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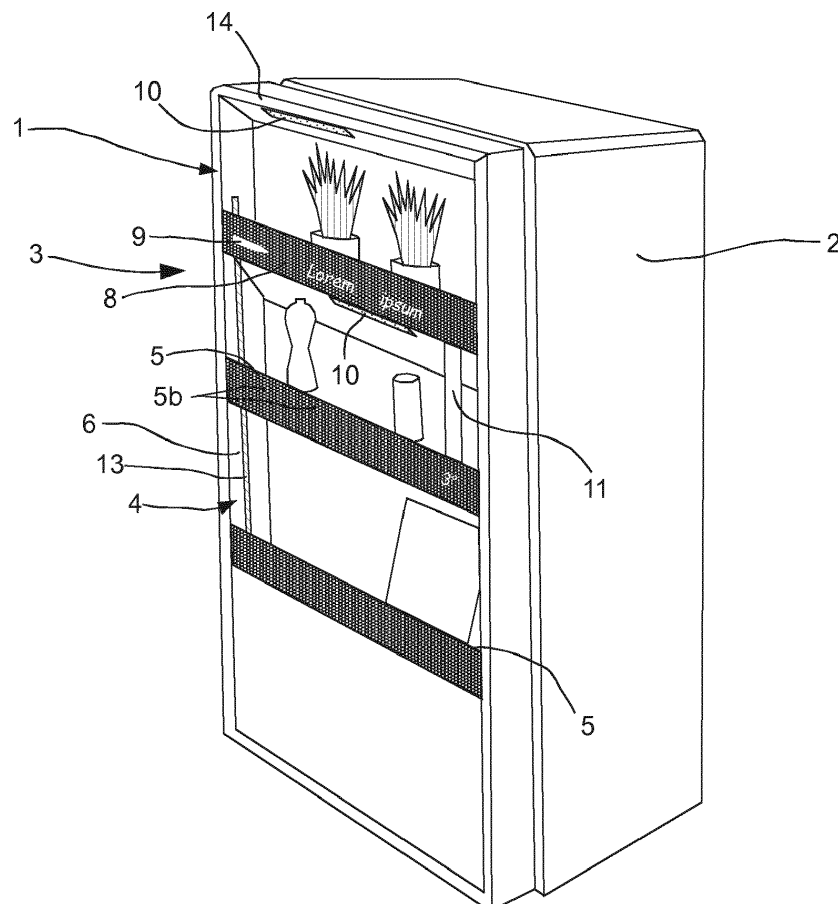
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(54) **INTEGRATED STORAGE RACKS OF A REFRIGERATOR DOOR ON THE OUTSIDE**

(57) A refrigerator door (1) having an inside and an outside (2), wherein, on the outside (2), a storage system is integrated into the refrigerator door (1) at least in sec-

tions is described. Furthermore, a refrigerator with such a door, as well as a means of transport comprising this refrigerator is described.

Fig. 1



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Description

[0001] The invention relates to a refrigerator door into which a storage system is integrated, a refrigerator with such a door, and a means of transport comprising such a refrigerator.

[0002] In the future, there will be so-called level 4 or 5 piloted motor vehicles which will drive autonomously. One will be able to make very long drives in these vehicles, so that the wish can then emerge to eat and drink during the drive as well. For this reason, there will also be refrigerators in such autonomous vehicles.

[0003] From the prior art according to DE 10 2015 200 438 A1, a refrigerator comprising a separate storage bag which can be fastened to an outside of the door is known. The disadvantage of these storage bags is that they are not stable and cannot reliably be mounted to the refrigerator door, so that they would rattle if such a refrigerator were built into a motor vehicle.

[0004] US 2016/0290705 A1 describes a refrigerator comprising a worktop which is extractable underneath two doors of the refrigerator and serves to store objects which are put into the refrigerator. Such a worktop is very deep, so that it takes up enormous space. Should it be used as a storage system within a vehicle, then enormous space within the vehicle would be wasted.

[0005] The object underlying the invention is to overcome the disadvantages known from the prior art and, in particular, to provide a storage system, which is stable, which can be reliably connected to a refrigerator door, does not rattle and is space-saving.

[0006] This object is solved by a refrigerator door with the features of claim 1, by a refrigerator with the features of claim 8, and by a means of transport with the features of claim 9. Advantageous embodiments with suitable further modifications are stated in the dependent claims.

