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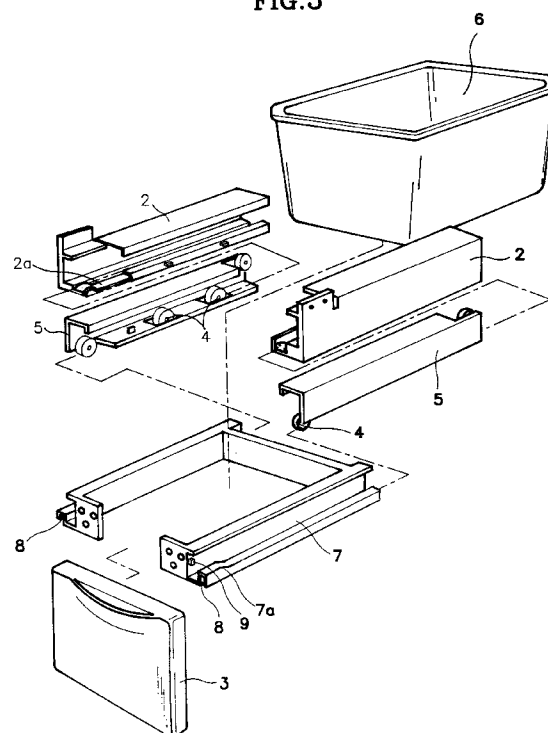
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(54) **Drawer mechanism, particularly for a refrigerator.**

(57) A drawer mechanism for enabling a drawer to slide into and out of a cabinet has guide rails 2 to be fixed to wall surfaces of the cabinet to guide movement of the drawer, sliders 5 adapted to move along the guide rails; and drawer support members 7 on both sides of the drawer and moving forward and rearward along with the sliders as the drawer is opened or closed. The guide rails 2, sliders 5 and support members 7 include gravitational locking means such that in the closed configuration of the drawer the weight of the drawer acts constantly to exert a force maintaining this closed configuration. The locking means includes sloping parts 2a, 7a on the relevant guide surfaces and rollers 4 on the sliders 5, the rollers resting between the sloping surfaces when the door is closed. This system dispenses with magnetic seals.

FIG.3



The present invention relates generally to a device for opening and/or closing a drawer such as a vegetable box of a refrigerator.

Generally, a vegetable box 6 is formed in the lower part of the main body 1a of a conventional refrigerator, as shown in Figs. 1 and 2. A user may open and close the vegetable box 6 using a door 3a of the vegetable compartment in the manner of a drawer.

When the user pushes the door 3a of the vegetable compartment into the main body 1a of the refrigerator, an attraction is produced between a magnetic material attached to a door gasket (not shown) and an iron plate. Accordingly, the door 3a of the vegetable compartment is attached to the main body 1a of the refrigerator, so that the heat insulation is maintained between the magnetic material attached to the door gasket and the iron plate.

However, the magnetic force of the door gasket tends to weaken after a long period of use, so that the door 3a of the vegetable compartment is no longer satisfactory sealed to the main body 1a of the refrigerator. This means that cool air leaks outside the main body 1a of the refrigerator. As a result, the conventional refrigerator has the disadvantages of a loss of power in the refrigerator and a drop in efficiency.

The object of the present invention is to overcome the problems and disadvantages of the conventional device, that is, to provide a mechanism for opening and closing a vegetable box of a refrigerator to or from which a user can easily place or get food such as vegetables and fruit without the seal being subject to deterioration over time.

According to the invention there is provided a drawer mechanism for enabling a drawer to slide into and out of a cabinet, comprising: guide rails to be fixed to wall surfaces of the cabinet to guide movement of the drawer; sliders adapted to move along the guide rails; and drawer support members on both sides of the drawer and moving forward and rearward along with the sliders as the drawer is opened or closed; wherein the guide rails, sliders and support members include gravitational locking means such that in the closed configuration of the drawer the weight of the drawer acts constantly to exert a force maintaining this closed configuration.

