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(54) **A product support device**

(57) The present invention relates to a product support device (202) for a gravity feeding shelf (200), comprising a product support holder (209), and pivotable product supports (208) arranged at the product support holder (209). Each product support (208) is pivotable about a vertical axis (A) of the product support (208) between a closed position where the product support (208) supports a product (210) on the shelf (200) and an open position where the product support (208) lets products (210) pass in the front-rear direction.

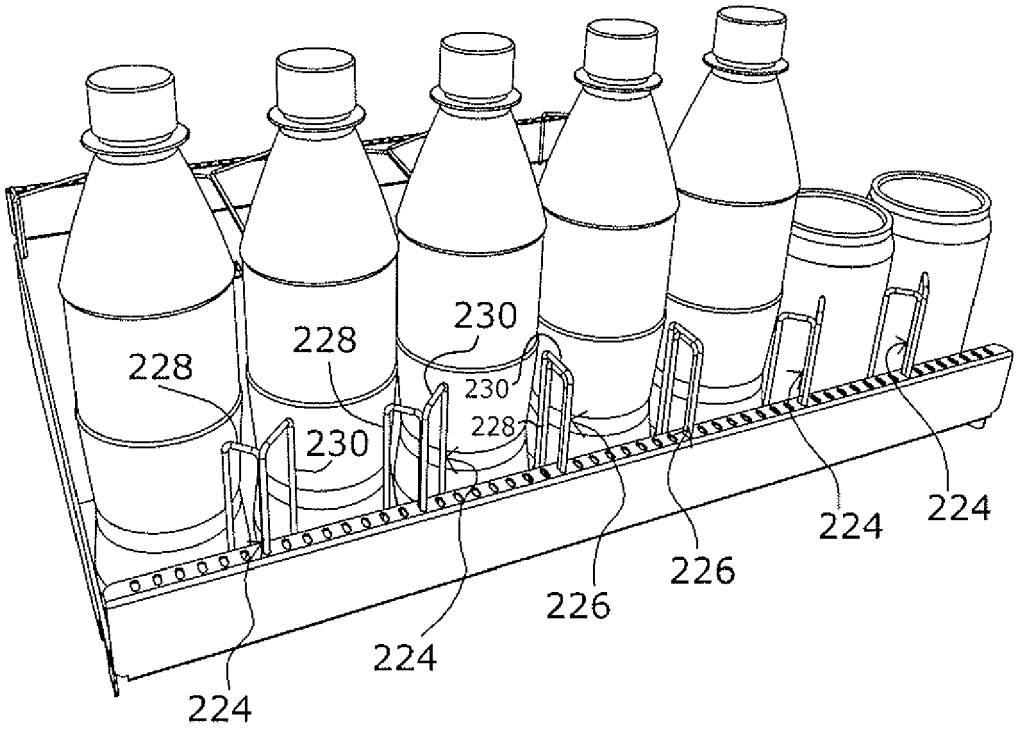

fig.3

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a product support device for a gravity feeding shelf, and more particularly to such a product support device comprising a product support holder, and pivotable product supports arranged at the product support holder.

BACKGROUND OF THE INVENTION

[0002] Gravity feeding shelves need some kind of front stopper to prevent the products on the shelf from falling off the shelf. Basically, some kind of product support device is arranged. However, it is desirable to be able to mount the shelves as close to each other as possible in a vertical direction, wherein the height of the product support device is important for how easy it is to load the shelf with products from a front of the shelf and to remove products from the shelf. When the products are tall and narrow, such as bottles, the product support device has to be rather high in order to provide a significant support. The height causes a problem when refilling the shelf with bottles, since the point of action is too high up. For instance, an ordinary half litre bottle will need a product support height of about 80-90 mm. If there is one or some bottles left on the shelf they easily fall over backwards when pushed to the rear of the shelf by the bottle which is pushed onto the shelf. In order to prevent the falling the person refilling the shelf will have to, inconvinently, use one hand to support the bottles on the shelf. US patent No. 6,142,317 discloses an effort to facilitate the refilling of products on the front-filled gravity feeding shelf. The product support is designed as a hurdle, which is able to bend down towards the rear of the shelf when a product is being moved onto the shelf. However, for the case of tall products, the hurdle becomes rather high and involves the problem described above. Additionally, when bent down it will occupy an undesirably large area of the shelf, preventing a good use of the top surface of the shelf.

SUMMARY OF THE INVENTION

[0003] It is an object of the resent invention to provide a product support device for a gravity feeding shelf that alleviates the above-mentioned problems of the prior art.

[0004] The object is achieved by a product support device for a gravity feeding shelf according to the present invention as defined in claim 1.

[0005] Thus, in accordance with an aspect of the present invention, there is provided a product support device for a gravity feeding shelf, comprising a product support holder, and pivotable product supports arranged at the product support holder. Each product support is pivotable about a vertical axis of the product support between a closed position where the product support supports a product on the shelf and an open position where the product support lets products pass in a front-rear direction.

[0006] By arranging the product supports pivotable about a vertical axis the height of the product supports can be made high enough for providing a proper support of the products while their width can be kept narrow such that they block less product space in the track when products are refilled than the prior art product supports.

[0007] In accordance with an embodiment of the product support device, each product support is generally gate shaped and the vertical axis extends along a vertical edge portion of the product support. This embodiment provides for simplicity of design of the product support.

[0008] In accordance with an embodiment of the product support device, each product support comprises a bias spring element biasing the product support towards the closed position. The bias spring element secures that the product support is returned to the closed position after product refilling.

[0009] In accordance with an embodiment of the product support device, the product support holder is elongated and arranged to be mounted at a front of the shelf, wherein the product support holder comprises seats at which the product supports are rotatably mounted. It is advantageous to mount the product supports rotatably in the product support holder.

[0010] In accordance with an embodiment of the product support device, at least a major part of the vertical extension of the product support holder is upwards from the top surface of the shelf. This is advantageous in that prior art gravity feeding shelves are often provided with a standing front border, and it would be convenient to add the product supports to such a known design.

[0011] In accordance with an embodiment of the product support device, at least a major part of the vertical extension of the product support holder is downwards from the top surface of the shelf. This is advantageous in that the threshold at the front edge of the shelf that the products have to be lifted above when refilling the shelf can be eliminated or at least minimized.

[0012] In accordance with an embodiment of the product support device, the product supports have the shape of bent wires. A wire construction is easy to manufacture.

[0013] In accordance with an embodiment of the product support device, the product supports are plate shaped and are arranged to form a wall in the closed position. In other words, the product supports operate like doors, which in particular is advantageous when the shelf is used in a cold application like a fridge, since the flow of cold air out of the fridge is decreased in comparison with a more open structure of the product supports.

[0014] In accordance with an embodiment of the product support device, the product supports comprise at least one two-gate element, wherein the two gates of the two-gate element are operative at a respective product track of two adjacent product tracks.

[0015] In accordance with an embodiment of the prod-

uct support device, each two-gate element comprises one common bias spring element for the two gates. Thereby, material is saved.

[0016] In accordance with an embodiment of the product support device, the product supports are mountable and demountable in different positions along the length of the product support holder.

[0017] In accordance with an embodiment of the product support device, it comprises a product track divider, which is one of attachable to the product support holder and integral with the product support holder. Thus, the product track divider can be regarded as a part of the product support device, and it can be connected with the product support holder in different ways.

[0018] Furthermore, according to the present invention there is provided a gravity feeding shelf having a front and a rear, comprising product track dividers arranged at a top surface of the shelf, and dividing the shelf in several product tracks along a front-rear direction; and a product support device as described above.

[0019] In accordance with an embodiment of the shelf, the product track dividers comprise first product track dividers separating two neighboring product tracks, wherein each one of said first product track dividers has front and rear ends, and extends along a mid section of the shelf leaving openings between its front and rear end and respective front and rear ends of the shelf, thereby providing room for transversal product passage past the ends of the first product track dividers. This is advantageous in that when refilling the shelf it is possible to put new products in place on the shelf when there are still some older products left, and then continue to feed the new products further to the rear of the shelf while the older products are simultaneously being fed to the front of the shelf. Thus, it is not necessary to remove the old products, push the new products onto the shelf and return the old products for the old products to be placed in front.

[0020] In accordance with an embodiment of the shelf, the product track dividers comprise second product track dividers, each second product track divider separating two neighboring track sets, each track set comprising at least one first product track divider and at least two product tracks, wherein the second product track dividers are longer than the first product track dividers, leaving no room for transversal product passage. By means of the second product track dividers it is secured that the freedom of transversal movement of the products does not get too high.

[0021] These and other aspects, and advantages of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The invention will now be described in more detail and with reference to the appended drawings in which:

Fig. 1 schematically shows a refrigerator provided with an embodiment of shelves according to the present invention;

Fig. 2 schematically shows an embodiment of the shelf according to the present invention;

Figs. 3 to 21 schematically show embodiments of the shelf according to the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0023] One example of an application of the product support device according to the present invention is a refrigerator 100, which holds several shelves 102. The shelves 102 are gravity feeding, i.e. the products 104 on the shelves 102 slide towards the front 106 of the shelves 102 by means of the force of gravity. In order for this to work, the shelves 102 are inclined downwards from the rear to the front 106. Each shelf 102 is provided with a product support device 107, supporting the products on the shelf. Typically, the product support devices 107 prevent the products 104 from falling off the shelf 102. The product support devices 107 comprise product supports 108, which are pivotable about a vertical axis in order to facilitate refilling of products 104, where the products are simply pushed passed the product supports 108 while they are pivoting, as will be described in detail below. Of course, many other applications than this refrigerator application are possible, such as shelving units placed in room temperature in a store, and shelving units placed in a cooled room, etc. However, since this is obvious to a person skilled in the art such alternative applications will not be more closely described herein.

[0024] The product support device 107 according to the present invention is a separate device which is produced separately and adapted to different kinds of shelves. However, alternatively it can be regarded or actually produced as a more or less integral part of a shelf 102. Furthermore, although it is possible to produce and market the product support device 107 as a separate device, is not very useful until it is mounted on a shelf 102. Therefore, in order to best illustrate the use and functions of the product support device, the following description describes different embodiments of a shelf. However, of course, they include different embodiments of the product support device, as will be understood by the person skilled in the art.

