



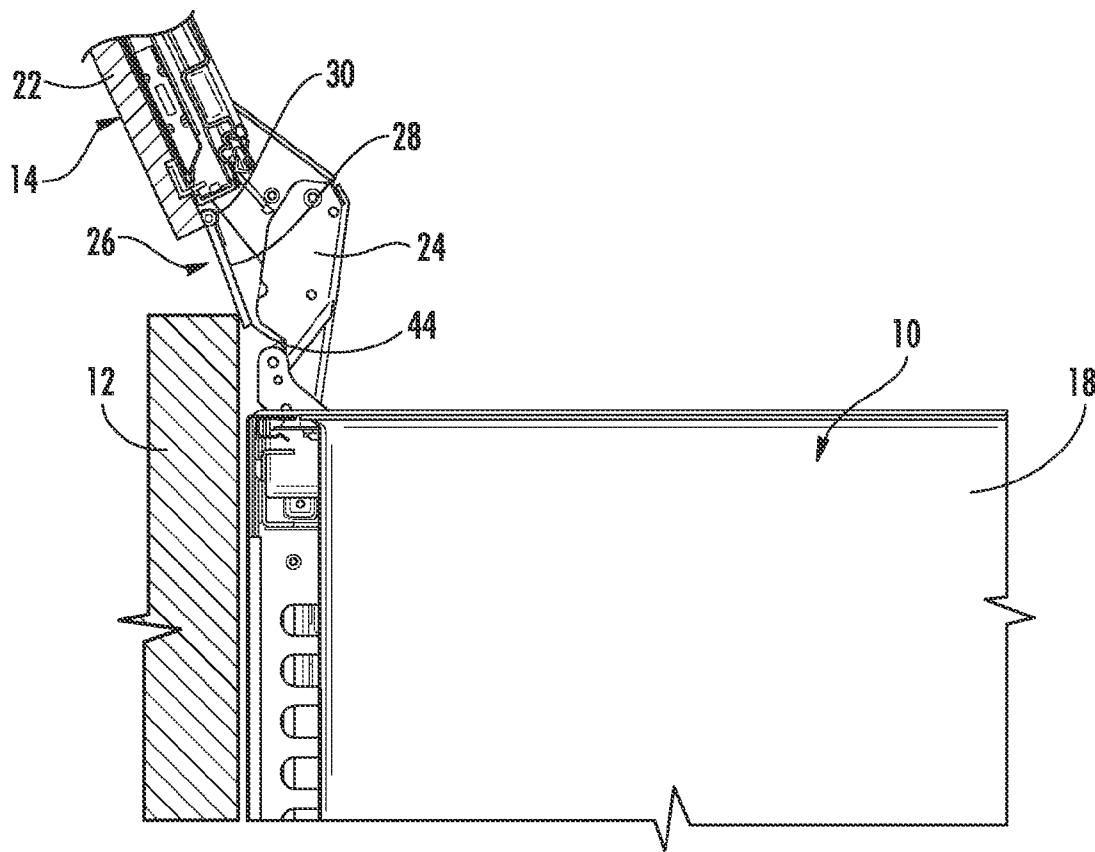
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(19) **United States**(12) **Patent Application Publication**  
**Wilson**(10) **Pub. No.: US 2012/0080991 A1**(43) **Pub. Date: Apr. 5, 2012**(54) **CONSUMER APPLIANCE WITH FINGER  
GUARD****Publication Classification**(51) **Int. Cl.***F25D 23/02* (2006.01)*A47B 95/00* (2006.01)(52) **U.S. Cl. .... 312/405; 312/237**

(57)

**ABSTRACT**

A consumer appliance, such as a refrigerator, includes a door attached to the casing along a hinge side of the door. An elongated finger guard is pivotally mounted to a back surface of the door along the hinge side of the door. The finger guard has an extension portion with a floating edge and is pivotally biased to swing away from the appliance casing so that the floating edge of the extension portion engages against an item, such as a cabinet, adjacent to the appliance casing. The extension portion has a transverse width so as to slide along and remain engaged against the item adjacent to the appliance in all positions of the door.

