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(54) Support assembly for a refrigerated display case

(57) A refrigerated display case (10) for maintaining food product at a desired temperature. The refrigerated display case includes a case (12), a refrigeration system, a support assembly (32), and a glass pane (18). The case at least partially defines a product display area (14) for supporting and displaying the food product. The refrigeration system supplies refrigerated air to the product display area. The support assembly (32) includes a plurality of support brackets (34), a decorative assembly (36), and a glass support assembly (38). The brackets (34) are coupled to a front portion of the case (12) and each is separated from an adjacent support bracket by a distance (D). The decorative assembly (36) is coupled to portions of the adjacent support brackets (34) and the glass support assembly (38) is coupled to other portions of the adjacent support brackets (34). The glass pane (18) at least partially defines the product display area (14) and includes a lower edge (74) supported by the glass support assembly (38).

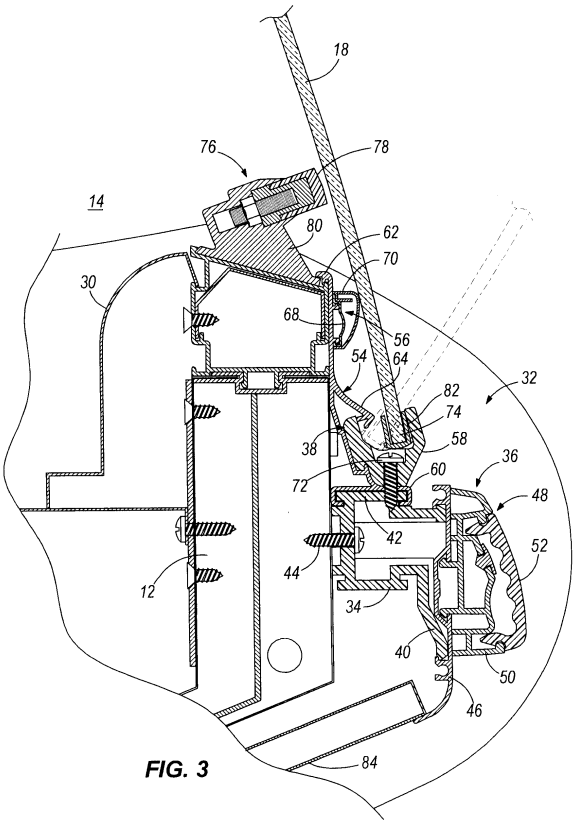

FIG. 3

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Description

BACKGROUND

[0001] The present invention relates to refrigerated display cases and, more particularly, to support assemblies for refrigerated display cases.

[0002] Many known methods of assembling a refrigerated display case exist. Generally, these methods include securing individual components directly to the case with fasteners such as screws. The number and placement of these components generally increase assembly time, complicate case maintenance, and restrict airflow passageways that can be utilized to enhance operation of the refrigerated display case.

SUMMARY

[0003] In one embodiment, the invention provides a refrigerated display case for maintaining food product at a desired temperature. The refrigerated display case includes a case, a refrigeration system, a support assembly, and a glass pane. The case at least partially defines a product display area for supporting and displaying the food product. The refrigeration system supplies refrigerated air to the product display area. The support assembly includes a plurality of support brackets, a decorative assembly, and a glass support assembly. The brackets are coupled to a front portion of the case and each is separated from an adjacent support bracket by a distance. The decorative assembly is coupled to portions of the adjacent support brackets and the glass support assembly is coupled to other portions of the adjacent support brackets. The glass pane at least partially defines the product display area and includes a lower edge supported by the glass support assembly.

[0004] Other aspects of the invention will become apparent by consideration of the detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Fig. 1 is a perspective view of a refrigerated display case according to one embodiment of the present invention.

[0006] Fig. 2 is an exploded view of the refrigerated display case shown in Fig. 1.

[0007] Fig. 3 is a cross-section view taken along line 3-3 in Fig. 1.

[0008] Fig. 4 is an exploded view of a locking assembly for a refrigerated display case according to another embodiment of the invention.

[0009] Fig. 5 is a cross-section view taken along line 5-5 of Fig. 4, illustrating the locking assembly in a locked condition.

[0010] Fig. 6 is a view similar to Fig. 5, illustrating the locking assembly in an unlocked condition.

DETAILED DESCRIPTION

[0011] Before any embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. Unless specified or limited otherwise, the terms "mounted," "connected," "supported," and "coupled" and variations thereof are used broadly and encompass both direct and indirect mountings, connections, supports, and couplings. Further, "connected" and "coupled" are not restricted to physical or mechanical connections or couplings.