[0025] In a first embodiment of the shelf, as shown in Figs. 2-4, the shelf 200 comprises a major flat plate shaped portion 201 carrying products 210, and a product support device 202, embodying a front border of the shelf 200. The product support device 202 is elongated and extends longitudinally along the front 204 of the shelf 200. The product support device 202 comprises product supports 208, and a product support holder 209 holding the product supports 208. The product support holder 209 extends vertically upward from the top surface 206 of the shelf 200. The vertical height, which could also be considered to represent the width of the product support

holder 209, extends upwards to an appropriate height. What height is appropriate depends on how the product supports 208 are designed, since an important function of the product support holder 209 is to hold the product supports 208. However it should be kept as low as possible in order to facilitate the refilling of products 210. The shelf 200 furthermore comprises a rear border 218 being elongated and extending longitudinally along the rear 220 of the shelf 200; and product track dividers 212 arranged at the top surface 206 of the shelf 200, and dividing the shelf 200 in several product tracks 222 along a front-rear direction. For the purposes of this application, it should be noted that the expression "front-rear" direction includes the direction from the front to the rear of the shelf as well as the direction from the rear to the front of the shelf. More particularly, a front end 214 of each product track divider 212 is demountably mounted at the plate portion 201, and a rear end 216 of each product track divider 212 is demountably mounted at the rear border 218. More particularly, each product track divider 212 is a metal wire which has been bent at its ends and inserted in respective holes of the plate portion and the rear border, as will be further explained below. Many alternative designs are feasible as is understood by the skilled person.

[0026] Each product support 208 is generally gate shaped, and is pivotable about a vertical axis A, between a closed position, shown by all product supports 224 except the two middle product supports 226 in Fig. 3, and an open position as illustrated by the two middle product supports 226 in Fig. 3. In this embodiment, each product support 208, 224, 226 is generally gate shaped and the vertical axis extends along a vertical edge portion of the product support 208, 224, 226. In this embodiment, each product support 208, 224, 226 is a two-gate element, i.e. it comprises two separate gates 228, 230. The two-gate element 208, 224, 226 comprises one common bias spring element 232 for the two gates 228, 230, as best seen in Fig. 4. Each gate 228, 230 is a bent metal wire, which is generally U-shaped, with the U turned upside down, thus having first and second vertical post portions, or legs, 234, 236 and a horizontal connection portion 238 connecting the post portions with each other. Thus, the length of the connection portion 238 constitutes the width of the gate 228, 230. The product support holder 209 has an elongated upper portion 240, constituting a horizontal narrow lip, provided with a series of upper holes 242 extending along the length thereof, and, thus, along the length of the product support holder 209, and a lower portion 244, being a slanting surface portion, provided with a series of lower holes 246 extending along the length thereof, and, thus, along the length of the product support holder 209. The first post portions 234 of the gates 228, 230 have been mounted through the same upper and lower holes 242, 246 of the product support holder 209, and the bottom end of each first post portion 234 rests on the top surface 206 of the shelf 200. The bias spring element 232 is biasing the second post portions 236 against a rear surface 247 of the product support holder 209 in the closed position while spreading the second post portions 236 of the gates 228, 230 from each other, such that the gates 228, 230 form a V-shape.

[0027] In this embodiment two neighboring product supports 208, 224, 226 together support the products 210 of a common product track 222. More particularly, one gate 228 of one of the product supports 208 cooperates with one gate 230 of the neighboring product support 208. This is since each product track divider 212 is aligned with the first post portions 234 of the gates 228, 230 of a product support 208. This is true for all tracks but the tracks on the respective sides of the shelf 200, where there is one gate 228 or 230, acting on an inner half of the product 210, while at the outer side of the product 210 there is a wall of a refrigerator or of a shelving unit or the like, preventing the product from sliding off the shelf 200.

[0028] In this embodiment there is a series of holes 248 in the plate shaped portion 201 of the shelf 200, which holes 248 are aligned with the holes 242, 246 of the product support holder 209, and they are arranged at a small distance to the rear of the product support holder 209. The front ends 214 of the product track dividers 212 have been mounted in those holes 248. The rear border 218 has an elongated upper portion 250 provided with a series of holes 252 extending along the length of the rear border 218, as illustrated in Fig. 2. The rear ends 216 of the product track dividers 212 have been mounted in those holes 252 of the rear border 218.

[0029] Since demountably mounted, both the product track dividers 212 and the product supports 208, 224, 226 are movable, and they are differently mounted in dependence of the width of the products to be put on the shelf 200.

[0030] It should be noted that the top surface 206 is of a low friction type. For instance the top surface 206 has been painted with low friction paint, is made of a low friction material, or is provided with rollers or the like. There are many current alternatives that work well, and that are known to the skilled person.

[0031] A part of the product support device 202, more particularly a very front wall and the upper portion 240, is integral with the plate portion 201 and has been formed by bending a front portion of the plate shaped portion 201. The rest of the product support device 202, including the lower portion 244, has been rigidly attached to the bent plate part. However, the product support device could alternatively be made as a separate part, which is rigidly attached to the plate portion 201, such as by adhesion, welding or the like.

[0032] A second embodiment of the shelf 300, illustrated in Figs. 5-7, is similar to the first embodiment except for the design of the product track dividers 311, 312. Thus, the shelf 300 is provided with a similar product support device, embodying a front border, 302, a similar rear border 318, similar product supports 308, and product support holder 309, comprised in the product support

device 302, and a flat plate portion 301 upon which the products 310 are placed. However, the product track dividers 311, 312 are of two different types. First product track dividers 311 each separate two neighboring product tracks 322. Each one of the first product track dividers 311 has a front end 315 and a rear end 317, and extends along a mid section of the shelf 300 leaving openings between its front and rear ends 315, 317, and respective front and rear ends 304, 305 of the shelf 300. Instead of the front and rear ends 304, 305 of the shelf 300, the openings can be related to the product support device, or front border, 302, and the rear border 318. In any case, the distance between the ends 315, 317 of the first product track dividers 311 and the front and rear borders 302, 318, respectively, provides room for transversal product passage past the ends 315, 317 of the first product track dividers 311.

[0033] Second product track dividers 312 are similar to the product track dividers 212 of the first embodiment. Thus, they are made of metal wires having their front ends mounted in seats, constituted by holes, 348 close to the front border 302, and having their rear ends mounted in seats, also being holes, 352 of the rear border 318. Thus, the second product track dividers 312 are longer than the first product track dividers 311, leaving no room for transversal product passage. Each second product track divider 312 separates two neighboring sets, each set comprising at least one first product track divider 311 and at least two product tracks 322, on either side of the first product track divider 311.

[0034] When the shelf 300 is to be refilled, and a product 310 is to be put on the shelf 300, it does not have to be lifted above the product support 308, but it can be pushed straight passed the product support 308, which pivots away like a gate. If the distance between the upper edge of the product support holder 309 and the shelf above is enough, the products 310 can be held fully upright while refilling the shelf 300, as illustrated in Fig 6. If not, the operator will have to lean the product slightly backward. Since the product supports 308 pivot about a vertical axis they can be made relatively narrow in width, and therefore they occupy little space on the shelf 300 when pivoted, in contrast to the prior art gate referred to above. This is true for all embodiments presented in this application. Since the product supports 308 are movable along the length of the product support holder 309, which is provided with closely arranged seats 342 for the product supports 308, the width can be kept narrow. This is because the product supports 308 can be mounted at a distance between them that is just slightly in excess of the width of the products 310. In particular when the products 310 are rigid like cans and bottles, the product supports 308 only have to cover a minor part of their width to fulfill the purpose of preventing the products 310 from falling off the shelf 300.

[0035] After having refilled the shelf 300 according to this second embodiment it is possible to rotate the products around the first product track divider 311, as illustrated in Fig. 7. Thus, when the products 310 placed in a line in one track 322 are pushed to the rear of the shelf 300, they are able to turn around the rear end 317 of the first product track divider 311 and move towards the front of the shelf 300 in the neighboring track 323. Furthermore, the operator can move the foremost products 310 sideways, because there is room for transversal movement in front of the front end 315 of the first product track divider 311. Consequently, this embodiment provides for a fast and simple handling of the products on the shelf 300. It is mostly desirable to move around the products 310, since the products behind the newly loaded products are either older, as regards the best-before date, or colder, or both, and from a merchandising point of view they should be placed in front of the newly loaded products.

[0036] Each two neighboring second product track dividers 312, which have at least one first product track divider 311 between them, have rear end portions 354, 356 which approach each other in a rearward direction. In other words these rear end portions 354, 356 are inclined relative to the front-rear direction. Thereby the products 310 sliding rearwards are guided to deviate from the rearward direction obliquely towards the neighbor product track, facilitating their transversal movement, and when passing the first product track divider 311, the rear end portion of the neighbor second product track divider guides the products to move obliquely forwards and into the neighbor product track.

[0037] Furthermore, it should be noted it is possible to push two products 310 passed the product supports 308 and onto the shelf 300 at the same time, holding one in each hand. This is true for all embodiments. If those two products are loaded adjacent to each other, the product support 308 between them simultaneously opens both gates, which reach the position shown at 226 in fig. 3. Thus, one of the gates 228 fits into the other 230, since its dimensions are slightly smaller. Thus, the total thickness of the two gates is no more than that of a single gate.

[0038] Furthermore, as shown in Fig. 5 the shelf 300 comprises two brackets 360 arranged at opposite sides of the shelf 300. Each bracket 360 is wedgeshaped with the base of the wedge at the rear end 362 of the bracket 360. The bracket 360 has mounting seats 364 to be engaged with horizontal bracket supports of a shelving unit, a fridge, etc. consequently, the wedge shape of the brackets 360 provide the inclination of the shelf 300, which in turn provides the gravity function. However, this is just one example of many of how to achieve the gravity function.