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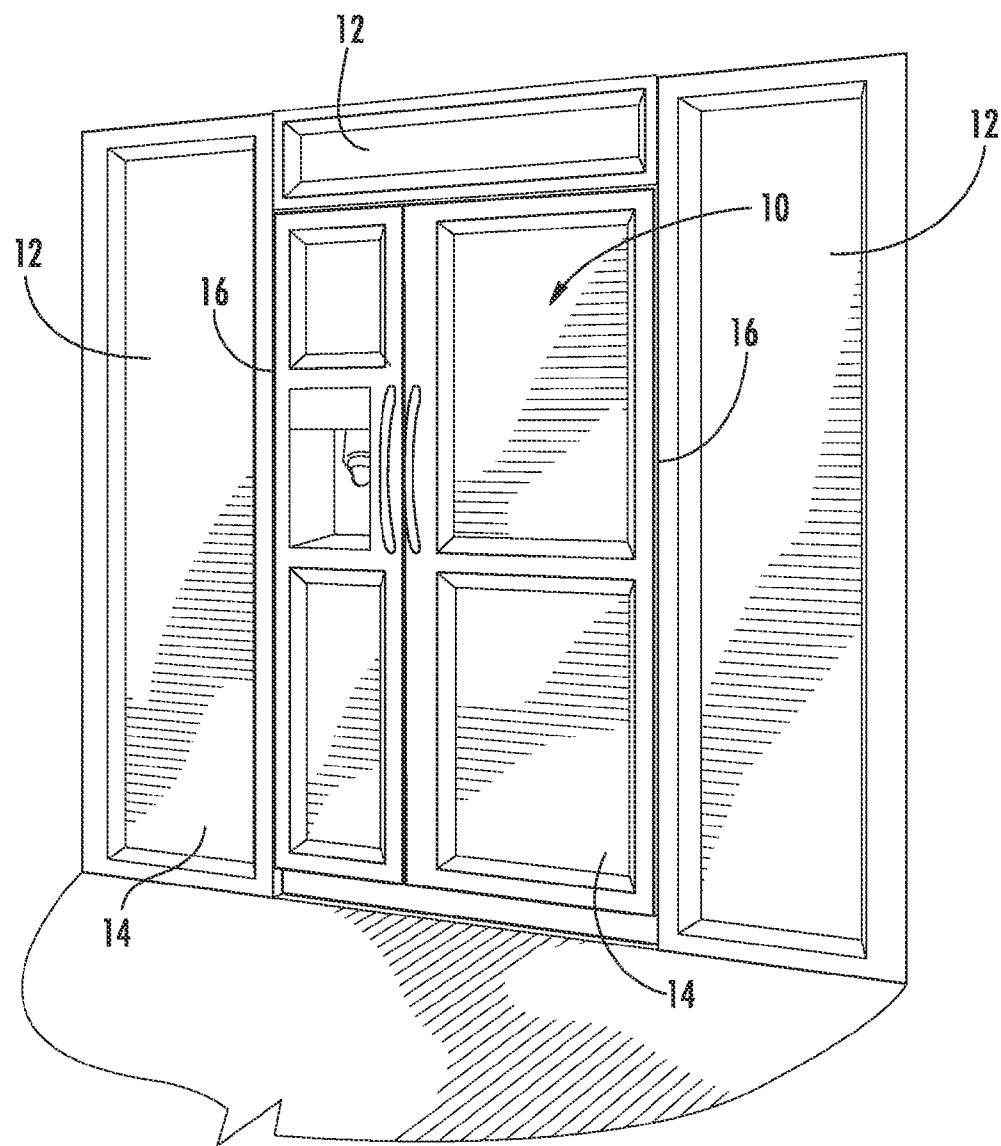