[0012] Fig. 1 illustrates a refrigerated display case 10 according to one embodiment of the present invention. The illustrated refrigerated display case 10 is known as a deli-style case. The present invention is not limited to use with deli-style cases but can also be used on other cases that support, display, and maintain food products at a desired temperature. The refrigerated display case 10 includes a case 12 that defines a product display area 14 in combination with side glass panes 16, a forward glass pane 18, and rearward, sliding glass doors 20. The sliding glass doors provide a merchant with selective access the product display area 14. The side glass panes 16 and the sliding glass doors 20 are at least partially supported by frame members 22 of the case 12. The forward glass pane 18 is at least partially supported by a cross-frame member 24 that extends across and is coupled to the frame members 22. The upper edge 26 of the front glass pane 18 is releasably coupled to the cross-frame member 24. The front glass pane 18 is curved and defines the dominant viewing window of the refrigerated display case 10.

[0013] The refrigerated display case 10 includes a refrigeration system (not shown) that provides refrigerated airflow to the product display area 14. Although not shown, the refrigeration system generally includes an evaporator located within an air passageway internal to the case 12. Remotely located compressors compress a gaseous refrigerant and direct the compressed refrigerant to an exterior condenser where the refrigerant is cooled and condensed into a liquid refrigerant that is directed to the evaporator. Prior to reaching the evaporators, the liquid refrigerant is forced through an expansion valve converting the refrigerant into a two-phase fluid. The two-phase refrigerant absorbs heat from air being directed though the evaporator by a fan. The refrigerant generally leaves the evaporator in a superheated condi-

tion and is routed back to the compressor for recycling. The cooled air exiting the evaporator is directed through the remainder of the air passageway and is introduced into the product display area 14 through an outlet located in the rear wall of the case 12. The outlet includes louvers 28 to direct the air into the product display area 14 where it will remove heat from the displayed food products and maintain the food products at the desired temperature. After being circulated through the product display area 14, the warmed air is routed back into the air passageway through an inlet located in a front wall or forward portion of a bottom surface of the product display area 14. The inlet is covered with a grill 30 (Fig. 3) to prevent debris from entering into the air passageway. The air returning into the air passageway is again circulated through the evaporator by the fan.

[0014] The refrigerated display case 10 includes a support assembly 32. With further reference to Figs. 2 and 3, the support assembly 32 includes three support brackets 34 connected to the front of the case 12, a decorative assembly 36 coupled to the front of the support brackets 34, and a glass support assembly 38 coupled to the top of the support brackets 34. The support brackets 34 are separated from each other by a distance D and are equally spaced across the length L of the case 12. Although three support brackets 34 are illustrated, two support brackets or more than three support brackets can also be used. Also, the spacing between adjacent support brackets 34 is not required to be consistent across the length L of the case 12.

[0015] The support bracket 34 can be made from a plastic material and can be molded. The support bracket 34 includes a rear portion, a top portion extending forwardly from the top of the rear portion, a bottom portion extending forwardly from the bottom of the rear portion, and a flange 40 extending downwardly from the forward end of the bottom portion. The upper portion includes a raised, undercut surface 42. A screw 44 extends through a hole in the rear portion and into a front portion of the case 12 to secure the support bracket 34 to the case 12.

[0016] The decorative assembly 36 includes a lower decorative panel 46 and a bumper assembly 48. The lower decorative panel 46 is a substantially planar extrusion. The extrusion can be manufactured with a metal or plastic material. The lower decorative panel 46 includes two rearwardly projecting tabs that are used to connect the distal ends of the top portion and flange 40 of the support bracket 34 via a snap-fit. The lower decorative panel 46 includes a curved portion that curves rearwardly from the bottom edge of the panel 46. The curved portion partially supports a fan 84 or series of fans to the front of the case 12. The front of the lower decorative panel 46 includes a slot having inwardly-projecting ribs on the top and bottom of the slot.

[0017] The bumper assembly 48 includes a bumper support bracket 50 and a bumper 52. The bumper support bracket 50 can be a metal or plastic extrusion. The front of the bracket 50 includes upper and lower channels. Each channel includes a rib extending inwardly into the channel. The rear of the bracket 50 includes a clip that snap-fits into the slot of the lower decorative panel 46. The bumper 52 can be an extrusion made from rubber, urethane, or other resilient material. The bumper 52 includes a front face and two rearwardly extending legs that are received into the upper and lower channels. The legs also include grooves that receive the ribs when assembled. The bumper 52 is located near the bottom of the case to prevent carts and other equipment from damaging the front of the refrigerated display case 10.

