DOOR MOLDING FOR A WALK-IN FOOD CHILLING COMPARTMENT

Inventors: Gaylon Yates, Parsons, TN (US); Loren D. Rasmusson, River Falls, WI (US); Allen Joe Hunsaker, Hillsboro, IA (US); Gary B. Swetish, Racine, WI (US); Daniel John Delay, Muskego, WI (US)

Correspondence Address:
Jasper W. Dockrey
Brinks Hofer Gilson & Lione
P.O. Box 10395
Chicago, IL 60610 (US)

Assignee: Manitowoc Foodservice Companies, Inc.

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Abstract

A door molding for use with doors closing openings into food-chilling compartments, and the like, is aligned to a horizontal edge of the door and extends from one vertical side of the door to the opposite vertical side. The door molding has a back surface adjacent to the door and a convex outer surface. An elongated side surface near the horizontal edge of the door is substantially perpendicular to the door and extends from the back surface to the convex outer surface. A beveled surface opposite to the elongated side surface extends from the back surface to the convex outer surface. Rounded sides near the vertical sides of the door extend from the back surface to the convex outer surface. A plurality of cavities in the base extend from the back surface into the base toward the convex outer surface. A method of fabricating the door molding is also disclosed.
DOOR MOLDING FOR A WALK-IN FOOD CHILLING COMPARTMENT

TECHNICAL FIELD

[0001] The present invention relates, generally, to decorative and functional door moldings for food-chilling compartment doors and, more particularly, to protective door moldings for walk-in coolers used in large kitchens and commercial facilities.

BACKGROUND

[0002] Large food-chilling units are commonly used in commercial kitchens and food storage areas for preservation of perishable food items. Commercial food-chilling units, such as walk-in coolers, refrigerators, and freezers, and the like, generally include a cabinet or room having a rectangular opening in one or more vertical walls. Typically, a heavy-duty industrial door is mounted in the opening and secured to the vertical wall by hinges. Because it is often necessary to transfer large, bulky materials into and out of the food-chilling unit, the door is relatively large in the width direction to facilitate movement of the large, bulky materials.

[0003] In addition to being relatively large in size, doors for commercial food-chilling units are typically constructed of materials similar to the vertical walls of the food-chilling units. Until recently, commercial food-chilling units were fabricated of heavy steel construction and corrugated metal. With the development of new materials and construction techniques, commercial food-chilling units can now be constructed of lighter materials, such as aluminum and aluminum alloys, and the like. In addition to being lighter, the new materials improve the aesthetic appearance of the food-chilling unit. For example, the exteriors of the food-chilling units can be fabricated with a metallic material having a shiny or glossy surface. Accordingly, advances in materials and construction techniques have resulted in commercial food-chilling units that are lighter and more esthetically pleasing than in the past.

[0004] Although the lightweight attractive materials of construction have resulted in food-chilling units having an improved appearance, the exterior materials are somewhat more susceptible to denting, marring, and other types of surface damage. Since the food-chilling units are often located in areas where movement of hand trucks and heavy transport carts takes place, the food-chilling units are constantly in danger of being damaged by collisions. Additionally, food-chilling units are often located in close proximity to other machines and the like, that can damage the doors of the food-chilling units when the doors are opened. Accordingly, a need exists for protective door moldings to preserve the esthetic appearance of food-chilling compartment doors, and preserving the overall enhanced appearance of modern food-chilling compartments.

BRIEF SUMMARY

[0005] There is provided in accordance with the invention a door molding having a rectangular base with two opposed elongated side surfaces intersecting two opposed shortened side surfaces. A front side opposite to the base has a convex surface and joins the two opposed elongated side surfaces and the two opposed shortened side surfaces. One of the two opposed elongated side surfaces is inclined toward the convex surface.

[0006] In another aspect of the invention, a walk-in cooler door molding has a cross-sectional configuration that includes a back surface and an elongated side surface intersecting the back surface at substantially a right angle. A beveled side surface is inclined toward the back surface and intersects the back surface at an acute angle. A convex outer surface intersects the top surface and the beveled side surface.

[0007] In yet another aspect of the invention, a walk-in cooler door and door molding combination is provided. The door molding includes a rectangular base having elongated sides and shortened ends. A domed front surface resides opposite the rectangular base. A beveled surface joins one of the elongated sides to the domed front surface. Rounded end surfaces join the shortened ends to the domed front surface. An elongated side surface joining the other of the elongated sides to the domed front surface.

[0008] In a further aspect of the invention a door molding for a food-chilling compartment door includes a back surface for mounting on a face of the door. A front surface is opposite the back surface. A first elongated side surface extends between the back surface and the front surface and is inclined at an acute angle with respect to the back surface. A second elongated side surface is opposite to the first elongated side surface and extends between the back surface and the front surface.

