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(54) **Refrigerating appliance**

(57) The present invention relates to a refrigerating appliance (1; 1'), in particular for household use, comprising:
- at least one internal compartment (10; 10') for preserving foodstuffs;
- at least one shelf (20; 20') for supporting the foodstuffs to be preserved in said at least one internal compartment (10; 10').

The invention is characterised in that said refrigerating appliance (1; 1') comprises a housing (30; 30') adapted to house said at least one shelf (20; 20') in a manner such that said at least one shelf (20; 20') is retractable and can be placed in the following conditions:
- at least one operating condition, wherein foodstuffs can be laid onto said at least one shelf (20; 20');
- an idle condition, wherein foodstuffs cannot be laid onto said at least one shelf (20; 20').

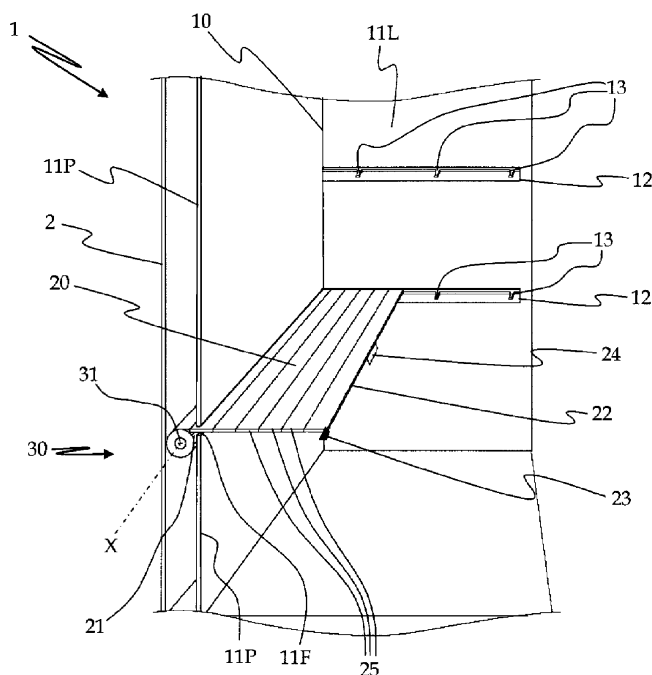


Fig. 1a

Description

[0001] The present invention relates to a refrigerating appliance, in particular for household use, according to the preamble of claim 1.

[0002] Although not subject to any strict limitations, the present invention typically applies to refrigerating appliances for household use.

[0003] Known refrigerating appliances have at least one internal compartment for preserving foodstuffs.

[0004] Said at least one internal compartment is usually accessible through a door that allows the compartment itself to be opened and closed by a user.

[0005] The refrigerating appliances known in the art typically comprise two internal compartments kept at different temperatures, thus providing at least two different foodstuff preservation states, in particular a refrigerator compartment suitable for preserving fresh foods at a temperature between 0°C and 10°C and a freezer compartment suitable for preserving frozen foods at a temperature between -15°C and -30°C; such refrigerating appliances are commonly referred to by those skilled in the art of household refrigeration as "double-door" or "combined" refrigerators, depending on the relative position of the two compartments. In a "double-door" refrigerating appliance, the freezer compartment is above the refrigerator compartment, whereas in a "combined" refrigerating appliance the freezer compartment is located at the bottom.

[0006] Said internal compartments typically include shelves for supporting foodstuffs to be preserved in the refrigerating appliance; said shelves usually extend between the two side walls of the cell and are often made of glass or, less frequently, of plastic or metal grid. These shelves are also commonly used for laying containers suitable for containing specific types of foods, such as vegetables, cheese or liquid substances; sometimes there are also extractable drawers adapted to contain food to be preserved in the refrigerating appliance.

[0007] In a solution currently available on the market, the containers are hung under the shelves, for better space distribution and utilisation within the internal compartment of the refrigerating appliance; in such a case, the containers are drawers equipped with guides that engage with the overhanging shelf, thus allowing the hanging drawer to be extracted. One drawback of such hanging drawers is that they require that the foodstuffs contained therein do not exceed certain weight limits, in order to prevent the guides, which are typically made of plastic, from being overly stressed.

[0008] When the containers are laid on the shelves, on the contrary, they usually can be moved freely on the shelf surface in order to ensure the utmost flexibility as regards the arrangement of the foodstuffs to be preserved and the type and shape of the containers.