[0007] According to the invention, a refrigerator door with an inside and an outside is provided, which is characterised in that, on the outside, a storage system is integrated into the refrigerator door at least in sections. Any refrigerator door known per se can be used as refrigerator door. "Inside" designates that side of the refrigerator door which is directed, under normal conditions of use, towards the interior of the refrigerator, in particular, the cold-storage space. Accordingly, the term "outside", within the meaning of the present invention, means that side of the refrigerator door which is directed, under normal conditions of use, towards the outside, in particular, towards the surrounding area.

[0008] In a preferred embodiment, the storage system is a rack wherein at least one horizontal shelf is held by a vertical holding system.

[0009] A rack within the meaning of the present invention is understood to be an appliance which serves to store objects of all kinds. The storage surface is created by horizontal shelves (shelf boards) held by a vertical holding device. The rack is open at least towards the front.

[0010] In addition to the already aforedescribed horizontal shelves and the vertical holding system, a rack can furthermore be closed at the upper end and/or at the bottom end through an end element, so that, as a result, a circumferential enclosure is created.

[0011] The shelves can be configured as boards or L-shaped. If a shelf is configured L-shaped, then a leg of the "L" forms the storage surface for the storage of the objects, and the other leg forms a cover which prevents the objects of the rack open towards the front from falling out. Within the rack, a plurality of horizontal shelves can be provided which can be similar or different from one another, for example, with regard to materials or the constructive design.

[0012] In the refrigerator door according to the invention, the storage system, in particular, a rack, is integrated into the outside of the refrigerator door at least in sections. This means that the refrigerator door and storage system are built in an integral construction method so that the refrigerator door according to the invention shows both the function of a customary refrigerator door and the function of a storage system combined. This is different from a differential construction method in which the parts (here the refrigerator door and the storage system) can be physically separated from each other as, for example, the storage bag known from DE 10 2015 200 438 A1, which is separately attached to the outside of a door and, thus, can be separately detached again. This is not possible in the case of an integral construction method.

[0013] The expression "at least in sections" points out that it is not required that all parts of the storage system are integrated into the refrigerator door, but that individual parts are fabricated separately and capable of being mounted at the positions designated in the storage system for normal conditions of use. If the storage system is a rack, then, for example, the two vertical holding systems can be integrated into the refrigerator door, and the horizontal shelves can subsequently be inserted.

[0014] The at least one horizontal shelf within the vertical holding system can be held in any manner known in this field, for example, by a customary clamping element.

[0015] In one embodiment, the at least one horizontal shelf and the vertical holding element are adapted that the at least one horizontal shelf is adjustable in height. Dependent on the objects to be stored in the storage system, the rack can thereby be adjusted.

[0016] In another embodiment, the front side of the at least one horizontal shelf is provided with a display device. If, for example, an L-shaped horizontal shelf is inserted, then the display device can be built into the leg of the "L", which serves to protect against objects falling out. Examples for a display device can be a blackboard, paper, a writeable plastic surface (white board), or an electronic display such as customary computer displays or E-paper. If an electronic display or another display requiring power is used, then the power supply can be ensured in a customary manner, for example, with mul-

multiple plugs. An electric contact between the horizontal shelf, which includes the display device, and the vertical holding system can be established by electric contacts or plug connectors or in any other manner known per se.

[0017] In another embodiment, the storage system has at least one lighting element. Such lighting elements can, for example, be provided on the bottom sides and/or on the upper side and/or the shelves or the bottom side of the end elements in the case of a circumferential enclosure. Examples of the lighting elements are halogen lamps or LEDs. In this process, the lighting element can be configured as smart lighting, so that the lighting level can be changed and thus adjusted depending on the requirements.

[0018] A multitude of advantages is achieved with the refrigerator door according to the invention, in particular, in the concretely illustrated embodiments. Due to the integration of the storage system into the refrigerator door, a stable system is provided in which the storage system is reliably connected to the refrigerator door. Rattling of the storage system comprising the refrigerator door is avoided. In addition, space is saved. Objects stored in the storage system are clearly visible and can be reached in a fast and simple manner.

[0019] Object of the present invention is furthermore a refrigerator with a refrigerator door as described above. Any refrigerator known per se can be used as refrigerator.

[0020] The refrigerator according to the invention can be placed within a means of transport which, in particular, can be used for transportation by land, sea and air, in particular, within a motor vehicle, or inside a residential space.

[0021] In order to guarantee that the refrigerator door, in particular, if the refrigerator is located inside a residential space, can be opened wide, and nevertheless does not strike against other cabinets or walls, accordingly adjusted hinges can be inserted.

