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(54) Drawer mechanism, particularly for a refrigerator

Schubladenauszug, insbesondere für einen Kühlschrank

Dispositif de guidage pour tiroir, en particulier pour réfrigérateurs

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Description

[0001] The present invention relates generally to a device for opening and/or closing a drawer such as a vegetable box of a refrigerator.

[0002] 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.

[0003] 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. A magnetic seal is shown, for instance, in CH-A-665472.

[0004] 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.

[0005] 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.

[0006] 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 having rollers 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, rollers and support members are so arranged that in the closed configuration of the drawer the weight of the drawer acts constantly to exert a force maintaining this closed configuration, by virtue of the device including on the one hand upward projections of the guide rails at their front ends and the rollers on the front of the sliders, and on the other hand an upwardly projecting portion and a slanting surface at the front end of the movement surface of each support member, corresponding to the projections 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 through the roller to slanting surfaces of the upward projections (2a) of the guide rails, thus exerting a closing force on the drawer as aforesaid.

[0007] US-A-2496673 (Nielsen) discloses a drawer construction, not intended for a refrigerator, with rollers and sloping surfaces, but the sloping surfaces are separate and are associated with separate rollers.

[0008] 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 uniting 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.

[0009] By the provision of gravitational closing means including the 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.

[0010] 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.

[0011] 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.

[0012] 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.

[0013] 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.

[0014] 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 supporting 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.

[0015] 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.

[0016] The operation of the present invention described above will be explained as follows.

[0017] 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.

[0018] 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.

[0019] 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.

[0020] 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.

[0021] 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.

[0022] 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, each having near its front end a roller (4) running on the respective guide rail (2); 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;
   characterised in that the gravitational locking means includes on the one hand upward projections (2a) of the guide rails (2) at their front ends and the rollers (4) on the front of the sliders, and on the other hand 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 slanting surfaces of the upward projections (2a) of the guide rails (2), thus exerting

a closing force on the drawer as aforesaid.

2. A mechanism according to claim 1, 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.

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

Patentansprüche

1. Schublade-Vorrichtung zum Ermöglichen, daß eine Schublade in ein Gehäuse hinein oder aus dem Gehäuse heraus gleiten kann, wobei die Vorrichtung aufweist:

   Führungsschienen (2), die an Wandoberflächen des Gehäuses befestigt sind, um eine Bewegung der Schublade zu führen;
   Schlitten (5), die ausgelegt sind, sich entlang den Führungsschienen zu bewegen, wobei jeder an seinem Vorderende eine Rolle (4) hat, die auf der jeweiligen Führungsschiene (2) läuft; und
   Schublade-Tragteile (7) an beiden Seiten der Schublade, die sich zusammen mit den Schlitten vorwärts und rückwärts bewegen, wenn die Schublade geöffnet oder geschlossen wird;
   wobei die Führungsschienen (2), die Schlitten (5) und die Tragteile (7) eine Schwerkraft-Sperreinrichtung (2a, 4, 7a) derart haben, daß in der geschlossenen Konfiguration der Schublade das Gewicht der Schublade ständig wirkt, um eine Kraft auszuüben, die diese geschlossene Konfiguration aufrechterhält;
   dadurch gekennzeichnet, daß die Schwerkraft-Sperreinrichtung auf der einen Seite nach oben gerichtete Vorsprünge (2a) der Führungsschienen (2) an ihren Vorderenden und die Rollen (4) an der Vorderseite der Schlitten und auf der anderen Seite einen nach oben hervorstehenden Abschnitt und eine schräge Oberfläche (7a) am Vorderende der Bewegungsoberfläche jedes Tragteils (7) entsprechend den Vorsprüngen (2a) der Führungsschienen derart aufweist, daß in der geschlossenen Position das Gewicht der Schublade schräg von der schrägen Oberfläche des Stützteils (7) über die Rolle (4) auf die schrägen Oberflächen der nach oben gerichteten Vorsprünge (2a) der Führungsschienen (2) umgesetzt wird, damit eine Schließkraft auf die Schublade, wie zuvor angegeben, einwirkt.

