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**Kane et al.**

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(54) **CABINETRY SYSTEM HAVING REMOVABLE CABINET FACES**

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(71) Applicant: **Richardson Industries, Inc.**, Sheboygan Falls, WI (US)

(72) Inventors: **Gary R. Kane**, Sheboygan Falls, WI (US); **Adam J. Schneider**, Howards Grove, WI (US); **Jason T. Gudex**, Howards Grove, WI (US)

(73) Assignee: **Richardson Industries, Inc.**, Sheboygan Falls, WI (US)

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*A47B 88/04* (2006.01)

(52) **U.S. Cl.**  
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USPC ..... 312/204, 109, 326, 348.2, 348.4, 285; 49/501; 52/DIG. 4  
See application file for complete search history.

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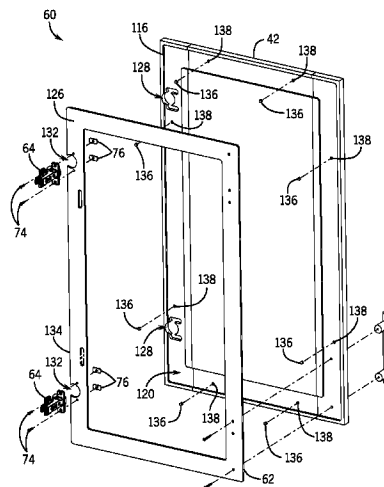
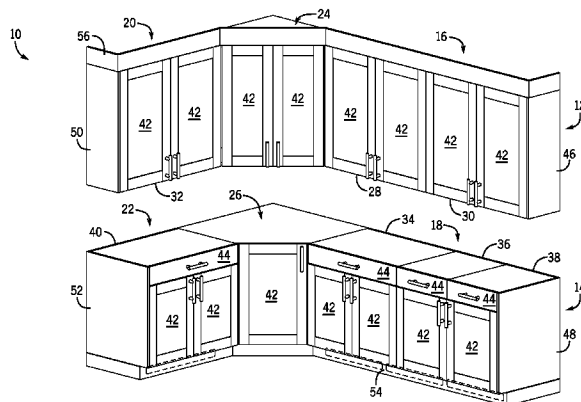
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Primary Examiner — Hanh V Tran  
(74) *Attorney, Agent, or Firm* — Ziolkowski Patent Solutions Group, SC

(57) **ABSTRACT**

A cabinetry system is disclosed herein that includes removable drawer panels, door panels, and trim components, which permit the entire outward appearance of the cabinetry system to be changed within a short period of time. The cabinetry system includes a door assembly having at least one hinge assembly, a metal door plate coupled to the at least one hinge assembly, a door panel having a cavity formed in an inward-facing surface thereof, the cavity sized to receive the metal door plate, and a plurality of magnets coupling the door panel to an outward-facing surface of the metal door plate. After being removed from the cabinets, one set of door and drawer panels may be stored in internal storage components provided within the cabinetry system while a second set of door and drawer panels are in use.

**20 Claims, 21 Drawing Sheets**



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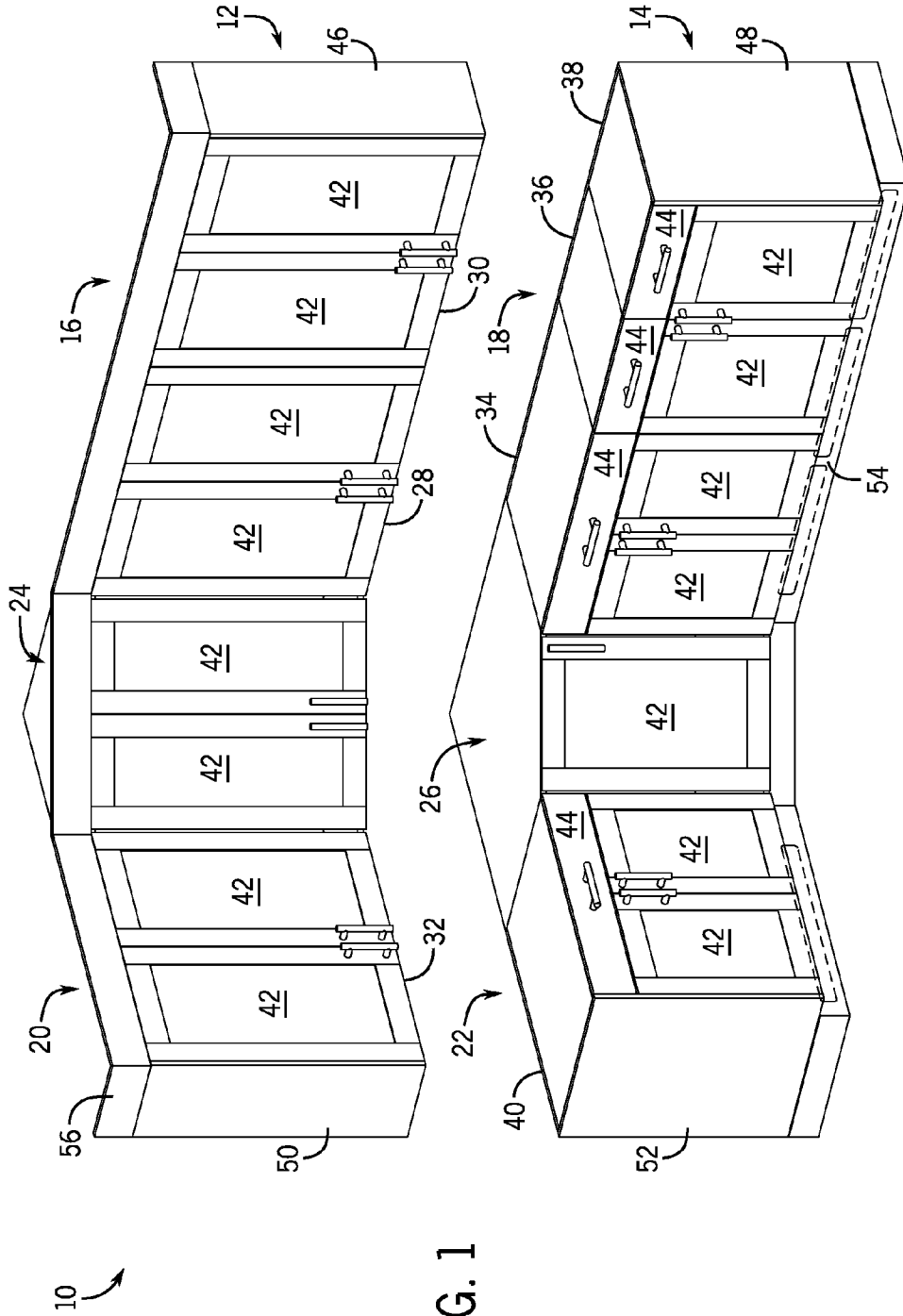
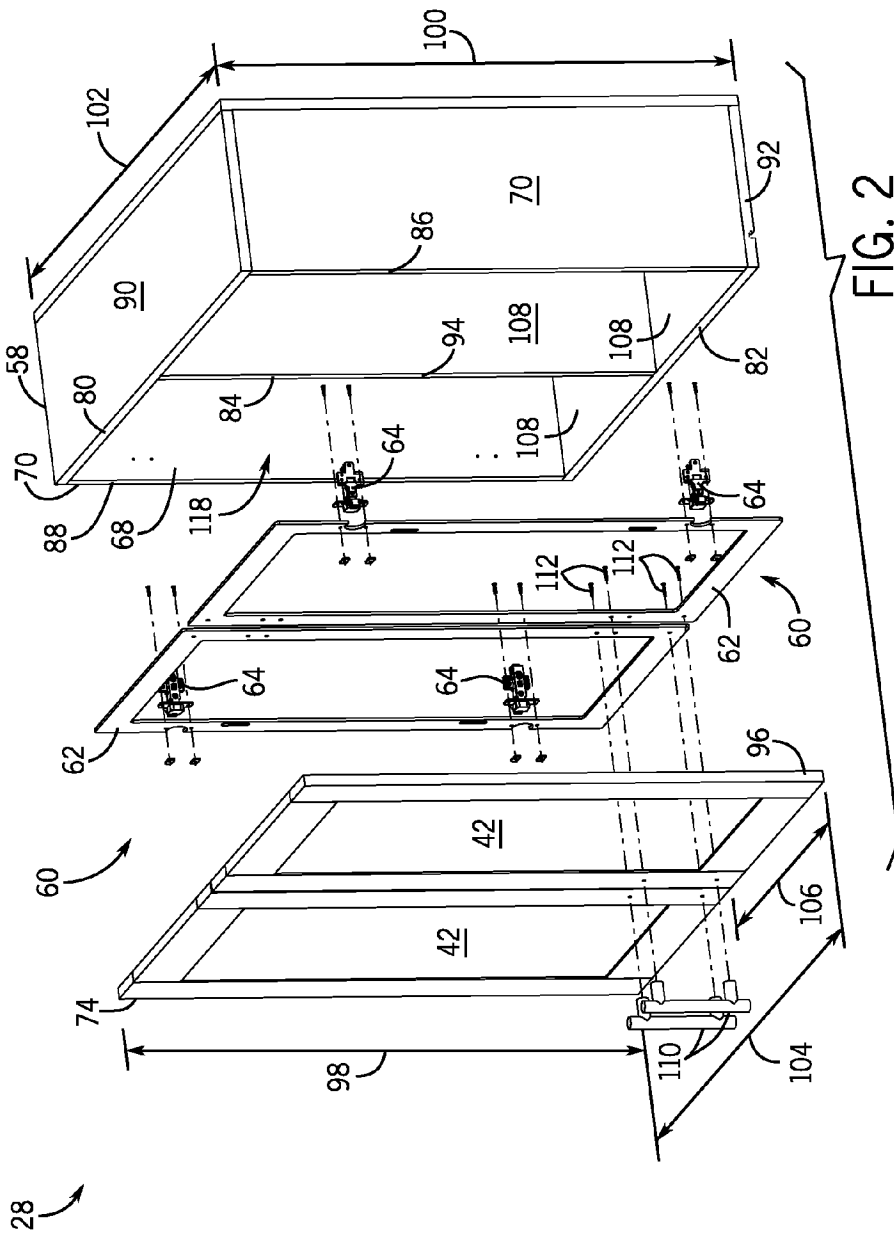


