



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.08.2021 Bulletin 2021/33

(51) Int Cl.:
A47F 3/04 (2006.01)

(21) Application number: **21154890.4**

(22) Date of filing: **03.02.2021**

(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
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **HEINÄVAARA, Kimmo**
07910 Valko (FI)
• **MÄKINEN, Ilkka**
02650 Espoo (FI)

(74) Representative: **Berggren Oy**
P.O. Box 16
Eteläinen Rautatiekatu 10A
00101 Helsinki (FI)

(30) Priority: **14.02.2020 FI 20205154**

(71) Applicant: **Viessmann Refrigeration Systems Oy**
06150 Porvoo (FI)

(54) **TEMPERATURE-CONTROLLED CABINET**

(57) The invention relates to a temperature-controlled cabinet (10), which comprises two line cabinet parts (11) located with back sides towards each other and one or two crown end cabinet part/-s (12) located at one end or both ends of the line cabinet part (11). The temperature-controlled cabinet (10) comprises sliding doors (20)

on longitudinally extending front sides of the line cabinet parts (11) and at longitudinal sides of the crown end cabinet parts (12) and each sliding door (20) is slidable past the next to it located sliding door (20) to at least partially overlapping position.

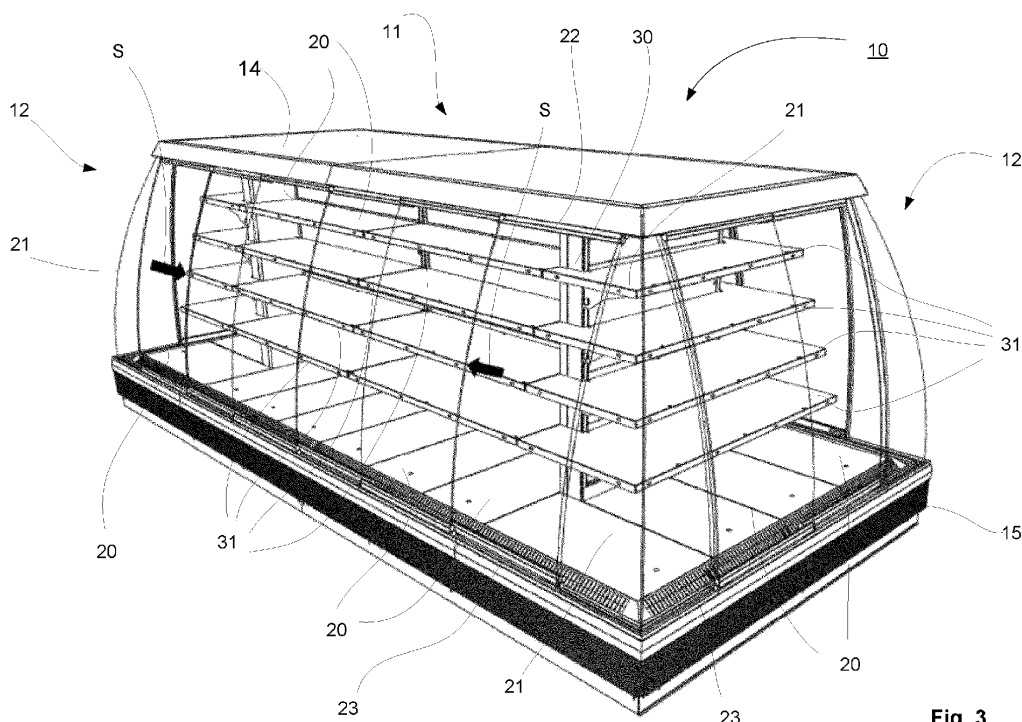


Fig. 3

Description

Technical field

[0001] The present invention relates to a temperature-controlled cabinet and especially the invention relates to a temperature-controlled cabinet according to the preamble of claim 1.

Background

[0002] Different types of temperature-controlled cabinets are known from prior art for grocery stores, supermarkets etc. and for institutional catering services, for example for schools, canteens, cafeterias. Temperature-controlled cabinets for cool temperatures i.e. temperatures +8 °C or below are employed for products, such as food products, beverages and like that must be kept in cooled, refrigerated temperatures and to allow users or customers to access groceries and other refrigerated or frozen items from the cabinet. The temperature-controlled display cabinet comprises typically shelves for the products and at least partially transparent wall structure in order to provide direct view to the products inside for the customers. Often, they also include a light source that illuminates the product display area for better marketing of the food product and for higher visibility to the customers.

[0003] The temperature-controlled cabinets typically comprise a frame structure; supporting, top, bottom and wall structures with at least one door or without the doors with at least one partially open wall for customers to access the products. The doors may be doors provided with hinges of slidable doors. The frame structure surrounds at least one product space, which comprises shelves and/or other structures for the refrigerated or frozen products. The temperature-controlled cabinets may be of plug-in type or remote type cabinets. The plug-in type temperature-controlled cabinets comprise the controlled temperature providing means and the temperature controlling means. In the remote type temperature-controlled cabinets the temperature providing means is typically common to several temperature-controlled cabinets and the temperature controlling means are typically comprised by each temperature-controlled cabinet.

