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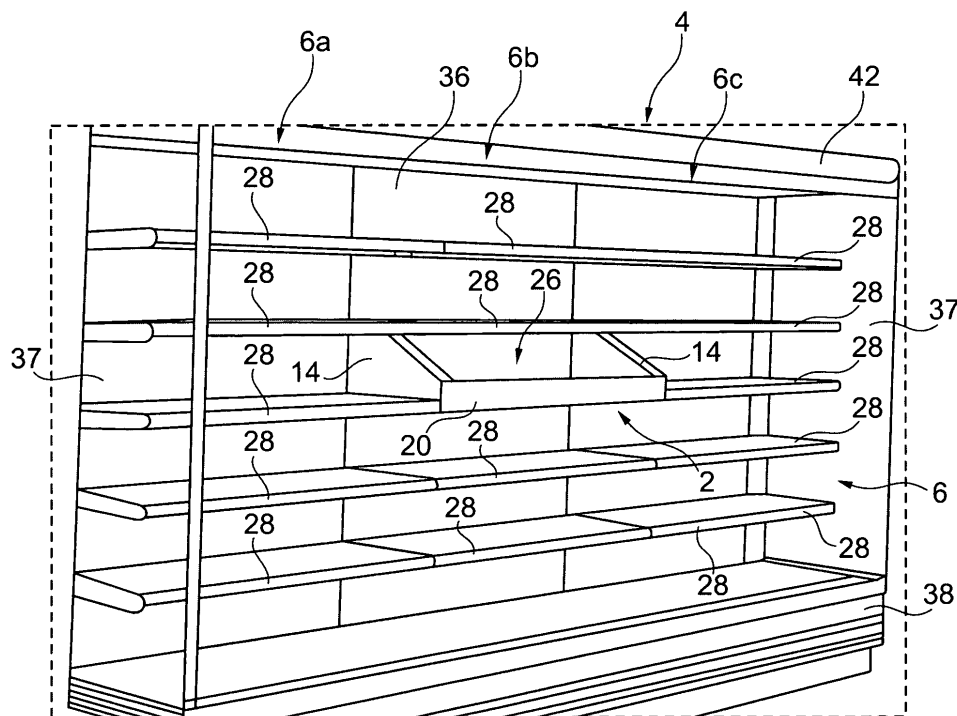
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(54) **Sales furniture**

(57) A sales furniture (4) comprises a goods presentation space (6), and at least one refrigerating sales module (2) arranged within the goods presentation space (6). The refrigerating sales module (2) has a thermoelectric

refrigerating element (32) and a separate refrigerated goods presentation space (26) providing a refrigerating temperature being lower than the temperature in the goods presentation space (6).



**Fig. 1**

## Description

**[0001]** The invention relates to a sales furniture.

**[0002]** There are sales furnitures for presenting goods at room temperature and there are refrigerated sales furnitures for presenting goods at cooling or freezing temperatures. However, with such well known furnitures goods cannot be presented at different temperatures within a single furniture at the same time.

**[0003]** Thus, it would be beneficial to provide an improved sales furniture in which goods can be stored and presented simultaneously at different temperatures.

**[0004]** A sales furniture according to exemplary embodiments of the invention comprises a goods presentation space and at least one refrigerating sales module arranged within the goods presentation space, wherein the refrigerating sales module comprises a thermoelectric refrigerating element and a separate refrigerated goods presentation space providing a refrigerating temperature below the temperature in the goods presentation space of the sales furniture.

**[0005]** Exemplary embodiments of the invention will be described in more detail with reference to the enclosed figures, wherein

Fig. 1 shows a perspective front view of sales furniture comprising a refrigerating sales module according to an embodiment of the invention;

Fig. 2 shows a sectional side view of a refrigerating sales module according to an embodiment of the invention;

Fig. 3 shows a perspective front view of a refrigerating sales module according to an embodiment of the invention;

Fig. 4 shows a perspective front view of a refrigerating sales module according to another embodiment of the invention;

Fig. 5 shows a sectional side view of a refrigerating sales furniture comprising a refrigerating sales module according to an embodiment of the invention;

Fig. 6 shows a perspective front view of a refrigerating sales module according to a further embodiment of the invention;

Fig. 7 shows a perspective front view of a refrigerating sales module according to a further embodiment of the invention.