FIG. 1



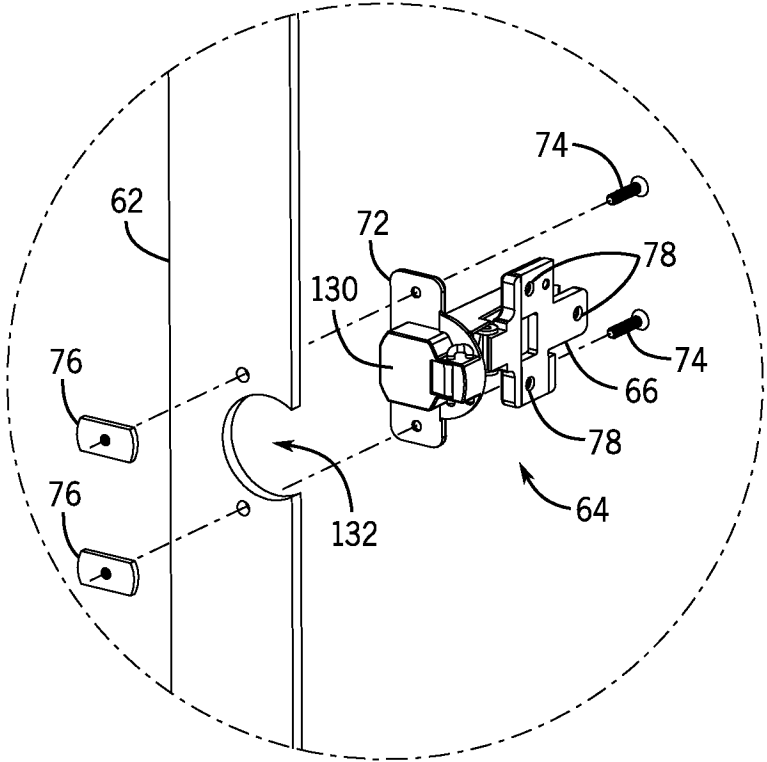
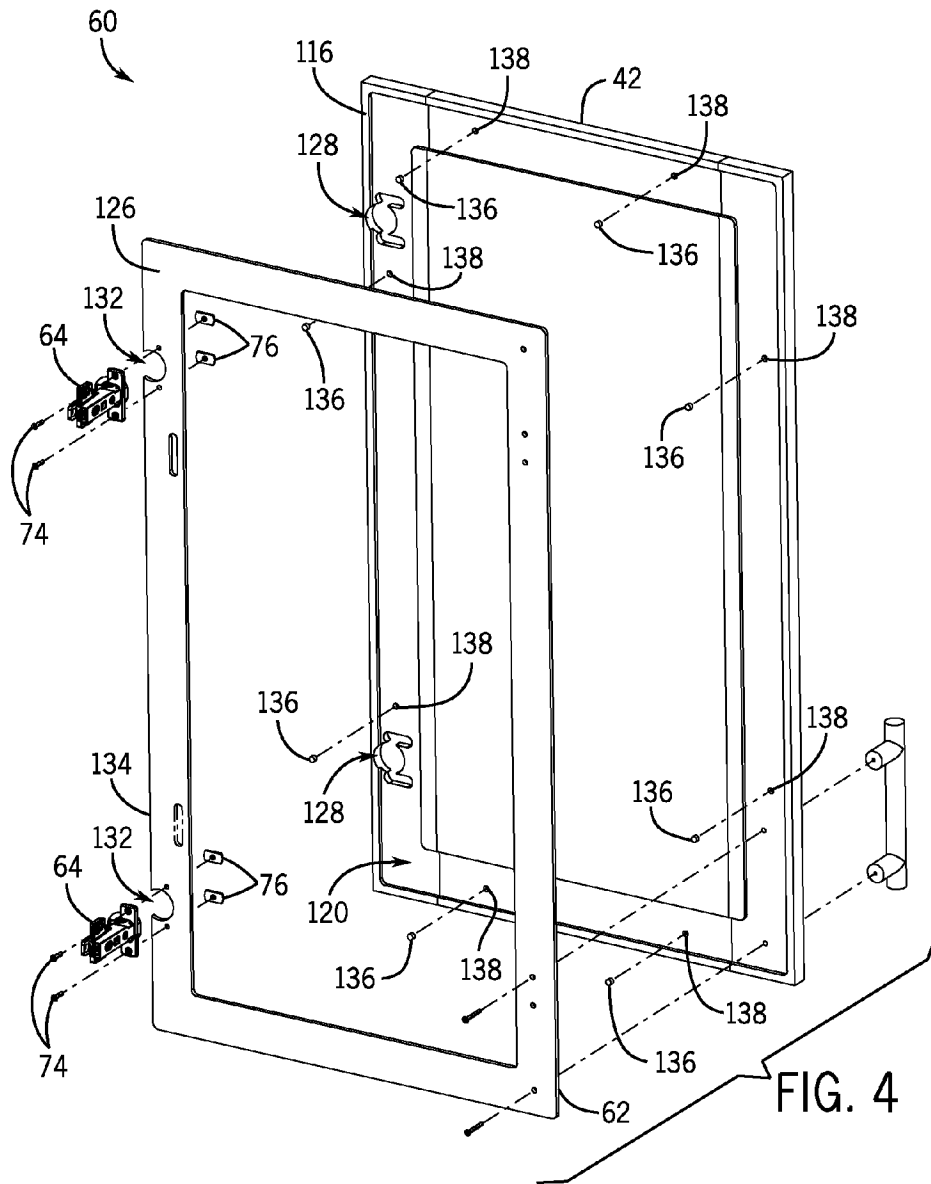


