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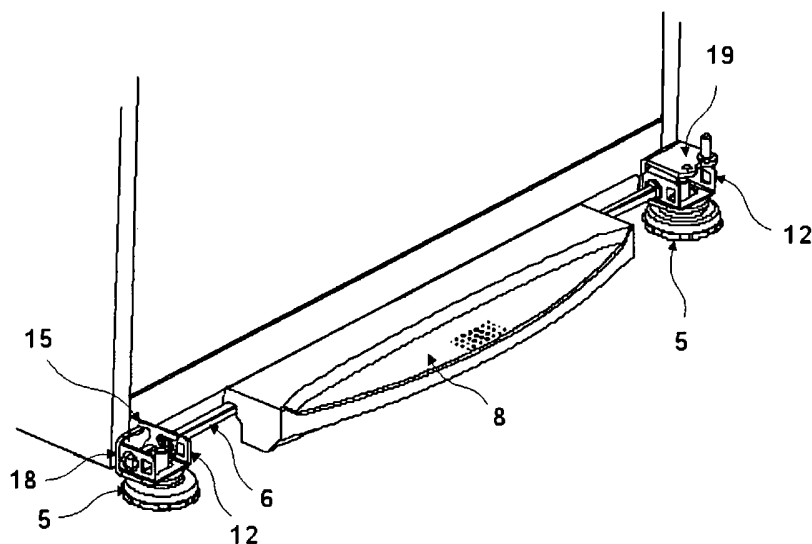
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(54) Title: A COOLING DEVICE



(57) Abstract: This invention relates to a cooling device (1) the door of which can easily be opened by the user by means of a force applicator (8), a force transmitter (6) and a pusher (14) activated by the force transmitter (6).

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Description

A COOLING DEVICE

- [001] This invention relates to a cooling device wherein the user can easily open the door.
- [002] Opening the door can be hard in a cooling device, preferably in a refrigerator, due to the vacuum effect created by pressure difference and/or the magnetic forces of gaskets on the door. This situation can be a problem especially when both hands of user are full when trying to open the door of the cooling device.
- [003] In English Patents no. GB442718 and GB759978 cooling devices are described wherein a foot lever can open its door.
- [004] In English Patent no. GB1090530 a cooling device is described wherein its door can be opened by pushing with a piece connected to a foot lever.
- [005] In English Patent no. GB1166952 a cooling device is described wherein its door, which is closed by magnetic force, can be opened by pushing with a piece connected to a foot lever.
- [006] The object of this invention is to provide a cooling device which is cheap, simple, ergonomic, with convenience of production, assembly and usage wherein the door can preferably be opened with an opening mechanism facilitating operation by foot in an effortless manner.
- [007] The cooling device designed to fulfill the object of the present invention is illustrated in the attached figures wherein;
- [008] Figure 1- is the perspective view of a cooling device.
- [009] Figure 2- is the front view of an opening mechanism mounted on a cooling device.
- [010] Figure 3- is the exploded view of an opening mechanism.
- [011] Figure 4- is the bottom view of a force exerting device and an /integrated support fixed to force exerting device
- [012] Figure 5- is the side schematic view of a body, an opening mechanism and a door in closed position.
- [013] Figure 6- is the side schematic view of a body, an opening mechanism and a door opened by the opening mechanism.
- [014] Figure 7- is the bottom view of a door, an opening arm on the door closed by the pressure applied and the front corner of a body onto which the door is mounted.
- [015] Figure 8- is the bottom view of a door, an opening arm in open position on the door, and the front corner of a body onto which the door is mounted.
- [016] Figure 9- is the top perspective view of a kick plate, a pusher, a pusher spring, and a force transmitting retainer onto which a force transmitter is attached.
- [017] Figure 10 – is the top perspective view of a foot, a pusher, a pusher spring, and a force transmitting retainer onto which a force transmitter is attached.

[018] Figure 11 – is the perspective view of a cooling device comprising two doors and two opening mechanisms parallel to the front bottom edges of the doors.

