

(19)



(11)

EP 2 944 228 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
18.11.2015 Bulletin 2015/47

(51) Int Cl.:
A47F 1/12 (2006.01) **A47F 5/00** (2006.01)
A47F 7/28 (2006.01)

(21) Application number: **14168326.8**

(22) Date of filing: **14.05.2014**

(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

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(54) **A shelf**

(57) A shelf comprising a bottom (2), and a front stopper (5) connected with the bottom, wherein at least a surface layer of the bottom is made of a low friction material, the shelf thereby being arranged for gravity-feed use. The bottom comprises ribs (9) arranged side by side and extending in a front-rear direction of the shelf (1), each rib having side clamping portions, wherein the shelf comprises functional elements constituting at least one

kind of functional element of a group of functional elements comprising partition walls (6), roller tracks (7), and pushers (8), each functional element having a mounting portion, wherein the bottom is arranged for receiving the mounting portion between two adjacent ribs, wherein side clamping portions of the adjacent ribs facing each other engage with the mounting portion.

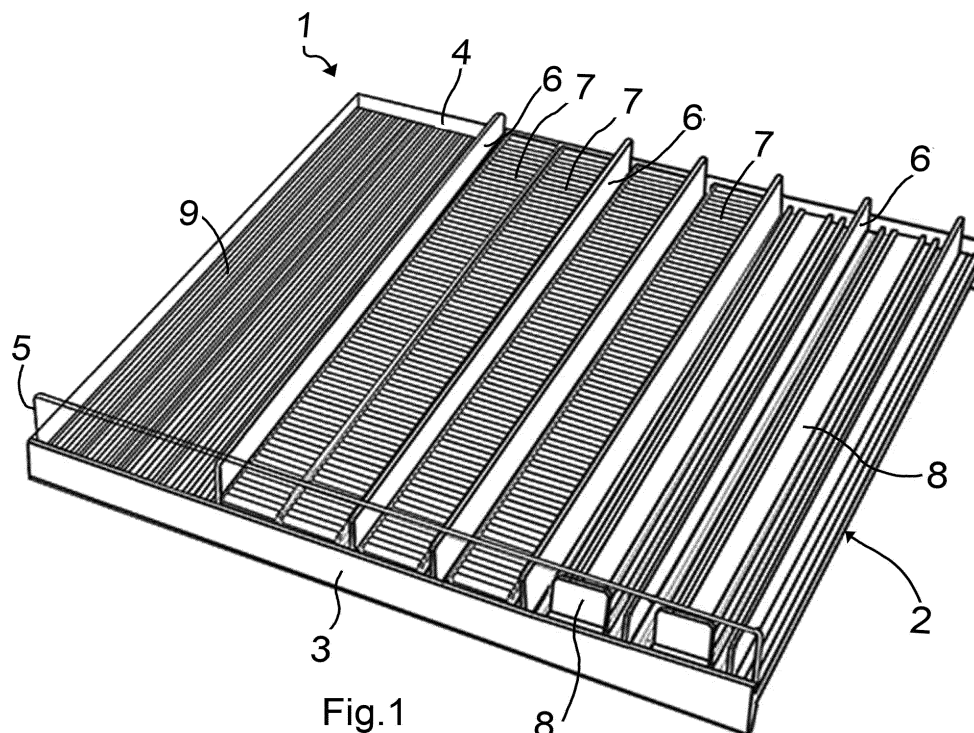


Fig.1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a shelf comprising a bottom and a front stopper connected with the bottom, wherein at least a surface layer of the bottom is made of a low friction material.

BACKGROUND OF THE INVENTION

[0002] A gravity-feed shelf is typically arranged with an inclination to the horizontal track, and is provided with a surface structure that facilitates for products placed on the shelf to move by themselves towards the front wall of the shelf. This can be obtained, for instance, by providing the bottom of the shelf with a low friction top surface, or by providing the bottom with rollers. As a further example, spring-biased pushers can be arranged to push the products forward.

[0003] An example of a prior art gravity-feed shelf is disclosed in AU 2012203585, having a bottom with "longitudinal load-bearing glides" extending from the rear to the front of the shelf, and lateral shafts connecting the glides and also arranged to support rollers. Partition walls are mountable between the glides and have hooks which engage with the lateral shafts to lock the partition walls in place.

SUMMARY OF THE INVENTION

[0004] It would be advantageous to provide a more flexible shelf, where the user may arbitrarily choose the type of product-feeding arrangement at any given time.