FIG. 1

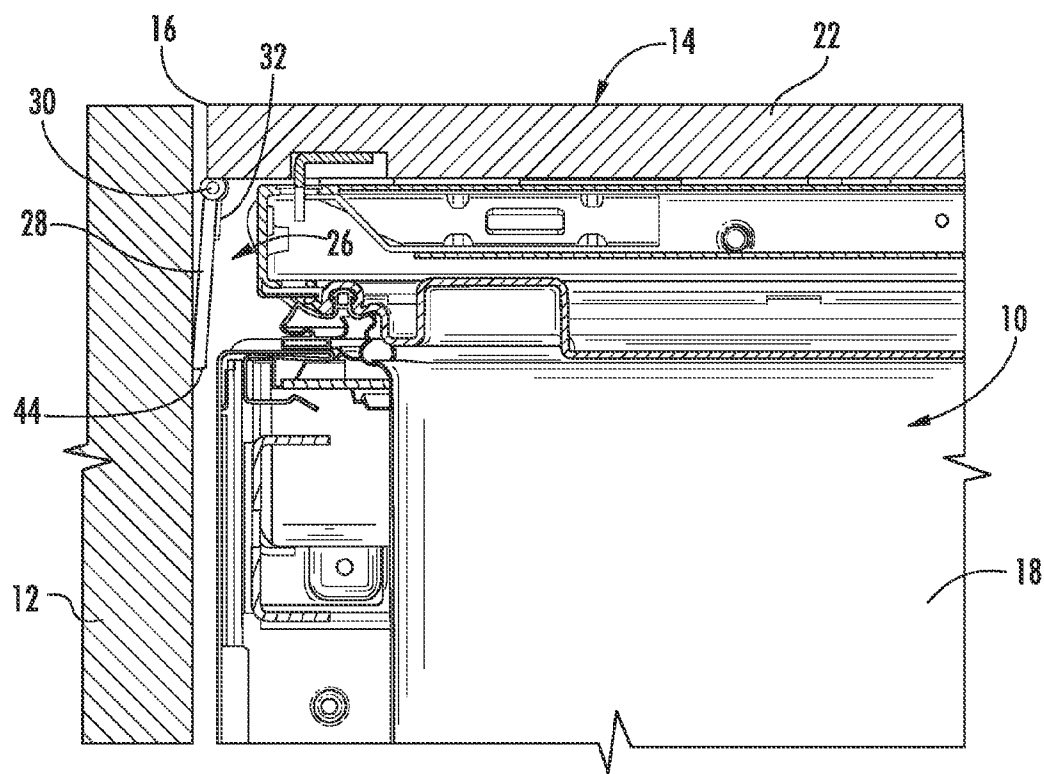


FIG. 2

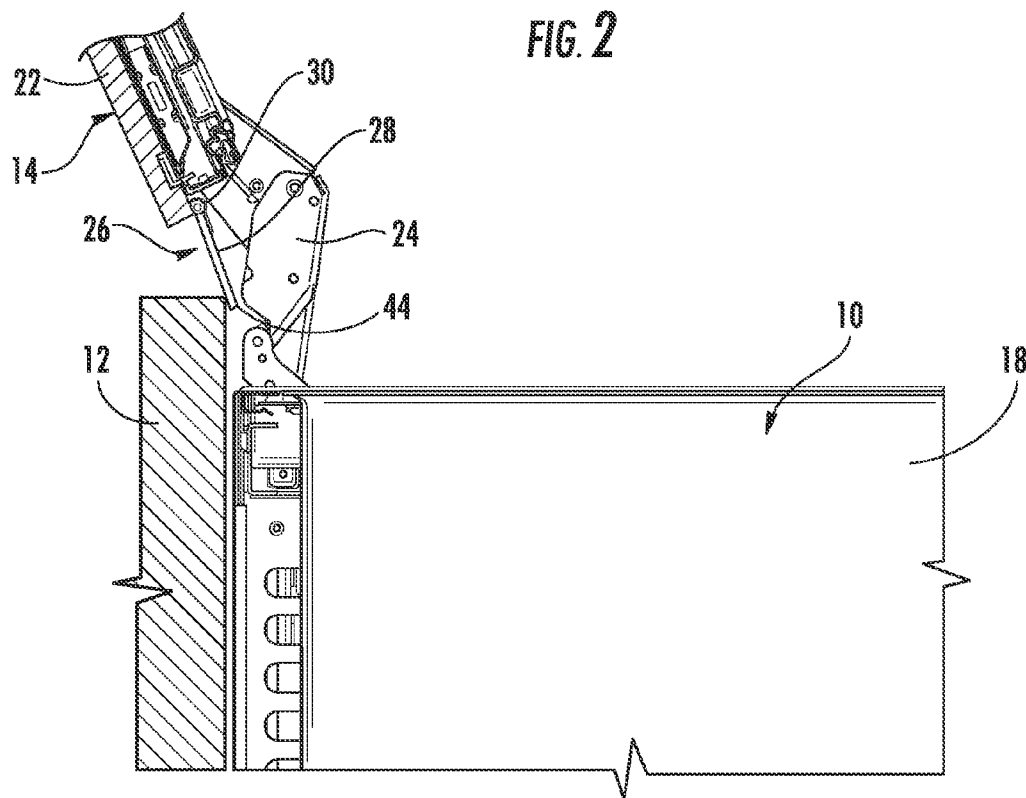