[019] Figure 12 – is the perspective view of a cooling device comprising two doors and two opening mechanisms parallel to the sides of the doors.

[020] Elements shown in figures are numbered as follows:

1. Cooling device
2. Door
3. Body
4. Opening mechanism
5. Foot
6. Force transmitter
7. Arm
8. Force applier
9. Arm group
10. Support groove
11. Door support
12. Force transmitting retainer
13. Washer
14. Pusher
15. Pusher spring
16. Gasket
17. Body wheel
18. Profile
19. Support profile
20. Kick plate
21. Kick plate housing
22. Force transmitter housing
23. Arm wheel
24. Arm shaft
25. Arm spring
26. Support
27. Force transmitter support
28. Arm group cover

[021] A cooling device (1) preferably a refrigerator, comprising a body (3), a door (2) enabling the body (3) to be closed, more than one foot (5) supporting it, one or more gaskets (16) ensuring the door (2) to be closed on the body (3) in a leak proof way preferably with magnetic attraction force, one or more body wheels (17) under the body (3) facilitating easy movement of the body (3) and an opening mechanism (4)

functioning to open the door by pushing.

[022] An opening mechanism (4), comprising a pusher (14) which enables the door (2) to be pushed and released from the body (3), a force applier (8) on the door (2) or on the body (7) preferably at the front bottom section, which the user can readily access from any side of the door (2), and apply force on various points of it, by means of almost equal moment arm formation on every point, with small or almost equal force exertions, which activates the pusher (14) which is at a different or remote position from the point where force is applied and enables the opening of the door (2), and one or more force transmitters (6) which transmit the force received from force applier (8) to the pusher (14) and activating it, a force transmitting retainer (12) which serve as bearing and fixing of the force transmitter (6) to the body (3), a washer (13) in a shape conforming to that of the force transmitter (6) and allowing movement of force transmitter (6) in the bearing, a pusher spring (15) resuming its former position after the door (2) is opened so that the door (2) can be reopened, a door support (11) fixed to the door (2) which pushes the door (2) along with itself while the pusher (14) shoves it, a preferably "L" shaped profile (18) which is fixed to the body (3) together with force transmitting retainer (12) and onto which the foot (5) is fixed, preferably a horizontally aligned "U" shaped support profile (19) which is fixed to the body (3) together with the force transmitting retainer (6), onto which the force transmitter (12) is positioned and the foot (5) is fixed and which enables pivotal movement of the door (2) by way of a pin retained on it, a kick plate (20), which incorporates arrangement of components on it and provides concealing of internal components from sight and from being affected by external factors, a support (26) bracket which ensures assembling of the foot lever to the kick plate (20) easily and prevents the force applier (8) and the kick plate (20) from being damaged by the force applied on it, a support groove (10) on the kick plate (20) in which the pusher (14) and the door support (11) move, a force transmitter support (27), which is fixed to the body (3) with the kick plate (20) and provides support for the force transmitter (6), and an arm group (9) which enables the door (2) to be opened easily and avoids closing itself once opened.

[023] The force transmitting retainer (12), comprises a force transmitter housing (22) into which the washer (13) is mounted which further has the force transmitter (6) mounted in it, and within which the washer (13) can move, one or more kick plate housings (21) onto which the kick plate (20) is fixed, and holes in suitable number, position and shape that provide means for attaching it to the body (3) together with the profile (18) and support profile (19) onto which it is mounted.

[024] The arm group (9) comprises an arm (7) which assures the door (2) to be released by the pusher (14) from the grip of the gasket (16) and to stay ajar and not closing again, an arm shaft (24) which provides pivotal movement of the arm (7) around it, and

attaches it to the body (3), an arm spring (25) which ensures arm (7) not to open more than the angle (A) preset by the manufacturer while it pivotally turns around the arm shaft (24), and in smaller angles than the said angle (A), pushing the arm (7) and the door (2) which touches the arm (7) to reach the angle (A) preset by the manufacturer with a force less than the magnetic attraction force of the gasket (16), an arm wheel (23) on the edge of the arm (7), contacting the door (2) by moving on inner bottom surface of door (2), facilitating the door (2) to be pushed without damaging the surface when arm (7) moves due to arm spring (25) and prevents closing itself and an arm group cover (28) maintaining the arrangement and protection thereof .