[0009] However, the presence of the shelves often makes it hard to fully use the internal compartment of the refrigerating appliance, especially when the foodstuffs to

be preserved have large dimensions, in particular when they are tall (e.g. bottles).

[0010] In order to overcome this problem, the user often has to remove at least one shelf from the internal compartment of the refrigerating appliance to increase the distance between the remaining shelves. However, this solution has some drawbacks as well, in that the removed shelf is bulky and must be temporarily stored somewhere in the kitchen. Moreover, removing a shelf inevitably implies a reduction in the surface available for laying foodstuffs in the refrigerating appliance.

[0011] In a known solution, the shelves are designed in a manner such that they can be folded. However, such a solution is not very practical and advantageous, since the folded shelf still takes up a considerable volume inside the refrigerating appliance, and the volume occupied by the folded shelf cannot be used for preserving foodstuffs.

[0012] In this frame, it is the main object of the present invention to provide a refrigerating appliance, in particular for household use, adapted to overcome the above-described drawbacks, thus being particularly practical and advantageous.

[0013] It is another object of the present invention to provide a refrigerating appliance, in particular for household use, so conceived as to ensure an optimal exploitation of the inner spaces of the appliance itself, for the purpose of most effectively using the volumes available for food preservation.

[0014] It is a further object of the present invention to provide a refrigerating appliance, in particular for household use, wherein it is not necessary to remove a shelf if the foodstuffs to be preserved have large dimensions, in particular when they are tall.

[0015] Said objects are achieved by the present invention through a refrigerating appliance, in particular for household use, incorporating the features set out in the appended claims, which are intended as an integral part of the present description.

[0016] Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 is a sectional view of a first embodiment of a refrigerating appliance, in particular for household use, according to the present invention;
- Fig. 1b is a side sectional view of a detail of the refrigerating appliance of Fig. 1a;
- Figs. 2a, 2b, 2c are views of the refrigerating appliance according to the present invention in different operating conditions;
- Fig. 3 shows a second embodiment of a refrigerating appliance, in particular for household use, according to the present invention.

[0017] Referring now to the first embodiment shown in

Fig. 1a, reference numeral 1 designates as a whole a refrigerating appliance, in particular for household use, according to the present invention.

[0018] Said refrigerating appliance 1 comprises at least one internal compartment 10 for preserving foodstuffs.

[0019] In particular, the refrigerating appliance 1 may comprise a refrigerator compartment adapted to preserve fresh foods (usually at a temperature between 0°C and 10°C). The refrigerating appliance 1 may also comprise a freezer compartment adapted to preserve frozen foods.

[0020] Said at least one internal compartment 10 is closed by a respective door, not shown in the annexed drawings; in particular, the refrigerating appliance 1 may comprise a first door adapted to close the refrigerator compartment and a second door used for closing the freezer compartment.

[0021] The refrigerating appliance 1 further comprises at least one shelf 20 for supporting foodstuffs to be preserved in said at least one internal compartment 10.

[0022] According to the present invention, said refrigerating appliance 1 comprises a housing 30 adapted to house said at least one shelf 20 in a manner such that said at least one shelf 20 is retractable and can be placed in the following conditions:

- at least one operating condition, wherein foodstuffs can be laid onto said at least one shelf 20;
- an idle condition, wherein foodstuffs cannot be laid onto said at least one shelf 20.

[0023] For simplicity, the representation of the refrigerating appliance 1 provided in Fig. 1 a does not show the plurality of shelves with which a refrigerating appliance 1 is commonly equipped, said shelves being usually arranged at different levels so as to exploit the full height of the internal compartment 10. It is understood that the shelves not shown may be shelves 20 of the type according to the present invention and/or of different types.

[0024] As can be seen in Figs. 1a and 1b, said housing 30 comprises a shaft 31 connected to a first end 21 of said at least one shelf 20, said shaft 31 being adapted to roll up said at least one shelf 20.

[0025] Said shaft 31 preferably has a substantially cylindrical shape and is rotatable about a substantially horizontal axis X; in Fig. 1, said axis X is represented by a dashed-dotted line.

[0026] Said housing 30 also comprises a return element (not shown in the annexed drawings) which allows said shaft 31 to roll up said at least one shelf 20.

[0027] In particular, said return element may comprise an elastic element and/or a motor for automatically driving said shaft 31.