[0018] The glass support assembly 38 includes an upper decorative panel 54, a gasket 56, and glass support channels 58. The upper decorative panel 54 can be a plastic or metal extrusion. The upper decorative panel 54 includes a lower portion that defines a downwardly-opening channel 60. The upper decorative panel 54 also includes an upper portion that defines a hook portion 62. The channel 60 is snap-fit to the undercut surface 42 of the support bracket 34 and the hook portion 62 is engaged to a mating edge of the case 12. The front of the upper decorative panel 54 includes a flange 64 that extends downwardly from a central portion of the panel 54. The top portion of the panel 54 also includes a clip that extends forwardly from the front surface of the panel 54.

[0019] The gasket 56 includes a backing member 68 and a gasket portion 70 adhered to the backing member 68. The gasket portion 70 can be an extrusion made from a rubber, urethane, or other compressible and resilient material. The gasket portion 70 includes a smooth front surface and a rear surface that matches the contour of the backing member 68. The backing member 68 includes a ribbed recess that allows the gasket to be snap-fit to the clip of the upper decorative panel 54.

[0020] The glass support channels 58 are fastened by screws 72 to the lower portion of the upper decorative panel 54 and the support bracket 34. The glass support panels 58 are positioned adjacent each end of the glass pane 18. A single fastener 72 can be used at a central location along the length of the glass support channel 58 because of the configurations of the glass support channel 58 and the upper decorative panel 54. More specifically, the glass support channel 58 includes front and rear walls extending upward from a base to define a channel. The rear wall is positioned within a cavity defined at least partially by the central flange 64 of the upper decorative panel 54. In addition, the upper decorative panel 54 includes an upwardly extending rib that is received by a corresponding groove in the glass support channel 58. The channel receives a lower edge 74 of the glass pane 18. Although only two glass support channels 58 are shown, a single glass support channel or more than two glass support channels can be used.

[0021] The refrigerated display case 10 includes three levelers 76. Although three levelers 76 are shown, less or more than three levelers can be used. Each leveler 76 includes a pad 78 that extends from a base 80 toward the glass pane 18. The pad 78 is adjustable to vary the

distance that the pad 78 extends from the base 80 to level the position of the glass pane 18 across the length L of the case 12. The base 80 includes projections that snap-fit between a rearward groove of the case 12 and a forward groove defined by the case 12 and the hook portion 62 of the upper decorative panel 54.

[0022] Lower edge covers 82 are used on each end of the lower edge 74 of the glass pane 18. The edge covers 82 protect the glass pane 18 while the glass pane 18 is supported and moved within the glass support channels 58. The lower edge covers 82 are substantially the same length as the glass support channels 58. Although two lower edge covers 82 are shown, a single or more than two edge covers can be used.

[0023] The glass pane 18 can be pivoted about the lower edge 74 to gain convenient access to the rear surface of the glass pane 18 for cleaning. The top edge 26 of the glass pane 18 is released from the cross-frame member 24 and then the glass pane 18 is pivoted forward about the lower end 74 (shown in phantom lines of Fig. 3). When cleaning is finished, the glass pane 18 is pushed back and the top edge 26 is re-secured to the cross-frame member 24.

[0024] Warm or ambient air can be directed over the front surface of the glass pane 18 by activation of the fan 84. The fan draws ambient air in from the front of the refrigerated display case 10 and directs the air between the support brackets 34, through a gap 86 between the decorative assembly and the glass support assembly 38, and across the exterior surface of the glass pane 18 to resist the build up of condensation.

[0025] Another embodiment of the refrigerated display case 110 is illustrated in Figs. 4-6. As best shown in Fig. 4, the lower edge cover 82 and the glass support channel 58 of the embodiment illustrated in Figs. 1-3 can be replaced with the locking assembly 112 and glass support channel 114 shown in Figs. 4-6. The locking assembly 112 includes a lower edge cover 116 substantially similar to the lower edge cover 82 of the prior embodiment except that the lower edge cover 116 includes a centrally located lock member housing 118. The lock member housing 118 is a vertically extending channel that includes side recesses within the channel. The glass support channel 114 is substantially similar to the glass support channel 58 of the prior embodiment except that the glass support channel 114 includes a cutout portion 120. When the glass pane 18 is in the closed position, the lock member housing 118 is received within the cutout 120.

