

(12) STANDARD PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 2015351339 B2**

(54) Title
Refrigerator

(51) International Patent Classification(s)
F25D 23/00 (2006.01)

(21) Application No: **2015351339**

(22) Date of Filing: **2015.10.01**

(87) WIPO No: **WO16/080086**

(30) Priority Data

(31) Number
2014-236394

(32) Date
2014.11.21

(33) Country
JP

(43) Publication Date: **2016.05.26**

(44) Accepted Journal Date: **2017.12.21**

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(56) Related Art
JP 2008069999 A

(12) 特許協力条約に基づいて公開された国際出願

(19) 世界知的所有権機関
国際事務局

(43) 国際公開日
2016年5月26日(26.05.2016)



(10) 国際公開番号

WO 2016/080086 A1

- (51) 国際特許分類:
F25D 23/00 (2006.01)
- (21) 国際出願番号: PCT/JP2015/077952
- (22) 国際出願日: 2015年10月1日(01.10.2015)
- (25) 国際出願の言語: 日本語
- (26) 国際公開の言語: 日本語
- (30) 優先権データ:
特願 2014-236394 2014年11月21日(21.11.2014) JP
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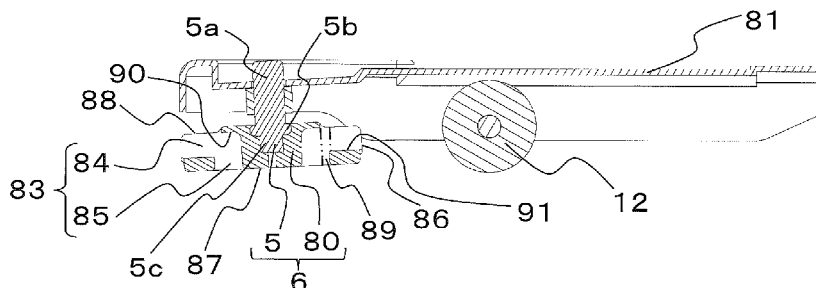
- (81) 指定国 (表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) 指定国 (表示のない限り、全ての種類の広域保護が可能): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), ユーラシア (AM, AZ, BY, KG, KZ, RU, TJ, TM), ヨーロッパ (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

添付公開書類:

— 国際調査報告 (条約第21条(3))

(54) Title: REFRIGERATOR

(54) 発明の名称: 冷蔵庫



(57) Abstract: The purpose of the present invention is to provide a refrigerator provided with adjustment legs such that the height thereof can be easily adjusted without decreasing the volume of the refrigerator. The refrigerator is provided with: a refrigerator housing which is open on the front side; and adjustment legs attached to the bottom surface of the refrigerator housing. Each adjustment leg is provided with an adjustment leg main body and a screw part that is mounted perpendicularly to the adjustment leg main body and screws into the bottom surface of the refrigerator housing. The adjustment leg main body is provided with tool engagement sections opening from the outer peripheral portion of the adjustment leg main body toward the center portion side such that the end edges of the openings are near the screw part in a planar view.

(57) 要約: 冷蔵庫の内容積を減少させることなく容易に高さ調節が可能な調節足を備えた冷蔵庫を提供する。冷蔵庫は、前面が開口した冷蔵庫筐体と、冷蔵庫筐体の底面に取り付けられる調節足とを備える。調節足は、調節足本体と、調節足本体に垂直に設けられ、冷蔵庫筐体の底面に螺合するねじ部と、を備える。調節足本体は、調節足本体の外周部から中央部側に向かって開口して設けられ、該開口の終端が、平面視において、ねじ部の手前側となる工具係合部を備えたことを特徴とする。



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DESCRIPTION

Title of Invention

REFRIGERATOR

Technical Field

5 [0001]

The present invention relates to a refrigerator and particularly to a configuration of an adjusting foot whose height is adjustable.

Background Art

[0002]

10 In general, refrigerators have adjusting feet at the bottom faces so that the refrigerator is kept horizontal on the installation surface. An adjusting foot includes an adjusting-foot body and a screw portion and is attached to a refrigerator with the screw portion screwed into the bottom face of the refrigerator. Such a configuration allows the adjusting foot to be rotatable to adjust the height of the
15 adjusting foot extending from the bottom face of the refrigerator. The height is adjusted after the refrigerator is installed. That is, the height is adjusted while the adjusting feet bear the weight of the refrigerator and the bottom parts of the adjusting feet are in contact with the installation surface.

In a known refrigerator, the adjusting-foot body has a through hole or a
20 through groove, into which a long narrow tool such as a screwdriver is inserted, the screwdriver is fitted into the hole or the groove, and a force is applied to a grip of the tool, to adjust the height. Hence, the force required for rotating the adjusting foot can be made smaller than that in a case of rotating the adjusting-foot body by grabbing the outer periphery of the adjusting-foot body with a hand, for example.
25 Thus, the height can be easily adjusted (see Patent Literature 1, for example).

Citation List

Patent Literature

[0003]

2015351339 03 Mar 2017

Patent Literature 1: Japanese Unexamined Patent Application Publication
No. 4-320783 (pages 3 and 4)

[0003A]

Reference to any prior art in the specification is not, and should not be taken
5 as, an acknowledgment or any form of suggestion that this prior art forms part of
the common general knowledge in any jurisdiction or that this prior art could
reasonably be expected to be understood, regarded as relevant and/or combined
with other pieces of prior art by a person skilled in the art.

[0003B]

10 As used herein, except where the context requires otherwise, the term
"comprise" and variations of the term, such as "comprising", "comprises" and
"comprised", are not intended to exclude further additives, components, integers or
steps.

[0004]

15 In the refrigerator proposed by Patent Literature 1, the adjusting foot is
provided at the bottom face of the refrigerator housing, and the adjusting-foot body
has the through hole or the through groove. Consequently, the adjusting-foot body
needs to be high enough. The bottom face of the refrigerator housing needs to be
raised accordingly so that the adjusting foot can be provided. To thermally
20 insulate the storage compartment in the refrigerator from the outside, the bottom
face of the refrigerator housing and the floor surface of the storage compartment
need to be at a certain distance from each other. When the bottom face of the
refrigerator housing is raised, the floor surface of the storage compartment in the
refrigerator inevitably needs to be raised correspondingly for thermal insulation,
25 leading to a loss in the capacity of the refrigerator.

