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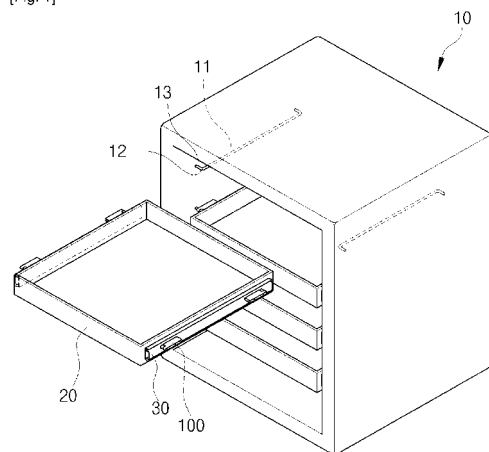
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(54) **APPARATUS FOR FIXING SLIDE RAIL**

(57) Provided is a slide rail fixing apparatus for fixing slide rails coupled to both sides of a drawer to corner portions of support bars protruding from both inner sides of a main body in a central direction and connected to fixing bars at both ends of the main body in a horizontal direction, the slide rail fixing apparatus including a first fixing body disposed at one fixed surface of the slide rail, disposed at one corner portion of both ends upon insertion of the support bars to be opened in the insertion direction of the support bars and facing directions of the support bars, the corner portion and the fixing bar, and closed at the remaining portions to surround the one corner portion in a closed curve, and a second fixing body disposed at one fixed surface of the slide rail, disposed at the other corner portion of both ends upon insertion of the support bars, which is one side facing the first support unit, to be opened in the insertion direction of the support bars and facing directions of the support bars, the corner portion and the fixing bar, and closed at the remaining portions to surround the other corner portion in a closed curve.

[Fig. 1]



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Description

[Technical Field]

5 **[0001]** The present invention relates to an apparatus for fixing a slide rail.

[Background Art]

10 **[0002]** In general, a drawer slidably coupled to accommodate and draw out a substance is installed at a main body of a home appliance such as a refrigerator or a dishwasher, cooking equipment such as an oven, or furniture for accommodating and storing various goods. The drawer can be drawn out from the main body to accommodate the substance and then pushed into the main body after being drawn out, accommodating the substance. The drawer includes slide rails installed at the main body such that the drawer can be smoothly operated when the drawer is drawn out and pushed in. The slide rails may include ball-type or roller-type rolling means to enable smooth rolling movement when the drawer is drawn out and pushed in. The slide rails are installed between the main body and the drawer such that the drawer can be smoothly slid when the drawer is drawn out and pushed in, improving use convenience.

15 **[0003]** In particular, in the case of the cooking equipment such as an oven, since the inside of the main body is heated to a temperature at which foods are cooked, the slide rails and the fixing apparatus to which the slide rails are fixed should be formed of a heat-resistant material. In addition, the structure becomes complex and a manufacturing cost is increased. Accordingly, a technique of simplifying the structure of the apparatus for fixing the slide rails is being developed.

20 **[0004]** In the conventional main body having the above-mentioned simple structure, net-shaped support bars are installed at both positions to which the drawer is fixed, and the slide rails fixed to both sides of the drawer are fixedly installed at the support bars by a slide rail fixing apparatus. Each of the support bars has a substantially C-shaped cross-section protruding in a horizontal direction and includes corners curved from both ends thereof such that both sides of the drawer slidably moving in the horizontal direction are supported and fixed in a sidewall direction of the main body. The support bars are provided in plural in a longitudinal direction according to the number of drawers. A fixing apparatus for fixing the slide rails slidably coupled to the main body to the support bars is installed at both sides of the drawer.

25 **[0005]** The conventional slide rail fixing apparatus is installed in the horizontal direction of the slide rail to be detachably installed at the support bars protruding in the horizontal direction, being press-fitted to the support bars.

30 **[0006]** However, the conventional slide rail fixing apparatus is installed in the horizontal direction in which the drawer is pushed in and drawn out along the slide rails, and fixed to the support bars. Accordingly, a force is continuously applied in the horizontal direction when the drawer is pushed in and drawn out. The force is applied to the fixing apparatus installed in the horizontal direction to decrease a fixing force, causing movement. Continuous movement weakens the fixing force of the fixing apparatus to cause deformation and separation thereof.

35 **[0007]** In addition, in the conventional slide rail fixing apparatus, as the slide rails are press-fitted to the support bars, a large amount of force is applied. When the applied force is smaller than the press-fitting force, the slide rails are not fixed to the support bar, and thus, the fixing apparatus may be separated.

40 **[0008]** Further, in the conventional slide rail fixing apparatus, when the fixing apparatus is pressed to be press-fitted to a position deviated from a support bar fixing position, in a state in which the fixing apparatus is deviated from the support bar fixing position, the fixing apparatus is pressed in a direction of the support bar and brought in contact with the support bar, causing deformation and damage.

45 **[0009]** Furthermore, in the conventional slide rail fixing apparatus, when the slide rails are fixed to the support bars, the drawer is moved in a state in which a load of the drawer in which the substance is accommodated and a load of the slide rails are concentrated on the fixing apparatus, and thus, torsional stress is applied to the fixing apparatus fixed to the support bars. That is, in the fixing apparatus for fixing the slide rail disposed at both sides of the drawer, the drawer in which the substance is accommodated to increase the weight is slid so that the load applied in facing inward directions is moved, and thus, a torsional load is generated at a fixing apparatus fixing position of the support bars according to movement of the load. Accordingly, as the torsional load applied upon movement of the drawer is applied from both sides to a central direction, the conventional fixing apparatus press-fitted in the horizontal direction cannot easily deal with the torsional load. Therefore, the torsional stress is concentrated on the fixing apparatus to cause deformation, or the fixing apparatus may be separated to the outside due to a continuously applied force.

50 **[0010]** In addition, in the conventional slide rail fixing apparatus, since the fixing apparatus for fixing the slide rails to the support bars is installed in the horizontal direction in which the drawer is slid, a force is applied to a portion fixed to the support bar and is applied in the horizontal direction to cause severe movement and reduce the fixing force. Accordingly, since the fixing apparatus cannot be easily supported by one support bar, the fixing apparatus is fixed by two or more support bars, increasing manufacturing cost and installation cost.

55 **[0011]** In particular, a structure configured to guide a shelf on which a material to be cooked is placed is installed in an oven. The structure configured to guide the shelf can be supported to be drawn out and pushed in in a state in which

a pair of support bars are installed inside the main body to dispose the shelf between the support bars in consideration of the weight of the shelf. In the shelf guide structure, conventionally, one of the pair of support bars is connected to a connecting bar, and the other is connected to a corner portion to form a pair of extension bars extending in a direction of the main body. Accordingly, the pair of support bars and the pair of extension bars are fixed to the plurality of fixing bars disposed inside the main body in the longitudinal direction to support the shelf using the pair of support bars.

[0012] In the conventional oven as described above, slide rails may be installed at both sides of the shelf to slide the shelf on which foods are cooked. In order to fix the slide rails to the inside of the oven, the pair of support bars installed to support the shelf should be replaced with the support bars coupled to the slide rails, and the fixing apparatus coupled to the support bars should be installed at the slide rails. In this case, as an interior design of the main body should be changed, cost is increased and thus the interior design cannot be applied to the conventional main body.

[0013] The conventional slide rail fixing apparatus is installed in the horizontal direction of the slide rails to be detachably mounted on the pair of support bars protruding in the horizontal direction, and is press-fitted to the support bars.

[0014] However, since the conventional slide rail fixing apparatus is press-fitted to the support bars in the horizontal direction to be fixed to the pair of support bars and installed in the same direction as the shelf moving direction, a force is continuously applied in the horizontal direction when the shelf is pushed into and drawn out. Accordingly, the force is applied to the fixing apparatus installed in the horizontal direction to reduce the fixing force and generate movement, and the fixing force of the fixing apparatus is weakened due to continuous movement to be deformed and separated therefrom.

[0015] In addition, since the conventional slide fixing apparatus is conventionally installed in plural at positions fixed to the pair of support bars in the horizontal direction, respectively, needs of the fixing apparatus are increased to increase the manufacturing cost, and a task of coupling each fixing apparatus to the support bars cannot be easily performed.

[0016] Further, in the conventional slide rail fixing apparatus, since the plurality of fixing apparatuses are press-fitted to the support bars when the pair of support bars are fixed to the slide rails, a large amount of force is applied upon the mounting. When the applied force is smaller than the press-fitting force, the fixing apparatuses respectively fixed to the pair of support bars cannot be fixedly coupled to the slide rails, and thus, the slide rails may be separated therefrom.

[0017] Furthermore, when the conventional slide rail fixing apparatus presses the fixing apparatus to be press-fitted to a position deviated from a fixing position to the pair of support bars, the fixing apparatus is pressed in the direction of the support bars and brought in contact with the support bars in a state in which the fixing apparatus is fixed to the support bars, causing deformation and damage thereof.

[0018] In addition, when the conventional slide rail fixing apparatus is installed in plural to be fixed to the pair of support bars to fix the slide rails to the main body, a load of the shelf, on which the substance is accommodated, and a load of the slide rails are concentrated on the plurality of fixing apparatuses. In this state, when the shelf is moved, a torsional stress is applied to the fixing apparatus fixed to the pair of support bars. That is, the shelf on which the substance is accommodated to increase the weight is slid to the fixing apparatus for fixing the slide rails disposed at both sides of the shelf, and loads applied in facing inward directions are moved. According to movement of the loads, a torsional load is generated at the fixing apparatus fixing position of the support bars. Accordingly, as the torsional stresses applied upon movement of the shelf are applied from both sides in a central direction, the conventional fixing apparatus press-fitted in the horizontal direction cannot easily deal with the torsional stress. As a result, the torsional stress is concentrated on the fixing apparatus to generate deformation, and the fixing apparatus may be separated to the outside due to the continuous applying force.

[0019] As described above, development of the slide rail fixing apparatus capable of securely fixing the slide rails with no structure change in the conventional main body at which the shelf guide structure is installed is acutely needed.

[Disclosure]

[Technical Problem]

[0020] In order to solve the foregoing and/or other problems, it is an aspect of the present invention to provide a slide rail fixing apparatus, in which both corners of support bars installed at a main body are supported to fix slide rails to both sides of a drawer, enabling attachment thereof and improving a fixing force.

[Technical Solution]

[0021] The foregoing and/or other aspects of the present invention may be achieved by providing a slide rail fixing apparatus for fixing slide rails coupled to both sides of a drawer to corner portions of support bars protruding from both inner sides of a main body in a central direction and connected to fixing bars at both ends of the main body in a horizontal direction, the slide rail fixing apparatus including: a first fixing body disposed at one fixed surface of the slide rail, disposed at one corner portion of both ends upon insertion of the support bars to be opened in the insertion direction of the support

bars and facing directions of the support bars, the corner portion and the fixing bar, and closed at the remaining portions to surround the one corner portion in a closed curve; and a second fixing body disposed at one fixed surface of the slide rail, disposed at the other corner portion of both ends upon insertion of the support bars, which is one side facing the first support unit, to be opened in the insertion direction of the support bars and facing directions of the support bars, the corner portion and the fixing bar, and closed at the remaining portions to surround the other corner portion in a closed curve, wherein the first fixing body and the second fixing body are disposed at facing positions to surround both outer surfaces of the corner portions in different directions, surround the fixing bar connected to the corner portions at both ends of the support bars in a closed curve shape, and opened in a direction in which the support bars are inserted and in facing directions of the support bars, the corner portions and the fixing bars to be inserted and mounted at both ends of the support bars.

[0022] In addition, the slide rail fixing apparatus may further include a first elastic body disposed at one surface of the first fixing body into which a portion of the support bar is inserted and in contact therewith, and protruding into the first fixing body to be elastically moved upon insertion of the support bar to fix the support bar, wherein the first elastic body is elastically moved in the direction of the first fixing body upon insertion of the support bar to enable easy insertion of the support bar, and protrudes by elasticity after being inserted to be hooked and fixed in the direction of the first fixing body of the support bar.

[0023] Further, the slide rail fixing apparatus may further include a second elastic body disposed at one surface of the second fixing body into which a portion of the support bar is inserted and in contact therewith, and protruding into the second fixing body to be elastically moved upon insertion of the support bar to fix the support bar, wherein the second elastic body is elastically moved in the direction of the second fixing body upon insertion of the support bar to enable easy insertion of the support bar, and protrudes by elasticity after being inserted to be hooked and fixed in the direction of the second fixing body of the support bar.

[0024] Furthermore, the first and second fixing bodies each may include: a first fixing plate disposed at one surface of the slide rail, positions at the one corner portion being in contact with a portion of the support bar in one side direction and one side surface of a portion of the fixing bar connected to the one corner portion; a second fixing plate facing and spaced apart from the first fixing plate, and in contact with the other side surface of the portion of the fixing bar connected to a portion of the support bar in one side direction by the one corner portion at the other side corresponding to the first fixing plate; and a connecting plate connected to close a direction corresponding to a direction in which the support bars of the first fixing plate and the second fixing plate are inserted, and in contact with and supporting the support bars when the support bars are inserted, wherein the first fixing plate, the second fixing plate and the connecting plate are integrally provided, and the direction in which the support bars are inserted is opened to surround the support bars in a closed curve shape.

[0025] In addition, the first and second fixing bodies each may include: first fixing pieces protruding from both ends of the first fixing plate corresponding to the facing directions, and protruding from the connecting plate to a central position of the first fixing plate toward an outer surface of the fixing bar to surround a portion of the fixing bar in the direction of the first fixing plate at different positions of the first fixing body and the second fixing body; and second fixing pieces protruding from both sides of the second fixing plate corresponding to the facing directions, and protruding from a central position of the second fixing plate to an end position in a direction in which the support bars are inserted toward the outer surface of the fixing bar spaced apart from the first fixing piece to surround a portion of the fixing bar spaced apart from the first fixing pieces in the direction of the second fixing plate direction at different positions of the first fixing body and the second fixing body, wherein the first fixing plate and the second fixing plate protrude from both ends of the support bar to surround the fixing bar connected to the corner portion in different directions to distribute torsional stress and a load due to an external impact, improving a fixing force.