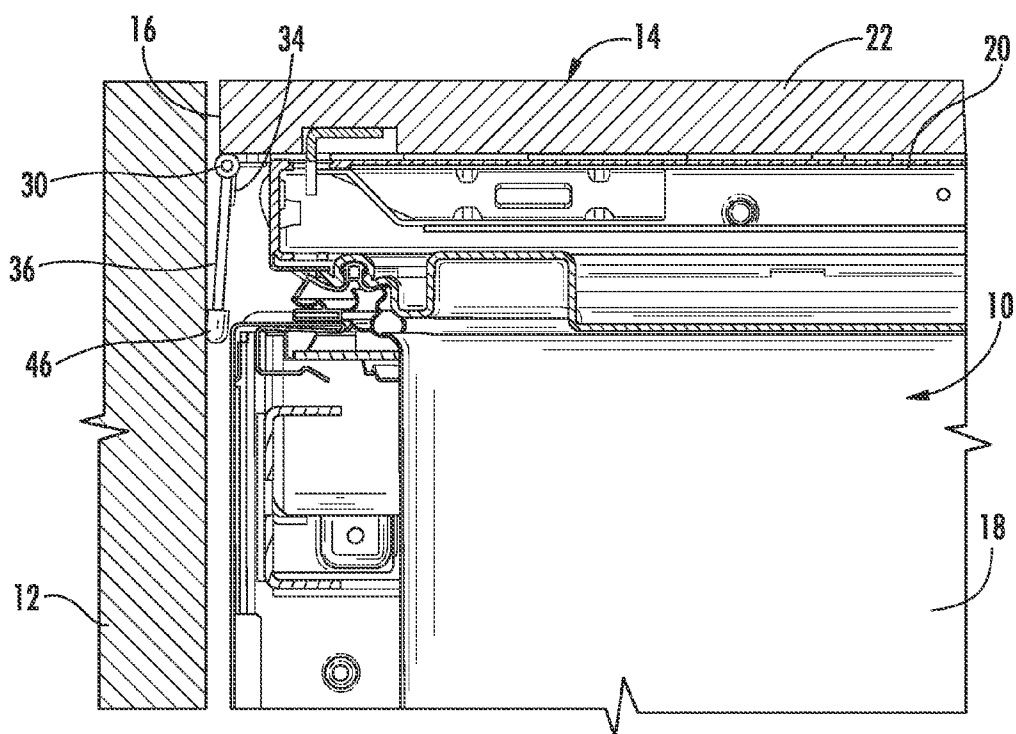
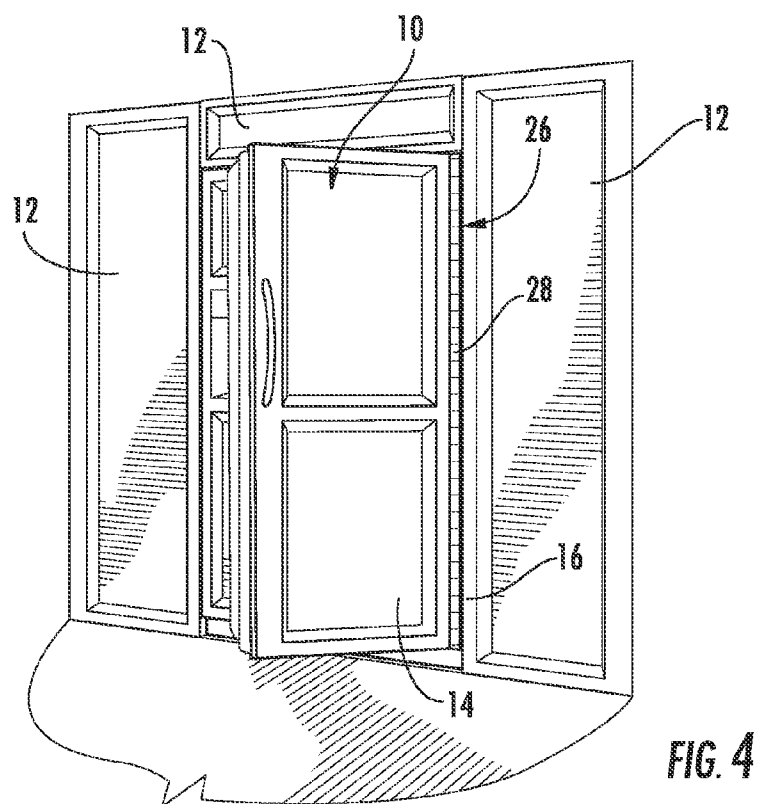