[0005] To address this concern, in a first aspect of the invention there is presented a shelf comprising a bottom, and a front stopper connected with the bottom. At least a surface layer of the bottom is made of a low friction material, the shelf thereby being arranged for gravity-feed use. The bottom comprises ribs arranged side by side and extending in a front-rear direction of the shelf, each rib having side clamping portions. Furthermore, the shelf comprises functional elements constituting at least one kind of functional element of a group of functional elements comprising partition walls, roller tracks, and pushers. Each functional element has a mounting portion, wherein the bottom is arranged for receiving the mounting portion between two adjacent ribs, wherein side clamping portions of the adjacent ribs facing each other engage with the mounting portion. Thereby, a flexible shelf system has been provided where the user easily arranges the functional elements as desired for each respective application. The clamping engagement between the side clamping portions and the mounting portions means that the user only has to push the mounting portion(s) of the functional element down between the clamping portions to mount it, and simply pull the functional element away to make a change.

[0006] According to an embodiment of the shelf, the distance between the clamping portions facing each other corresponds with a width of the mounting portion. Thereby, a simple mechanical clamping is provided. By the term corresponding means a distance which may not be fully the same as the width, but as close to the width as is appropriate to obtain a proper clamping yet a simple mounting and dismounting, as would be understood by a person skilled in the art.

[0007] According to an embodiment of the shelf, each side clamping portion comprises a flat surface facing the opposite rib.

[0008] According to an embodiment of the shelf, the bottom comprises elongated lateral supports extending perpendicular to the ribs and connected to the ribs at a bottom surface thereof. Thereby a strong yet lightweight structure is obtainable.

[0009] According to an embodiment of the shelf, the ribs are made of a low friction plastic. Thereby, production of the shelf is facilitated.

[0010] According to an embodiment of the shelf, the ribs are provided with a top surface low friction layer. Thereby, a material of higher friction can be chosen for the clamping portions causing an improved engagement.

[0011] According to an embodiment of the shelf, it comprises at least one partition wall which has a length that is substantially shorter than the length between a rear end of the shelf and the front stopper. Thereby, the handling of products on the shelf can be facilitated.

[0012] According to an embodiment of the shelf, the mounting portions comprise elongated wall portions. The wall portions provide a stable engagement.

[0013] According to an embodiment of the shelf, the mounting portions comprise tongue elements.

[0014] According to an embodiment of the shelf, each rib comprises two inclined opposite side walls, and wherein the clamping portions comprise protrusions protruding from the side walls, each protrusion having a vertical end surface. The inclined side walls facilitate manufacture, while the protrusions ensure a stable clamping of the functional elements.

[0015] According to an embodiment of the shelf, the mounting portions of the roller track and of the pusher comprise two elongated wall portions extending in parallel at a distance from each other and constituting the lowermost portions of the roller track and of the pusher. This blade like embodiment of the mounting portions provides for a stable yet simple mounting and dismounting of the functional elements in question.

[0016] According to an embodiment of the shelf, the group of functional elements further comprising at least partly arc-shaped product rotation guiding elements, each having a mounting portion which is elongated and which extends along a portion of, and protrudes downwards from, a bottom edge of the guiding element. These elements are preferably used in combination with a shortened partition wall, thereby facilitating movement/rotation of products from one side of the partition wall past

its end, to the other side, while being guided by the product rotation guiding elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The invention will now be described in more detail and with reference to the appended drawings in which:

Fig. 1 is a schematic perspective view, from obliquely above, of an embodiment of the shelf according to the present invention;

Fig. 2 is a schematic perspective view of a cut-out portion of the shelf shown in Fig. 1;

Figs. 3 to 5 are schematic sectional views of portions of the shelf shown in Fig. 1;

Fig. 6 is a schematic perspective view, from obliquely above, of functional elements comprised in the shelf in Fig. 1;

Fig. 7 is a schematic perspective view, from obliquely above, of a portion of a shelf having other functional elements according to an embodiment of the invention;

Figs. 8 and 9 are schematic views from above showing handling of products on a portion of the shelf; and
Fig. 10 is a schematic perspective view of an alternative embodiment of a functional element.

DESCRIPTION OF EMBODIMENTS

[0018] The shelf according to the present invention is arranged for use in merchandising shelving systems, which are used for displaying products for sale. Some examples of such merchandising shelving systems are shelving systems used in refrigerators for merchandising beverages in bottles or other containers, and stand alone shelving systems for merchandising any kind of product throughout a store.