[0026] Further, the first fixing piece may include: first bodies protruding from both ends of the first fixing plate corresponding to the facing directions, and protruding from the connecting plate to a central position of the first fixing plate toward the outer surface to be in contact with portions of the fixing bars disposed at both sides in the direction of the first fixing plate; first connecting bodies protruding from both ends of the first bodies in an outward direction of the fixing bar, and protruding in facing directions of the fixing bar connected to both ends of the support bar by the corner portions and in a direction in contact with the outer surfaces corresponding to the facing directions; and first extension bodies extending from the first connecting bodies in the direction of the second fixing plate, and configured to cover a portion of the fixing bar from the corner portions at positions facing the first bodies in the direction of the second fixing plate, wherein the first body, the first connecting body and the first extension body are integrally formed with each other, and portions into which a portion of the fixing bar is inserted from the corner portion is opened in a closed curve shape to be surrounded from the direction of the first fixing plate to the direction of the second fixing plate.

[0027] Furthermore, the second fixing piece may include: second bodies protruding from both ends of the second fixing plate corresponding to the facing directions, and protruding from a central position of the second fixing plate spaced apart from the first fixing piece to an end of the second fixing plate, into which the support bar is inserted, toward the outer surface to be in contact with a portion of the fixing bar in the direction of the second fixing plate; second connecting

bodies protruding from both ends of the second body in the horizontal direction, and protruding in a direction in which both outer surfaces of a portion of the fixing bar are in contact with each other upon insertion of the support bar insertion; and second extension bodies extending from the second connecting body in the direction of the first fixing plate, and spaced apart from the first fixing piece in a direction facing the second body to cover a portion of the fixing bar in the direction of the second fixing plate, wherein the second body, the second connecting body and the second extension body are integrally formed with each other, and portions spaced apart from the first fixing piece and into which a portion of the fixing bar is inserted are opened in a closed curve shape to be surrounded from the direction of the first fixing plate to the direction of the second fixing plate.

[0028] In addition, the first and second fixing bodies each may include: side surface connecting bodies connecting to close outer surfaces of the fixing bars corresponding to facing surfaces of the first fixing plate and the second fixing plate, and connecting different side surfaces of the first fixing plate and the second fixing plate to be in contact with the outer surfaces of the fixing bars connected to the corner portions at both ends of the support bar, wherein the side surface connecting bodies correspond to the facing directions, which are different directions of the first fixing plate and the second fixing plate, to connect directions in contact with the outer surfaces of the fixing bars to close the outer surfaces in a closed curve shape.

[0029] Further, separation grooves may be formed to pass through the side surface connecting bodies connected to both ends of the first fixing plates facing each other from a center in the longitudinal direction to a center of the first fixing plate in the horizontal direction, and divide the connecting body from a center of the first fixing plate in the horizontal direction to be in communication with a center of the second fixing plate in the horizontal direction, wherein the separation grooves divide the first fixing plate, the second fixing plate and the connecting body from the center in the horizontal direction to support forces applied in different directions in a state in which the first fixing plates are partially connected to the side surface connecting bodies.

[0030] Furthermore, another aspect of the present invention may be achieved by providing a slide rail fixing apparatus having support fixing apparatuses protruding from both inner sides of a main body at facing positions to fix slide rails to which a shelf is slidably coupled, and fixed to a pair of support bars, one of which is connected to a connecting bar and the other of which is connected to a corner portion, and having extension bars extending in a direction of the main body, the support fixing apparatus includes: support members disposed at one sides of the slide rails, and protruding in a direction of the support bars at positions of the connecting bars to surround the connecting bars to be supported with the support bars upon insertion into the pair of support bars; support fixing bodies disposed at one surfaces of the slide rails, and disposed at the other side, which is a position of the support bars connected to corner portions of the pair of support bars upon insertion into the support bars; insertion fixing pieces protruding from both ends of the support fixing body in the horizontal direction, connecting the pair of support bars upon insertion of the support bars, and protruding at facing positions to have a fixing space to contact the outer surfaces; and side surface fixing pieces protruding from the other side ends of the insertion fixing pieces facing each other, and surrounding the pair of extension bars upon insertion of the support bar, wherein, in a state in which the support members surround the connecting bars and support the pair of support bars when the slide rails are fixed to the main body, the other sides of the pair of support bars are inserted into the fixing space formed inside the support fixing bodies facing each other to connect the pair of support bars and simultaneously fix the connecting bars.

[0031] In addition, the slide rail fixing apparatus may further include elastic bodies protruding from one surfaces of the insertion fixing pieces facing each other in a direction of the fixing space, and partially connected to the insertion fixing pieces to be moved by elasticity, wherein the elastic bodies are elastically moved in the direction of the support fixing body when the pair of support bars are inserted to enable insertion of the pair of support bars, and protrude by elasticity to hook and fix the pair of support bars after the insertion.

[0032] Further, bent grooves may be formed to pass through the insertion fixing pieces facing each other to be partially connected according to shapes of the elastic body to bend the elastic bodies partially connected to the insertion fixing pieces into the fixing space to be elastically moved, integrally forming the elastic bodies with the insertion fixing pieces.

[0033] Furthermore, the support member may include: support bodies disposed at one surfaces of the slide rails, and disposed at positions at which the pair of support bars are in contact with one surfaces of the connecting bars upon insertion of the support bars; support protrusions protruding from one sides of the support bodies, and protruding in the direction of the support bars to support side surfaces of the connecting bars upon insertion of the support bars; and support fixing bodies protruding from one sides of the support protrusions in the direction of the other side end, protruding to support the connecting bar in the direction of the support bar and surround the connecting bars upon insertion of the support bars to have a support space opened in the other side direction, wherein the support members form the support space with the support protrusions and the support fixing bodies to be inserted into the other side opened by the support space and supported.

[0034] In addition, the slide rail fixing apparatus may further include: support projections protruding from both side surfaces of the support member in the direction of the pair of support bars, and protruding at facing positions to support outer surfaces of the pair of support bars upon insertion of the support bar, wherein the support projections support the

outer surfaces of the pair of support bars supported by the support members to contact the outer surfaces to prevent movement thereof when the pair of support bars are supported.

[0035] Further, the side surface fixing piece may include: a side surface body protruding from the support fixing body in the other side direction, and protruding to contact and support one surface of the extension bar; a side surface support member protruding from the side surface body in the direction of the support bar, and protruding to contact and support the side surface of the extension bar upon insertion of the support bar; and a side surface extension body protruding from the side surface support member in one side direction, and spaced apart from the side surface body and connected to the side surface support member to surround the extension bar with one side opened, wherein the side surface fixing piece protrudes from one of the support fixing bodies, on which the pair of support bars are supported, to surround and fix the extension bodies, simultaneously supporting the pair of support bars and the extension bars.

[Advantageous Effects]

[0036] According to the embodiment of the present invention, in the fixing apparatus for fixing the slide rails to the main body such that the drawer is slid into the main body, the fixing force can be maintained and easy attachment and detachment can be enabled, in comparison with the fixing apparatus surrounding the entire structure in which the rails are disposed to be spaced apart from each other at both sides of the support bars connected to the fixing bars installed at both side surfaces inside the main body to surround the corners.

[0037] In addition, in the fixing apparatus, since the fixing bodies configured to support the outer surfaces of the corners and portions of the support bars and the fixing bars are opened at the inner surfaces in the insertion direction of the support bars and installed at both sides to be spaced apart from each other to correspond to facing directions of the corners disposed at both sides, the slide rails surrounding both corners in a closed curve are fixedly fixed to the corners, improving the fixing force.

[0038] Further, the fixing bodies are open in directions facing the directions in which the support bars are inserted, and the plate members are bent to surround portions of the support bars and portions of the fixing bars connected to the corners. The fixing bodies can be manufactured by differentiating the bending directions according to positions of the corners formed at both sides. Accordingly, the manufacturing process can be simplified to reduce manufacturing cost.

[0039] Furthermore, both side surfaces of the fixing apparatus surrounding the fixing bars are divided to support different directions, and the corners are opened to be exposed to the outside. Accordingly, the weight is moved with movement of the drawer, and thus the torsional stress applied in a direction of the fixing bars opens the corners and is distributed to the fixing apparatus in different directions. As a result, damage and deformation due to concentration of the stress can be prevented to increase the lifespan.

[0040] In addition, the support bars moved and easily inserted into one side of the fixing apparatus by elasticity are fixedly supported by the elastic pieces protruding to fix the support bars, and thus, the support bar can be easily assembled to the fixing apparatus through a simple push operation, improving assembly efficiency.

[0041] Further, the fixing apparatus surrounds the support bars and the fixing bars, and has a structure installed to surround the fixing bars such that loads applied in different directions are distributed, increasing the fixing force. Accordingly, the stress generated due to movement of the drawer can be effectively distributed, and the fixing state can be maintained even when the thickness of the fixing apparatus is reduced, reducing the manufacturing cost.

[0042] Furthermore, as the fixing apparatus supports both ends of the corners using the fixing bodies, movement thereof can be prevented even when the fixing apparatus is fixed by one support bar. Since the fixing force can be maintained even when the plurality of support bars are not used, the number of installed support bars can be reduced.

[0043] In addition, in the fixing apparatus, one of the pair of support bars is connected such that the slide rails are fixed to the inside of the main body and the other of the pair of support bars is connected to surround the corners of the support bars, increasing the fixing force of the pair of support bars and improving the fixing strength by minimizing movement when the shelf is moved.

[0044] Further, the fixing apparatus connects the pair of support bars and is supported at one side end and the other side end in different directions of the horizontal direction and the vertical direction to increase the fixing force. As the weight is moved with movement of the shelf, the torsional stress applied to the fixing apparatus is effectively distributed at the fixing apparatus configured to support the shelf in different directions. Accordingly, damage and deformation due to concentration of the stress can be prevented to increase the lifespan.

[0045] Furthermore, at least one or more elastic bodies moved by elasticity are formed at the fixing body inserted into the fixing apparatus at the other side corner position to support the extension bars and the support bars according to the positions of the pair of support bars. Accordingly, the elastic bodies are moved by elasticity upon insertion of the support bars to enable easy attachment, and return by the elastic force after the attachment to be hooked and fixed to the support bars. As a result, the fixing apparatus can be assembled by a push operation of the support bars into the fixing apparatus, improving assembly efficiency.

[0046] In addition, the fixing apparatus has a structure configured to connect the pair of support bars and surround

both ends to distribute the load and stress generated due to movement of the shelf. Accordingly, the fixing force is increased, and the stress generated due to movement of the shelf can be effectively distributed. As a result, the fixing state can be maintained even when the thickness of the fixing apparatus is reduced, decreasing manufacturing cost.

[0047] Further, as the fixing apparatus for connecting the pair of support bars to each other to support the shelf inside the main body and fix the slide rails is provided, the conventional pair of support bars can be used with no interior design change, increasing universality.

[Description of Drawings]

[0048] The above and other aspects and advantages of the present invention will become apparent and more readily appreciated from the following description of exemplary embodiments, taken in conjunction with the accompanying drawings of which:

FIG 1 is a perspective view showing a state in which a slide rail fixing apparatus according to a first embodiment of the present invention is installed;

FIG. 2 is a perspective view of major parts showing a state in which the slide rail fixing apparatus of FIG. 1 is installed at lower-mounted slide rails;

FIG. 3 is a perspective view showing a fixing apparatus disposed at one side of the slide rail fixing apparatus of FIG. 1;

FIG. 4 is a rear perspective view of the slide rail fixing apparatus of FIG. 3;

FIG. 5 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 1 is inserted;

FIG. 6 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 1 is installed;

FIG. 7 is a perspective view showing a slide rail fixing apparatus according to a second embodiment of the present invention;

FIG. 8 is a rear perspective view of the slide rail fixing apparatus of FIG. 7;

FIG. 9 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 7 is inserted;

FIG. 10 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 7 is installed;

FIG. 11 is a use state view showing a state in which a slide rail fixing apparatus according to a third embodiment of the present invention is installed;

FIG. 12 is a use state view showing a state in which the slide rail fixing apparatus of FIG. 11 is installed at lower-mounted slide rails;

FIG. 13 is a perspective view showing the slide rail fixing apparatus of FIG. 11;

FIG. 14 is a partially-cut side surface showing a state in which the slide rail fixing apparatus of FIG. 11 is installed;

FIG. 15 is a use state view of major parts showing a state in which the slide rail fixing apparatus of FIG. 11 is installed; and

FIG. 16 is a use state view showing a state in which the slide rail fixing apparatus of FIG. 11 is installed.

<Description of Major Reference Numerals>

[0049]

10: main body	11: support bar
12: corner portion	13: fixing bar
20: drawer	30: slide rail
100: fixing apparatus	110: fixing body
111: fixing upper plate	112: fixing lower plate
113: connecting plate	114: fixing space
115: bent groove	116: elastic body
117: side surface connecting body	118: separation groove
120: support unit	121: upper fixing piece
121 a: upper body	121b: upper connecting body
121 c: upper extension body	122: lower fixing piece
122a: lower body	122b: lower connecting body
122c: lower extension body	123: support space
40: main body	41: support bar
42: connecting bar	43: protrusion
44: corner portion	45: extension bar

(continued)

46: fixing bar	50: shelf
60: slide rail	200: support fixing apparatus
210: support unit	211: support member
211 a: support body	211 b: support protrusion
211 c: support fixing body	212: support space
213: support projection	220: support fixing unit
221: support fixing body	222: insertion fixing piece
223: support fixing space	224: side surface fixing piece
224a: side surface body	224b: side surface support member
224c: side surface extension body	225: bent groove
226: elastic body	

[Mode for Invention]

[0050] Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings. However, it will be apparent to those skilled in the art that the following embodiments can be readily understood and modified into various types, and the scope of the present invention is not limited to the embodiments. Like elements are designated by like reference numerals throughout the specification.

[0051] A slide rail fixing apparatus according to a first embodiment of the present invention will be described with reference to FIGS. 1 to 5.

[0052] FIG 1 is a perspective view showing a state in which a slide rail fixing apparatus according to a first embodiment of the present invention is installed, FIG. 2 is a perspective view of major parts showing a state in which the slide rail fixing apparatus of FIG. 1 is installed at lower-mounted slide rails, FIG. 3 is a perspective view showing a fixing apparatus disposed at one side of the slide rail fixing apparatus of FIG. 1, FIG. 4 is a rear perspective view of the slide rail fixing apparatus of FIG. 3, and FIG. 5 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 1 is inserted.