[0009] In a still further aspect of the invention a molding mounted on a door that closes an opening into a food chilling compartment. The molding includes a base substantially parallel to a horizontal edge of the door and extending from one vertical side of the door to the opposite vertical side. The base has a back surface adjacent to a door face. A convex outer surface. An elongated side is proximate to the horizontal edge of the door and substantially perpendicular to the door face and extends from the base to the convex outer surface. A beveled side is opposite to the elongated side and extends from the base to the convex outer surface. Rounded sides are located adjacent to the vertical sides of the door and extend from the base to the convex outer surface. A plurality of interior walls in the base extend from the back surface toward the convex outer surface.

[0010] In still another embodiment, a method of fabricating a door molding for a food-chilling compartment includes providing a mold having a cavity that is configured to form the door molding recited above. A thermoplastic material is provided and the thermoplastic material is flowed into the mold to form the door molding. Additional aspects of the fabrication method include blow molding and flowing a copolymer of acrylonitrile, butadiene, and styrene.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a partial front view of a food-chilling compartment having a door with door moldings configured in accordance with the invention;

[0012] FIG. 2 is a partial cross-sectional view of the door and one of the door moldings taken along section line II-II of FIG. 1,
FIG. 3 is a front view of the door molding shown in FIG. 2.

FIG. 4 is a cross sectional view of the door molding taken along section line IV-IV of FIG. 3; and

FIG. 5 is a back view of the door molding shown in FIG. 2.

DETAILED DESCRIPTION OF THE DRAWINGS
AND THE PRESENTLY PREFERRED EMBODIMENTS

FIG. 1 illustrates a chilling-compartment door 10 in a vertical wall 12 of a chilling compartment. Door 10 is attached to vertical wall 12 by means of hinges 14. An upper door molding 16 and a lower door molding 18 are attached to a face surface 20 of door 10. In the illustrated embodiment, upper and lower door moldings 16 and 18 are positioned near the horizontal edges of door 10. Further, upper and lower door moldings 16 and 18 span face surface 20 from a first vertical edge 22 to a second vertical edge 24. By arranging upper and lower door moldings 16 and 18 as shown in FIG. 1, face surface 20 of door 10 and hinges 14 can be protected from damage by collision with hand-trucks, carts and other heavy objects.

In accordance with one embodiment of the invention, upper and lower door moldings 16 and 18 protrude outwardly from face surface 20 to a distance that is sufficient to prevent direct contact against face surface 20 and hinges 14, so long as the contacting object is positioned on the floor. Upper door molding 16 will guard against damage caused by opening door 10 in situations where additional wall surfaces are present, or ventilation of other equipment is attached to the ceiling in proximity to the food-chilling compartment.

Those skilled in the art will appreciate that upper and lower door moldings 16 and 18 can be positioned in other locations on door 10. For example, upper and lower door moldings 16 and 18 can be positioned closer to the center of door 10. Further, door moldings 16 and 18 can be considerably taller than is shown in FIG. 1, and can extend vertically across a large portion of face surface 20. Additionally, instead of two separate door moldings, a single door molding can be used to protect door 10. It will also be apparent to those skilled in the art that upper and lower door moldings 16 and 18 can be sized such that they do not extend entirely across face surface 20 from first vertical edge 22 to second vertical edge 24. Instead, upper and lower door moldings 16 and 18 can be configured to only extend across a portion of face surface 20, or can be formed in small sections and a plurality of small sections can be arranged across face surface 20 of door 10.

As illustrated in FIG. 1, upper door molding 16 and lower door molding 18 are similarly shaped and, as arranged on door 10, the moldings are mirror images of one another. Although illustrated as mirror images, upper door molding 16 and lower door molding 18 can be shaped differently from one another. The particular design illustrated in FIG. 1 offers an aesthetically pleasing symmetry; however, either of the upper or lower door moldings can be shaped to correspond with a particular environmental hazard to which the food-chilling compartment is subjected. The several embodiments of the invention will now be described with reference to upper door molding 16. Those skilled in the art, however, will appreciate that the following description also applies to lower door molding 18.

FIG. 2 illustrates a cross-sectional view of upper molding 16 and a portion of door 10 taken along section line II-II of FIG. 1. Upper molding 16 includes a back surface 26 that is adjacent to face surface 20 of door 10. A front surface 28 is opposite from back surface 26. Two elongated side surfaces constitute a top or upper surface 30 opposite from a beveled surface 32. Beveled surface 32 is inclined away from face surface 20 of door 10 and forms an acute angle 36 with back surface 26. Front surface 28 forms a generally right angle with upper elongated surface 30. Also, in the illustrated embodiment, upper surface 30 is generally flat and extends perpendicularly from face surface 20 of door 10.

