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(54) **Back-loadable refrigeration cabinet**

(57) The present invention relates to a back-loadable refrigeration cabinet (10) comprising a frame (11; 11 A, 11 B, 14) and cooling devices, which frame (11) is open to the front of the cabinet (10) and forms a product space (13) and has a back wall structure (11 B) comprising sliding doors (15), which cooling devices are located in an

equipment space (12) provided in the frame (11) and connected to at least one air duct (18) for providing cooled air to the product space (13). The frame (11) has a bottom part (11 A) with a front edge having a height (H) to the bottom (17) of the product space (13) from floor level 100 - 380 mm.

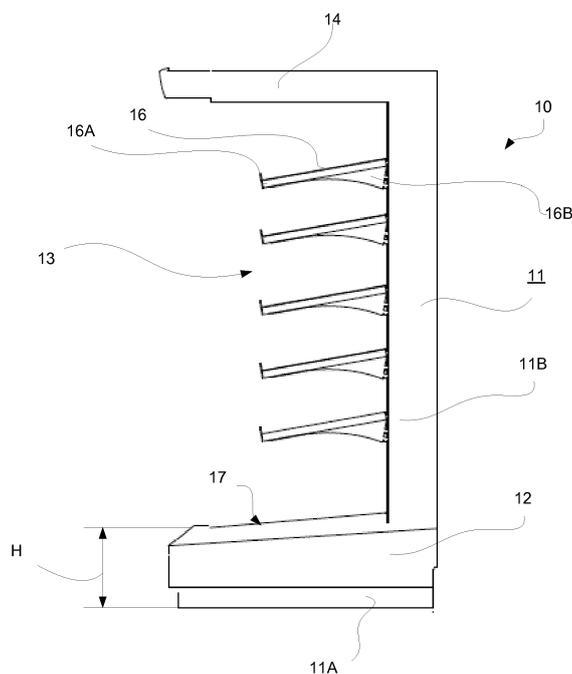


Fig. 1

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Description

[0001] The present invention relates to a back-loadable refrigeration cabinet and more especially the invention relates to a back-loadable refrigeration cabinet with sliding doors on the non-customer side of the cabinet according to the preamble of claim 1.

[0002] Different types of refrigeration solutions for grocery stores are known from prior art. Refrigerated, back-loadable cabinets are employed to allow customers to access groceries and other refrigerated items from the front of the case without the obstruction of a door. The refrigerated items are loaded onto the cabinet shelves from the back of the cabinet to allow restocking without disturbing the customers. These types of cabinets typically comprise frame for shelves and cooling equipment with blowing devices to create cooling air flows to the interior of the cabinet in order to keep inside of the cabinet and the products inside in the required temperature to ensure the required shelf life of the products. The cooling equipment typically comprises an evaporator and a blower located at equipment space below the refrigerated space with shelves for products, which leads to high lower front edge / wall of the equipment space thus reducing product space. The height of the lower front edge in prior art arrangements has typically been at least 395 mm. In prior art arrangements air ducts leading the cooling air to the product space lead from the equipment space to the shelf structures such that air is blown from below the shelf and thus the locations of the shelves are fixed.

[0003] The back side of the cabinet is typically openable to a cooled storage room located behind the cabinet to allow access to cabinet when loading is required and it may be provided with curtains or doors, for example narrow sliding doors to close the back of the cabinet when loading is not required for efficient functioning of the cooling equipment and preventing the view from the customer side to the cooled storage and thus this has simultaneous led to poor visibility from the cooled storage space into the refrigerated cabinet and thus the need for filling in products has required the personnel to either open the curtains or doors or to do the checking of the product amounts in the refrigerated cabinet from the customer side.

[0004] In patent publication US 3812684 is disclosed a back-loadable refrigeration cabinet comprising a frame and cooling devices, which frame is open to the front of the cabinet and forms a product space and has a back wall structure comprising sliding doors, which cooling devices are located in an equipment space provided in the frame and connected to at least one air duct for providing cooled air to the product space.