[0053] Referring to FIGS. 1 to 5, support bars 11 are installed at both inner sides of a main body 10 of an oven, or the like, at a position at which a drawer 20 accommodating a substance is drawn out and pushed in. The support bars 11 protrude from both sides toward a central direction at facing positions, and have corner portions 12 bent toward an inner wall surface of the main body 10 from both ends in a horizontal direction in which the support bars 11 protrude. In addition, fixing bars 13 connected to the corner portions 12 to fix the support bars 11 to the main body 10 are fixed to inner surfaces of the main body 10.

[0054] The above-mentioned support bars 11 may be fixed to both sides of the main body in plural by the fixing bars 13 according to the number of installed drawers 20. In addition, the plurality of support bars 11 can be fixed to the main body 10 by the fixing bars 13 connected to both sides thereof, respectively. The fixing bars 13 may be fixed to integrated fixing means and the fixing means may be coupled to the main body 10 such that the plurality of support bars 11 and the fixing bars 13 can be fixed together by the fixing means to improve installation convenience.

[0055] As described above, in order to install the drawer 20 slid in the horizontal direction after the support bars 11 are fixed to the inside of the main body 10 by the fixing bars 13, slide rails 30 are fixed to both sides of the drawer 20 to be slidably coupled to the support bars 11, and fixing apparatuses 100 are installed between the slide rails 30 and the support bars 11 to fix the slide rails 30 to the support bars 11, so that the drawer 20 is slidably coupled to the main body 10.

[0056] Here, the fixing apparatuses 100 are installed at the slide rails 30 installed at both sides to be fixed to the support bars 11 such that the drawer 20 is slidably coupled to the main body 10. While the apparatus in which the slide rails 30 configured to slide the drawer 20 is installed at the side surfaces and the fixing apparatuses 100 are installed at the side surfaces of the slide rails 30 to be slid on the side surfaces as shown in FIG. 1, and the apparatus in which the fixing apparatuses 100 are installed at lower portions of the rails on which the drawer 20 is slid has been described, they are provided for the convenience of description. Since the slide rails 30 may include conventional slide rails, in addition to the slide rails installed at side surfaces or lower parts, the fixing apparatuses 100 can also be installed at various positions according to the slide rails.

[0057] As described above, the fixing apparatuses 100 for fixing the slide rails 30 to the support bars 11 fixed to the main body 10 by the fixing bars 13 are fixed to the slide rails 30 to which the support bars 11 are fixed, and include fixing bodies 110 and support units 120. The fixing bodies 110 are disposed at one sides of the slide rails 30 fixed to the support bars 11 and surround both portions of the support bars 11 and the corner portions 12 connected to both ends when the support bars 11 are fixed in facing directions, and include fixing upper plates 111, fixing lower plates 112, connecting plates 113, and elastic bodies 116, respectively.

[0058] The fixing upper plates 111 are disposed at one sides of the slide rails 30, at which the support bars 11 are fixed, and at upper positions of the corner portions 12 connected to both portions of the support bars 11 and both ends of the support bars 11, and have a plate shape such that both portions of the support bars 11 are brought in contact with upper portions of the corner portions 12 connected to both ends upon insertion of the support bars 11. The fixing upper plates 111 are disposed at facing positions and spaced apart from each other, and have a width such that both corresponding outer side surfaces can partially cover the fixing bars 13 in facing directions. That is, the fixing upper plates 111 disposed at facing positions have a width such that the support units 120 are formed to support the fixing bars 13 disposed at both outer side surfaces and spaced apart from each other. The fixing upper plates 111 may be disposed and supported at both side portions of the support bars 11 and upper portions of the corner portions 12 connected to both ends when the slide rails 30 are fixed.

[0059] The fixing lower plates 112 are disposed at one sides of the slide rails 30, to which the support bars 11 are fixed, and at lower positions of the corner portions 12 connected to both portions of the support bars 11 and both ends of the support bars 11, and have a plate shape such that both portions of the support bars 11 are brought in contact with the lower portions of the corner portions 12 connected to both portions when the support bars 11 are inserted. The fixing lower plates 112 are disposed at lower portions of the facing fixing upper plates 111, and have a width such that both corresponding outer side surfaces can cover portions of the fixing bars 13 in facing directions. That is, the fixing lower plates 112 disposed at facing positions and spaced apart from each other have a width such that the support units 120 supports the fixing bars 13 disposed at both outer side surfaces and spaced part from each other, respectively. The fixing lower plates 112 may be disposed at both portions of the support bars 11 and lower parts of the corner portions 12 connected to both ends when the slide rails 30 are fixed.

[0060] In addition, bent grooves 115 are formed to pass through the fixing lower plates 112 according to shapes of the elastic bodies 116, except for portions of the support bars 11 in the insertion direction.

[0061] The connecting plates 113 connect the fixing upper plates 111 to the fixing lower plates 112 in a direction in which the slide rails 30 are fixed, and have fixing spaces 114 between the fixing upper plates 111 and the fixing lower plates 112 such that a direction in which the support bars 11 are inserted is opened and a direction of the slide rails 30 is closed. The fixing spaces 114 have both side surfaces at which the fixing bars 13 are disposed, one side surfaces opened such that the support bars 11 are inserted, upper portions closed by the fixing upper plates 111, and lower portions closed by the fixing lower plates 112, so that a direction of the slide rails 30 is closed by the connecting plates 113. That is, when the support bars 11 are inserted into the fixing spaces 114, the fixing bars 13 are disposed at both outer side surfaces in communication with each other and corresponding to facing directions, and the fixing upper plates 111, the fixing lower plates 112 and the connecting plates 113 surround the remaining portion to support the support bars 11. In other words, the corner portions 12 connected to both portions of the support bars 11 inserted into the fixing spaces 114 and both ends of the support bars 11 are closed at the upper portions, the lower portions and the direction of the slide rails 30, a partial position into which the support bars 11 are inserted and the other positions except for the side surfaces form a closed curve shape and support the support bars 11 to support both ends to which the loads are concentrated, and thus, a material cost can be reduced and the attachment can be easily performed while providing a support force similar to support of the entire support bars 11.

[0062] The elastic bodies 116 protrude from centers of the fixing lower plates 112 in a direction of the fixing spaces 114, and are partially connected to the support bars 11 in the insertion direction to be moved by elasticity. When the support bars 11 are inserted, the elastic bodies 116 are moved and inserted in the direction of the fixing lower plates 112, and after the insertion, the support bars 11 inserted by protrusion of the elastic bodies 116 in the direction of the fixing spaces 114 are fixed to the inside of the fixing spaces 114. In the specification, while the elastic bodies 116 are respectively formed at all of the fixing lower plates 112 spaced apart from each other, this corresponds to only one embodiment. That is, even when the elastic body is installed at any one of the fixing lower plates 112 installed at both sides, it also falls within the scope of the present invention.

[0063] The support units 120 respectively protrude from both outer side surfaces corresponding to directions in which the fixing bodies 110 face each other, and protrude from both outer side surfaces of the fixing bodies 110 from the corner portions 12 to portions of the fixing bars 13 to surround portions of the fixing bars 13 at the corner portions 12. The support units 120 include upper fixing pieces 121 and lower fixing pieces 122. The upper fixing pieces 121 and the lower fixing pieces 122 surround portions of the fixing bars 13 from the corner portions 12, respectively, and have support spaces 123 in which portions of the corner portions 12 and the fixing bars 13 are disposed.

[0064] The upper fixing pieces 121 protrude from the fixing upper plates 111 installed at facing positions to surround the fixing bars 13, and protrude from the insertion direction of the support bars 11 of the fixing upper plates 111 to the central position in a direction of the fixing bars 13 to surround the fixing bars 13 and extend in the direction of the fixing lower plates 112, supporting the fixing bars 13.

[0065] The upper fixing pieces 121 include upper bodies 121a, upper connecting bodies 121b, and upper extension bodies 121c that protrude from the insertion direction of the support bars 11 of the fixing upper plates 111 to the central position in the direction of the fixing bars 13 and are brought in contact with upper portions of the fixing bars 13. The

upper bodies 121a protrude from the insertion direction of the support bars 11 of the fixing upper plates 111 to the central position such that the upper portion is supported by the fixing bars 13 at outer surface positions of the fixing bars 13.

[0066] The upper connecting bodies 121b are connected from an end of the upper bodies 121 a in the direction of the fixing bars 13 to the direction of the fixing lower plates 112, and installed to be supported by the outer surfaces of the fixing bars 13 when the support bars 11 are inserted. The upper connecting bodies 121b are connected to the upper bodies 121 a supporting the upper portions of the fixing bars 13 to support the outer surfaces of the fixing bars 13. The upper connecting bodies 121b are connected to the upper bodies 121a and disposed at the outer surfaces of the fixing bars 13, and protrude to support the outer surfaces of the fixing bars 13 supported by the upper bodies 121a at the upper portions.

[0067] The upper extension bodies 121c protrude from the upper connecting bodies 121b in the direction of the fixing lower plates 112, and contact and support the lower portions of the fixing bars 13 when the support bars 11 are inserted. The upper extension bodies 121 c are spaced apart from the fixing lower plates 112 and supported by the lower portions of the fixing bars 13 to surround the fixing bars 13 with the upper bodies 121 a and the upper connecting bodies 121b. That is, the upper bodies 121 a, the upper connecting bodies 121b and the upper extension bodies 121c protrude from the side surfaces of the fixing upper plates 111 to surround the lower portions in an upward direction, and surround and support the fixing bars 13 when the support bars 11 are inserted, increasing the fixing force and effectively distributing the torsional stress generated from the upward direction to the downward direction.

[0068] The lower fixing pieces 122 protrude from the fixing lower plates 112 installed at facing positions to surround the fixing bars 13, and protrude from the direction of the connecting plates 113 of the fixing lower plates 112 to the central position spaced from the upper fixing pieces 121 in the direction of the fixing bars 13 to surround the fixing bars 13 and extend in the direction of the fixing upper plates 111, supporting the fixing bars 13. The lower fixing pieces 122 surrounded from the downward direction to the upward direction are installed to support the fixing bars 13 in a direction opposite to the upper fixing pieces 121 surrounded from the upward direction to the downward direction. Accordingly, when the torsional stress is vertically applied, the upper fixing pieces 121 and the lower fixing pieces 122 distribute the stress according to the direction of the load, and thus damage and deformation due to concentration of stress can be prevented and the fixing force can be increased.

[0069] The lower fixing pieces 122 include lower bodies 122a, lower connecting bodies 122b and lower extension bodies 122c that protrude from the central position of the fixing lower plates 112 spaced apart from the upper fixing pieces 121 in the direction of the connecting plates 113 and are brought in contact with the lower portions of the fixing bars 13. The lower bodies 122a protrude from the central position of the fixing lower plates 112 to a position at which the corner portions 12 are inserted in the direction of the connecting plates 113 such that the lower portions of the fixing bars 13 are supported at the outer surface positions of the fixing bars 13.

[0070] The lower connecting bodies 122b are connected from ends of the lower bodies 122a in the direction of the fixing bars 13 to the direction of the fixing upper plates 111, and installed to be supported by the outer surfaces of the fixing bars 13 when the support bars 11 are inserted. The lower connecting bodies 122b are connected to the lower bodies 122a supporting the upper portions of the fixing bars 13 to support the outer surfaces of the fixing bars 13. The lower connecting bodies 122b are connected to the lower bodies 122a and disposed at the outer surfaces of the fixing bars 13, and protrude to support the outer surfaces of the fixing bars 13, the lower portions of which are supported by the lower bodies 122a.

[0071] The lower extension bodies 122c protrude in the direction of the fixing upper plates of the lower connecting bodies 122b, and contact and support the upper portions of the fixing bars 13 when the support bars 11 are inserted. The lower extension bodies 122c are spaced apart from the fixing upper plates 111, and supported by the upper portions of the fixing bars 13 to surround the fixing bars 13 with the lower bodies 122a and the lower connecting bodies 122b. That is, the lower bodies 122a, the lower connecting bodies 122b and the lower extension bodies 122c protrude from the side surfaces of the fixing lower plates 112 to surround the fixing lower plates 112 from the downward direction to surround and support the fixing bars 13 when the support bars 11 are inserted, and thus the fixing force can be increased and the torsional stress generated from the downward direction to the upward direction can be effectively distributed.

[0072] In addition, an operation of the slide rail fixing apparatus according to the first embodiment of the present invention will be described with reference to FIG. 6.

[0073] FIG. 6 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 1 is installed.

[0074] Referring to FIG. 6, the plurality of fixing bars 13 are fixed to the inside of the main body 10 in the longitudinal direction according to the number of drawers 20, and the support bars 11 having the corner portions 12 are installed at both ends. The slide rails 30 are installed at both sides of the drawer 20 slidably coupled to the main body 10. Here, slide rails 30 have a structure that is slid using a conventional rolling means such as a ball or a roller. The fixing apparatuses 100 are installed at both side surfaces of the slide rails 30 to be fixed to the corner portions 12 of the support bars 11 at facing positions. In addition, the slide rails 30 may include a rail at which the drawer 20 and the fixing apparatuses 100 are installed at the side surface to be slid to the side surfaces, and a rail at which the drawer 20 and the fixing apparatuses

100 are installed at upper and lower sides, installed at a lower portion of the drawer 20.

[0075] When the fixing apparatuses 100 are inserted in the direction of the corner portions 12 disposed at both ends of the support bars 11 upon installation of the drawer 20, the support bars 11 are inserted into the fixing spaces 114 formed inside the fixing bodies 110 and the support units 120 are inserted in the direction of the fixing bars 13. That is, the support bars 11 are inserted into the fixing bodies 110 spaced apart from each other, and the support bars 11 surround and contact the fixing upper plate, the fixing lower plate and the connecting plates 113. In addition, the upper fixing pieces 121 and the lower fixing pieces 122 formed at different side surfaces, which are outward directions of the fixing bodies 110 disposed at both facing sides, are spaced apart from each other, the upper fixing pieces 121 are fixed to surround the fixing bars 13 from the upward direction to the downward direction, and the lower fixing pieces 122 are fixed to surround the fixing bars 13 from the downward direction to the upward direction. Accordingly, the fixing apparatuses 100 surround the support bars 11 and the fixing bars 13 when the slide rails 30 are fixed to increase the fixing force of the slide rails 30 and prevent movement of the drawer 20 when the drawer is moved. In addition, the fixing apparatuses 100 simultaneously surround the support bars 11 and the fixing bars 13 to increase the fixing force and reduce the thickness, reducing manufacturing cost, in comparison with the conventional fixing apparatuses 100.