[0019] An embodiment of the shelf 1 according to the present invention comprises a bottom 2, and a front stopper 5 connected with the bottom 2. More particularly, a base portion of the shelf 1 has been manufactured in one piece by moulding, wherein the base portion, in a basic embodiment of the shelf 1, consists of the bottom 2. At least a surface layer of the bottom 2 is made of a low friction material, the shelf thereby being arranged for gravity-feed use. When the shelf 1 is used as a gravity-feed shelf it is arranged with an inclination where the rear end is positioned higher than the front end, such that the products placed on the shelf 1 slide forwards by themselves due to gravity. Thereby, the front most products are always positioned at the front of the shelf 1. At present it is preferred to mould the bottom 2 as a whole in a low friction plastic, such as polypropylene with added silicone. However, many other alternative plastics or even other materials, providing a low friction surface as such or being coated with a low friction layer, such as a low friction paint, etc., are feasible as well. As regards the

peripheral portion of the bottom, its shape may be any suitable shape that fits with a desired shelving system. Furthermore, it can be provided with a rim, either all around or along portions of the periphery. This is exemplified in Fig. 1 with a front rim portion 3, extending along the front end of the bottom 2, and a rear rim portion 4, extending along the rear end of the bottom 2.

[0020] Furthermore, the shelf 1 comprises the front stopper 5, which prevents products placed on the shelf 1 from accidentally falling off the shelf 1. However, still it should be low enough to facilitate the customers' picking of the products from the shelf 1. The front stopper 5 is transparent, which is advantageous from a product display point of view, and it is attached to the bottom 2. Alternatively, though, the very front rim 3 can serve as a front stopper if manufactured with a suitable height. The shelf 1 additionally comprises functional elements, such as partition walls 6, roller tracks 7, and pushers 8. The functional elements 6, 7, 8 are demountably mountable at the bottom 2 of the shelf.

[0021] The bottom 2 comprises ribs 9, as best shown in Fig. 2, which are arranged side by side and which extend in a front-rear direction of the shelf 1. In other words, the ribs 9 extend between the rear rim portion 4 and the front rim portion 3. Furthermore, the bottom 2 comprises elongated lateral supports 13, which extend perpendicular to the ribs 9 and which are connected to the ribs 9 at a bottom surface thereof. Typically, as described above, the whole bottom is moulded in one piece, i.e. the lateral supports 13 are integral with the ribs 9.

[0022] Each rib 9 has side clamping portions 10, and each functional element 6, 7, 8 has a mounting portion 11, 12, i.e. at least one mounting portion. The bottom 2 is arranged for receiving the mounting portion 11, 12 between two adjacent ribs 9, wherein the clamping portions 10 of the adjacent ribs 9 facing each other engage with the mounting portion 11, 12. For example, the partition wall 6, which in this embodiment is a rectangular plate, has a mounting portion 11 constituting a long side edge portion of the partition wall 6. When the partition wall 6 is mounted at the bottom 2, it is simply held in a vertical position with one of its long sides pointing down, and then it is pushed down between the clamping portions 10 of two adjacent ribs 9 until it reaches the top surface of the lateral support 13, as shown in Fig. 3. Each clamping portion 10 comprises a flat vertical surface 14 facing the opposite rib 9. The vertical surfaces 14 are engaged with the mounting portion 11 of the partition wall 6, and corresponding mounting portions of the other functional elements 7, 8 when they are mounted at the bottom 2. In this embodiment each rib 9 comprises two inclined opposite side walls 15, 16, and the clamping portions 10 constitute protrusions protruding from the side walls 15, 16. In the space between two adjacent ribs 9 the clamping portions 10 are aligned such that each clamping portion 10 of one of the ribs 9 is positioned opposite to a clamping portion 10 of the other rib 9. Furthermore, the clamping portions 10 are positioned at the lateral supports 13. The

distance between the clamping portions 10 corresponds with the width of the mounting portion 11. Thereby, the partition wall 6 is firmly held in place by the clamping portions 10. At the same time, it is easy for a user to demount, i.e. lift up, the partition wall 6 and put it aside, or move it to another spacing between adjacent ribs 9 where it suits better in view of the size of the products to be placed on the shelf 1.

[0023] The mounting portions 12 of each roller track 7 and each pusher 8 comprise two elongated wall portions 17, 18, 31, 32 as exemplified with roller tracks 7 in Figs. 4 and 6, and with a pusher 8 in fig. 5. The roller track 7 comprises a rectangular base plate 19, extending parallel with the bottom 2 in use, and opposite roller support walls 20, 21 extending in parallel at a distance from each other along the long sides of the base plate 19, and several rollers 22 rotationally attached to the roller support walls 20, 21 at the respective opposite ends of the rollers 22. Thus, the rollers 22 are located just above the base plate 19. The mounting portions 17, 18 extend in parallel at a distance from each other at the bottom of the base plate 19, like vertical rectangular plate shaped portions, and, thus, constitute the lowermost portions of the roller track 7. When mounting the roller track 7, or the pusher 8, it is simply pushed down on the bottom 2 such that each mounting portion 17, 18 is received between respective pairs of adjacent ribs 9, and clamped there by the clamping portions 10.