[0026] The locking assembly 112 also includes a lock member 122 including a generally rectangular body, top flange, and side tabs 124. The locking assembly 112 is positioned within the lock member housing 118 such that the side tabs 124 are received within the side recesses of the channel. The side tabs 124 and side recesses limit the extent of possible movement of the locking member 122 relative to the lock member housing 118.

[0027] As shown in Figs. 5 and 6, the locking member 122 is movable between lowered and raised positions. In the lowered position (Fig. 5), a lower portion of the locking member 122 extends from the bottom of the lock member housing 118. When the locking member 122 is in the lowered position, the glass pane 18 is substantially restricted from moving relative to the glass support channel 114 defming a locked condition for the locking assembly 112. In the raised position (Fig. 6), the lower portion of the locking member 122 is positioned within the lock member housing 118. When the locking member 122 is in the raised position, the glass pane 18 is allowed to move relative to the glass support channel 114 defining an unlocked condition for the locking assembly 112.

[0028] Various features and advantages of the invention are set forth in the following claims.

Claims

1. A refrigerated display case for maintaining food product at a desired temperature, the refrigerated display case comprising:

   a case at least partially defining a product display area for supporting and displaying the food product;
   a refrigeration system supplying refrigerated air to the product display area;
   a support assembly having
   a plurality of support brackets coupled to a front portion of the case, each support bracket being separated from an adjacent support bracket by a distance,
   a decorative assembly extending between adjacent support brackets and coupled to portions of the adjacent support brackets,
   a glass support assembly extending between adjacent support brackets and coupled to other portions of the adjacent support brackets; and
   a glass pane at least partially defining the product display area, the glass pane having a lower edge being supported by the glass support assembly.

2. The refrigerated display case of claim 1, wherein the decorative assembly and the glass support assembly are separated from each other by a distance, the distance between the decorative assembly and the glass support assembly defming a gap, wherein airflow is directed between adjacent support brackets, through the gap, and across an outer surface of the glass pane to resist condensation on the outer surface of the glass pane.

3. The refrigerated display case of claim 1, wherein the decorative assembly includes a decorative front panel of the refrigerated display case, the decorative front panel being snap-fit onto the portions of the adjacent support brackets.

4. The refrigerated display case of claim 3, wherein the decorative assembly also includes a bumper assembly coupled to the front panel.

5. The refrigerated display case of claim 5, wherein the bumper assembly includes a bumper support bracket and a bumper, the bumper support bracket being snap-fit onto the decorative front panel and the bumper being snap-fit onto the bumper support bracket.

6. The refrigerated display case of claim 5, wherein the bumper includes a front portion and two leg portions extending rearwardly from the top and bottom edges of the front portion, the two leg portions received within the bumper support bracket, the bumper support bracket at least partially covering the two leg portions from view.

7. The refrigerated display case of claim 1, wherein the glass support assembly includes a decorative front panel, the decorative front panel being snap-fit onto the other portions of the adjacent support brackets.

8. The refrigerated display case of claim 6, wherein the decorative front panel is also coupled to the front portion of the case.

9. The refrigerated display case of claim 6, wherein the glass support assembly includes a gasket snap-fit onto the decorative front panel, the gasket compressed between the glass pane and the decorative front panel.

10. The refrigerated display case of claim 7, wherein the glass support assembly includes a glass support channel coupled to the decorative front panel, wherein the glass support channel receives the lower edge of the glass pane.

11. The refrigerated display case of claim 10, wherein the glass pane is pivotable about the lower edge from a closed position substantially restricting access to the product display area from a front of the case and an open position allowing access to the product display area from the front of the case.

12. The refrigerated display case of claim 11, further comprising a locking assembly coupled to the lower edge of the glass pane, the locking assembly including a locked condition that substantially resists against movement of the glass pane and an unlocked condition that allows movement of the glass pane between the open and closed positions.

13. The refrigerated display case of claim 12, wherein the glass support channel includes a cutout portion, and wherein the locking assembly includes a lower edge cover coupled to the lower edge of the glass pane, the lower edge cover including a lock member housing received within the cutout portion of the glass support channel.

14. The refrigerated display case of claim 13, wherein the locking assembly includes a locking member received within the lock member housing, the locking member movable between first and second positions, the locking assembly being in the locked condition when the locking member is in the first position and the locking assembly being in the unlocked condition when the locking member is in the second position.

