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(19) **United States**(12) **Patent Application Publication****Park et al.**(10) **Pub. No.: US 2008/0074019 A1**(43) **Pub. Date: Mar. 27, 2008**(54) **DRAWER TYPE DOOR AND REFRIGERATOR HAVING THE SAME**(75) Inventors: **Sung Cheul Park**, Gwangju (KR);
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Suwon-si (KR)(21) Appl. No.: **11/889,662**(22) Filed: **Aug. 15, 2007**(30) **Foreign Application Priority Data**

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A47B 88/04 (2006.01)
(52) **U.S. Cl.** 312/236; 312/348.4(57) **ABSTRACT**

Disclosed is a refrigerator having a plurality of drawer-type doors installed in a transverse direction in parallel to each other. The refrigerator includes a body provided at left and right portions thereof with a plurality of storage chambers which are aligned in parallel to each other to store materials therein, and a plurality of drawer-type doors installed in the storage chambers and capable of being moved forward or backward. A step difference adjusting device is provided to adjust installation positions of the drawer-type doors to reduce a step difference between adjacent drawer-type doors.

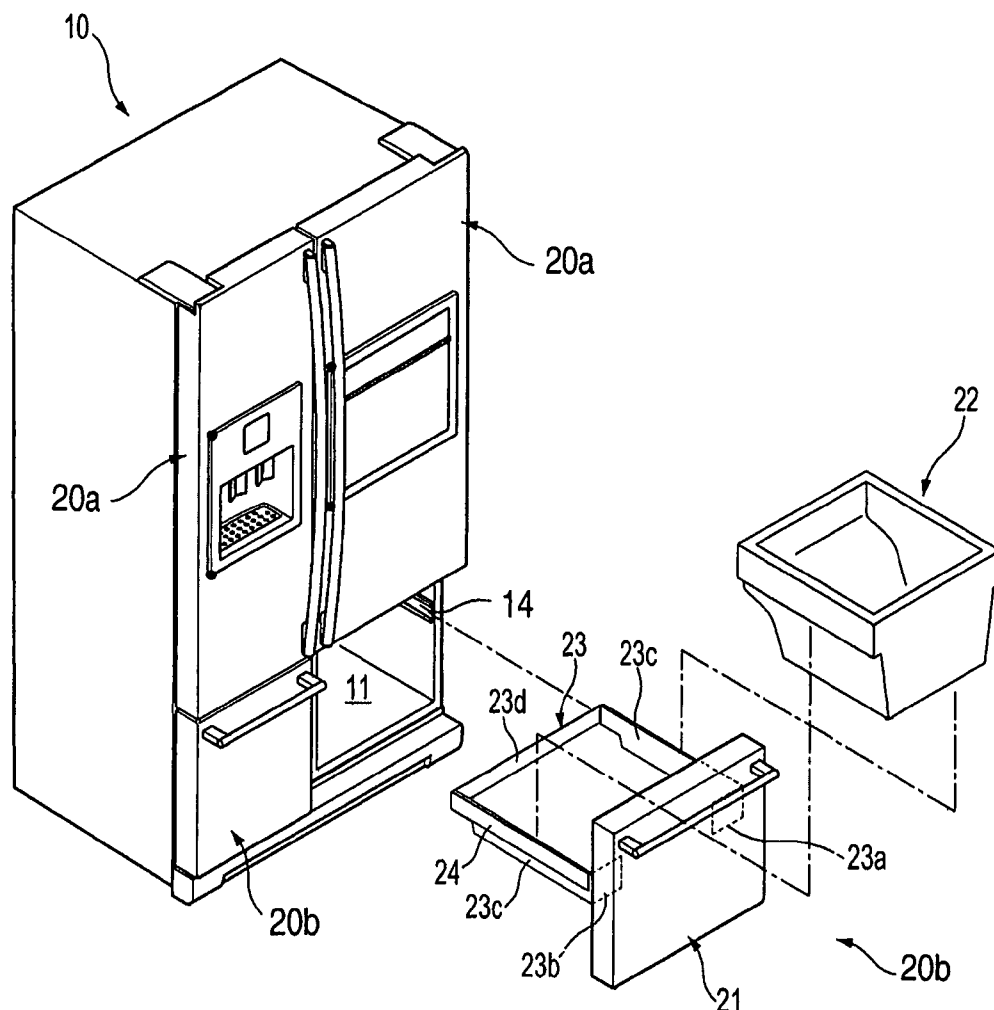