[0005] An object of the present invention is to create a back-loadable refrigeration cabinet in which the disadvantages of prior art arrangements are eliminated or at least minimized.

[0006] A particular object of the invention is to create a back-loadable refrigeration cabinet, in which the rela-

tion of the product space to the equipment space is greater than in prior art arrangements.

[0007] A particular object of the invention is to create a back-loadable refrigeration cabinet, in which shelf locations in the product space are modifiable.

[0008] A particular object of the invention is to create a back-loadable refrigeration cabinet, in which visibility from the cooled storage into the cabinet is improved.

[0009] In order to achieve the above objects and those that will come apparent later the back-loadable refrigeration cabinet is mainly characterized by the features of the characterizing part of claim 1. Advantageous embodiments and features are defined in dependent claims.

[0010] According to the invention the back-loadable refrigeration cabinet comprises a frame and cooling devices, which frame is open to the front of the cabinet and forms a product space and has a back wall structure comprising sliding doors, which cooling devices are located in an equipment space provided in the frame and connected to at least one air duct for providing cooled air to the product space. The frame has a bottom part with a front edge having a height to the bottom of the product space from floor level 100 - 380 mm, advantageously 300 - 350 mm. By this more product space is achieved and simultaneously the front edge line with other store cabinet can easily be standardized without loss of product space in other types of store cabinets.

[0011] Advantageously the low front edge of the back-loadable according to the invention is provided by locating cooling devices such as an evaporator and a blower into the equipment space on the bottom part or in the ceiling part of the cabinet such that lowest possible dimension of the front edge can be achieved for example locating the devices to a longest dimension horizontally extending position.

[0012] According to an advantageous feature of the invention the sliding doors are transparent material by which very good visibility from the cooled storage into the cabinet for checking the need of filling in products to the product space is achieved.

[0013] According to an advantageous feature of the invention the sliding doors cover at least 75 % of the back wall surface area seen from the product space and/or at least 55 % of the back wall surface area seen from the cooled storage so that good accessibility from the cooled storage room located behind the back-loadable refrigeration cabinet to the product space is achieved.

[0014] According to an advantageous feature of the invention the shelves for products are movably attached to the back wall structure of the back-loadable refrigeration cabinet.

[0015] In the following the invention is described in detail with reference to the accompanying drawings, in which

in figures 1 - 3 is shown schematically one advantageous example of a back-loadable refrigeration cabinet,

in figure 4 is shown examples of an equipment space location alternatives in an advantageous example of a back-loadable refrigeration cabinet and

in figure 5 is shown a detail showing air ducts leading the cooling air to a product space of an example of a back-loadable refrigeration cabinet.

[0016] During the course of the following description of figures 1 - 5 like numbers and signs will be used to identify like elements according to the different views which illustrate the invention.

[0017] In figures 1 - 3 shown a schematical example of back-loadable refrigeration cabinet 10 comprises a frame 11. The frame 11 has a horizontally extending bottom part 11 A, a vertically from back end of the bottom part extending back wall structure 11 B and a horizontally from the upper end of the back wall structure 11 B extending ceiling part 14 so that side view of the cabinet 10 has a turned C-like shape, in which the bottom part 11 A and the ceiling part 14 form the arms of the C-shape and the back wall structure 11 B forms the connecting part between the arms 11 A, 14. Thus the refrigerated, back-loadable cabinet 10 can be employed to allow customers to access groceries and other refrigerated products from the refrigerated product space 13 via the front of the cabinet 10.

[0018] On the bottom part 11 A in the frame 11 in the example of figures 1 - 3 is located an equipment space 12 formed as an openable casing into which equipment space 12 cooling devices such as an evaporator and a blower are located advantageously to a longest dimension horizontally extending position so that the front edge of the cabinet up to the uppermost part of the equipment space 12 casing i.e. to the bottom 17 of the product space 13 from floor level has height H 100 - 380 mm advantageously the height H is 300 - 350 mm. Upwards from the equipment space 12 is formed the product space 13 that is open to the front and limited by the back wall structure 11 B and the ceiling part 14.