In embodiments of the invention the mechanism includes a vegetable box formed in the lower part of the main body of the refrigerator for receiving food like vegetables and fruit, guide rails fixed to wall surfaces in the lower parts of the main body of the refrigerator to guide movement of the vegetable box, sliders inserted into the guide rails and having a plurality of rollers, supporting members mounted in both sides of the vegetable box and moving straight forward and rearward along with the sliders by rotating the rollers when the vegetable box opened or closed, and a gravitational locking means for unit the supporting members with the guide rails by the weight of the vegetable

box itself when the supporting members and the vegetable box are completely inserted into the lower part of the main body of the refrigerator.

By the provision of gravitational closing means such as sloping guide surfaces on the drawer supports, sliders and guide rails it is ensured that the weight of the drawer and/or the sliders will always act to keep the drawer shut, and clearly this weight is not subject to weakening with time in the same way as a magnetic strip. Each slider preferably has a roller at its front end which in the closed position of the drawer, as defined by a sealing gasket being pressed around the drawer opening in the cabinet, is situated between the slopes of the guide surfaces to provide the necessary inward closing force component.

For a better understanding of the invention an embodiment will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a conventional refrigerator;

Fig. 2 is a longitudinal sectional view of a portion "A" in Fig. 1;

Fig. 3 is an exploded perspective view of the relevant parts of a refrigerator according to a preferred embodiment of the present invention;

Fig. 4 is a sectional view showing the parts in Fig. 2 as assembled;

Fig. 5a is a longitudinal sectional view showing the parts with the drawer closed; and

Fig. 5b is a corresponding longitudinal sectional view with the drawer open.

Referring to Fig. 3, guide rails 2 are formed at both wall surfaces of an inner case in the lower part of the main body 1 of the refrigerator, for guiding a drawer for use as a vegetable compartment, for instance. The rails have raised sections or upper projections 2a formed at their forward ends.

Sliders 5 moving forward and rearward when the door or panel 3 of the drawer is pulled or pushed are mounted on the guide rails 2. The sliders 5 have a plurality of rollers 4.

Support members 7 constituted as arms of a U-shaped frame are united with the door 3 of the vegetable compartment, and a vegetable box 6 is mounted in the supporting members 7. The supporting members 7 are moved along with (or roll on) the sliders 5 by a frictional force of the rollers 4 when the door 3 of the vegetable compartment is pulled or pushed, a downward-facing guide groove 8 being formed in each supporting member 7 for contact to the upper surfaces of the rollers.

Stops 9, for pushing the sliders 5 as the door 3 of the vegetable compartment is closed, are formed in the forward upper end portion of each supporting member 7, and slant surfaces 7a corresponding to the upper projections 2a of the guide rails 2 are formed in each forward lower end portion of the sup-

porting members 7, thus giving the grooves 8 a ceiling near their front ends which first slopes and then runs horizontally at a higher level up to the door 3.

A gravitational locking means is constituted by the upper projections 2a raised above the rest of the guide rails 2 at the front and the rollers 4 formed at the front of the sliders 5 and operating against the slant surfaces of the upper projections 2a under gravity when the vegetable box 6 is substantially completely inserted into the lower part of the refrigerator.

The operation of the present invention described above will be explained as follows.

Referring to Fig. 5a, when a user wants to open the door 3 of the vegetable compartment in the lower part of the main body in the refrigerator, he pulls the door 3 in the direction of the arrow. The rollers 4 of the sliders 5 are in this closed position pressed between the slanting part of the upper projections 2a of the guide rails 2 and the slant surfaces 7a in the forward lower end portions of the guide grooves 8 of the supporting members 7. This configuration ensures a force component in the closure direction resulting from the weight of the drawer. When the drawer is opened the rollers move forward by the friction force, sliding over the upper projections 2a formed in each forward end portion of the guide rails 2.