[0024] Similarly, as schematically illustrated in Fig. 5, the pusher 8 comprises a rectangular base plate 30. The mounting portions 31, 32 extend in parallel at a distance from each other at the bottom of the base plate 30. The pusher 8 additionally comprises a product pushing member 33, longitudinally movably connected with the base plate 30, and a bias spring, not shown, biasing the product pushing member 33 forwards.

[0025] The shape of the mounting portions can be varied in many ways. For example, according to another embodiment of the roller track 46, instead of being a continuous wall portion, each mounting portion is shaped as a number of tongue elements 47 arranged in a row, as shown in Fig. 10. The rest of this roller track 46 corresponds with the above-described embodiment.

[0026] According to alternative embodiments of the shelf, each rib can have vertical parallel side walls, and the walls can be provided with vertical grooves defining the clamping portions between them, the width of the grooves exceeding the width of the clamping portions, etc. However, when moulding the bottom it is more convenient and more distinct to have the side walls slope and add protruding clamping portions, and to determine by testing which width, number and separation distance of the clamping portions that give the desired clamping function.

[0027] The partition walls 6, 6a, 6b can be made in different lengths, as illustrated in Fig. 7. Thus, a shorter alternative of the partition wall 6a has a length that is substantially shorter than the length between the front

and rear rims 3, 4 of the shelf 1. If mounting the partition wall 6a in a rearmost position it is possible to pass products from one side of the partition wall 6a to the other past its front end. This is sometimes handy when handling the products on the shelf 1. If the shortened partition wall 6a, having a suitable length, is placed in the middle between the front and rear rims 3, 4, as illustrated in Figs. 7-9, it is possible to pass products 34 both in front of and behind the partition wall 6a, as illustrated in Figs. 8 and 9. The products can, thus, be rotated on the shelf 1 around the partition wall 6a. In order to facilitate the product rotation, when working from the front end of the shelf, the shelf 1 comprises a further kind of functional element, which is an at least partly arc-shaped product rotation guiding element 35, 36. Each guiding element 35, 36 has a mounting portion 37, 38, which is elongated and which extends along a portion of, and protrudes downwards from, the bottom edge 39, 40 of the guiding element 35, 36. The guiding elements shown in Fig. 7 are of two types, the shape of which is mirrored. They can be regarded as a right arc guiding element 35 and a left arc guiding element 36. By placing a right arc element and a left arc guiding element 35, 36 side by side just in front of the rear rim 4, which can also be regarded and defined as a rear wall 4, with the mounting portions 37, 38 received in respective spaces between ribs 9, by placing a shortened partition wall 6a in the middle, such that there is a space between each end of the partition wall 6a and the front and rear rims 3, 4, respectively, and by placing two slightly longer but still shortened partition walls 6b between the front edge of the right arc guiding element 35 and the left arc guiding element 36 and the front rim 3, two parallel product lanes 41, 42 are obtained, separated by the middle partition wall 6a. Products pushed rearwards on one side of the partition wall 6a, along the first product lane 41, will impact on the right arc guiding element 35, and be guided thereby passed the rear end of the partition wall 6a to the other side thereof, and over to the left arc guiding element 36 and into the second product lane 42, where the product will then slide forward towards the front rim 3.

[0028] An example with three parallel product lanes 43, 44, 45 is shown in Fig. 9. Two partition walls 6a of the shortest type are mounted as middle walls, and two partition walls 6b of the second shortest type are mounted as outer side walls on either side of the middle walls. The guiding elements 35, 36 have been laterally separated and are placed in alignment with the partition walls 6b forming the outer side walls. When moving products 34 rearwards in the left most product lane they are guided to the right by the guiding element 35 and slide forward in either the middle product lane, or in the right most product lane.

[0029] While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive. The invention is not limited to the disclosed embodiments.