FIG. 3



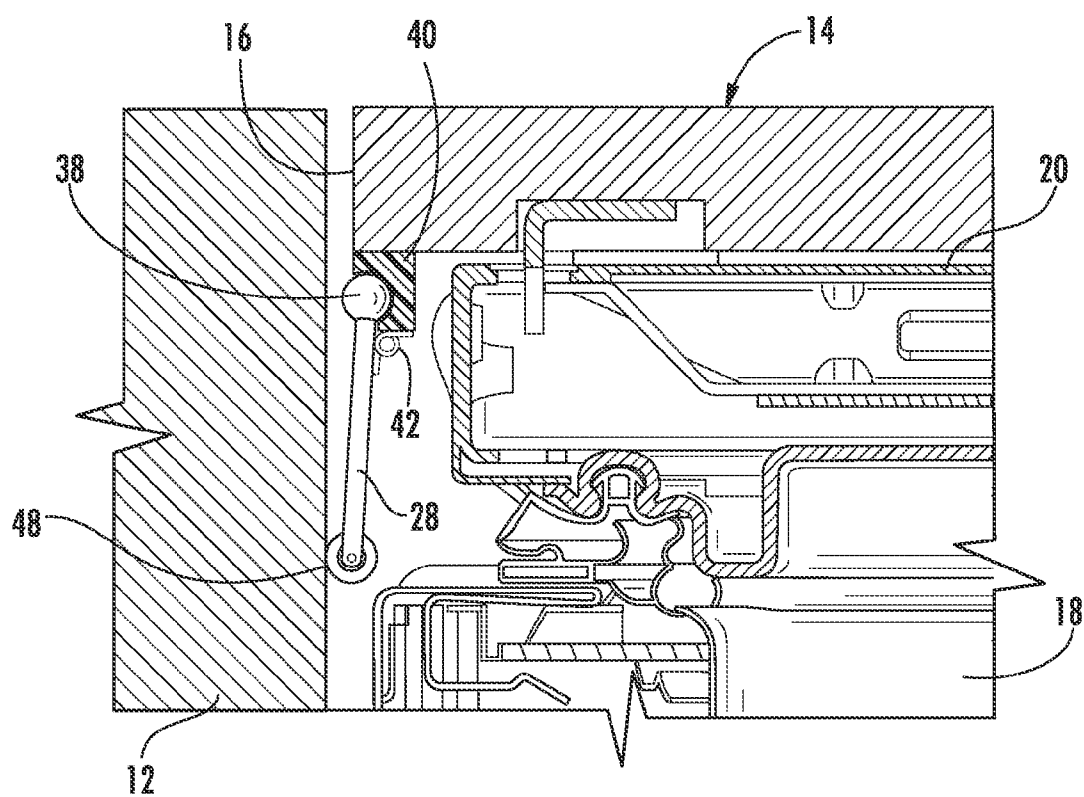


**FIG. 6**

## CONSUMER APPLIANCE WITH FINGER GUARD

### FIELD OF THE INVENTION

[0001] The present subject matter relates generally to a protective device for doors to prevent injury to a hand or fingers, and more particularly to a consumer appliance, such as a refrigerator, incorporating such a device.

### BACKGROUND OF THE INVENTION

[0002] It is generally appreciated that the operation of doors swinging relative to a stationary frame can create a pinch or crush hazard in the gap that is formed along the hinge side of the door. It is not uncommon for an unwary person or child to place their hand or fingers in this gap wherein, upon closing the door, a serious injury can result.

[0003] Various devices have been suggested to address the issue. For example, the published European patent application EP 1988249A describes a door gap guard intended to cover the gap between a door panel and door frame. The guard is an elongated sheet member that is mounted to the door frame along one side. The opposite free side rides against the door panel to cover the gap created when the door moves to an open position. Similarly, the published UK patent application GB 2271134 describes a finger shield that attaches to the door frame with a spring loaded hinge. A free end of the shield is biased against the door.

[0004] Refrigerators are not immune to the problem. A crush zone can be created between the hinge side of the refrigerator door and an adjacent cabinet or other article. This is particularly true with flush-mount refrigerators having side-by-side doors that are mounted flush with the front plane of adjacent cabinets. These doors typically require an articulated hinge so that the door can fully open.

[0005] U.S. Pat. No. 5,265,954 recognizes that injury can occur when a person places their hand or fingers in the hinge assembly of a refrigerator, particularly between the hinge butt and hinge leaf. These components can create a dangerous scissoring action upon opening and closing the refrigerator door. The '954 patent describes an anti-pinch hinge assembly that incorporates a gap cover with the hinge brackets to minimize the risk of injury at the hinges.