FIG. 3



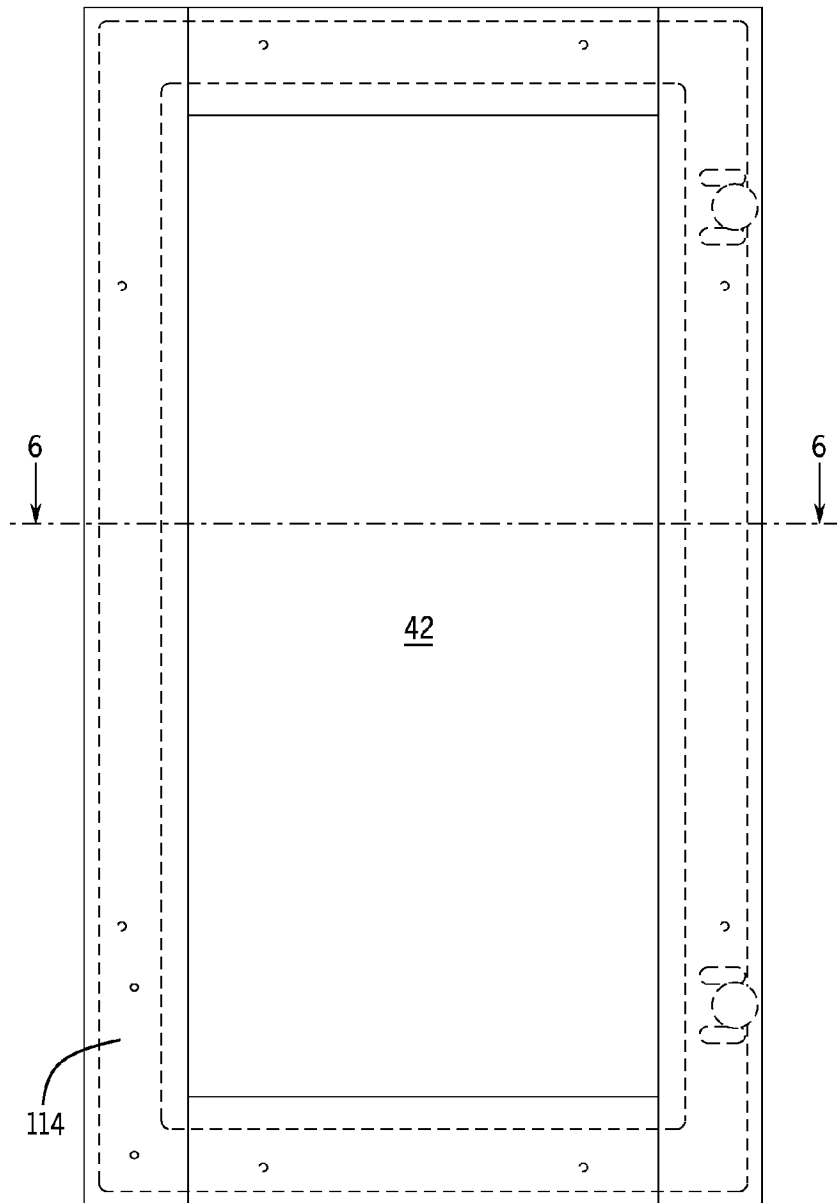


FIG. 5

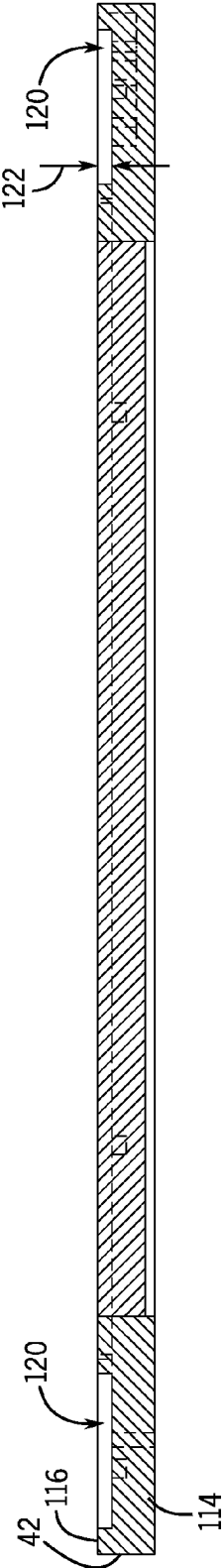


FIG. 6



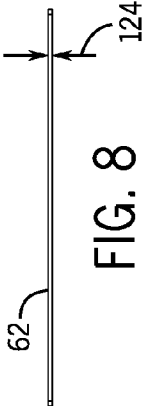


FIG. 8

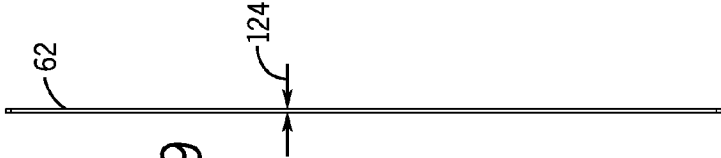


FIG. 9

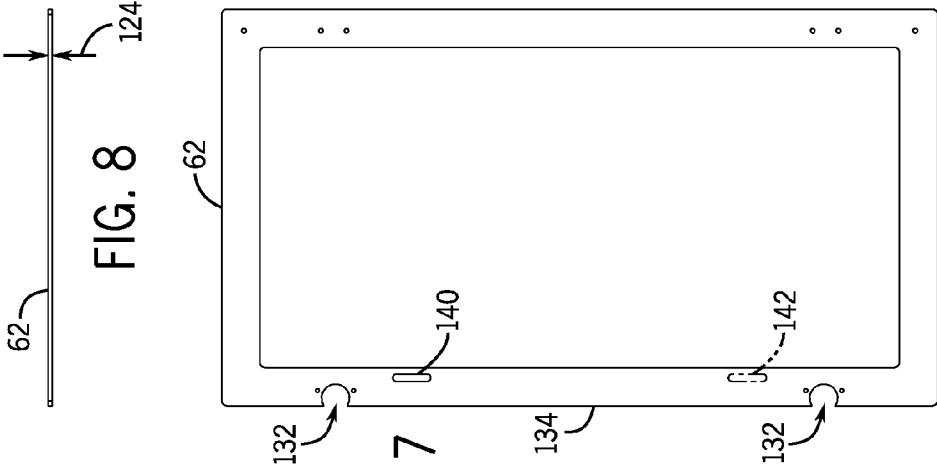


