LINER SHELF SUPPORT STRUCTURES FOR REFRIGERATORS AND FREEZERS

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ABSTRACT

An example shelf support structure integral to a refrigerator or freezer liner includes a first feature defined in a liner and extending inward from the liner, the first feature having a first portion at a first height, and a second portion at a second height different from the first height; and a second feature defined in the liner and extending inward from the liner, the second feature spaced-apart from the first feature along a front to back direction and together with the first feature providing support for a shelf, the second feature having a third portion at a third height and a fourth portion at a fourth height different from the third height.
FIG. 4
LINER SHELF SUPPORT STRUCTURES FOR REFRIGERATORS AND FREEZERS

FIELD OF THE DISCLOSURE

[0001] This disclosure relates generally to refrigerators and freezers, and more particularly, to liner shelf support structures for refrigerators and freezers.

BACKGROUND

[0002] Most refrigerators and freezers have one or more shelves or baskets that facilitate the storage of items, such as food items. The shelves may be made of materials such as glass, acrylic, and wire rod.

SUMMARY

[0003] An example shelf support structure integral to a refrigeror or freezer liner includes a first feature defined in a liner and extending inward from the liner, the first feature having a first portion at a first height, and a second portion at a second height different from the first height; and a second feature defined in the liner and extending inward from the liner, the second feature spaced-apart from the first feature along a front to backward direction and together with the first feature providing support for a shelf, the second feature having a third portion at a third height and a fourth portion at a fourth height different from the third height.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is an isometric perspective view of an example refrigerator having liner shelf support structures constructed in accordance with the teachings of this disclosure.

[0005] FIG. 2 is an isometric perspective view showing an example liner shelf support structure for a wire shelf for the example refrigerator of FIG. 1.

[0006] FIG. 3 is an isometric perspective view showing another example liner shelf support structure for a wire shelf for the example refrigerator of FIG. 1.

[0007] FIG. 4 is a side view of the example liner shelf support structure of FIG. 3.

[0008] FIG. 5 is an isometric perspective view showing an example liner shelf support structure for a glass shelf for the example refrigerator of FIG. 1.

[0009] FIG. 6 is an isometric perspective view showing another example liner shelf support structure for a glass shelf for the example refrigerator of FIG. 1.

[0010] FIG. 7 is an isometric perspective view showing another example liner shelf support structure of a wire shelf for the example refrigerator of FIG. 1.

[0011] FIG. 8 is a side view of the example liner shelf support structure of FIG. 7.

DETAILED DESCRIPTION

[0012] In conventional refrigerators and freezers, liner shelf supports extend along the entire depth of the shelf, which unnecessarily reduces the internal volume of conventional refrigerators and freezers. Moreover, many conventional liner shelf supports do not include features that support the entire depth of the shelf and/or prevent inadvertent shelf movement.

[0013] To overcome at least these problems, liner shelf support structures comprising a plurality of spaced-apart liner features are disclosed. In disclosed examples, the spaced-apart liner features have portions, segments, sections, etc. of different dimensions or at different heights to provide shelf support along a greater portion of the depth of a shelf. Additionally or alternatively, the disclosed spaced-apart liner features may have portions, segments, sections, etc. of different dimensions or at different heights to reduce inadvertent shelf movement.

[0014] The shelf support structures disclosed herein are an integral part of a refrigerator or freezer liner. That is, they are not separate or distinct from the liner. Instead, they are defined in, a part of, and/or are formed together with and of the same material(s) as the rest of the liner during liner manufacturing. Being integral to the liner, the disclosed shelf support structures are not distinct structures affixed, inserted, mounted, etc. to a liner subsequent to liner manufacture. Moreover, because they are an integral part of the liner, the disclosed shelf support structures cannot be removed without substantial damage to the liner.

[0015] In view of the instant application, persons of ordinary skill in the art will readily understand the meaning of terms such as spaced-apart in the appended claims to be, at least, that two elements have at least some practical and visually discernable intervening space between them, are distinct, non-abutting, non-adjacent, and non-adjorning, and do not share a common boundary.

[0016] As used herein, terms such as up, down, top, bottom, side, end, front, back, etc. are used with reference to the normal orientation of an appliance, a compartment in an appliance, a liner shelf support structure, and a shelf. If any of these is considered with respect to another orientation, it should be understood that such terms need to be correspondingly modified.