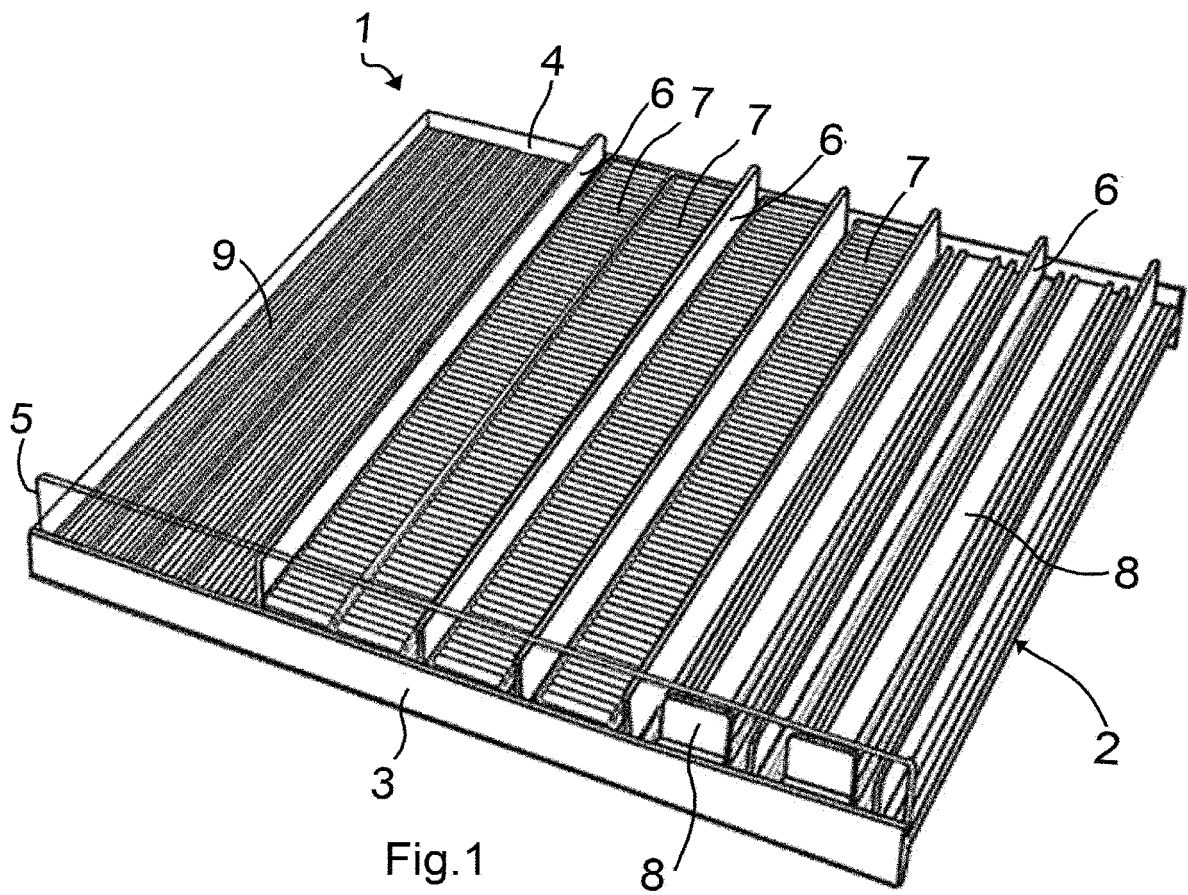
[0030] Other variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. Any reference signs in the claims should not be construed as limiting the scope.

