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PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,
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(54) Title: RETAINER MEMBER

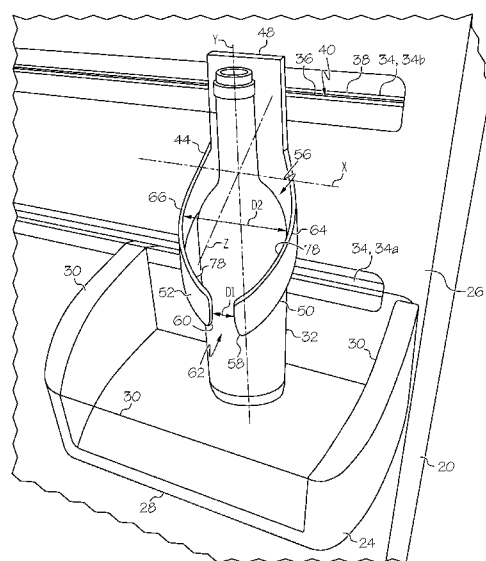


FIG. 2

(57) Abstract: A retainer member (44) is provided for retaining a food receptacle relative to an inner liner (26) of an appliance cabinet or door (20). The retainer includes a base (48) that is movably coupleable to the inner liner and first and second arms (50, 52) that extend from the base (48). The first and second arms (50, 52) are curved about an axis and define a passageway (56) extending through the first and second arms (50, 52) along the axis. A free end (58) of the first arm is spaced from a free end (68) of the second arm to define an opening to provide radial access to the passageway through the opening (62).

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RETAINER MEMBER

FIELD

[0001] The present invention relates generally to a retainer member, and, more particularly, to a retainer member for retaining a food receptacle relative to an inner liner of an appliance cabinet or door.

BACKGROUND

[0002] An appliance such as, for example, a refrigerator can include a cabinet defining a storage compartment and a door for providing selective access to the storage compartment. The appliance can further include a storage member such as a shelf or a bin that is attached to an inner liner of the door or storage compartment. The storage member can be used to support and store various food receptacles such as wine bottles, milk jugs, jars, or other containers holding food. Such food receptacles can be set upon a support platform of the storage member in an upright position. However, sometimes, a food receptacle can tip over from its upright position and/or move laterally about the support platform due to movement of the door, cabinet, and/or other objects near the food receptacle. Accordingly, there is a need for a device to help retain a food receptacle in its stored, upright position and inhibit movement of the food receptacle from said position.

SUMMARY

[0003] In accordance with a first aspect, a retainer member is provided for retaining a food receptacle relative to an inner liner of an appliance cabinet or door. The retainer includes a base that is movably coupleable to the inner liner and first and second arms that extend from the base. The first and second arms are curved about an axis and define a passageway extending through the first and second arms along the axis. A free end of the first arm is spaced from a free end of the second arm to define an opening to provide radial access to the passageway through the opening.

[0004] In accordance with a second aspect, an appliance includes a cabinet defining a storage compartment, a door for selectively opening and closing the storage compartment, and a storage member coupled to an inner liner of the cabinet or door. The appliance further includes a retainer member for retaining a food receptacle relative to the inner liner. The retainer member includes a base that is movably coupled to the inner liner above the storage member and first and second arms that extend from the base. The first and second arms are

curved about an axis and define a passageway extending through the first and second arms along the axis. A free end of the first arm is spaced from a free end of the second arm to define an opening that provides radial access to the passageway through the opening.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The foregoing and other aspects will become apparent to those skilled in the art to which the present examples relate upon reading the following description with reference to the accompanying drawings, in which:

[0006] **FIG. 1** is a front view of an example appliance;

[0007] **FIG. 2** is an enlarged view of storage member and a retainer member removably coupled to an inner liner of the example appliance;

[0008] **FIG. 3** is a rear perspective view of the retainer member; and

[0009] **FIG. 4** is an enlarged view of a hook of the retainer member being removably coupled to the inner liner.

DETAILED DESCRIPTION

[0010] Certain terminology is used herein for convenience only and is not to be taken as a limitation on the present invention. Relative language used herein is best understood with reference to the drawings, in which like numerals are used to identify like or similar items. Further, in the drawings, certain features may be shown in somewhat schematic form.