Moreover, in recent years, there have been increasing demands for
refrigerators having larger capacities. Such demands increase the sizes and

weights of refrigerators. To increase the capacity of a refrigerator, an adjusting foot including an adjusting-foot body having a reduced height and easily rotatable in adjusting the height is required, in view of the lowered floor of the refrigerator housing and the weight of the huge refrigerator.

5 [0005]

The present invention is made in light of the above problem. Disclosed within the following is a refrigerator including an adjusting foot whose height is easily adjustable while the capacity of the refrigerator is not reduced.

[0006]

10 A refrigerator according to an embodiment of the present invention comprises a refrigerator housing including a front face having an opening, and an adjusting foot attached to a bottom face of the refrigerator housing. The adjusting foot includes an adjusting-foot body, and a screw portion standing perpendicularly on the adjusting-foot body and screwed into the bottom face of the refrigerator
15 housing. The adjusting-foot body includes a tool-fitting portion having an opening extending from an outer periphery of the adjusting-foot body toward a central part of the adjusting-foot body. The opening of the tool-fitting portion has a distal end positioned, in plan view, on a proximal side from the screw portion. The tool-fitting portion includes a top groove provided at a top of the adjusting-foot body, and the
20 adjusting-foot body has a bottom hole as an opening extending from a bottom of the adjusting-foot body toward an upper side and communicating with the top groove.

[0007]

In the refrigerator according to the embodiment disclosed within the
25 following, the adjusting foot provided at the bottom face of the refrigerator housing has the tool-fitting portion that does not extend

through the adjusting-foot body but has the distal end on the proximal side of the screw portion. Hence, while the capacity of the refrigerator is not reduced, a height can be easily adjusted by using a commercially available tool or other tool.

Brief Description of Drawings

5 [0008]

[Fig. 1] Fig. 1 is a front view of a refrigerator according to Embodiment of the present invention.

[Fig. 2] Fig. 2 is a side view of the refrigerator illustrated in Fig. 1.

10 [Fig. 3] Fig. 3 is a bottom perspective view of the refrigerator illustrated in Fig. 1.

[Fig. 4] Fig. 4 is an enlarged view of a part A defined in Fig. 3.

[Fig. 5] Fig. 5 is a perspective view of a supporting leg and peripheral elements included in the refrigerator illustrated in Fig. 1.

15 [Fig. 6] Fig. 6 is a top perspective view of the supporting leg of the refrigerator illustrated in Fig. 1.

[Fig. 7] Fig. 7 is a bottom perspective view of the supporting leg illustrated in Fig. 6.

[Fig. 8] Fig. 8 is a front view of an adjusting foot attached to the supporting leg of the refrigerator illustrated in Fig. 1.

5 [Fig. 9] Fig. 9 is a side view of the supporting leg of the refrigerator illustrated in Fig. 8.

[Fig. 10] Fig. 10 is a sectional view taken along line Z-Z illustrated in Fig. 8.

Description of Embodiments

[0009]

10 Embodiment 1

Fig. 1 is a front view of an exemplary refrigerator according to Embodiment 1 of the present invention. Specifications of compartments provided in a storage portion of the refrigerator according to Embodiment 1 of the present invention will be described below. In the following description, "left" and "right" refer to "left" and
15 "right" of the refrigerator seen from the front as illustrated in Fig. 1, "front" refers to a side of an opening of a refrigerator housing having the storage portion, and "rear" refers to the rear side of the refrigerator.

[0010]

A refrigerator housing 1 of the refrigerator according to Embodiment 1 of the
20 present invention has the opening in the front face and a storage portion for storing things inside the refrigerator housing 1. The storage portion includes a plurality of compartments. Each of the compartments has a door on the front face.

The refrigerator housing 1 has a sealed space between a resin inner box 40
(see Fig. 5) provided on the inner side of the refrigerator and an outer panel 41
25 made of a metal plate provided on the outer side of the refrigerator. The sealed space is stuffed with urethane-foam heat insulator (not illustrated). A vacuum insulator is preferred to be embedded in the urethane-foam heat insulator.

[0011]

The inside of the refrigerator housing 1 is sectioned into compartments, namely a refrigerator compartment, an ice compartment, a changeable compartment, a freezer compartment, and a vegetable compartment by a partition 45, a partition 46, a partition 47, and a partition 48 each having a heat-insulating function. The compartments thus sectioned are provided on the front faces with a door 27, a door 28, a door 29, a door 30, a door 31, and a door 32 each having a heat-insulating function, and the compartments are thermally insulated from the outside of the refrigerator.

The door 27 and the door 28 form a double door with rotating shafts (not illustrated) provided at the left and right front-side ends of the refrigerator. The temperature in the refrigerator compartment, covered by the door 27 and the door 28, is set to about 3 degrees C. The door 29 is a door of the ice compartment in which ice is stored. The door 30 is a door of the changeable compartment in which the temperature is selectable between about 3 degrees C to -18 degrees C. The partition 48 is provided between the ice compartment and the changeable compartment. The partition 45 is provided between the refrigerator compartment and a set of the ice compartment and the changeable compartment. The door 31 is a door of the freezer compartment in which the temperature is about -18 degrees C. The door 32 is a door of the vegetable compartment in which the temperature is about 5 degrees C. The partition 46 is provided between the freezer compartment and the set of the ice compartment and the changeable compartment. The partition 47 is provided between the freezer compartment and the vegetable compartment. The ice compartment, the changeable compartment, the freezer compartment, and the vegetable compartment are of a drawer type and each include a drawer and a pair of drawer rail structures provided on the left and right sides of the compartment. The refrigerator compartment is provided with shelves and cases inside the refrigerator compartment and pockets on the door side. The ice compartment and the changeable compartment are also provided with cases.