FIG. 7



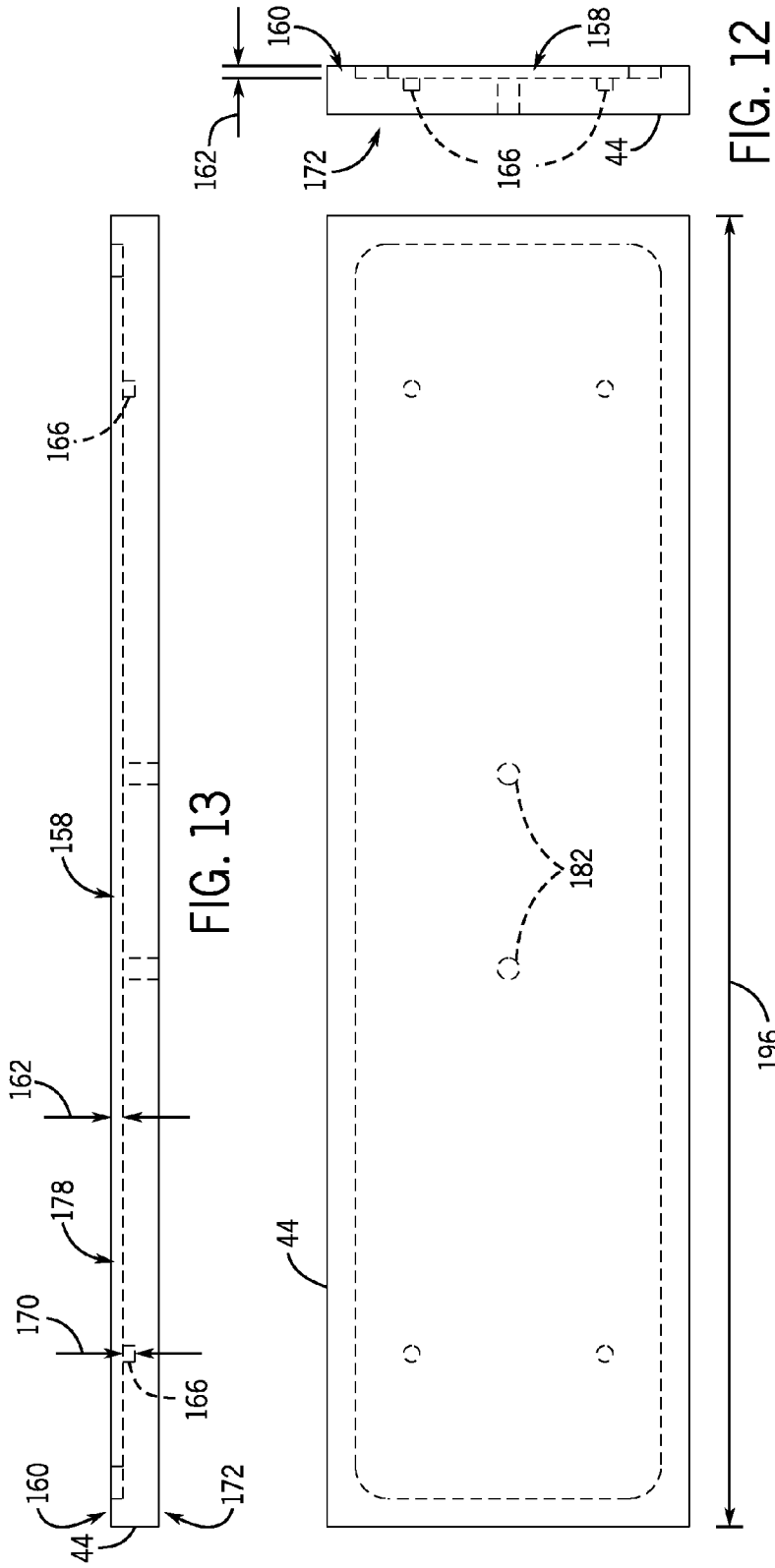


FIG. 13

FIG. 12

FIG. 11

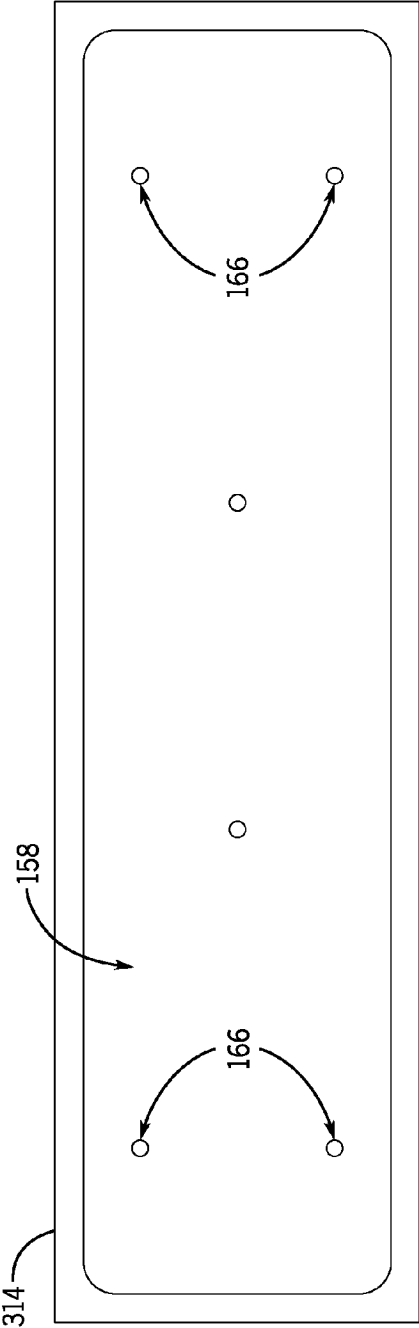


FIG. 14

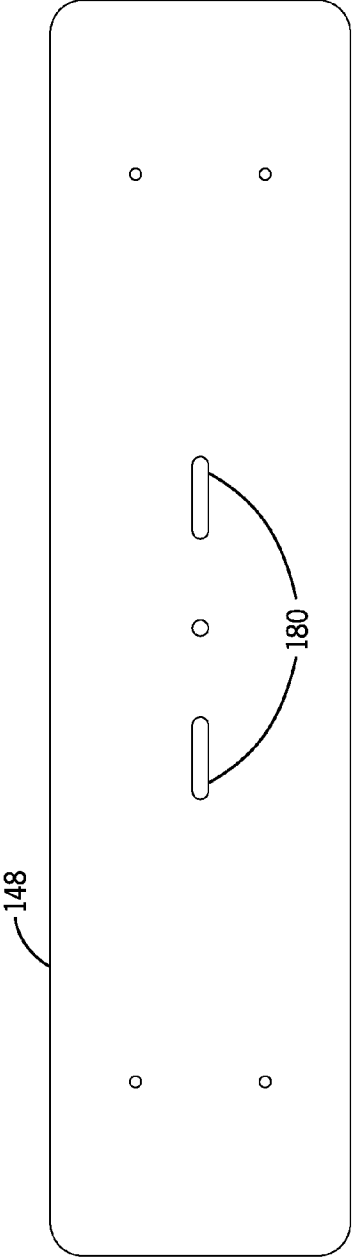


FIG. 15

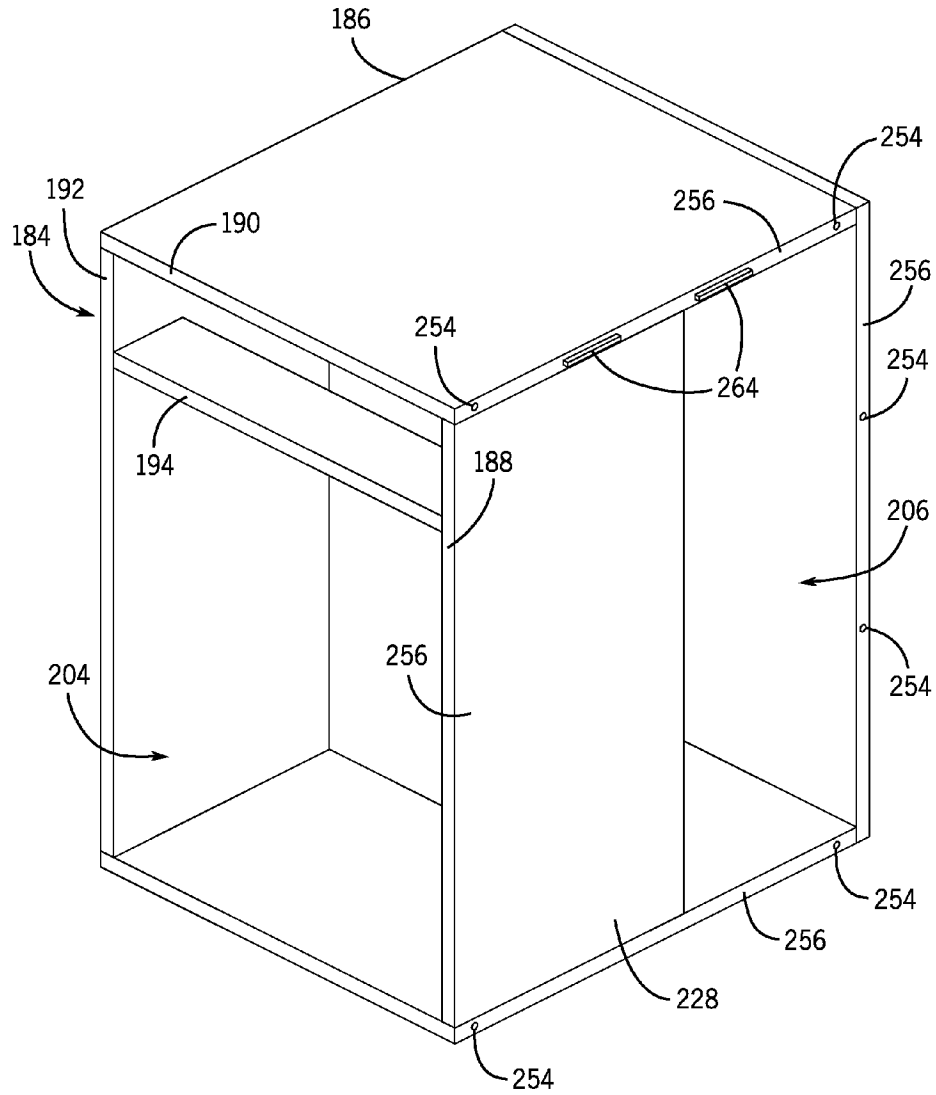


FIG. 16