[0006] Accordingly, it would be desirable to provide a door for refrigerator with a finger guard assembly that does not require mounting to adjacent cabinets or other devices and that provides protection along the entire length of the door.

### BRIEF DESCRIPTION OF THE INVENTION

[0007] Aspects and advantages of the invention will be set forth in part in the following description, or may be obvious from the description, or may be learned through practice of the invention.

[0008] In an exemplary embodiment, a consumer appliance, such as a refrigerator, is provided having a casing that defines one or more internal storage spaces. A door (or doors) is attached to the casing along a hinge side of the door. An elongated finger guard is pivotally mounted to a back surface of the door (for example, to the back of a front panel attached to a door frame) along the hinge side of the door. The finger guard has an extension portion that defines a floating edge. The finger guard is pivotally biased to swing away from the casing so that the floating edge of the extension portion engages against an item adjacent the casing, for example

against the side of cabinetry adjacent a flush-mount refrigerator. The extension portion has a transverse width so as to slide along and remain engaged against the item adjacent to the casing in all positions of the door.

[0009] These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures, in which:

[0011] FIG. 1 is a perspective view of a consumer appliance, in particular a flush-mount refrigerator, that may incorporate a finger guard in accordance with aspects of the invention;

[0012] FIG. 2 is a top cut-away view of a refrigerator with a finger guard, with the refrigerator door in the closed position;

[0013] FIG. 3 is a top cut-away view of the refrigerator as in FIG. 2 with the door in the open position and the finger guard deployed;

[0014] FIG. 4 is a perspective view of the refrigerator in FIG. 1 with the door open and the finger guard deployed;

[0015] FIG. 5 is a top cut-away view of a refrigerator with an alternate embodiment of a finger guard, with the refrigerator door in the closed position;