[0004] In patent application publications EP0769262A2 and EP2382896A1 is disclosed island-type temperature-controlled cabinets openable from the top via slidable doors.

[0005] It is known from prior art to configure the temperature-controlled cabinet as a line cabinet, which is formed as a longitudinally extending cabinet with several doors openable to the longitudinally extending side of the cabinet. It is also known from prior art to configure the temperature-controlled cabinet as a line of cabinets, which is formed as a longitudinally extending temperature-controlled cabinets that are installed back to back, typically a narrow gap between them, with several doors

openable to the both longitudinally extending sides of the island-type temperature-controlled line consisting of back-to-back installed cabinet. Further, it is known to locate at an end or at each end of such a line of formed by line cabinets, independent temperature-controlled cabinet with a door or two doors openable to the front of this separate, independent temperature-controlled cabinet. In this kind of configuration, the products inside the line cabinets are accessible only through the doors of the line cabinet and the products inside the at the ends located separate, independent cabinet only through the doors of the separate independent cabinet.

[0006] An object of the present invention is to create a temperature-controlled cabinet in which the disadvantages of prior art arrangements described above are eliminated or at least minimized.

[0007] An object of the invention is to create a temperature-controlled cabinet, in which the problems relating to the accessibility of the products inside the temperature-controlled cabinets.

Summary

[0008] In order to achieve the above objects and those that will come apparent later the temperature-controlled cabinet is mainly characterized by the features of the characterizing part of claim 1. Advantageous embodiments and features are defined in dependent claims.

[0009] According to the invention the temperature-controlled cabinet comprises two line cabinet parts located back sides towards each other and one or two crown end cabinet part/-s located at one end or both ends of the line cabinet part, the temperature-controlled cabinet comprises sliding doors on longitudinally extending front sides of the line cabinet part and at longitudinal sides of the crown end cabinet parts and each sliding door is slidable past the next to it located sliding door to at least partially overlapping position.

[0010] According to the invention the temperature-controlled cabinet is substantially rectangular.

[0011] According to the invention that the sliding doors on the front sides of the line cabinet parts extend to transversal sides of the crown cabinet part/parts such, that the sliding doors of the line cabinet parts extend to respective corners of the temperature-controlled cabinet and the sliding doors of the crown end cabinet parts extend to respective corners of the temperature-controlled cabinet or such, that the temperature-controlled cabinet comprises corner walls at each corner and the corner walls extend from the corner to towards and to the sliding doors of the line cabinet parts and to towards and to the sliding doors of the crown end cabinet part.

[0012] According to an advantageous feature of the invention the sliding doors are made of transparent material.

[0013] According to an advantageous feature of the invention the corner walls are made of transparent material.

[0014] According to an advantageous feature of the invention inside of the temperature-controlled cabinet is configured to an inner, temperature-controlled space and that the space is continuous and united.

[0015] According to an advantageous feature of the invention the temperature-controlled cabinet comprises support structures for shelves and of the temperature-controlled cabinet.

[0016] According to an advantageous feature of the invention the sliding doors are supported by and slidable in guides such, that upper ends of the sliding doors are supported in upper guides and lower ends of the sliding doors are supported in lower guides.

[0017] According to an advantageous feature of the invention the guides are configured as guide grooves, which are wide enough to hold two sliding doors.

[0018] According to an advantageous feature of the invention the guide comprises two parallel guide grooves.

[0019] According to an advantageous feature of the invention the guides are provided with guide pins to position the sliding doors and to guide the sliding doors to the overlapping position.

[0020] In this description and the claims by terms vertical and horizontal as well as by terms top, bottom, front, back and side are referred as in normal use position of the temperature-controlled cabinet unless otherwise mentioned.

[0021] In this description and following claims by term temperature-controlled cabinets are meant temperature-controlled cabinets, in which temperature of the product space, i.e. the space, in which the products are located, is + 8 °C or below + 8 °C.

[0022] According to an advantageous aspect of the invention the temperature-controlled cabinet forms functionally one unit in view of providing controlled temperature and controlling it.

[0023] The temperature-controlled cabinet according to the invention and its advantageous aspects provides many advantages: The line cabinet parts and the crown end cabinet part/-s of the temperature-controlled cabinet form a continuous, united inner space. The overlapping structure of the sliding doors provides that any product position on the shelves of the temperature-controlled cabinet is easily reachable by the customers. Especially, advantageous is that product positions on the shelves of the crown end cabinet part are reachable also from the side of the line cabinet part and vice versa. The centrally located support structure provides that no intermediate walls or support structures are needed and it also provides support for the shelves of the line cabinet part and the shelves of the crown end cabinet part. The temperature-controlled cabinet is in configuration an island-type cabinet, which provides accessibility to the products inside all around the temperature-controlled cabinet.