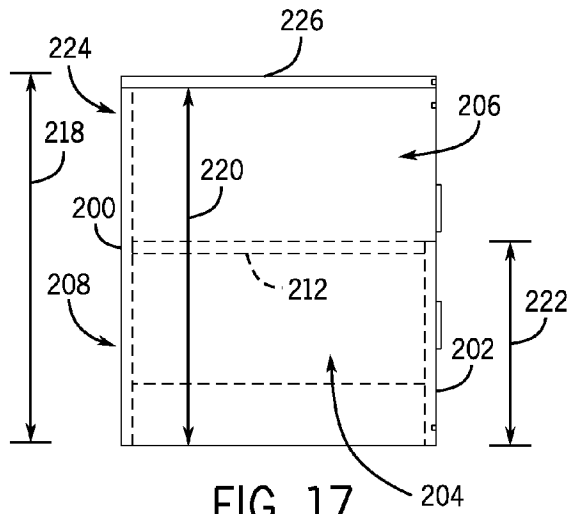


FIG. 17

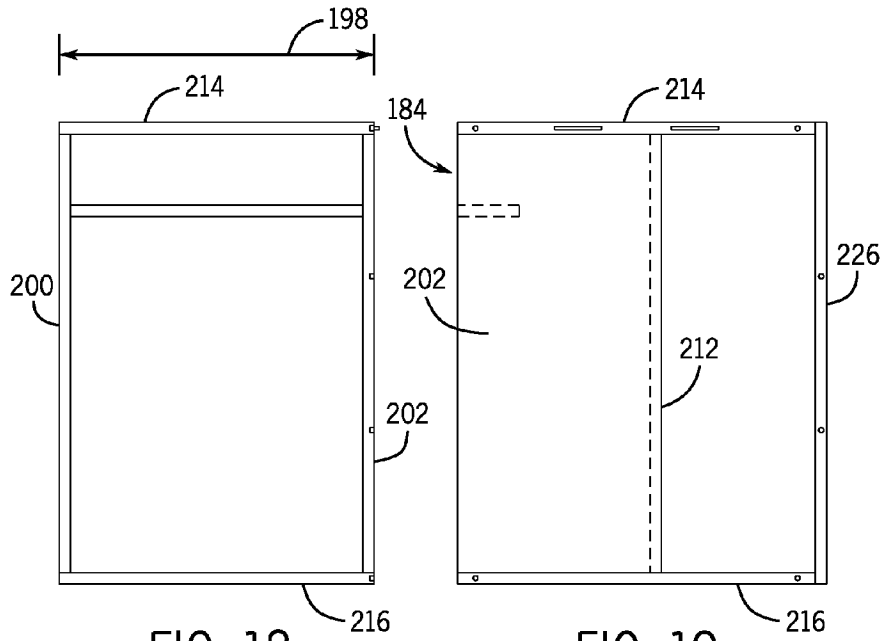


FIG. 18

FIG. 19

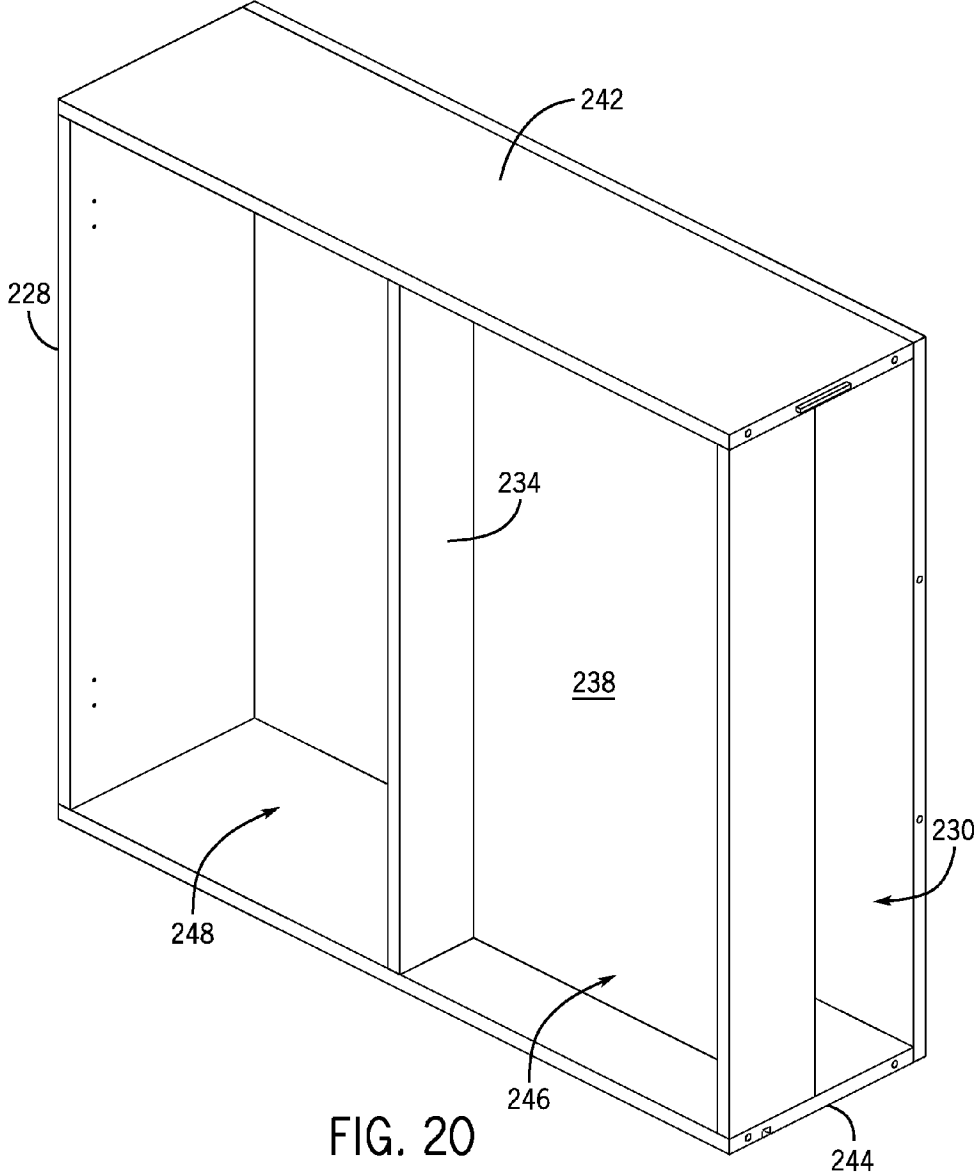


FIG. 20

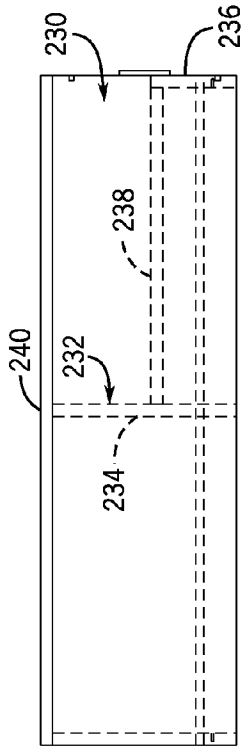


FIG. 21

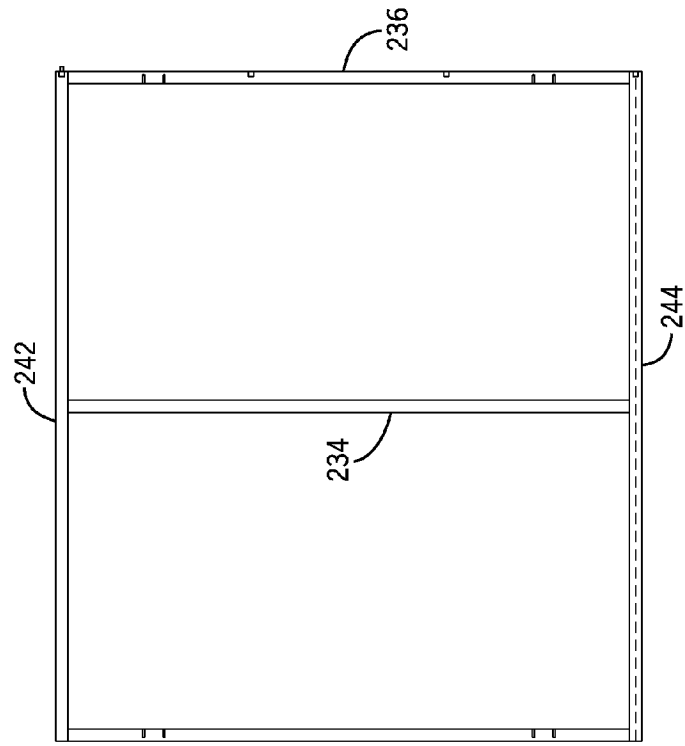