[0039] According to a third embodiment of the shelf 400, as shown in Figs. 8 and 8a, it comprises a second embodiment of the product support device 401. The product support device 401 is elongated and is arranged to be mounted at the front of the shelf 400, and comprises a product support holder 402.. The product support holder 402 has a generally U-shaped cross-section and encloses a correspondingly U-shaped front portion of the

shelf 400, which has been formed by bending a front portion of the major flat plate shaped portion 404 of the shelf 400. First it has been bent perpendicularly down, and then perpendicularly rearwards. Thus, similar to the product support holder of the first and second embodiments, the product support holder 402 of this third embodiment has an elongated upper horizontal portion, or lip, 412 provided with a series of holes 414 extending along the length of the product support holder 402. The shelf 400 is provided with corresponding upper holes 415 close to the front thereof. However, in contrast to the above embodiments the vertical extension of the product support holder 402 is substantially downwards from the top surface 416 of the shelf 400. A bottom lip 418 of the front portion extending rearwards below the plate shaped portion 404 is provided with lower holes 419, which are aligned with the upper holes 415. A corresponding bottom lip 420 of the product support holder 402 extends below and parallel with the bottom lip 418 of the front portion. Each product support 406 has a vertical elongated portion, or leg, 407 fitting in the holes 414, 415, where the bottom lip 420 of the product support holder 402 acts as a bottom stop for the vertical elongated portion 407 of the product support 406. The product supports 406 are similar to those described above, but they are higher, i.e. at least the vertical elongated portion 407 is longer than the corresponding portion of the above embodiments. The bias spring elements are arranged between the upper horizontal portion 412, and the top surface 416 of the shelf 400. Alternatively the bias spring elements can be arranged, for instance, within the space created by the bent front portion of the plate shaped portion 404 of the shelf 400.

[0040] According to a fourth embodiment of shelf 500, and a third embodiment of the product support device 502, as illustrated in Figs. 9 and 10, each product support 504 comprises a single gate instead of two gates. The product track dividers 508 extend between the rear end of the shelf and a position close to the product support device 502, giving no room for transversal movement of the products 510 past the product track divider ends. This embodiment is advantageous in that it used less material for the product supports 508 than the two-gate product support embodiments. The products 510 are still prevented from falling off the shelf 500. The front product 510 of each track is guided and laterally supported by the product track dividers 508, and longitudinally supported by the product support 504 and the product support holder 506. However, a smaller part of the front product is covered by the product support 504 than in a two-gate embodiment, unless the width of the gate 504 is increased, which is undesired if the depth occupied at refilling of the shelf 500 is to be minimized. In any case, this embodiment also works well for many types of products.

[0041] A fifth embodiment of the shelf 600, as shown in Figs. 11 and 11a, is similar to the fourth embodiment. However, one difference is that a front end of each product track divider 608 is has been received at the same seat 610 of the product support holder 606 as the associated one gate product support 604. The seats 610 have been made larger in order to be able to receive them both. It is advantageous not to have to make separate seats for front ends of the product track dividers 608.

[0042] According to a sixth embodiment of the shelf 700, as shown in Figs. 12 and 13, the product support device 702 comprises several product supports 704, which are generally plate shaped and are arranged to form a wall together in the closed position. Each product support 704 comprises two doors 706, 708 pivotally arranged at a common seat 710 arranged at the product support holder 714, and preferably transparent. The free edges 712 of the doors 706, 708 engage with, or abut against, each other when the product supports 704 are in the closed position.

[0043] According to a seventh embodiment of the shelf 800, as most schematically illustrated in Fig. 14, the product supports 802 are differently shaped than those described above. More particularly, each product support 802 comprises two gates 804, 806, which are made from metal wires and which are generally U-shaped, but the legs of the U are not parallel. A first leg, or vertical portion, 808 of each gate 804, 806, is strictly vertical and extends down into a seat of a product support holder 812, which is merely faintly outlined in Fig. 14, while a second leg 810 is inclined such that the distance between the legs 808, 810 at a top end of the product support 802 is shorter than the distance between the legs 808, 810 at a free bottom end of the second leg 810. This means that the second leg 810 is adapted to a product 814 which has an inclined outer shape, and preferably follows the inclination of the outer shape of the product 814.

[0044] According to further embodiments of the shelf as shown in Figs. 15-19, the shelf and the different parts involved are substantially made from a plastic material, which provides for other design prerequisites than when designing products in metal. However, the below embodiments at least partly can be made from other materials as well, such as metal. The person skilled in the art will understand when substitute materials are useful.

[0045] Thus, according to an eighth embodiment of the shelf 900, a part of which is shown in Figs. 15 and 16, the shelf 900 comprises a major flat plate shaped portion 902, product track product track dividers 904, and a product support device 906 comprising separate product support units 908. The plate shaped portion 902 of the shelf 900 is provided with seats 910 close to a front edge 912 thereof, and the product support units 908 are mounted at the seats 908. Each product support unit 908 comprises a product support holder 914, and a product support 920. The product support holder 914, is substantially plate shaped and is provided with a centre seat 915 for receiving a pivot shaft 916, and end holes 918 close to the two ends of the product support holder 914, which end holes 918 are used for attaching the product support unit 908 to the major flat part 902 of the shelf 900. Further, the product support 920 comprises two door-shaped

gates 922, 924, which are pivotally mounted on the pivot shaft 916 at one vertical edge of each gate 922, 924, and which are biased against a rear side 926 of the product support holder 914. In other words, a lower edge portion of each gate 922, 924 abut against the rear side 926 in a closed position. Each gate 922, 924 is pivotable towards the rear of the shelf 900 when a product is being pushed onto the shelf 900. Each product track divider 904 is an elongate plate extending in a vertical plane, in which the pivot shaft 916 resides as well.

[0046] A ninth embodiment of the shelf 1000, illustrated in Figs. 17 and 18 is similar to the eighth embodiment, except for the pivot shaft of the product support units 1002, and the product track dividers 1004. The pivot shaft 1006 is a front portion 1006 of the product track divider 1004, which is wire shaped and has a shorter vertical rear portion 1008 and a longer vertical front portion 1006, which extends through a vertical edge portion of the gates 1012, 1014 of the product support 1010 instead of the separate pivot shaft 916 of the eighth embodiment, and through one of the seats 1016 of the major plate portion 1018 of the shelf 1000.

[0047] According to a tenth embodiment of the shelf 1100, see Figs. 19 and 20, the product support device 1102 is made in one integral piece comprising a divider portion 1104, and a product support device portion 1106. The product support device portion 1106, in turn, comprises a product support holder portion 1108, and a product support portion 1110, which in turn comprises two gate portions 1112, 1114, which are pivotally connected with a vertical portion of the product support holder portion 1108, via a respective pivoting portion 1116, 1118 each constituted by a thinner vertical portion along a vertical edge of the gate 1112, 1114. The material of the pivoting portions 1116, 1118 is formed to keep the gate portions 1112, 1114 in a closed position when not acted upon, i.e. to provide a bias spring function, and thereby constitutes a bias spring element as well. Furthermore, the thinner vertical portions 1116, 1118 constitute hinges allowing the gate portions 1112, 1114 to pivot between a closed position and an open position, as illustrated in Fig. 20, where products are allowed to pass onto the shelf 1100. The product support devices 1102 have been received in seats of the top surface 1126 of a plate shaped portion of the shelf 1100, close to the front 1128 thereof. More particularly, the products support holders 1108 have been attached by means of screws or the like to the plate shaped portion.

[0048] The divider portion 1104 is plate shaped as well, but extends in a vertical plane rearwards from the product support device portion 1106 and rests on the top surface 1126. In this embodiment the divider portion comprises a front portion 1120, and a rear portion 1122, where the front portion 1120 is slightly thinner than the rear portion 1122.

[0049] According to an eleventh embodiment of the shelf 1200, as shown in Fig. 21, it is provided with a product support device 1202 according to one of the above-described embodiments, comprising product support 1218 having two gates 1220, 1222; and first and second product track dividers 1232, 1230, where the first product track dividers 1232 are arranged to separate two adjacent product tracks, leaving openings beyond both ends of the product track divider 1232 for transversal, i.e. lateral, product passage, and the second product track dividers are arranged to separate adjacent sets of at least one first product track divider 1232 and at least two product tracks 1208, 1210. Additionally, the second product track dividers 1230 are arranged to guide the products 1216 to facilitate the transversal movement by being arc shaped at a rear end portion thereof.

[0050] Furthermore, the low friction surface has been obtained by the arrangement of sets of rollers 1208, 1210. For the front-rear movement of the products 1216 along the product tracks, the rollers 1206 of the sets of rollers 1208, 1210 are arranged with lateral rotation axes. However, at the rear area of the shelf 1200, where the products 1216 pass transversally through the opening behind the first product track dividers 1232 from one product track to the other, the rollers 1206 of the sets of rollers 1214 are arranged with the rotation axes in the front-rear direction, i.e. perpendicular to the transversal direction. The products 1216 are shown as having a brick shape. This roller surface embodiment is often advantageous for such kind of products, while it is more expensive than a rigid low friction solution like low friction paint or other low friction material.

[0051] Above embodiments of the shelf, and product support device, according to the present invention as defined in the appended claims have been described. These should only be seen as merely non-limiting examples. As understood by the person skilled in the art, many modifications and alternative embodiments are possible within the scope of the invention as defined by the appended claims.

[0052] For instance, the shape of the product supports can be widely varied in addition to the alternative embodiments describe above.

[0053] It is to be noted that for the purposes of his application, and in particular with regard to the appended claims, the word "comprising" does not exclude other elements or steps, and the word "a" or "an" does not exclude a plurality, which per se will be evident to a person skilled in the art.

Claims

1. A product support device for a gravity feeding shelf, comprising a product support holder, and pivotable product supports arranged at the product support holder, **characterized in that** each product support is pivotable about a vertical axis of the product support between a closed position where the product support supports a product on the shelf and an open position where the product support lets products

pass in a front-rear direction.

2. The product support device according to claim 1, wherein each product support is generally gate shaped and the vertical axis extends along a vertical edge portion of the product support.

3. The product support device according to claim 1 or 2, wherein each product support comprises a bias spring element biasing the product support towards the closed position.

4. The product support device according to any one of the preceding claims, wherein the product support holder is elongated and arranged to be mounted at a front of the shelf, wherein the product support holder comprises seats at which the product supports are rotatably mounted.

5. The product support device according to claim 4, wherein at least a major part of the vertical extension of the product support holder is arranged to extend upwards from a top surface of the shelf.

6. The product support device according to claim 4, wherein at least a major part of the vertical extension of the product support holder is arranged to extend downwards from a top surface of the shelf.

