(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 947 407 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.11.2015 Bulletin 2015/48

(51) Int Cl.:
F25D 25/02 *(2006.01)* *A47B 88/16* *(2006.01)*

(21) Application number: **15168984.1**

(22) Date of filing: **22.05.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(30) Priority: **22.05.2014 BR 102014012397**

(71) Applicant: **Whirlpool S.A.**
04578-000 São Paulo - SP (BR)

(72) Inventors:
- **Tres, Andrei**
  89221-480 Joinville (BR)
- **Izui, Edson Luis**
  89217-195 Joinville (BR)
- **Schulze, Márcio**
  89203-500 Joinville (BR)

(74) Representative: **Soldatini, Andrea et al**
Società Italiana Brevetti S.p.A.
Corso dei Tintori, 25
50122 Firenze (IT)

(54) MOVABLE COMPARTMENT ENGAGEMENT SYSTEM FOR HOUSEHOLD APPLIANCES, HOUSEHOLD APPLIANCE PROVIDED WITH SAID ENGAGEMENT SYSTEM, AND MOVABLE STRUCTURE COMPRISING MOVABLE COMPARTMENT ENGAGEMENT SYSTEM FOR HOUSEHOLD APPLIANCES

(57) Abstract: the present invention belongs to the technical field of household appliances and refers, more specifically, to a system for making the engagement of sliding drawers safer and versatile in household refrigerators, besides of allowing the variation of the amount and configuration of compartments of a certain storage space. Therefore, it basically comprises at least one slide means (100) comprising an lower inner channel (102) comprising in its front end, a semicircular protrusion (103) provided with a longitudinal slot (104) cooperating with the skirt (23) of the movable compartment (20), wherein the width of the longitudinal slot (104) is substantially coincident with the width of the skirt (23); at least one slide means (200) comprises a lower inner channel (202) comprising in its front end, a semicircular protrusion (203) provided with a longitudinal slot (204) cooperating with the skirt (23) of the movable compartment (20), and a movable structure comprising a member (500) removably cooperating with the back (133) and bottom (134) surfaces of the cabinet (10), said member (500) comprising left side surface (501) comprising at least one slide means (200), and the left side surface (502) comprising at least one slide means (100).

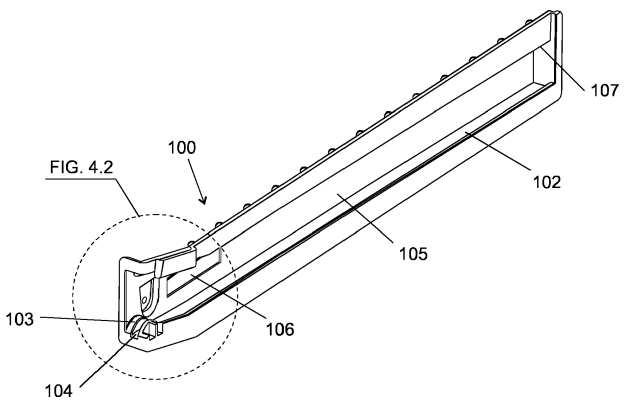


FIG. 4.1

EP 2 947 407 A2

Description

Field of the invention

[0001] The present invention refers to a movable compartment engagement system for household appliance, said system being designed, more specifically, for making the engagement of sliding drawers safer and versatile in household refrigerators, besides of allowing the variation of the amount and configuration of compartments of a certain storage space in a completely new fashion when compared with the current state of the art.

Background of the invention

[0002] As is well known in the prior art, many household appliances - especially refrigerators - have, inside their compartments, regions intended for specific food storage (mainly fruits and vegetables) that need to be kept under refrigeration at not so low temperatures, and in a conventional manner they are stored in drawers that are located in the lower portion of the cooled compartments.

[0003] Typically such drawers are removable and sliding, constructed in order to cooperate with tracks existing on the walls of the cooled compartment, wherein, in general, said tracks comprise cavities on which the drawers edge structures are simply supported or alternatively casters are attached thereto to facilitate the sliding of the drawers when closing or opening.

[0004] One problem associated with such drawers refers to the fact that in general they have large dimensions and for this reason, they may house various products, thereby acquiring a high weight which can compromise the proper sliding conditions thereof with respect to the tracks and thereby causing disengagement or undue fall during handling, due to undue vertical and horizontal movement. Under these conditions, drawers jamming often occurs during closing or opening, since if it is improperly handled - by only one of the user's hands or pushed / pulled by near regions of its sides - there is a horizontal displacement diagonally thereof, resulting in inconvenience that compromise their proper handling.

[0005] The appended Figure 1 schematically illustrates how the misalignment of the refrigerator drawers occurs during the sliding. This Figure illustrates, in schematic cross-sectional view, a refrigerator cabinet 10 with an inner compartment 11 comprising side tracks 12 cooperating with its side walls 13, wherein the side tracks 12 slide on the side edges 21 of a movable compartment or drawer 20.

[0006] The horizontal misalignment of the drawer occurs generally due to the clearance afforded by the width "d" of the tracks 12 - which exists to enable the engagement and the movement of the drawer 20 - associated with large longitudinal dimension "D" of the drawer which, as it is inserted into the inner compartment 11, creates an imaginary diagonal displacement trend line that makes up the front surface projection of the cabinet 10 at an angle "a" that increases as the drawer 20 is inserted into the inner compartment 11 and because of this, will increase the possibility of displacing and jamming.

[0007] In addition such drawers, due to the weight of its own structure, eventually added to the weight of the products stored therein, also tend to have an undue vertical movement that also hampers the handling and sliding thereof.

[0008] Some solutions have been developed to try to minimize the clearance problem in the engagement of such drawers and, therefore, try to minimize the risk of jamming and falls as, for example, that shown in document US 2012/0262044 which provides the use of male-female metal tracks - for fastening to the walls of the inner compartment and the side surfaces of the drawer - sliding each other and provided with lower support structures to the lower side of the drawer. However, it is a significantly complex solution that requires a number of components for its assembling and usage, which ultimately burdens their implementation costs.

[0009] Other solutions, for example, comprised in document WO 2007/007950, disclose the use of a complex telescopic system also composed of metal parts which, like the previous solution, proves to be extremely costly and impractical to install.

[0010] Document US6945617 describes a track for sliding drawers whose construction results in a horizontal thin span for the passage of the support edge thereof, and although this will be able to reduce the undue horizontal and vertical movement of the drawer, during its opening or closing, it can hinder the sliding thereof, besides requiring the use of metal screws for fixing the refrigerator cabinet inner compartment, making the installation more complex.

[0011] In turn, document KR2008029046 discloses a drawer assembling structure which comprises using, between the track and the cabinet surface in which it is installed, a spring which, through the pressure exerted on the track, tends to compensate the horizontal displacement of the drawer and thereby reducing said clearance, and hence the misalignment. Note, however, that it is a complex assembly solution which, moreover, also uses metallic components (in this case, at least the spring) which, by being subjected to high temperatures and high humidity, may corrode and eventually release substances that could contaminate the environment and the food stored therein.

[0012] Another drawback associated with the use of drawers for refrigerators appliances refers to its little freedom of partitioning; since it has a single large space in which all kinds of products should be stored together, and the user must arrange partitioning modular solutions depending on the characteristics of the stored products and also their needs.

[0013] One solution for this problem was proposed in document US5044704, which discloses a modular structure which, while constituting a shelf for cooled inner compartment, it also houses, in its lower surface, cavities for

engaging support horizontal members comprising engagement tracks for 3 drawers arranged side by side. It occurs, however, that this solution demand direct interference in a device shelf, beyond just allowing the use of drawers of different widths, but always with the same depth - which ultimately limits the possibilities of partitioning in the region.

[0014] Document JP4254670 discloses a removable structure which allows using, instead of a single large tray, several drawers of different storage capacities. However, it is a horizontal structure which interferes with the entire base of the cooled compartment and on which other drawers are supported, also presenting significant limitation with respect to variability of internal volumes of storage products.

[0015] Document BR PI0504387-5 describes a vertical structure to be engaged within the inner compartment of a refrigerator appliance having a support function for the engagement of other internal components, for example, drawers. Such a solution, however, does not address the possibility of variation of the refrigerator compartment intended specifically for the installation of the vegetable drawer nor the particulars of its installation and use.