[0019] The shelves 16 for products are movably attached to the back wall structure 11 B so that the shelf locations are modifiable in the cabinet 10, which thus provides many possibilities for product placing. The shelves 16 are attached movably to the back wall structure 11 B by manners known per se. The shelves may be positioned horizontally or slightly inclined lowering towards the front side of the cabinet 10. Each shelf may have a front barrier 16A to prevent the products from falling off the front edge of the shelf, especially when inclined shelves are utilized. The shelves 16 may also have support part / parts 16B to secure the weight-carrying capacity of the shelf.

[0020] The refrigerated items are loaded onto the cabinet shelves 16 from the back of the cabinet 10 to allow restocking without disturbing the customers. The back wall structure 11 B comprises sliding doors 15 that cover at least 75 % of the back wall surface area seen from the

product space 13 and/or at least 55 % of the back wall surface area seen from the cooled storage so that good accessibility from the cooled storage room located behind the back-loadable refrigeration cabinet 10 is achieved. Advantageously the sliding doors 15 are of transparent material by which very good visibility from the cooled storage into the cabinet 10 for checking the need of filling in products onto the shelves 16 is achieved.

[0021] In figure 4 is shown by dashed lines two alternatives 12A; 12B of the equipment space 12 locations in the cabinet 10. In alternative 12A of the equipment space 12 is locate on the bottom part 11 A of the cabinet 10. In alternative 12B of the equipment space 12 is formed in the ceiling part 14.

[0022] In figure 5 is shown a detail showing air ducts 18 leading the cooling air to a product space 13 of an example of a back-loadable refrigeration cabinet 10. The air ducts 18 leading the cooling air to the product space 13 are located in connection with the back wall structure such that cooled air is led to the product space through air duct openings 18A in the back wall structure and through air duct openings 18B in connection with the console 19 for attaching the support parts 16B of the shelves 16.

Reference signs used in the drawing:

[0023]

10	refrigeration cabinet
11	frame
11A	bottom part
11B	back wall structure
12	equipment space
12A	alternative of location of the equipment space
12B	alternative of location of the equipment space
13	product space
14	ceiling part
15	sliding doors
16	shelf
16A	front barrier
16B	support part
17	bottom of the product space
18	air ducts
18A	air duct openings
18B	air duct openings
19	console
H	height of front edge

Claims

1. Back-loadable refrigeration cabinet (10) comprising a frame (11; 11 A, 11 B, 14) and cooling devices, which frame (11) is open to the front of the cabinet (10) and forms a product space (13) and has a back wall structure (11 B) comprising sliding doors (15), which cooling devices are located in an equipment

space (12) provided in the frame (11) and connected to at least one air duct (18) for providing cooled air to the product space (13), **characterized in that** the frame (11) has a bottom part (11 A) with a front edge having a height (H) to the bottom (17) of the product space (13) from floor level 100 - 380 mm, that the equipment space (12) with the cooling devices is located on the bottom part (11 A) of the frame (11) and that the cooling devices such as an evaporator and a blower are located in the equipment space (12) to a longest dimension horizontally extending position.

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2. Back-loadable refrigeration cabinet according to claim 1, **characterized in that** the height (H) of the front edge is 300 - 350 mm.

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3. Back-loadable refrigeration cabinet according to claim 1 or 2, **characterized in that** sliding doors (15) are transparent material.

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4. Back-loadable refrigeration cabinet according to any of previous claims, **characterized in that** the sliding doors (15) cover at least 75 % of the back wall (11 B) surface area seen from the product space.

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5. Back-loadable refrigeration cabinet according to any of previous claims, **characterized in that** the sliding doors (15) cover at least 55 % of the back wall (11 B) surface area seen from the cooled storage.