In accordance with the exemplary embodiment, upper door molding 16 is positioned on door 10, such that top surface 30 is positioned in close proximity to upper edge 34 of door 10. In accordance with one embodiment of the invention, a plurality of interior walls are formed in upper and lower door moldings 16 and 18 to define cavities within the door mold. The cavities improve the impact resistance and resiliency of the door moldings. One such cavity 36 is illustrated in silhouette outline in the cross-sectional view of FIG. 2. Cavity 36 is defined by an interior wall surface 37. By forming one or more cavities within upper and lower door moldings 16 and 18, the door moldings show improved resilience to sudden impact and are better able to protect face surface 10 and hinges 14 of door 10.

A front view of door molding 16 is illustrated in FIG. 3. Beveled surface 32 extends from a first shortened side surface 36 to a second shortened side surface 38. The top portion of beveled surface 32 forms a convex arc 40 where beveled surface 32 joins front surface 28. Convex arc 40 is defined by a radius of curvature, such that the radius becomes smaller at each of side surfaces 36 and 38.

In the illustrated embodiment, upper door molding 16 is generally rectangular shaped, such that upper surface 30 and bevel surface 32 are formed along elongated edges, while first side surface 36 and second side surface 38 are formed along shortened edges. Those skilled in the art, however, will recognize that although the door moldings of the invention are illustrated as generally rectangular structures with respect to their placement on face surface 20, other geometrical forms, such as square, oval, circular, and the like are possible.

A cross sectional view of door molding 16 taken along section line IV-IV of Figure is illustrated in FIG. 4. In the illustrated embodiment, the front surface 28 has generally domed shape having a crown 42 and gradually transitioning toward each of first and second side surfaces 36 and 38.

A plurality of cavities are illustrated in the side view of upper door molding 16 illustrated in FIG. 4. In addition to cavity 36, in the illustrative embodiment cavities 44 and 46 reside in door molding 16 on either side of cavity 36. Those skilled in the art will recognize that although three cavities are illustrated, door moldings in accordance with the invention can have more than three cavities or less than three cavities. Further, the cavities can vary in size from one another depending upon the particular degree of resiliency desired in the door molding.
FIG. 5 illustrates a bottom view of door molding 16 showing back surface 26 and cavities 36, 44, and 46. The cavities are generally funnel-shaped indentations in back surface 26. Referring to FIGS. 4 and 5, the cavities extend from back surface 26 into the interior region of molding 16. The depth to which the cavities extend into the interior regions of molding 16 will depend upon the particular design requirement for rigidity and resiliency of the door molding. Although the cavities are illustrated as generally funnel-shaped, the cavities can have a variety of geometric arrangements in the interior regions of the door molding. For example, the cavity openings on back surface 26 can be rectangular, round, square, oval, and the like. Further, the cavities can extend through the interior regions of molding 16 and terminate in close proximity to front surface 28. Alternatively, the cavities can be much shorter and terminate at various distances from front surface 28.

A door molding in accordance with the invention can be fabricated from a wide range of materials, including rubber, plastics, thermoplastics, polymers, and the like. Regardless of the particular material of construction, the door molding fabrication method preferably involves a molding process, in which a mold or dyes is constructed to have the desired shape of the door molding. A wide variety of molding processes can be used to fabricate a door molding in accordance with the invention, including injection molding, blow molding, thermforming, transfer molding, reaction injection molding, compression molding, extrusion, and the like. While numerous molding techniques can be used, the particular molding process should be compatible with the particular material of construction. Further, the construction material should offer the desired resiliency and hardness to provide adequate impact protection to a chilling-compartment door. Further, the particular material of construction preferably forms a non-skid surface, such as a textured surface or the like. Those skilled in the art will recognize that numerous rubber, thermoplastic, and polymer materials can be selected that are both compatible with a molding process and will have a desired degree of hardness and impact resistance.

In one embodiment of the invention, a thermoplastic material is molded to form a door molding in accordance with the invention. In a preferred embodiment, a thermoplastic copolymer of acrylonitrile-butadiene-styrene (ABS) material is used to fabricate the door molding. The components of the ABS material can be varied relative to one another to produce a desired impact strength, chemical resistance, abrasion resistance, colorfastness, and the like. Further, the ABS material can be formulated to have particular thermoexpansion characteristics.