[0016] FIG. 5 is a top cut-away view of a refrigerator with an alternate embodiment of a finger guard, with the refrigerator door in the closed position; and

[0017] FIG. 6 is a top cut-away view of a refrigerator with still another embodiment of a finger guard, with the refrigerator door in the closed position;

### DETAILED DESCRIPTION OF THE INVENTION

[0018] Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

[0019] FIG. 1 depicts a consumer appliance 10 in a form of a refrigerator that may incorporate a finger guard in accordance with aspects of the invention. It should be appreciated that the term "consumer appliance" is used in a generic sense herein to encompass any manner of household appliance having a manually operated door that provides access to an internal compartment. Conventional consumer appliances include, for example, refrigerators, freezers, ovens, washing machines, dryers, ranges, and so forth. For illustrative purposes, the present invention is described herein as a refrigera-

tor embodiment of a consumer appliance 10. In this regard, the term “refrigerator” is also used in a generic sense herein to encompass any manner of refrigeration appliance, such as a freezer, refrigerator/freezer combination, and any style or model of conventional refrigerator. In the illustrated embodiment, refrigerator 10 is a flush-mounted refrigerator wherein the front of the refrigerator 10 lies essentially flush with the front of adjacent cabinetry 12, as is well understood by those skilled in the art.

[0020] The refrigerator 10 includes doors 14 that open relative to a casing 18 (FIG. 2) along a hinge side 16. Referring to FIG. 4, one of the doors 14 is illustrated in an open position and a finger guard 26 in accordance with aspects of the invention is deployed along the hinge side 16 to prevent a person from accidentally inserting their hand or fingers into the space between the hinge side of the door 14 and the adjacent cabinet 12. It should be appreciated that a finger guard 26 may also be incorporated on the freezer compartment door as well.

[0021] FIG. 2 is a more detailed view of the refrigerator 10 and finger guard 26. In this particular embodiment, the refrigerator door 14 includes a decorative door panel 22 that is attached by any suitable means to a door casing 20, as with a flush-mount refrigerator wherein the door panel 22 often matches the style of the adjacent cabinetry 12. The finger guard 26 is pivotally mounted to a back surface of the door 14. In the embodiment of FIG. 2, the finger guard 26 is mounted to the back surface of the panel 22 adjacent to the hinge side 16 of the door 14. In other embodiments, the finger guard 26 may be mounted to the door casing 20.

[0022] The finger guard 26 includes an extension portion 28 that may be formed of any suitable material. For example, the extension portion 28 may be a strip of or pliant. The extension portion 28 may be rigid or pliant, a continuous strip of material, or a combination of separate material strips, and so forth. The invention is not limited by any particular type of material used for the extension portion 28. Referring to FIG. 4, the extension portion 28 may extend along the entire longitudinal length of the door 14 along the hinge side 16. In an alternative embodiment, the extension portion 28 may only extend along select areas of the longitudinal length of the door, for example along only the top portion of the door 14 wherein it is more likely that a person would inadvertently move their fingers into the space between the door 14 and the cabinet 12 when opening or closing the door.

[0023] The extension portion 28 is attached to the back side of the door 14 by any suitable pivot joint 30, such as a hinge. A biasing element 32, for example a spring, living hinge, and so forth, is configured at the pivot joint 30 to bias the extension portion 28 outwardly against the adjacent cabinet 12. The extension portion 28 includes a floating edge 44 that engages against the cabinet 12 (or any other item adjacent to the refrigerator 10) and, as the door is opened to the position illustrated in FIG. 3, the extension portion 28 remains biased against the cabinet 12 and moves along the surface of the cabinet 12 in all open positions of the door 14. Referring to FIG. 3, the extension portion 28 includes a transverse width that is sufficient to ensure that the extension portion 28 remains engaged against the inside surface of the cabinet 12 in all positions of the door. In other words, the extension portion 28 has a width to ensure that the portion 28 does not pull out from between the door 14 and the cabinet 12 at the point in the door's swing arc wherein the edge of the door panel 22 is furthest from the cabinet 12.