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6. Back-loadable refrigeration cabinet according to any of previous claims, **characterized in that** shelves (16) for products of the product space (13) in the cabinet (10) are movably attached to the back wall structure (11 B) of the back-loadable refrigeration cabinet (10).

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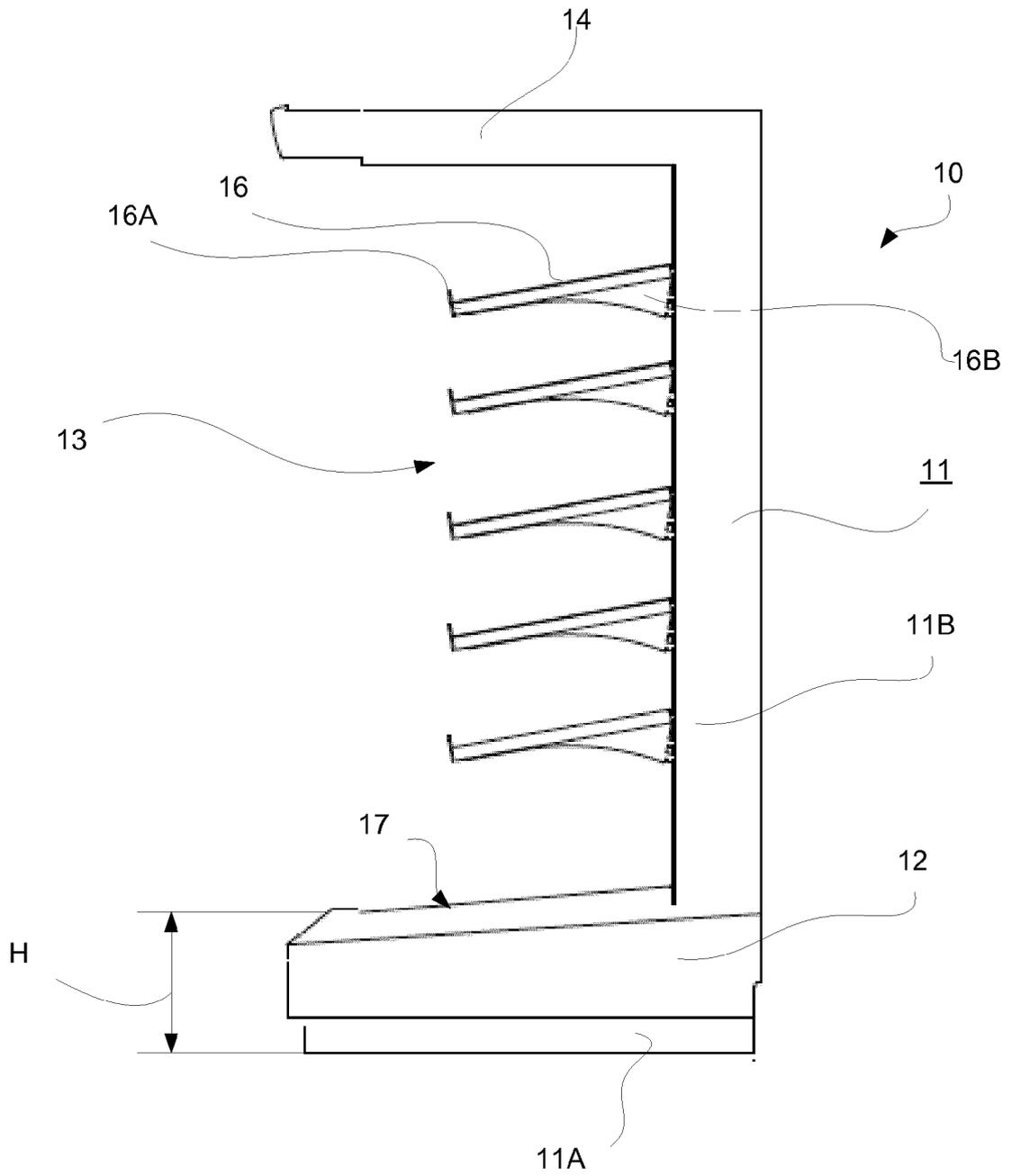