[0016] It is also noted that these solutions involve the use of a series of metallic components that, as has been said, undergo oxidation, and therefore are not suggested for use in environments subject to low temperatures and high humidity as is the case of cooled compartments.

[0017] It is noted, therefore, that the present state of the art lacks practical, effective and inexpensive solution to solve the problem of misalignment of the drawers during sliding, as well as simultaneously allowing the modulation of said drawers compartment in order that the user may, as needed, modularize multiple individual spaces in a region which until then was used as a single compartment. Such issues are the focus of the matter of the present invention.

Objectives of the invention

[0018] Therefore, the present invention aims primarily to solve the technical problem of undue movements and consequent horizontal and vertical misalignment that occurs with drawers of household appliances - especially refrigerators - when opening or closing for use, and optionally promote such benefits together with the possibility of modularization of a cooled compartment for storing a sliding drawer.

[0019] Thus, the main objective of the present invention is to reveal a movable compartment engagement system for household appliances that, without comprising a plurality of constituent elements, minimizes to the maximum the possibility of displacement in horizontal and vertical directions during handling the compartments, in order to avoid undue disengaging and falls.

[0020] Another objective, among others of the present invention, is to reveal a track-engagement system that does not require the installation of additional components in the drawers that will cooperate therewith, in order to make a cheaper and practical production of both tracks and drawers when assembling the system.

[0021] It is yet another objective, among others of the present invention, to provide an engagement system that is fully made of non-metallic materials not to incur a risk of contamination of the products to be stored on the appliance.

[0022] Furthermore, it is an objective of the present invention to provide an engagement system, whose installation of the cabinet in the appliance does not demand the use of additional tools or fastening means, namely, that is capable of installation by direct snap, engagement or interference, in a practical and quickly fashion.

[0023] Additionally, one of the objectives of the present invention is to disclose a movable compartments engagement system for household appliances that is built into a structure capable of allowing environmental modularization intended to house the drawers in the appliance, in order to allow performing layout changes and subdividing the area in several compartments of different storage capacities in a practical and simple way.

[0024] Therefore, it is also an objective of the present invention to provide a movable structure comprising movable compartments engagement system for household appliances cooperating with existing engagement systems in the inner compartment of the appliance to allow changing the arrangement and number of drawers for storage of various products.

Summary of the invention

[0025] The above objectives are achieved through the movable compartment engagement system for household appliance, object of the present invention, more specifically for refrigerators apparatus defined by a cabinet comprising side walls delimiting at least one inner compartment capable of housing at least one movable compartment with side upper edges comprising skirts projecting downwards, the system comprising at least one sliding means cooperating with the left side wall of the cabinet and with the skirt extending from the upper edge of the right side wall of the movable compartment and the least one sliding means cooperating with the right side wall of the cabinet and with the skirt extending from the upper edge of the left side wall of the movable compartment.

[0026] In a preferred embodiment of the invention, said engagement system comprises the following essential characteristics:

the back end of each of the upper edges of the side walls of the movable compartment comprising at least one substantially convex protrusion, wherein the longitudinal surface of the skirt of the movable compartment comprises at least one protrusion having a substantially convex lower end;
the at least one slide means comprises a lower inner

channel cooperating with the substantially convex lower end of the movable compartment and an upper surface cooperating with at least one substantially convex protrusion of the movable compartment, wherein the front end of said lower inner channel comprises a semicircular protrusion provided with a longitudinal slot cooperating with the skirt of the movable compartment, wherein the width of the longitudinal slot is substantially coincident with the width of the skirt.

the at least one slide means comprises a lower inner channel cooperating with the substantially convex lower end of the movable compartment and an upper surface cooperating with at least one substantially convex protrusion of the movable compartment, wherein the front end of said lower inner channel comprises a semicircular protrusion provided with a longitudinal slot cooperating with the skirt of the movable compartment.

[0027] Preferably said sliding means comprise, on the inner side of the side surfaces thereof, at least one resilient element cooperating with the skirt of the movable compartment, wherein said resilient elements comprise side surfaces cutouts which acquire a convex surface form protruding for the inner region of the sliding means (100, 200) after fastening the sliding means (100, 200) to the sidewalls (131, 132) of the cabinet (10).

[0028] The sliding means preferably comprise, on the outer side of its side surfaces, at least one engagement element cooperating with the side walls.

[0029] The invention is also characterized by the fact that said system comprises means for eliminating side movement clearances of the movable compartment, means for eliminating possible diagonal displacement of the movable compartment during its movement, and means for absorbing variation in the movable compartment assembling, wherein the means for eliminating side movement clearances of the movable compartment comprises semicircular protrusions and longitudinal slots; wherein the means for eliminating possible diagonal displacement of the movable compartment comprises a lower inner channel, and wherein the means for absorbing variation in the movable compartment assembling comprises at least one semicircular protrusion.

[0030] Preferably, the sliding means comprise members made of non-metallic material, and the at least one engagement element cooperates with the side walls of the cabinet by one of the following means: snap, interference or snap-fit.

[0031] This invention also comprises a movable structure comprising movable compartment engagement systems for household appliances, specifically for refrigerators apparatus, defined by a cabinet comprising side walls and back and lower surfaces delimiting at least an inner compartment capable of housing at least one movable compartment having side upper edges comprising skirts protruding downwards, said movable compartment cooperating with at least one slide means cooperating with the left side wall of the cabinet and the skirt extending from the upper edge of the right side of the movable compartment, and at least one slide means cooperating with the right side wall of the cabinet and the skirt extending from the upper edge of the left side wall of the movable compartment, characterized by the fact that said movable structure comprises a member removably cooperating with the back and lower surfaces of the cabinet, said member comprising left side surface comprising at least one slide means cooperating with a movable compartment and the left side surface comprising at least one slide cooperating with a movable compartment.

[0032] Preferably the movable structure removably cooperate with the back and lower surfaces of the cabinet by one of the following means: snap, interference or snap-fit.

[0033] The present invention also relates to a household appliance comprising sliding means and / or the movable structure described above.

Brief description of the drawings

[0034] The present invention will be described in detail based on the figures below, wherein:

Figure 1 shows a schematic top view of a drawer engagement in an inner compartment of the refrigerator appliance, which allows a clear view of the engagement and movement problems that occur in the present state of the art;

Figure 2 shows a perspective view of a refrigerator drawer engaged to the movable compartments engagement system for household appliance object of the present invention;

Figure 3 shows the view illustrated in Figure 2 without the storage drawer, thus allowing to view only the engagement system tracks according to one of the preferred embodiments of the present invention;

Figure 4.1 shows an isolated perspective view of the system left track illustrated in the previous figures, while Figure 4.2 shows an enlarged detail of its end to clearly illustrate the specific engagement devices thereof;

Figure 5.1 shows an isolated perspective view of the system right track illustrated in Figures 2 and 3, while Figure 5.2 shows an enlarged detail of its end;

Figure 6.1 shows an isolated perspective view of a movable compartment for household appliances - specifically a drawer - while Figure 6.2 shows an enlarged detail of the components responsible for the proper engagement and sliding thereof in the engagement system of the present invention;

Figures 7.1 and 7.2 show enlarged detail views of the left and right tracks of the present invention, while Figure 7.1 shows a properly coupled partitioning drawer;

Figure 8 shows a perspective view of a preferred

embodiment of a movable structure comprising said movable compartment engagement systems for household appliances;

Figure 9 shows a perspective view of a household appliance comprising the movable structure shown in Figure 8, and having some drawers fully coupled thereto, and

Figure 10 shows another perspective view of the structure illustrated in Figure 8, in which a sliding drawer single positioning compartment is used for housing three drawers of different capacities using all system components of the present invention.

Detailed description of the invention

[0035] The object of the present invention will be described and explained in more detail based on the accompanying drawings, which have a merely illustrative and not limiting character, since adaptations and modifications may be made without thereby departing from the scope of the claimed protection.