The freezer compartment and the vegetable compartment are each provided with upper and lower cases.

[0012]

Fig. 2 is a side view of the refrigerator illustrated in Fig. 1. In Fig. 2, a decorative cover 8 is removed from the front side of the bottom face of the refrigerator. The bottom face of the refrigerator is provided with the decorative cover 8 attached to the front side to cover supporting legs 4 and front moving rollers 12. The refrigerator housing 1 is provided at the top of the rear side with upper grips 2.

[0013]

Fig. 3 is a bottom perspective view of the refrigerator illustrated in Fig. 1. Fig. 4 is an enlarged view of a part A defined in Fig. 3. Fig. 5 is a perspective view of the supporting leg and peripheral elements included in the refrigerator illustrated in Fig. 1, with the door 32 of the vegetable compartment open and the drawer of the compartment removed. In Figs. 3, 4, and 5, the decorative cover 8 is removed from the front side of the bottom face of the refrigerator. The refrigerator includes a cooling device (not illustrated) that cools the air in the refrigerator, a fan (not illustrated) that circulates the air, a motor that rotates the fan, and a compressor (not illustrated) that compresses refrigerant to be delivered to the cooling device. The compressor is provided inside the refrigerator and is mounted on a base plate 11.

[0014]

As illustrated in Fig. 4, a front beam 3 made of a metal plate is provided on the front side at the bottom face of the refrigerator housing. The supporting legs 4 supporting the refrigerator are provided on the left and right sides of the front beam 3. The supporting legs 4 each include an adjusting foot 6. The adjusting feet 6 are attached adjustably in height in the vertical direction of the refrigerator. The supporting legs 4 each are provided with the front moving roller 12. The base plate 11 is provided with rear moving rollers 13. Each pair of the front moving

rollers 12 and the rear moving rollers 13 is provided on the left and right sides at the bottom face of the refrigerator. The decorative cover 8 is attached to conceal the supporting legs 4 and the front moving rollers 12. A supporting-leg member 81 illustrated in Fig. 6 is made of a metal plate and is fixed to the bottom face of the refrigerator housing with screws. In this state, the adjusting foot 6 is positioned on the front side of the end face of the opening of the refrigerator housing 1 and below the door 32 of the vegetable compartment. That is, the adjusting foot 6 is provided to a position to prevent the refrigerator from falling down frontward when the center of gravity of the refrigerator is shifted toward the front side when any of the doors of the refrigerator is opened.

[0015]

Fig. 6 is a top perspective view of the supporting leg 4 of the refrigerator illustrated in Fig. 1, with the adjusting foot 6 removed from the supporting leg 4. Fig. 7 is a bottom perspective view of the supporting leg 4 illustrated in Fig. 6.

The adjusting foot 6 includes an adjusting-foot body 80 made of, for example, resin and a screw portion 5. The adjusting-foot body 80 has a columnar shape and has a circular plan-view shape with a diameter of, for example, about 45 mm. The screw portion 5 of the adjusting foot 6 projects from the upper surface of the adjusting-foot body 80 and at the center of the circular shape of the adjusting-foot body 80. The screw portion 5 is screwed into a nut portion 82 welded to the supporting-leg member 81, and thus the adjusting foot 6 is movable in the vertical direction of the refrigerator. The screw portion 5 projects from an adjusting-foot top part 88 and has a center axis extending perpendicularly to an adjusting-foot bottom part 87. The screw portion 5 is fixed to the adjusting-foot body 80, which is made of, for example, resin by integral molding. Before the screw portion 5 and the adjusting-foot body 80 are integrally molded, the screw portion 5 includes a threaded part 5a, a flange-shaped part 5b, and a stem part 5c. When the screw portion 5 and the adjusting-foot body 80 are integrated together, the flange-shaped part 5b and the stem part 5c are embedded in the adjusting-foot body (see Fig. 10).

[0016]

The adjusting-foot bottom part 87 comes into contact with the surface on which the refrigerator is installed and bears the weight of the refrigerator. When the refrigerator is installed, an installation worker or a user who uses the refrigerator can grab and rotate a circular adjusting-foot side part 86 of the adjusting foot 6 to adjust the height from the supporting leg 4 to the adjusting foot 6. Thus, the refrigerator can be installed horizontally, depending on the state of the surface on which the refrigerator is installed. As illustrated in Fig. 6, the adjusting-foot side part 86 has a circular shape when the adjusting foot 6 is seen from the top. The circular outer periphery of the adjusting foot 6 forms the adjusting-foot side part 86. The adjusting-foot side part 86 corresponds to "outer periphery" according to the present invention. The adjusting-foot side part 86 has ridges and troughs each extending perpendicularly to the adjusting-foot bottom part 87 so that fingers of the user or any other person grabbing the outer periphery of the adjusting foot 6 do not slip easily. Furthermore, the adjusting foot 6 has four tool-fitting portions 83 each having an opening in the adjusting-foot side part 86. When the adjusting-foot side part 86 is difficult to be grabbed and rotated with the hand, for example, a tool may be inserted into any of the tool-fitting portions 83 to rotate the adjusting-foot side part 86.

[0017]

Fig. 8 is a front view of the adjusting foot 6 attached to the supporting leg 4. Fig. 9 is a side view of Fig. 8. Fig. 10 is a sectional view taken along line Z-Z illustrated in Fig. 8 and illustrates the adjusting foot 6 attached to the supporting leg 4.

The adjusting foot 6 has the four tool-fitting portions 83 radially arranged centered on the screw portion 5. The tool-fitting portions 83 each have such a width as to receive a bar-like object having a diameter of, for example, about 6 mm, and can each be used as a height-adjustment hole into which a commercially

available screwdriver, for example, is insertable substantially horizontally from the outer periphery of the adjusting foot 6.