[025] In the preferred embodiment of the present invention, a foot lever, onto which force can be applied by touching its surface, is used as a force applier (8), a shaft that lies parallel to the force applier (8) along the length of the force applier (8) is used as a force transmitter (6), a pin is used as a pusher (14) retained on the force transmitter (6) to transmit the motion of the force transmitter (6) to the door (2) without restraining movement of the door (2) and with a shape and position so as to be unaffected by the forces acting upon itself.

[026] In the preferred embodiment of the present invention, a force transmitter (6) with a quadrilateral cross-section is used which can transmit the force applied on it without being displaced from its retained location due to its cross-sectional structure.

[027] In the preferred embodiment of the present invention, the cooling device (1) comprises a force applier (8) with dimensions that enables it to cover almost whole of one of the edge of the body (3) or the door (2).

[028] In one embodiment of the present invention, the cooling device (1) comprises a force applier (8) on its body (3) or on the front bottom edge of the door (2) which is smaller than the edge length of the body (3) or the door (2) or longer than the width of a hand or foot, for example 10 cm.

[029] In another embodiment of the present invention, the opening mechanism (4) is located at the front bottom part of the door (2) or the body (3) and the force applier (8) enables the opening of the door (2) by pushing by the foot. (Figure 1)

[030] In yet another embodiment of the present invention, the opening mechanism (4) is located in the middle or upper part of the door (2) or the body (3) and the force applier (8) enables the opening of the door (2) by pushing by the hand. (Figure 11, Figure 12)

[031] While the said invention is applied, the user depresses the foot lever; the force applier (8) moves in the direction of foot pressure and herewith rotates the force transmitter (6), which is attached to it. The moving force transmitter (6) starts to rotate the pusher (14), which is attached to the force transmitter (6) inside the force transmitting retainer (12). While the pusher (14) pin rotates, it pushes the door support (11), which is just opposite of the pusher (14) pin and fixed on the door (2) and con-

sequently the door (2), which was stuck to the body (3) with magnetic force created by the gasket (16). When the force applied on the foot lever is greater than the force of the gasket holding the door (2) stick to the body (3), the pusher (14) rotates and exerts a thrust on the door support (11) and enables the opening of the door (2). At this stage the door (2) may turn back to the initial closed position due to magnetic field effect created by the gasket (16). The arm (7) activated by the arm spring (25) enforces the door (2) to stay open and brings the door (2) to a position set by producer which is beyond the range of the magnetic effect of the gasket (16) at this stage. The arm (7) stays at the latest opened position but since the pusher spring (15) attached to the pusher (14) is stretched; it brings the pusher (14) to its initial position again.

[032] With the application of the present invention, the users, even if both their hands are full, can press on any point by foot on the force applier (8) positioned preferably almost all along the bottom edge of the cooling device (1) in one piece and by means of a force transmitter (6) preferably aligned parallel to the force applier (8) enabling the force transmitter (6) to trigger the pusher (14) with an almost equal and a small force and thus the pusher (14) enables the opening of the door (2) by pushing with ease. However in former applications, the user can open the door (2) by only pressing on the preferably pedal shaped force applier (8) from the location where the force applier (8) is assembled and cannot access the force applier (8) from any other place. Furthermore the opening mechanism (4) facilitates ease of production and assembling and provides visual integrity of the cooling device (1).