**[0006]** Fig. 1 shows a non-refrigerating sales furniture 4 according to an exemplary embodiment of the invention, wherein a refrigerating sales module 2 has been arranged.

**[0007]** The non-refrigerating sales furniture 4 has a goods presentation space 6 which is defined by a bottom 38, by a top 42, by a rear wall 36 and by two transparent side walls 37 and which is open to the front. Goods presentation decks 28 are arranged in five parallel horizontal rows on top of each other and extend in three lateral adjacent sections 6a, 6b, 6c over the whole width of the goods presentation space 6. In the middle section 6b a refrigerating sales module 2 having a front wall 20 and two side walls 14 is arranged between the second and third row from the top. The dimensions of the refrigerating sales module 2 are adapted to vertically fit in between two rows of goods presentation decks 28 so that the refrigerating sales module 2 can be arranged in the goods presentation space 6 easily without the need of reconfiguring any of the goods presentation decks 28.

**[0008]** In the embodiment shown in Fig. 1 only a single refrigerating sales module 2 is shown within the goods presentation space 6 of the sales furniture 4, however, additional refrigerating sales modules 2 may be arranged in between other goods presentation decks 28 in order to provide more refrigerated goods presentation space 26, if desired.

**[0009]** Fig. 2 shows a sectional side view of a refrigerating sales module 2 according to an embodiment of the invention. The refrigerating sales module 2 comprises a horizontal bottom 16, a front wall 20 extending vertically upwards from the front end of the bottom 16, a rear wall 22 extending vertically upwards from the rear end of the bottom 16, and a top 18. The top 18 extends horizontally from the top of the rear wall 22 parallel to the bottom 16 approximately up to the middle of the bottom 16, so that a refrigerated goods presentation space 26, which is defined by the bottom 16, by the front wall 20, by the rear wall 22 and by the top 18, has a goods access portion at its top. The front wall 20 has a considerable lower height than the rear wall 22, so that the goods presentation space 26 has a goods access portion at its front, as well. The bottom 16, the rear wall 22, the front wall 20 and the top 18 are at least partially made of a thermally isolating material in order to isolate the refrigerated goods presentation space 26 thermally from the environment.

**[0010]** A cover 12 extends between the front edge of the top 18 and the upper edge of the front wall 20. The cover 12 is arcuated and comprises two basically parallel panes made of at least partially transparent material in order to allow to look into the refrigerated goods presentation space 26 from the outside. The cover 12 may be formed as a sliding door in order to allow to open the cover 12 for providing easy access to the refrigerated goods presentation space 26. The cover 12 may be made of a thermally isolating material in order to reduce the energy needed for cooling the refrigerated goods presentation space 26.

**[0011]** A thermoelectric element 32 is arranged on top of the bottom 16 and it is operated to cool a goods display deck 30 which is arranged on top of the thermoelectric element 32 for accommodating the goods to be present-

ed. In operation the upper side 52 of the thermoelectric element 32 cools down while the opposite, i.e. lower, side 50 is caused to warm up. The heat generated at said warm side 50 of the thermoelectric element 32 is released to the outside by means of a fan, a cooling water cycle or another heat transportation means which is not shown in Fig. 2.

**[0012]** The refrigerating sales module 2 is provided with fixing means 10 such as hooks at its rear wall 22 in order to fix the refrigerating sales module 2 to the rear wall 36 of the sales furniture 4. The bottom 16 of the refrigerating sales module 2 is provided with a connection means 8 as e.g. a plug-and-socket connection in order to connect and fix the refrigerating sales module 2 to a goods presentation deck 28 of the sales furniture 4. Alternatively or additionally a connection means 8 may be provided at the top 18 or at the rear wall 22 of the refrigerating sales module 2. The connection means 8 may provide an electrical connection to supply power to the refrigerating sales module 2 for operating the thermoelectric element 32.

**[0013]** Fig. 3 shows a perspective front view of a refrigerating sales module 2 according to an embodiment of the invention. The features which are identical to the features shown in Fig. 2 are indicated by the same reference signs and will not be discussed in detail again.

**[0014]** In the embodiment shown in Fig. 3 the goods display deck 30 is cooled by contact cooling, e.g. the goods display deck 30, which is made of a heat conducting material, is in direct contact with the upper cool side 52 of the thermoelectric element 32 arranged below the goods display deck 30 and the goods display deck 30 is cooled by thermal conduction. A thermally isolating transparent side wall 14 is arranged on each side of the refrigerating sales module 2, respectively, for thermally isolating the refrigerated goods presentations space 26 from the environment.