When a screwdriver, for example, is inserted into one of the tool-fitting portions 83 and a load is applied to a handle of the screwdriver in a direction in which the adjusting foot 6 is rotatable, a large torque can be applied to the adjusting foot 6. Depending on the state of the surface on which the refrigerator is installed, the frictional force between the bottom face of the adjusting foot 6 and the installation surface may be large, preventing the adjusting foot 6 from being easily rotated by grabbing the outer periphery of the adjusting foot 6. Moreover, as the sizes of refrigerators increase, the weights of such refrigerators also increase. The increased weight of such a refrigerator may further increase the frictional force between the adjusting-foot bottom part 87 and the installation surface. In such a situation, with a familiar tool owned by the installation worker or the user who installs the refrigerator, the height of the adjusting foot 6 can easily adjusted by rotating the adjusting foot 6 to install the refrigerator horizontally.

[0018]

The tool-fitting portions 83 each extend from the outer periphery of the adjusting foot 6 toward the screw portion 5. A part of the outer periphery of the adjusting foot 6 corresponds to the proximal end of the tool-fitting portion 83, and a part of the proximal side from a part where the screw portion 5 is embedded in the adjusting foot 6 corresponds to the distal end of the tool-fitting portion 83. In such a configuration, the part (the flange-shaped part 5b and the stem part 5c, for example) of the screw portion 5 embedded in the adjusting-foot body and the tool-fitting portion 83 do not overlap each other in the height direction of the adjusting foot 6. Thus, the height of the adjusting foot 6 can be reduced. Consequently, the adjusting foot 6 enables an easy height adjustment with a commercially available tool or other tool while the capacity of the refrigerator is not reduced.

[0019]

A part of the tool-fitting portion 83 according to Embodiment 1 that extends from, for example, the outer periphery by about 10 mm forms a top groove 84 that is open on the upper side. Another part of the tool-fitting portion 83 located, for example, close to the center of the adjusting foot 6 and has a length of about 5 mm has a bottom hole 85 that is open on the lower side. That is, the adjusting foot 6 has a resin part on the upper side and a hole on the lower side. When the top groove 84 and the bottom hole 85 are seen from the side of the adjusting-foot top part 88, the top groove 84 and the bottom hole 85 are arranged to align on the center line of the top groove 84 and the center line of the bottom hole 85 lying on the same or substantially the same straight line. The top groove 84 and the bottom hole 85 communicate with each other. When the tool-fitting portion 83 is seen from the outer periphery of the adjusting-foot body 80 toward the center of the adjusting-foot body 80, the tool-fitting portion 83 has a hole having such a size that allows a tool to be inserted (see Fig. 8). The sidewall of the top groove 84 and the sidewall of the bottom hole 85 are connected to each other and form a continuous surface. Alternatively, as long as a tool is insertable and a force can be applied to the tool, a step may be present between the wall surface of the top groove 84 and the wall surface of the bottom hole 85 as a matter of, for example, convenience of processing or other factor. When a tool is inserted into the tool-fitting portion 83 and a load is applied to the tool in the direction of rotation of the screw portion 5, the tool comes into contact with the wall surface at two points. Hence, the force applied to the handle of the tool by the installation worker or the user who installs the refrigerator is transmitted to the two points of contact between the tool and the wall surface. Consequently, the adjusting foot 6 can be rotated easily.

[0020]

In the tool-fitting portion 83, a part of the top groove 84 that is open on the upper side and a part of the bottom hole 85 that is open on the lower side overlap each other. The part where the top groove 84 that is open on the upper side and the bottom hole 85 that is open on the lower side overlapping each other

corresponds to a hole part 89 (see Fig. 10) extending through the adjusting foot 6 in the vertical direction.

[0021]

Advantageous effects of the tool-fitting portion 83 according to Embodiment 1
5 that has the top groove 84 and the bottom hole 85 will be described below.

If the tool-fitting portion 83 has only the top groove 84, no part receives the tool from the upper side. Consequently, the tip of the tool inserted tends to come off toward the upper side of the adjusting foot 6, and a force is difficult to be applied to the handle of the tool in the direction of rotation of the adjusting foot 6. Such a
10 configuration is not preferable in adjusting the height. When the depth of the top groove 84 is made larger than the diameter of the tool to be inserted, the tool may become less likely to come off the groove. In this case, however, the height of the adjusting foot 6 increases, leading to a loss in the capacity of the refrigerator.

On the other hand, if the tool-fitting portion 83 has only a groove that is open
15 on the bottom side, the tip of the tool needs to be inserted into the tool-fitting portion 83 along the surface on which the refrigerator is installed. In general, the handle of a tool is thicker than the tip of the tool. To insert the tip of such a tool into the tool-fitting portion 83, the tool needs to be tilted obliquely to the installation surface. When the depth of the groove that is open on the bottom side is larger
20 than the radius of the handle of the tool, the tool can be inserted in a direction parallel to the installation surface. However, when the installation worker has only a tool having a handle with a radius larger than the depth of the groove that is open on the bottom side, the tool is difficult to be inserted into the groove. Moreover, when the depth of the groove that is open on the bottom side is determined in
25 consideration of the sizes of the handles of various kinds of tools, the height of the adjusting foot 6 increases, leading to a loss in the capacity of the refrigerator.

In contrast, in the tool-fitting portion 83 of the adjusting foot 6 included in the refrigerator according to Embodiment 1, a resin wall 90 is provided on the upper side of the adjusting foot 6 on the side to which the tip of the tool is inserted.

Consequently, the movement of the tip of the tool inserted is restricted by the wall 90 provided on the side of the adjusting-foot top part. Hence, the tip of the tool is less likely to come off the groove during the height adjustment. On the side of the handle of the tool inserted into the tool-fitting portion 83, a wall 91 is provided on the bottom side of the adjusting foot 6, and the tool-fitting portion 83 is open on the upper side of the adjusting foot 6. Consequently, the tool can be inserted from the outer periphery of the adjusting foot 6 toward the center with the tip of the tool tilted obliquely from the upper side of the adjusting foot 6 toward the installation surface. Hence, even when the outside diameter of the handle of the tool is larger than that of the tip of the tool, the tool can be easily inserted into the tool-fitting portion 83. Consequently, the number of options for selecting the tool to be used in rotating the adjusting foot 6 is increased.

