is another assembled perspective view of the level adjustment mechanism.
Fig. 3 is a pre-assembly perspective view of the level adjustment mechanism from one direction.
Fig. 4 is a pre-assembly perspective view of the level adjustment mechanism from another direction.
Fig. 5 is the front and rear perspective views of the rail.
Fig. 6 is a perspective view of the support frame.
Fig. 7 is a perspective view of the thumb lock.
Fig. 8 is a perspective view of the shaft.
Fig. 9 is a perspective view of the slide.
Fig. 10 is a perspective view of the adjustment frame.
Fig. 11 is a perspective view of the use of the level adjustment mechanism in a dishwasher.
Fig. 12 is another perspective view of the use of the level adjustment mechanism in a dishwasher.
Fig. 13 is the views of the slide, rail, and thumb lock from one direction.
Figs. 14-19 are the detailed positions of the inventive mechanism during operation.

[0010] The parts in the figures are numbered one by one and the corresponding terms of these numbers are given below.

Level adjustment mechanism (A)
Support frame (1)
Adjustment frame (2)
Wheels (3)
Rail (4)
Slide (5)
Thumb lock (6)
Shaft (7)
Retaining ring (8)
Basket (9)
Rear surface (10)
Channel (12)

Channels (13, 13')
Set (14, 14')
Slot (15)
Front surface (20)
Snap fitting (21)
Protrusion (22, 22')
Side profiles (23, 23')
Holders (25)
Rear edges (41)
Snap joints (42)
Front face (43)
Shaft insertion hole (44)
Snap joint (45)
Side surface (46)
Channel (47)
Front face (50)
Slots (51)
Rear face (52)
Protrusion (53)
Side surface (54)
Upper projection (55)
Lower projection (56)
Opening (57)
Counter bore (61)
Hole (62)
V shaped-slot (63)
V shaped-slot (64)
Shaft head (71)
Retaining ring channel (72)

Disclosure of Invention

[0011] Figs. 1 and 2 provide the assembled perspective views of the inventive level adjustment mechanism (A). The level adjustment mechanism (A) of which disassembled perspective views are provided in figs. 3 and 4 comprises a support frame (1) which comprises wheels (3) that allow it to move back and forth on the rails in a white good; an adjustment frame (2) which can slide up and down on the support frame (1) and which can be connected to the equipment such as rack or basket of which level adjustment is required; a rail (4) which is secured to the support frame (1) and which performs the bearing task for the up and down movement of the adjustment frame (2); a slide (5) which can move up and down inside said rail (4) and which is connected to the adjustment frame (2); a shaft (7) which is inserted into a slot on said rail (4) together with the retaining ring (8) thereon and a thumb lock (6) which is attached to the shaft (7) such that it can rotate thereon.

[0012] The rail (4) of which front and rear perspective views are provided in fig. 5 is made of a U-shaped profile of which rear edges (41) are incurved and face each other; front face (43) comprises snap joints (42) on its both sides; said front face (43) has a shaft insertion hole (44) somewhere towards its middle part; front face (43) has also a snap joint (45) somewhere towards its lower part, and which has a channel (47) with both sides open, that is located on the one side of the shaft insertion hole (44), on the side surface (46). The rail (4) is secured to the support frame (1) of which detailed perspective view is provided in fig. 6. On the support frame (1), there is a channel (12) into which snap joints (42) are attached and a slot (15) into which another snap joint (45) is placed. Assembly of the rail (4) and support frame (1) is performed through pushing and attaching these said snap joints (42, 45) to the channel (12) and the slot (15). By the protrusions on the snap joints (42, 45), the joints (42, 45) remain secured at the position they are attached.

[0013] The thumb lock (6) of which detailed perspective view is provided in fig. 7 is a part in the form of a plate, of which opposite two edges have V-shaped slots (63, 64). In the center of gravity of the thumb lock (6), there is a longitudinal hole (62) through which the shaft (7) is passed and a counter bore (61) concentric with this hole (62), into which the shaft head (71) of the shaft (7) is sunk. On the one end of the shaft (7) of which details are shown in fig. 8, there is a retaining ring channel (72) into which the retaining ring (8) can be placed. In the assembled position of the thumb lock (6) on the rail (4), the shaft (7) is passed through the hole (62) in the center of gravity of the thumb lock (6), and the shaft head (71) is seated into the said counter bore (61); the other end of the shaft (7) is passed through the shaft insertion hole (44). In order to prevent the dislocation of the shaft (7) from the shaft insertion hole (44) and said hole (62) in this position, a retaining ring (8) is placed into the retaining ring channel (72) on the front face (43) side of the rail.

[0014] The slide (5) of which perspective views are provided in fig. 9 is a part in the form of a U profile and has slots (51) into which snap fittings (21) of the adjustment frame (2) are attached and which provide passage between its front face (50) and rear face (52) and a protrusion (53) which extends outwards on the lower part of the rear face (52). In addition, through the opening (57) on the side surface (54) of the slide (5), the upper projection (55) and the lower projection (56) which are located on the uppermost and lowermost parts of this surface (54) respectively are separated from each other.

[0015] On the adjustment frame (2) of which perspective views are provided in fig. 10, there are snap fittings (21) attached into the slots (51) on the slide (5). There are also side profiles (23, 23') on the both sides of this frame (2) such that they enter into the channels (13, 13') which extend from up to down at the sides of the support frame (1). The protrusions (22, 22') which are located on the front surface (20) of the adjustment frame (2) are also positioned such that they are seated on the top surface of the set (14, 14') of which lower surfaces are located on the rear surface (10) of the support frame (1). With the help of the relationship of the protrusions (22, 22') with the set (14, 14'), the lowermost position of the adjustment frame (2) relative to the support frame (1) is detected. The uppermost position of the adjustment frame (2) relative to the support frame (1) is the position in which the slide (5) is attached to the thumb lock (6).

There are also holders (25) in the upper part of the adjustment frame (2), to which the parts such as rack or basket can be attached.

[0016] In the invention of level adjustment mechanism (A) of which assembled position is shown in figs. 1 and 2, the adjustment frame (2) secured with slide (5) to each other has an ability to move up and down compared to the support frame (1) secured with the rail (4) to each other. In order to allow this movement, the slide (5) is recessed in the rail (4) and the side profiles (23, 23') of the adjustment frame (2) in the side channels (13, 13') inside the support frame (1) such that they can only move up and down.

[0017] Figs. 11 and 12 provide the perspective views of the use of the invention of level adjustment mechanism (A) in a dishwasher. In the exemplary demonstration provided in fig. 11, the adjustment frame (2) in the level adjustment mechanism (A) is located in the lowermost position. This position is also the lowermost position of the basket (9) which is attached to the holders (25) on the adjustment frame (2). Fig. 12 is the upper position views of the adjustment frame (2) and thus the basket (9). Figs. 13-19 provide the drawings concerning the operating method of the level adjustment mechanism (A) regarding its positions shown in figs. 11 and 12.

[0018] As mentioned above, in the level adjustment mechanism (A), the adjustment frame (2) is secured with the slide (5) to each other and the support frame (1) is secured with the rail (4) to each other. In brief, the movement of the slide (5) relative to rail (4) summarizes the operation mode of the inventive mechanism (A). Therefore, figs. 13-19 explain the movement of the slide (5) in the level adjustment mechanism (A) relative to the rail (4) and the thumb lock (6) and as a result of this movement, the lower and upper positions of the slide (5). The lower and upper positions of the slide (5) detect the lower and upper positions of the adjustment frame (2) and the parts such as rack or basket attached thereto.

[0019] Fig. 13 provides the views of the slide (5), rail (4) and thumb lock (6) from one direction. In this case, the slide (5) is in the lowermost position. Figs. 14-19 provide the detailed positions of this mechanism shown in fig. 13 during operation.