Fig.1

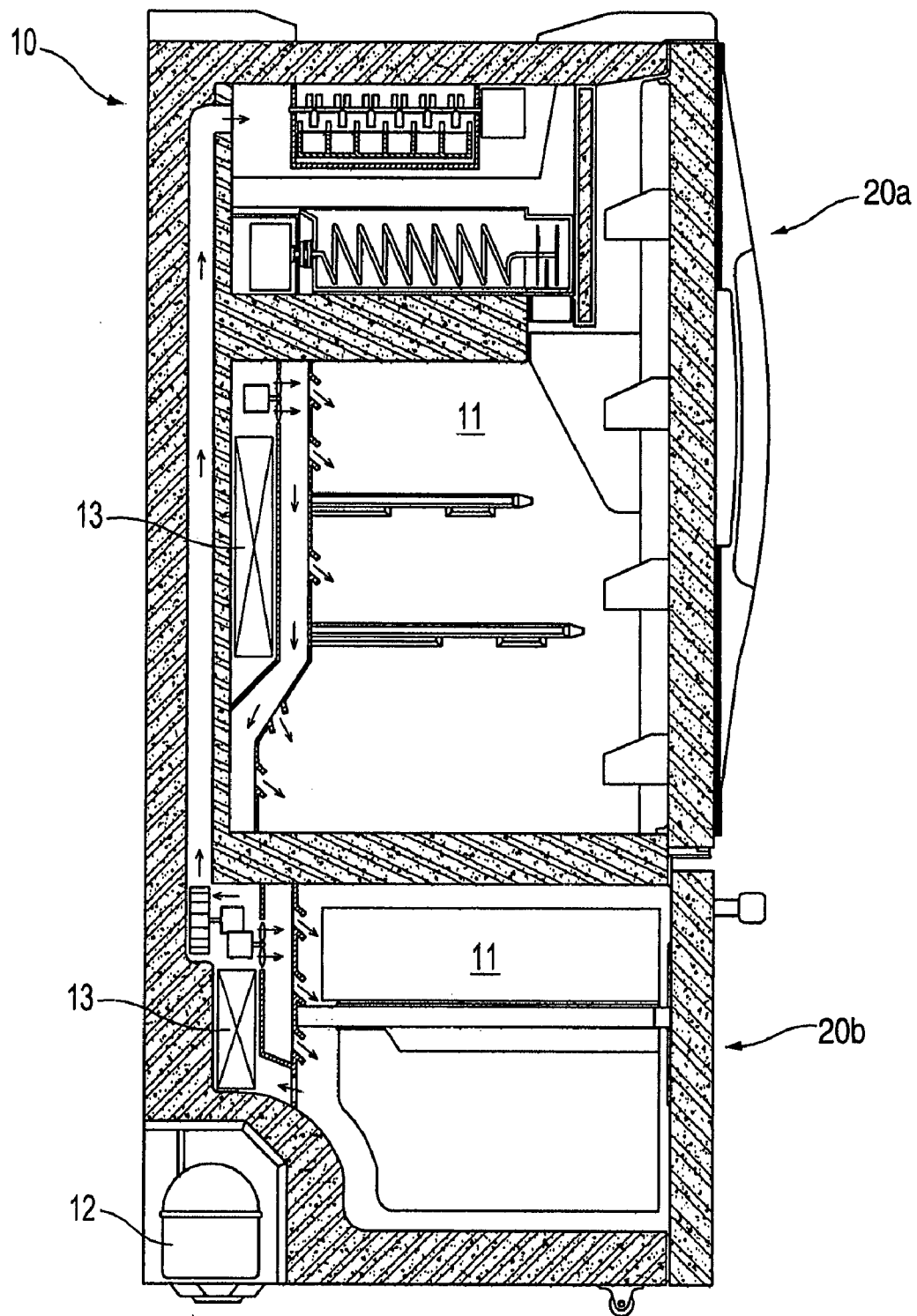


Fig.2

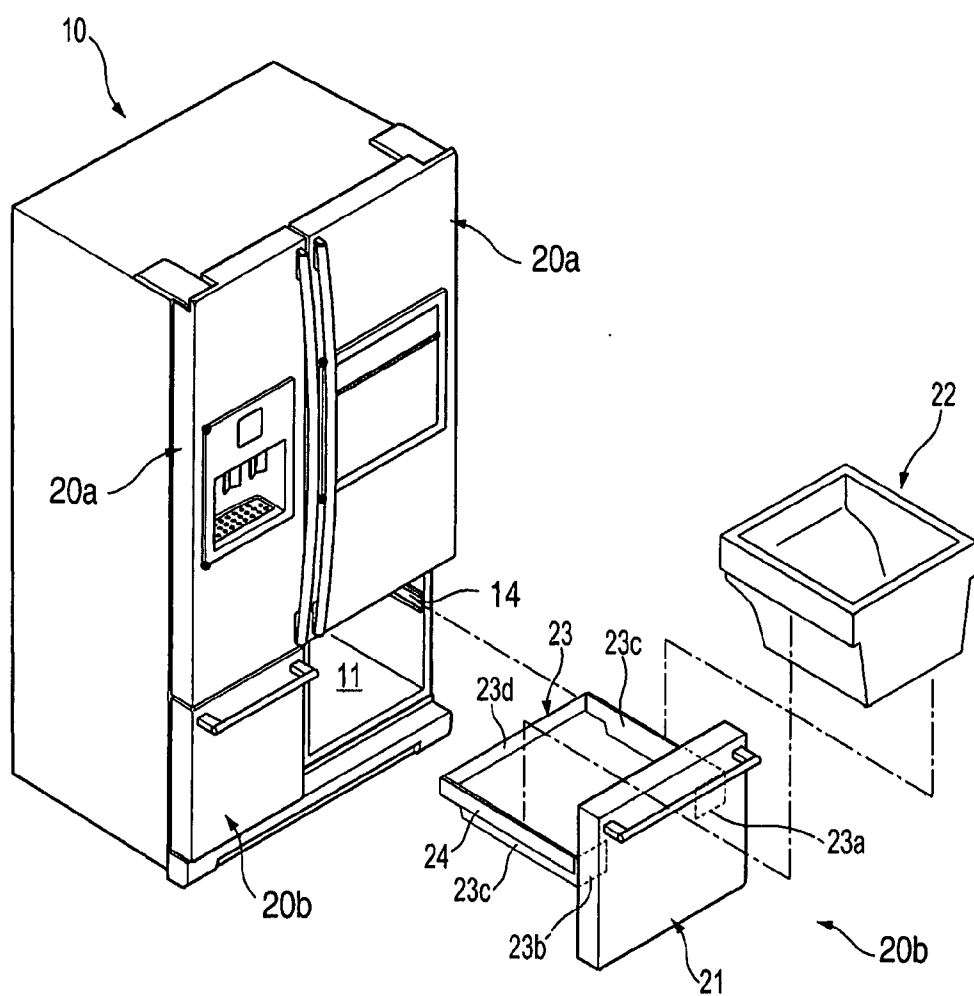


Fig.3

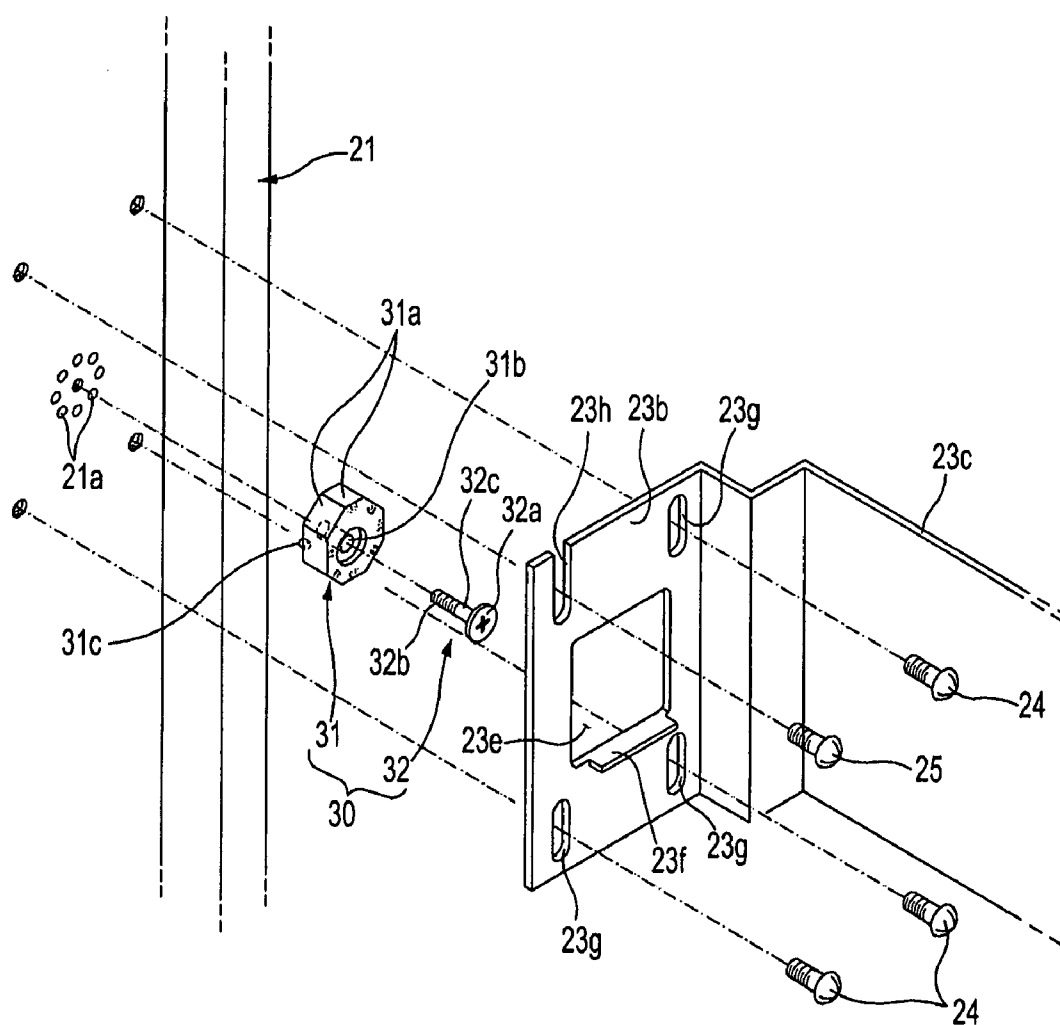


Fig.4

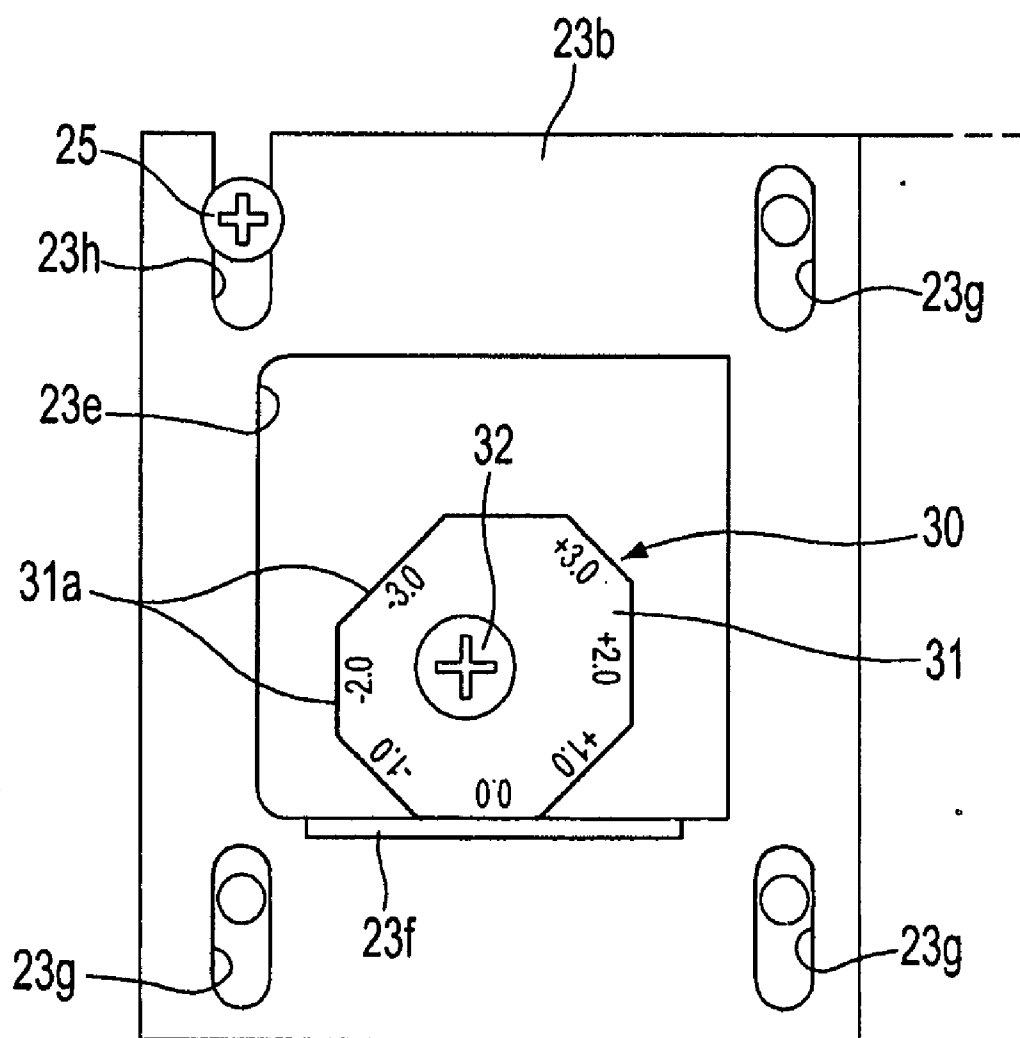


Fig.5

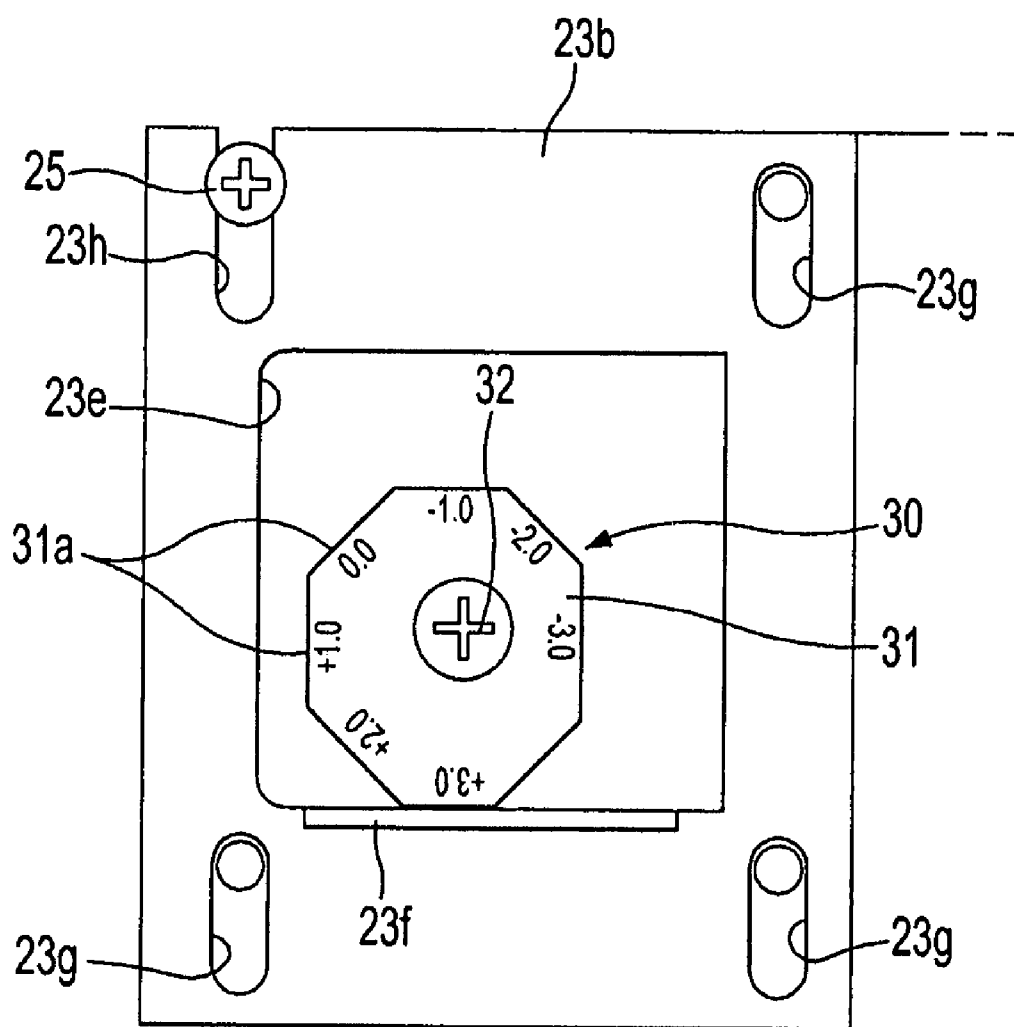


Fig.6

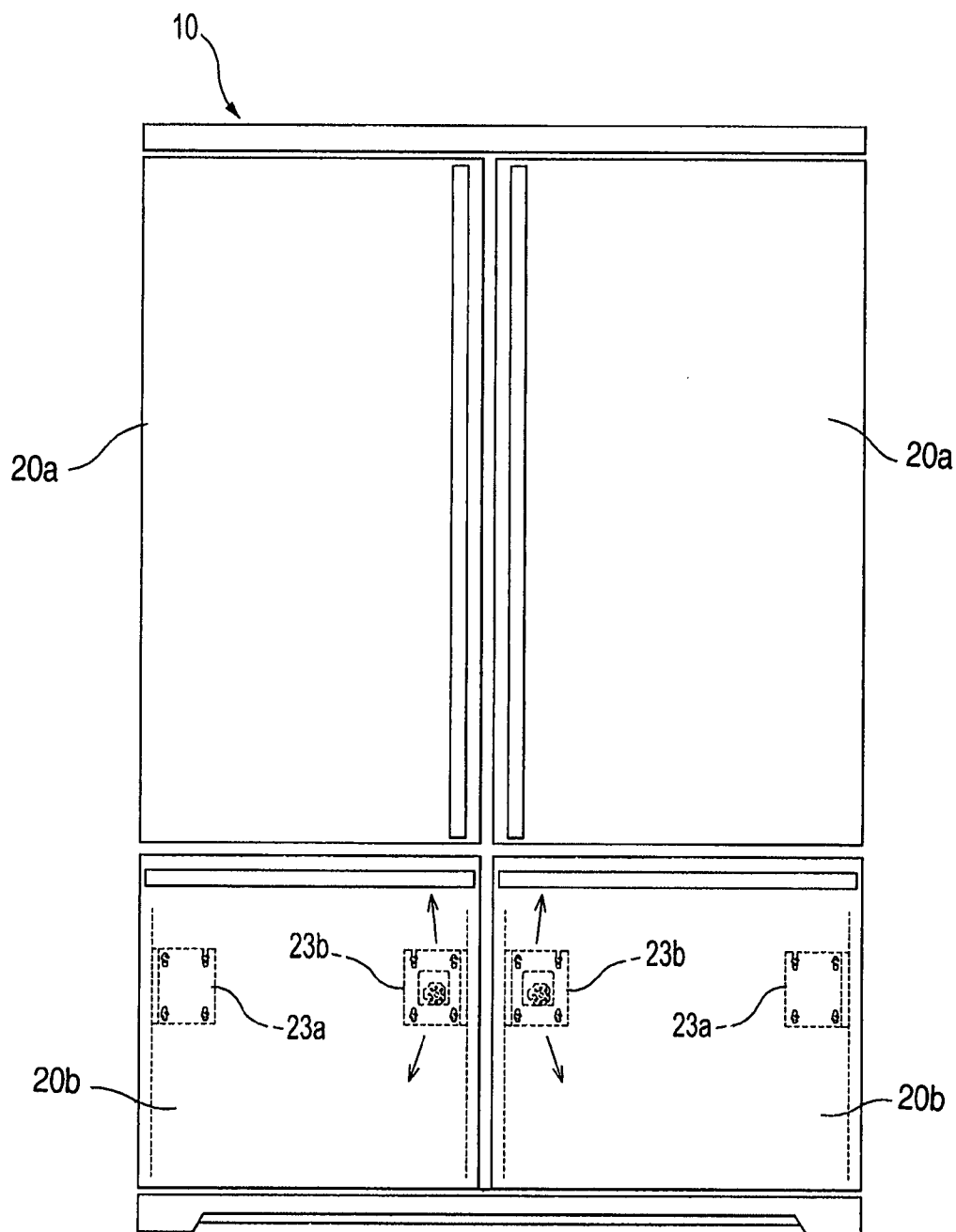


Fig.7

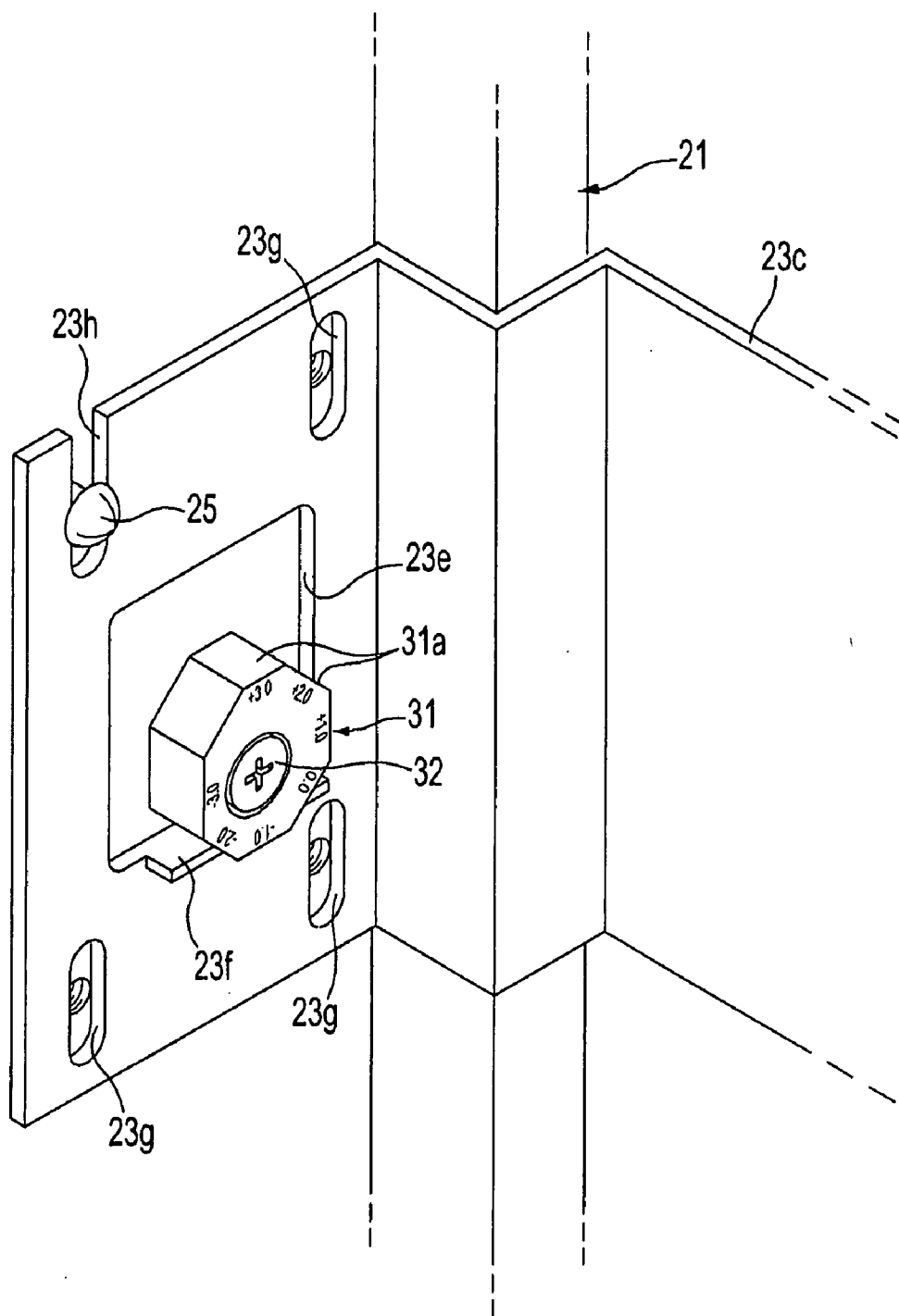
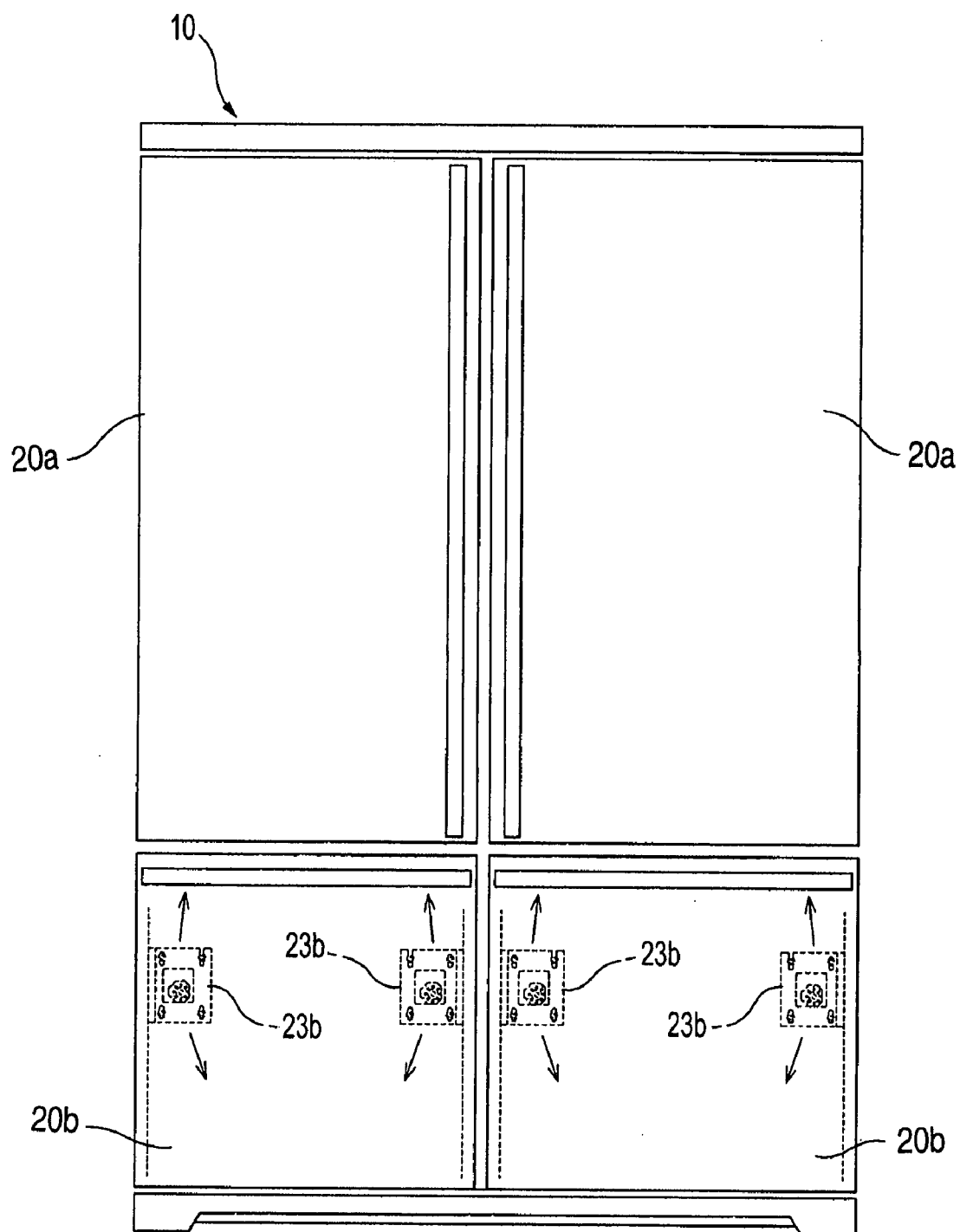