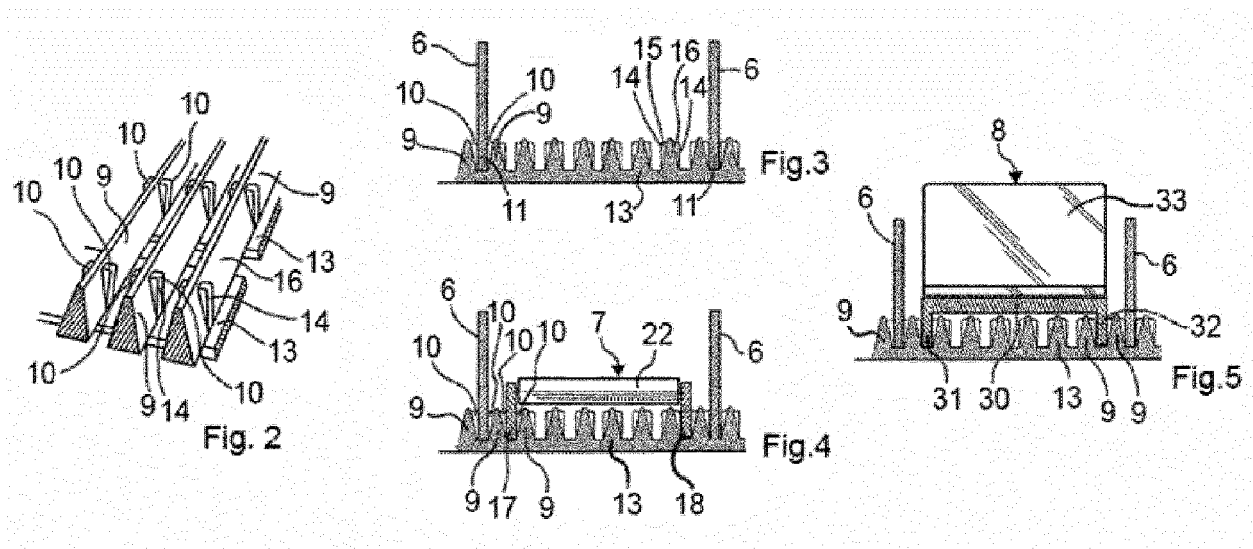
Claims

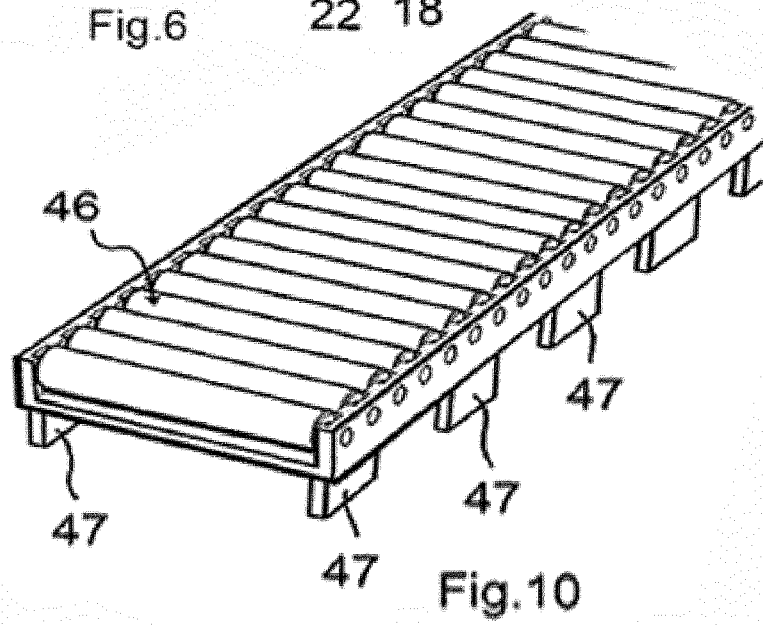
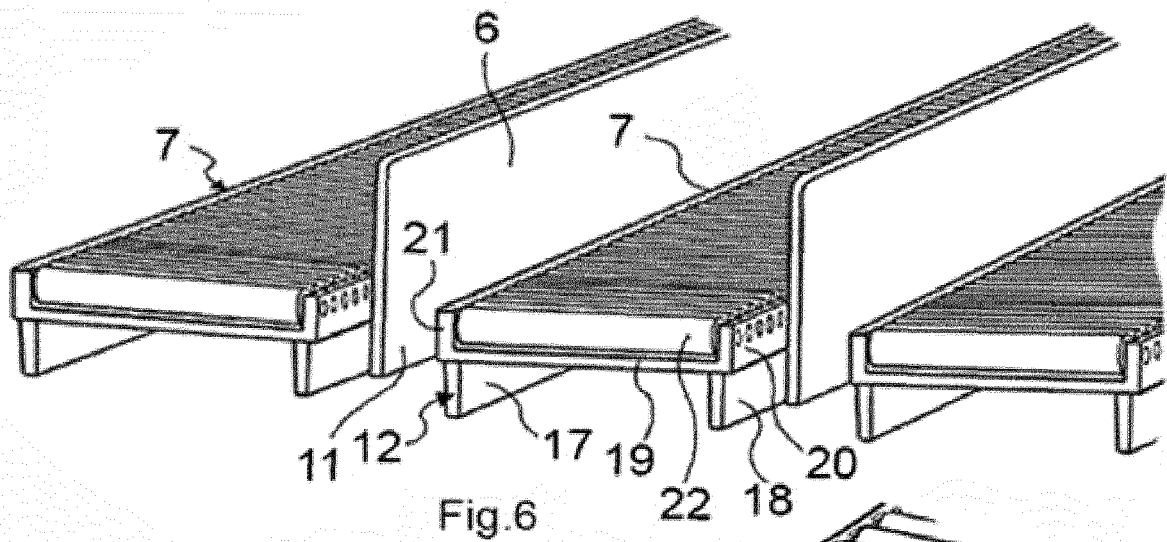
1. A shelf comprising a bottom (2), and a front stopper (5) connected with the bottom, wherein at least a surface layer of the bottom is made of a low friction material, the shelf (1) thereby being arranged for gravity-feed use, wherein the bottom comprises ribs (9) arranged side by side and extending in a front-rear direction of the shelf, each rib having side clamping portions (10), wherein the shelf comprises functional elements (6, 7, 8) constituting at least one kind of functional element of a group of functional elements comprising partition walls (6), roller tracks (7), and pushers (8), each functional element having a mounting portion (11, 17), wherein the bottom is arranged for receiving the mounting portion between two adjacent ribs, wherein side clamping portions of the adjacent ribs facing each other engage with the mounting portion.
2. The shelf according to claim 1, wherein the distance between the side clamping portions (10) facing each other corresponds with a width of the mounting portion (11, 17).
3. The shelf according to any one of the preceding claims, wherein each side clamping portion (10) comprises a flat vertical surface (14) facing the opposite rib (9).
4. The shelf according to any one of the preceding claims, wherein the bottom comprises elongated lateral supports (13) extending perpendicular to the ribs (9) and connected to the ribs at a bottom surface thereof.
5. The shelf according to any one of the preceding claims, wherein the ribs (9) are made of a low friction plastic.
6. The shelf according to any one of the preceding claims, wherein the ribs (9) are provided with a top surface low friction layer.
7. The shelf according to any one of the preceding claims, comprising at least one partition wall (6a) which has a length that is substantially shorter than the length between a rear end (4) of the shelf (1) and