[0076] In addition, the elastic bodies 116 are provided inside the fixing spaces 114, and the support bars 11 are inserted to be hooked by elasticity, increasing the fixing force.

[0077] The drawer 20 is moved in a state in which a material to be cooked and a substance to be accommodated are received in the drawer 20 upon opening and closing, and thus, the weight is moved according to movement of the drawer 20 so that the weight is concentrated on the fixing apparatuses 100. In particular, when the drawer 20 is moved, torsional stress is generated from the fixing apparatuses 100 disposed at inner and outer sides. The torsional stress is applied to the fixing apparatuses 100 in the downward direction as well as in the upward direction. Accordingly, if the upper and lower portions are not fixed, damage or deformation may occur. Therefore, in the support units 120 supporting the fixing bars 13, the upper fixing pieces 121 surrounding the fixing bars 13 from the upward direction to the downward direction and the lower fixing pieces 122 surrounding the fixing bars 13 from the downward direction to the upward direction are spaced apart from each other to support the fixing bars 13 in the upward direction and the downward direction, and thus, the torsional stress can be effectively distributed to prevent deformation and damage, increasing the lifespan.

[0078] Next, a slide rail fixing apparatus according to a second embodiment of the present invention will be described with reference to FIGS. 7 to 9.

[0079] FIG. 7 is a perspective view showing a slide rail fixing apparatus according to another embodiment of the present invention, FIG. 8 is a rear perspective view of the slide rail fixing apparatus of FIG. 7, and FIG 9 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 7 is inserted.

[0080] Referring to FIGS. 7 to 9, the slide rail fixing apparatuses 100 according to the second embodiment of the present invention are substantially the same as the slide rail fixing apparatuses 100 shown in FIGS. 1 to 5 having the structure installed at the slide rails 30 to fix the slide rails 30 to the main body 10, and thus description thereof will not be repeated.

[0081] In addition, the slide rail fixing apparatuses 100 according to the second embodiment of the present invention include fixing bodies 110. Here, some elements of the fixing bodies 110 are substantially equal to the fixing apparatuses 100 shown in FIGS. 1 to 5, and description thereof will not be repeated.

[0082] The fixing bodies 110 are spaced apart from each other and disposed at facing positions of one side surfaces of the slide rails 30 to support both sides of the support bars 11, the side surfaces facing the direction in which the support bars 11 are fixed are opened, and the fixing bodies 110 are closed such that both portions of the support bars 11 and upper and lower portions of the fixing bars 13 connected to the corner portions 12 are closed to connect to each other in the direction of the slide rails 30. The fixing bodies 110 include fixing upper plates 111, fixing lower plates 112, elastic bodies 116, and side surface connecting bodies 117. The fixing upper plates 111 are spaced apart from each other in a fixing direction of the support bars 11 of the slide rails 30 and disposed on both portions of the support bars 11 and portions of the fixing bars 13 connected to the corner portions 12, have a plate shape supporting both side portions of the support bars 11 and upper portions of the corner portions 12 and the fixing bars 13 connected thereto, and have a width to cover portions of the corner portions 12 and the fixing bars 13 at both sides of the support bars 11.

[0083] The fixing lower plates 112 are spaced apart from each other in the fixing direction of the support bars 11 of the slide rails 30 and disposed at both portions of the support bars 11 and lower portions of the fixing bars 13 connected to the corner portions 12, and have a plate shape to support both side portions of the support bars 11 and lower portions of the corner portions 12 and the fixing bars 13 connected thereto. The fixing lower plates 112 have the same width as the fixing upper plates 111, and the fixing upper plates 111 and the fixing lower plates 112 are disposed to contact both upper and lower portions of the support bars 11, and thus portions of the corner portions 12 and the fixing bars 13 disposed at both ends are brought in contact with the upper and lower portions and both ends of the support bars 11 are brought in contact with the upper and lower portions in the longitudinal direction and the horizontal direction.

[0084] The connecting plates 113 connect the fixing upper plates 111 and the fixing lower plates 112 in the direction of the slide rails 30, and close the direction of the slide rails 30 to support the support bars 11 by bringing both portions

of the support bars 11 inserted between the fixing upper plates 111 and the fixing lower plates 112 in contact with each other in the direction of the slide rails 30. That is, the connecting plates 113 connect the fixing upper plates 111 and the fixing lower plates 112 to form the fixing spaces 114, in which the inserted portion of the support bars 11 inserted therein and the facing side surfaces are opened and the others form a closed curve. As a result, the support bars 11 can be

[0085] In addition, bent grooves 115 are formed to pass through the fixing lower plates 112 according to the shapes of the elastic bodies 116, except for portions of the support bars 11 in the insertion direction. The elastic bodies 116 partially connected along the bent grooves 115 are formed to protrude in the direction of the fixing spaces 114 and move by elasticity.

[0086] The side surface connecting bodies 117 connect the fixing upper plates 111 and the fixing lower plates 112 to close the outer surfaces corresponding to the facing directions, and are formed to support the outer surfaces of the fixing bars 13 from the direction of the connecting plates 113 to the insertion direction of the support bars 11 when the support bars 11 are inserted. The side surface connecting bodies 117 connect the outer surfaces of the fixing upper plates 111 and the fixing lower plates 112 disposed at facing positions, and are formed to surround the fixing bars 13 when the support bars 11 are inserted and fixed, supporting the fixing bars 13 upon insertion of the support bars 11. That is, the side surface connecting bodies 117 connect the fixing upper plates 111 and the fixing lower plates 112 to close outer surfaces corresponding to the facing directions to close the outer surfaces of the fixing spaces 114, so that the outer surfaces of the fixing bars 13 connected to both ends of the support bars 11 by the corner portions 12 can contact each other to be supported. In other words, both side portions of the support bars 11 and portions of the corner portions 12 and the fixing bars 13 connected thereto close the direction of the slide rails 30 using the connecting plates 113 in a state in which the upper and lower portions are brought in contact with the fixing upper plates 111 and the fixing lower plates 112, and close the outer surfaces of the fixing bars 13 in the longitudinal direction using the side surface connecting bodies 117 so that the facing directions in which the support bars 11 are inserted and the corner portions 12 and the fixing bars 13 disposed at both sides and the direction in which the support bars 11 are inserted are opened, and the remaining portions form a closed curve shape. As a result, the attachment can be easily performed, and the fixing force of both ends can be increased.

[0087] In addition, the fixing spaces pass from the center of the side surface connecting bodies 117 in the longitudinal direction to the center of the fixing upper plates 111 in the horizontal direction, and are brought in communication with each other to divide the connecting plates 113 and the fixing lower plates 112 at the center of the fixing upper plates 111 in the horizontal direction. The fixing upper plates 111, the connecting plates 113 and the fixing lower plates 112 are divided at the center in the horizontal direction in a state in which they are partially connected to the side surface connecting bodies 117, and thus the center in the horizontal direction can be divided to support them in different directions. That is, after the slide rails 30 are fixed by the fixing apparatuses 100, the slide rails can be separated in the horizontal direction according to movement of the drawer 20 to be supported in different directions. Accordingly, the torsional stress generated in the fixing apparatuses 100 can be distributed to minimize the damage and deformation.

[0088] In addition, an operation of the slide rail fixing apparatus according to the second embodiment of the present invention will be described with reference to FIG. 10.

[0089] FIG. 10 is a partially-cut perspective view showing a state in which the slide rail fixing apparatus of FIG. 7 is installed.

[0090] Referring to FIG. 10, when the support bars 11 are inserted into the fixing spaces 114 of the fixing apparatuses 100 upon installation of the drawer 20, the elastic bodies 116 partially connected thereto are elastically moved in the direction of the fixing lower plates 112 to enable easy insertion of the support bars 11. When the support bars 11 are inserted, the fixing bars 13 are surrounded and supported inside the side surface connecting bodies 117 formed at the outer surfaces corresponding to the facing positions. Accordingly, the support bars 11 and the fixing bars 13 are simultaneously surrounded to prevent movement when the drawer 20 is moved and improve the fixing force.

[0091] In addition, the fixing bodies 110 pass from the center of the side surface connecting bodies 117 in the longitudinal direction to the center of the fixing upper plates 111 in the horizontal direction, and separation grooves 118 are formed to pass through the ends to divide the connecting bodies 113 and the fixing lower plates 112. Accordingly, the support bars 11 and the fixing bars 13 can be supported in a state in which they are partially connected to the side surface connecting bodies 117 and the central position in the horizontal direction of the fixing upper plates 111, and the connecting plates 113 and the fixing lower plates 112 are divided. That is, since the fixing bodies 110 respectively supporting the support bars 11 and the fixing bars 13 are separated from the central position in the horizontal direction by the separation grooves 118, stress applied in different directions can be effectively distributed. In other words, the torsional stress applied to the fixing apparatuses 100 upon movement of the drawer 20 is applied in various directions, with no particular limitation on the direction. Accordingly, the torsional stress applied in different directions at the fixing bodies 110 can be effectively distributed, and thus damage and deformation due to the torsional stress can be prevented, increasing the lifespan.

[0092] In addition, a slide rail fixing apparatus according to a third embodiment of the present invention will be described

with reference to FIGS. 11 to 15.

[0093] FIG. 11 is a use state view showing a state in which a slide rail fixing apparatus according to a third embodiment of the present invention is installed, FIG. 12 is a use state view showing a state in which the slide rail fixing apparatus of FIG. 11 is installed at lower-mounted slide rails, FIG. 13 is a perspective view showing the slide rail fixing apparatus of FIG. 11, FIG. 14 is a partially-cut side surface showing a state in which the slide rail fixing apparatus of FIG. 11 is installed, and FIG. 15 is a use state view of major parts showing a state in which the slide rail fixing apparatus of FIG. 11 is installed.

[0094] Referring to FIGS. 11 to 15, slide rails 60 are fixed to the inside of a main body 40 at which a pair of support bars 41 are installed to support a shelf 50 of an oven, or the like, by support fixing apparatuses 200.

[0095] The pair of support bars 41 disposed at both sides to support the shelf 50 installed at the oven are connected to the inside by connecting bars 42, and are bent outward in the direction of the main body 40 to form extension bars 45 connected by corner portions 44. Fixing bars 46 are installed at inner and outer sides of the main body in the horizontal direction and disposed at facing positions. The fixing bars 46 disposed inside have protrusions 43 protruding in the direction of the connecting bars 42 of the pair of support bars 41, and the fixing bars 46 disposed outside have a pair of extension bars 45 connected to the pair of support bars 41 by the corner portions 44. The pair of support bars 41 are provided in plural in the longitudinal direction according to the number of shelves 50, and installed inside the main body 40 in a state fixed to the fixing bars 46.

[0096] In order to install the shelf 50 slid along the slide rails 60 at the main body 40 having the pair of support bars 41, the slide rails 60 can be fixed by the support fixing apparatuses 200. Here, the slide rails 60 include a side surface mounting type slide rail installed at side surfaces of the shelf 50 and fixed by the support fixing apparatuses 200 as shown in FIG. 1, and a lower-mounted slide rail installed at a lower portion of the shelf 50 and fixed by the support fixing apparatuses 200 as shown in FIG. 2. This is for convenience of description. The slide rails 60 can be slid through rolling movement to be fixed to various positions of the shelf 50, and can be fixed to the main body 40 by the support fixing apparatuses 200 according to the position fixed to the shelf 50, which is not limited to the mounting position.

[0097] As described above, the support fixing apparatuses 200 for fixing the slide rails 60 to the pair of support bars 41 fixed to the main body 40 by the fixing bars 46 include support units 210 and support fixing units 220, which are supported at the connecting bars 42 of the slide rails 60 together with the pair of support bars 41. The support units 210 include support members 211 fixed to one side surfaces of the slide rails 60, and support projections 213. The support members 211 are fixed to one side surfaces of the slide rails 60 fixed to the support bars 41, and installed at positions at which the connecting bars 42 are inserted when the support bars 41 are supported. The support members 211 are opened at one side ends in the other side direction to surround and support the connecting bars 42 in an inserted state, and the support members 211 are moved in a state in which the connecting bars 42 are supported to contact and support the pair of support bars 41 at the one side surfaces, simultaneously supporting the pair of support bars 41 and the connecting bars 42.

[0098] The support members 211 include support bodies 211a, support protrusions 211b, and support fixing bodies 211c, which are fixed to one sides of the slide rails 60. The support bodies 211 a are disposed at one sides of the slide rails 60, and contact one side surfaces to support the pair of support bars 41 when the support bars 41 are fixed.

[0099] The support protrusions 211b protrude from one side ends of the support bodies 211 a in the direction of the pair of support bars 41, and are formed to contact side surfaces of the pair of connecting bars 42 connecting the pair of support bars 41.

[0100] The support fixing bodies 211c protrude from one side ends of the support protrusions 211b in the other side direction, and protrude to have support spaces 212 surrounded by the connecting bars 42 after the insertion when the other sides are opened and the support bars 41 are supported. The support fixing bodies 211c contact the connecting bars 42 in the direction of the pair of support bars 41 to support the connecting bars 42 upon insertion of the support bars 41, and protrude from the support protrusions 211b in the other side direction. Accordingly, the connecting bars 42 are inserted into the support spaces 212 at the other side opened when the support bars 41 are inserted to surround outer surfaces of the support fixing bodies 211c with the support protrusions 211b, increasing a support force.

[0101] As described above, in a state in which the connecting bars 42 extend from one side ends of the support bodies 211a and are inserted into the support spaces 212 opened at the other side by the support protrusions 211b and the support fixing bodies 211c to surround the connecting bars 42, the pair of support bars 41 can closely contact the support bodies 211 a to fix the support fixing units 220, increasing the support force. That is, the support fixing units 220 are fixed in a state in which the pair of support bars 41 and the connecting bars 42 are simultaneously supported, increasing the support force.