[0022] Further advantages, features and details of the invention emerge from the claims, the following description of preferred embodiments, as well as on the basis of the drawings, in which:

Fig. 1 shows, in a simplified and schematic perspective view, a refrigerator door, on the outside of which a storage system is integrated;

Fig. 2 shows an embodiment of a horizontal shelf.

[0023] Fig. 1 shows a refrigerator door 1 which closes a customary refrigerator 2. On the outside 3 of the refrigerator door 1, a rack 4 is integrated therein, which comprises horizontal shelves 5, which are held by a vertical holding system 6, in particular, by means of a clamping element 7 (shown in a schematic and simplified manner in Fig. 2).

[0024] As can be seen in Fig. 2, the horizontal shelf 5 is configured L-shaped. It comprises a storage surface 5a on which the objects to be stored in the rack can be

stored, as well as a front cover 5b.

[0025] The cover 5b has a display device 8. The display device 8 can, for example, be a writeable surface, wherein a writing instrument 9 can additionally be fastened to the cover 5b in such a manner that it can be detached therefrom and attached thereto again. The refrigerator door can further have a door handle 11, with which it can be opened and closed.

[0026] Fig. 2 further shows schematically a power connection 12, with which horizontal shelves 5 can be brought in contact with a corresponding power connection 13 (Fig. 1) in the vertical holding system 6 to ensure a power supply, for example, for an electrically operated display device 8 or for a lighting element 10. In the example of Figure 5, two lighting elements 10 are indicated by dashes, which are integrated into the shelf 5 and can illuminate a shelf compartment arranged underneath. With reference to Figure 1, it is also pointed out that a lighting element 10 can also be arranged within an upper frame element 14 of the rack 4. In particular, optoelectronic elements such as LED arrays or LED stripes are used as lighting elements 10.

[0027] If an electronic display is used as the display device 8, it can be considered that information to be displayed thereon can be entered by means of an operating device. For example, a smartphone or a tablet computer can be used as operating device on which a corresponding programme is installed for controlling functions of the refrigerator door 1 or of the refrigerator 2. Furthermore, it is also possible that the display device 8 is configured as a touch sensitive display (touch screen) or/and that operating elements, such as keys or similar, are arranged in the area of the display device 8. In this process, the operating elements can be configured to communicate, when actuated, with the display device 8 or/and the refrigerator or/and an external operating device mentioned above.

[0028] In the illustrated example, the vertical holding system 6 is configured as a type of integral framework, which is arranged along the circumference of the refrigerator door. The rack shelves 5 are inserted within the framework. It is pointed out that the number of rack shelves 5 and their arrangement or positioning relative to the framework or to the vertical holding system 6 can be varied according to requirement.

[0029] Even if a refrigerator is shown in Figure 1 where a single refrigerator door exists for closing the cold-storage space, a refrigerator can also have a multipart, in particular, double-leaf refrigerator door into which a storage system is integrated at least in sections. Naturally, a refrigerator door presented herein can optionally have hinges for a rotational fastening to the refrigerator on the left or right-hand side. Only for the sake of completeness, it is pointed out that the refrigerator door introduced here could also be used for a freezer.

Claims

1. A refrigerator door (1) having an inside and an outside (2), **characterised in that**, on the outside (2), a storage system is integrated into the refrigerator door (1) at least in sections. 5
2. The refrigerator door (1) according to claim 1, **characterised in that** the storage system is a rack (4), wherein at least one horizontal shelf (5) is held by a vertical holding system (6). 10
3. The refrigerator door (1) according to claim 2, **characterised in that** the at least one horizontal shelf (5) in the vertical holding system (6) is held with a clamping element (7). 15
4. The refrigerator door (1) according to claim 2 or 3, **characterised in that** the at least one horizontal shelf (5) and the vertical holding system (6) are adapted so that the at least one horizontal shelf (5) is adjustable in height. 20
5. The refrigerator door (1) according to any one of claims 2 to 4, **characterised in that** a front side of the at least one horizontal shelf (5) is provided with a display device (8). 25
6. The refrigerator door (1) according to claim 5, **characterised in that** the display device (8) is a black-board, paper, a writeable plastic surface, or an electronic display. 30
7. The refrigerator door (1) according to any one of the preceding claims, **characterised in that** the storage system has at least one lighting element (10). 35
8. A refrigerator (2) with a refrigerator door (1) according to any one of claims 1 to 7. 40
9. A means of transport, in particular a motor vehicle, comprising a refrigerator (2) according to claim 8. 45