Fig. 1

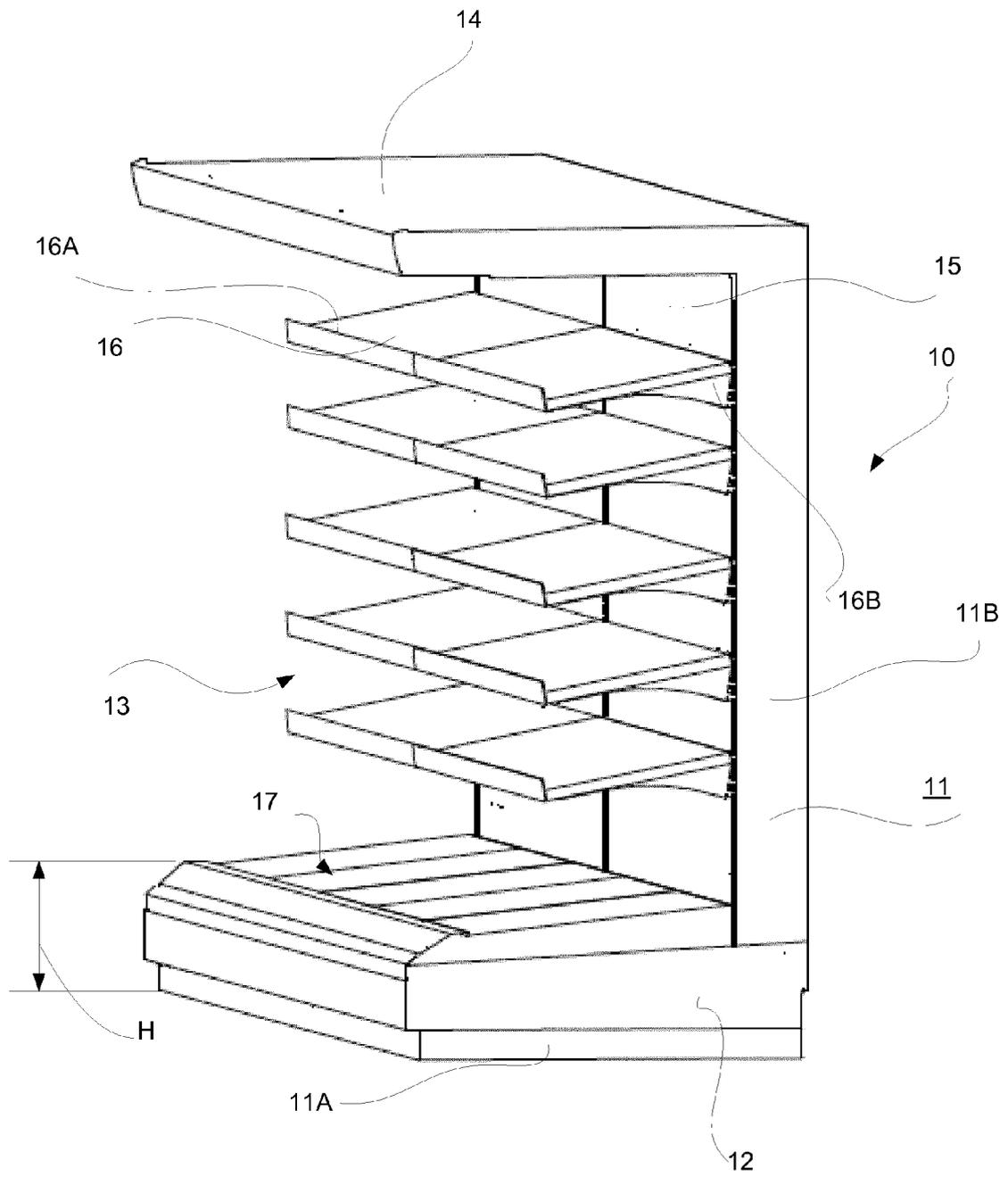


Fig. 2