15. The refrigerated display case of claim 1, further comprising levelers located along a rear surface of the glass pane, each leveler including a base and a pad extending from the base toward a rear surface of the glass pane, the distance the pad extends from the base being adjustable to control the level of the glass pane.

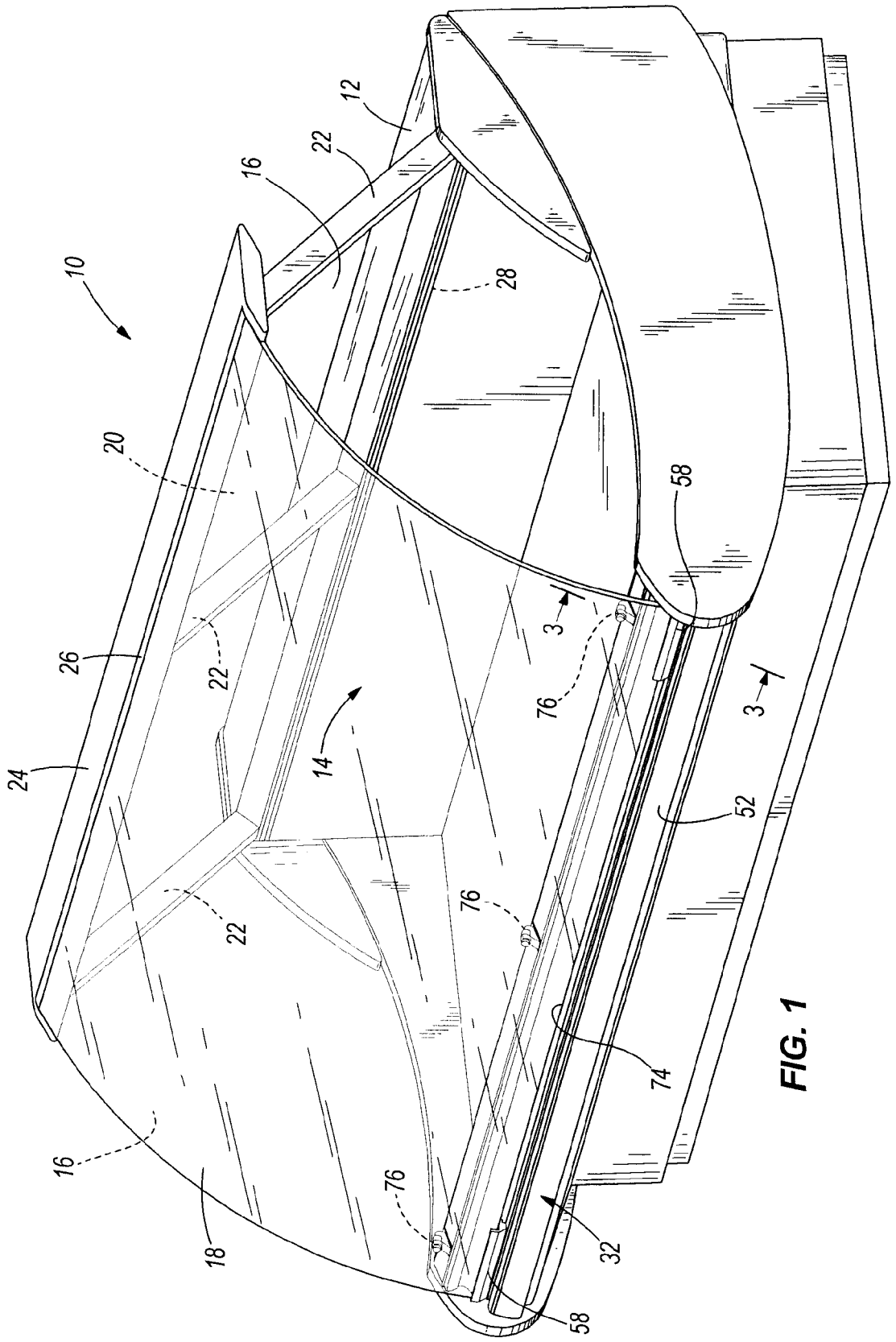

FIG. 1

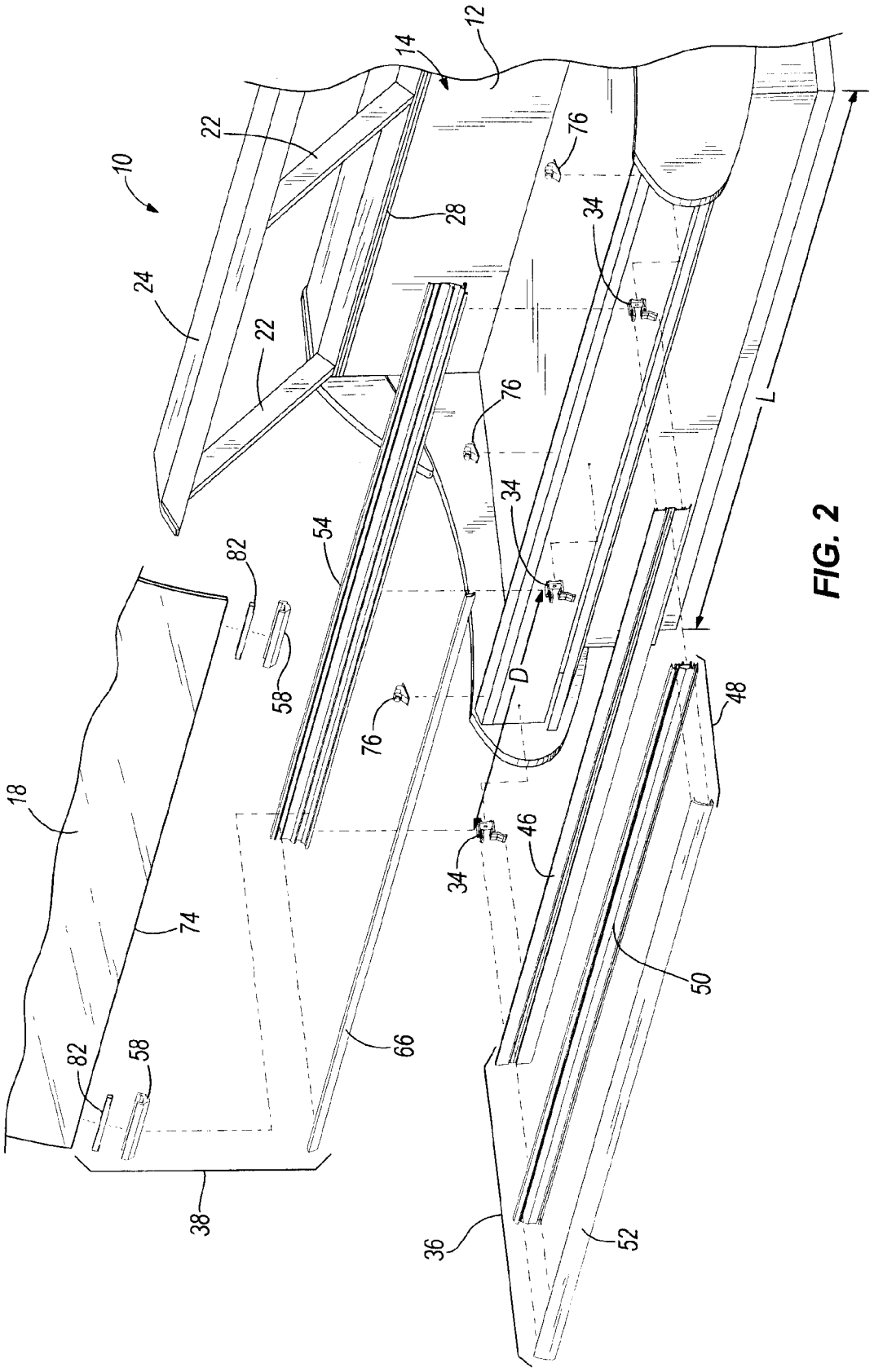
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FIG. 2