2. Vorrichtung gemaß Anspruch 1, in der die Schublade eine Frontplatte (3) hat, die in der geschlossenen Position an das Gehäuse über eine Dichtung (10) anstößt, und in der die Tragteile (7) in dem oberen Teil ihrer vorderenden Anschläge (9) zum Schieben der Schlitten (5) nach innen haben, wenn die Schublade geschlossen wird.

3. Kühlschrank-Gehäuse, das eine Schublade enthält, die an einer Vorrichtung, beansprucht in einem der vorhergehenden Ansprüche, angebracht ist.

Revendications

1. Mécanisme pour tiroir permettant à un tiroir de pénétrer et de sortir d'un compartiment par glissement, comprenant:

   des rails de guidage (2) destinés à être fixés à des surfaces de parois du compartiment pour guider le mouvement du tiroir;
   des coulisseaux (5) conçus pour se déplacer le long des rails de guidage, chacun comportant, à proximité de son extrémité frontale, un galet (4) se déplaçant sur le rail de guidage respectif (2); et
   des éléments de support de tiroir (7) de part et d'autre du tiroir et effectuant un déplacement vers l'avant et vers l'arrière conjointement avec les coulisseaux lorsqu'on ouvre ou lorsqu'on ferme le tiroir;
   dans lequel les rails de guidage (2), les coulisseaux (5) et les éléments de support (7) englobent des moyens de verrouillage par gravitation (2a, 4, 7a) de telle sorte que, dans la configuration fermée du tiroir, le poids du tiroir exerce de manière constante une force qui maintient cette configuration fermée;
   caractérisé en ce que les moyens de verrouillage par gravitation englobent, d'une part, des saillies dressées (2a) des rails de guidage (2) à leurs extrémités frontales et les galets (4) à l'avant des coulisseaux, et d'autre part, une portion faisant saillie vers le haut et une surface inclinée (7a) à l'extrémité frontale de la surface de mouvement de chaque élément de support (7), correspondant aux saillies (2a) des rails de guidage, de telle sorte que, dans la position fermée, le poids du tiroir est transmis en oblique depuis la surface inclinée de l'élément de support (7) vie les galets (4) aux surfaces inclinées des saillies dressées (2a) des rails de guidage (2) en exerçant ainsi une force de fermeture sur le tiroir, comme indiqué ci-dessus.

2. Mécanisme selon la revendication 1, dans lequel le tiroir possède un panneau frontal (3) qui, dans la

position fermée, vient buter contre le compartiment via un joint d'étanchéité (10) et dans lequel les éléments de support (7), dans la partie supérieure de leurs extrémités avant, possèdent des arrêts (9) pour pousser les coulisseaux (5) vers l'intérieur lorsque le tiroir est fermé.

3. Compartiment de réfrigérateur englobant un tiroir monté sur un mécanisme tel que revendiqué dans l'une quelconque des revendications précédentes.