**[0015]** The embodiment of the refrigerating sales module 2 shown in Fig. 3 is inexpensive to produce, has low power consumption and needs to be defrosted only very rarely. Furthermore, the temperature within the refrigerated goods presentation space 26 can be held very reliably at a predetermined value.

**[0016]** Fig. 4 shows a perspective view of another embodiment of a refrigerating sales module 2 according to the invention. Again, the features which are identical to the features shown in Figs. 2 and 3 are indicated by the same reference signs and will not be discussed in detail again.

**[0017]** In Fig. 4 the goods display deck 30 inside the refrigerated goods presentation space 26 has been removed for demonstration in order to show the thermoelectric element 32, which is arranged on top of the bottom 16 of the refrigerating sales module 2. Fans, which are not shown in Fig. 4, direct an air-flow along the upper cool side 52 of the thermoelectric element 32 and into the refrigerated goods presentation space 26 for cooling the refrigerated goods presentation space 26. The em-

bodiment shown in Fig. 4 provides an increased cooling capacity and allows to operate the refrigerating sales module 2 without using a closing cover 12.

**[0018]** Fig. 5 shows a sectional side view of a refrigerating sales furniture 24 according to an embodiment of the invention having a refrigerated goods presentation space 6 in which a refrigerating sales module 2 is arranged.

**[0019]** The refrigerating sales furniture 24 comprises a base 44 on which a furniture body comprising a horizontal bottom 38, a vertical rear wall 36 and a horizontal top 42 defining a refrigerated goods presentation space 6 is arranged. The refrigerated goods presentation space 6 is also defined by side walls, which are not visible in the sectional view shown in Figure 5.

**[0020]** The goods presentation space 6 is open to the front and it comprises four goods presentation decks 28 which extend horizontally from the rear wall 36 of the furniture body. The interior of the goods presentation space 6 is refrigerated e.g. by means of a well known vapor compression cycle, which is not shown in Fig. 5. On the second goods presentation deck 28 counted from the top a refrigerating sales module 2 according to an embodiment of the invention is arranged. The refrigerated goods presentation space 26 inside the refrigerating sales module 2 is cooled to a temperature below the temperature within the refrigerated goods presentation space 6 of the refrigerated sales furniture 24 by using the thermoelectric element 32, which is arranged below the goods display deck 30 within the refrigerating sales module 2. Thus, two areas of two different temperatures are provided within the sales furniture 24. In particular, when the goods presentation space 6 of the refrigerating sales furniture 24 is cooled to temperatures above 0 °C, the refrigerated goods presentation space 26 of the refrigerating sales module 2 may be cooled to a freezing temperature below 0 °C in order to simultaneously present cooled goods and frozen goods in the same sales furniture 24.

**[0021]** Fig. 6 shows a cut-out of a goods presentation space 6 of the sales furniture 4 with an alternative embodiment of the refrigerating sales module 2. The refrigerating sales module 2 is arranged between the goods presentation decks 28 of the sales furniture 4 and extends in height over three goods presentation decks 28. The refrigerating sales module 2 comprises a fan box 40 which is arranged below the bottom 16 of the refrigerating sales module 2. Said fan box 40 houses a fan (not visible) and is provided with openings 34 for rejecting warm air, which has been circulated by the warm side 50 of the thermoelectric element 32, which is not visible in Fig. 6, to the outside. This enhances the performance of the refrigerating sales module 2.

**[0022]** Fig. 7 shows a refrigerating sales module 2 according to yet another embodiment of the invention. The refrigerating sales module 2 is arranged between the goods presentation decks 28 of a sales furniture 4 and extends in height over three goods presentation decks

28. In this embodiment a flow of cooled air, which has been cooled by passing the cool side 52 of the thermoelectric element 32 (not visible), is led into the refrigerated goods presentation space 26 via cool air openings 46, which are formed in the rear wall 48 of the refrigerated goods presentation space 26. In this embodiment a fan box 40 comprising a fan is arranged below the bottom 16 of the refrigerating sales module 2, as well, in order to reject warm air which has been circulated along the warm side 50 of the thermoelectric element 32 via the warm air openings 34 to the outside. This embodiment of a refrigerating sales module 2 provides a very high cooling capacity.