[0102] The support projections 213 protrude from both surfaces of the support members 211 in the direction of the pair of support bars 41, and contact and support both outer surfaces of the pair of support bars 41 in contact with the support members 211 when the support bars 41 are supported. Accordingly, after the connecting bars 42 are supported in a surrounded state, both surfaces are supported to prevent movement of the pair of support bars 41 supported by the support members 211 to increase the support force.

[0103] The support fixing units 220 include support fixing bodies 221, insertion fixing pieces 222, side surface fixing pieces 224, and elastic bodies 226, which are fixed to the other side of the slide rails 60. The support fixing bodies 221 are fixed to the other side of the slide rails 60, and installed at positions of the pair of support bars 41 at which the corner portions contact when the support bars 41 are fixed.

[0104] The insertion fixing pieces 222 protrude from both surfaces of the support fixing bodies 221 in the direction of the pair of support bars 41 at facing positions, and have fixing spaces 223 opened at both sides in the direction of the pair of support bars 41 such that outer surfaces of the pair of support bars 41 are fixed when the support bars 41 are fixed. The fixing spaces 223 move the slide rails 60 in a state in which the pair of support bars 41 are supported by the support units 210. When the pair of support bars 41 are inserted, the corner portions 44 are formed to contact the support fixing bodies 221. The insertion fixing pieces 222 protrude at facing positions to fix both outer surfaces of the pair of support bars 41 at which the corner portions 44 connecting the extension bars 45 are in contact with the support fixing bodies 221 in a state in which the pair of support bars 41 are supported in the direction of the connecting bars 42. The insertion fixing pieces 222 are inserted into the fixing spaces 223 and fixed in a state in which both surfaces of the pair of support bars 41 are supported, and the pair of support bars 41 are kept connected to each other. In addition, bent grooves 225 are formed to pass through the insertion fixing pieces 222 facing each other according to the shape of the elastic bodies 226, except for portions at which the pair of support bars 41 are inserted.

[0105] The side surface fixing pieces 224 protrude from the other side end of the insertion fixing pieces 222 facing each other, and have a shape to surround the outer surfaces, except for one side, in a state in which the extension bars 45 are inserted into the open one side when the support bars 41 are fixed. The side surface fixing pieces 224 protrude to surround the extension bars 45 inserted into one side of the insertion fixing pieces 222 facing each other and opened to the side surfaces. That is, when one sides of the pair of support bars 41 are supported by the support units 210 with the connecting bars 42 and the pair of support bars 41 are inserted in the direction of the fixing spaces 223, the pair of support bars 41 and the extension bars 45 are fixed to the insertion fixing pieces 222 and the side surface fixing pieces 224. Accordingly, the connecting bars 42 connecting the pair of support bars 41 and the support bars 41, and the extension bars 45 connected to the corner portions 44 of the support bars 41 and extending in the direction of the main body 40 are simultaneously fixed. As a result, movement caused by movement of the shelf 50 is prevented, and the torsional stress generated by movement of the weight according to movement of the shelf 50 can be effectively distributed, improving the fixing force.

[0106] As described above, the side surface fixing pieces 224 include side surface bodies 224a, side surface support members 224b, and side surface extension bodies 224c, which protrude in the other side direction of the insertion fixing pieces 222 facing each other. The side surface bodies 224a protrude in the other side direction of the insertion fixing pieces 222 facing each other, and protrude from the support fixing bodies 221 in the other side direction such that the corner portions 44 are exposed to the outside when the support bars 41 are fixed. The side surface bodies 224a protrude to contact both outer surfaces of the pair of extension bars 45 via the corner portions 44 upon insertion of the support bars 41.

[0107] The side surface support members 224b protrude from the other side end of the side surface bodies 224a in the direction of the fixing spaces 223 facing each other, and contact the other side surfaces of the pair of extension bars 45 upon insertion of the support bars 41.

[0108] The side surface extension bodies 224c protrude from ends of the side surface support members 224b in the direction of the fixing spaces 223 to one side direction, and contact side surfaces of the extension bars 45 facing the side surface bodies 224a in the direction of the fixing spaces 223. That is, the side surface bodies 224a, the side surface support members 224b and the side surface extension bodies 224c are opened at one sides in communication with the fixing spaces 223 to surround the pair of extension bars 45 inserted through the corner portions 44, except the one sides, and connect the extension bars 45, respectively.

[0109] When the shelf 50 in which a substance is accommodated is moved in the drawing-out and pushing-in direction, an acting point of the weight is varied according to the moved position, and thus torsional stress according to variation in the acting point is generated from the support fixing apparatuses 200 fixed to the pair of support bars 41. That is, when the position of the weight is varied to vary the acting point, a load generating position is varied at the acting point. According to variation in the load generating position, the stress applied to the support fixing apparatuses 200 supporting the load is not applied in a uniform direction and size, and stress having a varied direction and size is generated according to variation in the acting point. The support fixing apparatuses 200 fix the slide rails 60 to the pair of support bars 41. When the stress varied according to the fixed position is applied, the torsional stress applied in different directions is generated from the support fixing apparatuses 200. The torsional stress is not applied in one direction but applied in various directions. In particular, the stress is further concentrated on positions of the connecting bars 42 of the pair of support bars 41, which are ends in which an opening state and a closing state of the shelf 50 are maintained, and positions of the extension bars 45 connected to the corner portions 44. Accordingly, the pair of support bars 41 are fixed by the support units 210 and the support fixing units 220, and the torsional stress generated by surrounding and fixing the pair of support bars 41, the connecting bars 42 and the extension bars 45 are effectively distributed in a state in

which the pair of support bars 41 are connected to each other, and thus damage and deformation due to the torsional stress can be prevented to increase the lifespan.

[0110] The elastic bodies 226 protrude from the insertion fixing pieces 222 facing each other in the direction of the fixing spaces 223, and are partially connected to the insertion fixing pieces 222 to be moved by elasticity. The elastic bodies 226 protrude in the direction of the fixing spaces 223 to be integrally formed with the insertion fixing pieces 222 while partially connected by the bent grooves 225 of the insertion fixing pieces 222. The elastic bodies 226 are moved in the direction of the insertion fixing pieces 222 by elasticity when the pair of support bars 41 are inserted, and when the pair of support bars 41 are inserted after movement, the elastic bodies protrude in the direction of the fixing spaces 223 to hook and fix the pair of support bars 41.

[0111] In addition, an operation of the slide rail fixing apparatus according to an embodiment of the present invention will be described with reference to FIG. 16.

[0112] FIG. 16 is a use state view showing a state in which the slide rail fixing apparatus of FIG. 11 is installed.

[0113] Referring to FIG. 16, the fixing bars 46 are formed in plural at both side surfaces of the main body 40, and the pair of support bars 41 are arranged in plural according to the number of shelves 50. The connecting bars 42 connecting the support bars 41 are formed at one sides of the pair of support bars 41, and the protrusions 43 protruding to be fixed to the fixing bars 46 are formed at one sides of the pair of support bars 41. The extension bars 45 bent in the direction of the main body 40 and connected to the corner portions 44 are formed at the other side ends of the pair of support bars 41, and the extension bars 45 are fixed to the fixing bars 46. Accordingly, the pair of support bars 41 are respectively fixed to the fixing bars 46 by the protrusions and the extension bars 45 connected to the corner portions 44.

[0114] In order to fix the slide rails 60 after installation of the pair of support bars 41, first, the connecting bars 42 are inserted into the support spaces 212 opened toward the other side and defined by the support protrusions 211b protruding from one sides of the support bodies 211a in the direction of the pair of support bars 41 and the support fixing bodies 211c protruding from ends of the support protrusions 211b in the direction of the support bars 41 to the other side. When the slide rails 60 are moved in the direction of the pair of support bars 41 after insertion of the connecting bars 42, the pair of support bars 41 are inserted into the fixing spaces 223 formed between the insertion fixing pieces 222 facing each other and enabling insertion of the pair of support bars 41 of the support fixing bodies 221.

[0115] Here, the corner portions 44 are inserted into the side surface bodies 224a protruding from the insertion fixing pieces 222 facing each other in the other side direction, the side surface support members 224b protruding from ends of the side surface bodies 224a toward the fixing spaces 223 in facing directions, and the side surface extension bodies 224c protruding from ends of the side surface support members 224b in the one side direction. The extension bars 45 connected after insertion of the corner portions 44 are inserted inward. That is, when the pair of support bars 41 are inserted into the fixing spaces 223, the extension bars 45 are simultaneously inserted into the side surface fixing pieces 224 with one sides open and the others surrounded. Accordingly, the extension bars 45 connected to the corner portions 44 can be fixed to the pair of support bars 41.

[0116] As described above, when the pair of support bars 41 are inserted into the fixing spaces 223, the protruding elastic bodies 226 are pressed to elastically move in the direction of the insertion fixing pieces 222 to be easily inserted. After the insertion, the elastic bodies 226 protrude in the direction of the fixing spaces 223 facing each other, fixing the pair of fixing bars 46. In addition, when the pair of support members 211 are fixed by the elastic bodies 226, the extension bars 45 connected to the pair of support bars 41 by the corner portions 44 are fixed to connect the pair of support bars 41 to the support fixing bodies 221, increasing the fixing force.

[0117] As described above, when the slide rails 60 are fixed by the support fixing units 220, the support bodies 211a are moved in the direction of the pair of support bars 41, and both outer sides of the pair of support bars 41 are brought in contact with the support projections 213 projecting from the support members 211 to be supported at their positions, preventing movement. Accordingly, when the slide rails are fixed by the support fixing units 220, the support members 211 are moved and the pair of support bars 41 are supported by the support projections 213. As a result, the connecting bars 42 and the pair of support bars 41 inserted into the support spaces 212 are simultaneously supported to increase the support force.

[0118] As described above, the connecting bars 42 and the pair of extension bars 45 formed at both ends of the pair of support bars 41 are fixed by the support fixing apparatuses 200 and the pair of support bars 41 are connected to each other at both sides, preventing movement thereof and preventing damage and deformation by effectively distributing the torsional stress generated due to movement of the shelf 50.

[0119] The foregoing description concerns an exemplary embodiment of the invention, is intended to be illustrative, and should not be construed as limiting the invention. The present teachings can be readily applied to other types of devices and apparatuses. Many alternatives, modifications, and variations within the scope and spirit of the present invention will be apparent to those skilled in the art.

[Industrial Applicability]

[0120] According to the present invention, a drawer slidable to accommodate and withdraw a substance is easily detachably installed at a main body of a home appliance such as a refrigerator or a dishwasher, cooking equipment such as an oven, and furniture for accommodating and storing various goods, improving use convenience.

Claims

1. A slide rail fixing apparatus for fixing slide rails coupled to both sides of a drawer to corner portions of support bars protruding from both inner sides of a main body in a central direction and connected to fixing bars at both ends of the main body in a horizontal direction, the slide rail fixing apparatus comprising:

a first fixing body disposed at one fixed surface of the slide rail, disposed at one corner portion of both ends upon insertion of the support bars to be opened in the insertion direction of the support bars and facing directions of the support bars, the corner portion and the fixing bar, and closed at the remaining portions to surround the one corner portion in a closed curve; and

a second fixing body disposed at one fixed surface of the slide rail, disposed at the other corner portion of both ends upon insertion of the support bars, which is one side facing the first support unit, to be opened in the insertion direction of the support bars and facing directions of the support bars, the corner portion and the fixing bar, and closed at the remaining portions to surround the other corner portion in a closed curve,

wherein the first fixing body and the second fixing body are disposed at facing positions to surround both outer surfaces of the corner portions in different directions, surround the fixing bar connected to the corner portions at both ends of the support bars in a closed curve shape, and opened in a direction in which the support bars are inserted and in facing directions of the support bars, the corner portions and the fixing bars to be inserted and mounted at both ends of the support bars.

2. The slide rail fixing apparatus according to claim 1, further comprising a first elastic body disposed at one surface of the first fixing body into which a portion of the support bar is inserted and in contact therewith, and protruding into the first fixing body to be elastically moved upon insertion of the support bar to fix the support bar, wherein the first elastic body is elastically moved in the direction of the first fixing body upon insertion of the support bar to enable easy insertion of the support bar, and protrudes by elasticity after being inserted to be hooked and fixed in the direction of the first fixing body of the support bar.

3. The slide rail fixing apparatus according to claim 1, further comprising a second elastic body disposed at one surface of the second fixing body into which a portion of the support bar is inserted and in contact therewith, and protruding into the second fixing body to be elastically moved upon insertion of the support bar to fix the support bar, wherein the second elastic body is elastically moved in the direction of the second fixing body upon insertion of the support bar to enable easy insertion of the support bar, and protrudes by elasticity after being inserted to be hooked and fixed in the direction of the second fixing body of the support bar.

4. The slide rail fixing apparatus according to claim 1, wherein the first and second fixing bodies each comprise:

a first fixing plate disposed at one surface of the slide rail, positions at the one corner portion being in contact with a portion of the support bar in one side direction and one side surface of a portion of the fixing bar connected to the one corner portion;

a second fixing plate facing and spaced apart from the first fixing plate, and in contact with the other side surface of the portion of the fixing bar connected to a portion of the support bar in one side direction by the one corner portion at the other side corresponding to the first fixing plate; and

a connecting plate connected to close a direction corresponding to a direction in which the support bars of the first fixing plate and the second fixing plate are inserted, and in contact with and supporting the support bars when the support bars are inserted,

wherein the first fixing plate, the second fixing plate and the connecting plate are integrally provided, and the direction in which the support bars are inserted is opened to surround the support bars in a closed curve shape.

5. The slide rail fixing apparatus according to claim 4, wherein the first and second fixing bodies each comprise:

first fixing pieces protruding from both ends of the first fixing plate corresponding to the facing directions, and

protruding from the connecting plate to a central position of the first fixing plate toward an outer surface of the fixing bar to surround a portion of the fixing bar in the direction of the first fixing plate at different positions of the first fixing body and the second fixing body; and

second fixing pieces protruding from both sides of the second fixing plate corresponding to the facing directions, and protruding from a central position of the second fixing plate to an end position in a direction in which the support bars are inserted toward the outer surface of the fixing bar spaced apart from the first fixing piece to surround a portion of the fixing bar spaced apart from the first fixing pieces in the direction of the second fixing plate direction at different positions of the first fixing body and the second fixing body, and

the first fixing plate and the second fixing plate protrude from both ends of the support bar to surround the fixing bar connected to the corner portion in different directions to distribute torsional stress and a load due to an external impact, improving a fixing force.