[0022]

When dust or other particles enter the tool-fitting portion 83, such dust or other particles drop downward through the bottom hole 85. Consequently, dust or other particles are less likely to accumulate in the tool-fitting portion 83. Even when dust or other particles accumulate, such dust or other particles can be removed easily by pushing the dust or other particles toward the center of the tool-fitting portion 83 and dropping the dust or other particles through the bottom hole 85.

[0023]

The tool-fitting portion 83 may be provided without the hole part 89 extending through the adjusting foot 6 in the vertical direction. However, as a resin molding of the adjusting-foot body 80 has no undercut, having the hole part 89 is beneficial in that the configuration of the mold for forming the resin molding can be simplified. In the case of machine processing, also beneficially, the processing can be easily performed.

[0024]

The top groove 84 of the tool-fitting portion 83 may be covered by the wall 90 provided on the side of the adjusting-foot top part, and a horizontal hole provided by boring an opening in the adjusting-foot side part 86 and extending from the adjusting-foot side part 86 toward the screw portion 5 of the adjusting foot 6 may be
 5 configured to communicate with the bottom hole 85. Alternatively, the tool-fitting portion 83 may include a horizontal hole bored in the adjusting-foot side part 86, the top groove 84, and the bottom hole 85 that communicate with each other in this order from the outer periphery of the adjusting foot 6. Each of such configurations also produces the above advantageous effect that dust or other particles are less
 10 likely to accumulate and, if any, can be removed easily.

Reference Signs List

[0025]

1 refrigerator housing 2 upper grip 3 front beam 4 supporting leg
 5 screw portion 5a threaded part 5b flange-shaped part 5c stem part 6
 15 adjusting foot 8 decorative cover 11 base plate 12 front moving roller 13 rear moving roller 27 door (on left side of refrigerator compartment) 28 door (on right side of refrigerator compartment) 29 door (of ice compartment) 30 door (of changeable compartment) 31 door (of freezer compartment) 32 door (of vegetable compartment) 40 inner box 41 outer panel 45 partition
 20 (between refrigerator compartment and set of ice compartment and changeable compartment) 46 partition (between freezer compartment and set of ice compartment and changeable compartment) 47 partition (between freezer compartment and vegetable compartment) 48 partition (between ice compartment and changeable compartment) 80 adjusting-foot body 81
 25 supporting-leg member 82 nut portion 83 tool-fitting portion 84 top groove 85 bottom hole 86 adjusting-foot side part 87 adjusting-foot bottom part 88 adjusting-foot top part 89 hole part 90 wall (on upper side) 91 wall (on bottom side)

CLAIMS

[Claim 1]

A refrigerator comprising:

a refrigerator housing including a front face having an opening; and

an adjusting foot attached to a bottom face of the refrigerator housing,

the adjusting foot including

an adjusting-foot body, and

a screw portion standing perpendicularly on the adjusting-foot body and

screwed into the bottom face of the refrigerator housing,

the adjusting-foot body including a tool-fitting portion having an opening extending from an outer periphery of the adjusting-foot body toward a central part of the adjusting-foot body,

the opening of the tool-fitting portion having a distal end positioned, in plan view, on a proximal side from the screw portion,

the tool-fitting portion including a top groove provided at a top of the adjusting-foot body,

the adjusting-foot body having a bottom hole as an opening extending from a bottom of the adjusting-foot body toward an upper side and communicating with the top groove.

[Claim 2]

The refrigerator of claim 1, wherein the adjusting foot projects from an end face of the opening of the front face of the refrigerator housing.