[0011] It is to be noted that the term “coupled” as used herein when describing two or more features means that the features can be integral with each other or that the features can be separate features that are removably or non-removably attached to each other using various means such as threads, fasteners, hooks, clips, adhesive, snap-fittings, welds, or other means of attaching two separate features. Moreover, the features can be attached to each other such that the features are selectively movable relative to each other by, for example, sliding, pivoting, or otherwise moving one feature relative to other.

[0012] An example appliance **10** is shown in **FIG. 1** that includes a cabinet **12** that defines a storage compartment **14**. The appliance **10** can further include a door **20** that is movably coupled to the cabinet **12** for selectively opening and closing the storage compartment **14**. For example, the door **20** can be pivotally coupled to the cabinet **12** using hinges or the door can be slidably coupled to the cabinet **12** using slides.

[0013] In the illustrated embodiment, the appliance **10** is a refrigerator having a fresh-food compartment and freezer compartment, the storage compartment **14** being the fresh-food

compartment. However, in other examples, the storage compartment 14 may be the freezer compartment. Moreover, the appliance 10 may be a single-compartment refrigerator or the appliance 10 may be a non-refrigerator appliance. The appliance 10 can be any cabinet-like structure including a cabinet that defines a storage compartment.

[0014] As shown in FIG. 2, the appliance 10 can include a storage member 24 coupled to an inner liner 26 of the appliance 10. In the illustrated embodiment, the inner liner 26 is part of the door 20. However, in some embodiments, the inner liner 26 can be a portion of the cabinet 12 that defines the storage compartment 14. The storage member 24 can be a bin having a support platform 28 and side walls 30 that extend upward from the support platform 28 or the storage member 24 can be a shelf that comprises a support platform without walls extending upward from the support platform. When the storage member 24 is coupled to the inner liner 26, a food receptacle 32 can be supported by the support platform 28 of the storage member 24. The food receptacle 32 can be a wine bottle, milk jug, jar, can, or any other container that holds food. The contained food can be a liquid, solid, or semi-solid.

[0015] In some examples, the appliance 10 can comprise one or more rails 34 coupled to the inner liner 26. Each rail 34 can comprise structure for movably coupling storage features to the rail 34. For instance, in some embodiments, each rail 34 can comprise first and second longitudinal side walls 36, 38 that extend parallel to each other and define a channel 40 therebetween. Various storage features such as, for example, the storage member 24, can be movably coupled to each rail 34 using a one or more hooks that extend over the rail's first longitudinal side wall 36 and downward into its channel 40. Once hooked to the rail 34, the storage feature can be selectively slid along the rail 34 in a horizontal direction to a desired position. Furthermore, in embodiments that comprise more than one rail 34, the storage feature can be removably coupleable to each rail 34 such that the storage feature can be moved from one rail to another. For example, the storage member 24 described above can be removably coupled to a lower rail 34a, as shown in FIG. 2, or the storage member 24 can be moved and coupled to an upper rail 34b vertically spaced above the lower rail 34a.

[0016] The appliance 10 can comprise a retainer member 44 for retaining the food receptacle 32 relative to the inner liner 26 when the food receptacle 32 is being supported by the storage member 24. The retainer member 44 includes a base 48 and first and second arms 50, 52 that extend from the base 48. The first and second arms 50, 52 can be curved about one or more axes to define a passageway 56 extending through the first and second arms 50, 52. For instance, in the illustrated embodiment, the first and second arms 50, 52 are curved

generally symmetrically about axes **X**, **Y**, and **Z** to define a passageway along the axis **Y**. The axis **Y** is aligned vertical and the axes **X** and **Z** are perpendicular to each other and horizontally aligned such that the axes **X** and **Z** intersect at the vertical axis **Y**. However, in other embodiments, the first and second arms **50**, **52** may be curved asymmetrically about the axes **X**, **Y**, and **Z** or the first and second arms **50**, **52** may be curved about only one or two axes such as, for example, only axis **Y**.

[0017] In some examples, the first and second arms **50**, **52** can be fixed to the base **48** at one end and then connected to each other at the opposite end to form a closed ring. In other examples, the first and second arms **50**, **52** can be fixed at one end to the base **48** and free at the other end. For instance, as shown in **FIG. 2**, a free end **58** of the first arm **50** can be spaced from a free end **60** of the second arm **52** to define an opening **62** that provides radial access to the passageway **56** through the opening **62**. (For the purposes of this disclosure, the term “radial” refers to a direction that is perpendicular and intersects with the axis **Y** and the term “axial” refers to a direction that is parallel to the axis **Y**). Due to the curvature of the first and second arms **50**, **52**, a horizontal distance **D1** (along a direction parallel to the axis **X**) between the free end **58** of the first arm **50** and the free end **60** of the second arm **52** will be less than a horizontal distance **D2** (along a direction parallel to the axis **X**) between a central portion **64** of the first arm **50** and a central portion **66** of the second arm **52**.