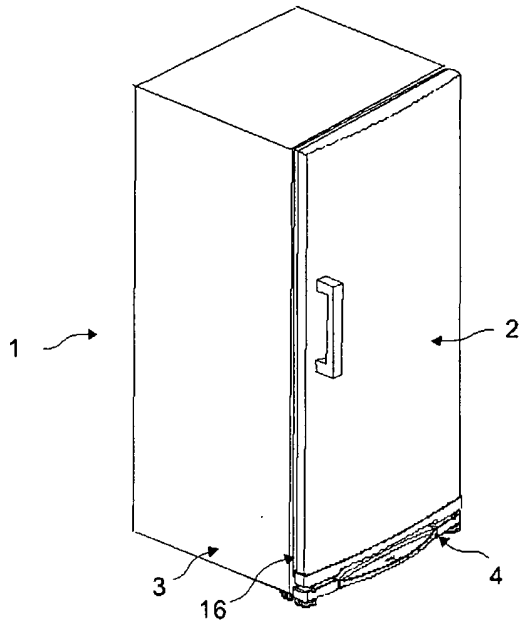
Claims

- [001] A cooling device (1) having a body (3) and a door (2) to close the body (3), characterized by an opening mechanism (4) which is fixed on the body (3) or the door (2) and enabling the door (2) to open by pushing; comprising a pusher (14) enabling the door (2) to be pushed and released from the body (3), a force applier (8) on the door (2) or on the body (3), which the user can readily access from any side of the door (2), and apply force on various points on it, by means of almost equal moment arm formation on every point, applying small or almost equal force, activating the pusher (14) which is at a different or remote position from the point where force is applied and enables the opening of the door (2), and one or more force transmitters (6) which transmit the force received from force applier (8) to the pusher (14) and activates the pusher (14).
- [002] A cooling device (1) as in Claim 1, characterized by an opening mechanism (4) comprising a force transmitting retainer (12) which serve as bearing and fixing of the force transmitter (6) to the body (3), a washer (13) in a shape conforming to that of the force transmitter (6) and allowing movement of force transmitter (6) in the bearing, a pusher spring (15) resuming its former position after the door (2) is opened so that the door (2) can be reopened, a door support (11) fixed to the door (2) which pushes the door (2) along with itself while the pusher (14) shoves it, a preferably "L" shaped profile (18) which is fixed to the body (3) together with force transmitting retainer (12) and onto which the foot (5) is fixed, preferably a horizontally aligned "U" shaped support profile (19) which is fixed to the body (3) together with the force transmitting retainer (12), onto which the force transmitter (6) is positioned and the foot (5) is fixed and which enables pivotal movement of the door (2) by way of a pin retained on it.
- [003] A cooling device as in Claim 1 or 2, characterized by an opening mechanism (4) comprising a kick plate (20) which accommodates arrangement of components on it, and conceals internal components from sight also preventing from being affected by external agents/factors.
- [004] A cooling device (1) as in Claim 1 to 3, characterized by an opening mechanism (4) comprising a support (26) providing ease of assembly of the foot lever to the kick plate (20), avoiding the force applier (8) and the kick plate (20) being damaged by the force applied on the foot lever, a support groove (10) on kick plate (20) inside which the lever (14) and the door support (11) move, and a force transmitter support (27) which is fixed to the body (3) with the kick plate (20) providing support for force transmitter (6).
- [005] A cooling device (1) as in Claim 1 to 4, characterized by a force transmitter (6)

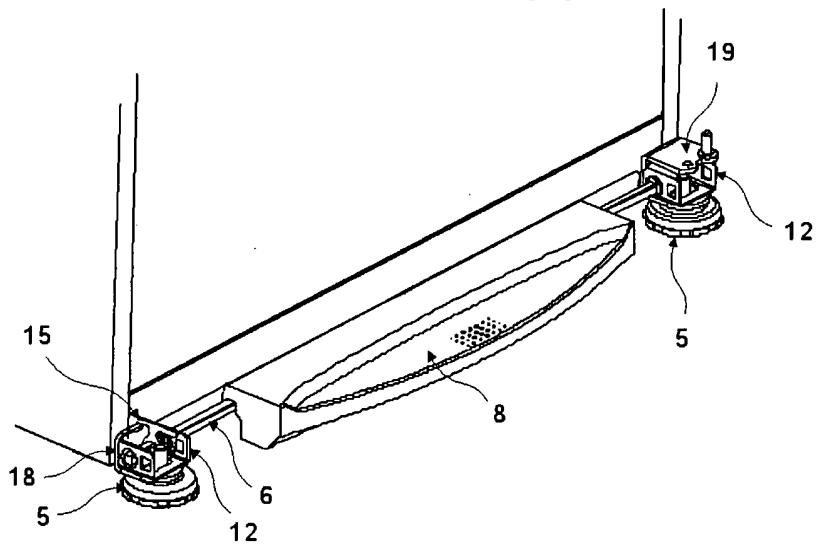
with a quadrilateral cross-section, which can transmit the force applied on it without being displaced from its retained location due to its cross-sectional structure.