6. The slide rail fixing apparatus according to claim 5, wherein the first fixing piece comprises:

first bodies protruding from both ends of the first fixing plate corresponding to the facing directions, and protruding from the connecting plate to a central position of the first fixing plate toward the outer surface to be in contact with portions of the fixing bars disposed at both sides in the direction of the first fixing plate;

first connecting bodies protruding from both ends of the first bodies in an outward direction of the fixing bar, and protruding in facing directions of the fixing bar connected to both ends of the support bar by the corner portions and in a direction in contact with the outer surfaces corresponding to the facing directions; and

first extension bodies extending from the first connecting bodies in the direction of the second fixing plate, and configured to cover a portion of the fixing bar from the corner portions at positions facing the first bodies in the direction of the second fixing plate,

wherein the first body, the first connecting body and the first extension body are integrally formed with each other, and portions into which a portion of the fixing bar is inserted from the corner portion is opened in a closed curve shape to be surrounded from the direction of the first fixing plate to the direction of the second fixing plate.

7. The slide rail fixing apparatus according to claim 5, wherein the second fixing piece comprises:

second bodies protruding from both ends of the second fixing plate corresponding to the facing directions, and protruding from a central position of the second fixing plate spaced apart from the first fixing piece to an end of the second fixing plate, into which the support bar is inserted, toward the outer surface to be in contact with a portion of the fixing bar in the direction of the second fixing plate;

second connecting bodies protruding from both ends of the second body in the horizontal direction, and protruding in a direction in which both outer surfaces of a portion of the fixing bar are in contact with each other upon insertion of the support bar insertion; and

second extension bodies extending from the second connecting body in the direction of the first fixing plate, and spaced apart from the first fixing piece in a direction facing the second body to cover a portion of the fixing bar in the direction of the second fixing plate,

wherein the second body, the second connecting body and the second extension body are integrally formed with each other, and portions spaced apart from the first fixing piece and into which a portion of the fixing bar is inserted are opened in a closed curve shape to be surrounded from the direction of the first fixing plate to the direction of the second fixing plate.

8. The slide rail fixing apparatus according to claim 4, wherein the first and second fixing bodies each comprise:

side surface connecting bodies connecting to close outer surfaces of the fixing bars corresponding to facing surfaces of the first fixing plate and the second fixing plate, and connecting different side surfaces of the first fixing plate and the second fixing plate to be in contact with the outer surfaces of the fixing bars connected to the corner portions at both ends of the support bar,

wherein the side surface connecting bodies correspond to the facing directions, which are different directions of the first fixing plate and the second fixing plate, to connect directions in contact with the outer surfaces of the fixing bars to close the outer surfaces in a closed curve shape.

9. The slide rail fixing apparatus according to claim 8, wherein separation grooves are formed to pass through the side surface connecting bodies connected to both ends of the first fixing plates facing each other from a center in the longitudinal direction to a center of the first fixing plate in the horizontal direction, and divide the connecting body from a center of the first fixing plate in the horizontal direction to be in communication with a center of the second

fixing plate in the horizontal direction,
 wherein the separation grooves divide the first fixing plate, the second fixing plate and the connecting body from
 the center in the horizontal direction to support forces applied in different directions in a state in which the first fixing
 plates are partially connected to the side surface connecting bodies.

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10. A slide rail fixing apparatus having support fixing apparatuses protruding from both inner sides of a main body at
 facing positions to fix slide rails to which a shelf is slidably coupled, and fixed to a pair of support bars, one of which
 is connected to a connecting bar and the other of which is connected to a corner portion, and having extension bars
 extending in a direction of the main body, the support fixing apparatus comprising:

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support members disposed at one sides of the slide rails, and protruding in a direction of the support bars at
 positions of the connecting bars to surround the connecting bars to be supported with the support bars upon
 insertion into the pair of support bars;

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support fixing bodies disposed at one surfaces of the slide rails, and disposed at the other side, which is a
 position of the support bars connected to corner portions of the pair of support bars upon insertion into the
 support bars;

insertion fixing pieces protruding from both ends of the support fixing body in the horizontal direction, connecting
 the pair of support bars upon insertion of the support bars, and protruding at facing positions to have a fixing
 space to contact the outer surfaces; and

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side surface fixing pieces protruding from the other side ends of the insertion fixing pieces facing each other,
 and surrounding the pair of extension bars upon insertion of the support bar,

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wherein, in a state in which the support members surround the connecting bars and support the pair of support
 bars when the slide rails are fixed to the main body, the other sides of the pair of support bars are inserted into
 the fixing space formed inside the support fixing bodies facing each other to connect the pair of support bars
 and simultaneously fix the connecting bars.

11. The slide rail fixing apparatus according to claim 10, further comprising:

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elastic bodies protruding from one surfaces of the insertion fixing pieces facing each other in a direction of the
 fixing space, and partially connected to the insertion fixing pieces to be moved by elasticity,
 wherein the elastic bodies are elastically moved in the direction of the support fixing body when the pair of
 support bars are inserted to enable insertion of the pair of support bars, and protrude by elasticity to hook and
 fix the pair of support bars after the insertion.

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12. The slide rail fixing apparatus according to claim 11, wherein bent grooves are formed to pass through the insertion
 fixing pieces facing each other to be partially connected according to shapes of the elastic body to bend the elastic
 bodies partially connected to the insertion fixing pieces into the fixing space to be elastically moved, integrally forming
 the elastic bodies with the insertion fixing pieces.

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13. The slide rail fixing apparatus according to claim 10, wherein the support member comprises:

support bodies disposed at one surfaces of the slide rails, and disposed at positions at which the pair of support
 bars are in contact with one surfaces of the connecting bars upon insertion of the support bars;

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support protrusions protruding from one sides of the support bodies, and protruding in the direction of the support
 bars to support side surfaces of the connecting bars upon insertion of the support bars; and

support fixing bodies protruding from one sides of the support protrusions in the direction of the other side end,
 protruding to support the connecting bar in the direction of the support bar and surround the connecting bars
 upon insertion of the support bars to have a support space opened in the other side direction,

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wherein the support members form the support space with the support protrusions and the support fixing bodies
 to be inserted into the other side opened by the support space and supported.

14. The slide rail fixing apparatus according to claim 10, further comprising:

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support projections protruding from both side surfaces of the support member in the direction of the pair of
 support bars, and protruding at facing positions to support outer surfaces of the pair of support bars upon
 insertion of the support bar,

wherein the support projections support the outer surfaces of the pair of support bars supported by the support
 members to contact the outer surfaces to prevent movement thereof when the pair of support bars are supported.

15. The slide rail fixing apparatus according to claim 10, wherein the side surface fixing piece comprises:

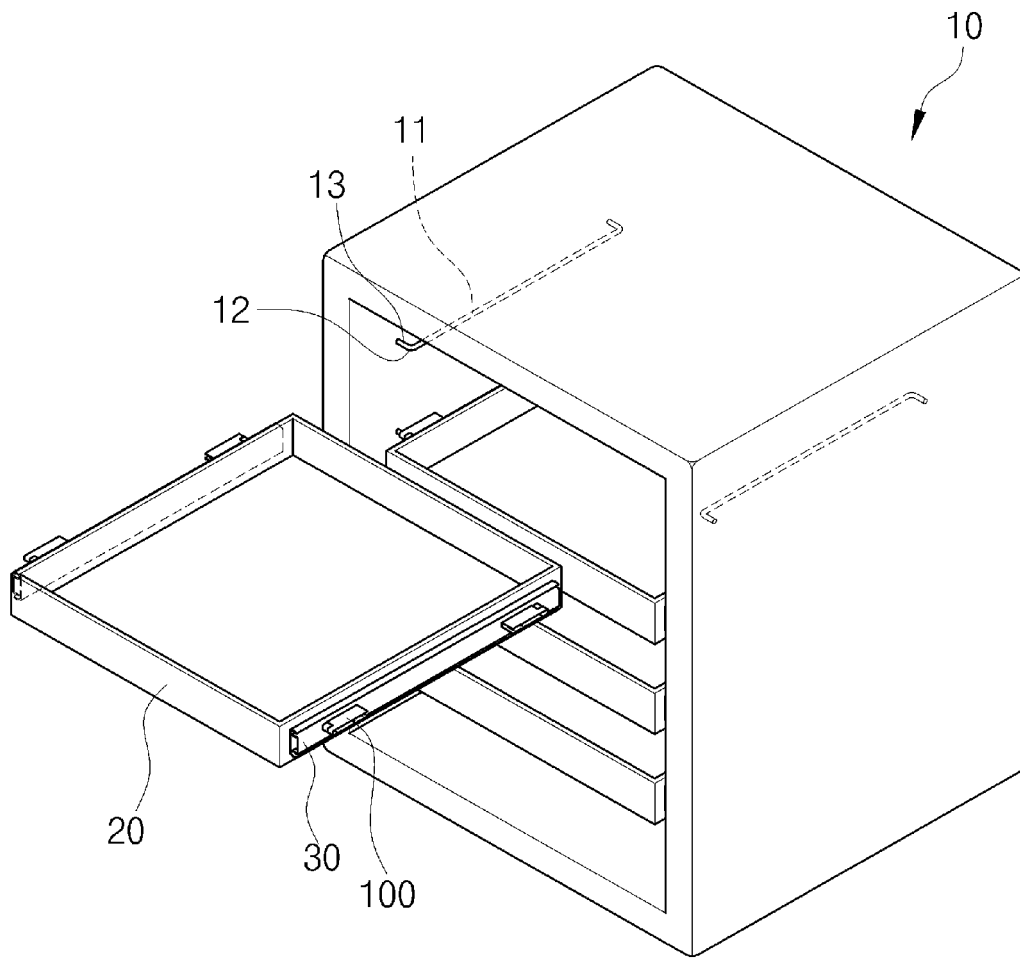
a side surface body protruding from the support fixing body in the other side direction, and protruding to contact and support one surface of the extension bar;

a side surface support member protruding from the side surface body in the direction of the support bar, and protruding to contact and support the side surface of the extension bar upon insertion of the support bar; and

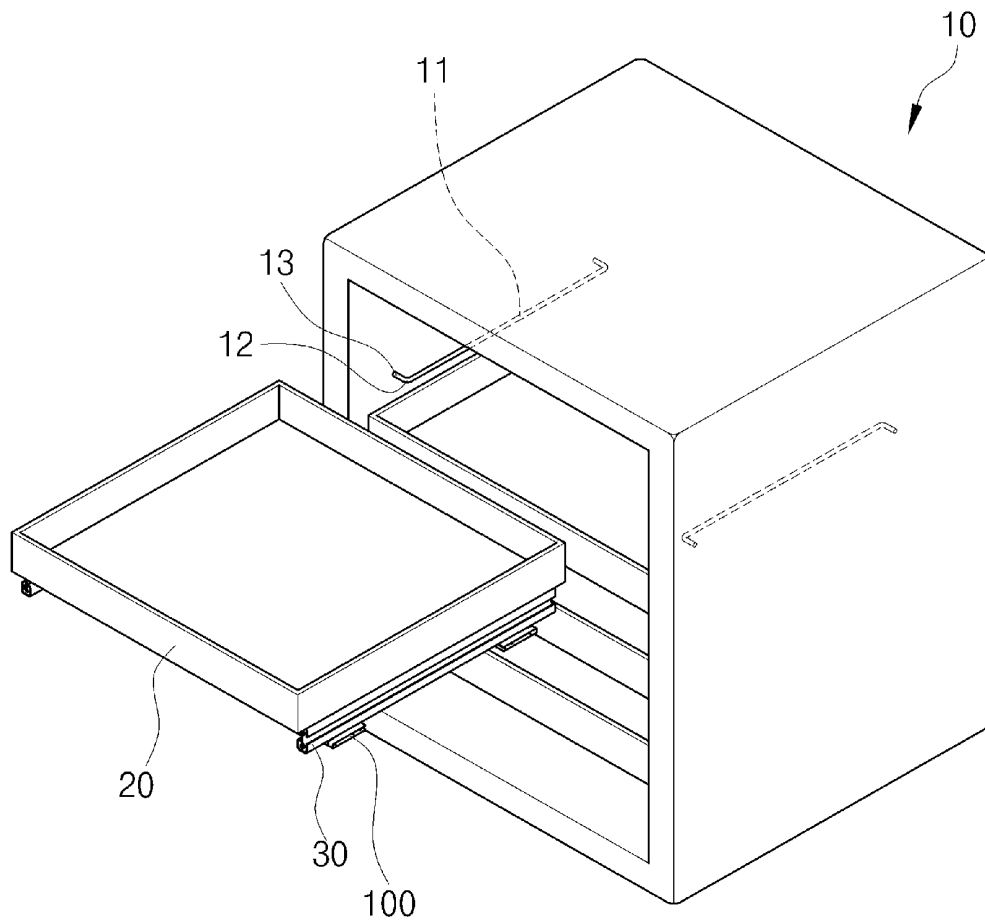
a side surface extension body protruding from the side surface support member in one side direction, and spaced apart from the side surface body and connected to the side surface support member to surround the extension bar with one side opened,

wherein the side surface fixing piece protrudes from one of the support fixing bodies, on which the pair of support bars are supported, to surround and fix the extension bodies, simultaneously supporting the pair of support bars and the extension bars.