Brief description of the drawings

[0024] Aspects of the invention, however, together with

additional objects and advantages thereof, will be best understood from the following description of some example embodiments when read in connection with the accompanying drawings and in the following the invention is described in more detail referring to the accompanying drawing, in which

in figure 1 is schematically show a part of the temperature-controlled cabinet according to an advantageous example of the invention as a longitudinal side view with sliding doors closed,

in figure 2 is schematically show a part of the temperature-controlled cabinet according to the advantageous example of the invention of figure 1 as a longitudinal side view with a sliding door opened,

in figure 3 is schematically shown the advantageous example of the temperature-controlled cabinet of the figures 1-2 as a see-through view,

in figure 4 is schematically shown the advantageous example of the temperature-controlled cabinet of the figures 1-3 and

in figure 5 is schematically shown a sectional view from the end of the advantageous example of the temperature-controlled cabinet of the figures 1-4.

Detailed description

[0025] During the course of the following description like numbers and signs will be used to identify like elements according to the different views which illustrate the invention and its advantageous examples. In the figures some repetitive reference signs may have been omitted for clarity reasons.

[0026] In figures 1 - 5 is shown a schematical example of a temperature-controlled cabinet 10 (in the following cabinet) comprising two line cabinet parts 11 located back sides towards each other and crown end cabinet parts 12. In the example of the figures both ends of the cabinet 10 a crown end cabinet part 12 is located but the cabinet 10 can comprise also only one crown end cabinet part 12 located at either end of the cabinet 10. The cabinet 10 comprises a top structure 14 forming a roof of the cabinet and a foundation structure 15 supporting the cabinet 10 on a floor or a corresponding base. The cabinet 10 also comprises sliding doors 20. The cabinet 10 in the example of the figures also comprises corner walls 21 but the sliding doors 20 may also extend to respective corners of the cabinet 10 and thus, in this configuration no corner walls are needed. The sliding doors 20 and the corner walls 21 are advantageously made of transparent material such, that visibility to products inside the cabinet 10 is provided all around the cabinet 10.

[0027] The inside of the cabinet 10 is configured to an inner, temperature-controlled space, a product space.

The cabinet 10 is comprises support structures 30 for shelves 31, onto which the products can be located, and of the cabinet 10. The inner space is limited by the top structure 14, the foundation structure 15, the sliding doors 20 and the corner walls 21 such that a continuous, united space is formed and can be kept in controlled temperature by one temperature controlling means.

[0028] The line cabinet parts 11 of the cabinet 10 are substantially rectangular and have sliding doors 20 on longitudinal front sides, as well as longitudinally located shelves 30 are provided on longitudinal sides inside the cabinet 10.

[0029] The crown end cabinet parts 12 are located at each end of the longitudinally extending line cabinet parts 11. The crown end cabinet parts 12 are also substantially rectangular and have sliding doors 20 on longitudinal outer side.

[0030] The line cabinet parts 11 and the crown end cabinet parts 12 form together one functional configuration.

[0031] The sliding doors 20 are provided on both longitudinally extending sides of the cabinet 10 i.e. on front sides of the line cabinet parts 11 and at ends of the cabinet 10 i.e. on the outer sides of the crown end cabinet parts 12. At corners of the cabinet corner walls 21 are located in the example of the figures but the sliding doors 20 may also extend to respective corners of the cabinet 10. The corner walls 21 extend from each corner of the cabinet 10 towards and to the endmost sliding doors 20 of the line cabinet parts 11 and the crown end cabinet part 12 such, that by the sliding doors 20 and the corner walls 21 a uniform, transparent outer structure is provided. The uniform, transparent outer structure may also be provided by the sliding doors 20 extending to corners of the cabinet 10.

[0032] The sliding doors 20 are supported by and slidable in guides 22, 23. Upper ends of the sliding doors 20 are supported in the upper guides 22 and lower ends of the sliding doors 20 are supported in the lower guides 23. As shown in figure 5 the guides 22, 23 can be configured as guide grooves 26, 27, which for example wide enough to hold two sliding doors or as two parallel guide grooves. The sliding doors 20 are for example alternately located in the wide guide groove or in the two parallel guide grooves such, that each sliding door 20 is slidable past the next to it located sliding door 20 to at least partially overlapping position to open the sliding door 20 and to reach a product/products located inside the cabinet 10. The guide grooves 26, 27 of the guides 22, 23 are advantageously provided with guide pins 24, 25 to position the sliding doors 20 and to guide the sliding doors past each other to the overlapping position. The each of the guides 22, 23 can be constructed of one continuous profile or of several profile parts connected to each other.

[0033] The guides 22, 23 are configured such, that the sliding doors 20 can be slid to at least partially overlapping position. Thus, the customers and like can reach any location on the shelves easily and especially also to

the shelves of the crown end cabinet part 12 form the side of the line cabinet part 11s and vice versa.

[0034] The sliding direction S of the sliding doors is denoted in the figures 1-4 by an arrow S.

[0035] The sliding doors 20 have advantageously a curved configuration such, that the outer surface of the sliding door 20 is outwards curved, i.e. convex, from upper part to lower part i.e. in vertical direction, as can be seen for example from figure 3. The outer surface of the sliding doors 20 can also be straight or concave or formed as a break-line configuration.