Fig.8



DRAWER TYPE DOOR AND REFRIGERATOR HAVING THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Patent Application No. 2006-91846, filed on Sep. 21, 2006, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND

[0002] 1. Field of the Invention

[0003] The present invention relates generally to a refrigerator, and more particularly to a refrigerator having a plurality of drawer-type doors installed in a transverse direction in parallel to each other.

[0004] 2. Description of the Related Art

[0005] In general, a refrigerator is an appliance that supplies cold air generated from an evaporator through a refrigeration cycle to storage chambers storing various foodstuffs so as to allow the foodstuffs to be kept in a fresh state for a long period of time.

[0006] Among the refrigerators, as disclosed in Korean Unexamined Patent Publication No. 10-2004-45808, there is provided a refrigerator including a drawer-type door, which is installed in a storage chamber and moved forward or backward so as to open or close the storage chamber. Recently, as the size of refrigerators has become enlarged, there has been provided a refrigerator equipped with a pair of drawer-type doors installed at left and right portions of the refrigerator in parallel to each other.

[0007] However, in the refrigerator equipped with the drawer-type doors, which are installed at left and right portions of the refrigerator in parallel with each other, a step difference is inevitably generated between two drawer-type doors installed in the storage chambers due to the process tolerance or the assembling tolerance. Such a step difference significantly degrades the external appearance of the product.

SUMMARY

[0008] Accordingly, the present invention has been made to solve the above-mentioned problem occurring in the prior art, and an object of the present invention is to provide a refrigerator capable of reducing a step difference generated between a pair of drawer-type doors installed at left and right portions of the refrigerator in parallel with each other.

[0009] Additional aspects and/or advantages will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the invention.

[0010] The foregoing and/or other aspects of the present invention are achieved by providing a refrigerator including a body provided at left and right portions thereof with a plurality of storage chambers which are aligned in parallel with respect to each other to store materials therein, a plurality of drawer-type doors installed in the storage chambers and capable of moving forward or backward, and a step difference adjusting device that adjusts installation positions of the drawer-type doors to reduce a step difference between adjacent drawer-type doors.

[0011] In addition, each drawer-type door includes a cover that covers a front side of one of the storage chambers so as

to close the storage chamber, a storage container which is opened upward to store the materials therein, and a support frame having a front end coupled with the cover so as to support the storage container installed thereon, and the step difference adjusting device adjusts an installation position of the support frame coupled with the cover in upward and downward directions.

[0012] The step difference adjusting device includes a step difference adjusting cam, which is rotatably installed on the cover and formed in a rotational direction thereof with a plurality of cam surfaces in which distances between a rotational center of the step difference adjusting cam and the cam surfaces are different from each other, and the support frame is coupled to the cover while being supported on one of the cam surfaces.

[0013] The step difference adjusting device further includes a cam installation screw rotatably coupling the step difference adjusting cam with the cover, the cam installation screw including a head section on which a rear surface of the step difference adjusting cam is supported, a male screw section provided at another side of the head section and formed with a male screw which is screw-coupled into the cover, and a hinge section having a circular sectional shape and being provided between the head section and the male screw section so as to rotatably install the step difference adjusting cam.

[0014] The step difference adjusting cam includes a support protrusion which extends in a forward direction to allow the step difference adjusting cam to be selectively rotated when the cam installation screw is partially released, and a rear surface of the cover includes a plurality of support holes formed in a circumferential direction and spaced apart from each other by a predetermined distance so as to support the support protrusion inserted into at least one of the support holes in a state in which the cam installation screw is completely screwed into the cover.

[0015] The support frame includes an installation section coupled with the cover and supported by one of the cam surfaces formed on the step difference adjusting cam, a pair of side support sections extending in a rearward direction from the installation section so as to support both sides of the storage container, and a rear support section connecting rear end portions of the side support sections to each other so as to support a rear surface of the storage container.

[0016] The installation section includes a through hole, through which the step difference adjusting cam is inserted, and a support rib extending from a portion adjacent to the through hole and being supported on one of the cam surfaces formed on the step difference adjusting cam.

[0017] In addition, a storage chamber rail is provided at both sides of the storage chamber to allow the drawer-type door to move in a forward direction or a backward direction, and door rails are provided in the side support sections, respectively, the door rails being installed on the storage chamber rails to move in a forward direction or a backward direction.

[0018] The installation section includes a fixing installation part fixedly installed on one side of a rear surface of the cover, and a variable installation part installed on the other side of the rear surface of the cover, the step difference adjusting device being installed on the variable installation part to change an installation position of the variable instal-

lation part in a longitudinal direction by rotating the variable installation part about and with respect to the fixing installation part.

[0019] The installation section is formed with a temporal assembling slot, longitudinally formed in the installation section, an upper portion of the temporal assembling slot being opened to allow the cover to be temporarily assembled with the support frame.