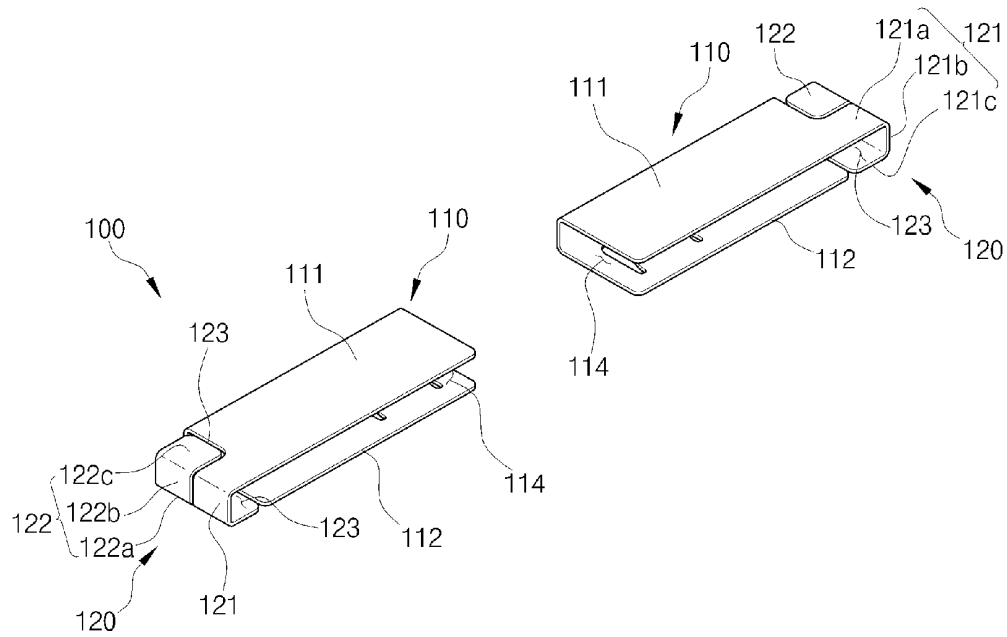
[Fig. 1]



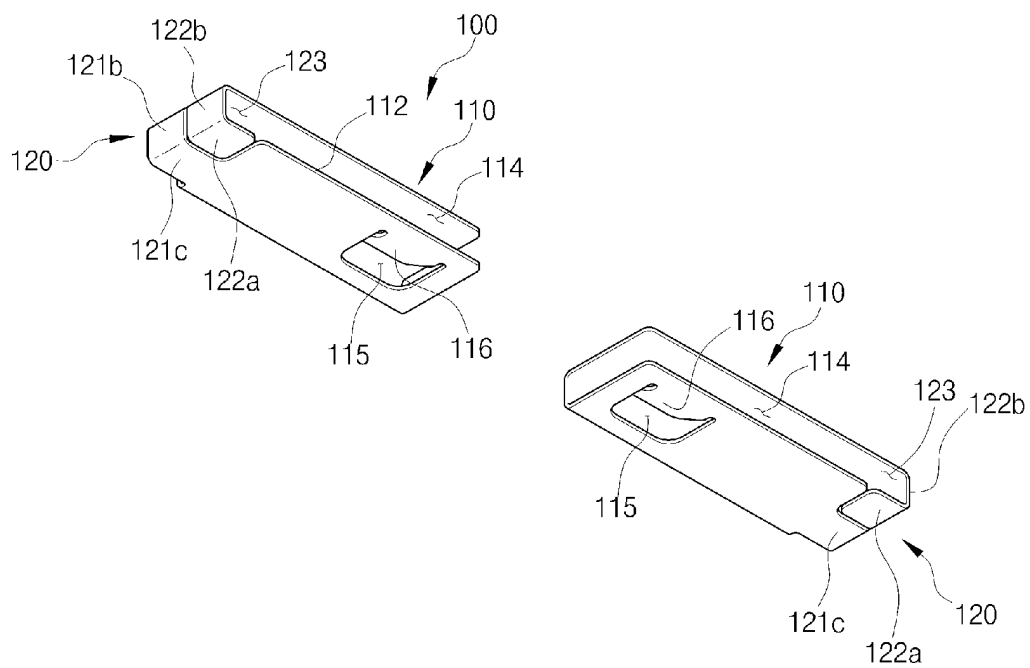
[Fig. 2]



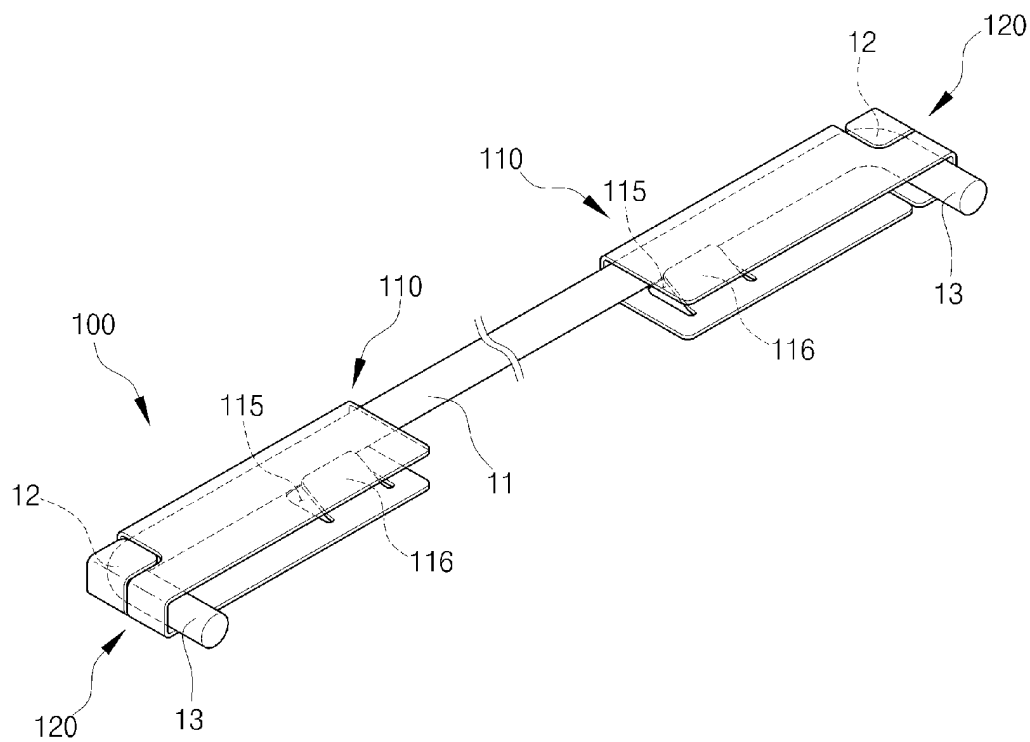
[Fig. 3]



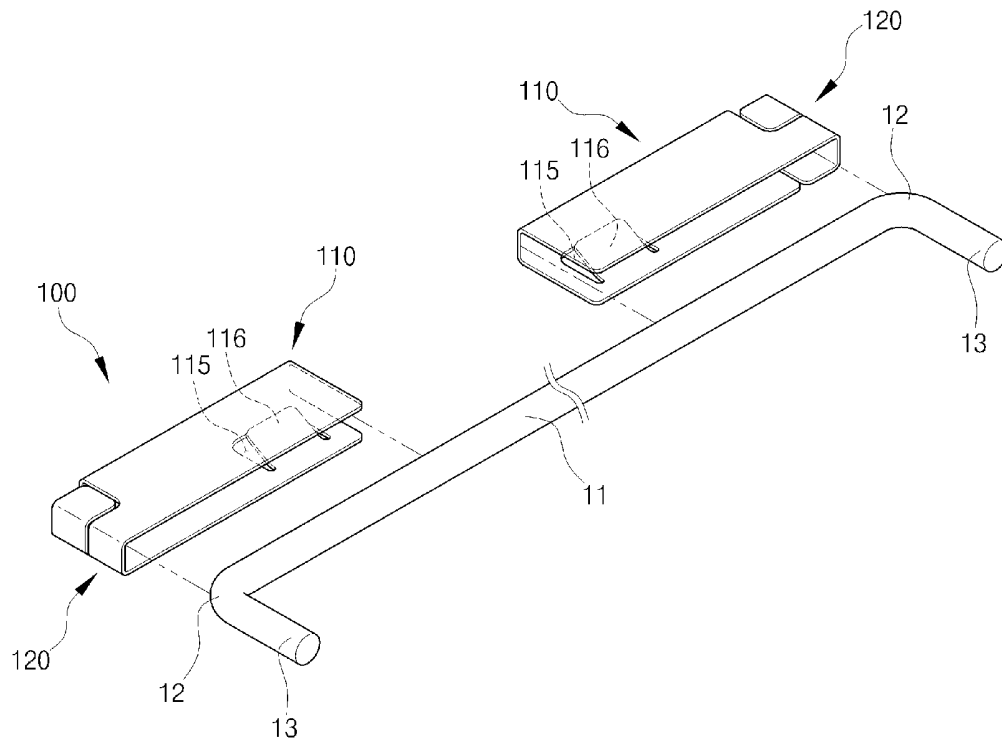
[Fig. 4]



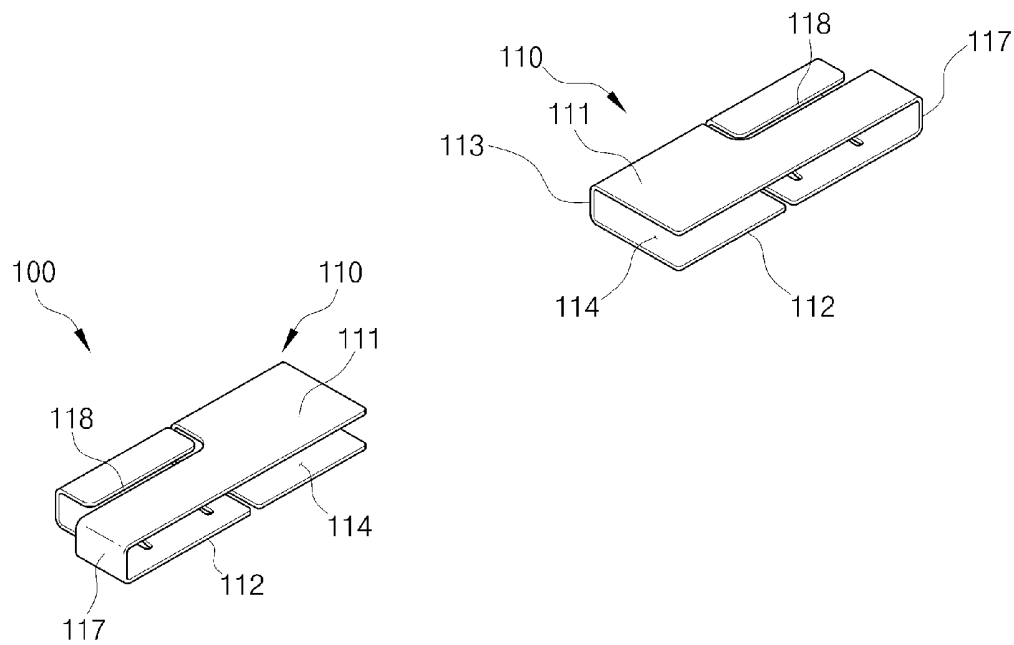
[Fig. 5]



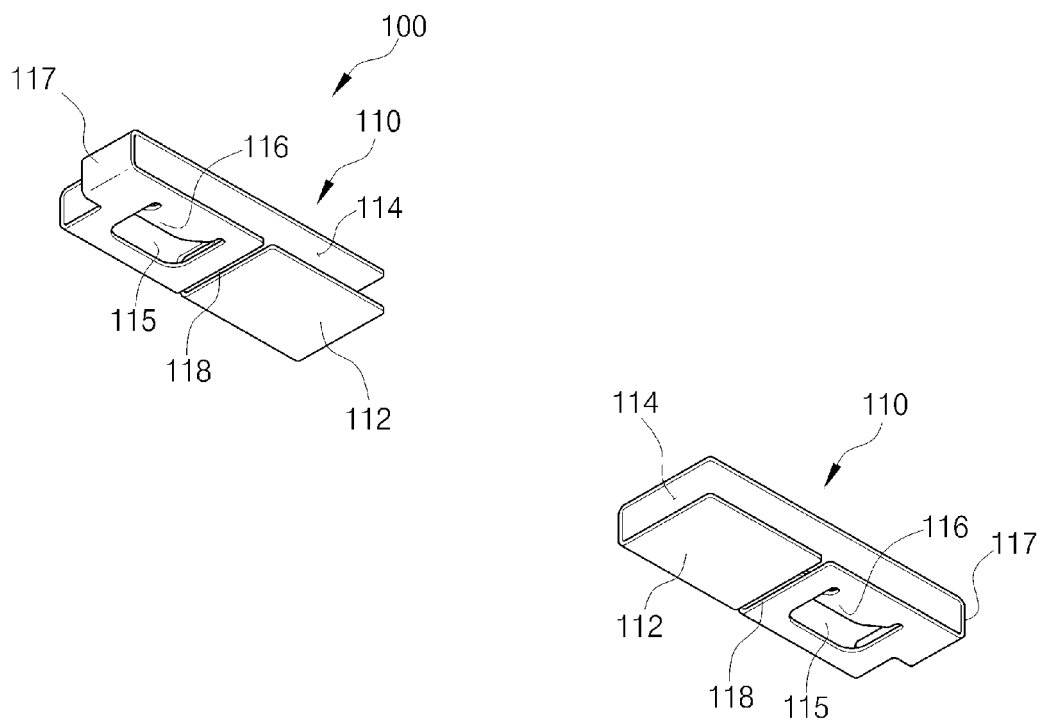
[Fig. 6]