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Fig. 1

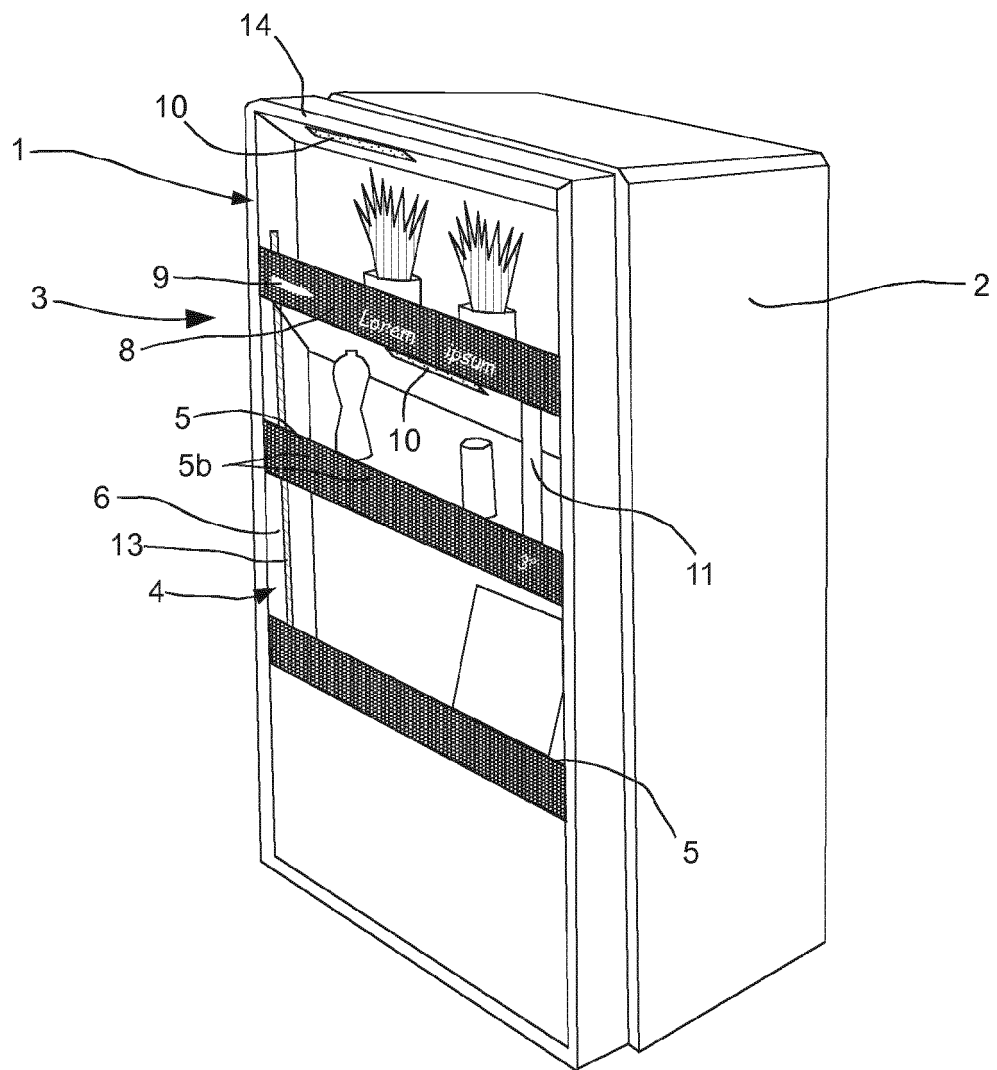
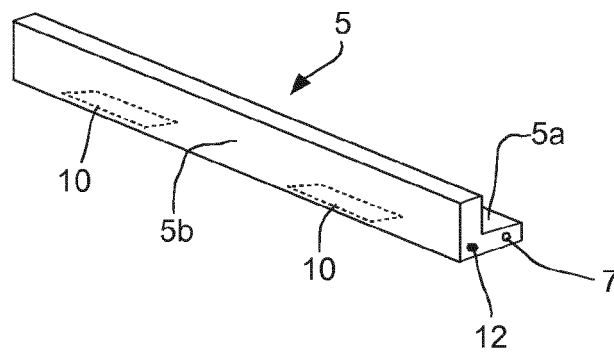


Fig. 2





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Application Number
EP 19 15 3430

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 July 2019	Examiner Canköy, Necdet
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