[0020] A temporal assembling screw is installed at a rear surface of the cover, a head section of the temporal assembling screw being spaced apart from the rear surface of the cover by a predetermined distance, the temporal assembling screw being coupled into the temporal assembling slot through an upper portion of the temporal assembling slot.

[0021] A coupling slot is formed in the installation section and a coupling screw is screw-coupled into the coupling slot, in which the coupling slot is prepared in a form of a longitudinal elongation slot.

[0022] The foregoing and/or other aspects are achieved by providing a drawer-type door installed in one of a plurality of storage chambers, aligned at left and right locations in parallel with respect to each other to store materials therein, and movable in a forward direction or a backward direction in the storage chambers, the drawer-type door including a cover covering a front side of one of the storage chambers to open and close the storage chamber, a storage container opening in an upward direction to store materials therein, a support frame having a front end coupled with the cover to support the storage container installed thereon, and a step difference adjusting device adjusting an installation position of the support frame coupled with the cover in upward and downward directions to reduce a step difference between adjacent drawer-type doors.

[0023] The step difference adjusting device includes a step difference adjusting cam rotatably installed on the cover and formed in a rotational direction thereof with a plurality of cam surfaces in which distances between a rotational center of the step difference adjusting cam and the cam surfaces are different from each other, and a cam installation screw rotatably coupling the step difference adjusting cam with the cover, and the support frame is coupled to the cover while being supported on one of the cam surfaces formed on the step difference adjusting cam.

[0024] The cam installation screw includes a head section on which a rear surface of the step difference adjusting cam is supported when the cam installation screw is coupled with the step difference adjusting cam, a male screw section provided at another side of the head section and formed with a male screw which is screw-coupled into the cover, and a hinge section having a circular sectional shape and being provided between the head section and the male screw section to rotatably install the step difference adjusting cam.

[0025] The step difference adjusting cam is provided with a support protrusion which extends in a forward direction from a side surface of the step difference adjusting cam to allow the step difference adjusting cam to be selectively rotated only when the cam installation screw is partially released, and a plurality of support holes are formed at a rear surface of the cover in a circumferential direction and are spaced apart from each other by a predetermined distance so as to support the support protrusion when the support protrusion is inserted into one of the support holes.

[0026] The support frame includes an installation section coupled with the cover and supported by one of the cam

surfaces formed on the step difference adjusting cam, a pair of side support sections extending in a rearward direction from the installation section to support both sides of the storage container, and a rear support section connecting rear end portions of the side support sections to each other to support a rear surface of the storage container.

[0027] The installation section includes a through hole, through which the step difference adjusting cam is inserted, and a support rib extending from a portion adjacent to the through hole and being supported on one of the cam surfaces formed in the step difference adjusting cam.

[0028] The installation section includes a fixing installation section fixedly installed on one side of the rear surface of the cover, and a variable installation section installed on the other side of the rear surface of the cover, the step difference adjusting device being installed on the variable installation section to change an installation position of the variable installation section in a longitudinal direction by rotating the variable installation part about and with respect to the fixing installation section.

[0029] The installation section is formed with a temporal assembling slot longitudinally formed in the installation section and an upper portion of the temporal assembling slot is opened to allow the cover to be temporarily assembled with the support frame, and a temporal assembling screw is installed at the rear surface of the cover, a head section of the temporal assembling screw being spaced apart from the rear surface of the cover by a predetermined distance, and being coupled into the temporal assembling slot through the upper portion of the temporal assembling slot.

[0030] The foregoing and/or other aspects are achieved by providing a drawer-type door installed in one of a plurality of storage chambers holding a storage container, the drawer-type door including a cover covering a front side of one of the storage chambers; a support frame coupled with the cover to support the storage container; and a step difference adjusting device adjusting an installation position of the support frame and concurrently adjusting the height of the cover.

[0031] The step difference adjusting device includes a cam having a plurality of cam surfaces. At least two of the cam surfaces vary in length such that the height of the cover can be increased or decreased according to the rotation of the cam onto a specific one of the cam surfaces with respect to the support frame.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] The above and other objects, features and advantages of the present invention will become more apparent and more readily appreciated from the following detailed description of the embodiments taken in conjunction with the accompanying drawings, in which:

[0033] FIG. 1 is a sectional view illustrating the schematic structure of a refrigerator equipped with drawer-type doors according to a first embodiment of the present invention;

[0034] FIG. 2 is a perspective view illustrating the refrigerator equipped with drawer-type doors according to the first embodiment of the present invention;

[0035] FIG. 3 is an exploded perspective view of a step difference adjusting device used for the refrigerator equipped with drawer-type doors according to the first embodiment of the present invention;

[0036] FIG. 4 is a view illustrating the operational state of the step difference adjusting device used for the refrigerator

equipped with drawer-type doors according to the first embodiment of the present invention;

[0037] FIG. 5 is a view illustrating the operational state of the step difference adjusting device used for the refrigerator equipped with drawer-type doors according to the first embodiment of the present invention;

[0038] FIG. 6 is a front view of the refrigerator equipped with drawer-type doors according to the first embodiment of the present invention;

[0039] FIG. 7 is a perspective view illustrating a support bracket temporarily assembled with a cover in the refrigerator equipped with drawer-type doors according to the first embodiment of the present invention; and

[0040] FIG. 8 is a front view illustrating a refrigerator equipped with drawer-type doors according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0041] Reference will now be made in detail to the embodiments, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below to explain the present invention by referring to the figures.

[0042] Hereinafter, exemplary embodiments of the present invention will be described with reference to the accompanying drawings.

[0043] As illustrated in FIG. 1, a refrigerator according to the present invention includes a box-shaped body 10 that is opened forward and has a plurality of storage chambers 11 in which stored goods, such as foodstuff, are stored at a low temperature, a plurality of doors 20a and 20b that are hinged and pivoted on one side of the body 10 and open and close the storage chambers 11. The body 10 is provided therein with refrigerating cycle components, such as a compressor 12, a condenser (not shown), an evaporator 13, and an expansion valve (not shown), thereby allowing cold air generated from the evaporator 13 to be supplied to the storage chambers 11.

[0044] The storage chambers 11 are provided in the body 10 and are used as a cooling chamber to store the stored goods in a cooled state, a freezing chamber store the stored goods in a frozen state, etc. In the first embodiment, the body 10 is partitioned into a total of four storage chambers 11, two of which are located at an upper portion of the body, and two of which are located at a lower portion of the body. As illustrated in FIG. 2, the two storage chambers 11 located at the upper portion of the body have a pair of rotary doors 20a, each of which is hinged and rotated on one side of the body 10, and opens and closes the corresponding storage chambers 11. The two storage chambers 11 located at the lower portion of the body have a pair of drawer type doors 20b, each of which can be installed to move forward and backward in the corresponding storage chamber 11, and store the stored goods.

[0045] Among these components, each drawer type door 20b includes a cover 21 that covers a front side of the open storage chamber 11, a storage container 22 that is installed on a rear side of the cover 21, has the shape of an upwardly opened box and contains the stored goods, and a support bracket 23 that is installed at the rear surface of the cover 21 at a leading end thereof so as to guide and support the storage container 22. The support bracket 23 includes instal-

lation sections 23a and 23b installed at the rear surface of the cover 21, a pair of side supports 23c extending backwards from the installation sections 23a and 23b and supporting sides of the storage container 22, and a rear support 23d connecting the two side supports 23c and supporting a rear surface of the storage container 22. In the first embodiment, the pair of installation sections 23a and 23b are adapted to be provided to the support bracket 23 so as to be installed on left and right sides of the rear surface of the cover 21, and the side supports 23c are adapted to extend from the installation sections 23a and 23b, respectively.