[0018] The base **48** of the retainer member **44** can be movably coupleable to the inner liner **26**. For example, as shown in **FIG. 3**, the base **48** can include a mounting surface **68** that faces away from the axis **Y** and is adapted to face the inner liner **26** when the base **48** is movably coupled to the inner liner **26**. The base **48** can further include a hook **70** that extends from the mounting surface **68** and is adapted for removable attachment to one of the rails **34** of the appliance **10**. For instance, the hook **70** can comprise a first member **74** that extends from the mounting surface **68** and a second member **76** that extends from the first member **74**. The first member **74** can extend normal to the mounting surface **68** and the second member **76** can extend parallel to the mounting surface **68**, though other relative directions to the mounting surface **68** are possible in other embodiments.

[0019] The retainer member **44** can be slidably coupled to any of the rails **34** of the appliance **10** by placing its hook **70** such that the first member **74** of the hook **70** extends over and is supported by the first longitudinal side wall **36** of the rail **34** and the second member **76** of the hook **70** extends downward into the channel **40** of the rail **34**. For instance, **FIGS. 2 & 4** show an example wherein the retainer member **44** is slidably coupled to the upper rail **34b**. When slidably coupled as such, the base **48** of the retainer member **44** can be slidably

moved along the rail **34b** in a horizontal direction. In particular, the base **48** can be moved in either the right or left direction. In this manner, the base **48** can be selectively moved along the rail **34b** such that the base **48** is positioned as desired. Preferably, the base **48** is positioned directly above the support platform **28** of the storage member **24**.

[0020] When the base **48** of the retainer member **44** is coupled to the inner liner **26** above the storage member **24** as described above, the axis **Y** and passageway **56** extending through the first and second arms **50**, **52** will be vertical such that the food receptacle **32** can be vertically aligned within the passageway **56** between the first and second arms **50**, **52** and supported by the storage member **24**. To align the food receptacle **32** within the passageway **56**, the food receptacle **32** can be lowered axially into the passageway **56** until it rests against and is supported by the support platform **28** of the storage member **24**. Alternatively, in examples wherein the first and second arms **50**, **52** are separated at their free ends **58**, **60** to define the opening **62**, the food receptacle **32** can enter the passageway **56** radially through the opening **62**. Preferably, the first and second arms **50**, **52** comprise a resilient material so that the free ends **58**, **60** of the first and second arms **50**, **52** can be flexed away from each other (e.g., in opposing directions that are parallel to the axis **X**) to temporarily increase the distance **D1** therebetween if the food receptacle **32** has a width greater than the distance **D1** in the un-flexed state. Using a resilient material for the first and second arms **50**, **52** can also permit the free ends **58**, **60** of the first and second arms **50**, **52** to be flexed away from each other (e.g., in opposing directions that are parallel to the axis **X**) to increase the distance **D2** between the central portions **64**, **66** of the first and second arms **50**, **52** if the food receptacle **32** has a width greater than the distance **D2** in the un-flexed state. Furthermore, because the material is resilient, the arms **50**, **52** will return to their un-flexed state/distances when force is not being applied to flex the arms **50**, **52** away from each other. Preferably, the first and second arms **50**, **52** comprise a resilient material that permits the free ends **58**, **60** of the first and second arms **50**, **52** to be flexed away from each other to temporarily increase the distances **D1** and **D2** by a substantial amount (e.g., more than 1 inch) so that the retainer member **44** can accommodate food receptacles varying substantially in width. Some example resilient materials that can be used for the first and second arms **50**, **52** can include (but are not limited to) polymer-based materials such as, for example, polypropylene, polyethylene terephthalate and polyvinyl chloride. However, the first and second arms **50**, **52** can comprise more rigid materials in other examples.

[0021] In some examples, the first and second arms **50**, **52** can include a layer of gripping material **78** coupled to an inner side of the arms **50**, **52** that faces the axis **Y**. The

layer of gripping material 78 can be a separate layer that is attached to the arms 50, 52 using for example, adhesive, or the layer of gripping material 78 can be integral with the arms 50, 52 by, for example, injection molding the layer with the arms 50, 52. The layer of gripping material 78 comprises a high-friction or sticky material that can facilitate gripping of the food receptacle 32 such as, for example, rubber.