In one particular embodiment of the invention, an ABS material is used in a blowmolding process to fabricate a door molding. Blowmolding processes are particularly suited to forming articles having hollow regions in the interior portions of the article. Accordingly, a blowmolding process is particularly useful to fabricate an embodiment of the invention in which cavities are formed within the door molding. In the blowmolding process, a molten tube of thermoplastic material, such as an ABS material, is blown into a tube with compressed air or other inert gas, while the blow mold is chilled. Those skilled in the art will recognize that blow molding processes can be carried by means of extrusion, injection, and injection-stretch blowmolding. When a door molding of the invention is fabricated with an ABS material, an injection blowmolding process is preferably carried out. In the preferred process, an ABS preform is placed within a split mold having a hollow cavity. The mold sides are clamped together and pinched to seal the preform. Air is then blown into the tube to expand the ABS material into the shape of the hollow cavity. After removing the mold, the door molding is trimmed and finished to a desired appearance.

In a preferred embodiment an extrusion molding process is carried out in which the ABS material is heated to form a molten plastic then forced into the mold. In an alternative processing method, a twin-sheeting process can be used in which halves of the door molding are formed then fused together.

In one particular embodiment of the invention, the door moldings are formed to have a textured outer surface. The texturing of the surface improves the resiliency and wear resistance of the door moldings.

Those skilled in the art will recognize that, through the molding process, door moldings configured in accordance with the invention offer wide ranging utility. For example, the door moldings for either the upper portion or the lower portion of a door can be fabricated from a single mold. Accordingly, the same door molding can be applied to either the top or bottom of the door simply by flipping the door molding over so that the beveled surface faces toward the central portion of the door.

Thus, it is apparent that there has been described, in accordance with the invention, a door molding for a food-chilling compartment that fully provides the advantages set forth above. Although the invention has been described and illustrated with reference to specific illustrative embodiments thereof, it is not intended that the invention be limited to those illustrative embodiments. Those skilled in the art will recognize that variations and modifications can be made without departing from the spirit of the invention. For example, although the invention has been described with reference to walk-in coolers, the door moldings can be used for a wide variety of doors that require impact protection. Accordingly, in addition to food-chilling compartments, refrigerators, freezers, and the like, the invention finds utility with doors closing openings into various structures, such as tool compartments, food storage compartments, warehouse doors, and the like. It is therefore intended to include within the invention variations and modifications that fall within the scope of the appended claims and equivalence thereof.

1. A door molding for a food-chilling compartment door comprising:
   a) a back surface for mounting on a face of a door;
   b) a front surface opposite the back surface;
   c) a first elongated side surface extending between the back surface and the front surface and inclined at an acute angle with respect to the back surface; and
   d) a second elongated side surface opposite the first elongated side surface and extending between the back surface and the front surface.

2. The door molding of claim 1 further comprising first and second shortened side surfaces, each extending between
the back surface and the front surface and having a gradual transition to the front surface.

3. The door molding of claim 2 wherein the front surface and the first elongated side surface join at a corner forming a convex arc wherein the convex arc has a radius of curvature, and wherein the radius of curvature becomes smaller at the first and second shortened side surfaces.

4. The door molding of claim 2 wherein the front surface, the first and second elongated side surfaces and the first and second shortened side surfaces comprise textured surfaces.

5. The door molding of claim 1 wherein the second elongated side surface forms a right angle with the back surface.

6. The door molding of claim 1 wherein the front surface comprises a dome-shaped surface.

7. The door molding of claim 1 wherein the first and second shortened side surfaces comprise rounded surfaces curved in a direction from the back surface toward the front surface.

8. The door molding of claim 1 further comprising a plurality of interior walls extending from the back surface into an interior region of the door molding wherein a plurality of interior walls define cavities within the door molding.

9. The door molding of claim 8 wherein each of the cavities comprises funnel-shaped indentations in the back surface.

10. The door molding of claim 1 wherein the door molding comprises a thermoplastic material.

11. The door molding of claim 10 wherein the door molding comprises a blow molded thermoplastic material.

12. The door molding of claim 10 wherein the thermoplastic material comprises a copolymer of acrylonitrile, butadiene, and styrene.

13. In combination, a door of a walk-in cooler and a door molding mounted on the door, the door molding comprising:
   a) a rectangular base having two elongated sides and two ends;
   b) a domed front surface opposite the rectangular base;
   c) a beveled surface extending between one of the elongated sides to the domed front surface;
   d) rounded end surfaces extending between the ends to the domed front surface; and
   e) an elongated side surface extending between the other of the elongated sides to the domed front surface.

14. The combination of claim 13 wherein the domed front surface, the beveled surface, the elongated side surface, and the rounded end surfaces comprise textured surfaces.