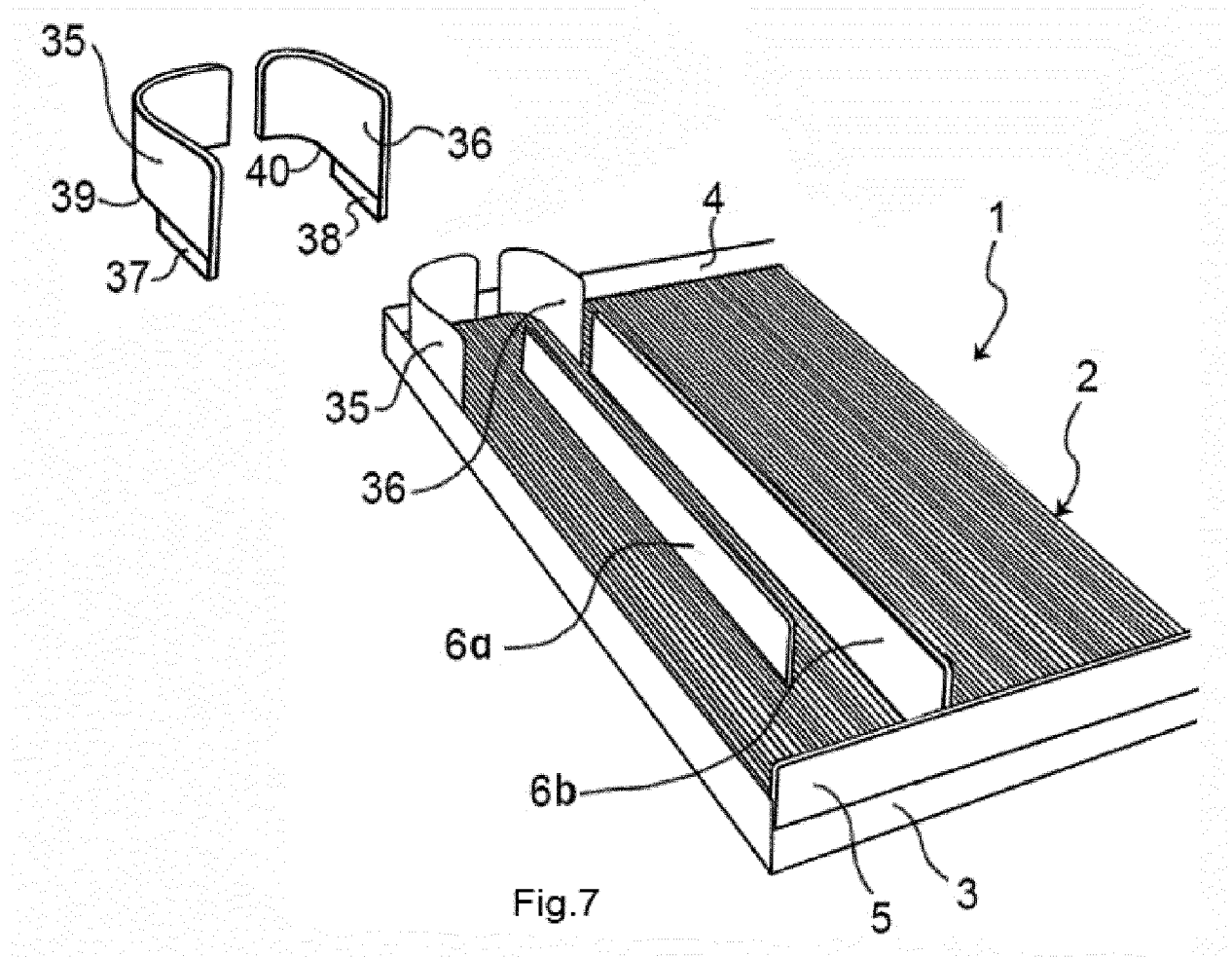
the front stopper (5).