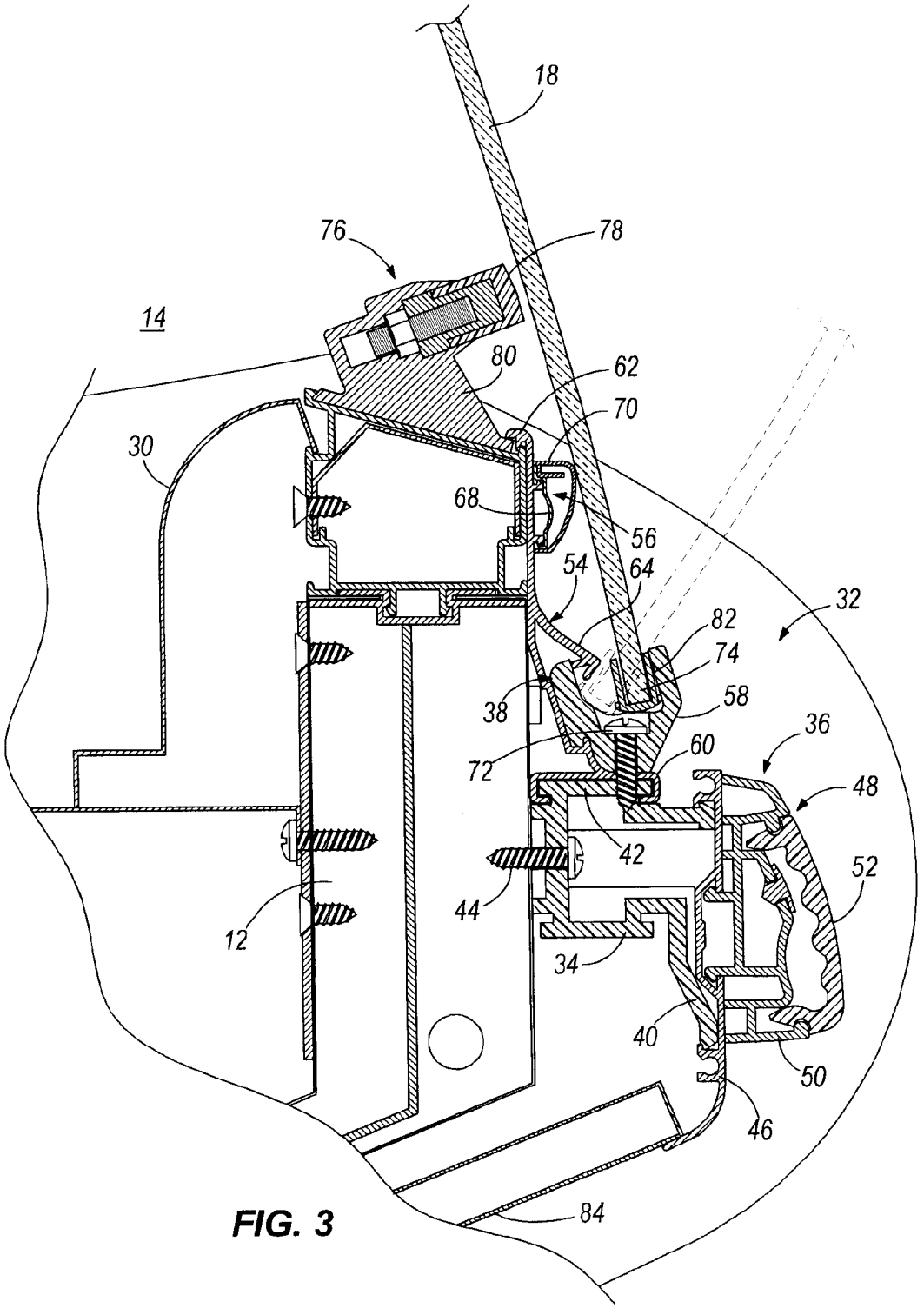
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FIG. 3