[0017] FIG. 1 illustrates an example refrigerator or freezer 100 having a single compartment 105 and door 110, and having liner shelf support structures (one of which is designated at reference numeral 115) defined on sidewalls 117 of the compartment 105, the liner shelf support structures 115 constructed in accordance with the teachings of this disclosure. The liner shelf support structures 115 extend inward from a respective sidewall 117, that is, toward the interior of the compartment 105.

[0018] For ease of discussion, the appliance 100 of FIG. 1 will subsequently be referred to herein as refrigerator 100. While example liner shelf support structures 115 are described in connection with the single compartment refrigerator 100 of FIG. 1, they may be implemented in other refrigerators and/or freezers having other type(s) and/or number of compartments, drawers, doors, etc. Other example refrigeration configurations include, but are not limited to, a side-by-side refrigerator, a top-freezer refrigerator, a French-door refrigerator, a bottom-freezer refrigerator, etc. The disclosed liner shelf support structures may, additional and/or alternatively, be used in any other appliance including, but not limited to, an oven, a microwave, a dishwasher, a refresher, etc. having interior compartment walls or liners, and shelves.

[0019] The example refrigerator 100 of FIG. 1 includes a liner 120 that at least partially defines an open face 125 that provides access to items present in the compartment 105, and the door 110 moveably mounted for movement between opened and closed positions to selectively open and close the open face 125 of the refrigerator 100.

[0020] To facilitate storages of items in the compartment 105, the example compartment 105 of FIG. 1 includes one or
more shelves, one of which is designated at reference numeral 130. In the example of FIG. 1, the shelves 130 are moveably positionable within the compartment 105 to allow for flexible storage of items in the compartment 105. However, some or all of the shelves 130 may not be moveably positionable. The example shelves 130 of FIG. 1 may be, for example, glass, acrylic or wire shelves.

[0021] The example integral liner shelf support structures shown herein may be used to support both wire shelves and glass shelves, see FIGS. 2-6. However, it should be understood that the example liner shelf support structures may be modified so they only support wire shelves or only support glass shelves, as a matter of design preference, without deviating from the teachings of this disclosure. Moreover, the number of features may be modified to support shelves having different dimensions, see FIGS. 7 and 8.

[0022] Consider first wire shelves. FIGS. 2-4 show portions of the liner 120, the integral liner shelf support structures 115, and the shelves 130 of FIG. 1 in more detail. As shown, ends of the shelves 130 engage a respective shelf support structure 115 that is integral to the liner 120. The shelf support structures 115 provide support, and/or impede the shelves 130 from being inadvertently moved out of place. In the examples of FIGS. 2-4, the shelves 130 are conventional wire shelves having two or more wire support rods 132, and a field 134 of relatively closely spaced wire rods supported by the support rods 132.

[0023] Each of the integral liner shelf support structures 115 includes two or more spaced-apart features, four of which are designated at reference numerals 201, 202, 203, and 204. As shown in FIGS. 2-4, the features 201-204 have two or more portions of differing or same height. Height having its common meaning as being with reference to, for example, a floor, a bottom interior surface of the compartment 105, etc. The example feature 201 has a first portion 201A designed to receive a wire support rod 132, a second portion 201B, and a third portion 201C to impede forward movement, e.g., provide shelf retention for the shelf 130. In some examples, the third portion 201C is higher than the second portion 201B, which is higher than the first portion 201A, thus, forming a U-shaped feature with one side lower than the other, as more clearly seen in FIG. 4.

[0024] The example feature 202 has a first portion 202A designed to receive a wire support rod 132, and second and third portions 202B and 202C. In some examples, the second and third portions 202B-202C are generally the same height, and are higher than the first portion 202A, thus, forming a U-shaped feature.

[0025] The example feature 203 has a first portion 203A designed to receive a wire support rod 132, a second portion 203B, and a third portion 203C to impede rearward movement of the shelf 130. In some examples, the third portion 203C is higher than the second portion 203B, which is higher than the first portion 203A, thus, forming a U-shaped feature with one side lower than the other.

[0026] The example feature 204 has a first portion 204A designed to receive a wire support rod 132, and a second portion 204B. In contrast to the feature 203, the feature 204 does not include the portion 203C when, for example, other structures in the refrigerator 100 would impede rearward movement of the shelf 130. Thus, the feature 204 can be an L-shaped feature. In some examples, rearward movement is additionally or alternatively impeded by the third portion 202C, as shown in FIG. 4. In such examples, the wire shelf 130 may be designed so a middle rod 132A is adjacent to the third portion 202C.