FIG. 22

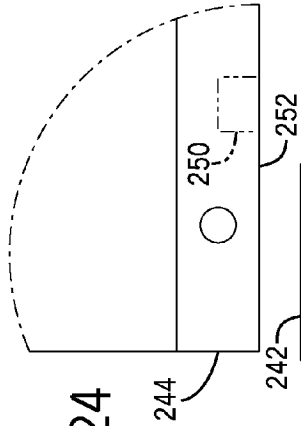


FIG. 24

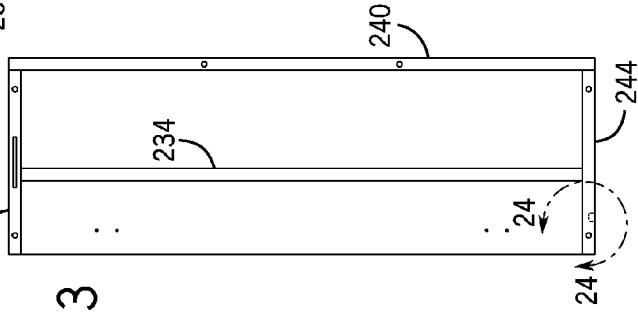
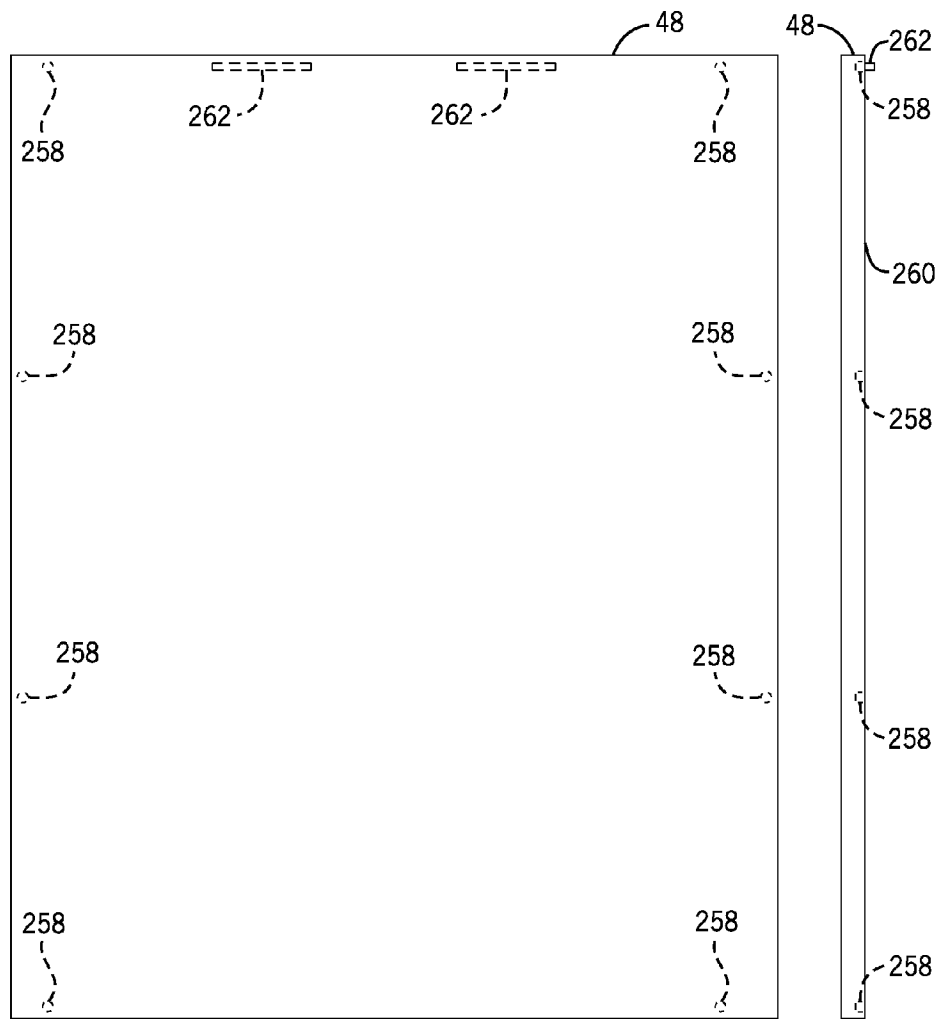
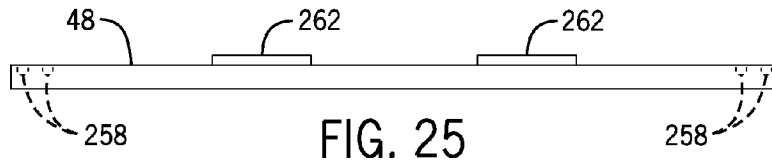
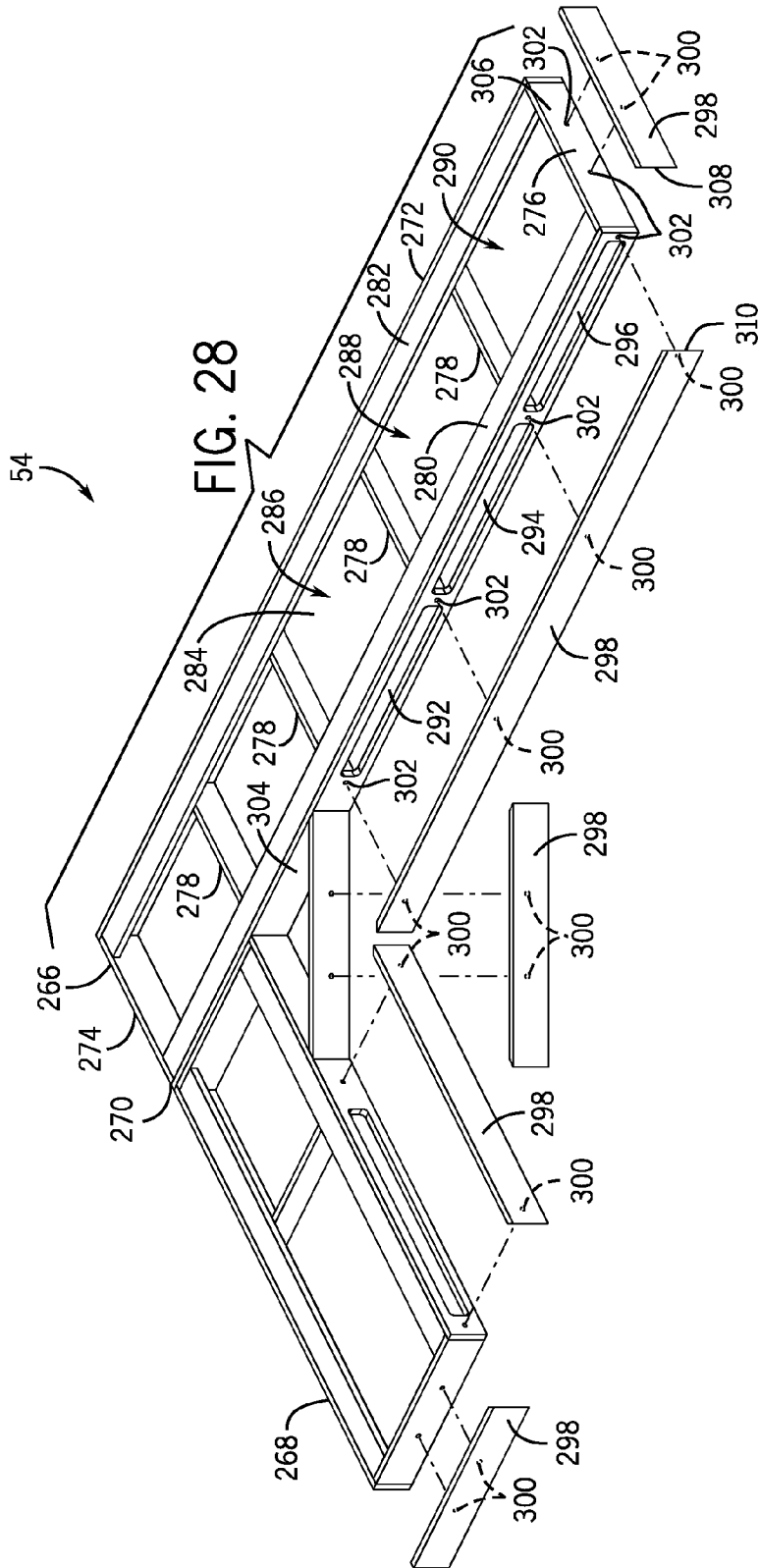