- [006] A cooling device (1) as in any of the above claims, characterized by an opening mechanism (4) comprising an arm group (9) which enables the door (2) to be opened with ease and avoids automatic closing once opened.
- [007] A cooling device (1) as in any of the above claims, characterized by an opening mechanism (4) comprising a force applier (8) having a width larger than that of a foot or hand.
- [008] A cooling device (1) as in any of the above claims, characterized by an opening mechanism (4) comprising a force applier (8) having a length that extends along almost entirely on one edge of the body (3) or the door (2).
- [009] A cooling device (1) as in Claim 6, characterized by an arm group (9) comprising an arm (7) which assures the door (2) released from the magnetic force of the gasket (16) by pusher (14) pin to stay ajar and not close again, an arm shaft (24) which implements pivotal movement of the arm (7) around it and attaches it to the body (3), an arm spring (25) which prevents arm (7) from opening more than the angle (A) preset by manufacturer while it pivots around the arm shaft (24), and in smaller angles than the said angle (A) compresses the arm (7) to reach the angle preset by the manufacturer, thus applies a force less than the magnetic attraction force of the gasket (16) and therefore can push the arm (7) and the door (2) which contacts the arm (7), an arm wheel (23) on the tip of the arm (7) touching the door (2) by moving on inner bottom surface of the door (2), when arm (7) moves due to arm spring (25) enabling door (2) to be pushed without harming the surface and preventing closing itself and an arm group cover (28) providing protection and arrangement of the arm group.

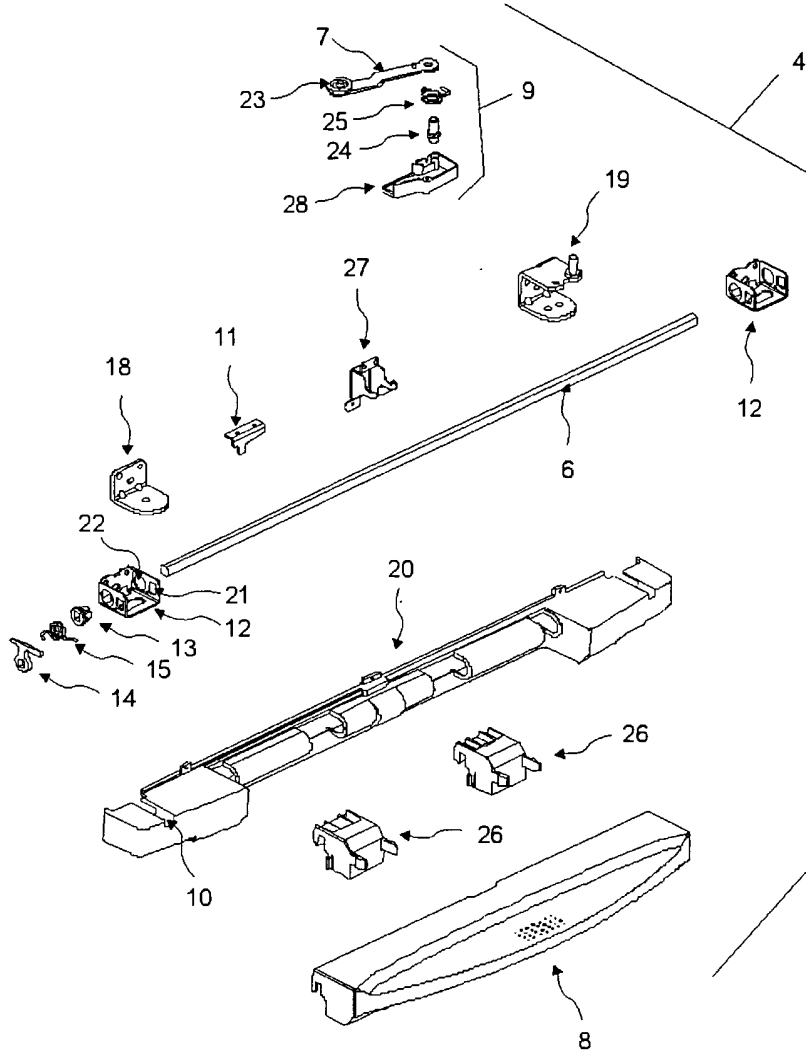
[Fig. 001]