**[0023]** A sales furniture according to any of the exemplary embodiments of the invention as described above provides at least two goods presentation areas of two different temperatures. Inserting a refrigerating sales module according to an exemplary embodiment of the invention into a non-refrigerating sales furniture provides a refrigerated space for presenting cooled goods. Inserting a refrigerating sales module according to an exemplary embodiment of the invention into a refrigerating sales furniture provides a space at freezing temperature for presenting frozen goods. The temperature within the refrigerated goods presentation space of the refrigerating sales module can be adjusted easily to match the desired temperature. Additional areas of different temperatures can be provided by adding additional refrigerating sales modules to the sales furniture. By using a plurality of refrigerating sales modules a plurality of different temperatures can be provided.

**[0024]** In an embodiment of the invention the temperature difference between the refrigerating temperature in the separate refrigerated goods presentation space of the refrigerating sales module and in the goods presentation space of the sales furniture is between 5 °C and 15 °C, preferably between 9 °C and 11 °C. This temperature difference is commonly needed in supermarkets and it can be achieved with high efficiency by using a thermoelectric element.

**[0025]** In an embodiment of the invention the temperature difference between the refrigerating temperature in the separate refrigerated goods presentation space of the refrigerating sales module and the goods presentation space of the sales furniture is individually adjustable by the thermoelectric refrigerating element, in particular by tuning and/or setting the performance of the thermoelectric refrigerating element. Thus the temperature within the refrigerated goods presentation space can be adjusted easily to match the actual needs.

**[0026]** In an embodiment the thermoelectric refrigerating element is a Peltier-element. A Peltier-element provides a reliable, efficient and inexpensive thermoelectric refrigerating element.

**[0027]** In an embodiment the refrigeration in the refrigerated goods presentation space of the refrigerating sales module is caused by contact cooling. A refrigerating sales module using contact cooling has a simple config-

uration and is easy and inexpensive to produce.

**[0028]** In an embodiment the an air cycle is used for refrigerating the separate refrigerated goods presentation space of the refrigerating sales module. An air cycle is a very effective and well controllable means for refrigerating the goods presentation space.

**[0029]** In an embodiment the refrigerating sales module comprises at least one hook and the sales furniture is configured for hooking the refrigerating sales module into the goods presentation space. Hooking is a very easy and reliable way of arranging and fixing the refrigerating sales module within the goods presentation space of the sales furniture.

**[0030]** In an embodiment the goods presentation space comprises at least one goods presentation deck. Goods presentation decks are a very efficient means for presenting goods in a sales furniture.

**[0031]** In an embodiment the refrigerating sales module is dimensioned to fit vertically between two goods presentation decks which are arranged in the goods presentation space of the sales furniture. Such a refrigerating sales module can be arranged easily in an existing sales furniture comprising goods presentation decks.

**[0032]** In an embodiment the refrigerating sales module has a goods access portion at the front. Accessing the goods presentation space from the front is a very efficient and convenient way of accessing the goods presentation space.

**[0033]** In an embodiment the refrigerating sales module has a goods access portion at the top. Accessing the goods presentation space from the top is another efficient and convenient way of accessing the goods presentation space. Furthermore it allows to arrange a thermally isolating barrier at the front of the module in order to avoid cooled air flowing out of the refrigerated goods presentation space. This reduces the energy needed for cooling the refrigerated goods presentation space.

**[0034]** In an embodiment the goods access portion can be opened and closed by means of a door, particularly by means of a sliding door. Closing the goods access portion avoids cooled air flowing out of the refrigerated goods presentation space. A door allows to open the access to the goods presentation space easily, when necessary; a sliding door does not need any additional space in front or above the module for opening the door.

**[0035]** In an embodiment the door is at least partially transparent and comprises glass, in particular isolating glass. A transparent door allows to look in to the goods presentation space even when the door is closed. A door comprising isolating glass provides an effective thermal barrier and thus reduces the energy needed for cooling the refrigerated goods presentation space.

**[0036]** In an embodiment the refrigerating sales module comprises at least one of a thermally isolating side wall, a thermally isolating bottom, a thermally isolating top, a thermally isolating front and a thermally isolating rear wall. This provides very effective temperature barriers and thus reduces the energy needed for cooling the

refrigerated goods presentation space.