Referring to Fig. 5b, when the supports 7 move along with the sliders 5 and the rollers 4 off the front of the guide rails 2 out of the main body 1 of the refrigerator, the door 3 of the vegetable compartment united with the supporting members 7 sags down under the weight of the vegetable box itself, so that the user can easily get food into or out of the vegetable box 6. It will be seen that the sliders are shown fully extended with the drawer supports 7 in Fig. 5, but they can also be arranged to roll with these supports, so that the sliders would extend only half as far as the drawer.

When the user pushes the door 3 of the vegetable compartment closed the supporting members 7 move to the right and at the same time the stops 9 formed in each forward upper end portion of the supporting members 7 push the sliders 5.

When the rollers 4 of the supporting members 7 slide over the upper projections 2a of the guide rails 2, the supporting members 7 and the door 3 of the vegetable compartment are generally and completely pressed against the main body 1 of the refrigerator, slightly raised upwards as shown in Fig. 5a, in such a way that leakage of cool air is prevented; a polymeric seal 10 can be used between the door and the cabinet.

As described above, the refrigerator according to the above embodiment has the advantage that the user can easily get the food such as vegetables or fruit into or out of the vegetable box 6 since the door 3 of the vegetable compartment sags down slightly when pulled, after the front rollers drop off the end of

the guide rails.

In addition, leakage of the cool air can be prevented because the door 3 of the vegetable compartment is completely attached to the main body 1 of the refrigerator by the weight of the vegetable box itself. As a result, the efficiency and reliability of the product is considerably heightened.

Claims

1. A drawer mechanism for enabling a drawer to slide into and out of a cabinet, comprising:
 - guide rails (2) to be fixed to wall surfaces of the cabinet to guide movement of the drawer;
 - sliders (5) adapted to move along the guide rails; and
 - drawer support members (7) on both sides of the drawer and moving forward and rearward along with the sliders as the drawer is opened or closed;
 - wherein the guide rails (2), sliders (5) and support members (7) include gravitational locking means (2a, 4, 7a) such that in the closed configuration of the drawer the weight of the drawer acts constantly to exert a force maintaining this closed configuration.
2. A mechanism according to claim 1, in which the sliders (5) each have near their front ends a roller (4) running on the guide rails (2) and on which the support members (7) are guided.
3. A mechanism according to claim 2, in which the gravitational locking means includes upward projections (2a) of the guide rails (2) at their front ends and the rollers (4) on the front of the sliders, operating against slanting surfaces of the upward projections under the influence of gravity when the drawer is substantially completely inserted into the cabinet.
4. A mechanism according to claim 3, in which the gravitational locking means further includes an upwardly projecting portion and a slanting surface (7a) at the front end of the movement surface of each support member (7), corresponding to the projections (2a) of the guide rails, in such a way that in the closed position the weight of the drawer is transmitted obliquely from the slanting surface of the support member (7) through the roller (4) to the slanting surface of the guide rails (2), thus exerting a closing force on the drawer as aforesaid.
5. A mechanism according to any preceding claim in which the drawer has a front panel (3) which in the closed position abuts against the cabinet via

a seal (10), and in which the supporting members (7) in the upper part of their forward ends have stops (9) for pushing the sliders (5) inwards when the drawer is closed.

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6. A refrigerator cabinet including a drawer mounted on a mechanism as claimed in any preceding claim.