FIG.1

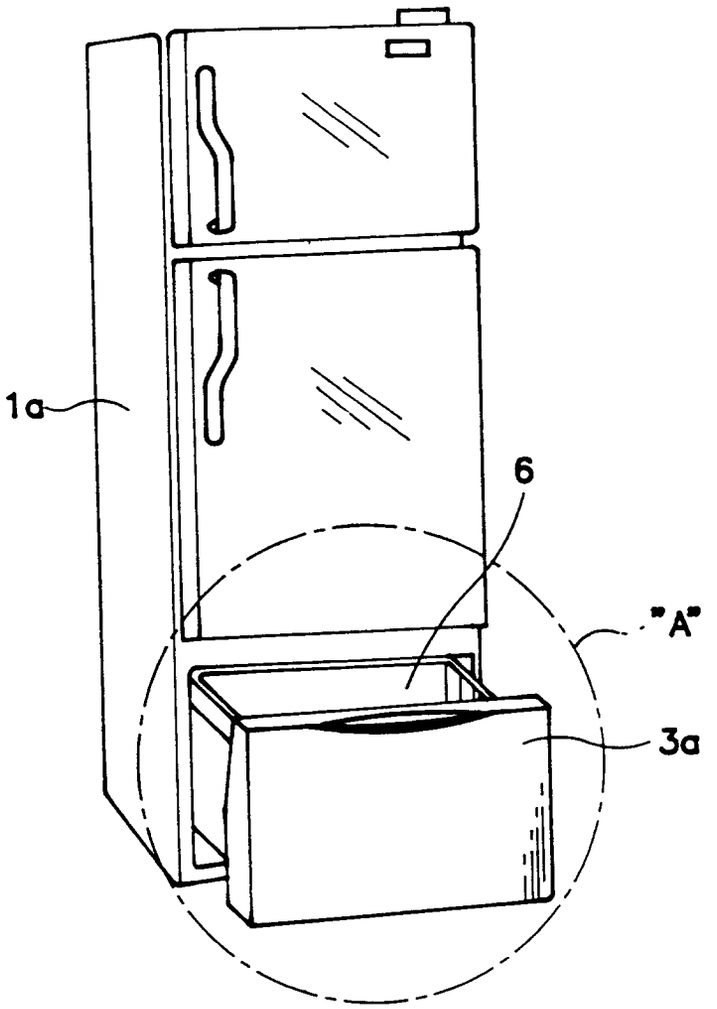

FIG.2

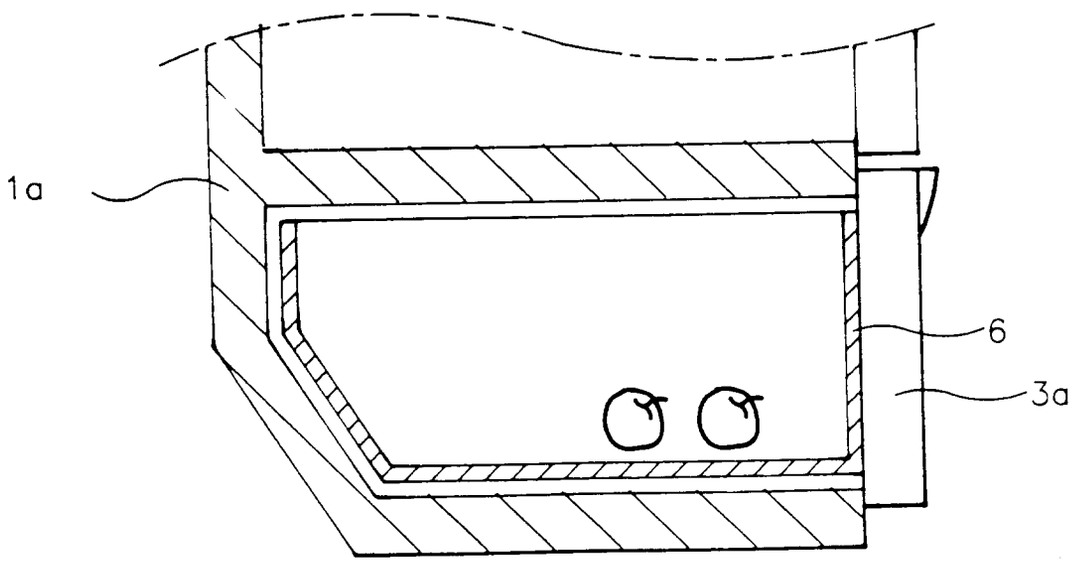