[0036] The present invention relates to a movable compartment engagement system intended for household appliances, more specifically, refrigerators apparatus, defined by a cabinet 10 comprising left 131 and right 132 side walls and back 133 and lower 134 surfaces delimiting at least one inner compartment 11 capable of housing at least one movable compartment 20 (or drawer) as can be best viewed in the appended Figure 2, 6.1 and 6.2, which usually presents right 21 and left 22 side walls whose upper edges protrudes outward and downward, forming skirts 23.

[0037] In a preferred embodiment of the invention, the back end of each upper edges of the side walls 21 and 22 of the movable compartment 20 comprises at least one substantially convex protrusion 24, while on the longitudinal surface of the skirt 23 of the movable compartment 20 is located a protrusion 25 that, in the presented exemplary embodiment, has a substantially triangular form having a substantially convex lower end 26.

[0038] The system of the present invention comprises two sliding means 100 and 200 with constructive particularities aimed at minimizing and / or absorbing to the maximum the possibilities of horizontal and vertical displacement of the movable compartment 20 or drawer, as well as its diagonally displacement, so as to make a smoother sliding along the tracks and with little risk of suffering jamming or undue disengaging which may cause the fall of the compartment 20.

[0039] Therefore, the system presented herein comprises a track or slide means 100, represented in detail in appended Figures 4.1 and 4.2 , which, in the preferred embodiment presented herein, is preferably installed in a built-in manner in the left side wall 131 of the cabinet 10 with the aid of at least one engagement means 101 which may be a rod, pin or protrusion liable to be coupled to a snap or hole of the left side wall 131 of the cabinet 10 by snap, interference or snap-fit so that it is not necessary to use any engagement means or additional tool for installation of the slide means 100.

[0040] Accordingly, it should be emphasized that all system components shown herein were designed to be preferably made of non-metallic materials - most preferably in polymeric material - in order to prevent that a possible presence of metallic elements subject to high humidity and temperature may cause oxidation therein, which is capable of releasing substances that can contaminate the food stored inside the appliance, this being one of the advantages of the present invention.

[0041] The slide means 100 has a lower inner channel 102 for sliding the substantially convex lower end 26 of the movable compartment 20, and an upper surface 107 with which the substantially convex protrusion 24 will remain in contact to prevent vertical displacement of the movable compartment 20, thereby facilitating its opening and closing during use. Furthermore, in order to minimize the occurrence of horizontal displacement of the compartment 20, the front end of said lower inner channel 102 is provided with a semicircular protrusion 103 provided with a longitudinal slot 104 which has a width substantially coincident with the width of the lower end of the skirt 23 of the movable compartment 20, so as to provide a fitted engagement of the skirt 23 and prevent that in this inlet point - which is usually the most critical location for the occurrence of displacement that, in similar ones known in the current state of the art, entails a diagonally movement that significantly hinders the sliding of the drawer - there are clearances which allow the movable cabinet leaves the proper trajectory. This fitted snap can be seen in enlarged detail in attached Figure 7.

[0042] Similarly, the system comprises a slide means 200 (shown in Figures 5.1 and 5.2) designed to be installed on the right side wall 132 of the inner compartment 11, which also comprises a lower inner channel 202 cooperating with the substantially convex lower end 26 of the movable compartment 20, and a upper surface 207 cooperating with the substantially convex protrusion 24 of the movable compartment 20, and the front end of said lower inner channel 202 has a semicircular protrusion 203 also provided with longitudinal slot 204, however in order to facilitate the engagement of the drawer, it is significantly wider than the width of the skirt 23 of the movable compartment 20.

[0043] Additionally, the sliding means 100 and 200 are provided, on the inner face of the side surfaces 105 and 205, with resilient elements 106, 206 which, after fastening the sliding means 100/200 to the side walls 131/132 of the cabinet 10, acquire convex surfaces form (see description of appended Figure 7.2) designed for the inner region of the sliding means 100, 200. Accordingly, the resilient elements 106 and 206 of the sliding means 100 and 200 exert forces in opposite directions against the skirts 23 of the movable compartment 20 so as to prevent horizontal displacement thereof and, consequently, always maintaining it in the suitable slide position. It should be noted also that the resilient elements 106/206 can be

made of the same material of the sliding means 100/200, or comprise separate elements of any resilient materials solidary with the side surfaces 105 and 205 without, therefore, departing from the scope of protection claimed herein.

[0044] Note, however, that without the use of casters or any additional elements, there is an engagement system presenting very practical and inexpensive installation and construction which solves the drawbacks observed in known similar ones, since it is provided with mechanical solutions incorporated into its own construction which, as never before, are able to eliminate the clearances and conditions that allowed in similar ones, the occurrence of jamming and undue falls. It should be stressed out that, in the proposed construction, the side walls 21 and 22 of the movable compartment 20 do not undergo any direct contact or friction with the sliding means 200 and 200, which aids greatly in the solution of the problem of appropriate and smooth drawer sliding.

[0045] Additionally, in order to provide an apparatus liable to be used in an even more versatile form, it is also possible to use the sliding means 100, 200 associated with a movable structure as that shown in attached Figures 8 to 10, which comprise more specifically, a member 500, preferably in a vertical plate form, removably cooperating with the back 133 and lower 134 surfaces of the case 10. Therefore, the back and lower end of member 500 may be provided with any engagement means to removably cooperate with the back 133 and lower 134 surfaces of the cabinet 10 by snap, interference or snap-fit. It should be noted that this embodiment also aims at not using any kind of metallic component due to the reason already expressed above.

[0046] Therefore, said member 500 comprises left side surface 501 comprising one or more sliding means 200 cooperating with a movable compartment 20, and the left side surface 502 comprising one or more sliding means 100 cooperating with a movable compartment 20. Thus, both sides of the plate 500 are provided with tracks that allow the user to make different arrangements of drawers or movable compartments 20, thus providing the optimization of the available space and also the separation of the stored products according to its individual preferences.

[0047] In order to enable the practical use of the member 500 as a subdivisor element of the inner compartment 11, it can be provide for the possibility of installing additional members 500 along the sidewalls 131, 132 of the cabinet, or the possibility of engaging various sliding means 100, 200 on said side walls 131, 132 (see Figure 9) for a wide possibility of alternative arrangement for engaging the movable compartments 20.

[0048] An example of this modularity is shown in Figures 9 and 10, which disclose the use of three movable compartments 20 of different capacities in the inner compartment 11, and by removing member 500, the use of a single movable compartment is allowed.

[0049] Note, therefore, that the object of the present invention solves the drawbacks of the prior art in an economical, practical and effective manner regarding the solution of the problem of making the engagement of sliding drawers safer and versatile in household refrigerators, besides of allowing the variation of configuration thereof in a certain storage space.

Claims

1. Movable compartment engagement system for household appliances, specifically for refrigerators apparatus, defined by a cabinet (10) comprising side walls (13) delimiting at least one inner compartment (11) capable of housing at least one movable compartment (20) with side edges comprising upper skirts (23) protruding downwards, the system comprising at least one slide means (100) cooperating with left side wall (131) of the cabinet and the skirt (23) extending from upper edge of the right side wall (21) of the movable compartment (20), and at least one slide means (200) cooperating with the right side wall (132) of the cabinet and the skirt (23) extending from the upper edge of the left side wall (22) of the movable compartment (20); said engagement system being **CHARACTERIZED by** the fact that:

   the back end of each of the upper edges of the side walls (21, 22) of the movable compartment (20) comprises at least one substantially convex protrusion (24), wherein the longitudinal surface of the skirt (23) of the movable compartment (20) comprises at least one protrusion (25) having a substantially convex lower end (26);
   the at least one slide means (100) comprises a lower inner channel (102) cooperating with the substantially convex lower end (26) of the movable compartment (20) and an upper surface (107) cooperating with at least one substantially convex protrusion (24) of the movable compartment (20), wherein the front end of said lower inner channel (102) comprises a semicircular protrusion (103) provided with a longitudinal slot (104) cooperating with the skirt (23) of the movable compartment (20), and the width of the longitudinal slot (104) is substantially coincident with the width of the skirt (23);
   the at least one slide means (200) comprises a lower inner channel (202) cooperating with the substantially convex lower end (26) of the movable compartment (20) and an upper surface (207) cooperating with at least one substantially convex protrusion (24) of the movable compartment (20), wherein the front end of said lower inner channel (202) comprises a semicircular protrusion (203) provided with a longitudinal slot (204) cooperating with the skirt (23) of the movable compartment (20)

wherein the sliding means (100, 200) comprise, on the inner side of the side surfaces (105, 205), at least one resilient member (106, 206) cooperating with the skirt (23) of the movable compartment (20),
wherein the sliding means (100, 200) comprise, on the outer side of its side surfaces (105), at least one engagement element (101, 201) cooperating with the side walls (131, 132),
wherein said system comprises means for eliminating side movement clearances of the movable compartment (20), means for eliminating possible diagonal displacement of the movable compartment (20) during its movement, and means for absorbing variation in the movable compartment (20) assembling, wherein the means for eliminating side movement clearances of the movable compartment (20) comprises semicircular protrusions (103, 203) and longitudinal slots (104, 204); wherein the means for eliminating possible diagonal displacement of the movable compartment (20) comprises a lower inner channel (202), and wherein the means for absorbing variation in the movable compartment (20) assembling comprises at least one semicircular protrusion (203).