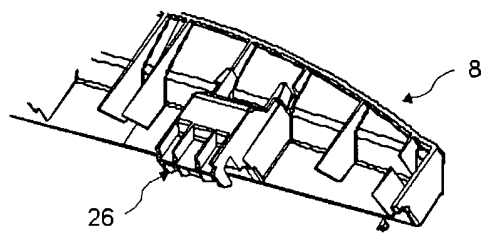
[Fig. 002]



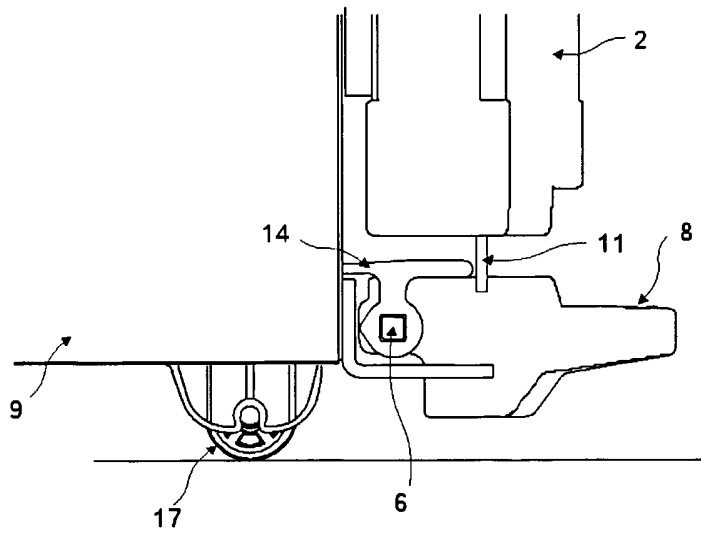
[Fig. 003]



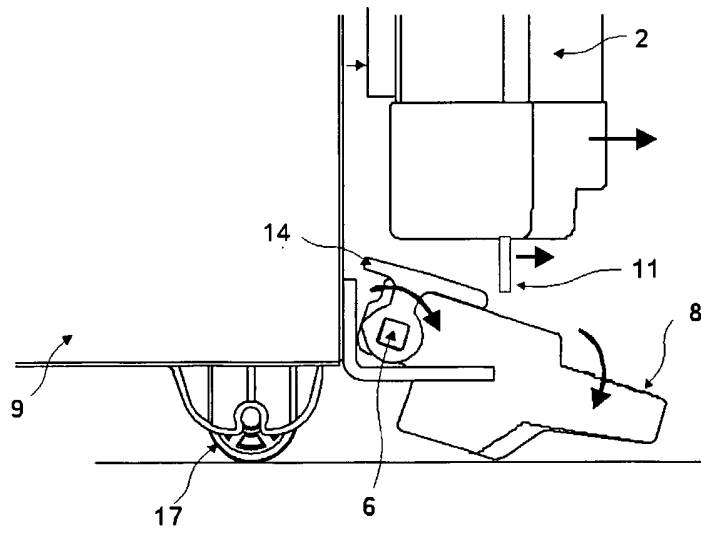
[Fig. 004]