FIG.3

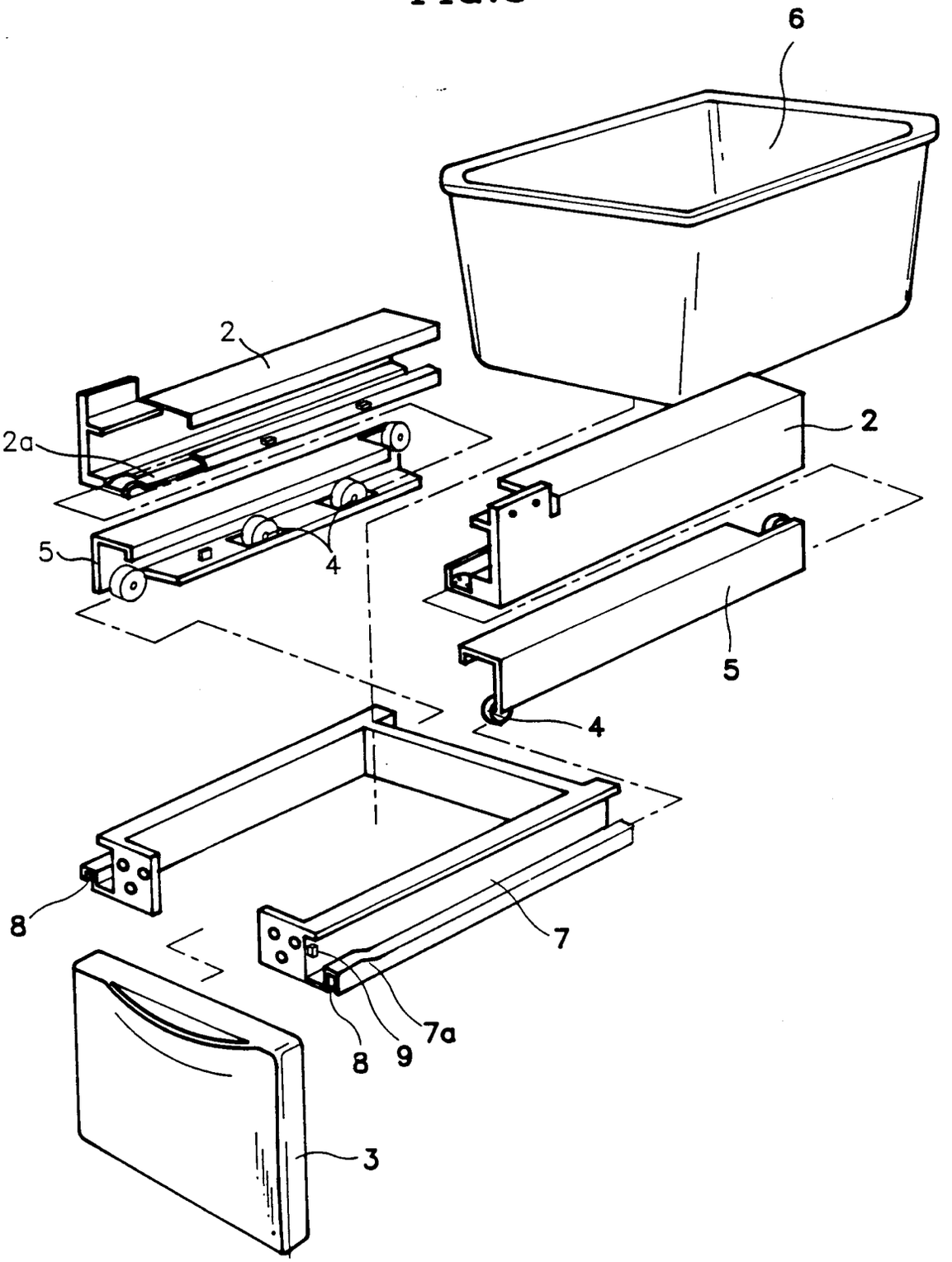

FIG.4