7. The product support device according to any one of the preceding claims, wherein the product supports have the shape of bent wires.

8. The product support device according to any one of claims 1 to 6, wherein the product supports are plate shaped and are arranged to form a wall together in the closed position.

9. The product support device according to any one of the preceding claims, wherein the product supports comprise at least one two-gate element, wherein the two gates of the two-gate element are operative at a respective product track of two adjacent product tracks.

10. The product support device according to claim 9, wherein each two-gate element comprises one common bias spring element for the two gates.

11. The product support device according to any one of the preceding claims, wherein the product supports are mountable and demountable in different positions along the length of the product support holder.

12. The product support device according to any one of the preceding claims, further comprising a product track divider, which is one of attachable to the product support holder and integral with the product support holder.

13. A gravity feeding shelf having a front and a rear, comprising product track dividers arranged at a top surface of the shelf, and dividing the shelf in several product tracks along a front-rear direction; and a product support device according to any one of the preceding claims.

14. The shelf according to claim 13, wherein said product track dividers comprise first product track dividers each separating two neighboring product tracks, wherein each one of said first product track dividers has front and rear ends, and extends along a mid section of the shelf leaving openings between its front and rear end and respective front and rear ends of the shelf, thereby providing room for transversal product passage past the ends of the first product track dividers.

15. The shelf according to any one of the preceding claims, wherein said product track dividers comprise second product track dividers, each second product track divider separating two neighboring sets, each set comprising at least one first product track divider and at least two product tracks, wherein the second product track dividers are longer than the first product track dividers, leaving no room for transversal product passage.

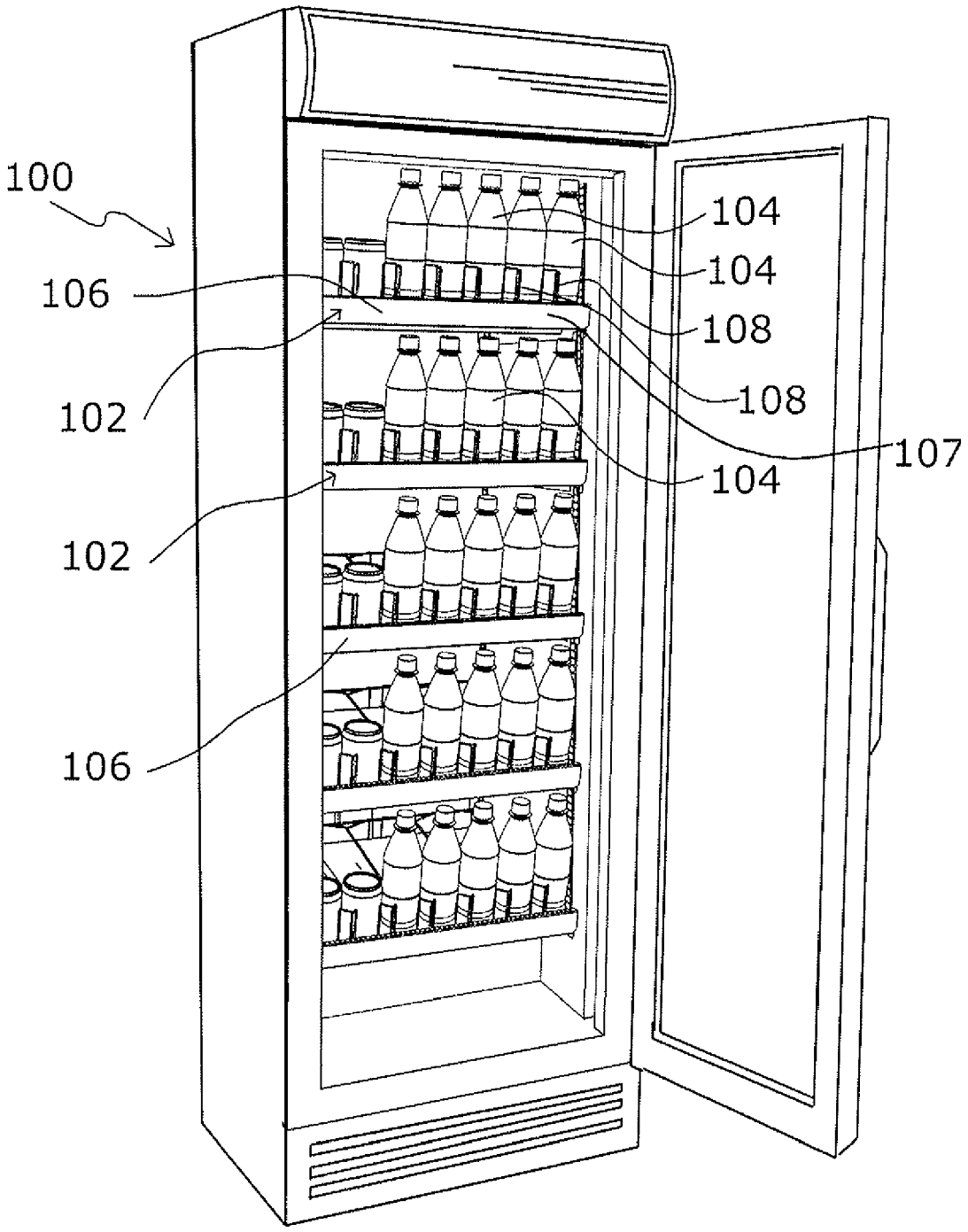

fig.1

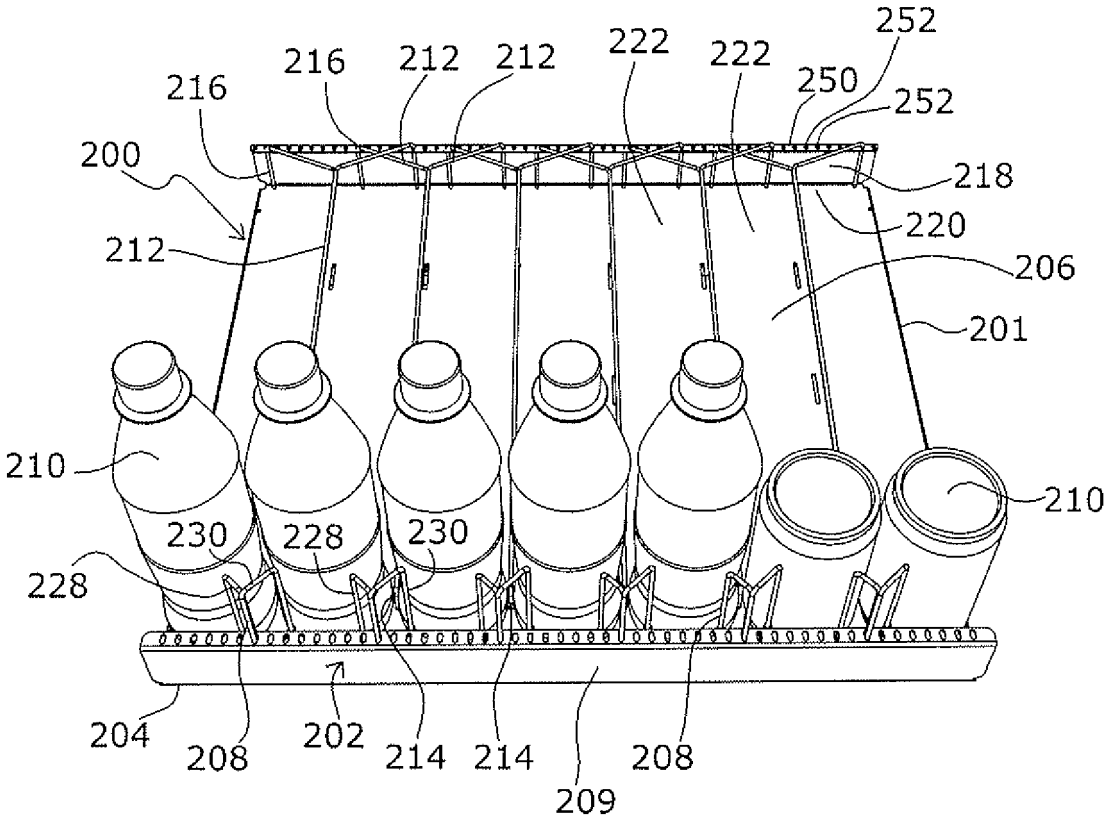
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fig.2