15. The combination of claim 13 wherein the molding in mounted adjacent to either a top end or a bottom end of the door, and the beveled surface comprises a flat surface inclined in a direction from the rectangular base toward the domed front surface and toward the end of the door on which the molding is mounted.

16. The combination of claim 13 wherein the domed front surface and the beveled surface join at a corner forming a convex arc wherein the convex arc has a angle of curvature, and wherein the angle of curvature becomes greater at the rounded end surfaces.

17. The combination of claim 13 wherein the door comprises an inner and outer panel with an insulation material therebetween.

18. The combination of claim 13 wherein the door molding is located in proximity to an upper edge of the door and the beveled surface faces toward a lower edge of the door.

19. The combination of claim 13 wherein the door molding is located in proximity to a lower edge of the door and the beveled surface faces toward an upper edge of the door.

20. The combination of claim 13 wherein the door molding comprises a thermoplastic material.

21. The combination of claim 20 wherein the door molding comprises a blow molded thermoplastic material.

22. The combination of claim 20 wherein the thermoplastic material comprises a copolymer of acrylonitrile, butadiene, and styrene.

23. A molding mounted on a door that closes an opening into a food chilling compartment, the molding comprising:
   a) a base substantially parallel to a horizontal edge of the door and extending from one vertical side of the door to the opposite vertical side, the base having a back surface adjacent to a door face;
   b) a convex outer surface;
   c) an elongated side proximate to the horizontal edge of the door and substantially perpendicular to the door face and extending from the base to the convex outer surface;
   d) a beveled side opposite the elongated side and extending from the base to the convex outer surface;
   e) rounded sides adjacent to the vertical sides of the door and extending from the base to the convex outer surface; and
   f) a plurality of interior walls in the base extending from the back surface toward the convex outer surface.

24. The molding of claim 23 wherein the door molding comprises a thermoplastic material.

25. The molding of claim 24 wherein the door molding comprises a blow molded thermoplastic material.

26. The molding of claim 24 wherein the thermoplastic material comprises a copolymer of acrylonitrile, butadiene, and styrene.

27. The molding of claim 23 wherein the plurality of interior walls define a plurality of cavities extending from the back surface into an interior region of the door molding.

28. The molding of claim 27 wherein each of the plurality of cavities comprises funnel-shaped indentations in the back surface.

29. A walk-in cooler door molding having a cross-sectional configuration comprising:
   a) a back surface and an elongated side surface intersecting the back surface at substantially a right angle;
   b) a beveled side surface inclined toward the back surface and intersecting the back surface at an acute angle; and
   c) a convex outer surface intersecting the top surface and the beveled side surface.

30. A door molding comprising a rectangular base of two opposed elongated side surfaces intersecting two opposed shortened side surfaces and a front side having a convex surface opposite the base and joining the two opposed elongated side surfaces and the two opposed shortened side surfaces wherein one of the two opposed elongated side surfaces is inclined toward the convex surface.
31. The door molding of claim 30, wherein the door molding is mounted to a door closing an opening into a structure selected from the group consisting of a tool compartment, a food storage compartment, and a warehouse.

32. The door molding of claim 30, wherein the door molding comprises a molding that extends across a portion of a face surface of a door.

33. The door molding of claim 30, wherein the door molding comprises a plurality of door molding sections arranged across a face surface of a door.

34. A method of fabricating a door molding for a walk-in food chilling compartment, where the door molding includes a rectangular base of two opposed elongated side surfaces intersecting two opposed shortened side surfaces and a front side having a convex surface opposite the base and joining the two opposed elongated side surfaces and the two opposed shortened side surfaces wherein one of the two opposed elongated side surfaces is inclined toward the convex surface and a plurality of cavities in the base, the method comprising:

a) providing a mold having a cavity that is configured to form the door molding;

b) providing a thermoplastic material; and

c) flowing the thermoplastic material into the mold.

35. The method of claim 34 wherein flowing the thermoplastic material comprises blow molding.

36. The method of claim 35 wherein providing a thermoplastic material comprises providing a copolymer of acrylonitrile, butadiene, and styrene.

37. In combination a door and two door moldings mounted on the door wherein each of the door moldings comprises a rectangular base of two opposed elongated side surfaces intersecting two opposed shortened side surfaces and a front side having a convex surface opposite the base and joining the two opposed elongated side surfaces and the two opposed shortened side surfaces wherein one of the two opposed elongated side surfaces is inclined toward the convex surface.

38. The combination of claim 37 wherein two door moldings are mounted on the door such that the elongated side surface that is inclined toward the convex surface of each door molding face each other.

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