2. System according to claim 1, **CHARACTERIZED by** the fact that the sliding means (100, 200) comprise components made of non-metallic material.

3. System according to claim 1, **CHARACTERIZED by** the fact that the at least one engagement element (101, 201) cooperates with the side walls (131, 132) of the cabinet (10) by one of the following means: snap, interference or snap-fit.

4. System according to claim 1, **CHARACTERIZED by** the fact that the resilient elements (106, 206) of the sliding means (100, 200) comprise side surfaces (105, 205) cutouts which acquire a convex surface form designed for the inner region of the sliding means (100, 200) after fastening the sliding means (100, 200) to the sidewalls (131, 132) of the cabinet (10).

5. Movable structure comprising movable compartment engagement systems for household appliances, specifically for refrigerators apparatus, defined by a cabinet (10) comprising side walls (131, 132) and back (133) and lower (134) surfaces delimiting at least an inner compartment (11) capable of housing at least one movable compartment (20) having side upper edges comprising skirts (23) protruding downwards, said movable compartment (20) cooperating with at least one slide means (100) cooperating with the left side wall (131) of the cabinet and the skirt (23) extending from the upper edge of the right side wall (21) of the movable compartment (20), and at least one slide means (200) cooperating with the right side wall (132) of the cabinet and the skirt (23) extending from the upper edge of the left side wall (22) of the movable compartment (20), **CHARACTERIZED by** the fact that said movable structure comprises a member (500) removably cooperating with the back (133) and lower (134) surfaces of the cabinet (10), said member (500) comprising left side surface (501) comprising at least one slide means (200) cooperating with a movable compartment (20) and the left side surface (502) comprising at least one slide means (100) cooperating with a movable compartment (20).

6. Movable structure according to claim 5, **CHARACTERIZED by** the fact that the at least one slide means (100) comprises a lower inner channel (102) comprising in its front end, a semicircular protrusion (103) provided with longitudinal slot (104) cooperating with the skirt (23) of the movable compartment (20), wherein the width of the longitudinal slot (104) is substantially coincident with the width of the skirt (23).

7. Movable structure according to claim 5, **CHARACTERIZED by** the fact that the at least one slide means (200) comprises a lower inner channel (202) comprising in its front end, a semicircular protrusion (203) provided with longitudinal slot (204) cooperating with the skirt (23) of the movable compartment (20).

8. Movable structure according to claim 5, **CHARACTERIZED by** the fact that the sliding means (100, 200) comprise, on the inner side of the side surfaces (105, 205), at least one resilient member (106, 206) cooperating with the skirt (23) of the movable compartment (20).

9. Movable structure according to claims 5 and 8, **CHARACTERIZED by** the fact that the resilient elements (106, 206) of the sliding means (100, 200) comprise side surfaces (105, 205) cutouts which acquire a convex surface form protruding for the inner region of the sliding means (100, 200) after fastening the sliding means (100, 200) to the sidewalls (131, 132) of the cabinet (10).

10. Movable structure according to claim 5, **CHARACTERIZED by** the fact of being made of non-metallic material.

11. Movable structure according to claim 5, **CHARACTERIZED by** the fact that the member (500) removably cooperates with back (133) and lower (134) surfaces of the cabinet (10) by one of the following means: snap, interference or snap-fit.

12. Household appliance provided with movable compartments engagement system, more specifically refrigerator apparatus, defined by a cabinet (10) comprising side walls (131, 132) and back (133) and lower (134) surfaces delimiting at least one inner compartment (11) capable of housing at least one movable compartment (20) having side upper edges comprising skirts (23) protruding downwards, said movable compartment (20) cooperating with at least one slide means (100) cooperating with the left side wall (131) of the cabinet and the skirt (23) extending from the upper edge of the right side wall (21) of the movable compartment (20), and at least one slide means (200) cooperating with the right side wall (132) of the cabinet and the skirt (23) extending from the upper edge of the left side wall (22) of the movable compartment (20), **CHARACTERIZED by** the fact that:

the back end of each of the upper edges of the side walls edges (21, 22) of the movable compartment (20) comprises at least one substantially convex protrusion (24), wherein the longitudinal surface of the skirt (23) of the movable compartment (20) comprises at least one protrusion (25) having a substantially convex lower end (26);

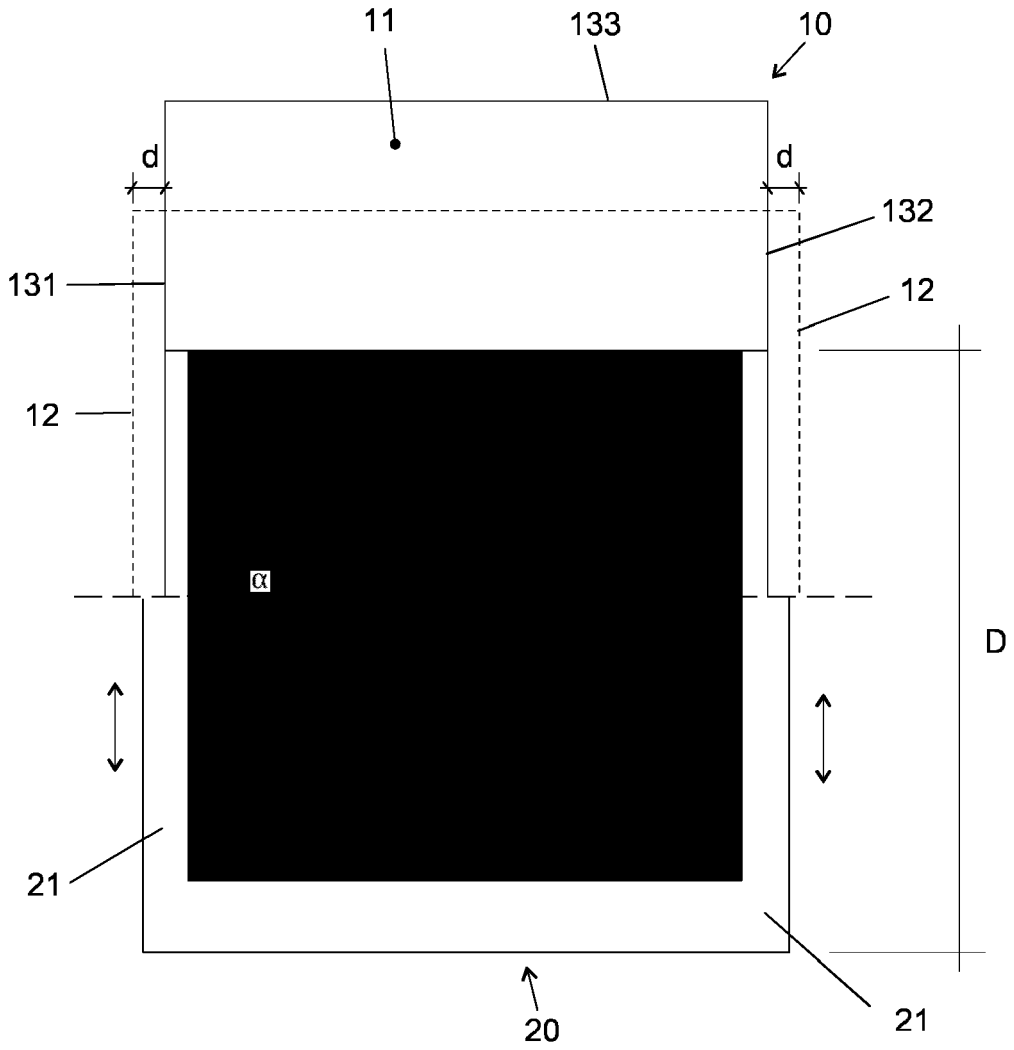
the at least one slide means (100) comprises a lower inner channel (102) cooperating with the substantially convex lower end (26) of the movable compartment (20) and an upper surface (107) cooperating with at least one substantially convex protrusion (24) of the movable compartment (20), wherein the front end of said lower inner channel (102) comprises a semicircular protrusion (103) provided with a longitudinal slot (104) cooperating with the skirt (23) of the movable compartment (20), and the width of the longitudinal slot (104) is substantially coincident with the width of the skirt (23);