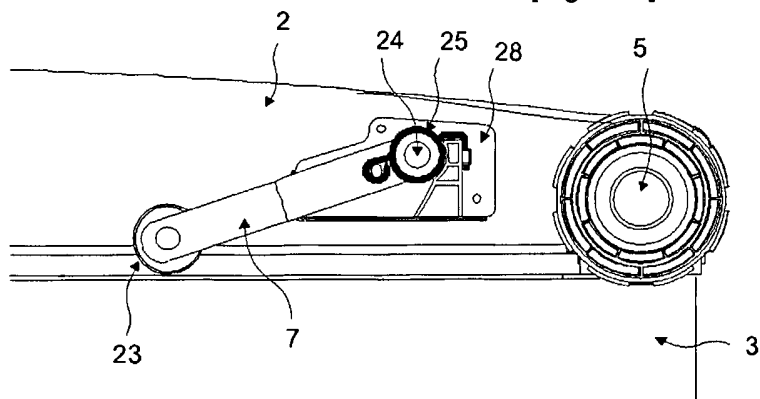
[Fig. 005]



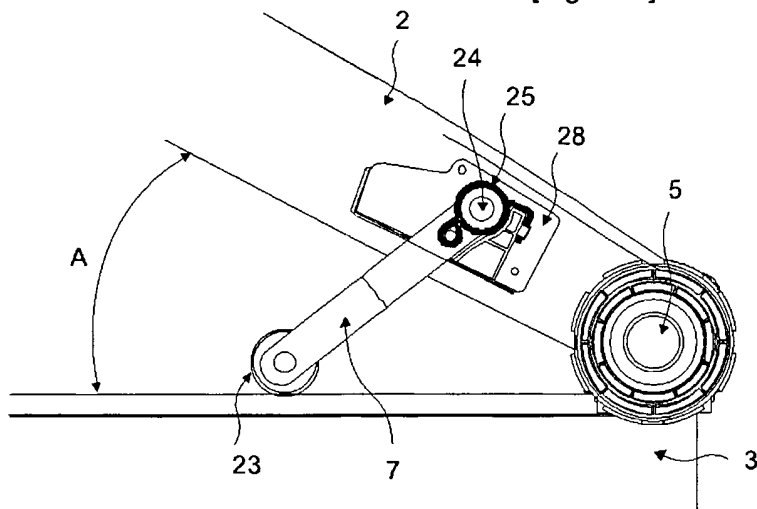
[Fig. 006]



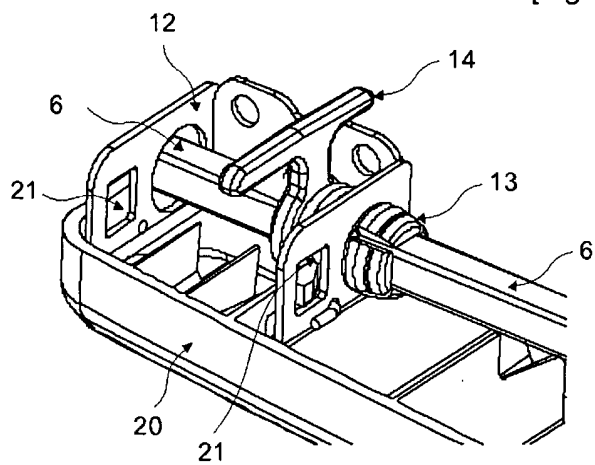
[Fig. 007]