[0020] Fig. 14 provides the lowermost position of the slide (5); in this position, the upper projection (55), the lower, projection (56) and the protrusion (53) on the slide (5) are in the baseline position. Fig. 15 provides the position of the slide (5) shifted upwards. In this position, the protrusion (53) contacts the V-shaped slot (63) which is located in the lower side of the thumb lock (6) and rotates the thumb lock (6) somewhat counter-clockwise. Fig. 16 shows the next stage; in this stage, the slide (5) is lowered somewhat and the upper projection (55) is placed into the V shaped-slot (64) on the upper part of the thumb lock (6), thus the thumb lock (6) is allowed to rotate somewhat more counter-clockwise. The position shown in fig. 16 is the position in which the slide (5) is attached to the thumb lock (6) and suspended, and the slide (5) and the thumb lock (6) are jammed. In this position, the slide (5), the adjustment frame (2) attached thereto and thus the parts such as rack, basket, etc. remain in the uppermost position. In order to allow the attachment and suspension of the slide (5) into the thumb lock (6), the upper projection (55) has an ability to jam in the V shaped-slot (64) such that it cannot move downwards any more. Fig. 17 shows the position in which the slide (5) disengages from the thumb lock (6). In order to allow this, the slide (5) is raised somewhat and the upper projection (55) disengages from the V shaped-slot (64). On the continuation of the movement, the protrusion (53) contacts the lower right surface of the lock (6) relative to the rotation axis and rotates the lock (6) again counter-clockwise; the left part of the lock (6) relative to the rotation axis also enters into the space between the upper and lower projections (55, 56). As shown in fig. 17; in this stage, the lower projection (56) and the protrusion (53) come into a position in which they contact the lower surface of the lock (6). Thereafter, the slide (5) is lowered downwards and the upper projection (55) contacts the top left surface of the lock (6) relative to the rotation axis and rotates the lock (6) again counter-clockwise. This position is shown in fig. 18. On the continuation of the movement, the lock (6) and the slide (5) are completely separated from each other as shown in fig. 19, the slide (5) returns its lowermost position which is its baseline position and the lock (6) turns and takes its initial position. In order to attach the slide (5) to the lock (6) and shift it to an upper position, the stages shown from fig. 14 onwards are repeated.

[0021] The above preferred level adjustment mechanism (A) are not intended to limit the protection scope of the invention. According to the information described with the invention, modifications to be performed on this preferred level adjustment mechanism (A) should be evaluated within the protection scope of the invention.

Claims

1. A level adjustment mechanism (A), which is used for the level adjustment of an equipment such as rack or basket located in white goods, comprising a support frame (1) which is located in a fixed position, a rail (4) which is connected to the support frame (1), a slide (5) which is recessed such that it can move up and down within the rail (4), an adjustment frame (2) which is connected to the slide (5) and onto which said racks or baskets can be attached, a thumb lock (6) in the form of a plate which allows the suspension of the slide (5) when it comes to an upper position and which is connected to the rail (4) such that it can rotate freely around its center of gravity and which has V-shaped slots (63, 64) on its two opposite edges, **characterized in that**
for allowing the slide (5) to contact the V-shaped slot (63) which is located in the lower part of the thumb lock (6) and rotate the lock (6) somewhat counter-

clockwise when it comes to the shifted upwards position from its lowermost position, there is a protrusion (53) on the lower part of the rear face (52) of the slide (5), which extends outwards;
there is an upper projection (55) on the upper part of the side surface (54) of the slide (5), which is placed into the V shaped-slot (64) on the upper part of the thumb lock (6) and turns the lock (6) somewhat more counter-clockwise after the slide (5) is lowered somewhat;
in order to allow the attachment and suspension of the slide (5) into the thumb lock (6), the upper projection (55) has an ability to jam in the V shaped-slot (64) such that it cannot move downwards any more; the slide (5) is raised somewhat and thus the upper projection (55) disengages from the V shaped-slot (64); on the continuation of the movement, in order to rotate the lock (6) again counter-clockwise after the protrusion (53) contacts the lower right surface of the lock (6) relative to the rotation axis; there is a opening (57) between the upper and lower projections (55, 56) such that the left part of the lock (6) relative to the rotation axis can enter thereinto;
in order to allow the slide (5) to return to its lowermost position which is its baseline position, after the lower projection (56) and the protrusion (53) are brought to a position such that they contact the lower surface of the lock (6), the slide (5) is lowered downwards, thus the upper projection (55) contacts the top left surface of the lock (6) relative to the rotation axis and rotates the lock (6) again counter-clockwise, and the lock (6) and the slide (5) have the ability to be completely separated from each other.

2. A level adjustment mechanism (A) according to the claim 1, wherein the slide (5) is recessed in the rail (4) and the side profiles (23, 23') of the adjustment frame (2) in the side channels (13, 13') inside the support frame (1) such that they can only move up and down.

3. A level adjustment mechanism (A) according to the claim 1, wherein there is a shaft insertion hole (44) on the front face (43) of the rail (4) into which the shaft (7) together with the thumb lock (6) thereon is inserted, and a channel (47) with both sides open, that is located on the one side of the shaft insertion hole (44), on the side surface (46) such that it will allow the thumb lock (6) to freely rotate.

4. A level adjustment mechanism (A) according to the claim 1, wherein the said slide (5) is a part in the form of a U profile and has slots (51) thereon into which snap fittings (21) of the adjustment frame (2) are attached and which provide passage between its front face (50) and rear face (52).

5. A level adjustment mechanism (A) according to the claim 1, wherein in the center of gravity of the thumb lock (6), there is a longitudinal hole (62) through which the shaft (7) is passed and a counter bore (61) concentric with this hole (62), into which the shaft head (71) of the shaft (7) is sunk.

6. A level adjustment mechanism (A) according to the claim 1, wherein in the assembled position of the thumb lock (6) on the rail (4), the shaft (7) is passed through the hole (62) in the center of gravity of the thumb lock (6), and the shaft head (71) is seated into the said counter bore (61); the other end of the shaft (7) is passed through the shaft insertion hole (44); in order to prevent the dislocation of the shaft (7) from the shaft insertion hole (44) and said hole (62) in this position, a retaining ring (8) is placed into the retaining ring channel (72) on the shaft (7) on the front face (43) side of the rail.

7. A level adjustment mechanism (A) according to the claim 1, wherein the said rail (4) is in the structure of a U-shaped profile of which rear edges (41) are incurved and face each other; front face (43) contains snap joints (42, 45).

8. A level adjustment mechanism (A) according to the claim 1, wherein on the support frame (1), there is a channel (12) into which snap joints (42) are attached and also a slot (15) into which another snap joint (45) is placed.

9. A level adjustment mechanism (A) according to the claim 1, wherein on the adjustment frame (2), there are snap fittings (21) attached into the slots (51) on the slide (5).

10. A level adjustment mechanism (A) according to the claim 1, wherein in order to detect the lowermost position of the adjustment frame (2) relative to the support frame (1), the protrusions (22, 22') which are located on the front surface (20) of the adjustment frame (2) are positioned such that they are seated on the top surface of the set (14, 14') of which lower surfaces are located on the rear surface (10) of the support frame (1).

11. A level adjustment mechanism (A) according to the claim 1, wherein there are holders (25) in the upper part of the adjustment frame (2), to which the parts such as rack or basket can be attached.

12. A level adjustment mechanism (A) according to the claim 1, wherein in order to allow the back and forth movement of the support frame (1) on the rails (4) in a white good, there are wheels (3) on the support frame (1).