[0027] Consider now glass shelves. FIGS. 5 and 6 show portions of the liner 120, the integral liner shelf support structures 115, and the shelves 130 of FIG. 1 in more detail. In the examples of FIGS. 5 and 6, the shelves 130 are conventional glass or acrylic shelves having trim 136, and a sheet of glass or acrylic 138. The example shelf support structures 115 of FIGS. 5 and 6 are substantially identical to those shown in and discussed in connection with FIGS. 2-4. Accordingly, the descriptions of the features 201-204 are not repeated here. Instead, the interested reader is referred to the description of FIGS. 2-4 and the identically numbered structures. In general, the portions 201A, 203A and 204A of FIGS. 5 and 6 provide space to accommodate the trim 136, and the portions 201B, 202B, 203C and 204B of FIGS. 5 and 6 support the sheet of glass or acrylic 138. The portions 201C and 203C of FIG. 5 impede, respectively, forward and rearward movement, e.g., proride shelf retention for the shelf 130. In some examples, the 201B, 202B, 202C, 203B and 204B provide support for the trim 136. Additionally or alternatively, the trim 136 may contact the side of the portion 201B to prevent rearward movement of the shelf 130.

[0028] FIGS. 7 and 8 illustrate example integral liner shelf support structures 705 that may be used to support a larger, e.g., wider or deeper (e.g., 20 inches) wire shelf 710. In comparison to FIGS. 2-4, the example shelf 710 of FIGS. 7 and 8 has a support rod 712. Each of the example integral liner shelf support structures 705 includes two spaced-apart features 720, 722. As shown in FIGS. 7 and 8, the features 720, 722 have two or more portions of differing or same height. The example features 720, 722 have portions 720A, 720B designed to receive respective wire support rods 132, an intervening portion 720C, and portions 720D, 720E to respectively impede forward and rearward movement, e.g., provide shelf retention for the shelf 710. In some examples, the portions 720A-E have heights that form U-shaped regions for respective ones of the wire rods 132.

[0029] Although certain example methods, apparatus and articles of manufacture have been described herein, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all methods, apparatus and articles of manufacture fairly falling within the scope of the claims of this patent.

1. A shelf support structure integral to a refrigerator or freezer liner, comprising:

a U-shaped first feature integrally defined in a liner and extending inward from the liner, the first feature having a generally horizontal first portion at a first height, a generally horizontal second portion at a second height below the first height, a third portion at a third height extending above the first height wherein the second, first, and third portions form the U-shaped first feature; a second feature integrally defined in the liner and extending inward from the liner, the second feature spaced-apart from the first feature along a front to back direction together with the first feature providing support for a shelf with the first feature providing support for a front end portion of the shelf and the second feature providing support for a rear end portion of the shelf, the second feature having a generally horizontal fourth portion at a fourth height and a generally horizontal fifth portion at a fifth height below the fourth height;
a first shelf mounting location comprising the first portion and the fourth portion;
a second shelf mounting location comprising the second portion and the fifth portion, and
wherein the third portion impedes the forward movement of a shelf when placed in the first shelf mounting location and when placed in the second shelf mounting location.

2. The shelf support structure as defined in claim 1, wherein the first height is selected relative to the second height so, when a shelf rests on the first shelf mounting location, the shelf does not rest on the second mounting location.

3. (canceled)

4. (canceled)

5. The shelf support structure as defined in claim 1, wherein the fourth height is selected relative to the fifth height so, when a shelf rests on the first shelf mounting location, the second shelf mounting location is not accessible for placement of a second shelf.

6. The shelf support structure as defined in claim 1, wherein the first portion and the fourth portions define a first line, and the second portion and the fifth portion define a second line below the first line.

7. The shelf support structure as defined in claim 1, wherein the second portion is rearward from the first portion, and the fifth portion is forward from the fourth portion.

8. The shelf support structure as defined in claim 1, wherein the fourth portion and the fifth portions form an L-shaped second feature.

9. The shelf support structure as defined in claim 1, wherein the second feature further has a sixth portion at a sixth height above the fourth height to impede backward movement of the shelf.

10. The shelf support structure as defined in claim 2, wherein the fourth height is selected relative to the fifth height so, when a shelf rests on the fourth portion, the shelf does not rest on the fifth portion.