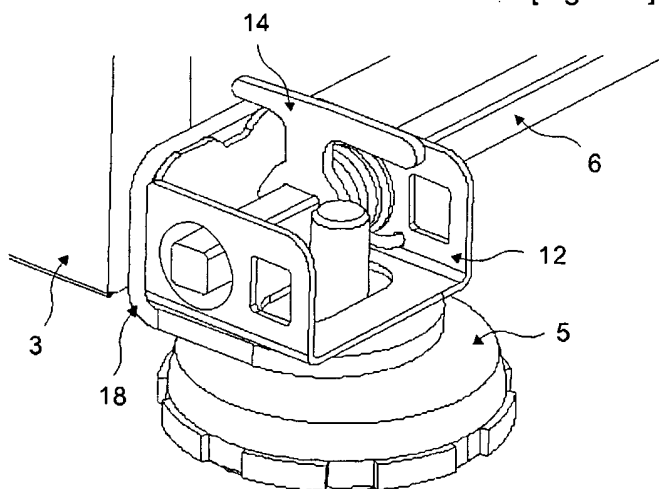
[Fig. 008]



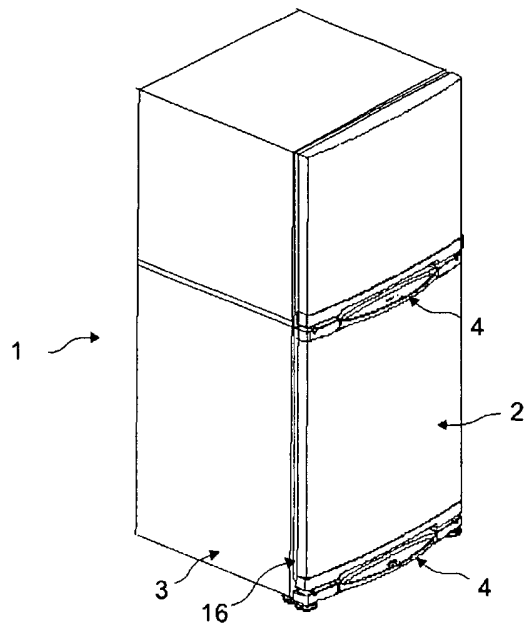
[Fig. 009]



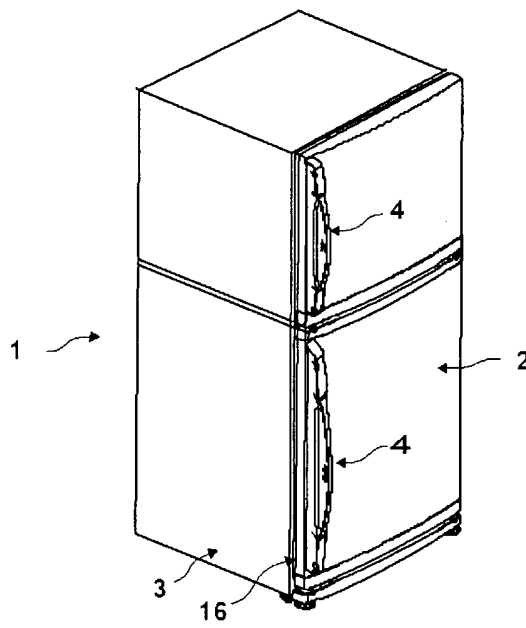
[Fig. 010]



[Fig. 011]



[Fig. 012]



INTERNATIONAL SEARCH REPORT

IB2005/052513

A. CLASSIFICATION OF SUBJECT MATTER
F25D23/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F25D E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 176 375 A (WHIRLPOOL CORPORATION) 30 January 2002 (2002-01-30) column 2, line 17 - column 3, line 36; figure 3 -----	1,3-5
X	US 4 911 508 A (TILLMAN ET AL) 27 March 1990 (1990-03-27) column 3, line 25 - column 4, line 27; figures 2,3 -----	1,2
Y	US 5 220 747 A (CHERRY ET AL) 22 June 1993 (1993-06-22) column 3, line 3 - column 4, line 17; figures 5,6 -----	6-9
Y	CH 665 538 A5 (FRANZ METTLER) 31 May 1988 (1988-05-31) page 3, column 2, line 11 - line 14; figure 1 -----	6,9
Y		7,8



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

7 November 2005

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29/11/2005

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