FIG. 1

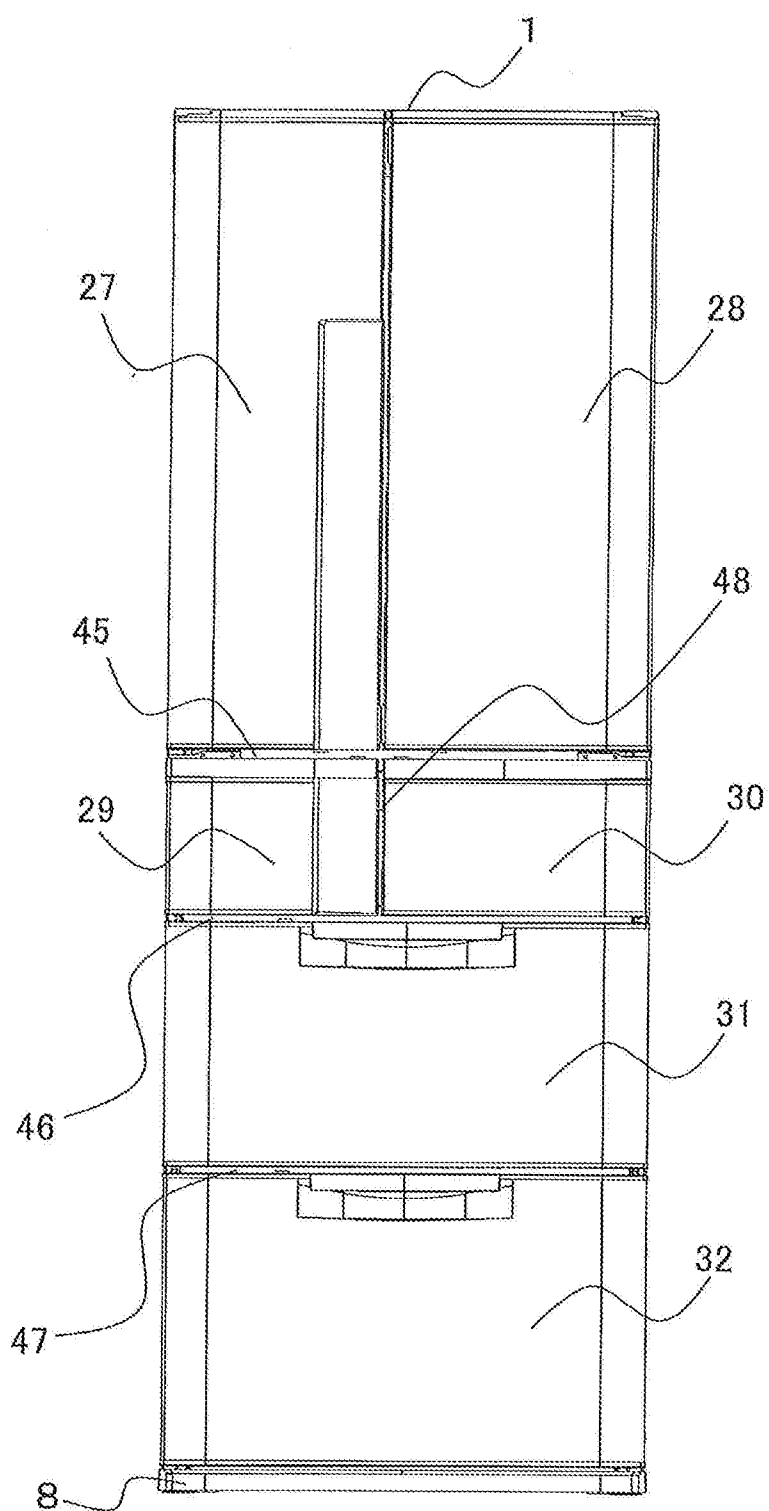


FIG. 2

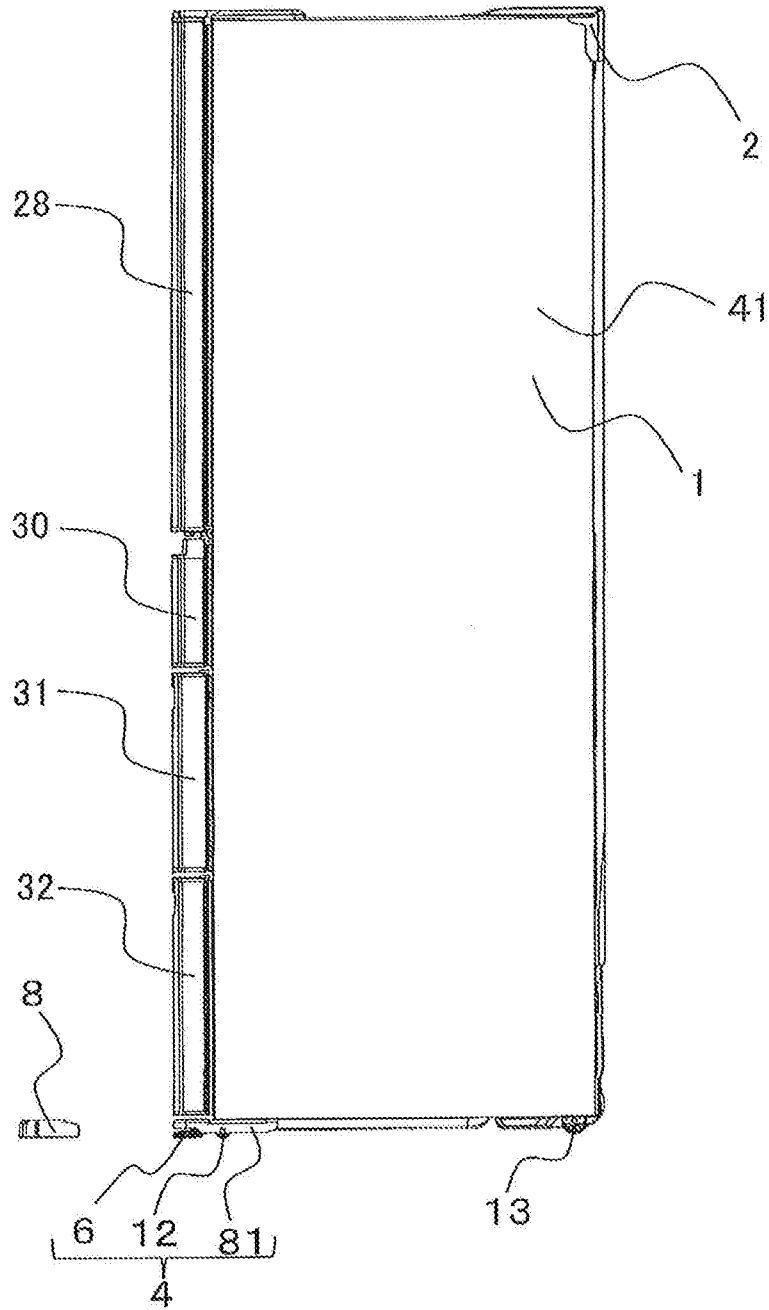


FIG. 3

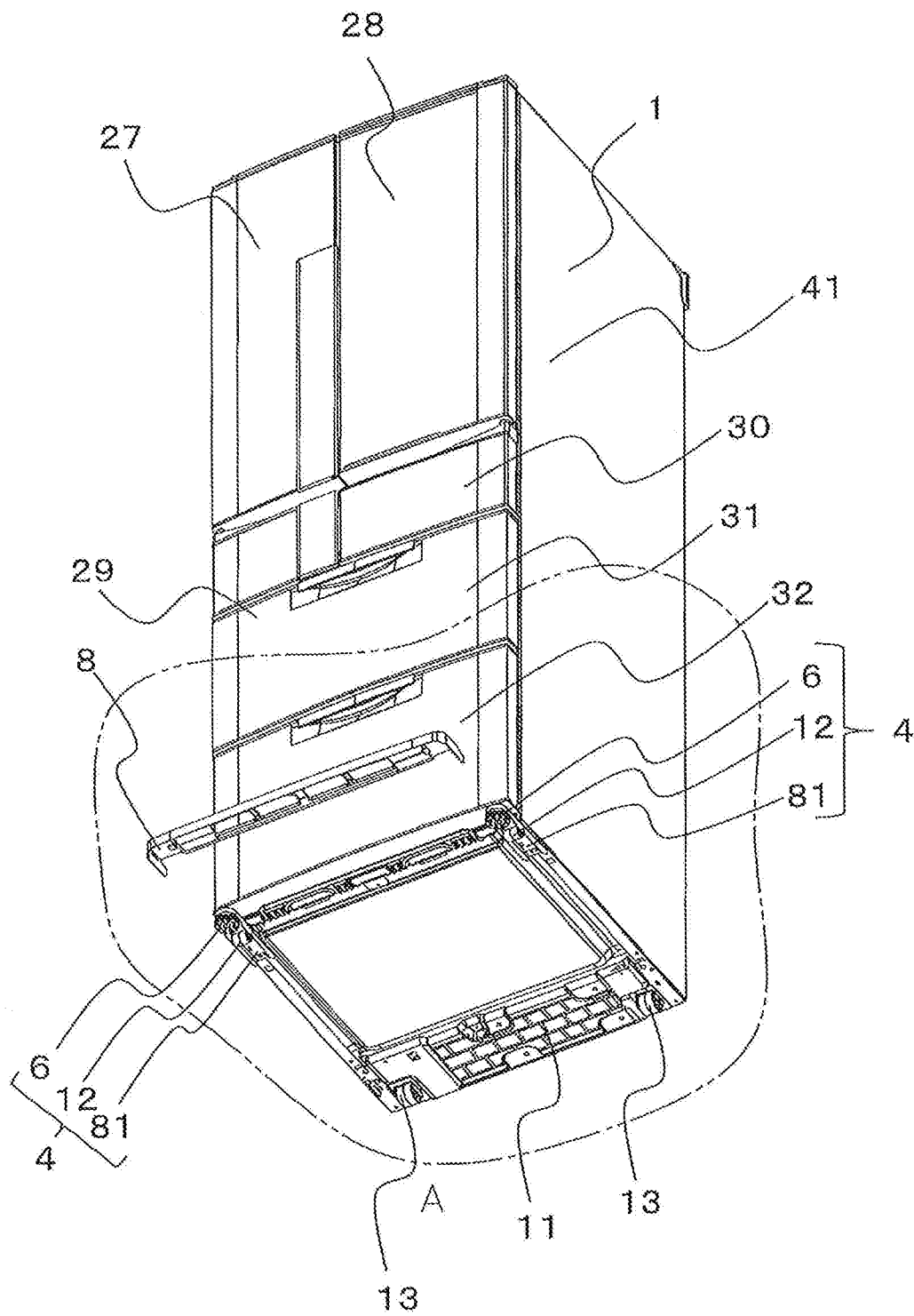