[0046] The opposite inner sidewalls of the storage chambers 11 are provided with a pair of storage chamber rails 14, which extend along a length of sides of the storage chambers 11 so as to allow the drawer type door 20b to be installed to move forward and backward. The opposite sides of the drawer type door 20b are provided with a pair of door rails 24, which extend along a length of sides of the drawer type door 20b and are fitted onto the storage chamber rails 14 so as to move forward and backward. In the first embodiment, the door rails 24 are installed on the outer sides of the side supports 23c respectively.

[0047] Further, the refrigerator according to the present invention is provided with a step difference adjusting unit 30, which adjusts the installation positions of the two drawer type doors 20b, which are installed to move forward and backward in the two lower storage chambers 11, and thus reduces a step difference generated between the neighboring drawer type doors 20b to further improve beauty of the refrigerator, as illustrated in FIG. 3.

[0048] The step difference adjusting unit 30 includes a step difference adjusting cam 31, which is rotatably installed at the rear surface of each cover 21, and has a plurality of cam surfaces 31a formed in a rotating direction thereof at a different distance from the center of rotation thereof. In the state in which the step difference adjusting cam 31 is rotated, and thus any one of the cam surfaces 31a is supported on any one of the installation sections 23a and 23b, the installation sections 23a and 23b are coupled with the cover 21. Thereby, the installation position of the cover 21 can be varied in an upward and downward direction, and thus the step difference between the neighboring drawer type doors 20b can be reduced.

[0049] In the first embodiment, as illustrated in FIGS. 4 and 5, when the step difference adjusting cam 31 is rotated in a clockwise direction adopting the cam surface 31a indicated by "0" as a reference surface, a height of the cover 21 is increased in a range from 1 mm to 3 mm by 1 mm. In contrast, when the step difference adjusting cam 31 is rotated in a counterclockwise direction, the height of the cover 21 is decreased in a range from 1 mm to 3 mm by 1 mm.

[0050] Further, as illustrated in FIG. 6, one 23a of the installation sections 23a and 23b in this embodiment is a fixing installation section that is fixedly coupled on one side of the rear surface of the cover 21, and the other 23b is a variable installation section that is fixedly coupled on the other side of the rear surface of the cover 21 and is fitted with the step difference adjusting unit 30 such that the installation position thereof can be varied in an upward and downward direction by the step difference adjusting unit 30. The variable installation section 23b rotates about and with respect to the fixing installation section 23a by the step difference adjusting unit 30, and then is supported and fixed after the upward or downward movement.

[0051] For the installation sections 23a and 23b, the variable installation section 23b on which the step difference adjusting unit 30 is installed is provided with a through hole 23e, through which the step difference adjusting cam 31 passes to protrude backwards, as illustrated in FIG. 3. The through hole 23e is provided with a support rib 23f, which extends backwards and on which any one of the cam surfaces 31a of the step difference adjusting cam 31 is supported. Any one of the installation sections 23a and 23b can be stably supported on the cam surface 31a through the support rib 23f.

[0052] Further, the step difference adjusting unit 30 is provided with a cam installation screw 32, which allows the step difference adjusting cam 31 to be rotatably installed on the cover 21. The cam installation screw 32 includes a head section 32a on which the rear surface of the step difference adjusting cam 31 is supported, a male screw section 32b provided at the other side of the head section 32a with a male screw, the male screw section 32b being screwed into the rear surface of the cover 21, and a hinge section 32c having a circular sectional shape between the head section 32a and the male screw section 32b such that the step difference adjusting cam 31 is rotatably installed. The step difference adjusting cam 31 is provided with a hinge hole 31b into which the cam installation screw 32 is fitted.

[0053] Further, the step difference adjusting unit 30 is adapted to selectively rotate only when the cam installation screw 32 is partly unscrewed. To this end, the step difference adjusting cam 31 is provided with a support protrusion 31c, which extends in a forward direction so as to allow the step difference adjusting cam 31 to be selectively rotated only when the cam installation screw 32 is partially released, and a plurality of support holes 21a are formed at a rear surface of the cover 21 in a circumferential direction while being spaced apart from each other by a predetermined distance so as to support the support protrusion 31c inserted into any of the support holes 21a.

[0054] Thus, in the state in which the cam installation screw 32 is completely screwed into the cover 21 with the step difference adjusting cam 31 fitted between the head section 32a of the cam installation screw 32 and the rear surface of the cover 21, the support protrusion 31c is maintained to be inserted in the support hole 21a, and thus the step difference adjusting cam 31 cannot be rotated. In the state in which the cam installation screw is partially released, the step difference adjusting cam 31 moves backwards at a predetermined interval, and thus the support protrusion 31c can be separated from any of the support holes 21a. The step difference adjusting cam 31 can be rotated.

[0055] The installation sections 23a and 23b are adapted to be fixed to the cover 21 through coupling screws 24, which pass through the installation sections 23a and 23b to be screwed into the cover 21. The installation sections 23a and 23b are provided with coupling slots 23g, through which the coupling screws 24 pass to be screwed. At this time, the coupling slots 23g have the shape of a long hole in a longitudinal direction such that the coupling screws 24 pass through the coupling slots 23g to be screwed into the cover 21 in the state in which the installation sections 23a and 23b move up or down by the step difference adjusting unit 30.

[0056] Further, in order to allow the cover 21 to be coupled with the support bracket 23 in a temporally assembled state, the installation sections 23a and 23b of the

support bracket 23 are provided with a temporal assembly slot 23h, which is opened upwards to allow the cover 21 to be assembled temporally with the support bracket 23. In addition, a temporal assembling screw 25 is installed at the rear surface of the cover 21, in which a head section of the temporal assembling screw 25 is spaced apart from the rear surface of the cover 21 by a predetermined distance, and is coupled into the temporal assembling slot 23h through an upper portion of the temporal assembling slot 23h.

[0057] Thus, as illustrated in FIG. 7, in the state in which the cover 21 is temporally assembled with the support bracket 23 through the temporal assembling slot 23h and the temporal assembling screw 25, the coupling screws 24 pass through the coupling slots 23g to be fixed to the cover 21. Thereby, the cover 21 can be easily fixed to the support bracket 23. Further, after the coupling screws 24 are completely screwed, the temporal assembling screw 25 is fully screwed into the cover 21. As a result, the coupling of the cover 21 and the support bracket 23 can be more stably maintained through the temporal assembling screw 25.

[0058] According to the present embodiment, the fixing installation section 23a is coupled to one side of the rear surface of the cover 21 and the variable installation section 23b, which is moved upward and downward by the step difference adjusting device 30, is coupled to the other side of the rear surface of the cover 21. Thus, the variable installation section 23b can be moved upward and downward while being rotated about and with respect to the fixing installation section 23a by the step difference adjusting device 30, so that the step difference between adjacent drawer-type doors 20b can be adjusted. However, the present embodiment is not limited thereto. For instance, as shown in FIG. 8 in a second embodiment, both of the installation sections provided at the rear surface of the cover 21 can be prepared in the form of variable installation sections 23b equipped with the step difference adjusting device 30.

[0059] As described above, the refrigerator according to the present embodiments includes the step difference adjusting device capable of changing the installation position of the support frame, which is coupled to the cover through the step difference adjusting member. Thus, the installation height of the cover can be adjusted, so that the step difference between adjacent drawer-type doors can be reduced.

[0060] Although a few embodiments have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

What is claimed is:

1. A refrigerator, comprising:

- a body provided at left and right portions thereof with a plurality of storage chambers which are aligned in parallel with respect to each other to store materials therein;
- a plurality of drawer-type doors installed in the storage chambers capable of moving forward or backward; and
- a step difference adjusting device that adjusts installation positions of the drawer-type doors to reduce a step difference between adjacent drawer-type doors.