[0028] Preferably, the housing 30 is positioned outside said internal compartment 10, in particular said housing 30 being positioned between an outer covering 2 of the refrigerating appliance 1 and a back wall 11P of the in-

ternal compartment 10; said back wall 11P comprises a slot 11 F for the shelf 20.

[0029] As can be seen in particular in Fig. 1b, said housing 30 comprises an envelope 32, preferably made of plastic material, which is adapted to envelop said at least one shelf 20 when it is rolled up around said shaft 31.

[0030] In Figs. 1a and 1b it can also be noticed that said at least one shelf 20 comprises a second end 22 fitted with at least one striker element 23 for coupling said shelf 20 to at least one support 12 of the internal compartment 10.

[0031] In particular, said internal compartment 10 comprises one pair of supports 12 for each shelf 20, said supports 12 being associated with side walls 11L of the internal compartment 10 and being equipped with a plurality of seats 13, each adapted to engage with a striker element 23 of the second end 22 and arranged at a pre-determined distance from the back wall 11P.

[0032] Furthermore, said second end 22 of the shelf 20 comprises a grip element 24 that allows a user to move the shelf 20.

[0033] Said at least one shelf 20 comprises a plurality of interconnected portions 25, e.g. like the various portions of a rolling shutter. Preferably, said portions 25 are made of transparent plastic material, so as not to reduce the brightness of the internal compartment 10; said portions 25 may also be made of glass, aluminium or non-transparent plastic.

[0034] As an alternative, said at least one shelf 20 may be obtained from a single sheet made of a flexible material, in particular a transparent plastic material, which is however strong enough to not become significantly deformed under a load orthogonal to the shelf 20, said load generally consisting of foodstuffs laid on the shelf 20.

[0035] Figs. 2a, 2b and 2c show the different conditions in which the shelf 20 according to the present invention may be used.

[0036] In particular, said shelf 20 may be placed in:

- a first operating condition (shown in Fig. 2a), wherein said shelf 20 is fully extended and substantially takes up the whole internal compartment 10 in the horizontal direction. In said first operating condition, substantially the entire surface of the shelf 20 can be used for supporting foodstuffs;
- at least a second (advantageous) operating condition (shown in Fig. 2b), wherein said shelf 20 only takes up a portion of the internal compartment 10 in the horizontal direction. In said second operating condition, a portion of the shelf 20 is housed in the housing 30, while another portion of the shelf 20 can be used for supporting foodstuffs. As a consequence, the portion of said internal compartment 10 which is not occupied by the shelf 20 can be used for preserving large foodstuffs, in particular tall ones; in fact, said large foodstuffs may be laid at a level below the shelf 20 and can extend in height up to a level above said shelf 20;

- an idle condition (shown in Fig. 2c), wherein said shelf 20 is housed in the housing 30 and substantially does not occupy any portion of the internal compartment 10. This allows the whole internal compartment 10 to be used for preserving large foodstuffs.

[0037] Consequently, the particular design of the shelf 20 according to the present invention allows to provide a refrigerating appliance 1, in particular for household use, which ensures an optimal exploitation of the spaces within the internal compartment 10, so that the volumes thereof can be used most effectively for preserving foodstuffs.

[0038] In fact, thanks to the particular design of the shelf 20 according to the present invention, it is not necessary to remove the shelf 20 when the foodstuffs to be preserved are very large, in particular tall. In particular, the design of the shelf 20 according to the present invention allows the room available in the internal compartment 10 of the refrigerating appliance to be increased or decreased in accordance with the dimensions of the foodstuffs; in fact, in order to increase the available room (in particular in height) in the internal compartment 10, the user can retract the shelf 20 either partially (as in the operating condition shown in Fig. 2b) or completely (as in the idle condition shown in Fig. 2c).

[0039] When it is not necessary to increase the room available in the internal compartment 10, the shelf 20 can be fully used for supporting foodstuffs (as in the operating condition shown in Fig. 2a).

[0040] Fig. 3 is a perspective view of a second possible embodiment of a refrigerating appliance 1' according to the present invention.

[0041] The elements shown in Fig. 3 which are equivalent to those of Fig. 1 are designated by the same reference numerals with the addition of an apostrophe (e.g. the refrigerating appliance 1 of Fig. 1 is substantially equivalent to the refrigerating appliance 1' of Fig. 3).

[0042] In the second embodiment as well, the refrigerating appliance 1' comprises:

- at least one internal compartment 10' for preserving foodstuffs;
- at least one shelf 20' for supporting the foodstuffs to be preserved in said at least one internal compartment 10'.