[0036] In the description in the foregoing, although some functions have been described with reference to certain features, those functions may be performable by other features whether described or not. Although features have been described with reference to certain embodiments or examples, those features may also be present in other embodiments or examples whether described or not. Above the invention has been described by referring to some advantageous examples only to which the invention is not to be narrowly limited. Many modifications and alterations are possible within the invention as defined in the following claims.

Reference signs used in the drawing:

[0037]

- 10 cabinet
- 11 line cabinet
- 12 crown end cabinet
- 14 top structure
- 15 foundation structure
- 20 sliding door
- 21 corner wall
- 22 upper guide
- 23 lower guide
- 24 guide pin
- 25 guide pin
- 26 guide groove
- 27 guide groove
- 30 support structure
- 31 shelf
- S sliding direction

Claims

1. Temperature-controlled cabinet (10), which temperature-controlled cabinet (10) is substantially rectangular and which temperature-controlled cabinet (10) comprises sliding doors (20) and each sliding door (20) is slidable past the next to it located sliding door (20) to at least partially overlapping position, **characterized in, that** the temperature-controlled cabinet (10) comprises two line cabinet parts (11) located with back sides towards each other and one or two crown end cabinet part/-s (12) located at one end or

both ends of the line cabinet part (11), that the temperature-controlled cabinet (10) comprises the sliding doors (20) on longitudinally extending front sides of the line cabinet parts (11) and at longitudinal sides of the crown end cabinet parts (12), that the sliding doors (20) on the front sides of the line cabinet parts (11) extend to transversal sides of the crown cabinet part/parts (12) such, that the sliding doors (20) of the line cabinet parts (11) extend to respective corners of the temperature-controlled cabinet (10) and the sliding doors (20) of the crown end cabinet parts (12) extend to respective corners of the temperature-controlled cabinet (10) or such, that the temperature-controlled cabinet (10) comprises corner walls (21) at each corner and the corner walls (21) extend from the corner to towards and to the sliding doors (20) of the line cabinet part (11) and to towards and to the sliding doors (20) of the crown end cabinet part (12).

2. Temperature-controlled cabinet (10) according to claim 1, **characterized in, that** the sliding doors (20) are made of transparent material. 20

3. Temperature-controlled cabinet (10) according to claim 1 or 2, **characterized in, that** the corner walls (21) are made of transparent material. 25

4. Temperature-controlled cabinet (10) according to any of claims 1 - 3, **characterized in, that** inside of the temperature-controlled cabinet (10) is configured to an inner, temperature-controlled space and that the space is continuous and united. 30

5. Temperature-controlled cabinet (10) according to any of claims 1 - 4, **characterized in, that** the temperature-controlled cabinet (10) comprises support structures (30) for shelves (31) and of the temperature-controlled cabinet (10). 35

6. Temperature-controlled cabinet (10) according to any of claims 1 - 5, **characterized in, that** the sliding doors (20) are supported by and slidable in guides (22, 23) such, that upper ends of the sliding doors (20) are supported in upper guides (22) and lower ends of the sliding doors (20) are supported in lower guides (23). 40
45

7. Temperature-controlled cabinet (10) according to claim 6, **characterized in, that** the guides (22, 23) are configured as guide grooves (26, 27), which are wide enough to hold two sliding doors. 50

8. Temperature-controlled cabinet (10) according to claim 6, **characterized in, that** the guide (22, 23) comprises two parallel guide grooves. 55

9. Temperature-controlled cabinet according to any of

claims 6 - 8, **characterized in, that** the guides (22, 23) are provided with guide pins (24, 25) to position the sliding doors (20) and to guide the sliding doors (20) to the overlapping position.