[0022] When the food receptacle 32 is aligned vertically within the passageway 56 between the first and second arms 50, 52, the food receptacle 32 will be retained by the first and second arms 50, 52 relative to the inner liner 26 such that the food receptacle 32 will be inhibited from tipping out of vertical alignment and/or moving laterally about the support platform 28 of the storage member 24. In some examples, the first and second arms 50, 52 can extend from the base 48 and inner liner 26 in a direction that is perpendicular to the axis Y. However, in other examples, the first and second arms 50, 52 can preferably extend from the base 48 in a direction that is transverse (i.e., non-parallel) and non-orthogonal (i.e., non-perpendicular) to the axis Y. More specifically, the first and second arms 50, 52 can preferably extend downward from the base 48 and away from the inner liner 26 when the retainer member 44 is coupled to the inner liner 26, as shown in FIGS. 2 & 4. Such a downward-angled extension of the first and second arms 50, 52 from the base 48 and inner liner 26 can permit the retainer member 44 to accommodate food receptacles of various heights because the first and second arms 50, 52 will have a greater presence along the vertical axis Y. Moreover, such greater presence along the vertical axis Y can also provide more vertical stability to a food receptacle retained within the first and second arms 50, 52. Furthermore, as mentioned above, the first and second arms 50, 52 can be curved generally symmetrically about axes X, Y, and Z. Such a curved extension of the first and second arms 50, 52 from the base 48 and inner liner 26 can permit the retainer member 44 to accommodate food receptacles of various widths and heights.

[0023] The invention has been described with reference to example embodiments described above. Modifications and alterations will occur to others upon a reading and understanding of this specification. Example embodiments incorporating one or more aspects described above are intended to include all such modifications and alterations insofar as they come within the scope of the appended claims.

CLAIMS

What is claimed is:

1. A retainer member for retaining a food receptacle relative to an inner liner of an appliance cabinet or door, the retainer member comprising:
a base that is movably coupleable to the inner liner; and
first and second arms that extend from the base,
wherein the first and second arms are curved about an axis and define a passageway extending through the first and second arms along the axis, further wherein a free end of the first arm is spaced from a free end of the second arm to define an opening to provide radial access to the passageway through the opening.
2. The retainer member of claim 1, wherein a distance between the free end of the first arm and the free end of the second arm is less than a distance between a central portion of the first arm and a central portion of the second arm.
3. The retainer member of claim 1, wherein the first and second arms extend from the base in a direction that is transverse and non-orthogonal to the axis.
4. The retainer member of claim 1, wherein the base comprises a mounting surface facing away from the axis and adapted to face the inner liner when the base is movably coupled to the inner liner, further wherein the base comprises a hook that extends from the mounting surface.
5. The retainer member of claim 4, wherein the hook comprises a first member that extends from the mounting surface a second member that extends from the first member, further wherein the first member extends normal to the mounting surface and the second member extends parallel to the mounting surface.
6. The retainer member of claim 1, further comprising a layer of gripping material coupled to an inner side of the first and second arms that faces the axis.

7. The retainer member of claim 1, wherein the first and second arms comprise a resilient material.
8. An appliance comprising:
 - a cabinet defining a storage compartment;
 - a door for selectively opening and closing the storage compartment;
 - a storage member coupled to an inner liner of the cabinet or door; and
 - a retainer member for retaining a food receptacle relative to the inner liner, the retainer member comprising:
 - a base that is movably coupled to the inner liner above the storage member,
 - and
 - first and second arms that extend from the base,wherein the first and second arms are curved about an axis and define a passageway extending through the first and second arms along the axis, further wherein a free end of the first arm is spaced from a free end of the second arm to define an opening that provides radial access to the passageway through the opening.
9. The appliance of claim 8, wherein a distance between the free end of the first arm and the free end of the second arm is less than a distance between a central portion of the first arm and a central portion of the second arm.
10. The appliance of claim 8, wherein the first and second arms extend from the base in a direction that is transverse and non-orthogonal to the axis.
11. The appliance of claim 8, wherein the first and second arms are curved about a vertical axis and two horizontal axes, wherein the horizontal axes are perpendicular to each other.
12. The appliance of claim 8, wherein the first and second arms extend downward from the base away from the inner liner.
13. The appliance of claim 8, further comprising a rail coupled to the inner liner, wherein the retainer member is slidably coupled to the rail such that the base is slidable along a horizontal direction.