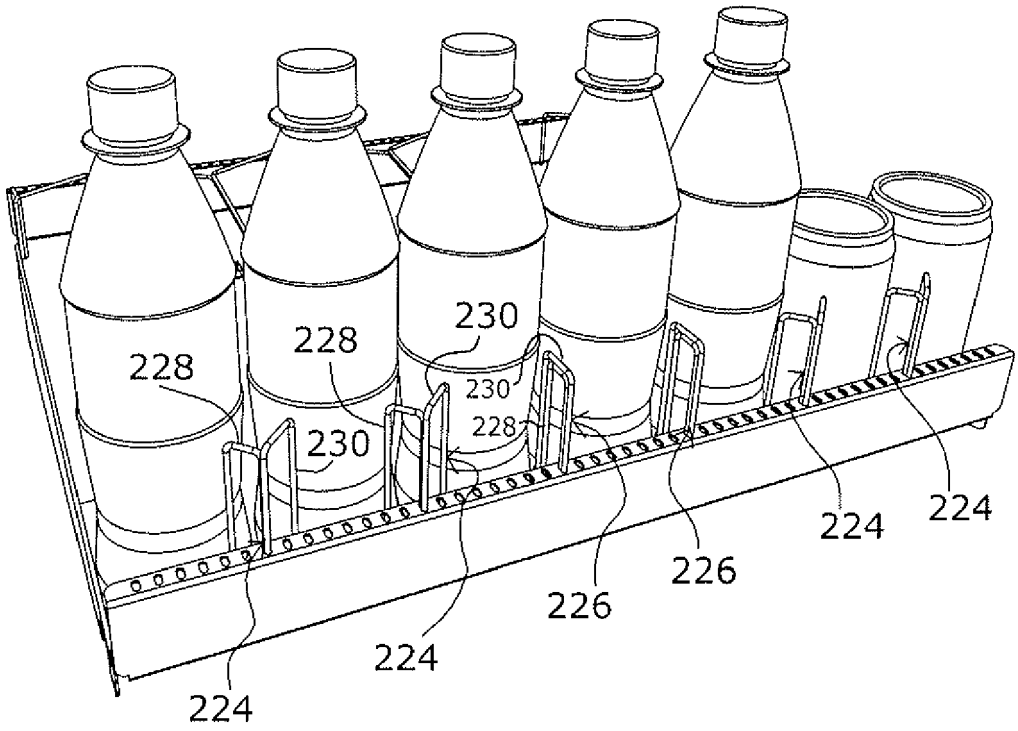

fig.3

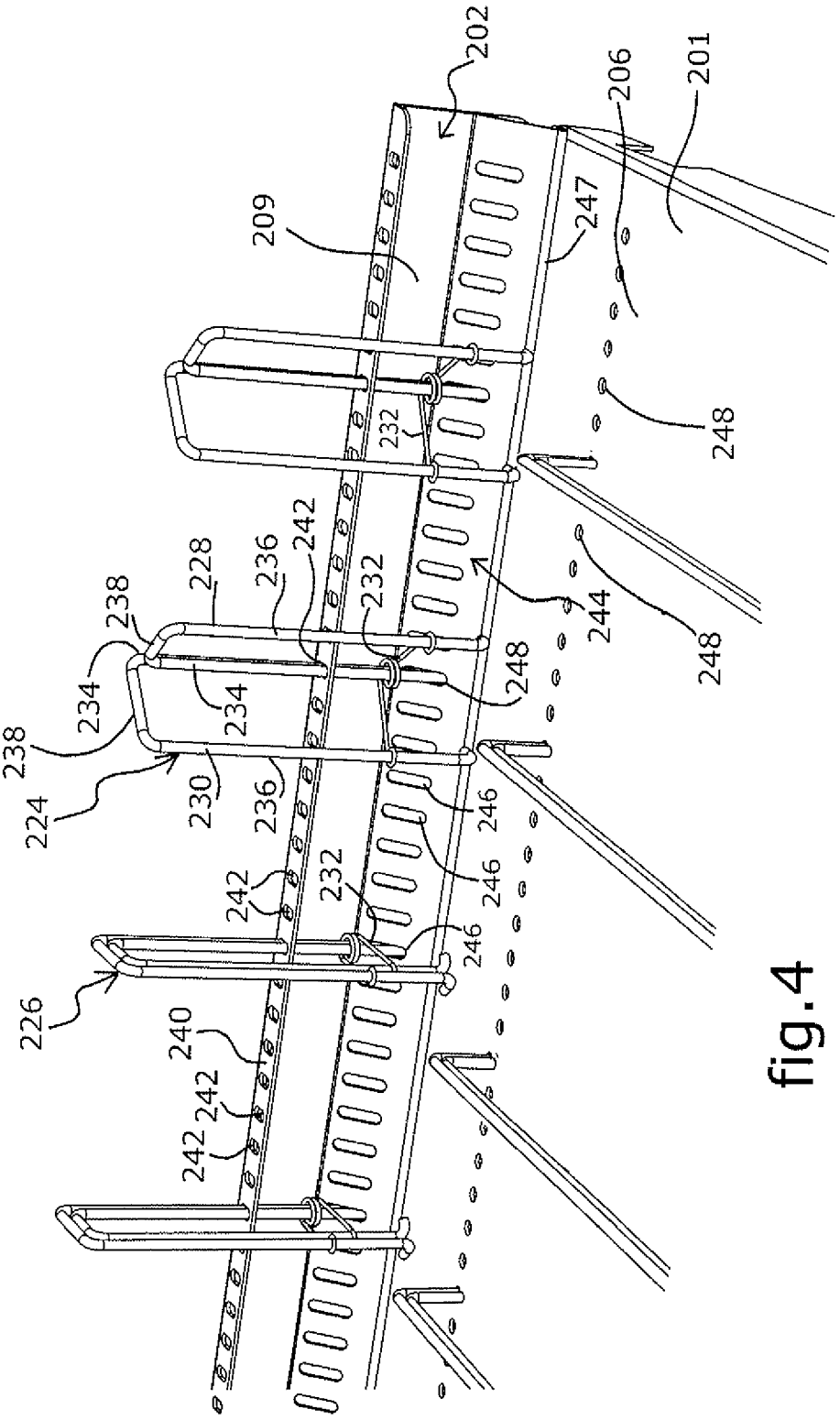
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fig.4

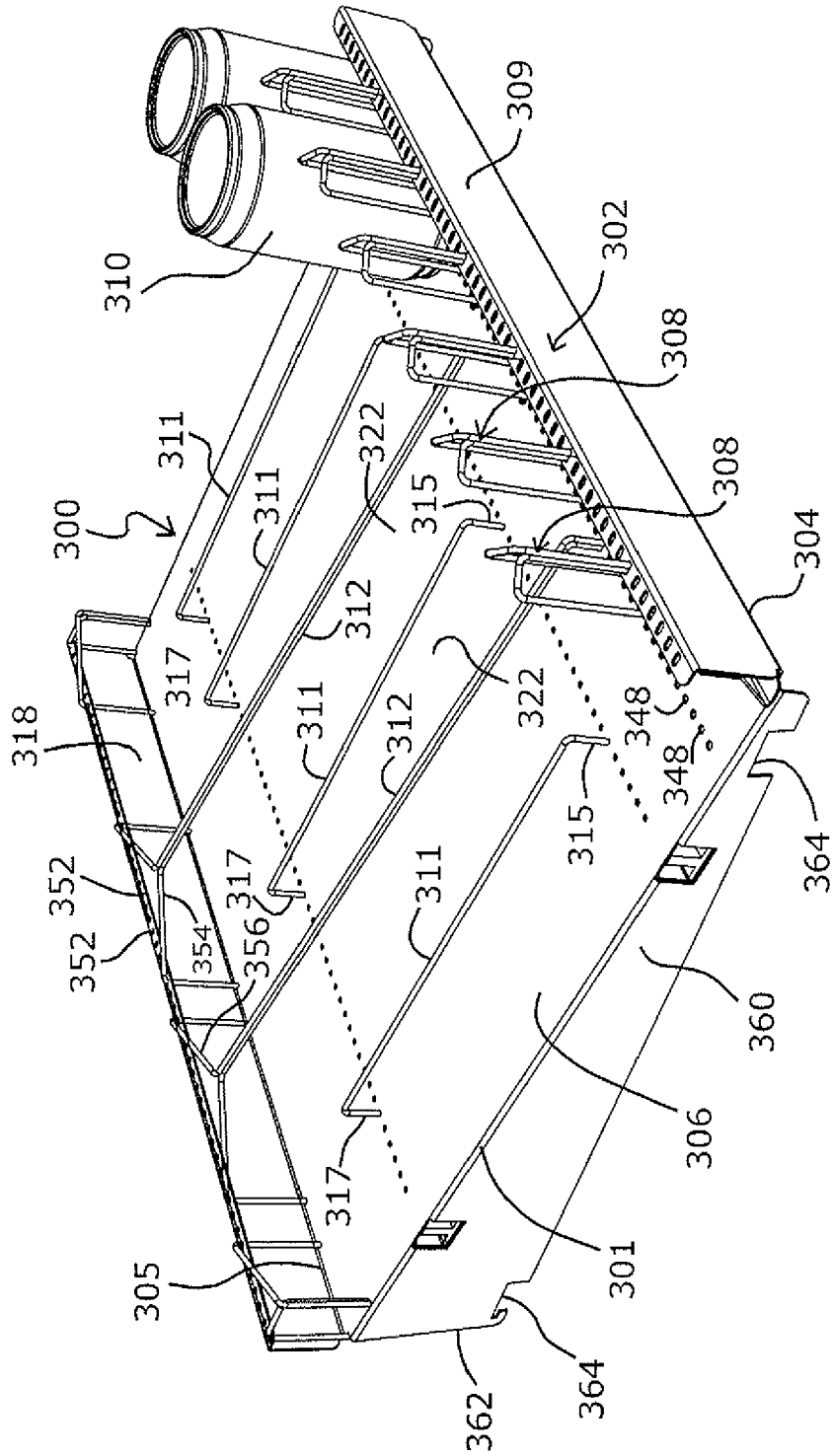
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fig.5