the at least one slide means (200) comprises a lower inner channel (202) cooperating with the substantially convex lower end (26) of the movable compartment (20) and an upper surface (207) cooperating with at least one substantially convex protrusion (24) of the movable compartment (20), wherein the front end of said lower inner channel (202) comprises a semicircular protrusion (203) provided with a longitudinal slot (204) cooperating with the skirt (23) of the movable compartment (20)

wherein the sliding means (100, 200) comprise, on the inner face of the side surfaces (105, 205), at least one resilient member (106, 206) cooperating with the skirt (23) of the movable compartment (20),

wherein the sliding means (100, 200) comprise, on the outer side of its side surfaces (105), at least one engagement element (101, 201) cooperating with the side walls (131, 132),

wherein the back (133) and lower (134) surfaces of the cabinet (10) comprises means for engaging at least one movable structure comprising a member (500) removably cooperating with back (133) and lower (134) surfaces, said member (500) comprising left side surface (501) comprising at least one slide means (200) cooperating with a movable compartment (20) and the left side surface (502) comprising at least one slide means (100) cooperating with a movable compartment (20).



(PRIOR ART)

FIG. 1

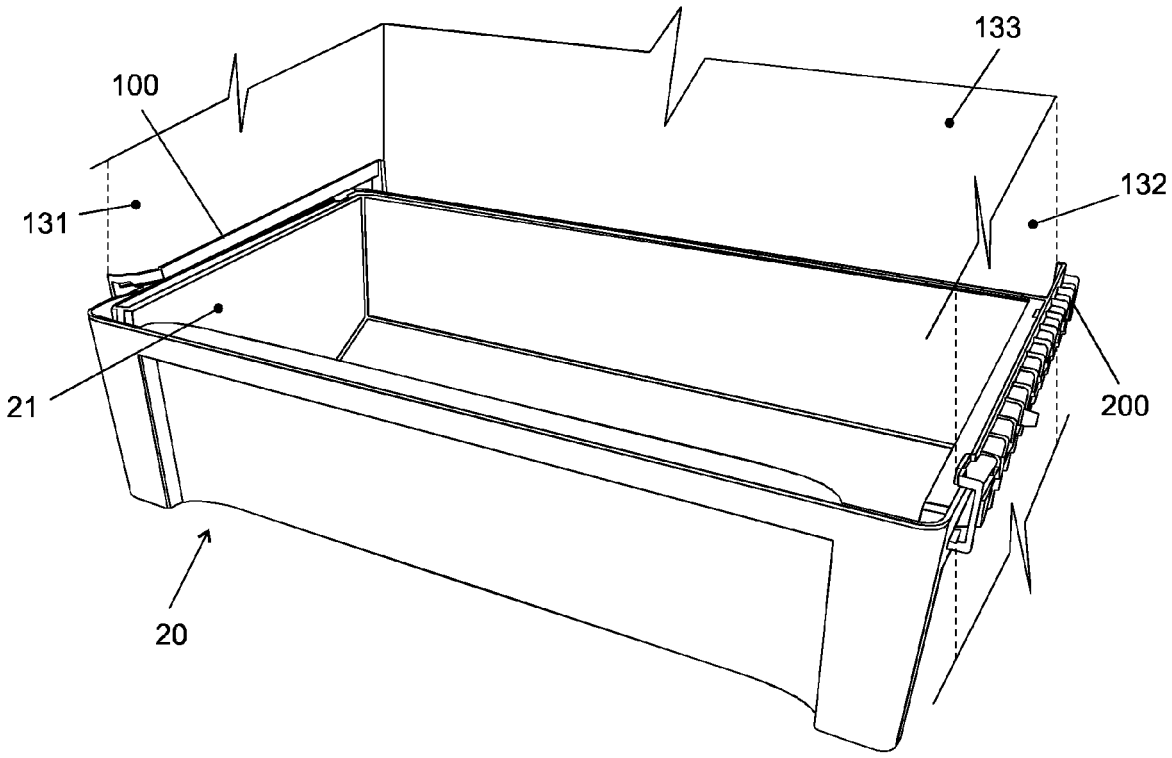


FIG. 2

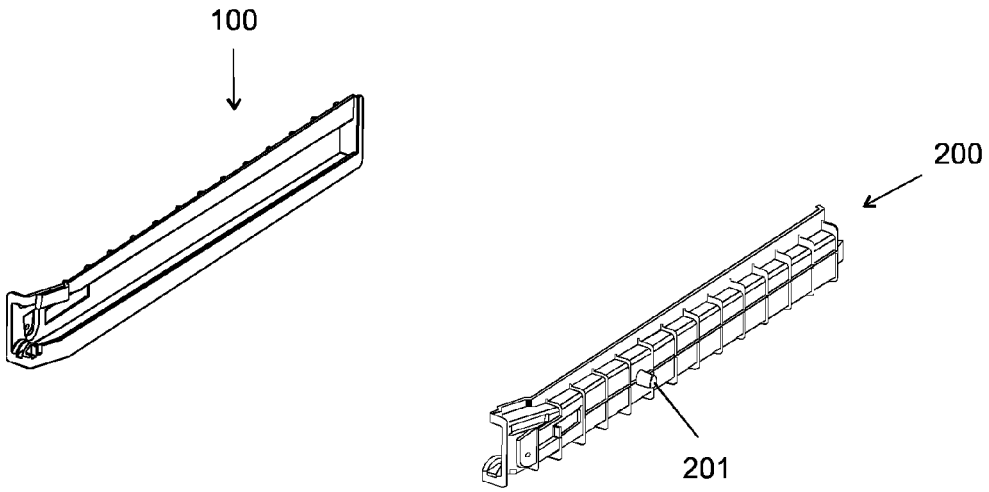


FIG. 3

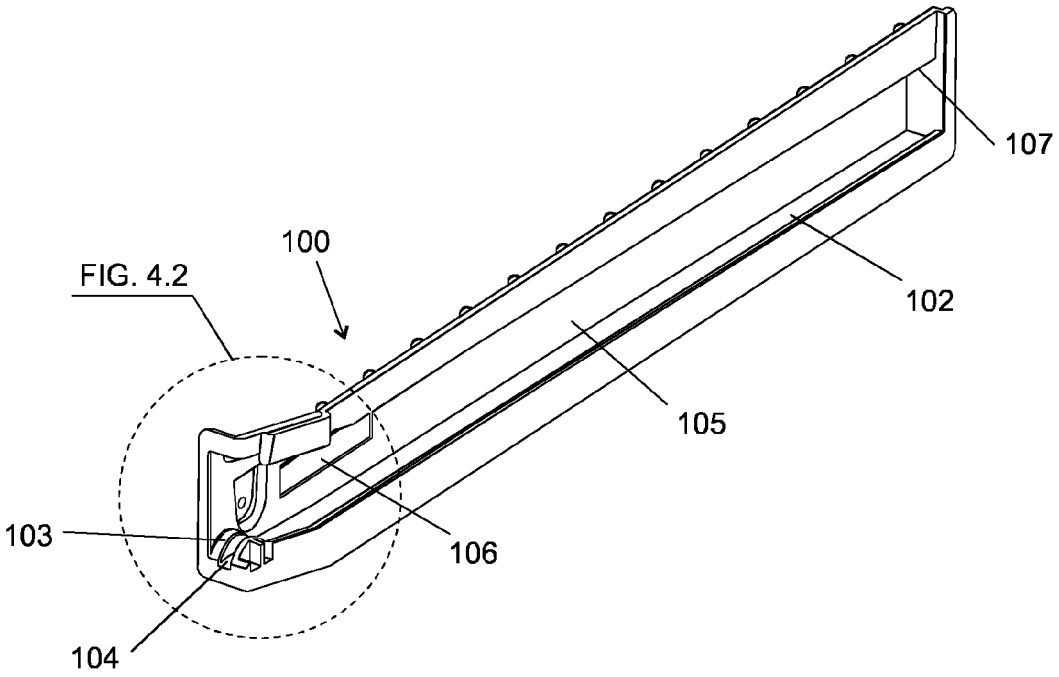


FIG. 4.1

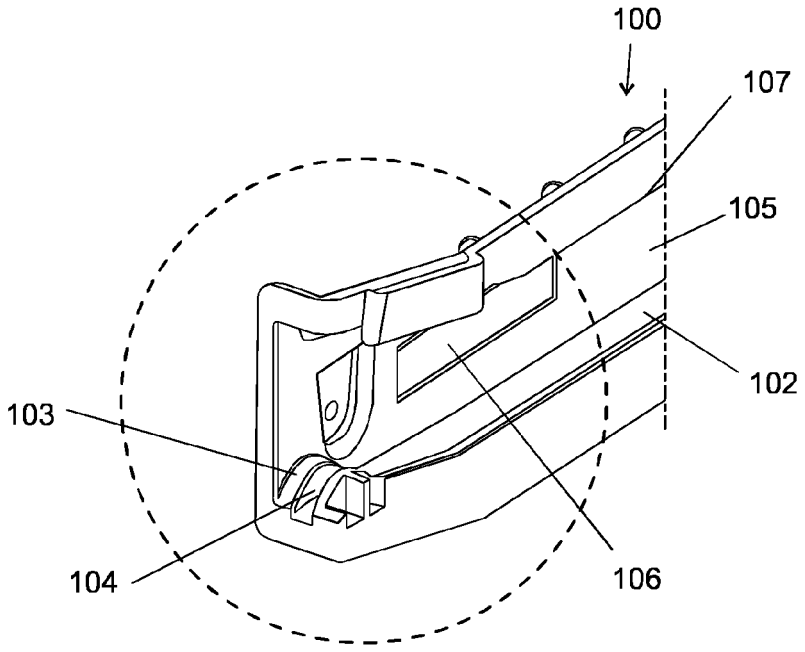


FIG. 4.2

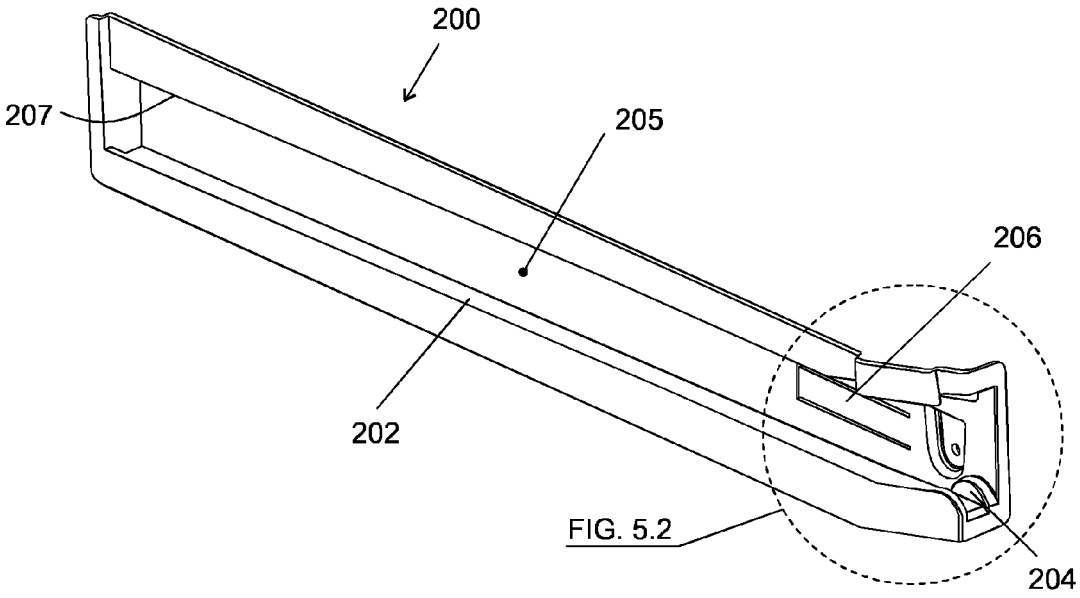


FIG. 5.1

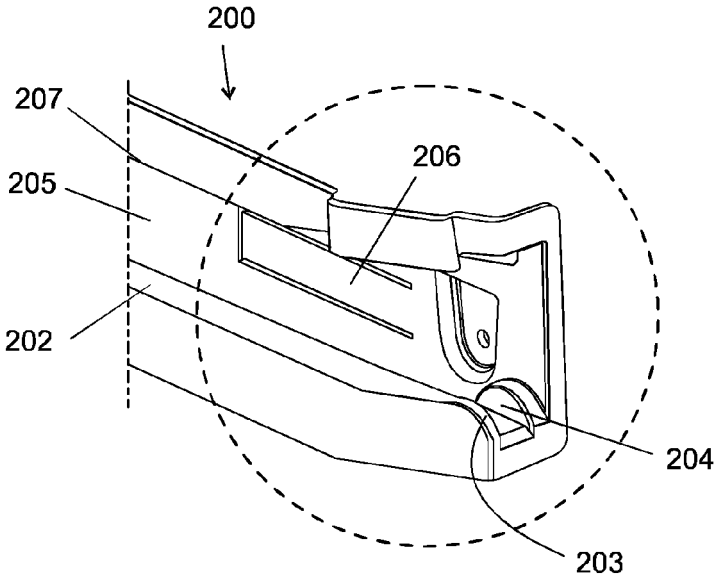


FIG. 5.2

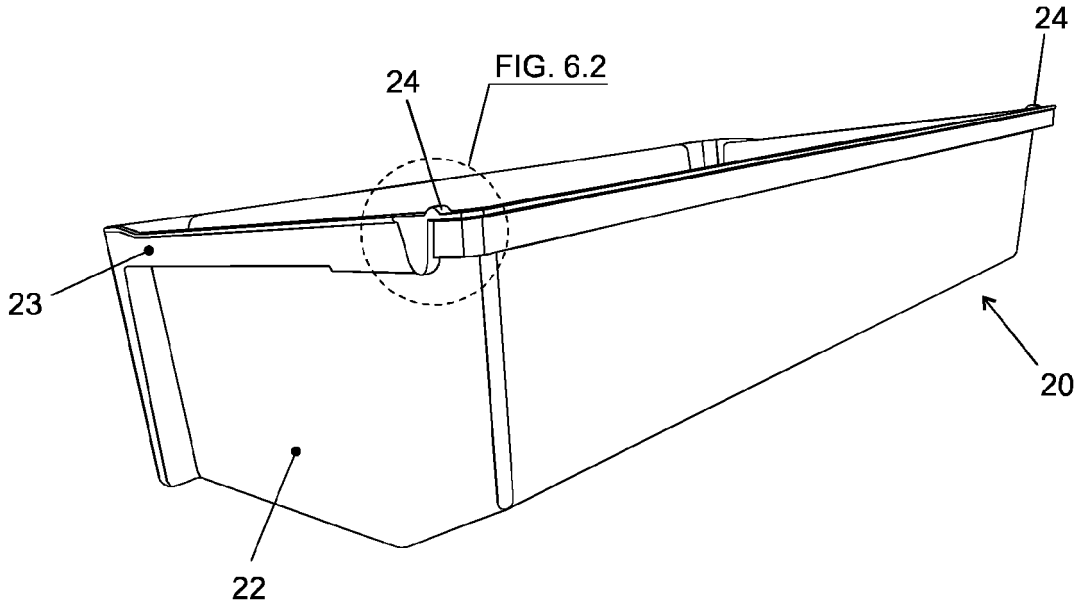