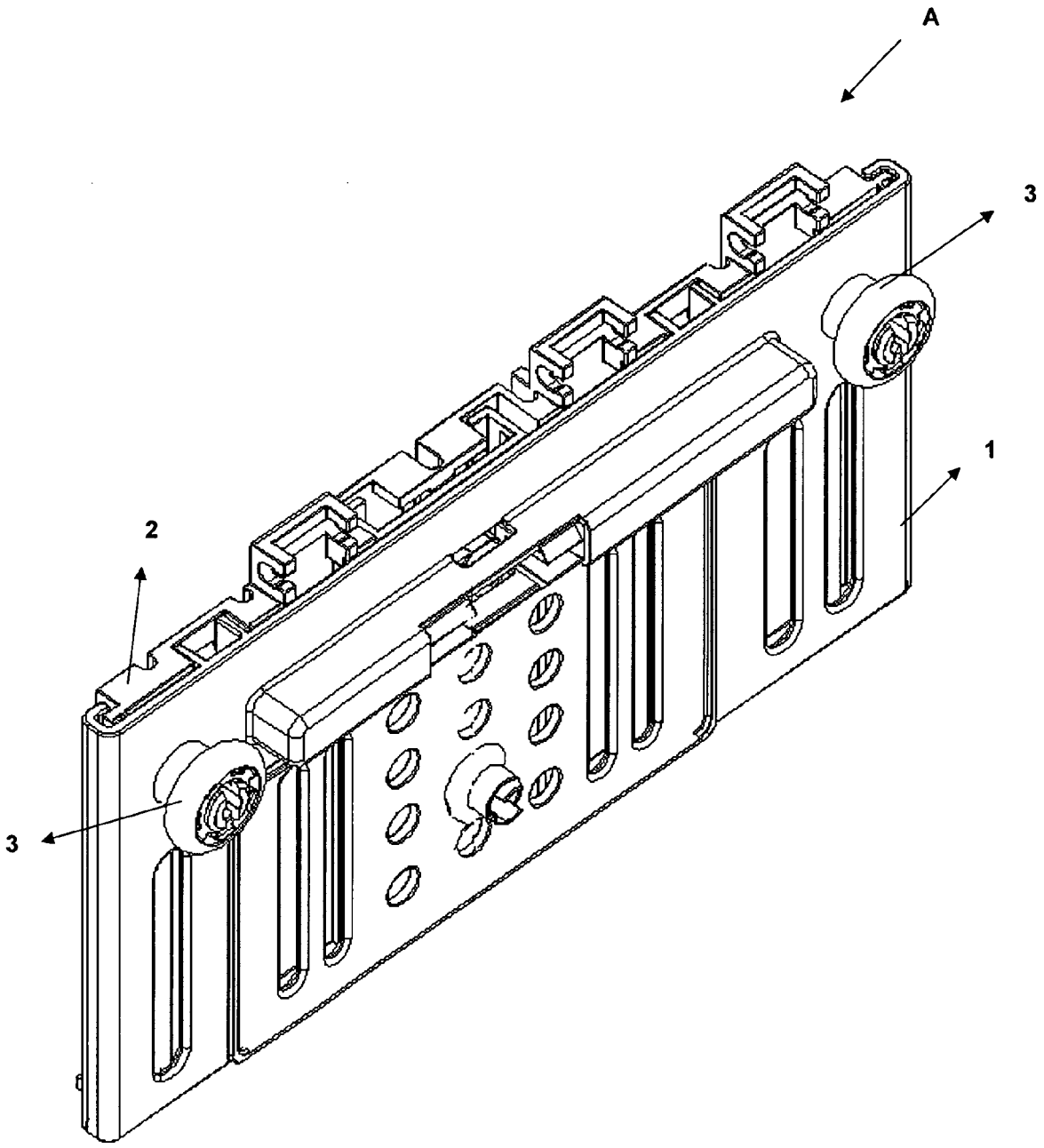


Figure – 1

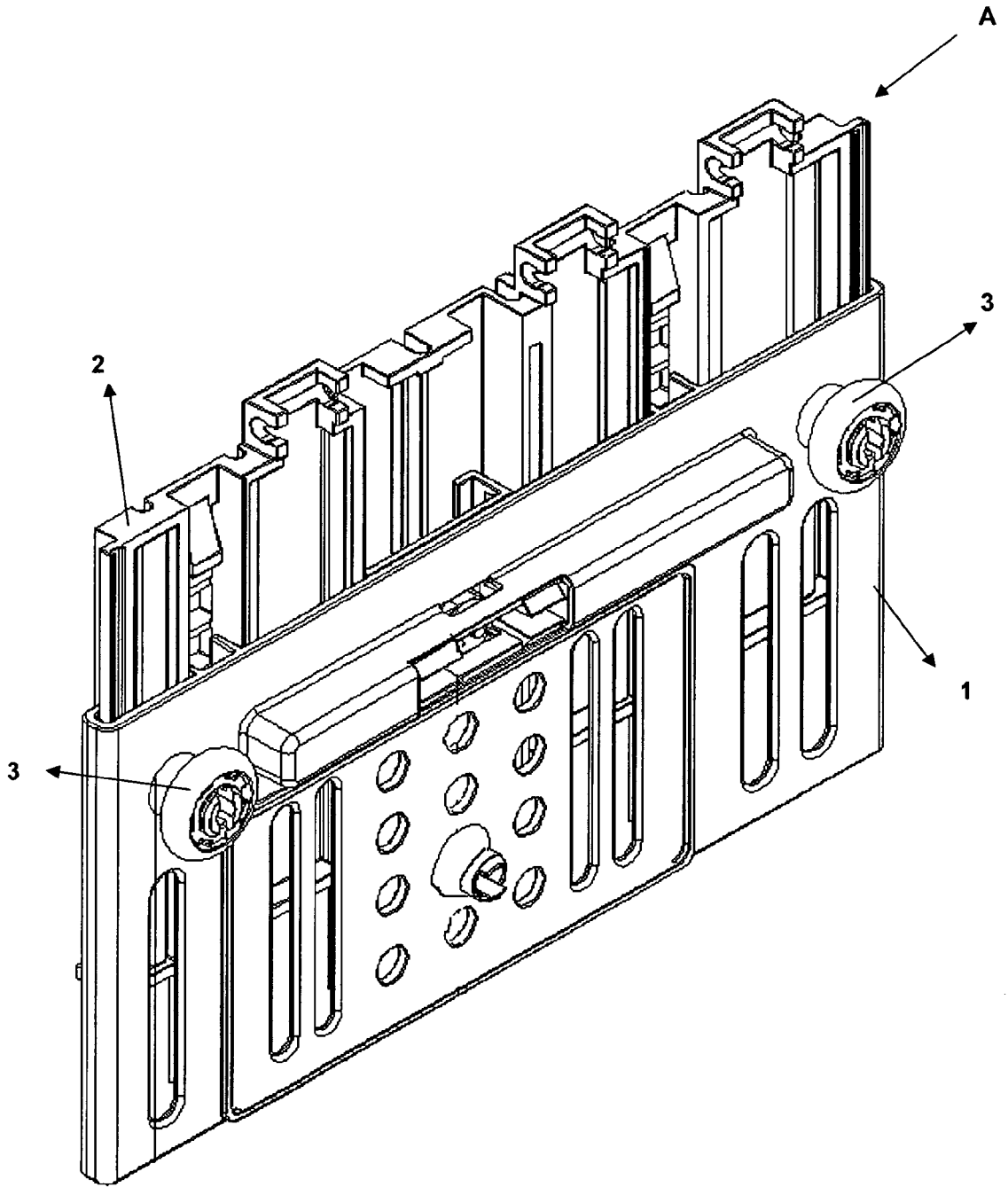


Figure – 2

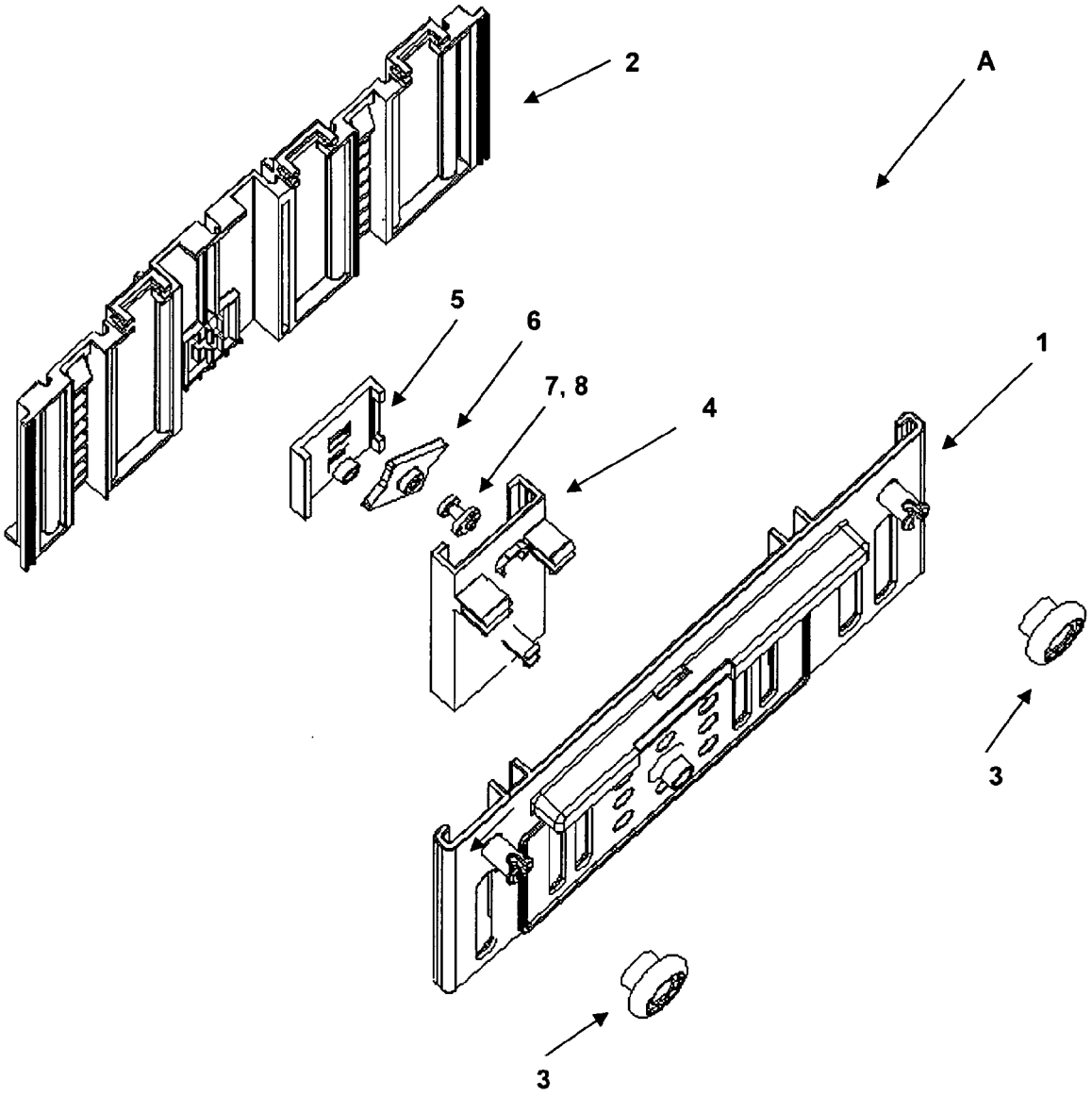


Figure – 3

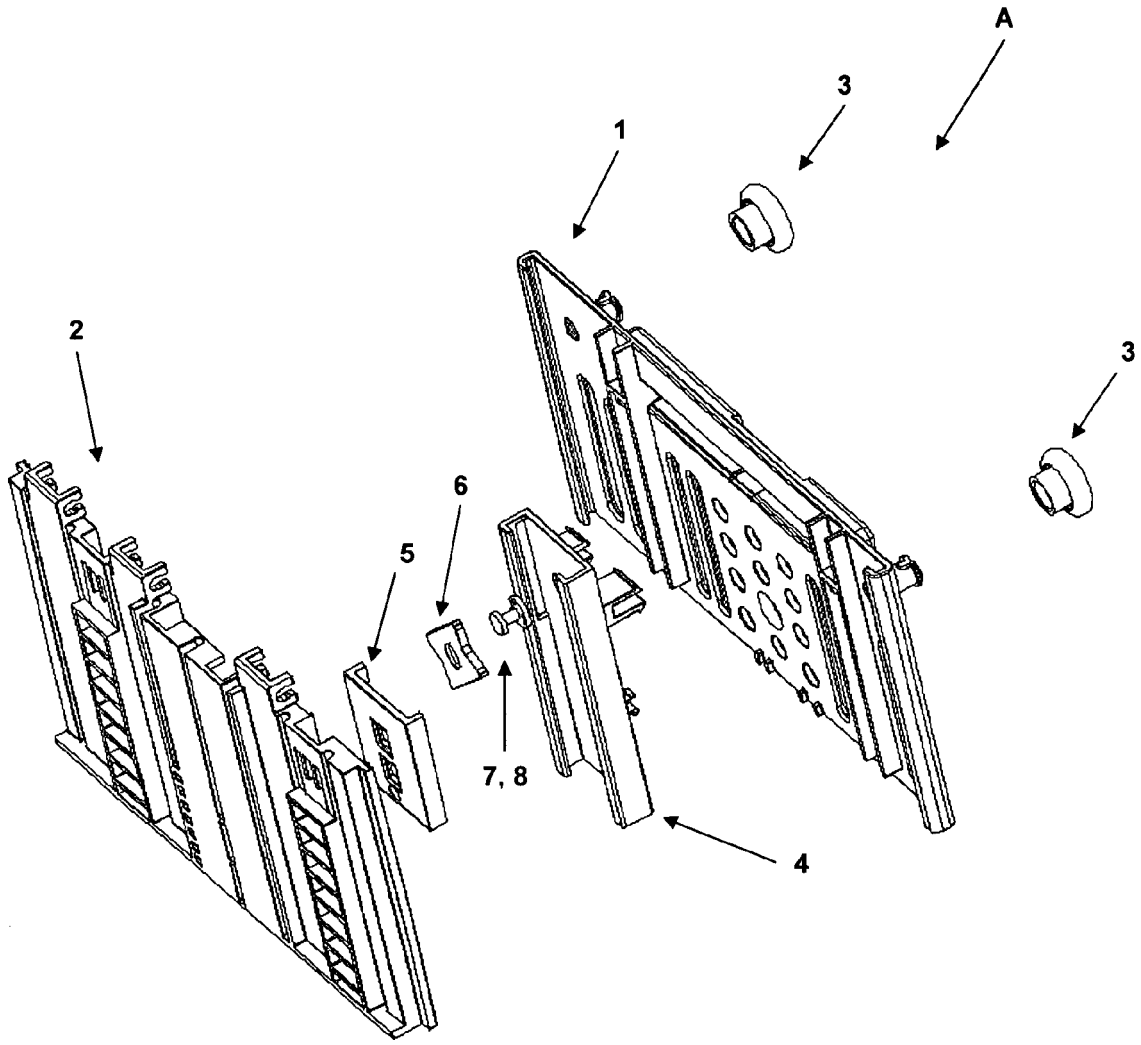


Figure – 4

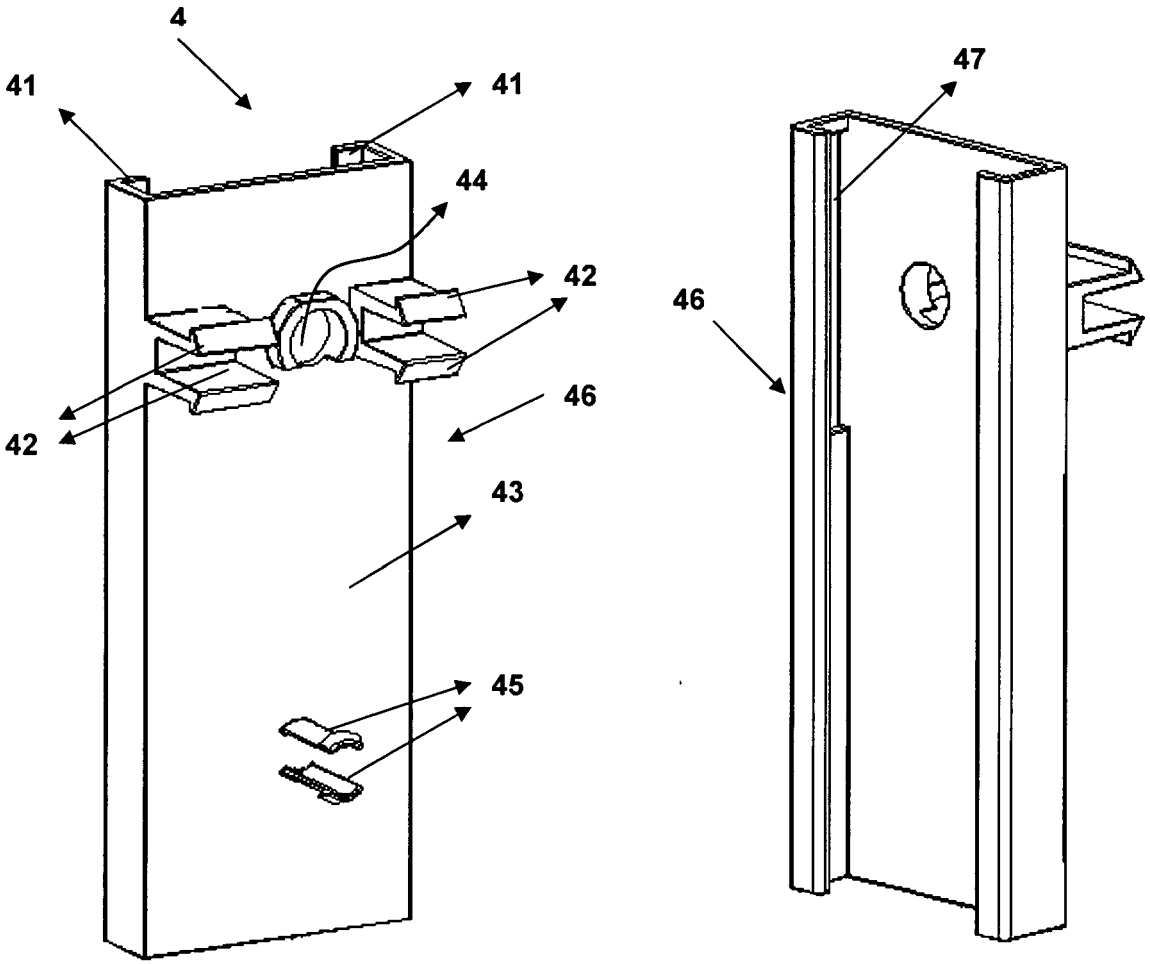


Figure – 5

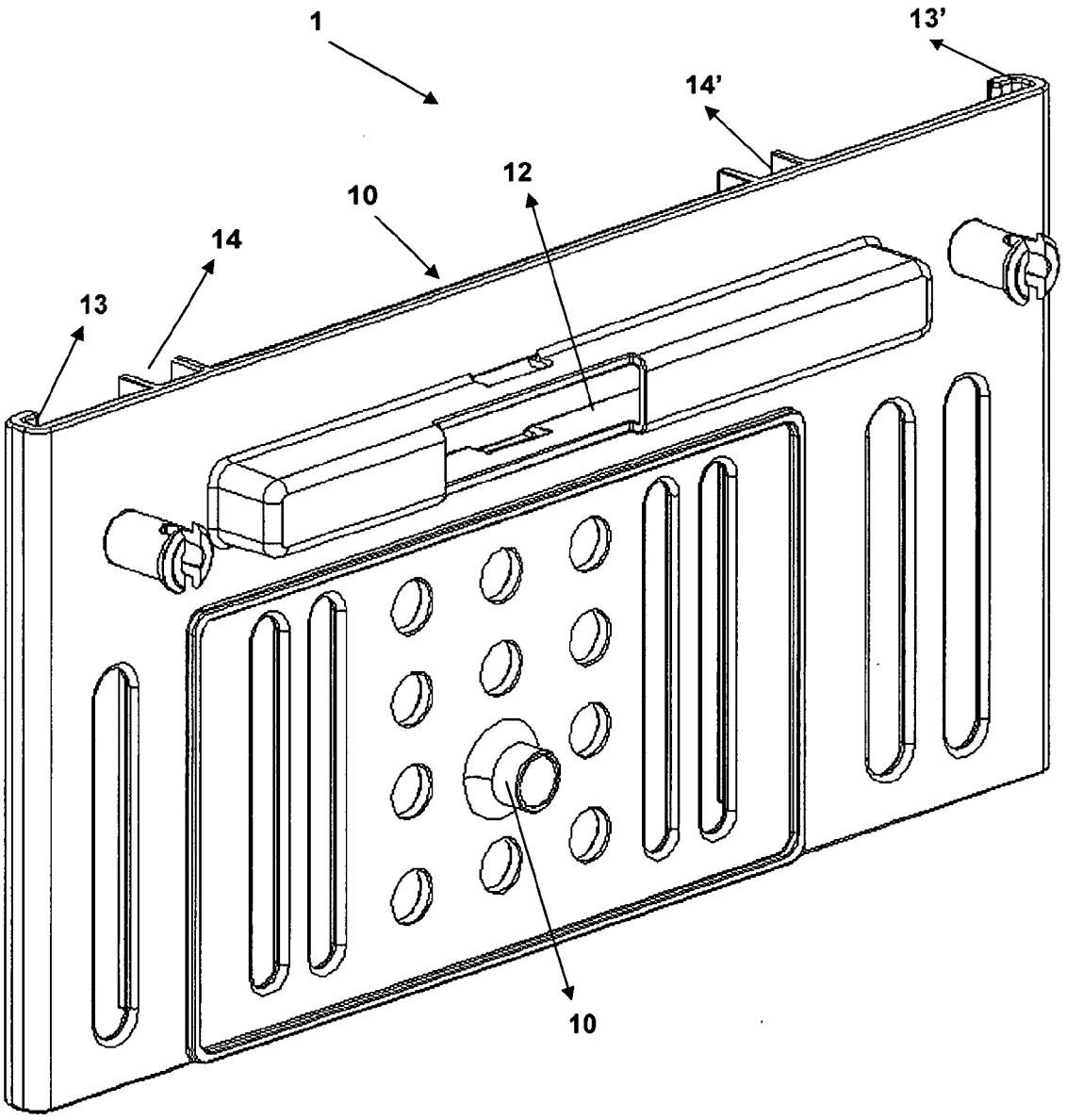


Figure – 6

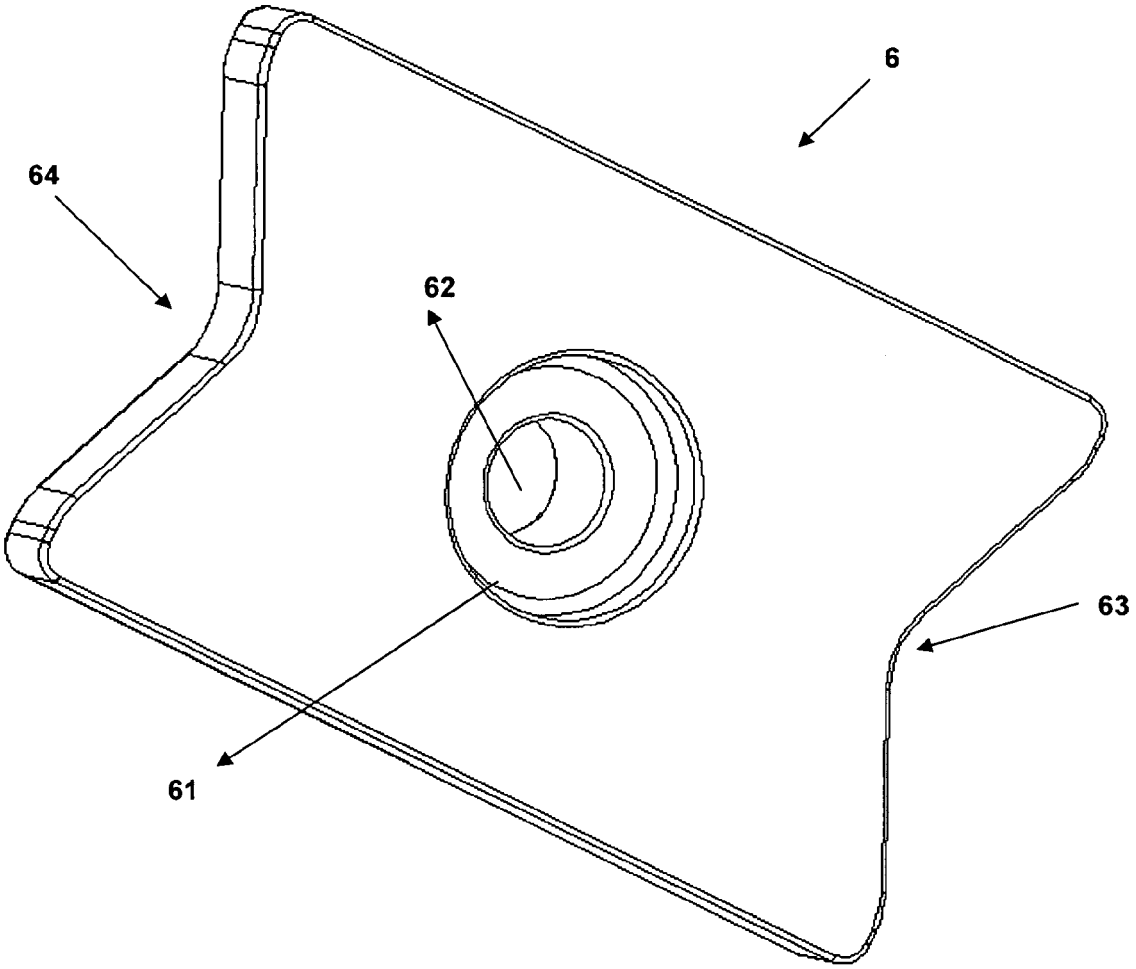


Figure – 7

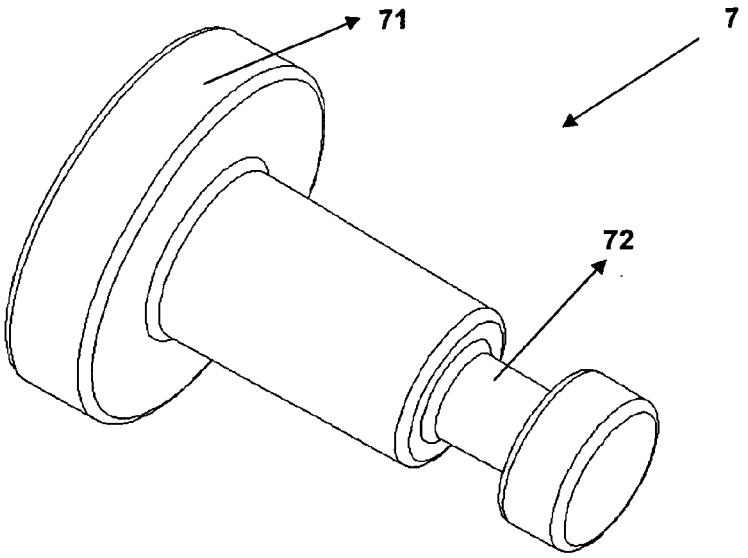