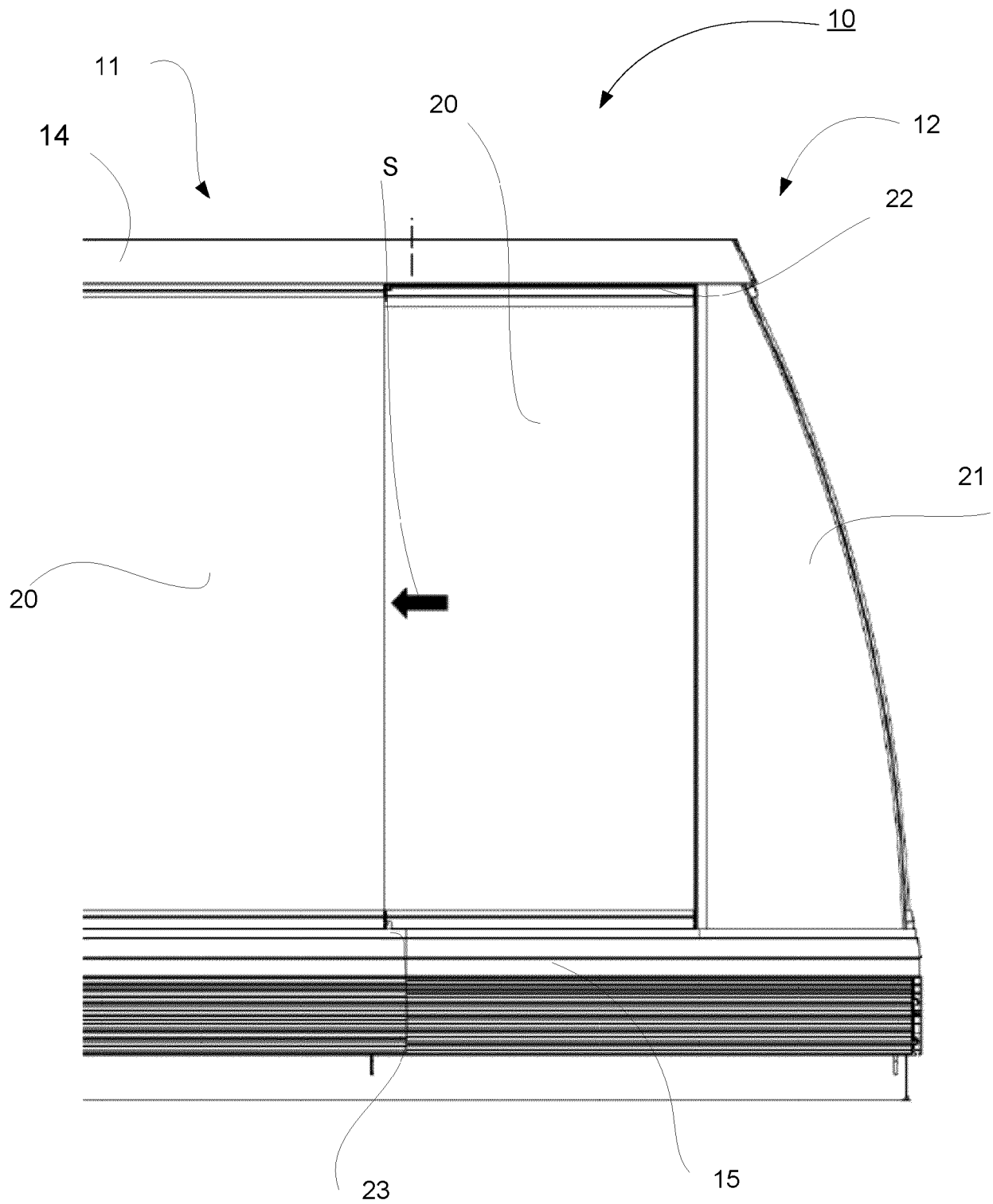


Fig. 1

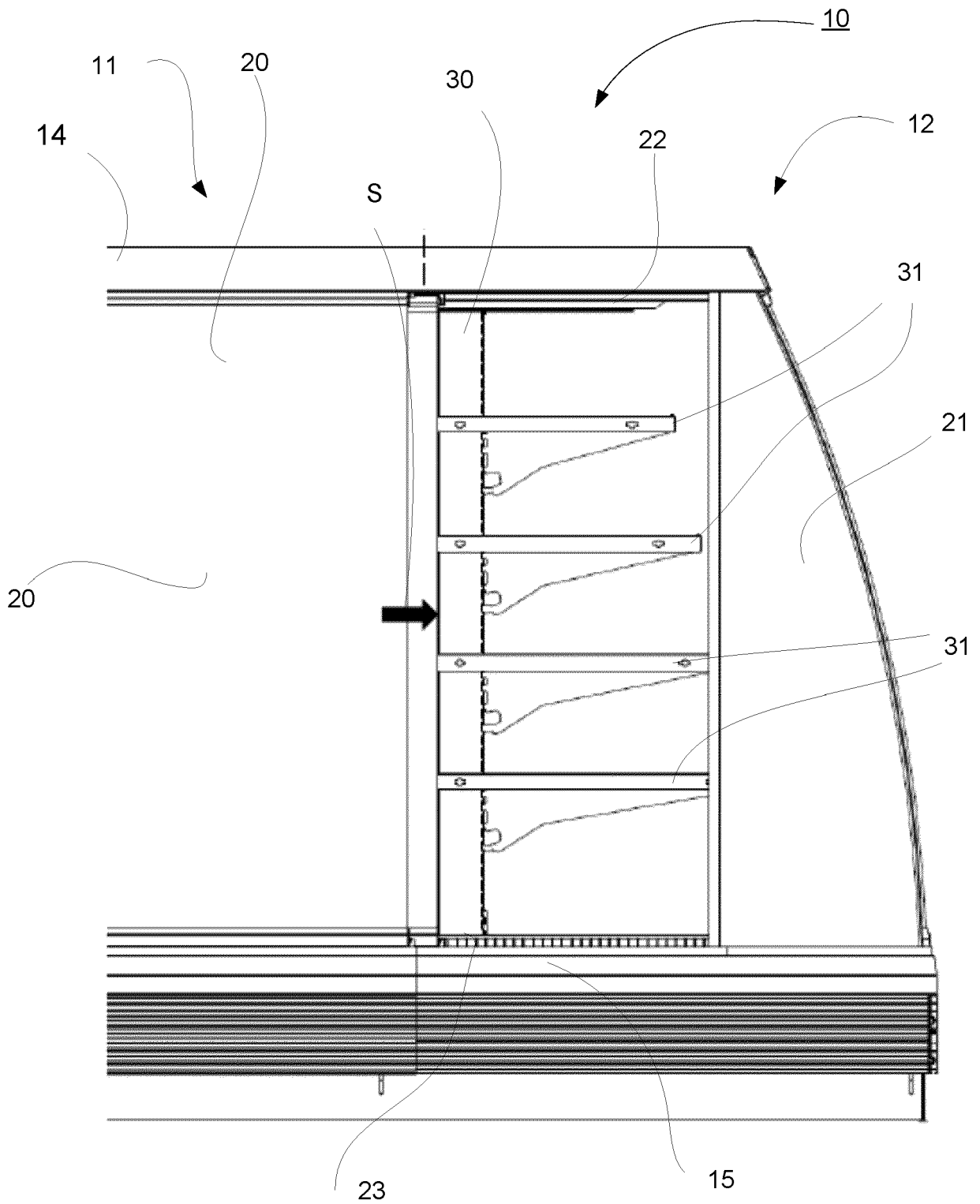


Fig. 2

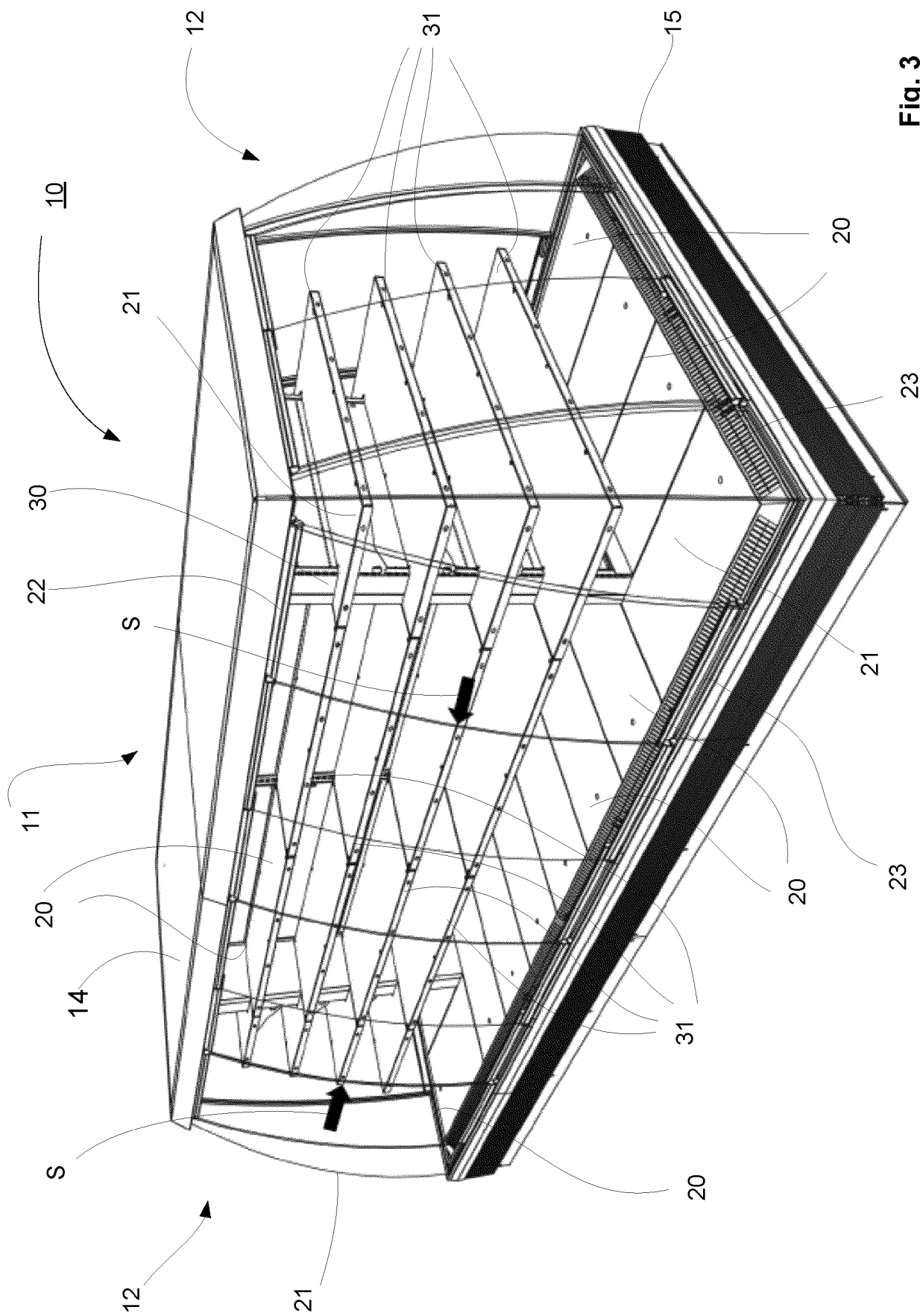


Fig. 3

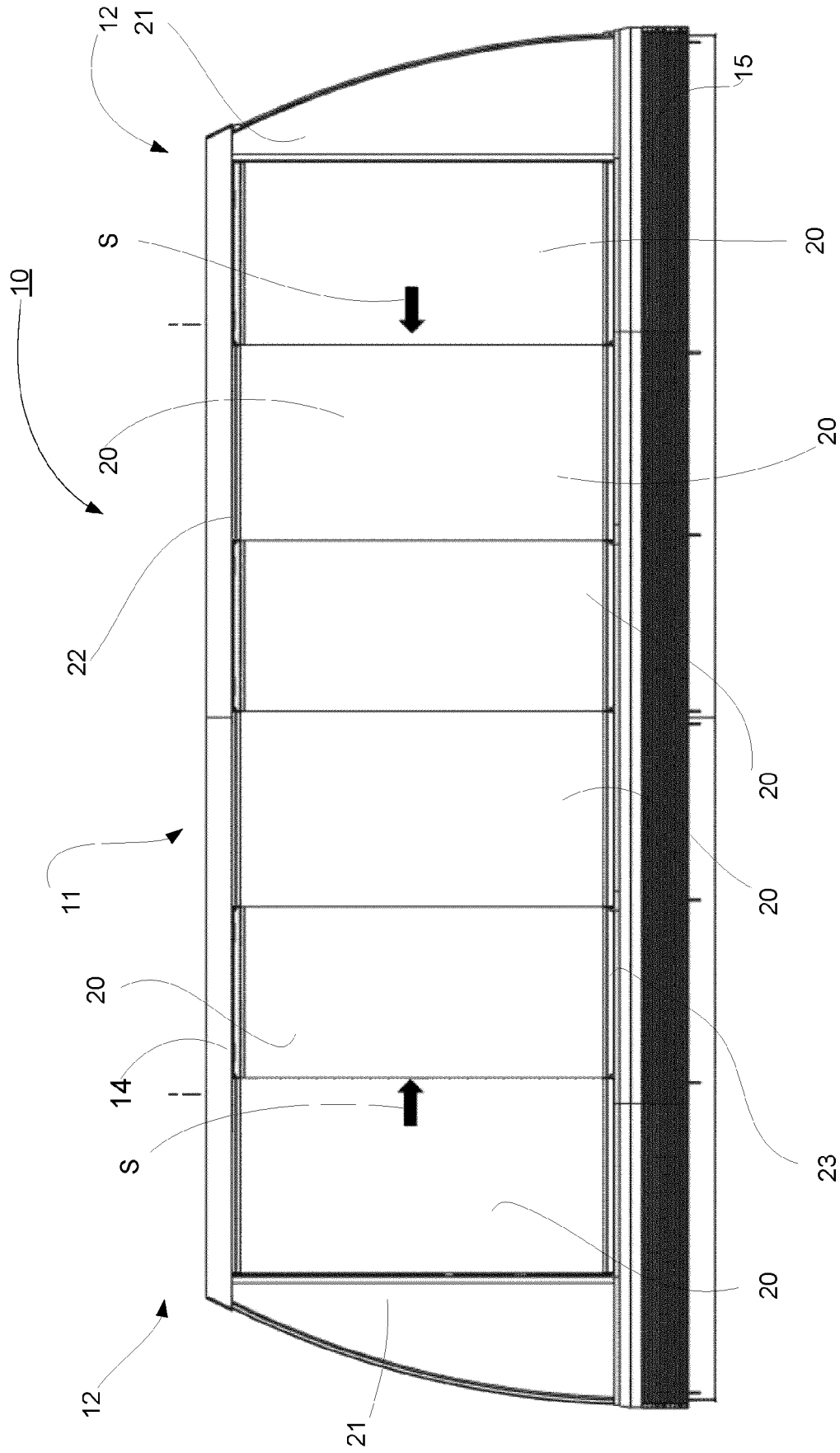


Fig. 4

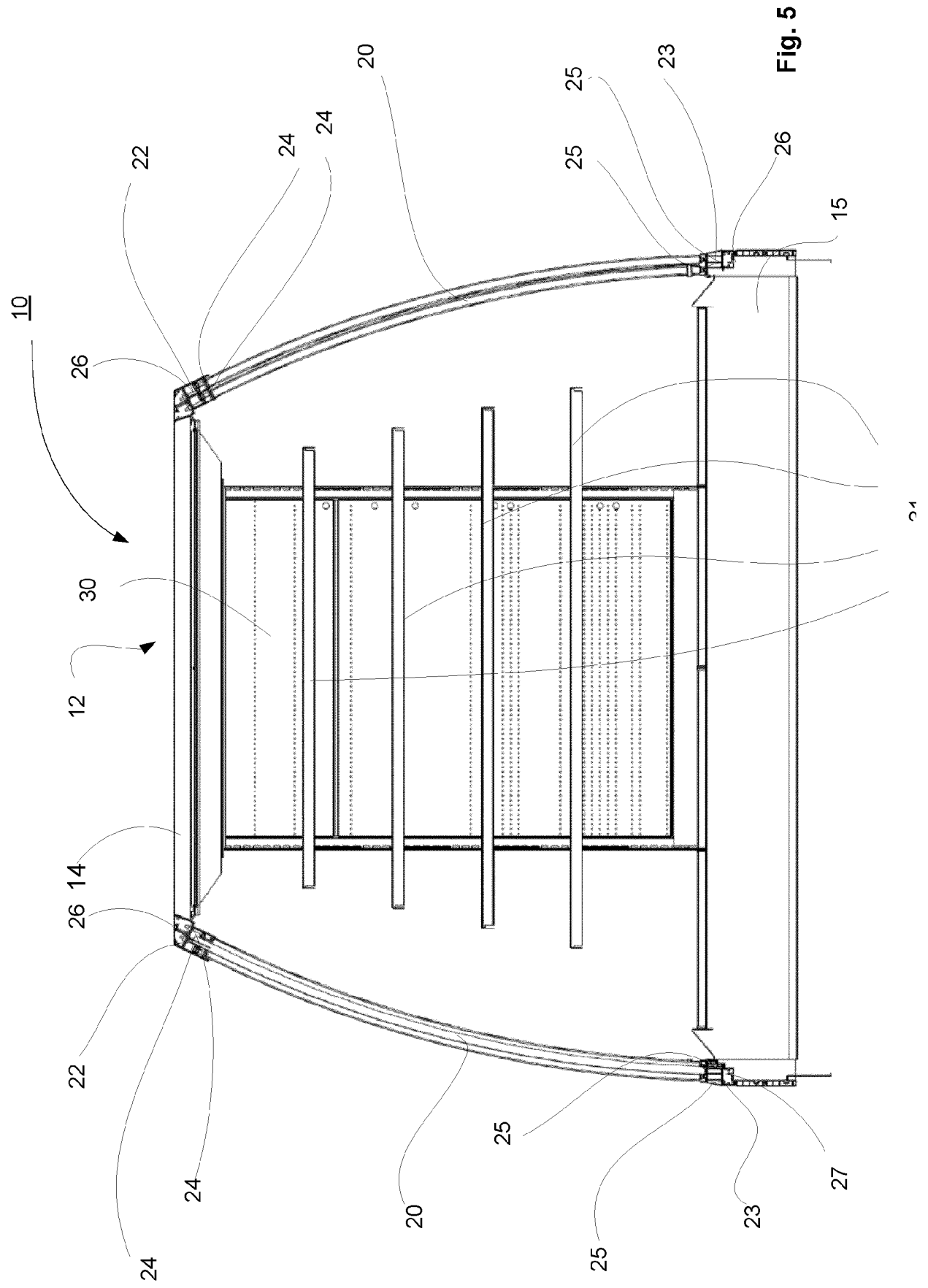


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 21 15 4890

5

10

15

20

25

30

35

40

45

50

55

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	EP 0 769 262 A2 (REMIS GMBH [DE]) 23 April 1997 (1997-04-23) * figures 1-3 *	1-9	INV. A47F3/04