**[0037]** In an embodiment the goods presentation space is refrigerated, e. g. by a vapor compression cycle, such that a first refrigerating temperature is provided in the goods presentation space and a second lower refrigerating temperature is provided in the refrigerated goods presentation space of the refrigerating sales module. This allows to provide two different cooling temperatures within a single sales furniture.

**[0038]** In an embodiment the first refrigerating temperature is above 0 °C and the second refrigerating temperature is below 0 °C, thus two different refrigerating temperatures can be effected, a plus temperature and a freezing temperature. This allows to provide cooling temperatures as well as freezing temperatures within a single sales furniture.

**[0039]** The invention further comprises a refrigerating sales module for use in a sales furniture according to the invention. Thus allows to upgrade a goods presentation space of an existing sales furniture with an area of different temperature.

**[0040]** The features, embodiments and advantages as described with respect to the sales furniture can also be realized in terms of method steps, with a method for fabricating the sales furniture and/or the refrigerating sales module according to the invention.

**[0041]** While the invention has been described with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition many modifications may be made to adopt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed, but that the invention include all embodiments falling within the scope of the dependent claims.

List of reference numerals

**[0042]**

2 refrigerating sales module  
4 sales furniture  
6 goods presentation space  
6a left section  
6b middle section  
6c right section  
8 connection means  
10 fixing means  
12 cover  
14 side wall of the module  
16 bottom of the module  
18 top of the module  
20 front of the module  
22 rear wall of the module  
24 refrigerating sales furniture

26 refrigerated goods presentation space  
28 goods presentation deck  
30 goods display deck  
32 thermoelectric element  
5 34 warm air openings  
36 rear wall of the furniture  
37 side wall of the furniture  
38 bottom of the furniture  
40 fan box  
10 42 top of the furniture  
44 base of the furniture  
46 cool air openings  
48 rear wall of the refrigerated goods presentation space  
15 50 warm side of the thermoelectric element  
52 cool side of the thermoelectric element

## Claims

- 20 1. Sales furniture (4) comprising  
a goods presentation space (6), and  
at least one refrigerating sales module (2) arranged  
within the goods presentation space (6);  
25 wherein the refrigerating sales module (2) has a thermoelectric refrigerating element (32) and a separate  
refrigerated goods presentation space (26) providing  
a refrigerating temperature being lower than the temperature in the goods presentation space (6).
- 30 2. Sales furniture (4) of claim 1, wherein the temperature difference between the refrigerating temperature in the refrigerated goods presentation space (26) of the refrigerating sales module (2) and the  
35 goods presentation space (6) of the sales furniture (4) is between 5 °C and 15 °C, preferably between 9 °C and 11 °C.
- 40 3. Sales furniture (4) of claim 1 or 2, wherein the temperature difference between the refrigerating temperature in the separate refrigerated goods presentation space (26) of the refrigerating sales module (2) and the goods presentation space (6) of the sales  
45 furniture (4) is individually adjustable by the thermoelectric refrigerating element (32).
- 50 4. Sales furniture (4) of any of the preceding claims, wherein the thermoelectric refrigerating element (32) is a Peltier-element.
- 55 5. Sales furniture (4) of any of the preceding claims, wherein the refrigeration in the refrigerated goods presentation space (26) of the refrigerating sales module (2) is effected by contact cooling.
6. Sales furniture (4) of any of the preceding claims, comprising an air cycle which is configured for refrigerating the refrigerated goods presentation space

(26) of the refrigerating sales module (2).

7. Sales furniture (4) of any of the preceding claims, wherein the refrigerating sales module (2) comprises at least one hook and the sales furniture (4) is configured for hooking the refrigerating sales module (2) into the goods presentation space (6) of the sales furniture (4). 5
8. Sales furniture (4) of any of the preceding claims, wherein the goods presentation space (6) comprises goods presentation decks (28). 10
9. Sales furniture (4) of claim 8, wherein the refrigerating sales module (2) is dimensioned to fit between two goods presentation decks (28). 15
10. Sales furniture (4) of any of the preceding claims, wherein the refrigerating sales module (2) has a goods access portion at its front. 20
11. Sales furniture (4) of any of the preceding claims, wherein the refrigerating sales module (2) has a goods access portion at its top. 25
12. Sales furniture (4) of claim 11 or 12, wherein the goods access portion can be opened and closed by means of a door, particularly by means of a sliding door. 30
13. Sales furniture (4) of any of the preceding claims, wherein the refrigerating sales module (2) comprises at least one of a thermally isolating side wall (14), a thermally isolating bottom (16), a thermally isolating top (18), a thermally isolating front (20) and a thermally isolating rear wall (22). 35
14. Sales furniture (4) of any of the preceding claims, wherein the goods presentation space (6) is refrigerated such that a first refrigerating temperature is provided in the goods presentation space (6) and a second lower refrigerating temperature is provided in the separate refrigerated goods presentation space (26) of the refrigerating sales module (2). 40
15. Sales furniture (4) of claim 14 wherein the first refrigerating temperature is above 0°C and the second refrigerating temperature is below 0 °C. 45
16. Refrigerating sales module (2) for use in a sales furniture (4) according to any of claims 1 to 15. 50