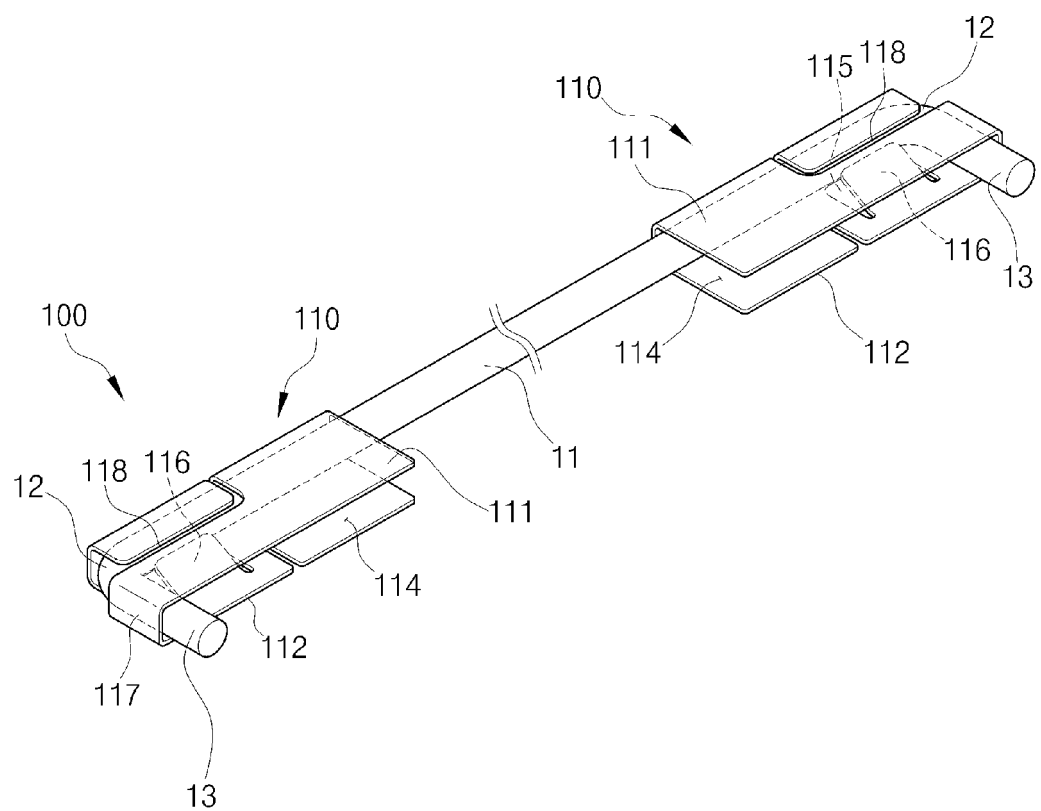
[Fig. 7]



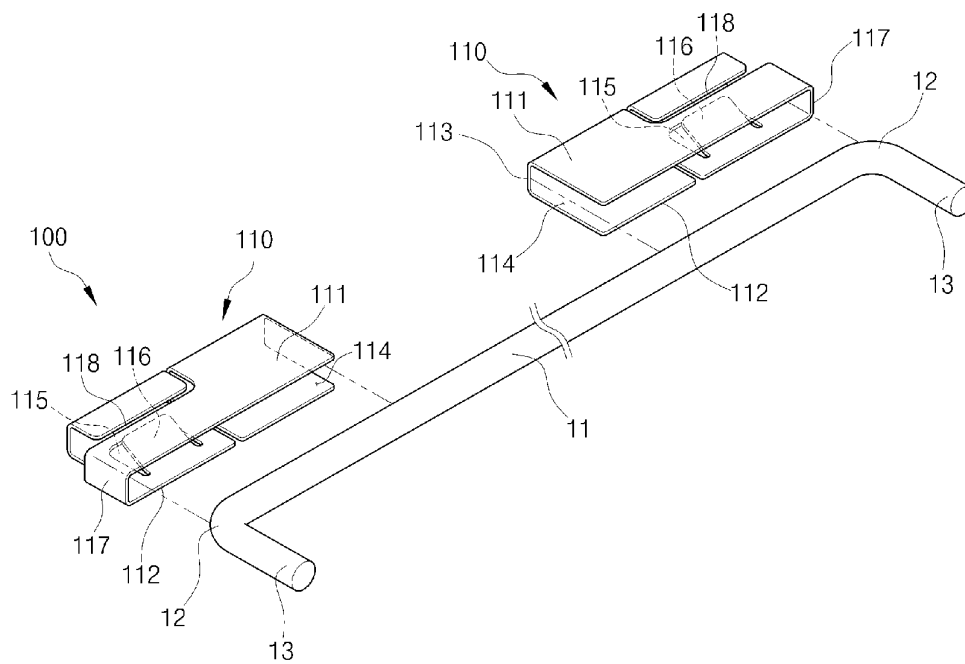
[Fig. 8]



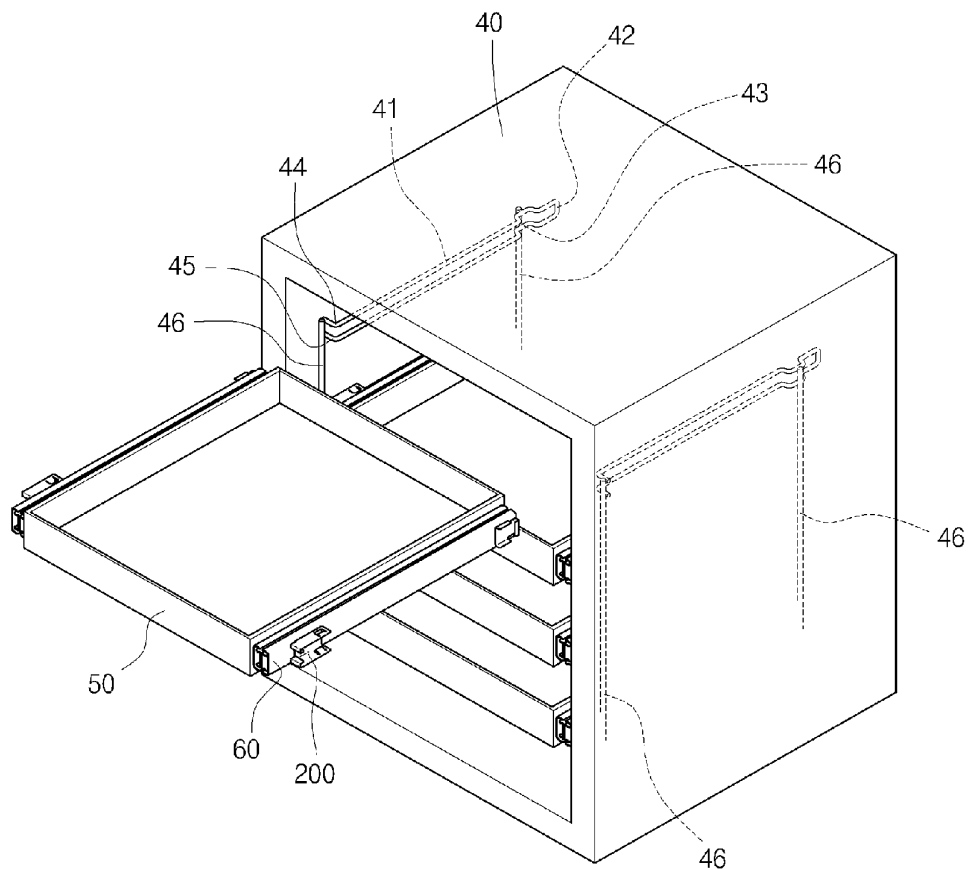
[Fig. 9]



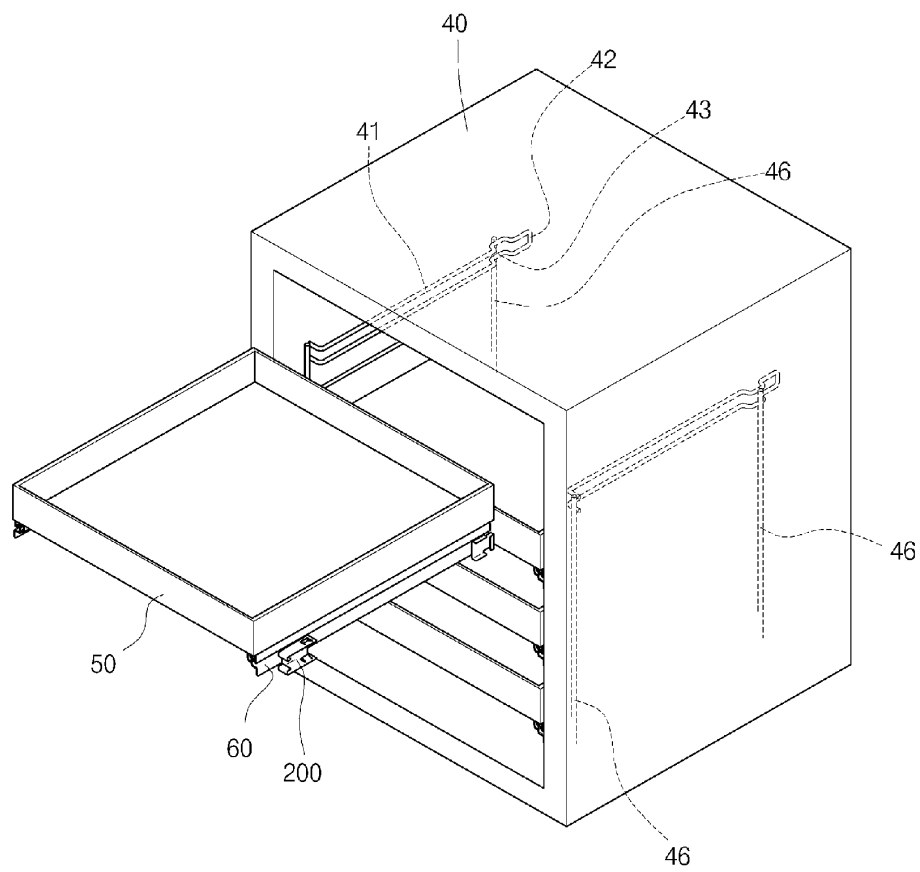
[Fig. 10]



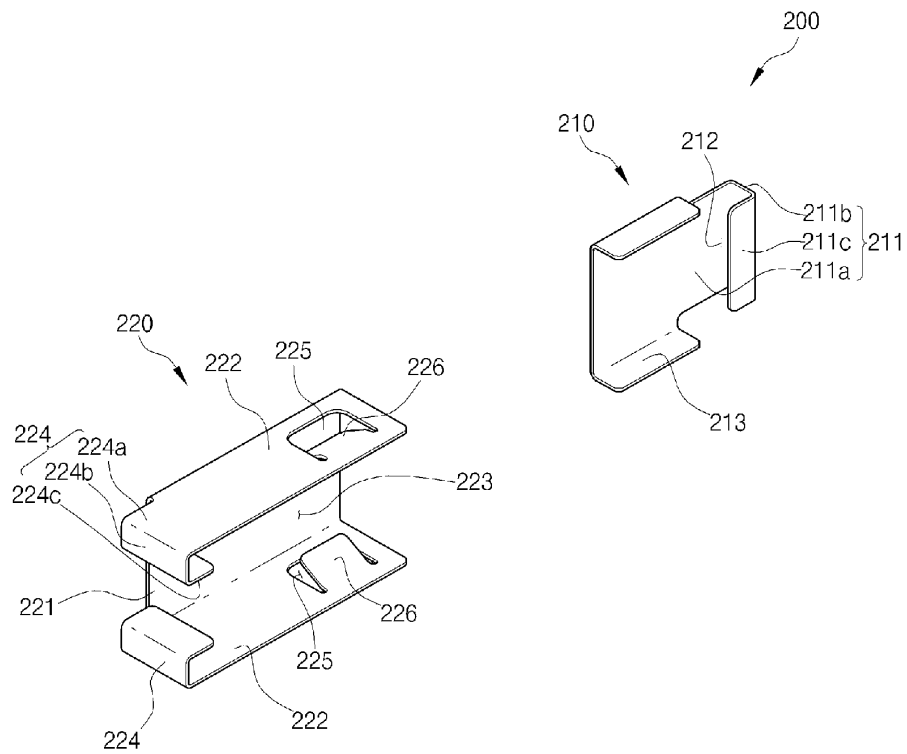
[Fig. 11]



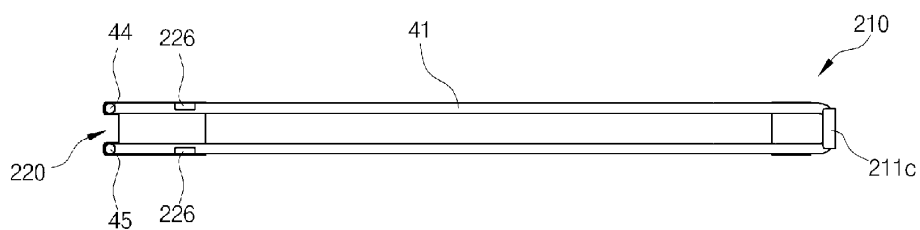
[Fig. 12]



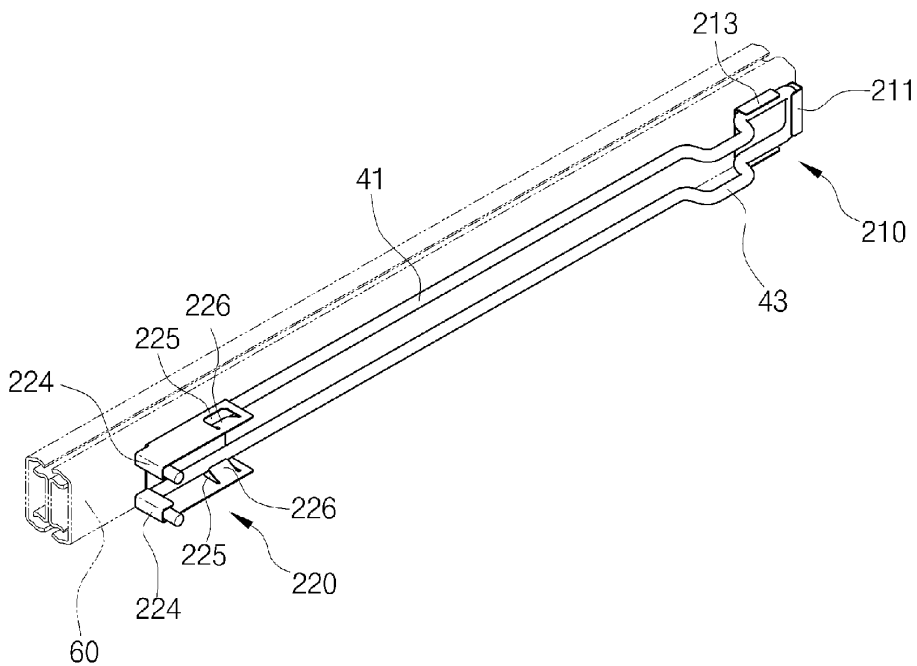
[Fig. 13]



[Fig. 14]



[Fig. 15]



[Fig. 16]