[0043] Also in said second embodiment said refrigerating appliance 1 comprises a housing 30' adapted to house said at least one shelf 20' in a manner such that said at least one shelf 20' is retractable and can be placed in the following conditions:

- at least one operating condition, wherein foodstuffs can be laid onto said at least one shelf 20';
- an idle condition, wherein foodstuffs cannot be laid onto said at least one shelf 20'.

[0044] Said housing 30' comprises a chamber 41' positioned between an outer covering 2' of the refrigerating appliance 1' and said internal compartment 10', in particular between the outer covering 2' and a back wall 11P' of the internal compartment 10'. Preferably, said chamber 41' is arranged vertically between said outer covering 2' and said back wall 11P'. Said back wall 11P' also comprises a slot 11F' for the shelf 20'.

[0045] In a preferred embodiment, a first portion 21' of the shelf 20' is associated with a mass 42' that facilitates the switching of said shelf 20' from said at least one operating condition to said idle condition.

[0046] Also in the embodiment shown in Fig. 3, said at least one shelf 20' comprises a plurality of interconnected portions 25', in particular made of transparent plastic material.

[0047] As an alternative, said at least one shelf 20' may be obtained from a single sheet made of a flexible material, in particular a transparent plastic material; in this case as well, the shelf 20' must be made of a material strong enough to not become significantly deformed under a load orthogonal to the shelf 20', said load generally consisting of foodstuffs laid on the shelf 20'.

[0048] Said chamber 41' comprises a support element 43', in particular adapted to rotate about a substantially horizontal axis X', which accompanies the movement of the shelf 20' from said at least one operating condition to said idle condition and vice versa.

[0049] Also in the second embodiment of Fig. 3:

- the shelf 20' comprises a second end 22' fitted with at least one striker element 23' for coupling said shelf 20' to at least one support 12' of the internal compartment 10'. In particular, said internal compartment 10' comprises one pair of supports 12' associated with side walls 11L' of the internal compartment 10', said supports 12' being equipped with a plurality of seats 13' adapted to engage with said striker element 23';
- said second end 22' of the shelf 20' comprises a grip element 24' that allows a user to move the shelf 20'.

[0050] Furthermore, also in the second embodiment of Fig. 3 the shelf 20' can be placed in the conditions shown in Figs. 2a, 2b and 2c, i.e.:

- a first operating condition (Fig. 2a), wherein the shelf 20' is fully extended and substantially takes up the whole internal compartment 10' in the horizontal direction;
- at least a second (advantageous) operating condition (shown in Fig. 2b), wherein the shelf 20' only takes up a portion of the internal compartment 10' in the horizontal direction;
- an idle condition (Fig. 2c), wherein the shelf 20' is housed in the housing 30' and substantially does not occupy any portion of the internal compartment 10'.

[0051] The features and advantages of the refrigerating appliance, in particular for household use, according to the present invention are apparent from the above description.

[0052] In particular, the special design of the shelves according to the present invention allows the internal compartment of the refrigerating appliance to be fully exploited, especially when the foodstuffs to be preserved therein are large, in particular tall. In fact, with such a design it is not necessary to remove the shelf from the internal compartment in order to increase the distance between the remaining shelves, in which case the removed shelf would take up space in the kitchen.

[0053] Another advantage of the present invention is that such a design provides a refrigerating appliance, in particular for household use, which is very practical and which ensures a new modularity of the internal compartment unknown to prior-art refrigerating appliances, in that the inner spaces of the appliance itself are utilised in an ideal and particularly profitable way.

[0054] According to variants of the invention which are adapted to improve the thermal insulation of the internal compartment 10, 10', it is conceivable that, instead of between the back wall 11P, 11P' and the internal compartment 10, 10', the housing 30, 30' is located:

- in the internal compartment 10, 10' (in such a case there will be a slight reduction in the capacity of the compartment 10, 10'), or
- outside the refrigerating appliance 1, 1'. In such a case it will be necessary to provide an additional slot (not shown in the drawings) in the outer covering 2, 2' and a sealing device associated with said additional slot for the purpose of preventing relatively warm air from entering into the internal compartment 10, 10'.

[0055] It is however clear that many changes may be made to the refrigerating appliance, in particular for household use, according to the present invention, and that in its practical implementation the various components may have different shapes and arrangements or be replaced with other technically equivalent elements without departing from the novelty spirit of the inventive idea.