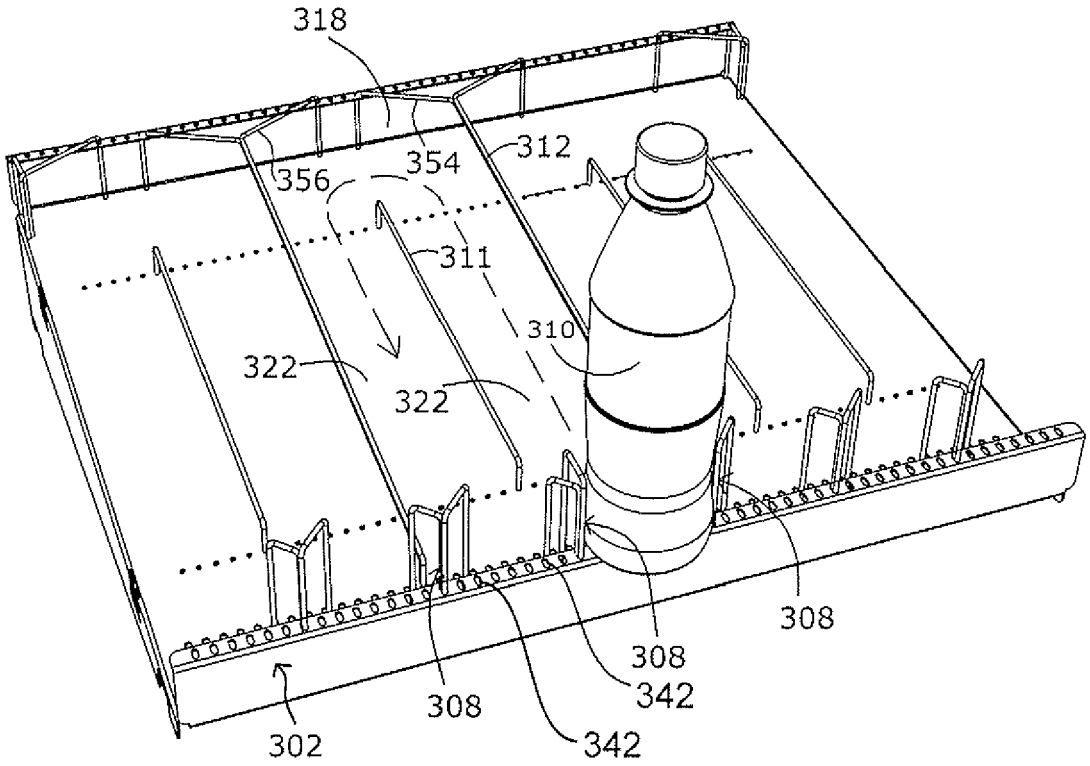


fig.6

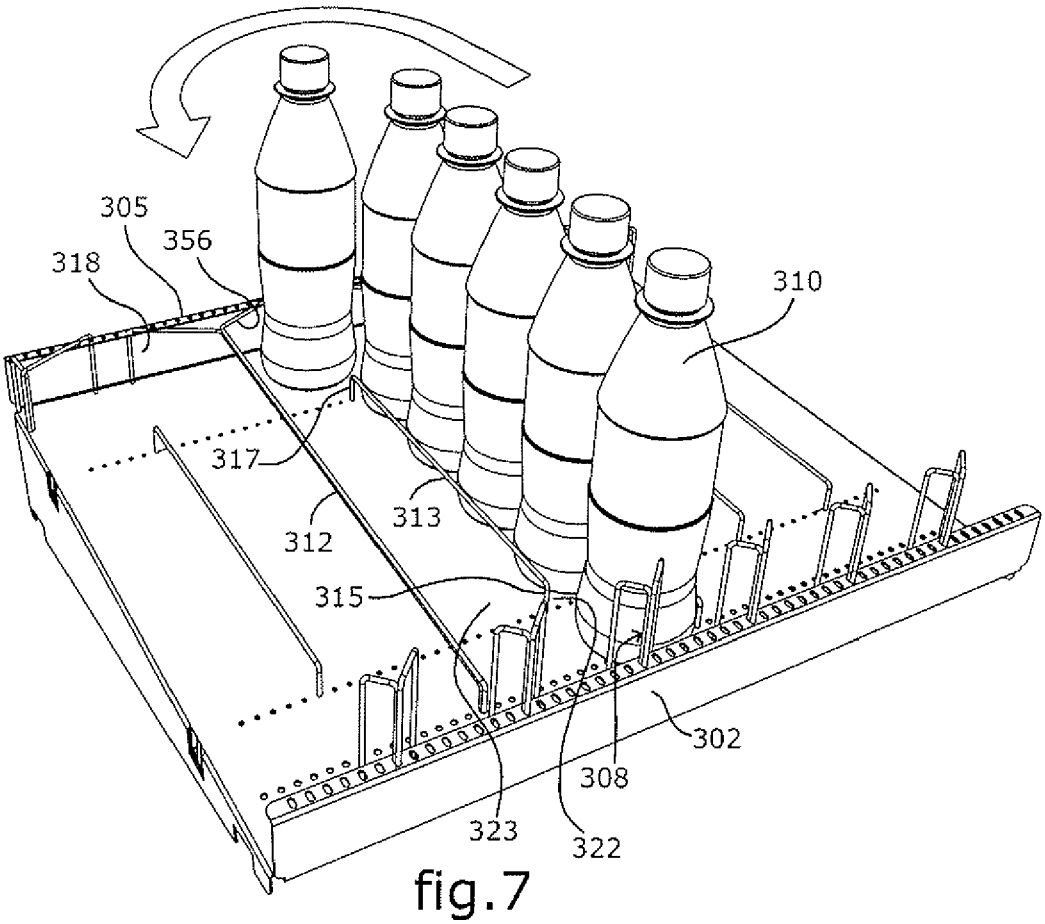


fig.7

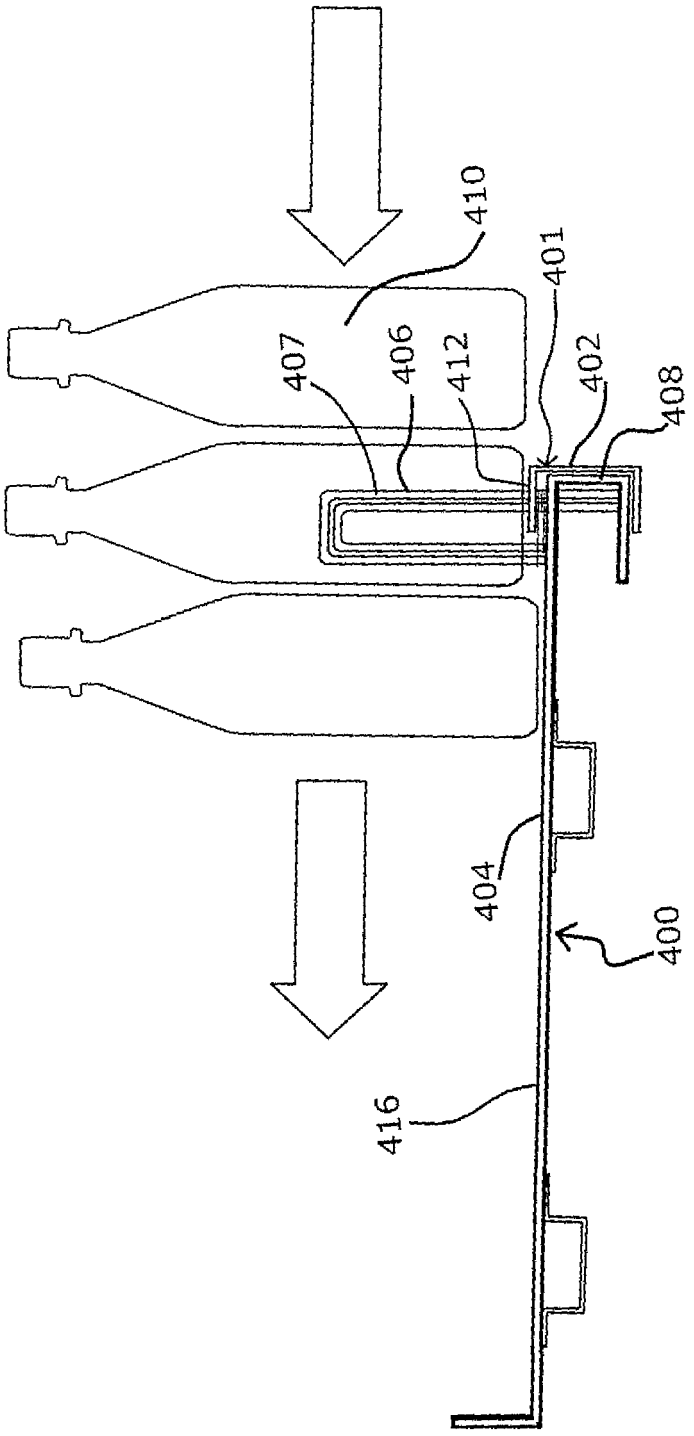
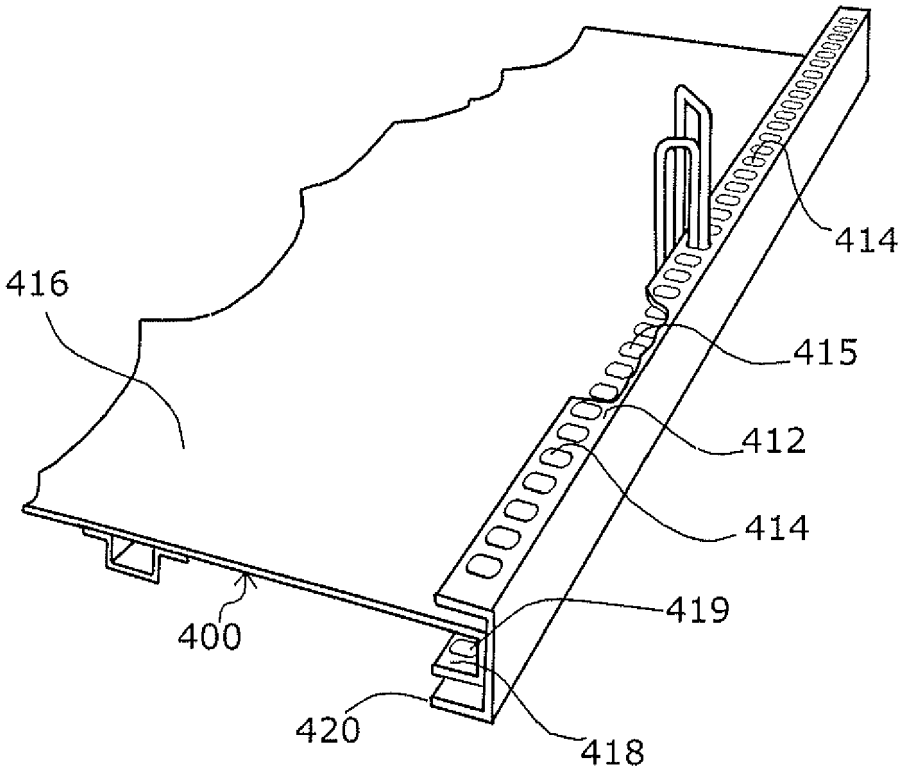