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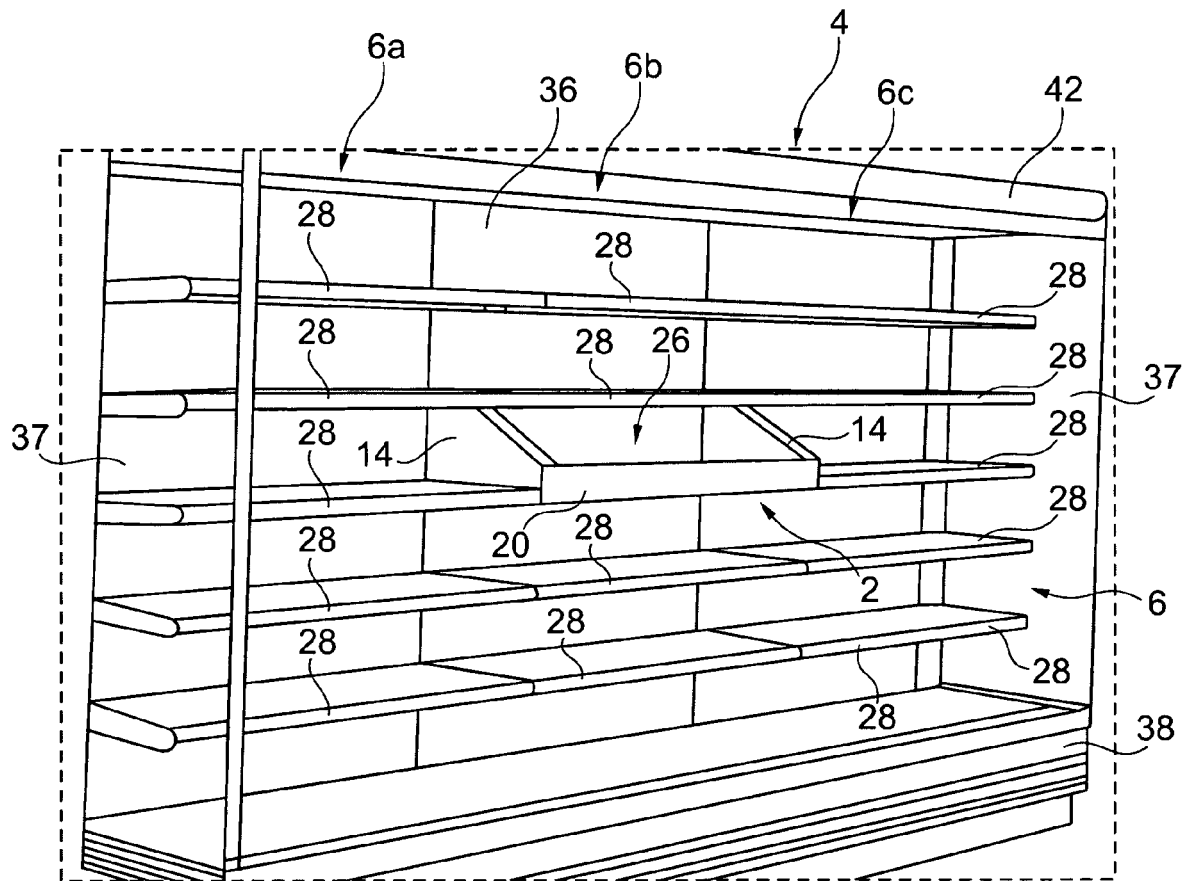