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FIG.1

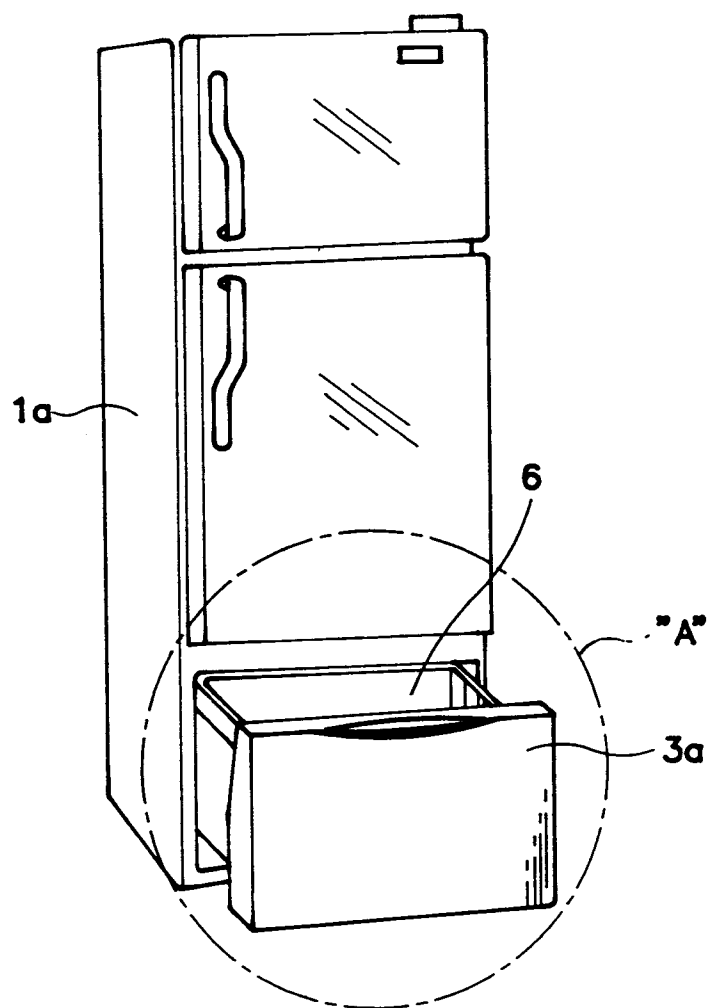


FIG.2

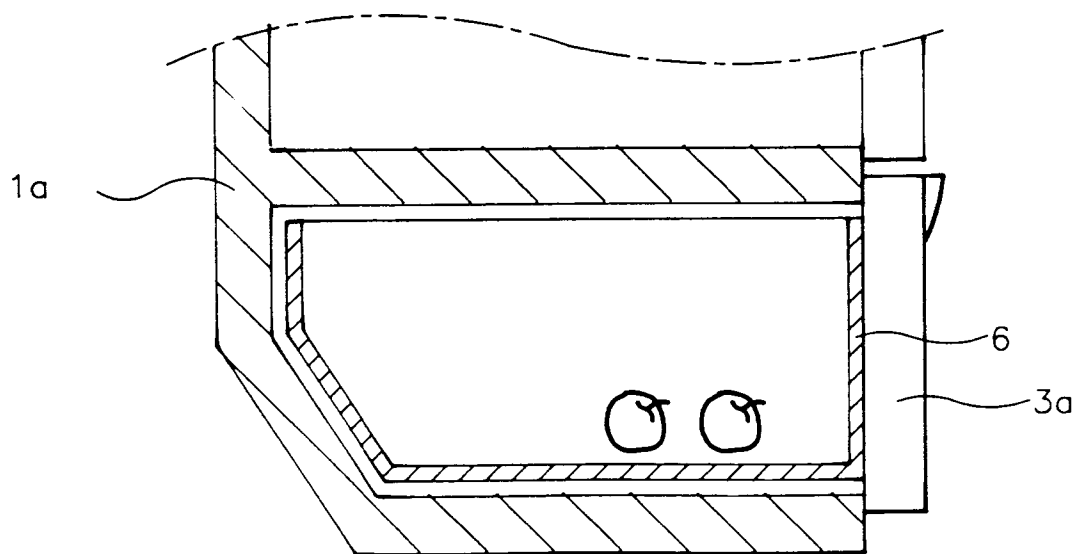


FIG.3

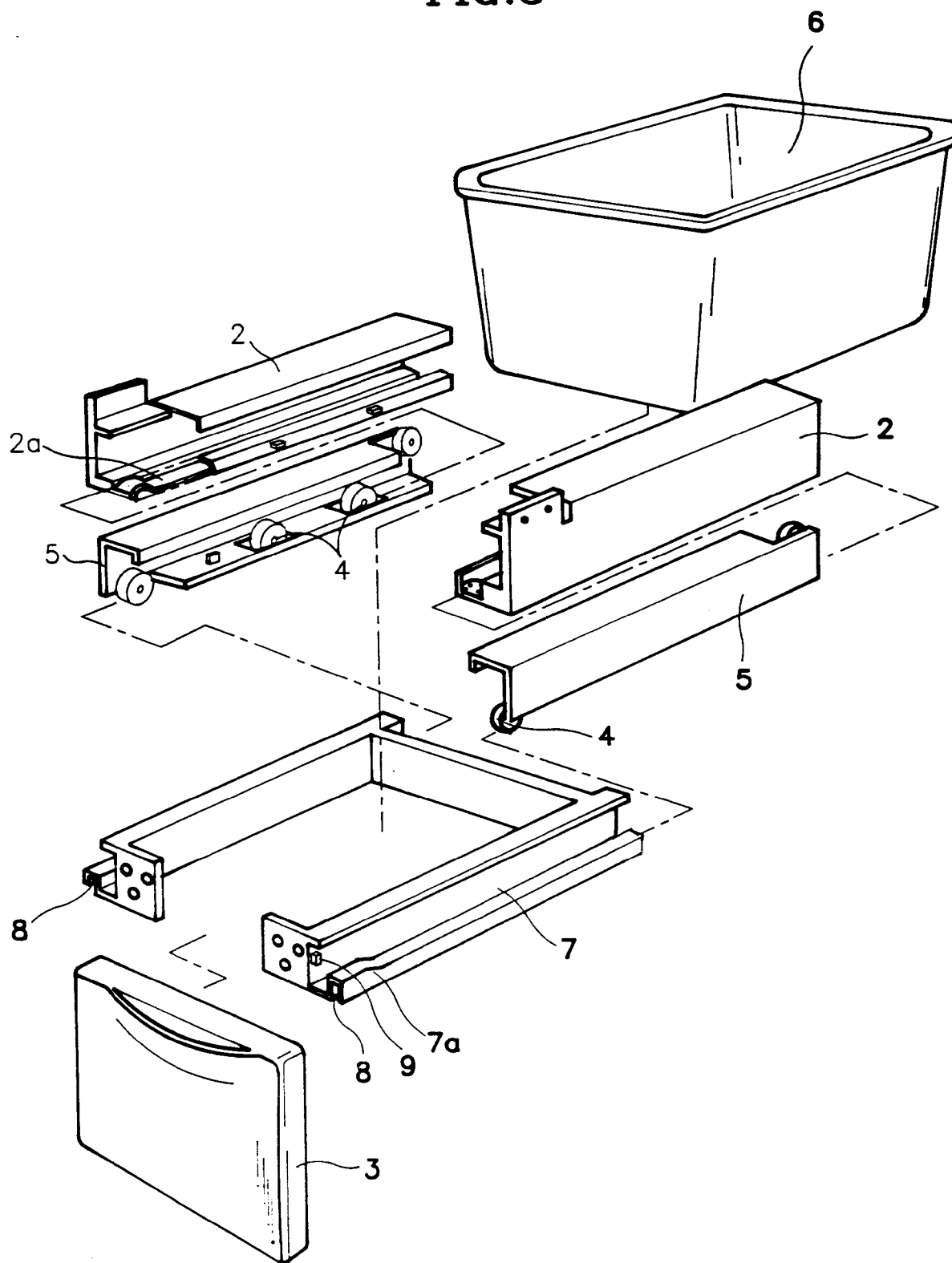


FIG.4

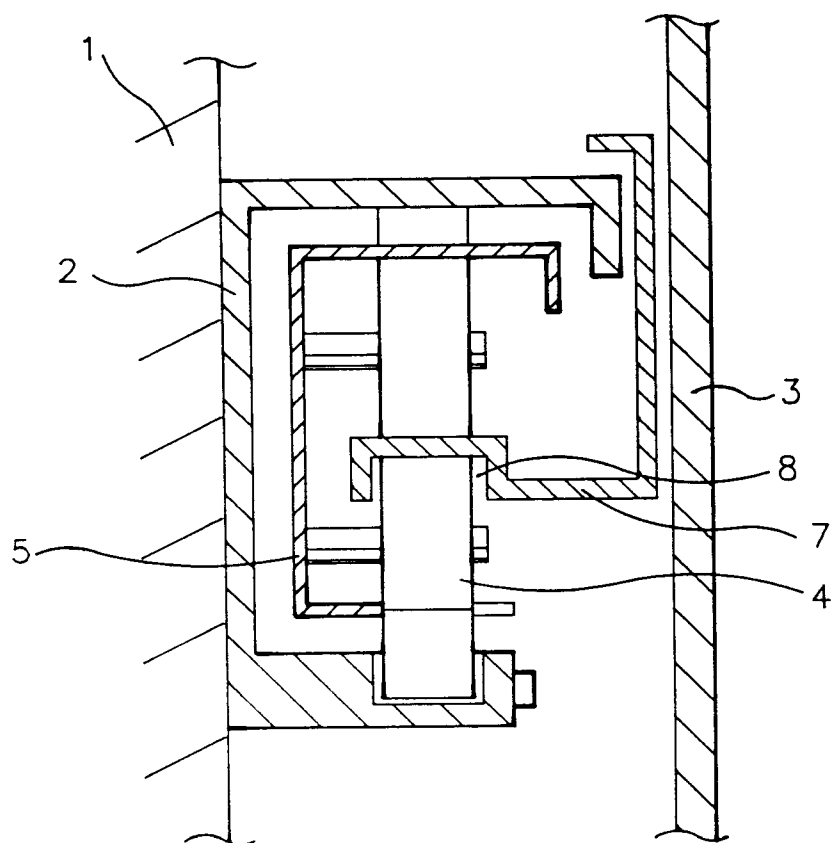


FIG.5a

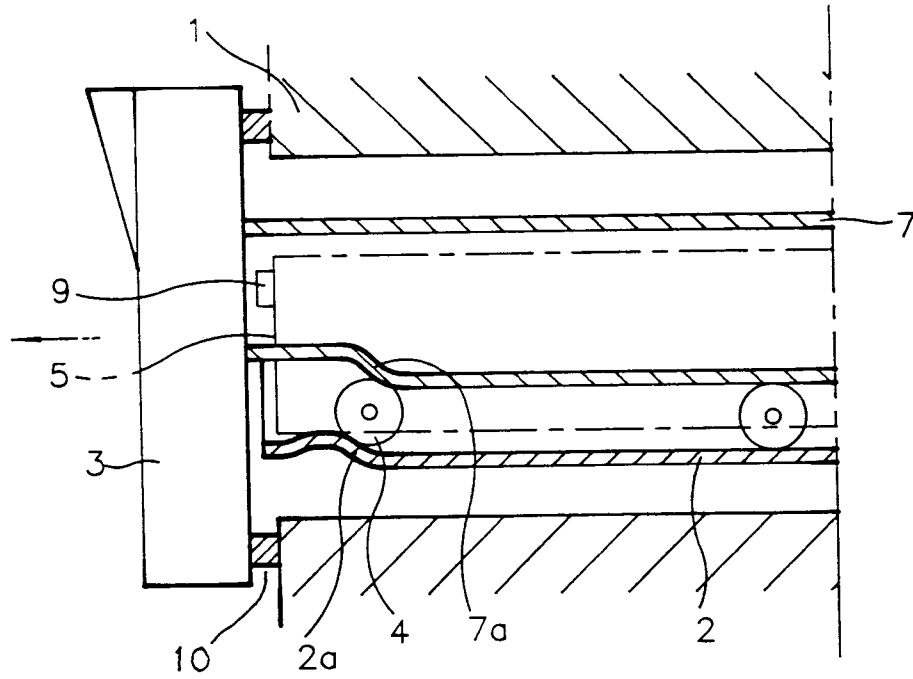
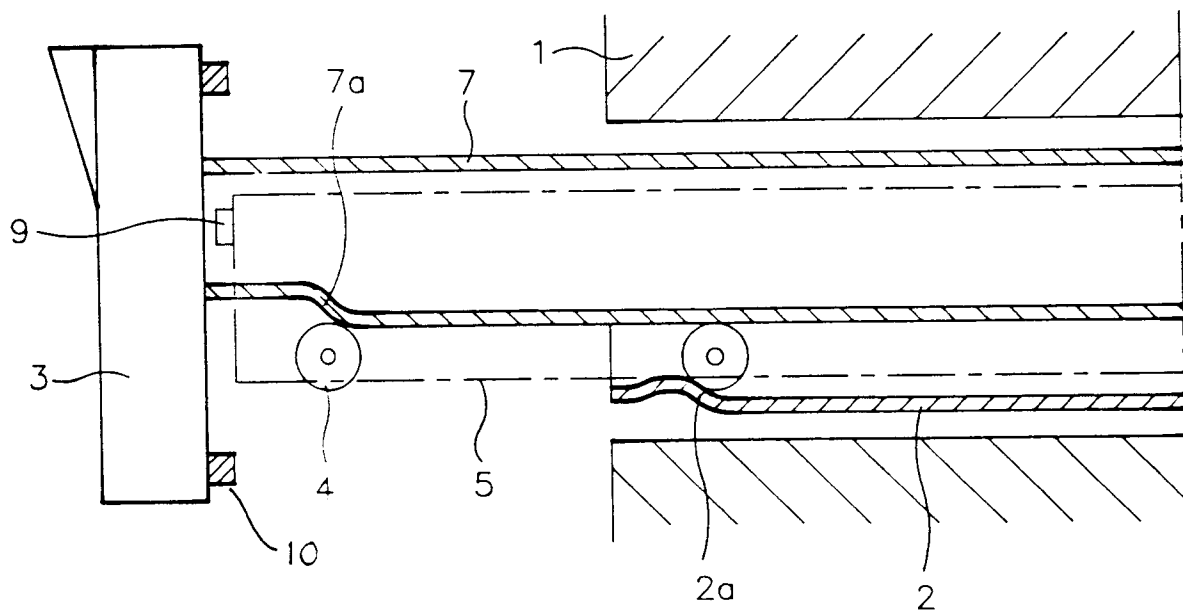


FIG.5b





European Patent
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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 94308976.3
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
X	<u>US - A - 2 496 673</u> (NIELSEN) * Column 1, lines 1-8; column 3, lines 23-65; column 4, lines 17-32; fig. 2-4,9 *	1-4	A 47 B 88/10 F 25 D 23/00
Y	--	5,6	
X	<u>AT - B - 394 132</u> (ALFIT GESELLSCHAFT M.B.H.) * Page 3, lines 44,45,53,54; page 4, lines 16-18,36-46; fig. 1 *	1	
A	--	2-4	
Y	<u>CH - A - 665 472</u> (BOSCH-SIEMENS HAUSGERÄTE G.M.B.H.) * Page 2, right column, lines 46-55; fig. 1 *	5	
Y	<u>US - A - 2 801 146</u> (MIKULAS) * Column 2, lines 7-9,32-36; fig. 4,5 * ----	6	TECHNICAL FIELDS SEARCHED (Int. Cl. 6) A 47 B 88/00 F 25 D 23/00 F 25 D 25/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 14-02-1995	Examiner VELINSKY-HUB
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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