[0024] Particularly for flush-mount refrigerators 10 as depicted in FIGS. 1 and 4, a hinge 24 must accommodate relative outward movement of the door 14 relative to the refrigerator casing 18 so that the door 14 opens outwardly beyond the adjacent cabinet 12. Various styles of articulating hinges are generally used for this purpose, as illustrated in FIG. 3. The extension portion 28 of the finger guard 26 has a sufficient width to ensure that the portion 28 remains engaged against the inner surface of the adjacent cabinet 12 even with the increased separation distance between the door 14 and casing 18 generated by the articulating hinge 24.

[0025] It should be appreciated that various configurations of a pivot joint 30 are within the scope and spirit of the invention for biasing an elongated strip member 28 against the inside surface of an adjacent cabinet 12. For example, in the embodiment of FIG. 5, a spring hinge 34 is utilized. One hinge leaf is mounted to the back of the door panel 22 and the other biased leaf spring is attached to a leaf extension 36, which functions as the extension portion 28. In an alternate embodiment, the biased leaf spring may have a width sufficient so as not to require an additional hinge leaf extension 36. In other words, the hinge leaf spring may serve the function of the extension portion 28.

[0026] The embodiment of FIG. 6 illustrates the pivot joint as a ball joint 38 that is pivotally disposed within a cage 40. The ball joint 38 is biased relative to the cage 40 via a torsion spring 42. The cage 40 is attached to the back side of the door panel 22 and defines the swing range for the ball joint 38.

[0027] The floating edge 44 at the end of the extension portion 28 may frictionally slide against the adjacent cabinet surface 12, as in the embodiment of FIGS. 2 and 3. This configuration may, however, result in a wear pattern on the cabinet over time, or premature wear of the extension portion 28. In this regard, it may be desired to include a replaceable wear member 46 that is attached to the floating edge 44, as depicted in FIG. 5. This wear member 46 may comprise any manner of material, such as a Teflon sleeve that is applied along the entire longitudinal edge 44 of the extension member 28. In an alternate embodiment, the floating edge 44 may be coated with a friction-reducing material.

[0028] In an alternate embodiment depicted in FIG. 6, a roller 48 may be configured at the end of the extension portion 28, wherein the roller 48 simply rolls along the surface of the cabinet 12 as the door is moved between the opened and closed positions.

[0029] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

What is claimed is:

1. A consumer appliance, comprising;
  - a casing defining an internal storage space;
  - a door attached to said casing along a hinge side of said door;

an elongated finger guard pivotally mounted to a back surface of said door along said hinge side of said door, said finger guard having an extension portion with a floating edge;

said finger guard pivotally biased to swing away from said casing so that said floating edge of said extension portion engages against an item adjacent said cabinet; and said extension portion having a transverse width so as to slide along and remain engaged against the item adjacent said casing in all positions of said door.

2. The appliance as in claim 1, wherein said appliance is a flush-mount refrigerator configured so that said door is flush with a front of cabinetry adjacent said refrigerator.

3. The appliance as in claim 2, wherein said door is attached to said casing with an articulating hinge.

4. The appliance as in claim 1, wherein said finger guard comprises a spring hinge attached to said back surface of said door.

5. The appliance as in claim 4, wherein said extension portion is an elongated leaf component of said spring hinge.

6. The appliance as in claim 4, wherein said finger guard is attached to said back surface of said door with a biased ball joint.

7. The appliance as in claim 1, wherein said floating edge is configured for sliding frictional engagement against the item adjacent to the appliance.

8. The appliance as in claim 7, further comprising a wear member attached to said floating edge.

9. The appliance as in claim 1, wherein said floating edge is configured for rolling engagement against the item adjacent to the appliance.

10. The refrigerator as in claim 9, comprising a roller configured at said floating edge.

11. The appliance as in claim 1, wherein said finger guard extends generally along the entire length of said door.

12. The refrigerator as in claim 1, wherein said appliance is a flush-mount refrigerator and comprises decorative panel attached to a door frame, said finger guard mounted to a back surface of said door panel.

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