Figure – 8

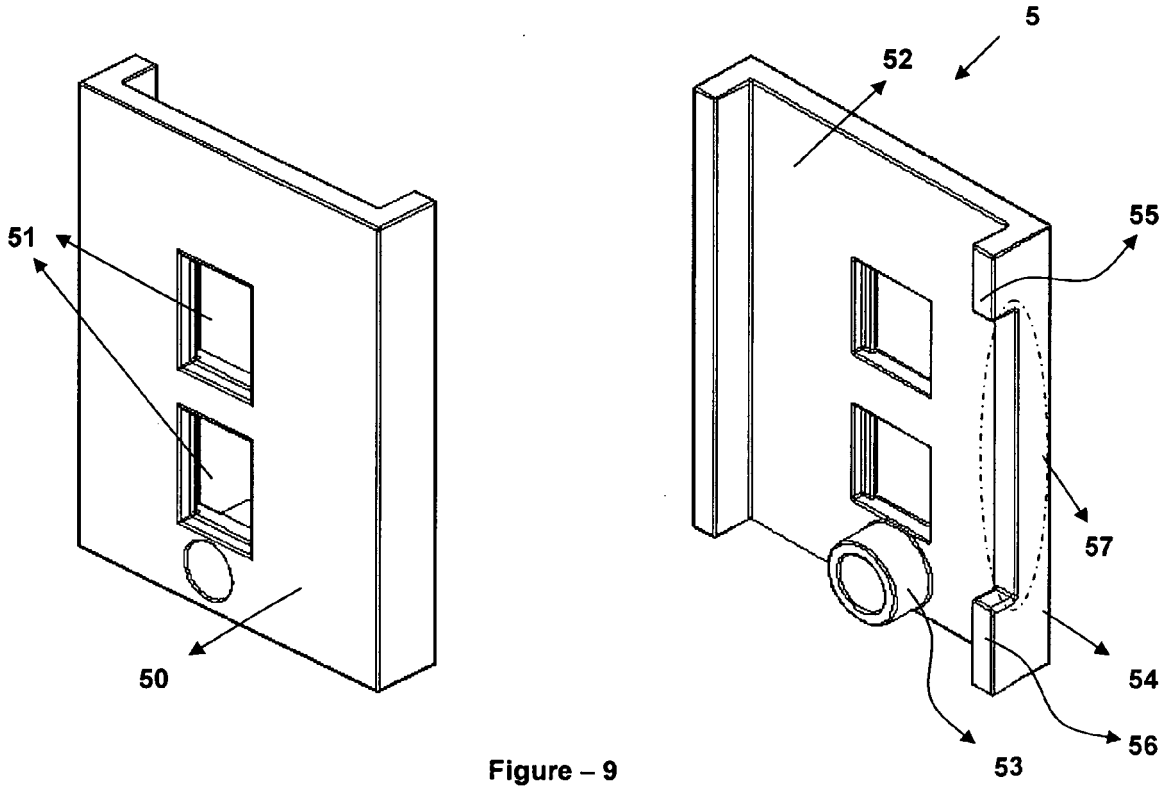


Figure – 9

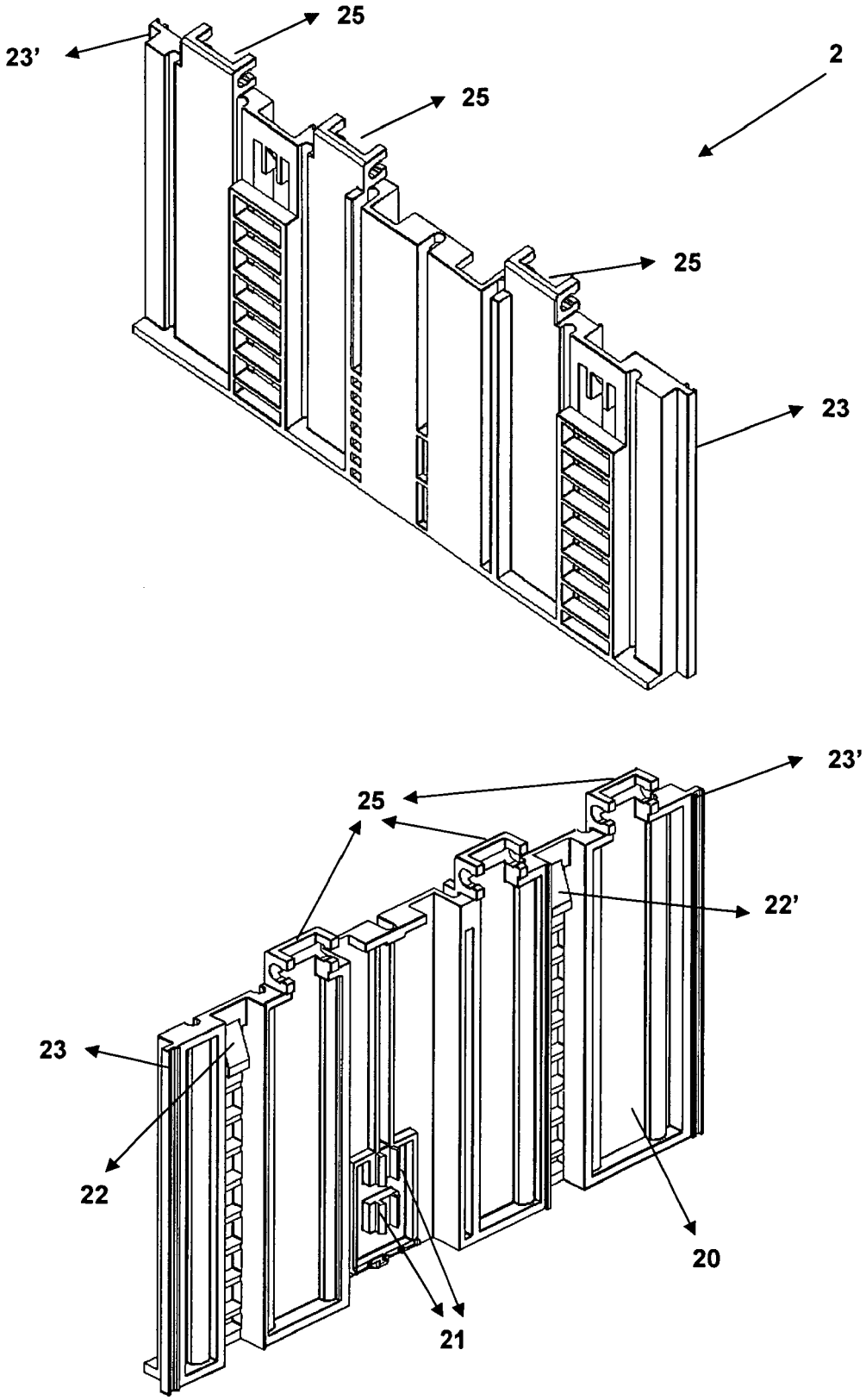


Figure – 10

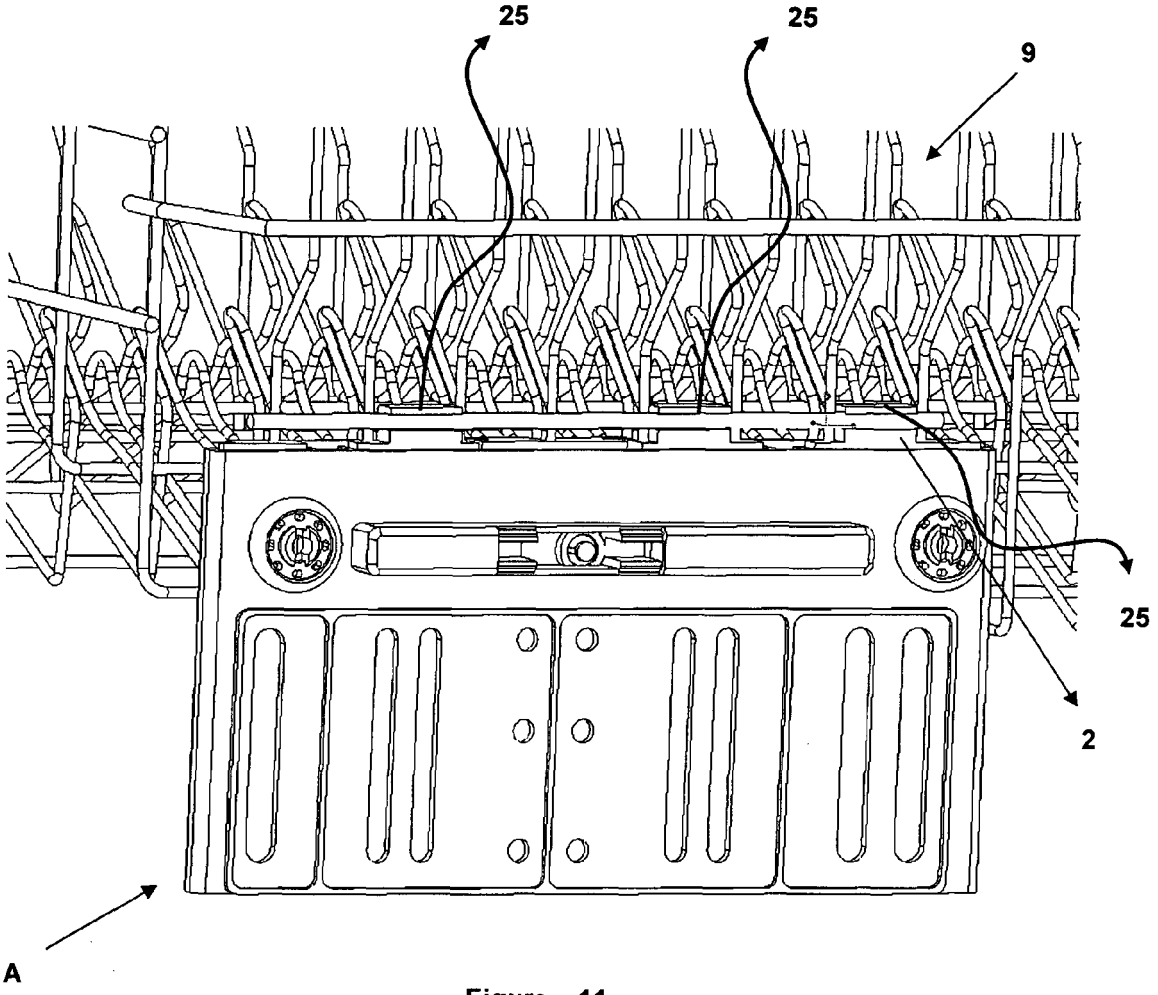


Figure – 11

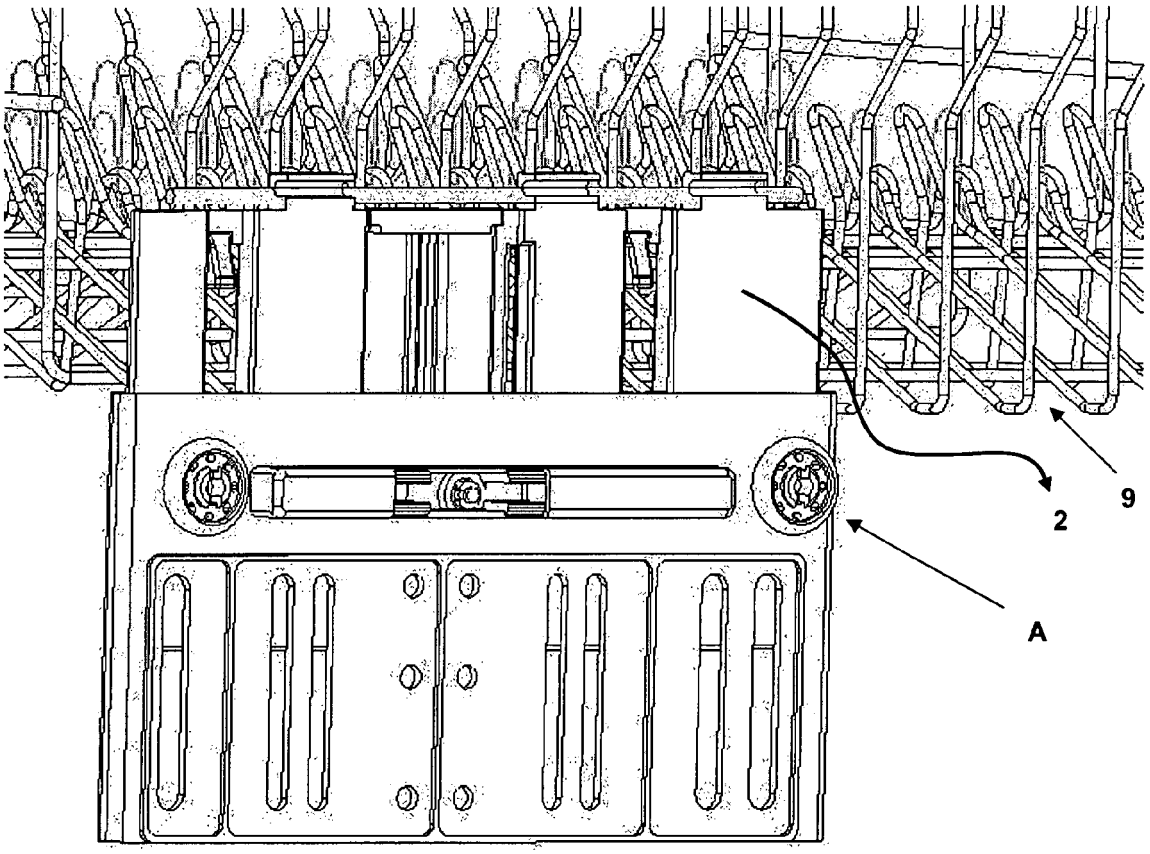


Figure – 12

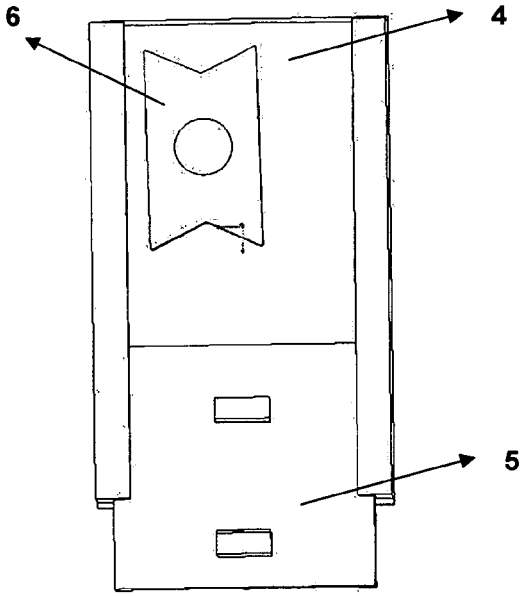


Figure – 13

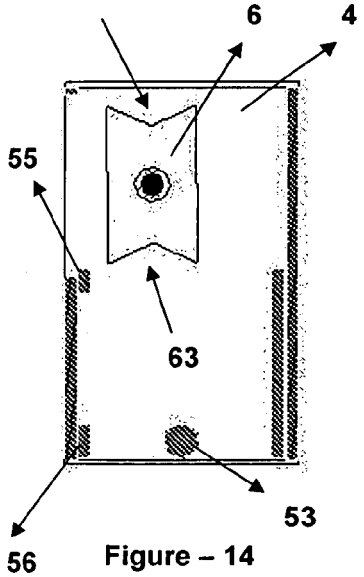


Figure – 14

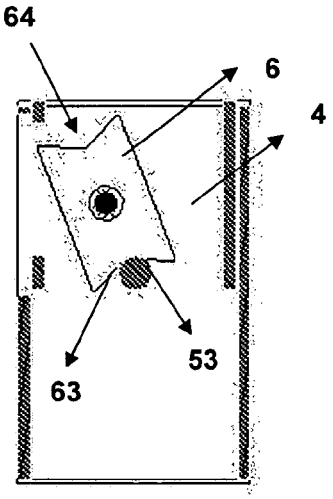