Fig. 1

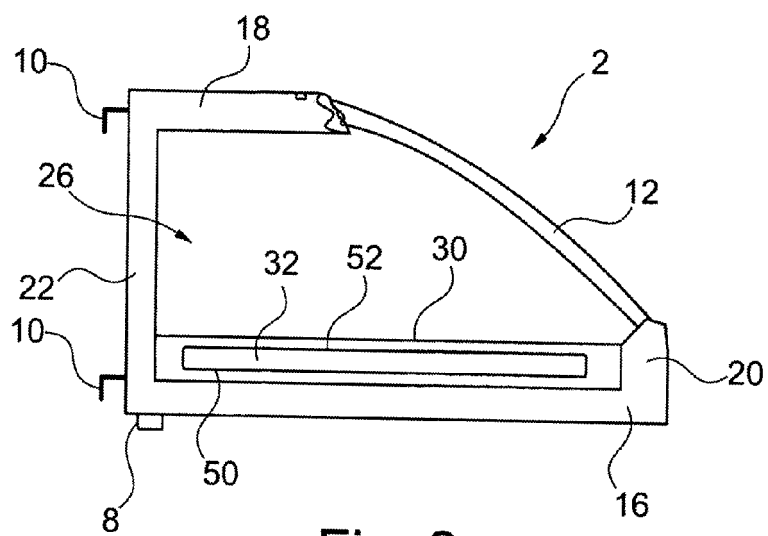


Fig. 2

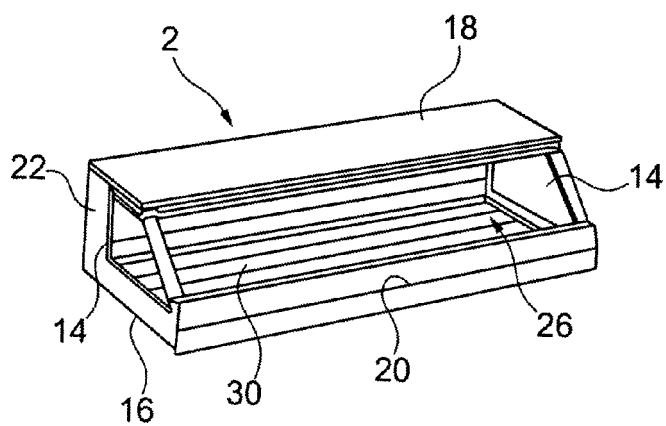


Fig. 3

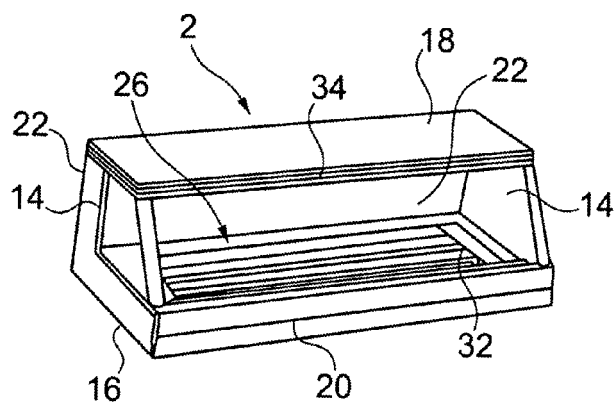


Fig. 4

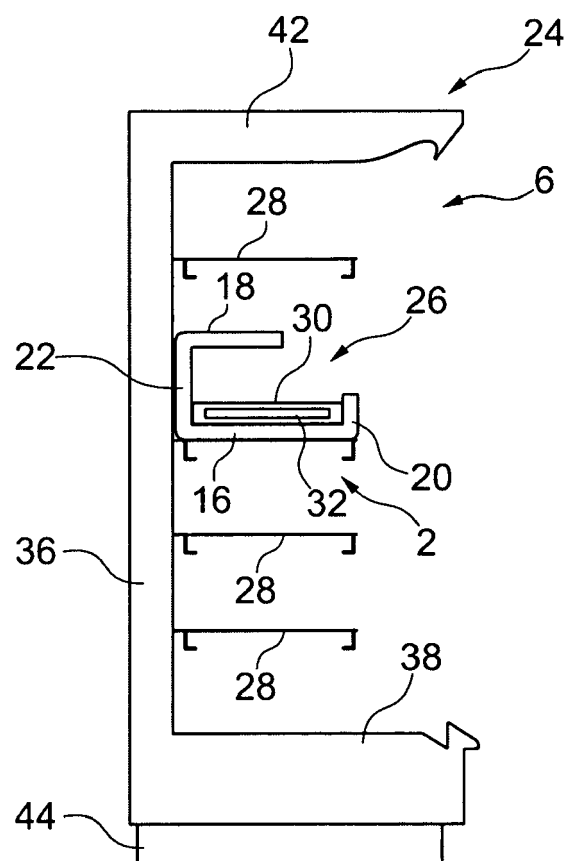


Fig. 5

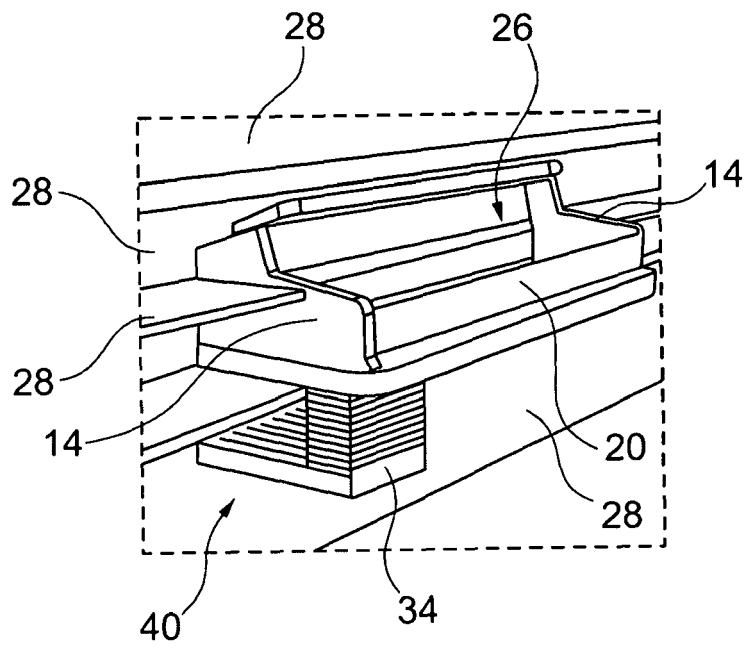


Fig. 6

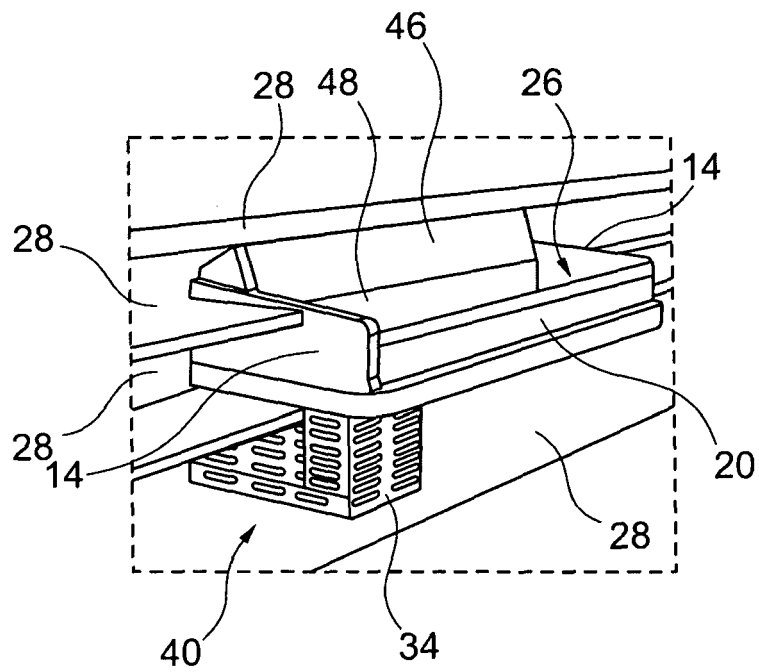


Fig. 7



## EUROPEAN SEARCH REPORT

Application Number  
EP 09 00 2303

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                           |                                                        |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------|
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -----                                                                                                                                     |                                                        |                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                           |                                                        |                                         |
| Place of search<br><b>The Hague</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                           | Date of completion of the search<br><b>15 May 2009</b> | Examiner<br><b>Vehrer, Zsolt</b>        |
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EPO FORM 1503 03.82 (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 00 2303

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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15-05-2009

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