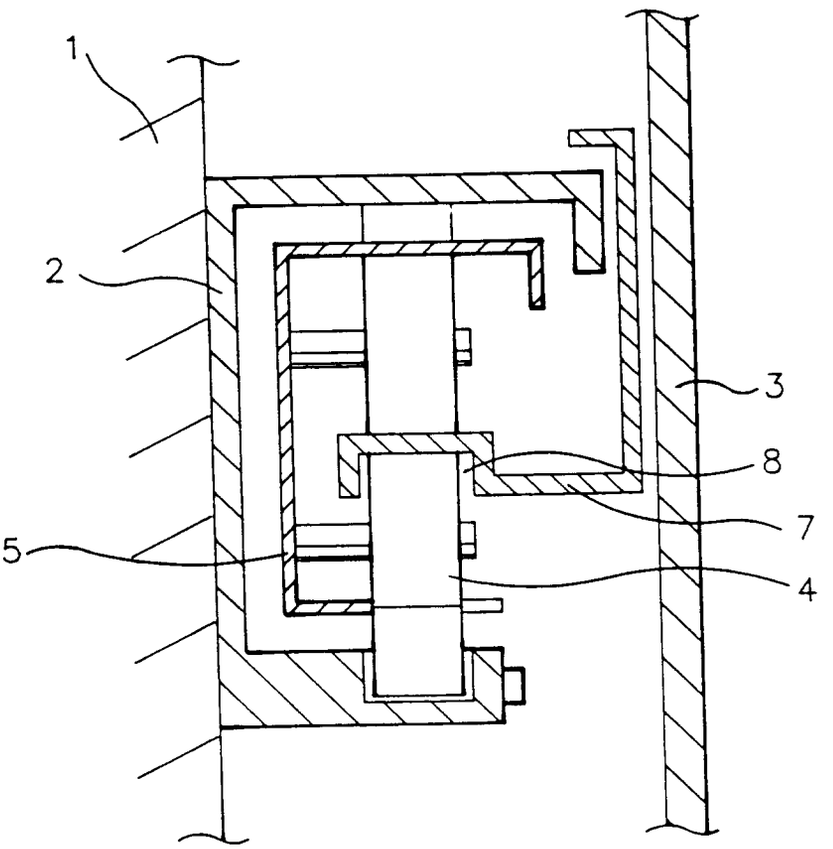

FIG.5a

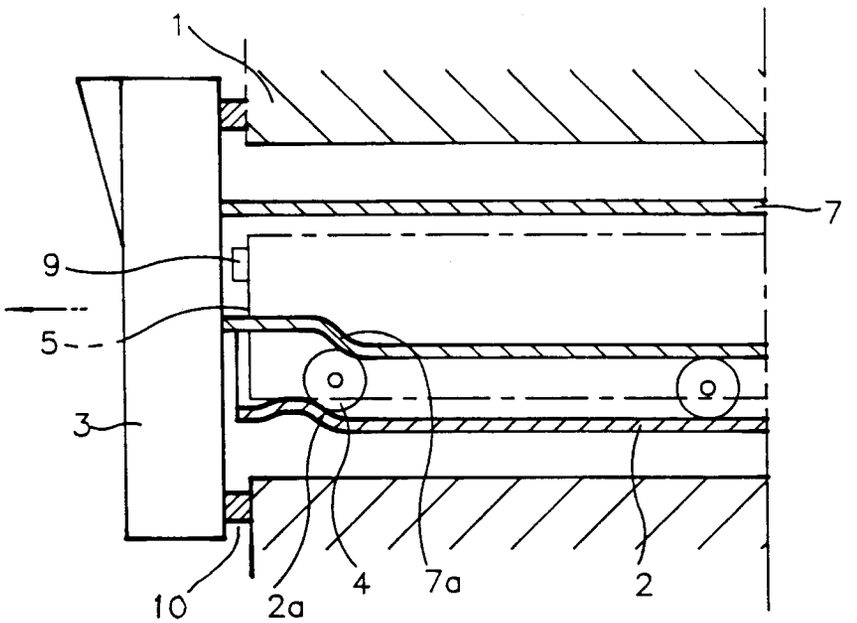

FIG.5b