Figure – 15

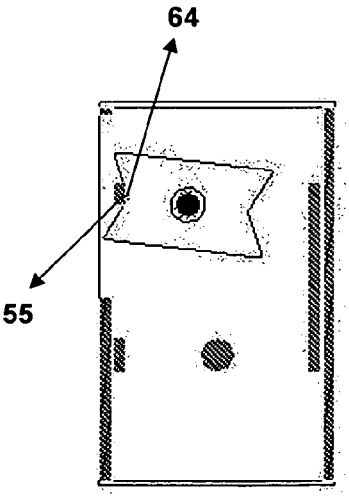


Figure – 16

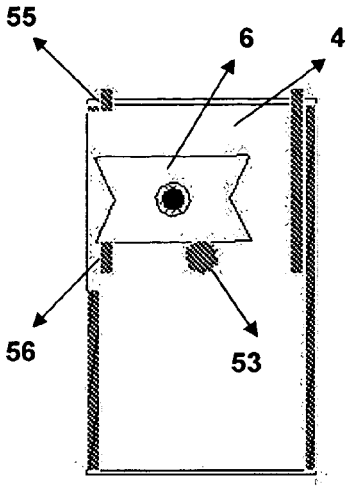


Figure – 17

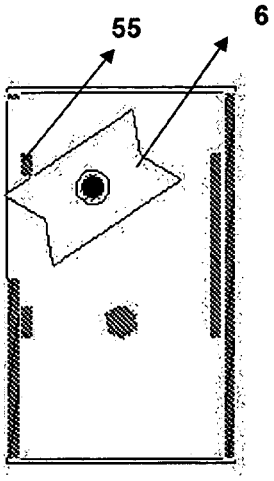


Figure – 18

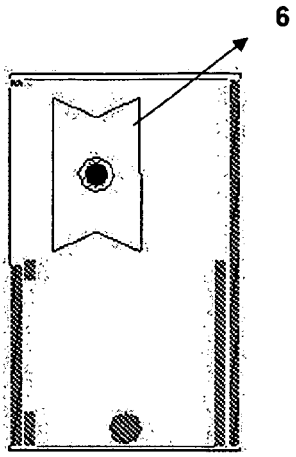


Figure – 19

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 11 3618

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	EP 1 161 917 A2 (CANDY SPA [IT]) 12 December 2001 (2001-12-12) * paragraphs [0009] - [0011]; figures 1,5-7 *	1	INV. A47L15/50
A	WO 02/49495 A (ARCEL K A [TR]; CET NKAYA ERTAN [TR]; ALTUN UEMIT [TR]) 27 June 2002 (2002-06-27) * figure 1 *	1	
A	EP 0 033 483 A2 (EURO HAUSGERAETE GMBH [DE]) 12 August 1981 (1981-08-12) * page 5, paragraph 1; figure 1 *	1	
A	EP 0 901 770 A2 (ELECTROLUX ZANUSSI ELETTRODOME [IT]) 17 March 1999 (1999-03-17) * column 2, lines 25-29; figure 4 *	11	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47L A47B E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 October 2006	PAPADIMITRIOU, S

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 06 11 3618

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.

16-10-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1161917 A2	12-12-2001	IT MI20001246 A1	05-12-2001
WO 0249495 A	27-06-2002	AU 1977802 A	01-07-2002
		EP 1351599 A1	15-10-2003
		TR 200300933 T1	21-02-2006
EP 0033483 A2	12-08-1981	AU 539377 B2	27-09-1984
		AU 6692881 A	13-08-1981
EP 0901770 A2	17-03-1999	DE 69800823 D1	28-06-2001
		DE 69800823 T2	06-09-2001
		ES 2159416 T3	01-10-2001
		IT PN970037 U1	12-03-1999

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

- WO 02087408 A **[0003]**
- US 5595200 A **[0004]**