fig.8



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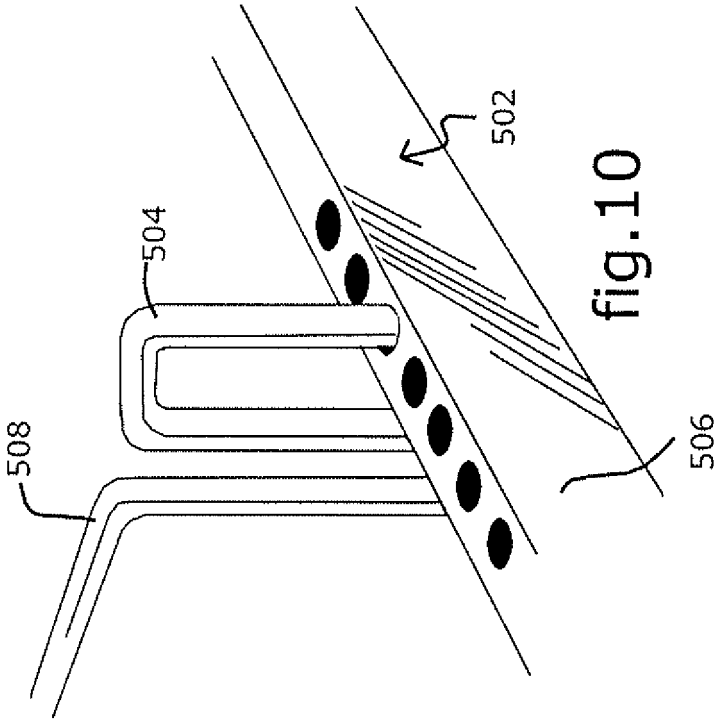


fig.10

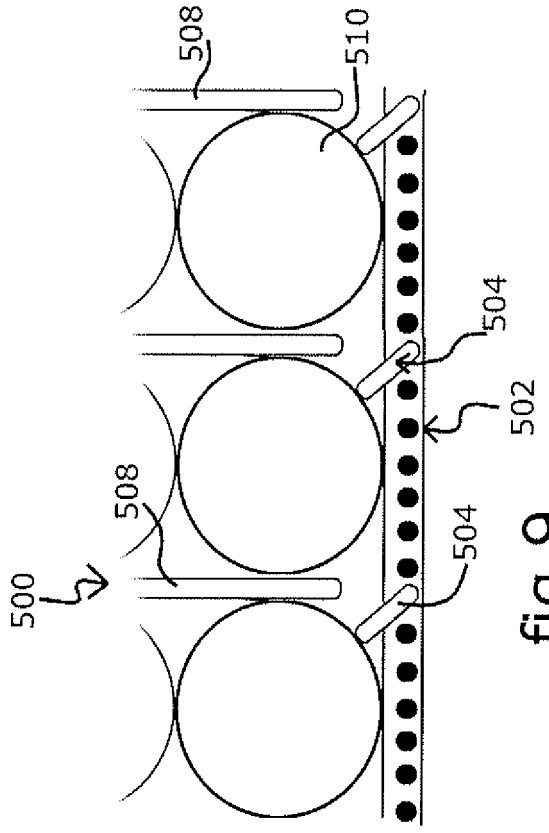
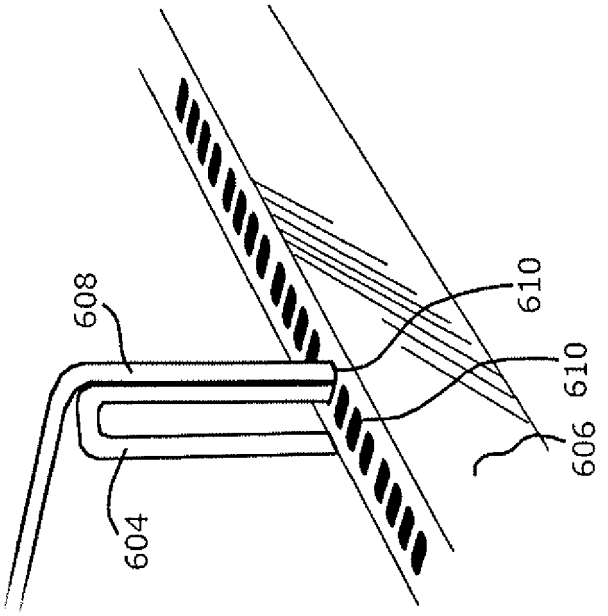


fig.9



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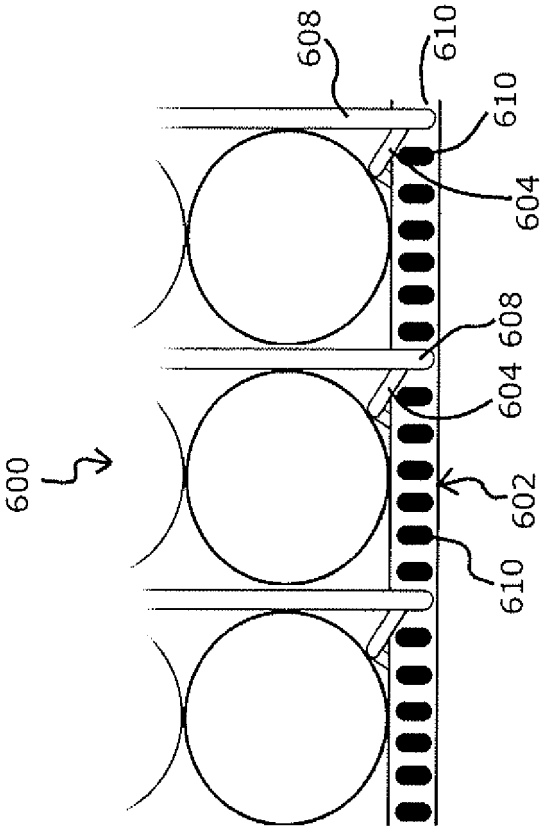

fig.11

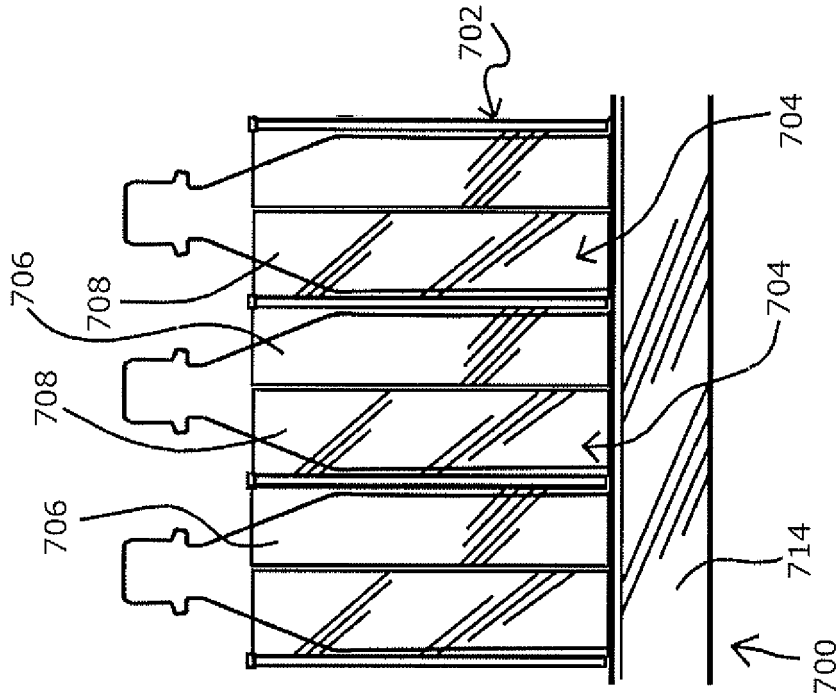
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fig.12

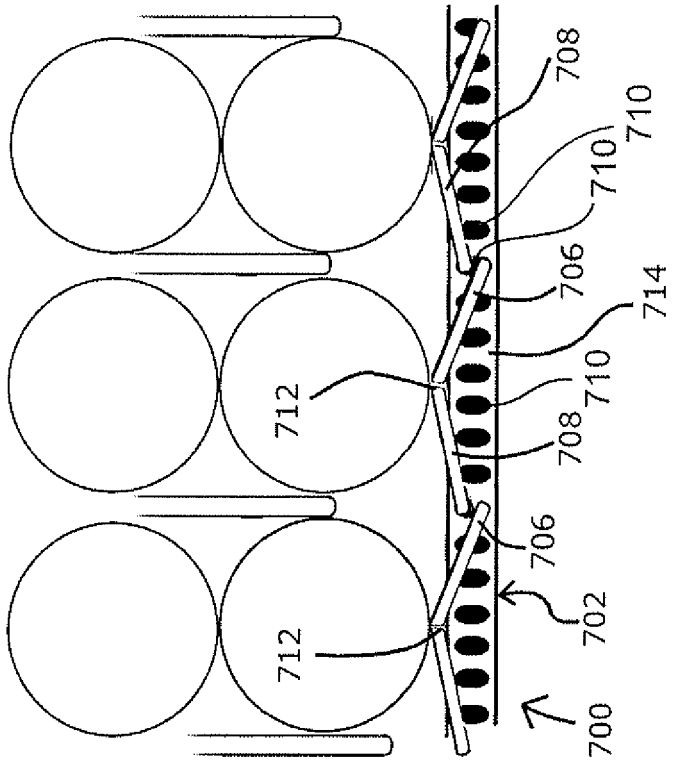
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fig.13