FIG. 4

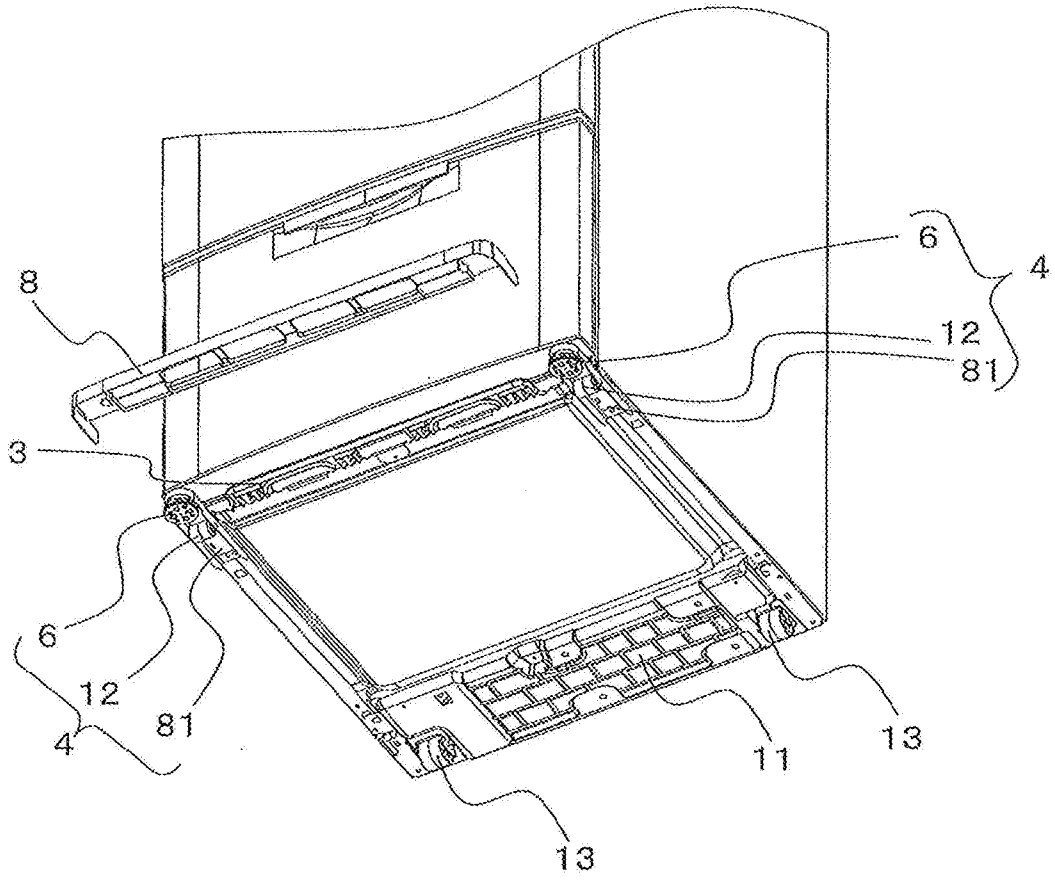


FIG. 5

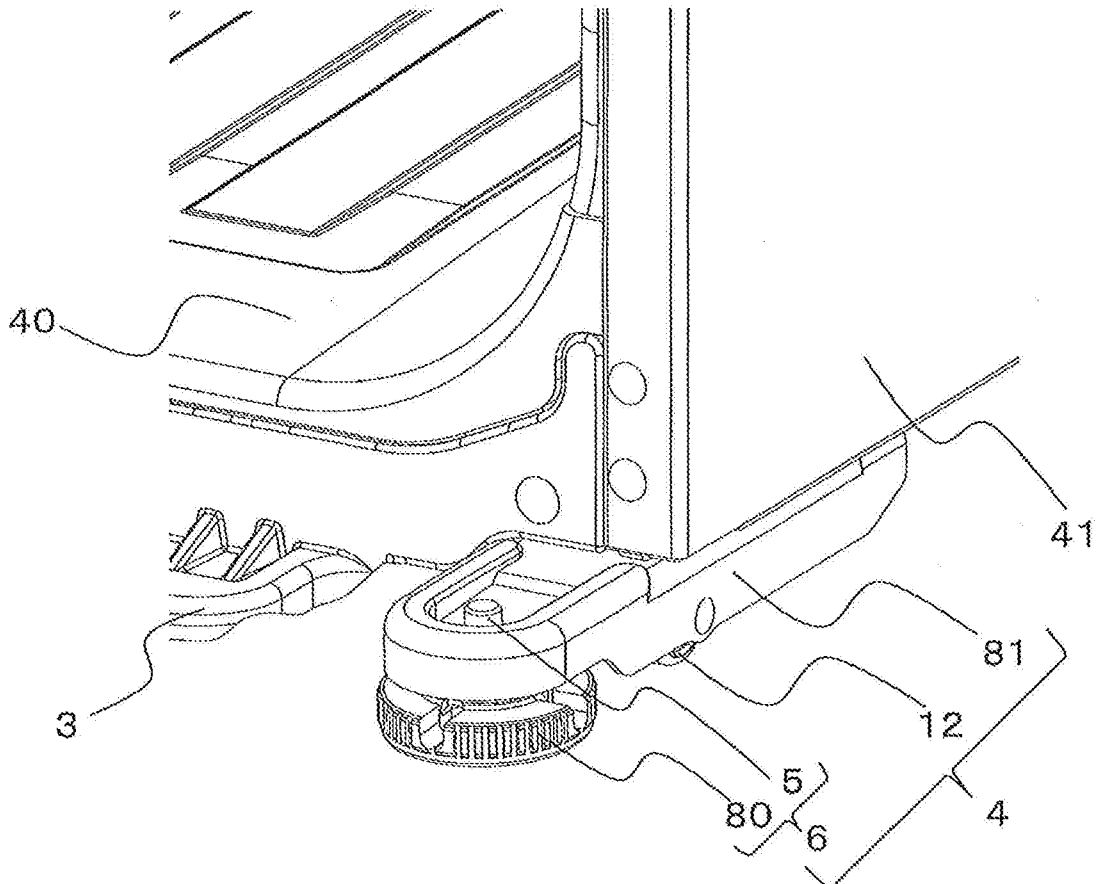


FIG. 6

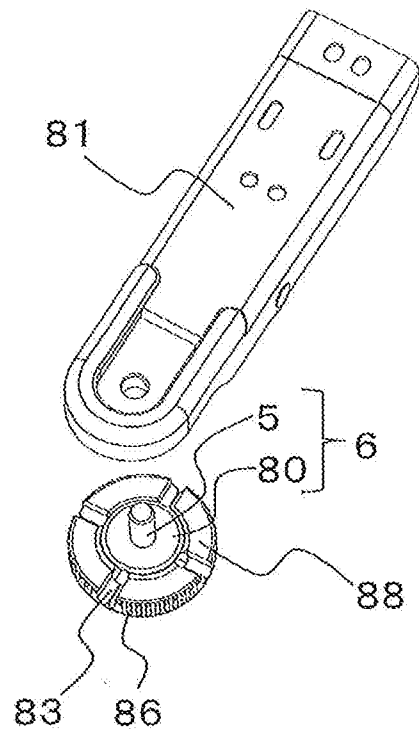


FIG. 7