FIG. 23







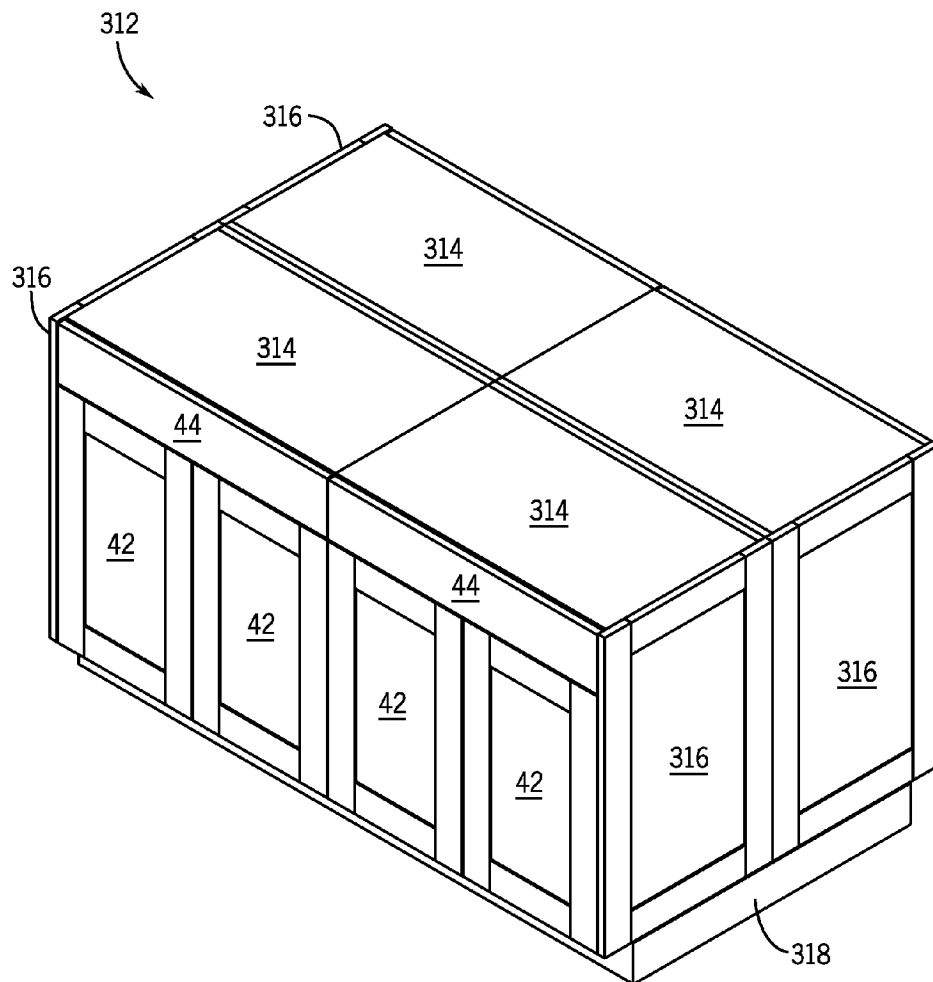
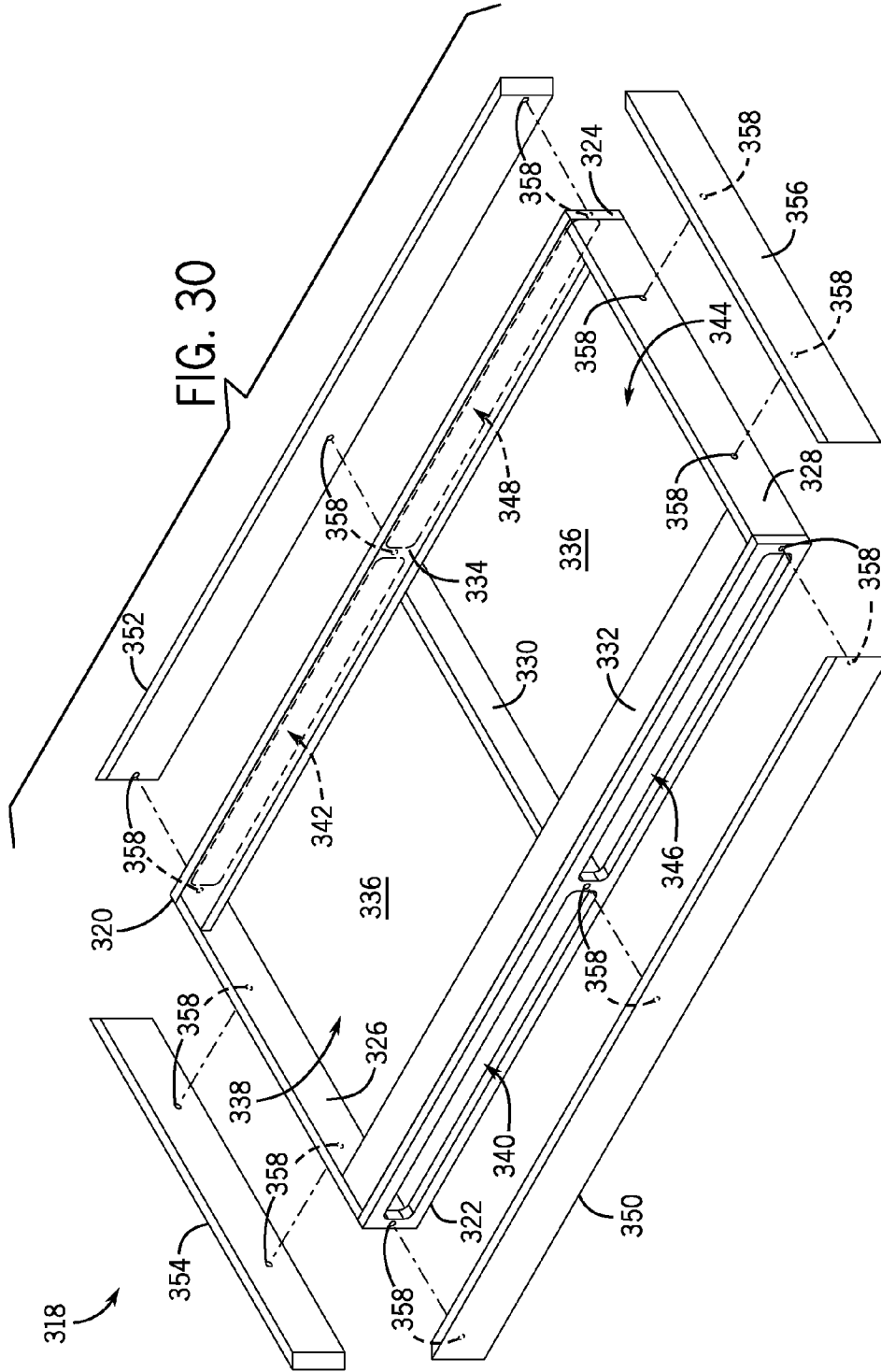