[0056] It can therefore be easily understood that the present invention is not limited to the above-described refrigerating appliance, in particular for household use, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. A refrigerating appliance (1; 1'), in particular for household use, comprising:

- at least one internal compartment (10; 10') for preserving foodstuffs;
- at least one shelf (20; 20') for supporting the foodstuffs to be preserved in said at least one internal compartment (10; 10'),

characterised in that

said refrigerating appliance (1; 1') comprises a housing (30; 30') adapted to house said at least one shelf (20; 20') in a manner such that said at least one shelf (20; 20') is retractable and can be placed in the following conditions:

- at least one operating condition, wherein foodstuffs can be laid onto said at least one shelf (20; 20');
- an idle condition, wherein foodstuffs cannot be laid onto said at least one shelf (20; 20').

2. A refrigerating appliance (1; 1') according to claim 1, **characterised in that** said housing (30) comprises a shaft (31) connected to a first end (21) of said at least one shelf (20), said shaft (31) being adapted to roll up said at least one shelf (20).
3. A refrigerating appliance (1; 1') according to claim 2, **characterised in that** said shaft (31) has a substantially cylindrical shape and is rotatable about a substantially horizontal axis (X).
4. A refrigerating appliance (1; 1') according to claim 2, **characterised in that** said housing (30) comprises a return element which allows said shaft (31) to roll up said at least one shelf (20).
5. A refrigerating appliance (1; 1') according to claim 2, **characterised in that** said housing (30) comprises an envelope (32), preferably made of plastic material, which is adapted to envelop said at least one shelf (20) when it is rolled up around said shaft (31).
6. A refrigerating appliance (1; 1') according to claim 1, **characterised in that** said housing (30') comprises a chamber (41') arranged between an outer covering (2') of the refrigerating appliance (1') and said internal compartment (10').
7. A refrigerating appliance (1; 1') according to claim 6, **characterised in that** a first portion (21') of said at least one shelf (20') is associated with a mass (42') that facilitates the switching of said at least one shelf (20') from said at least one operating condition to said idle condition.
8. A refrigerating appliance (1; 1') according to claim 6, **characterised in that** said chamber (41') comprises a support element (43'), in particular adapted to rotate about a substantially horizontal axis (X'), which accompanies the movement of said at least one shelf (20') from said at least one operating condition

dition to said idle condition, and vice versa.

9. A refrigerating appliance (1; 1') according to claim 1, **characterised in that** said housing (30; 30') is arranged between an outer covering (2; 2') of the refrigerating appliance (1) and a back wall (11P; 11P') of the internal compartment (10; 10'). 5
10. A refrigerating appliance (1; 1') according to claim 9, **characterised in that** said back wall (11P; 11P') comprises a slot (11F; 11F') for said at least one shelf (20; 20'). 10
11. A refrigerating appliance (1; 1') according to claim 1, **characterised in that** said at least one shelf (20; 20') comprises a second end (22; 22') fitted with at least one striker element (23; 23') for coupling said shelf (20; 20') to at least one support (12; 12') of the internal compartment (10; 10'). 15
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12. A refrigerating appliance (1; 1') according to claim 11, **characterised in that** said internal compartment (10; 10') comprises one pair of supports (12; 12') for each shelf (20; 20'), said supports (12; 12') being associated with side walls (11L; 11L') of the internal compartment (10; 10') and being equipped with a plurality of seats (13; 13'), each seat (13; 13') being adapted to engage with a striker element (23; 23') of the second end (22; 22') and being arranged at a predetermined distance from the back wall (11P; 11P'). 25
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13. A refrigerating appliance (1; 1') according to claim 11, **characterised in that** said second end (22; 22') comprises a grip element (24; 24'). 35
14. A refrigerating appliance (1; 1') according to claim 1, **characterised in that** said at least one shelf (20; 20') comprises a plurality of interconnected portions (25; 25'), in particular said portions (25; 25') being made of transparent plastic material. 40
15. A refrigerating appliance (1; 1') according to claim 1, **characterised in that** said at least one shelf (20; 20') is obtained from a single sheet made of a flexible material, in particular a transparent plastic material. 45