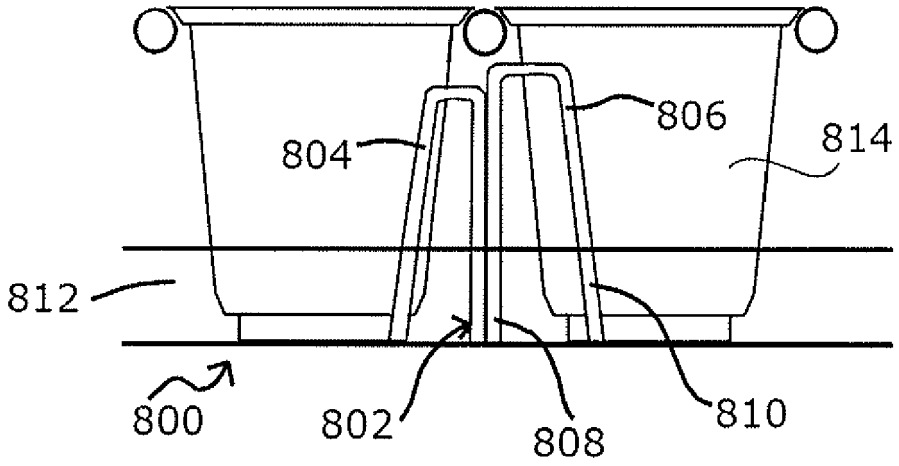


fig. 14

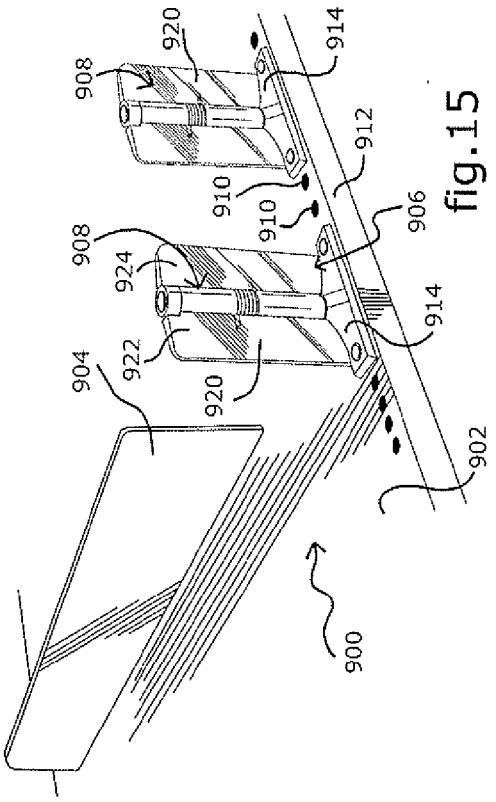
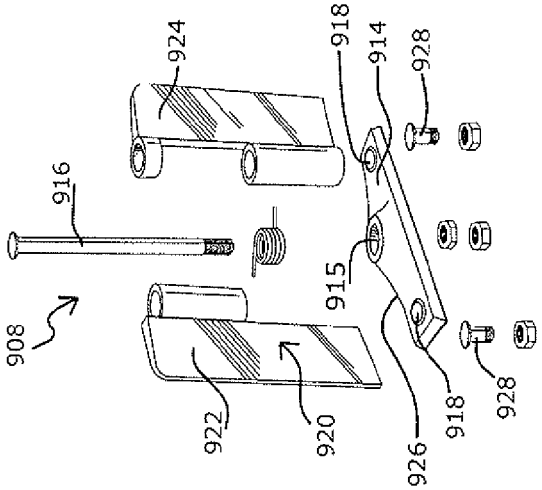


fig.15



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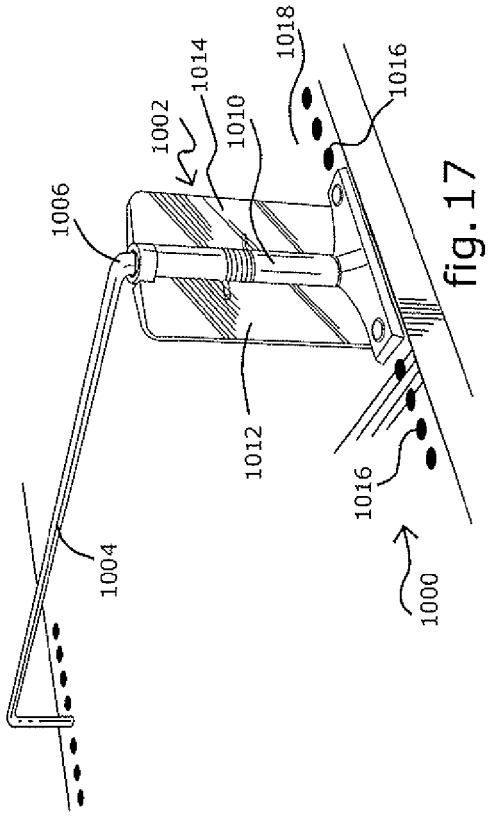

fig.17

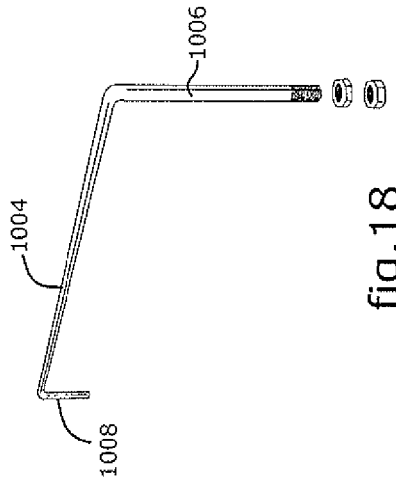

fig.18

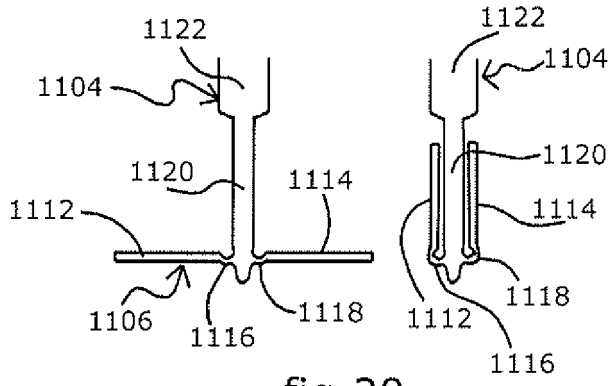
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fig.20

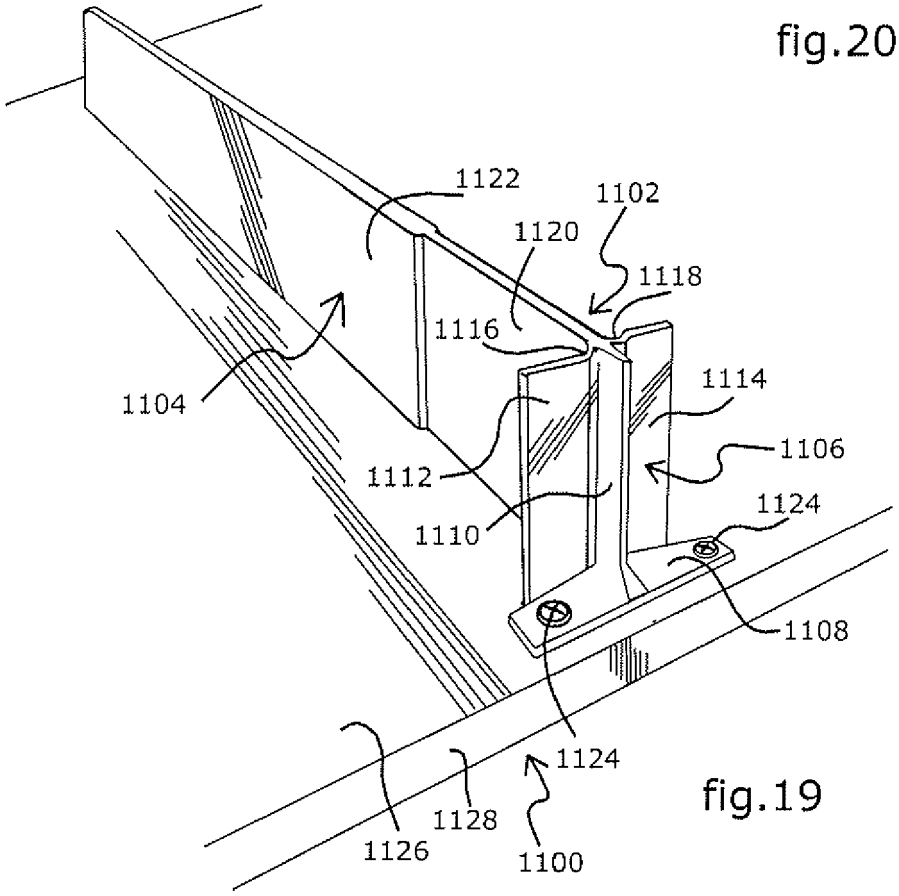
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fig.19

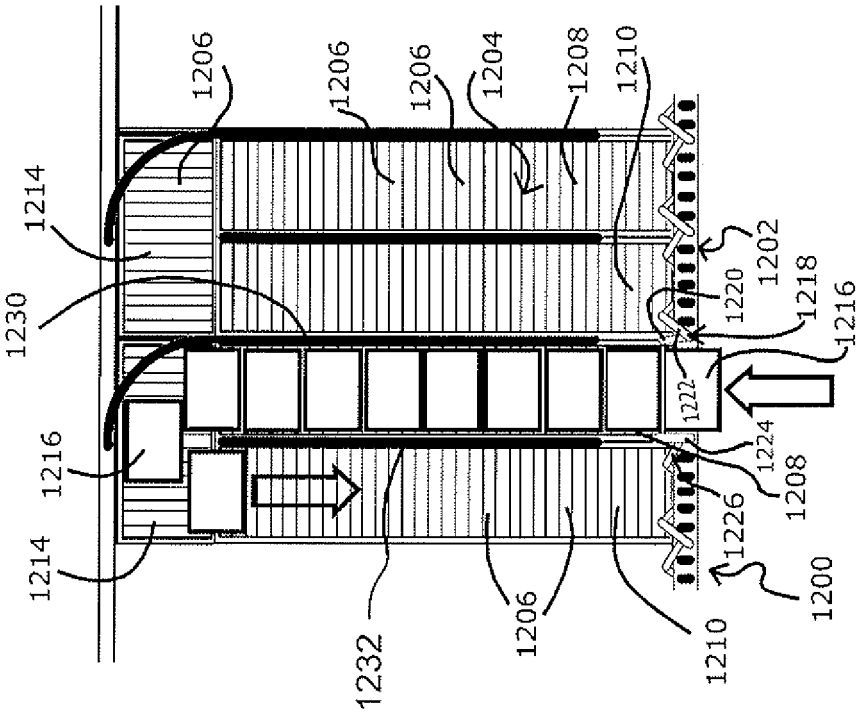
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fig.21

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EUROPEAN SEARCH REPORT

Application Number
EP 11 18 8278

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2008/051996 A2 (RTC IND INC [US]; HARDY STEPHEN [US]; MENZ ALBERT [US]; DUNCAN JAMES M) 2 May 2008 (2008-05-02) * paragraph [0037] - paragraph [0050]; figures 1-33e * -----	1-6,8,13	INV. A47F1/12

TECHNICAL FIELDS SEARCHED (IPC)

A47F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 May 2012	Vehrer, Zsolt

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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3

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03-05-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008051996 A2	02-05-2008	US 2008129161 A1	05-06-2008
		WO 2008051996 A2	02-05-2008

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Patent documents cited in the description

- US 6142317 A **[0002]**