FIG. 6.1

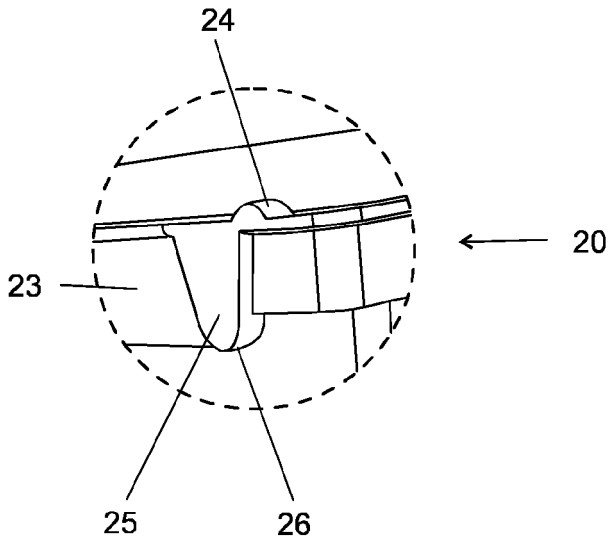


FIG. 6.2

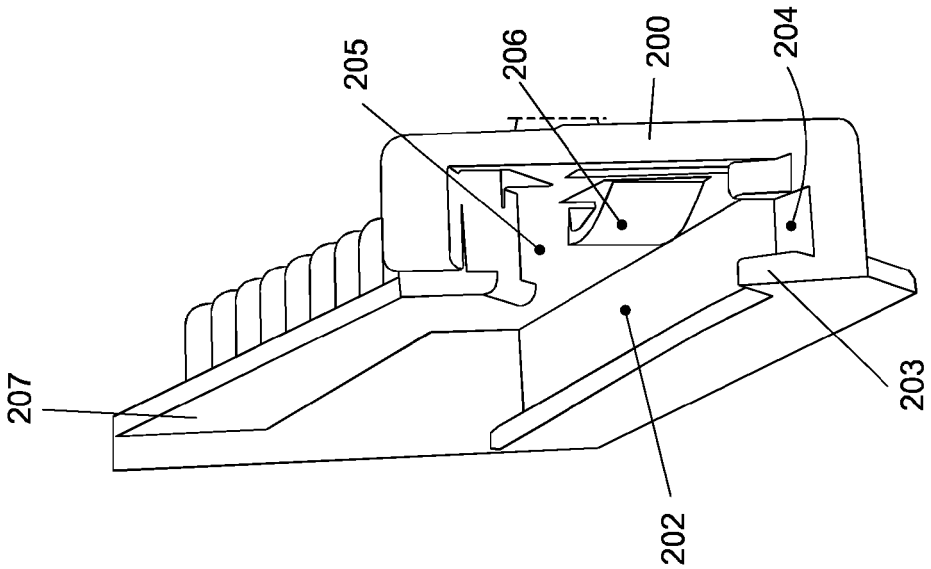


FIG. 7.2

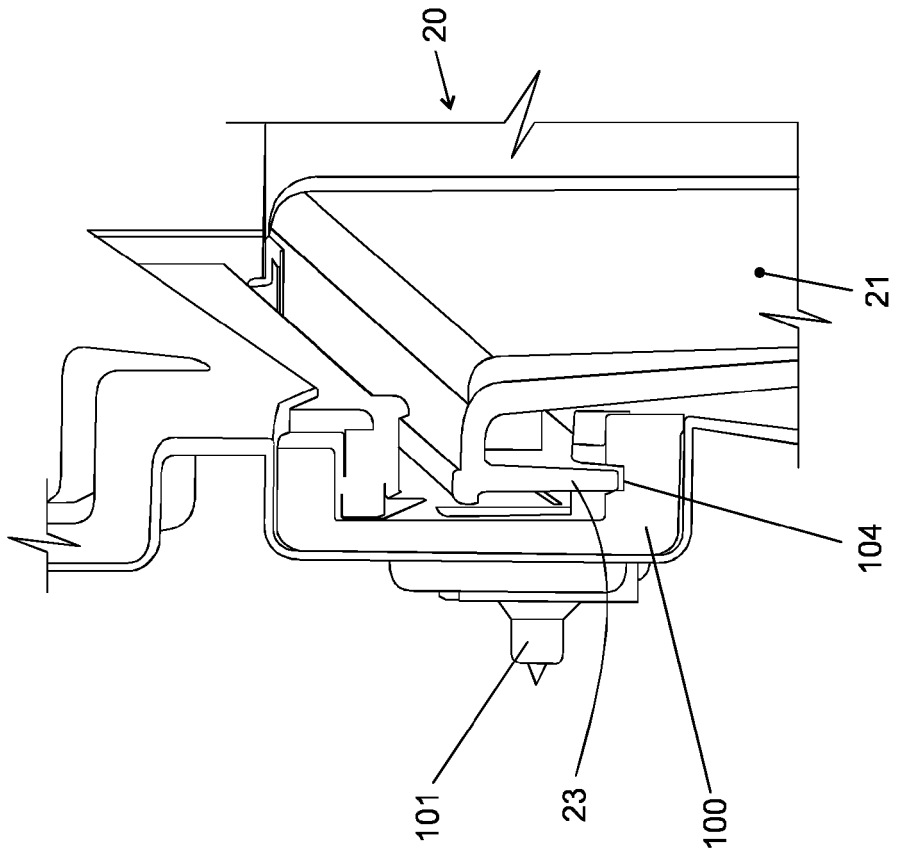


FIG. 7.1

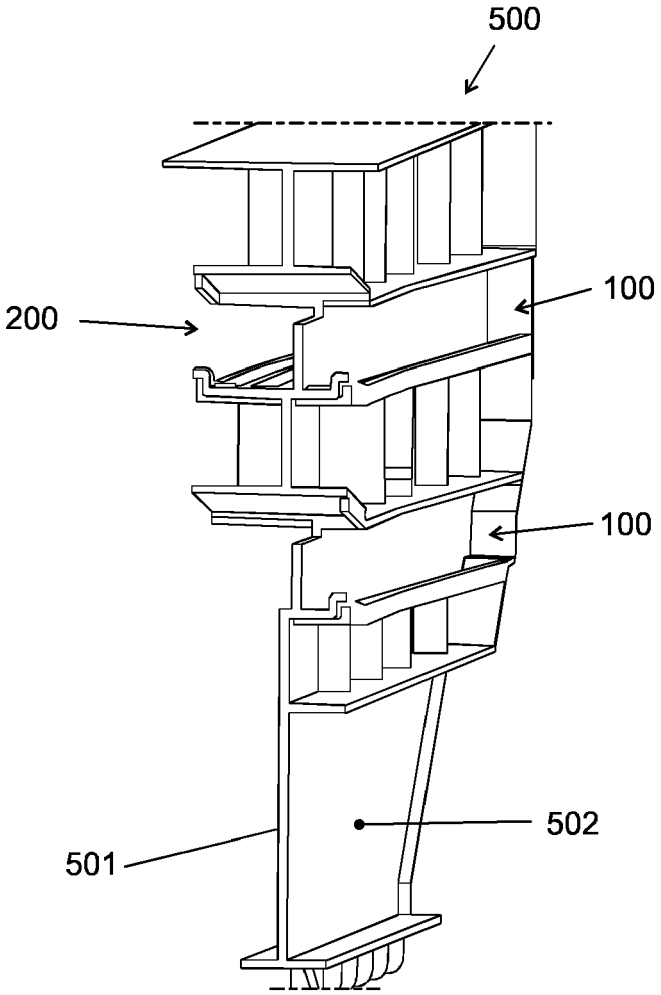


FIG. 8

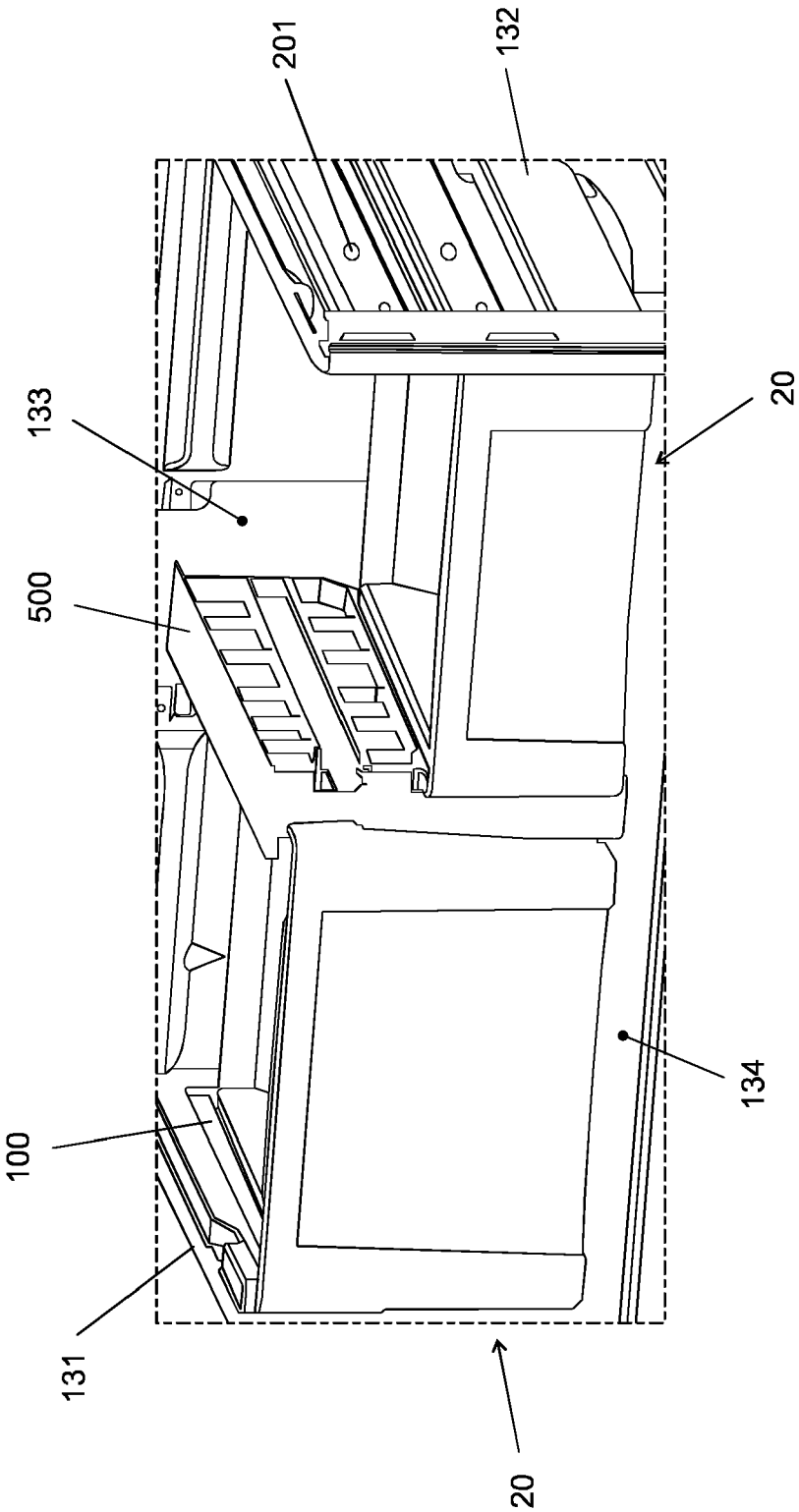


FIG. 9

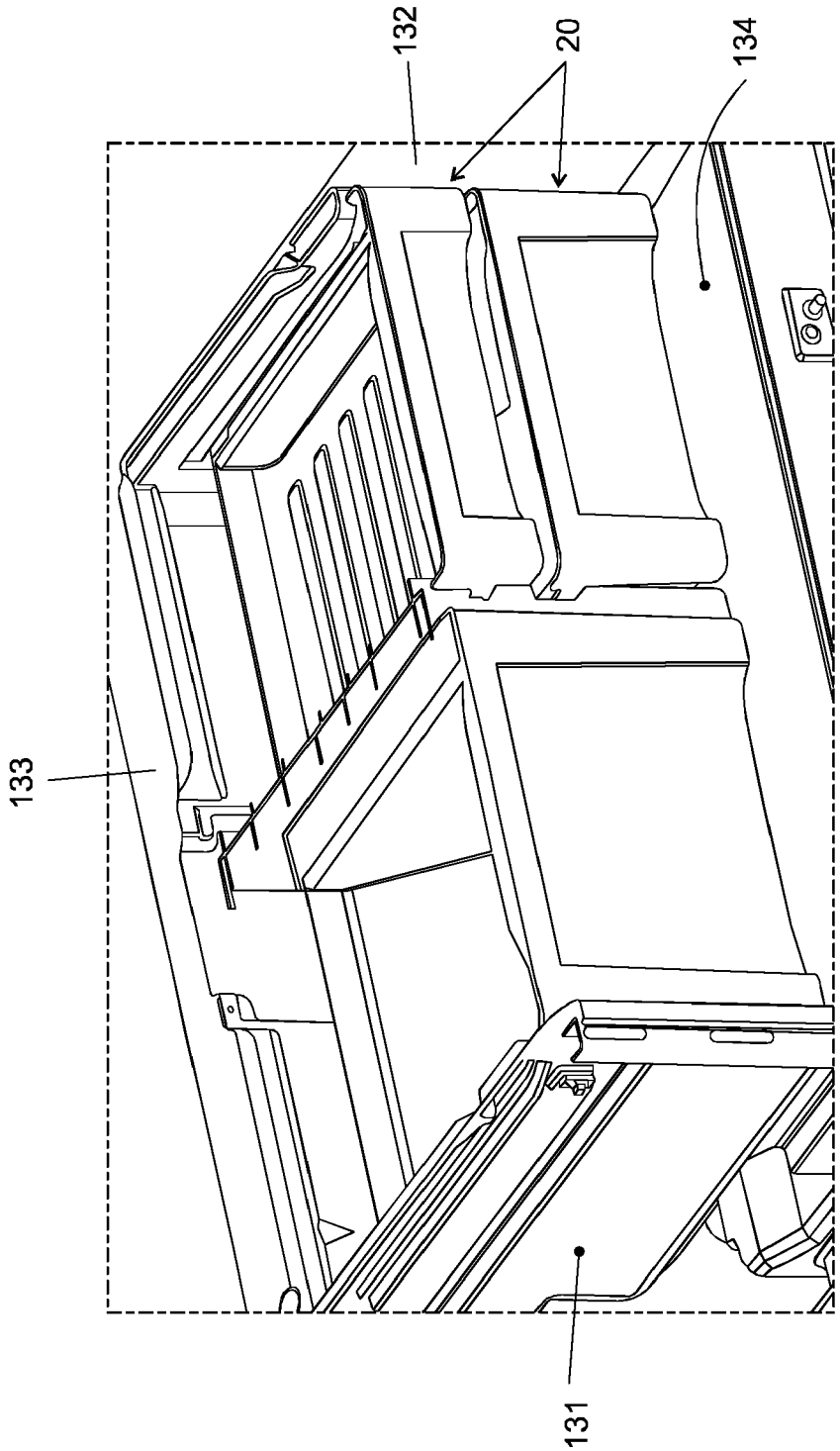


FIG. 10

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20120262044 A **[0008]**
- WO 2007007950 A **[0009]**
- US 6945617 B **[0010]**
- KR 2008029046 **[0011]**
- US 5044704 A **[0013]**
- JP 4254670 B **[0014]**
- BR PI05043875 **[0015]**