X,D	EP 2 382 896 A1 (HUSSMANN KOXKA S L [ES]) 2 November 2011 (2011-11-02) * figures 1-7 *	1-3,5-9	
X	EP 0 962 729 A1 (BONNET NEVE [FR]) 8 December 1999 (1999-12-08) * figures 1-3 *	1,2,4-9	
X	US 6 128 911 A (MATHEWS THOMAS J [US] ET AL) 10 October 2000 (2000-10-10) * figures 1,3,5 *	1-9	
A	WO 2019/102252 A1 (UAB FREOR LT [LT]) 31 May 2019 (2019-05-31) * the whole document *	1	
A	JP H08 126557 A (DAIWA REIKI KOGYO KK) 21 May 1996 (1996-05-21) * figures 1,6 *	1	TECHNICAL FIELDS SEARCHED (IPC) A47F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 5 July 2021	Examiner Linden, Stefan
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			

EPO FORM 1503 03.82 (P04C01)

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

EP 21 15 4890

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-07-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0769262 A2	23-04-1997	AT 187045 T EP 0769262 A2 ES 2141430 T3	15-12-1999 23-04-1997 16-03-2000
EP 2382896 A1	02-11-2011	EP 2382896 A1 US 2012104921 A1	02-11-2011 03-05-2012
EP 0962729 A1	08-12-1999	AT 248337 T EP 0962729 A1 FR 2779511 A1	15-09-2003 08-12-1999 10-12-1999
US 6128911 A	10-10-2000	NONE	
WO 2019102252 A1	31-05-2019	NONE	
JP H08126557 A	21-05-1996	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0769262 A2 [0004]
- EP 2382896 A1 [0004]