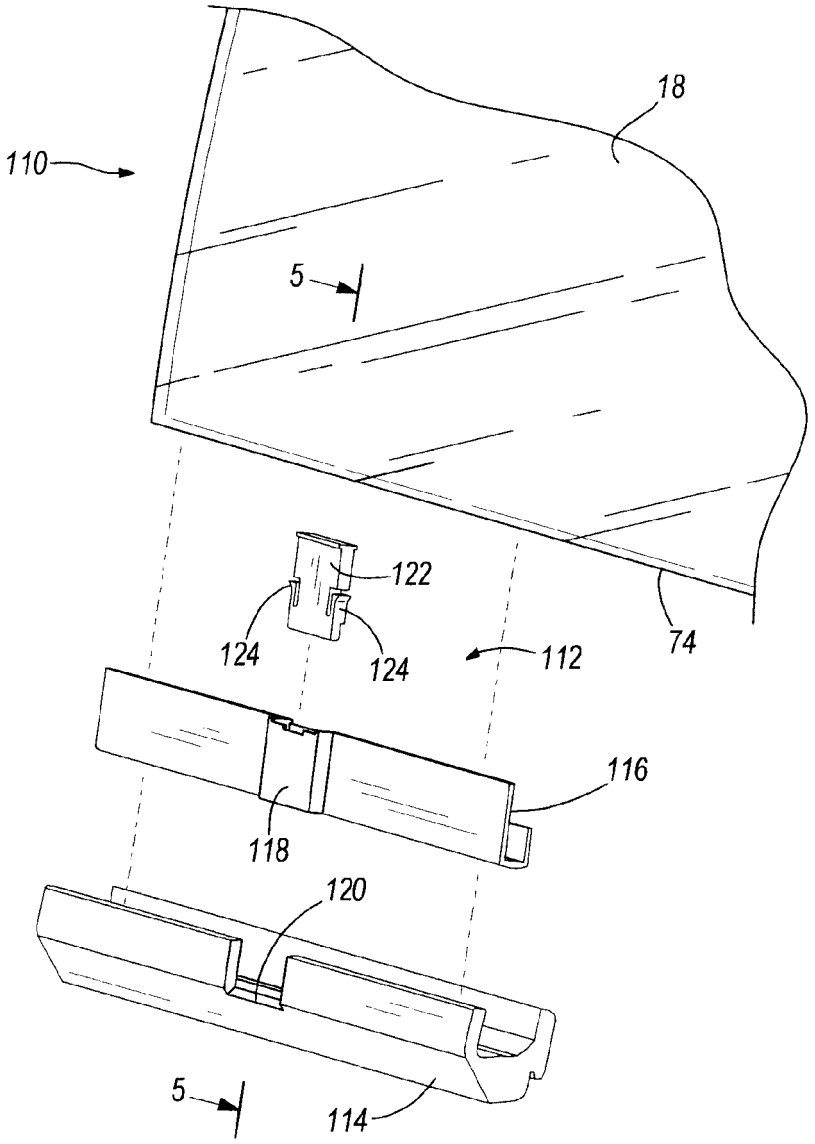

FIG. 4

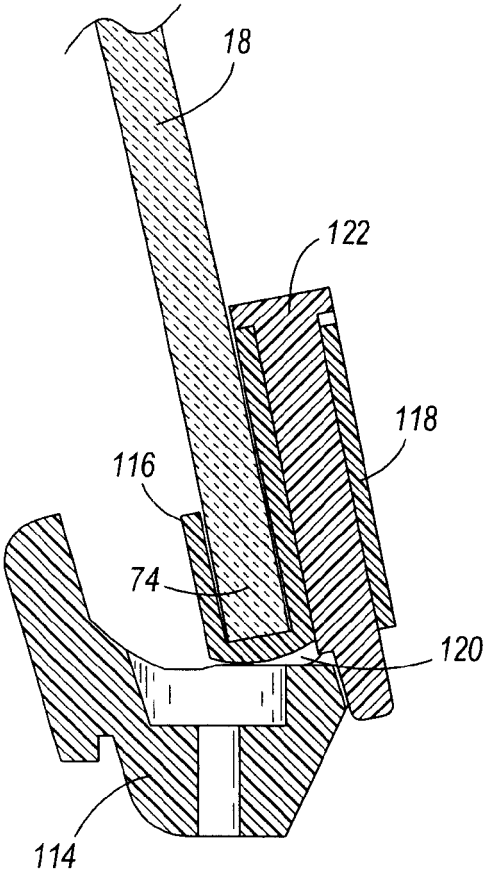

FIG. 5

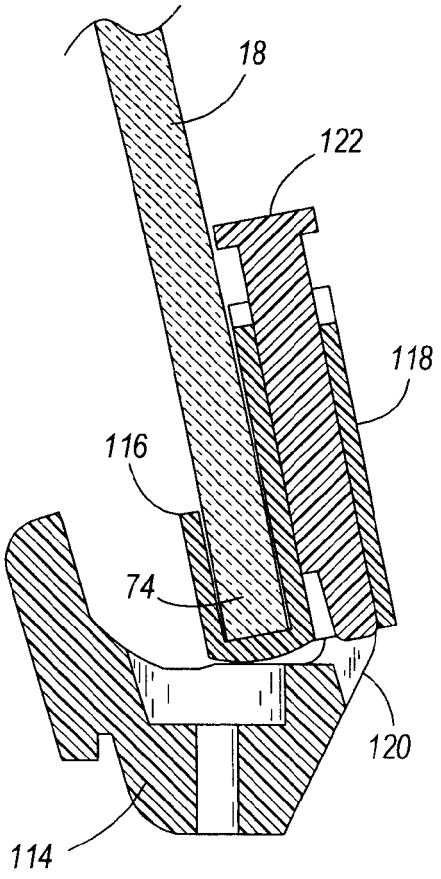

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 July 2005	Alff, R

CATEGORY OF CITED DOCUMENTS

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