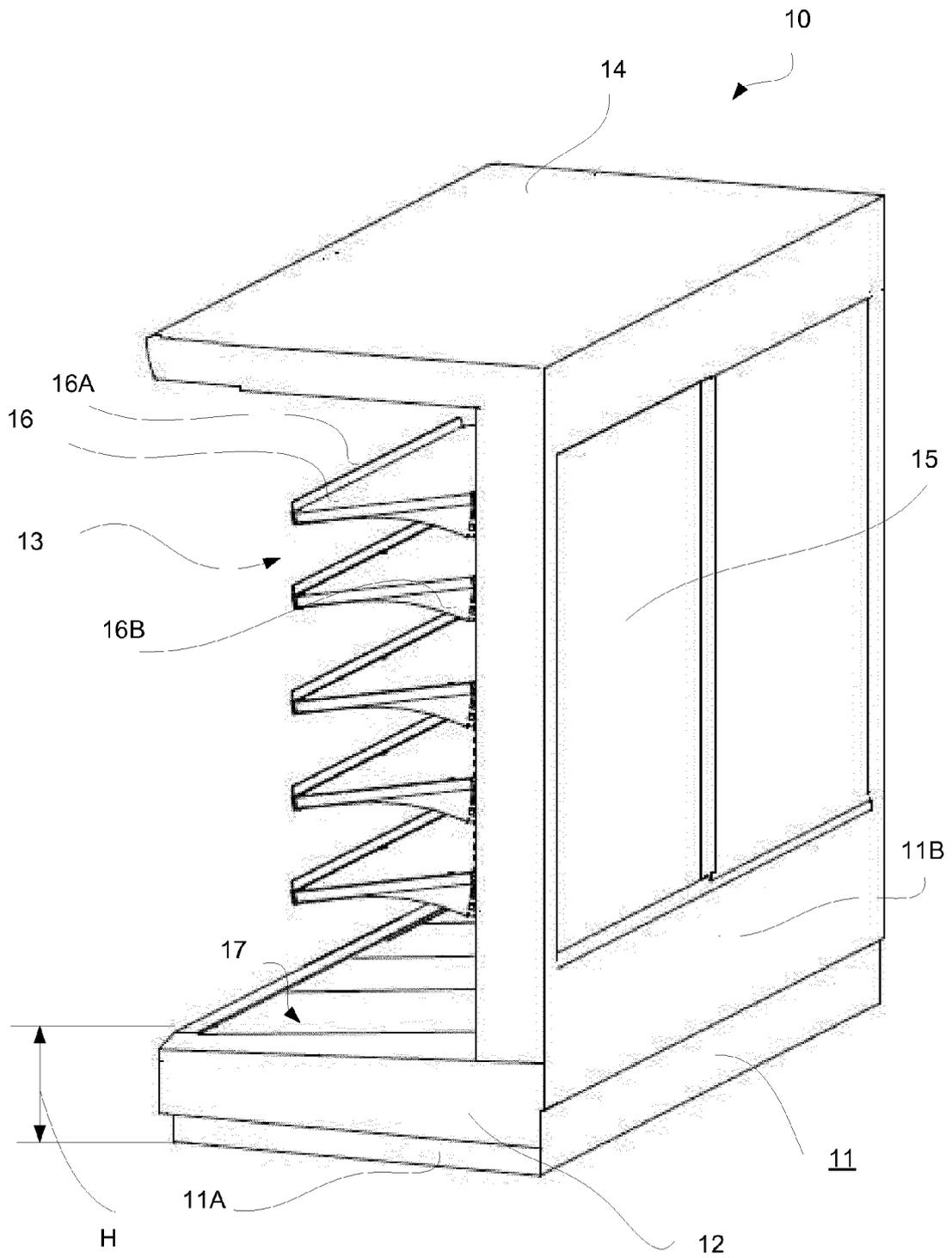


Fig. 3

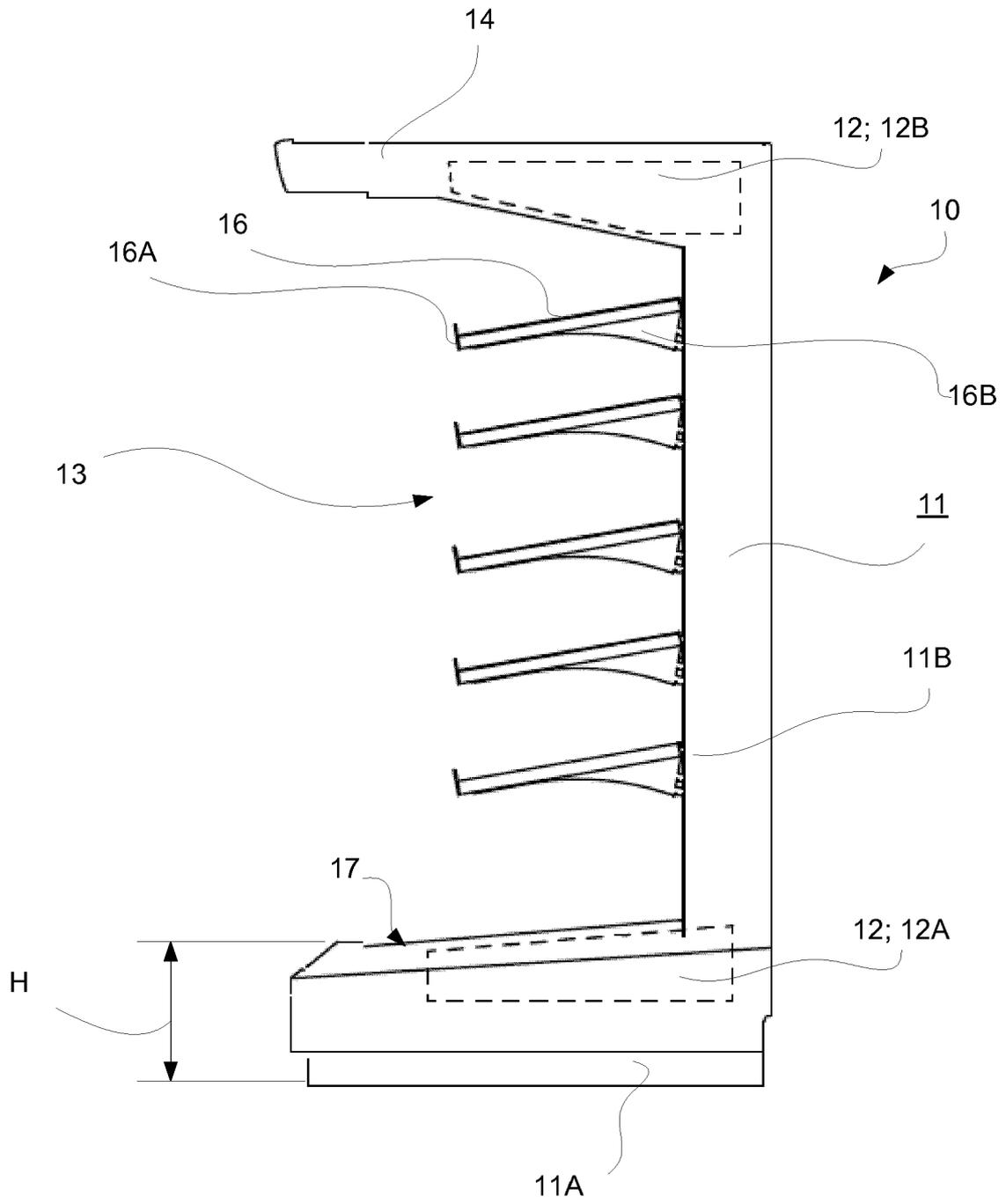