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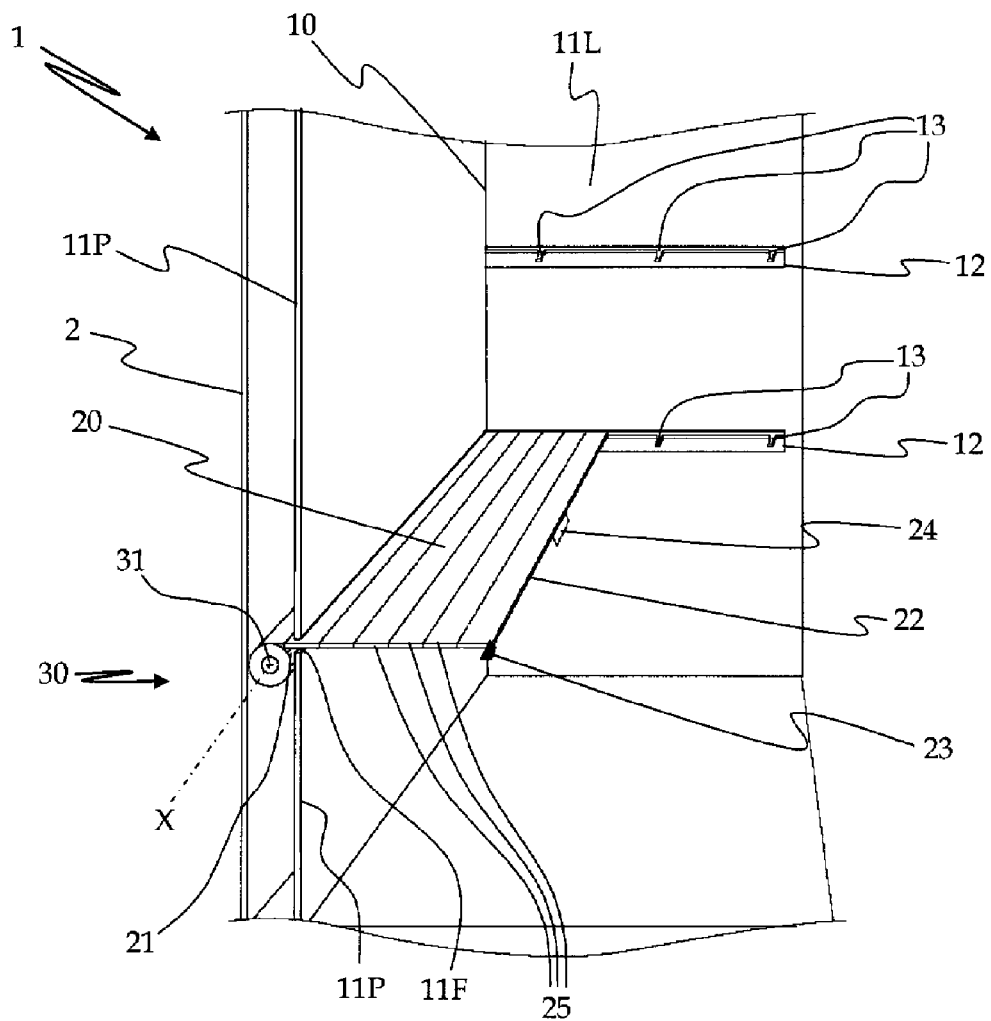