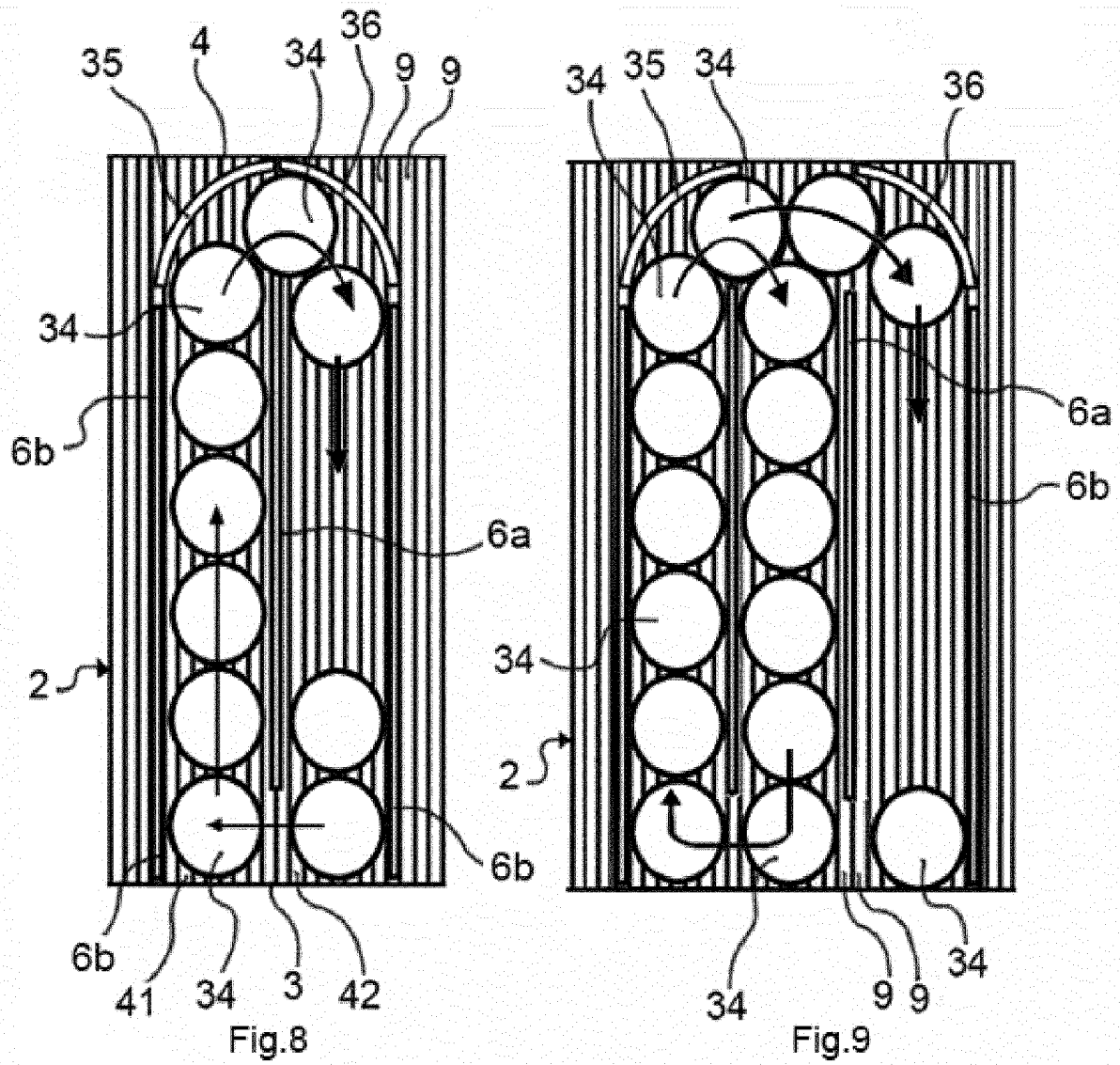
8. The shelf according to any one of the preceding claims, wherein the mounting portions (11, 17) comprise elongated wall portions.
9. The shelf according to any one of the preceding claims, wherein the mounting portions comprise tongue elements.
10. The shelf according to any one of the preceding claims, wherein each rib (9) comprises two inclined opposite side walls (15, 16), and wherein the side clamping portions (10) comprise protrusions protruding from the side walls, each protrusion having a vertical end surface (14).
11. The shelf according to any one of the preceding claims, wherein the mounting portions of the roller track (7) and of the pusher (8) comprise two elongated wall portions (17, 18, 31, 32) extending in parallel at a distance from each other and constituting the lowermost portions of the roller track and of the pusher.
12. The shelf according to any one of the preceding claims, the group of functional elements further comprising at least partly arc-shaped product rotation guiding elements (35, 36), each having a mounting portion (37, 38) which is elongated and which extends along a portion of, and protrudes downwards from, a bottom edge (39, 40) of the guiding element.













EUROPEAN SEARCH REPORT

Application Number
EP 14 16 8326

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Place of search The Hague		Date of completion of the search 24 October 2014	Examiner Martinez Valero, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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