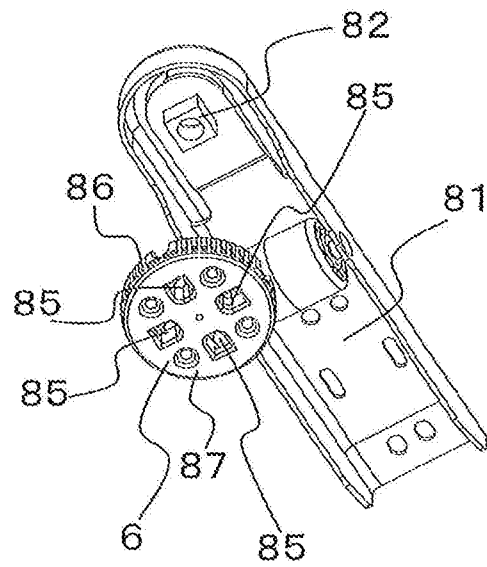


FIG. 8

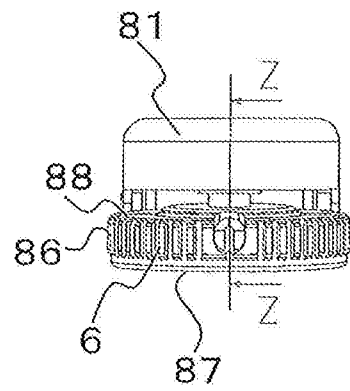


FIG. 9

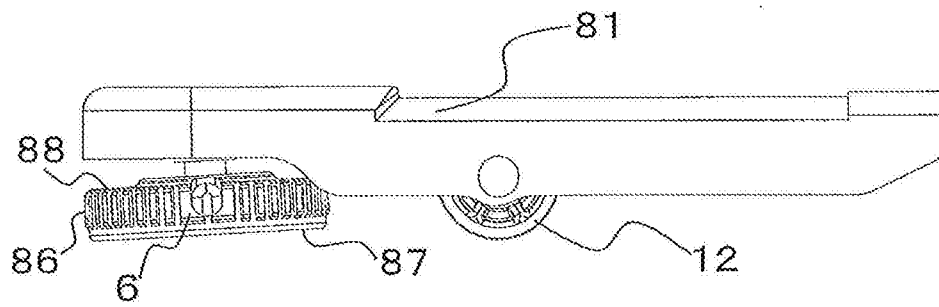


FIG. 10