2. The refrigerator according to claim 1, wherein each drawer-type door includes a cover that covers a front side of one of the storage chambers so as to close the storage chamber, a storage container which is opened upward to

store the materials therein, and a support frame having a front end coupled with the cover so as to support the storage container installed thereon, and wherein the step difference adjusting device adjusts an installation position of the support frame coupled with the cover in upward and downward directions.

3. The refrigerator according to claim 2, the step difference adjusting device comprising a step difference adjusting cam, which is rotatably installed on the cover and formed in a rotational direction thereof with a plurality of cam surfaces in which distances between a rotational center of the step difference adjusting cam and the cam surfaces are different from each other, the support frame being coupled to the cover while being supported on one of the cam surfaces.

4. The refrigerator according to claim 3, the step difference adjusting device further comprising a cam installation screw rotatably coupling the step difference adjusting cam with the cover, the cam installation screw including a head section on which a rear surface of the step difference adjusting cam is supported, a male screw section provided at another side of the head section and formed with a male screw which is screw-coupled into the cover, and a hinge section having a circular sectional shape and being provided between the head section and the male screw section so as to rotatably install the step difference adjusting cam.

5. The refrigerator according to claim 4, wherein the step difference adjusting cam includes a support protrusion which extends in a forward direction to allow the step difference adjusting cam to be selectively rotated when the cam installation screw is partially released, and a rear surface of the cover includes a plurality of support holes formed in a circumferential direction and spaced apart from each other by a predetermined distance so as to support the support protrusion inserted into at least one of the support holes in a state in which the cam installation screw is completely screwed into the cover.

6. The refrigerator according to claim 3, wherein the support frame comprises an installation section coupled with the cover and supported by one of the cam surfaces formed on the step difference adjusting cam, a pair of side support sections extending in a rearward direction from the installation section so as to support both sides of the storage container, and a rear support section connecting rear end portions of the side support sections to each other so as to support a rear surface of the storage container.

7. The refrigerator according to claim 6, wherein the installation section includes a through hole, through which the step difference adjusting cam is inserted, and a support rib extending from a portion adjacent to the through hole and being supported on one of the cam surfaces formed on the step difference adjusting cam.

8. The refrigerator according to claim 6, wherein a storage chamber rail is provided at both sides of the storage chamber to allow the drawer-type door to move in a forward direction or a backward direction, and door rails are provided in the side support sections, respectively, the door rails being installed on the storage chamber rails to move in a forward direction or a backward direction.

9. The refrigerator according to claim 6, wherein the installation section includes a fixing installation part fixedly installed on one side of a rear surface of the cover, and a variable installation part installed on the other side of the rear surface of the cover, the step difference adjusting device being installed on the variable installation part to change an

installation position of the variable installation part in a longitudinal direction by rotating the variable installation part about and with respect to the fixing installation part.

10. The refrigerator according to claim 6, wherein the installation section is formed with a temporal assembling slot longitudinally formed in the installation section, an upper portion of the temporal assembling slot being opened to allow the cover to be temporarily assembled with the support frame.

11. The refrigerator according to claim 10, wherein a temporal assembling screw is installed at a rear surface of the cover, a head section of the temporal assembling screw being spaced apart from the rear surface of the cover by a predetermined distance, the temporal assembling screw being coupled into the temporal assembling slot through an upper portion of the temporal assembling slot.

12. The refrigerator according to claim 6, wherein a coupling slot is formed in the installation section and a coupling screw is screw-coupled into the coupling slot, in which the coupling slot is prepared in a form of a longitudinal elongation slot.

13. A drawer-type door installed in one of a plurality of storage chambers aligned at left and right locations in parallel with respect to each other to store materials therein, and movable in a forward direction or a backward direction in the storage chambers, the drawer-type door comprising:

- a cover covering a front side of one of the storage chambers to open and close the storage chamber;
- a storage container opening in an upward direction to store materials therein, a support frame having a front end coupled with the cover to support the storage container installed thereon, and
- a step difference adjusting device adjusting an installation position of the support frame coupled with the cover in upward and downward directions to reduce a step difference between adjacent drawer-type doors.

14. The drawer-type door as claimed in claim 13, wherein the step difference adjusting device includes a step difference adjusting cam rotatably installed on the cover and formed in a rotational direction thereof with a plurality of cam surfaces in which distances between a rotational center of the step difference adjusting cam and the cam surfaces are different from each other, and a cam installation screw rotatably coupling the step difference adjusting cam with the cover, and

wherein the support frame is coupled to the cover while being supported on one of the cam surfaces formed on the step difference adjusting cam.

15. The drawer-type door as claimed in claim 14, wherein the cam installation screw includes a head section on which a rear surface of the step difference adjusting cam is supported when the cam installation screw is coupled with the step difference adjusting cam, a male screw section provided at another side of the head section and formed with a male screw which is screw-coupled into the cover, and a hinge section having a circular sectional shape and being provided between the head section and the male screw section to rotatably install the step difference adjusting cam.

16. The drawer-type door as claimed in claim 14, wherein the step difference adjusting cam is provided with a support protrusion which extends in a forward direction from a side surface of the step difference adjusting cam to allow the step difference adjusting cam to be selectively rotated only when the cam installation screw is partially released, and a plu-

rality of support holes are formed at a rear surface of the cover in a circumferential direction and are spaced apart from each other by a predetermined distance to support the support protrusion when the support protrusion is inserted into one of the support holes.

17. The drawer-type door as claimed in claim **14**, wherein the support frame includes an installation section coupled with the cover and supported by one of the cam surfaces formed on the step difference adjusting cam, a pair of side support sections extending in a rearward direction from the installation section to support both sides of the storage container, and a rear support section connecting rear end portions of the side support sections to each other to support a rear surface of the storage container.

18. The drawer-type door as claimed in claim **17**, wherein the installation section includes a through hole through which the step difference adjusting cam is inserted, and a support rib extending from a portion adjacent to the through hole and being supported on one of the cam surfaces formed in the step difference adjusting cam.

19. The drawer-type door as claimed in claim **17**, wherein the installation section includes a fixing installation section fixedly installed on one side of the rear surface of the cover, and a variable installation section installed on the other side of the rear surface of the cover, the step difference adjusting device being installed on the variable installation section to change an installation position of the variable installation section in a longitudinal direction by rotating the variable installation part about and with respect to the fixing installation part.

20. The drawer-type door as claimed in claim **17**, wherein the installation section is formed with a temporal assembling slot longitudinally formed in the installation section and an

upper portion of the temporal assembling slot is opened to allow the cover to be temporarily assembled with the support frame, and a temporal assembling screw is installed at the rear surface of the cover, a head section of the temporal assembling screw being spaced apart from the rear surface of the cover by a predetermined distance, and being coupled into the temporal assembling slot through the upper portion of the temporal assembling slot.

21. The drawer-type door as claimed in claim **17**, wherein a coupling slot is formed in the installation section and a coupling screw is screw-coupled into the coupling slot, the coupling slot being formed as a longitudinal elongation hole.

22. A drawer-type door installed in one of a plurality of storage chambers holding a storage container, the drawer-type door comprising:

- a cover covering a front side of one of the storage chambers;
- a support frame coupled with the cover to support the storage container; and
- a step difference adjusting device adjusting an installation position of the support frame and concurrently adjusting the height of the cover.

23. The drawer-type door according to claim **22**, wherein the step difference adjusting device includes a cam having a plurality of cam surfaces.

24. The drawer-type door according to claim **23**, wherein at least two of the cam surfaces vary in length such that the height of the cover can be increased or decreased according to the rotation of the cam onto a specific one of the cam surfaces with respect to the support frame.

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