11. The shelf support structure as defined in claim 1, further comprising a third feature integrally defined in the liner and extending inward from the liner, the third feature spaced-apart from and positioned between the first feature and the second features.

12. The shelf support structure as defined in claim 11, wherein the third feature is U-shaped to receive a wire support rod of a wire shelf.

13. The shelf support structure as defined in claim 1, wherein the second shelf mounting location is configured to support a wire shelf, and a support member of the shelf comprises a wire support rod.

14. The shelf support structure as defined in claim 1, wherein the first height is selected relative to the second height so, when a shelf rests on the second shelf mounting location, the shelf does not rest on the first shelf mounting location.

15. (canceled)

16. (canceled)

17. The shelf support structure as defined in claim 13, wherein the first shelf mounting location is configured to support a glass shelf, and a support member of the shelf comprises trim.

18. The shelf support structure as defined in claim 17, wherein placement of a shelf in the first shelf mounting location prevents insertion of a second shelf into the second shelf mounting location.

19. The shelf support structure as defined in claim 1, wherein the first portion and the fourth portion are configured to support a shelf comprising a planar panel, and a shelf support member comprises a portion of the planar panel.

20. The shelf support structure as defined in claim 1, wherein the first portion and the fourth portion are configured to support a shelf comprising a planar panel with a trim piece, and a shelf support member comprises a portion of the trim piece.

21. A refrigerator cabinet liner with an integral shelf support structure, comprising:
a U-shaped first feature integrally defined in a liner and extending inward from the liner, the first feature having a generally horizontal first portion at a first height, a generally horizontal second portion at a second height below the first height, a third portion at a third height extending above the first height wherein the second portion, the first portion, and the third portion form the U-shaped first feature;
a second feature integrally defined in the liner and extending inward from the liner, the second feature spaced-apart from the first feature along a front to back direction, the second feature having a generally horizontal fourth portion at a fourth height and a generally horizontal fifth portion at a fifth height below the fourth height;
a third feature integrally defined in the liner and extending inward from the liner, the third feature spaced-apart from and located between the first feature and the second feature along a front to back direction, the third feature having a generally horizontal sixth portion at a sixth height and a generally horizontal seventh portion at a seventh height below the sixth height; and whereby the first, second, and third features together provide support for a shelf in a first shelf mounting position and a second shelf mounting position with the first feature providing support for a front end portion of the shelf, the second feature providing support for a rear end portion of the shelf, and the third feature providing support for a central edge region of the shelf;
the first shelf mounting position comprising the first portion, the fourth portion, and the sixth portion;
the second shelf mounting position comprising the second portion, the fifth portion, and the seventh portion; and the third portion impeding the forward movement of a shelf when placed in the first shelf mounting position and when placed in the second shelf mounting position.

22. The refrigerator cabinet liner as defined in claim 21, wherein the second feature further has an eighth portion at an eighth height above the sixth height to impede backward movement of a shelf when the shelf is placed in the first shelf mounting position.

23. A refrigerator cabinet liner with an integral shelf support structure, comprising:
a refrigerator cabinet liner having a U-shaped first feature integrally formed in the liner and extending inward from the liner for supporting a first end portion of a shelf in a first shelf mounting location and in a second shelf mounting location,
the first feature having a generally horizontal first portion at a first height,
a generally horizontal second portion at a second height below the first height,
a third portion at a third height above to the first height to impede forward movement of a shelf,
the first portion providing support for the first shelf mounting location,
the second portion providing support for the second shelf mounting location, and
wherein the second, first, and third portions form the U-shaped first feature; and
an L-shaped second feature integrally formed in the liner and extending inward from the liner for supporting a rear portion of a shelf in the first shelf mounting location and in the second shelf mounting location,
the second feature spaced-apart from the first feature along a front to back direction and together with the first feature providing support for a shelf,
the second feature having a generally horizontal fourth portion at a fourth height and a generally horizontal fifth portion at a fifth height below the fourth height and positioned rearward of the fourth portion,
the fourth portion providing support for the first shelf mounting location, and
the fifth portion providing support for the second shelf mounting location,
wherein the fourth portion and the fifth portion form the L-shaped second feature; and
wherein placing a shelf in the first shelf mounting location blocks the placement of a second shelf in the second shelf mounting location.

24. The refrigerator cabinet liner as defined in claim 23, wherein the second feature further has a sixth portion at a sixth height above the fourth height to impede backward movement of a shelf when the shelf is placed in the first shelf mounting location.

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