Fig. 1a

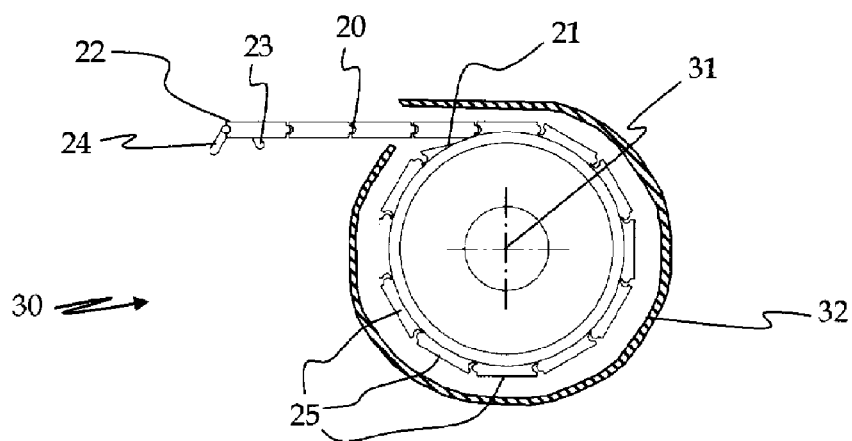


Fig. 1b

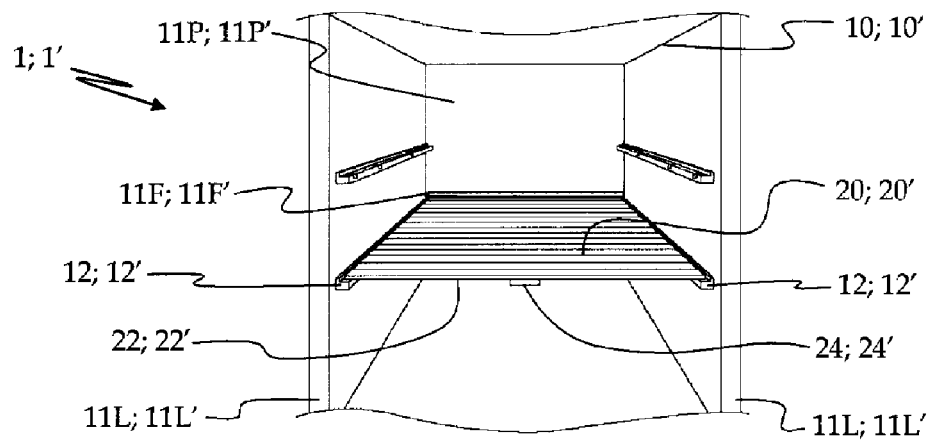


Fig. 2a

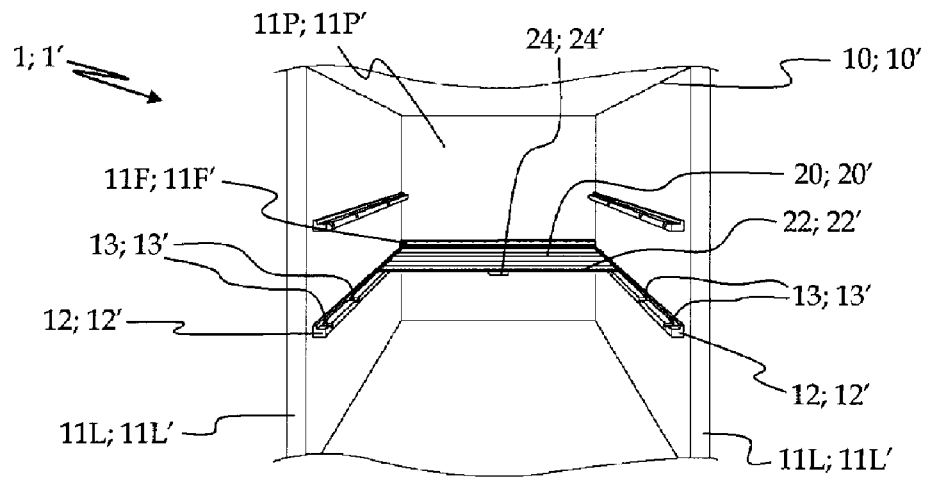


Fig. 2b

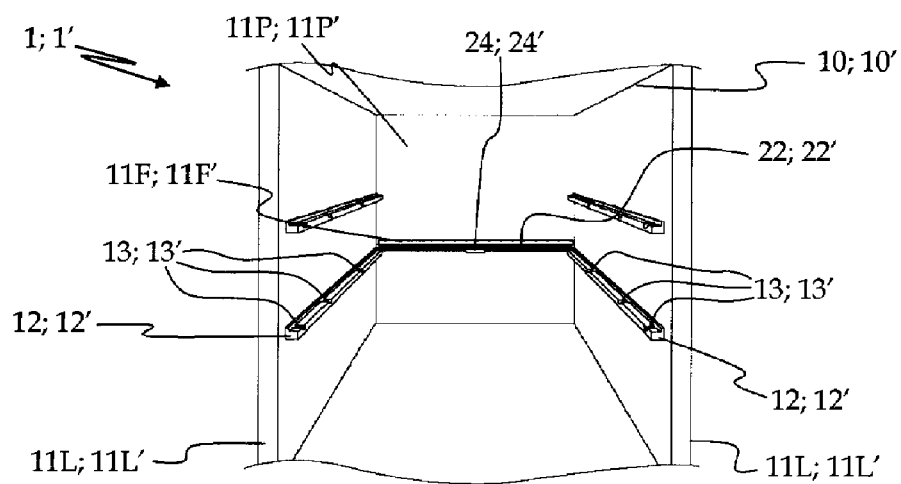


Fig. 2c

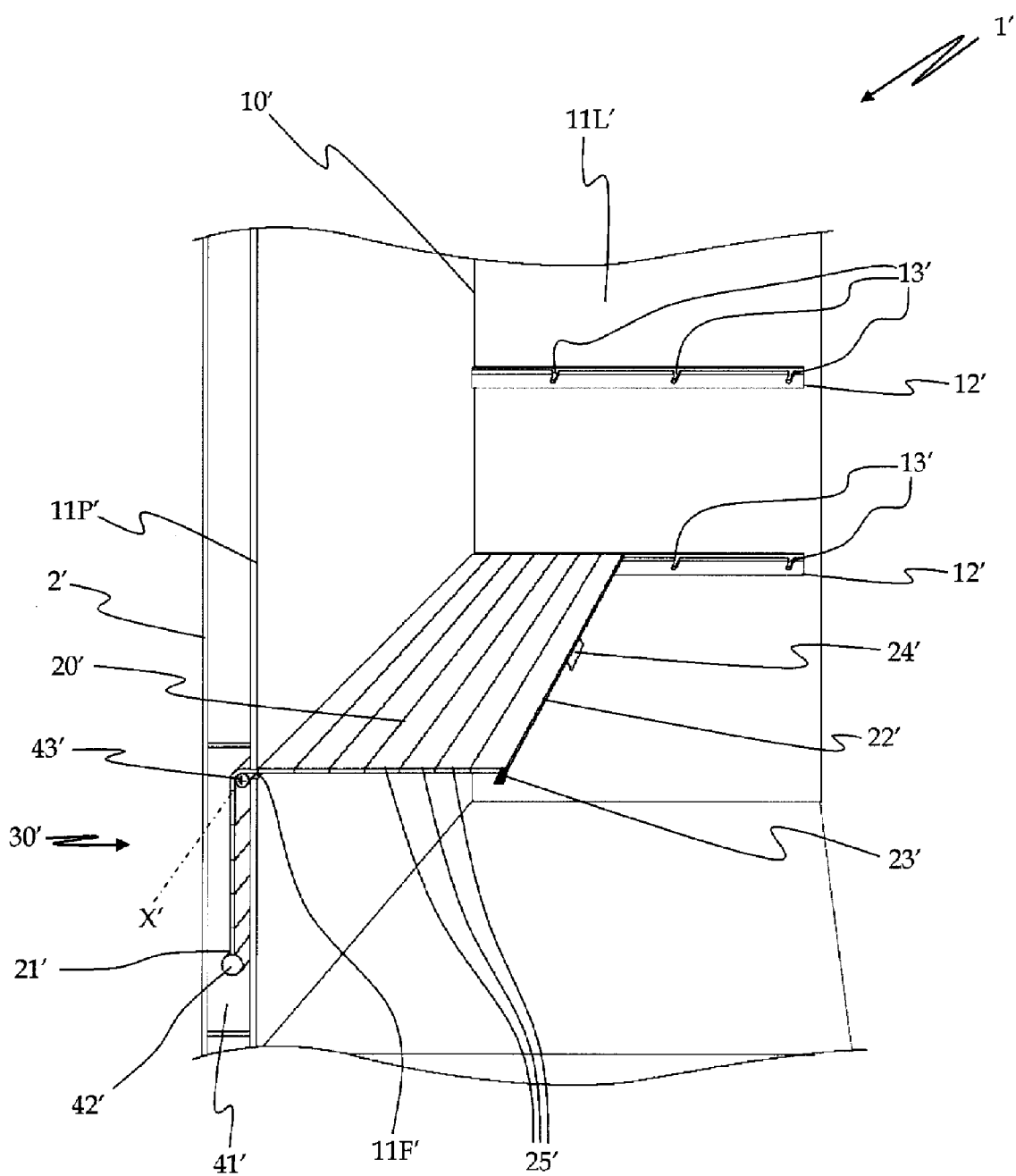


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 10 19 3942

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	US 2 057 544 A (LEE STRATTON) 13 October 1936 (1936-10-13) * page 1, left-hand column, line 53 - page 2, right-hand column, line 2; figures 1, 5, 6, 10 *	1-15	INV. F25D25/02
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			F25D
Place of search		Date of completion of the search	Examiner
Munich		3 January 2011	Salaün, Eric
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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EPO FORM 1503 03.82 (P04C01)

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

EP 10 19 3942

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
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03-01-2011

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