Fig. 4

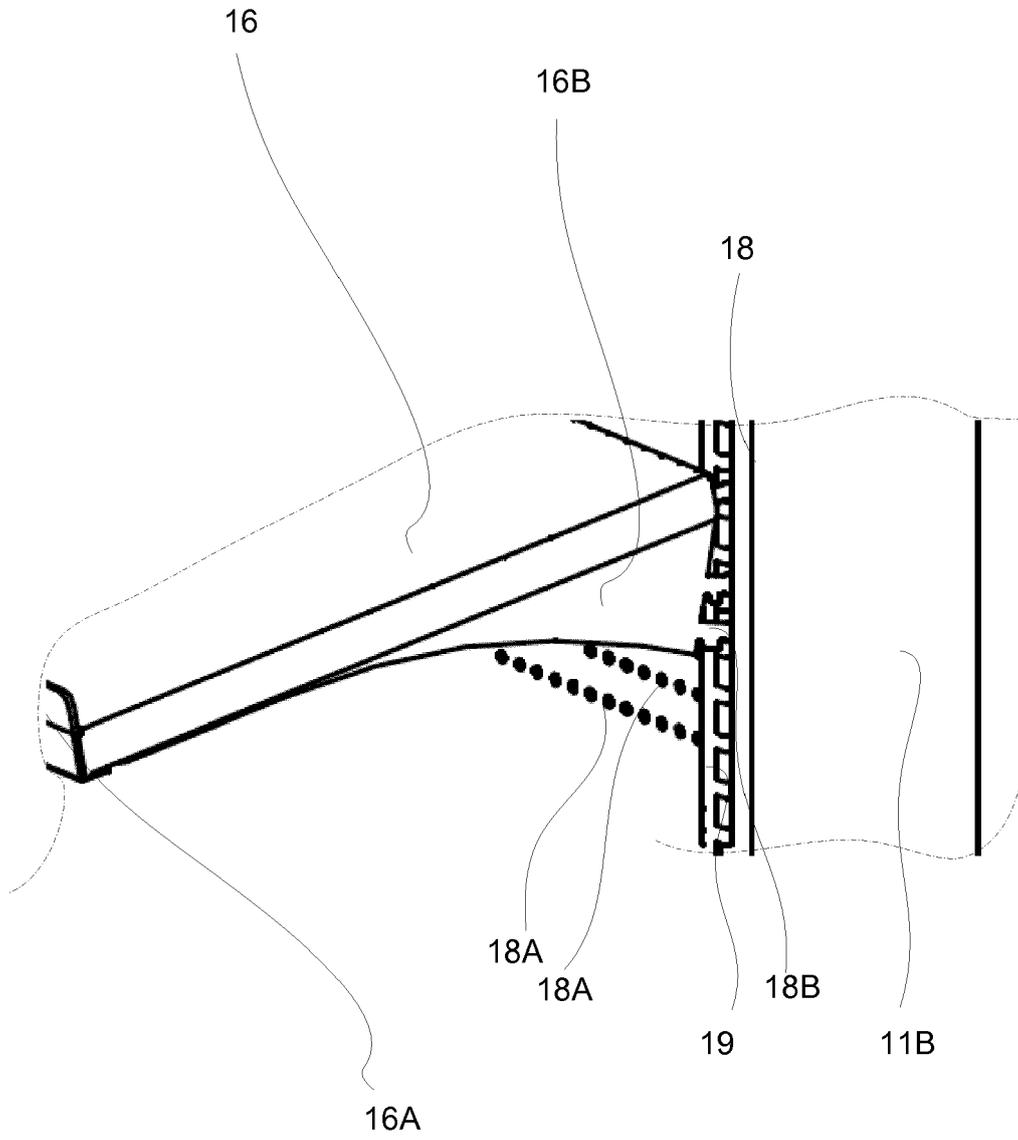


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 3812684 A [0004]