14. The appliance of claim 12, wherein the rail comprises first and second longitudinal side walls that extend parallel to each other and define channel therebetween.

15. The appliance of claim 14, wherein the base comprises a mounting surface facing the inner liner, further wherein the base comprises a hook that extends from the mounting surface.

16. The appliance of claim 15, wherein the hook comprises a first member that extends from the mounting surface a second member that extends from the first member, further wherein the first member extends normal to the mounting surface and the second member extends parallel to the mounting surface.

17. The appliance of claim 16, wherein the first member of the hook extends over and is supported by the first side wall of the rail and the second member extends downward into the channel of the rail.

18. The appliance of claim 8, wherein the base comprises a mounting surface facing the inner liner, further wherein the base comprises a hook that extends from the mounting surface.

19. The appliance of claim 18, wherein the hook comprises a first member that extends from the mounting surface a second member that extends from the first member, further wherein the first member extends normal to the mounting surface and the second member extends parallel to the mounting surface.

20. The appliance of claim 8, wherein the retainer member further comprises a layer of gripping material coupled to an inner side of the first and second arms that faces the axis.

1 / 4

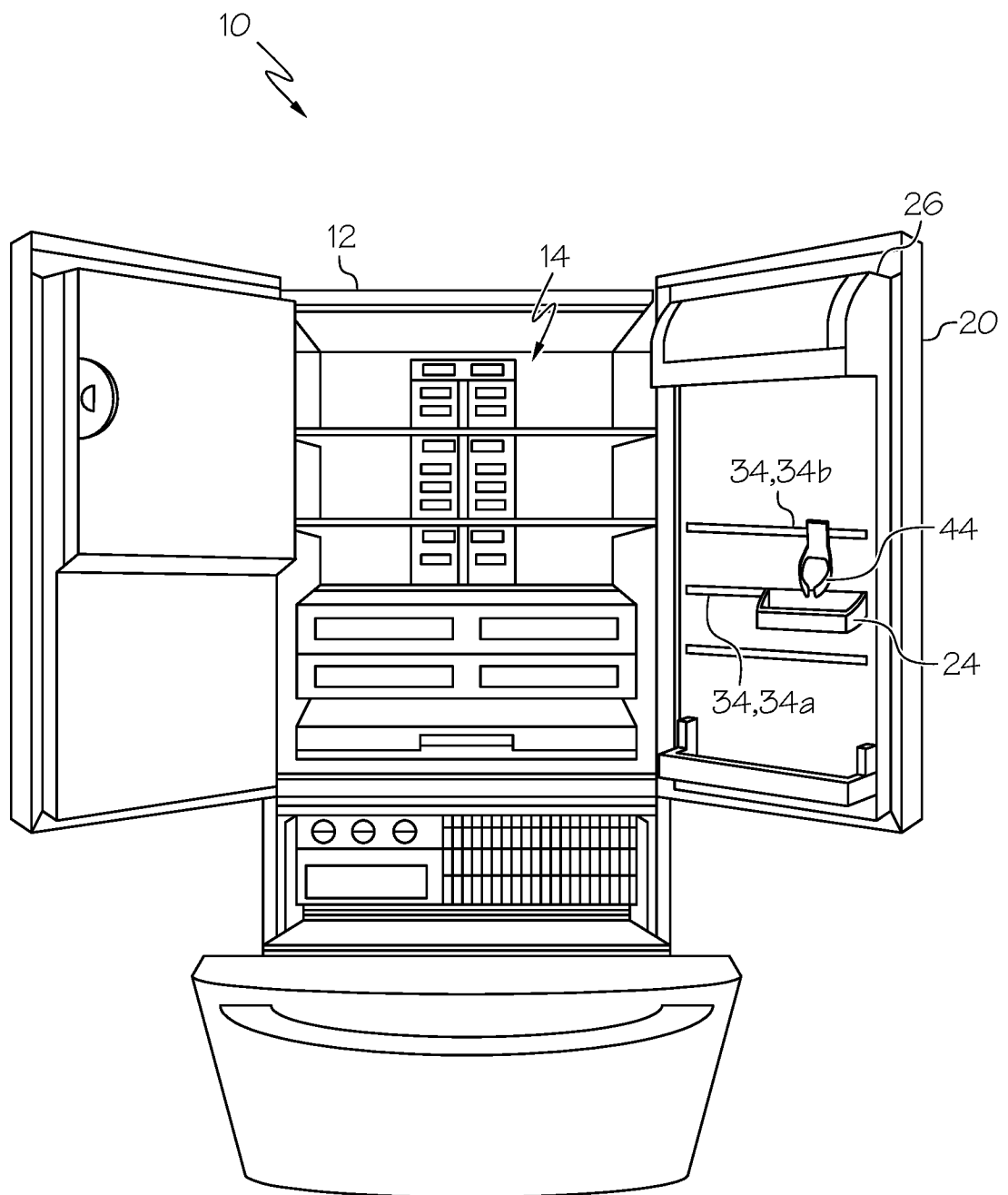


FIG. 1

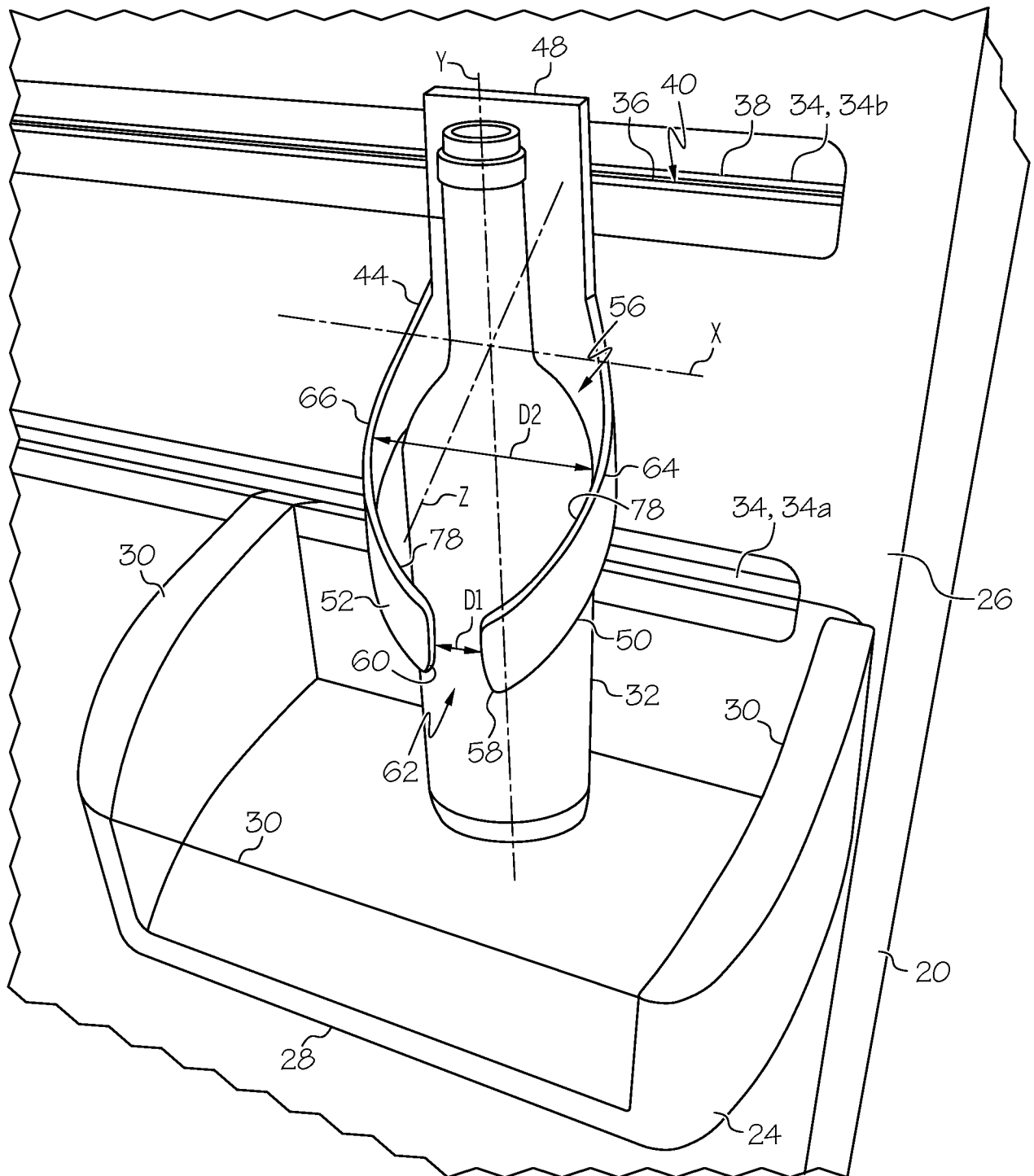


FIG. 2

3 / 4

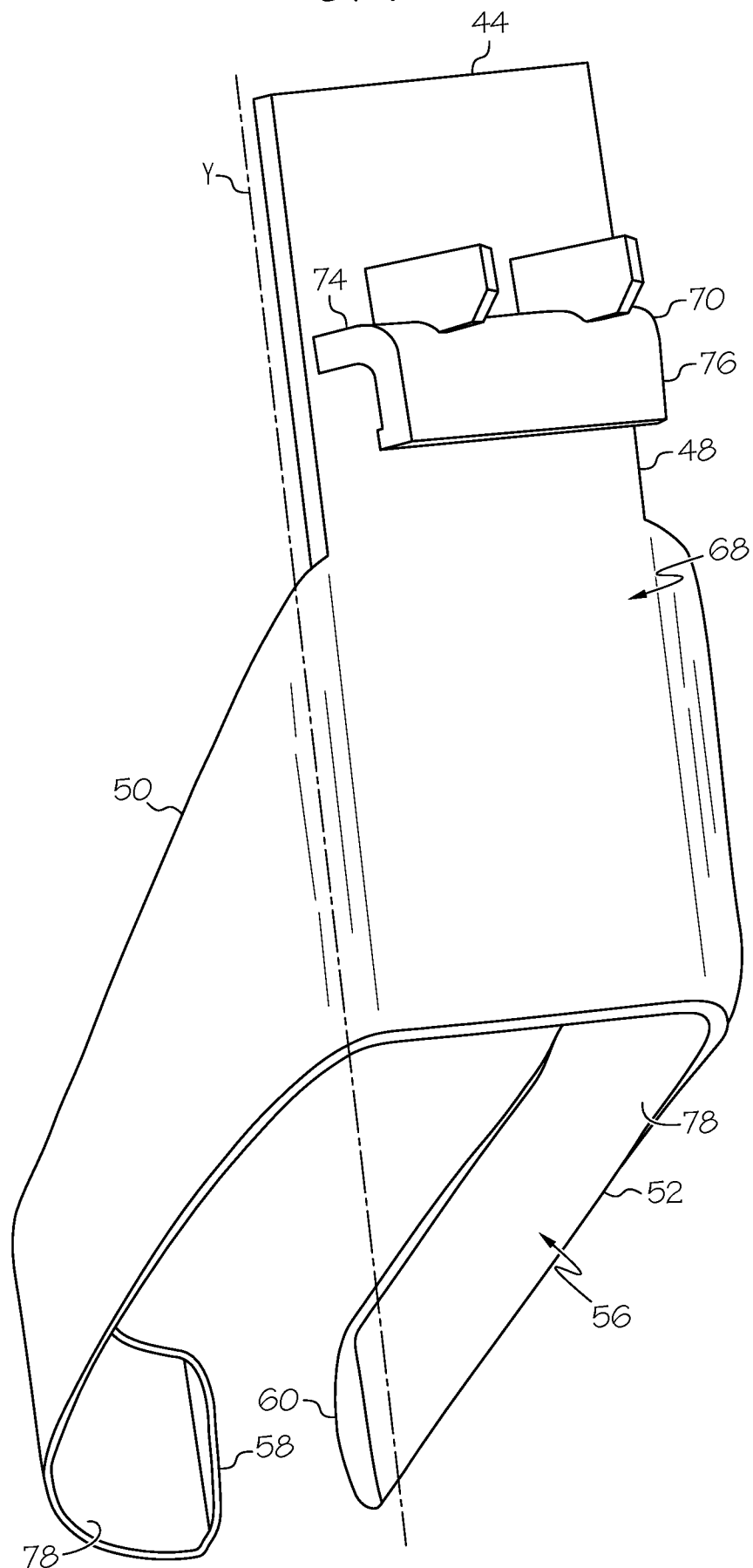


FIG. 3

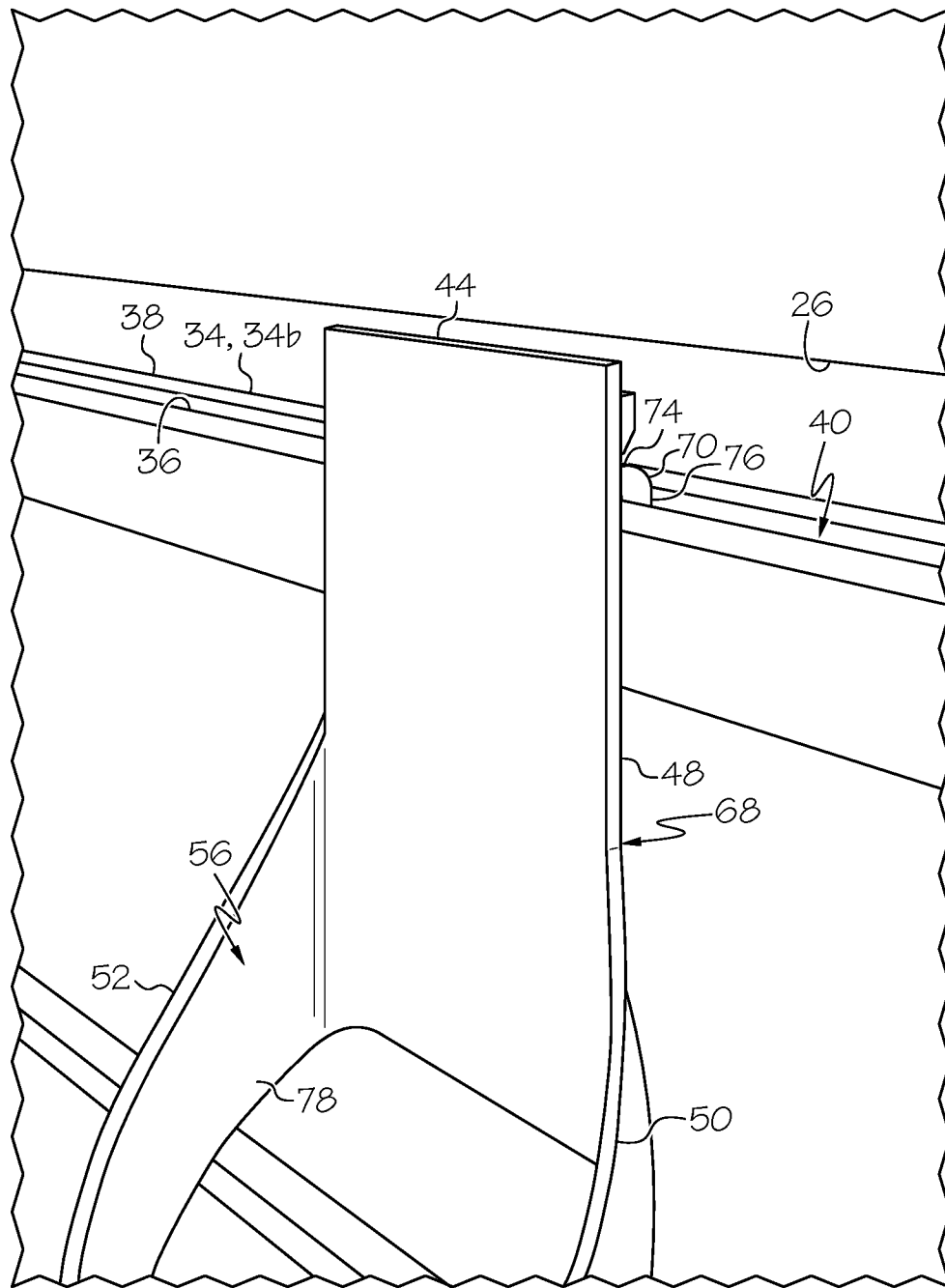


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/030496

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25D23/04 A47B73/00 A47F7/28
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F25D A47B A47F A47G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP H08 100987 A (TOSHIBA CORP) 16 April 1996 (1996-04-16) abstract; figures 1-5 -----	1,2,4-9, 11-20
X	JP H11 118337 A (FUJITSU GENERAL LTD) 30 April 1999 (1999-04-30) abstract; figures 1-5 -----	1,3-5,7, 8,10,11, 18,19
A	JP H06 35886 U (N.N.) 13 May 1994 (1994-05-13) figures 1, 2 -----	1,8,13



Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP H08100987	A	16-04-1996	JP 2957422 B2	04-10-1999
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