FIG. 29



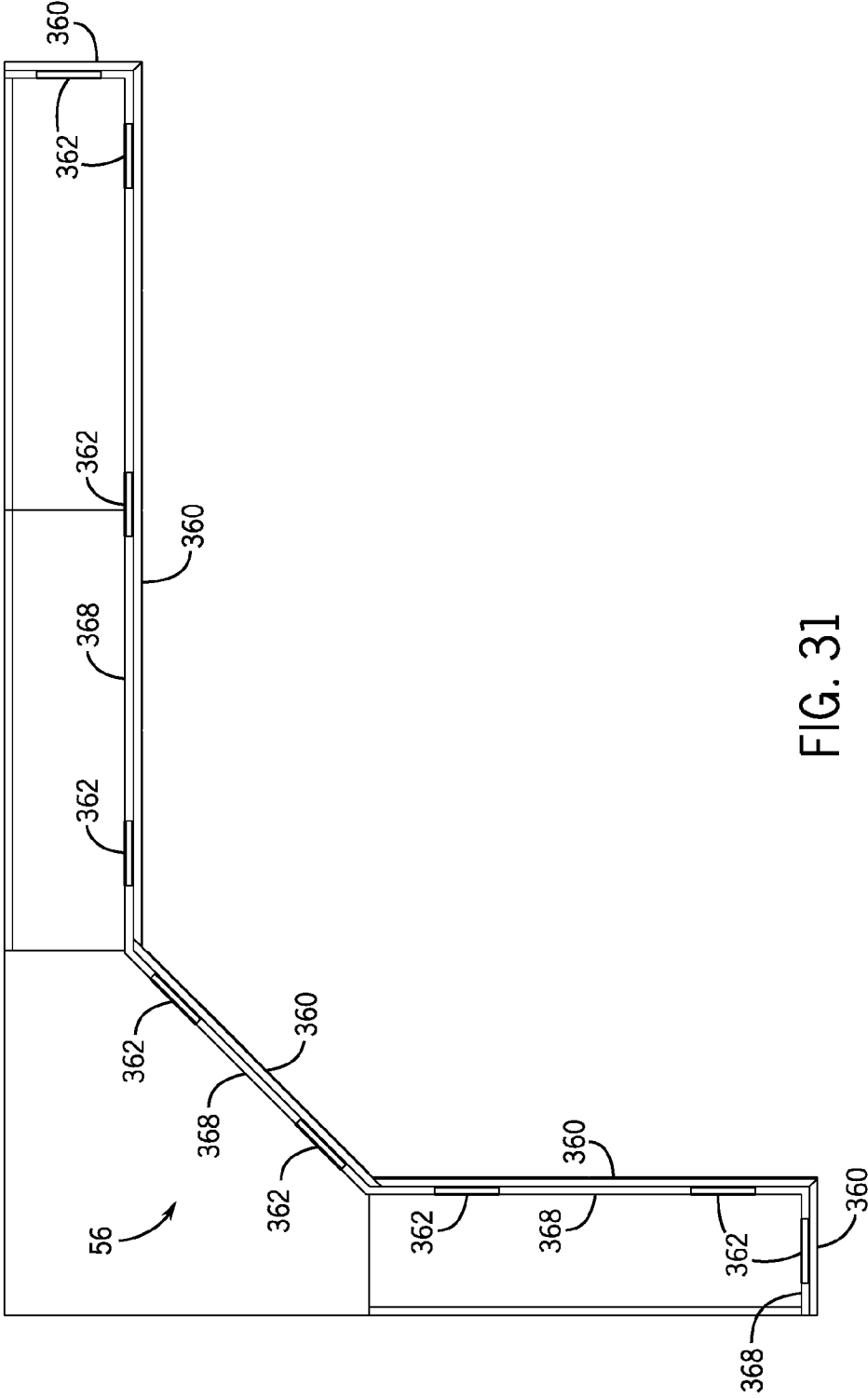


FIG. 31

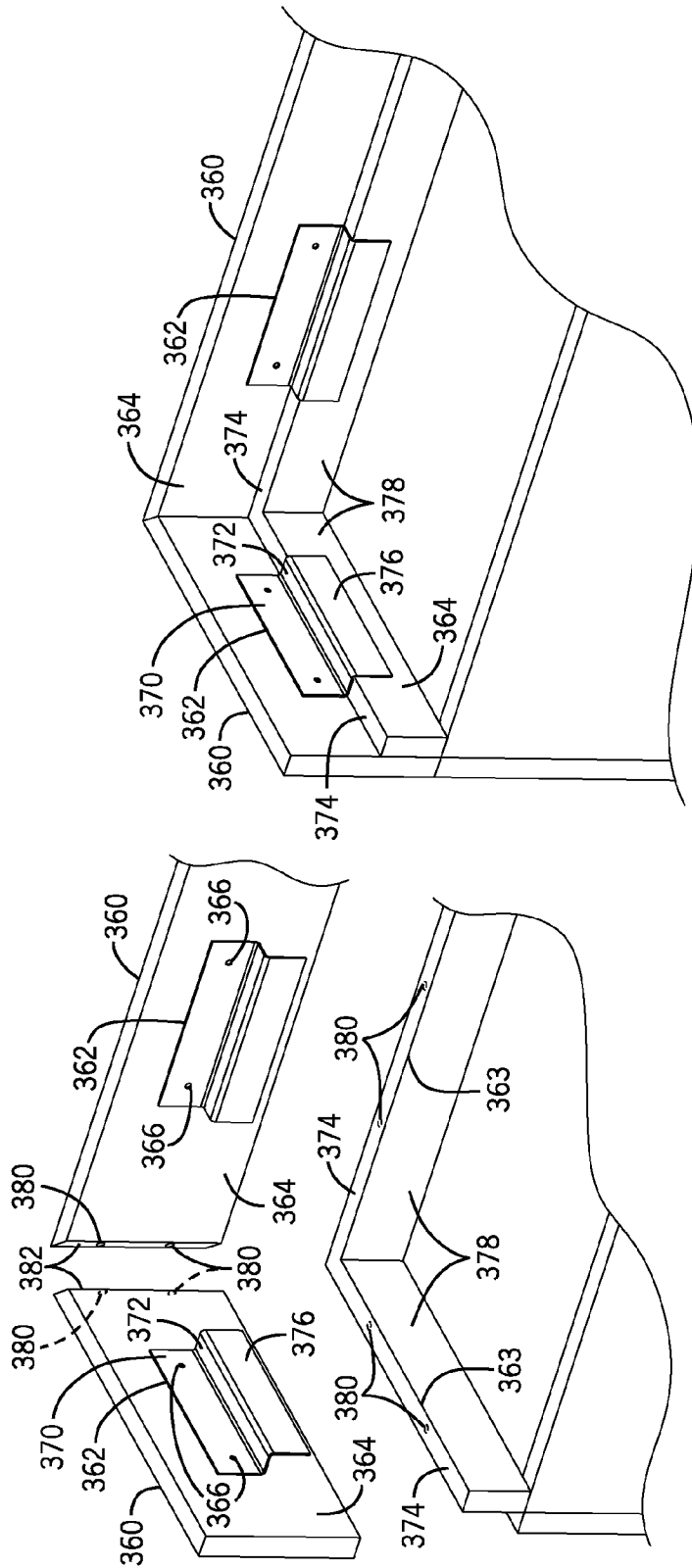
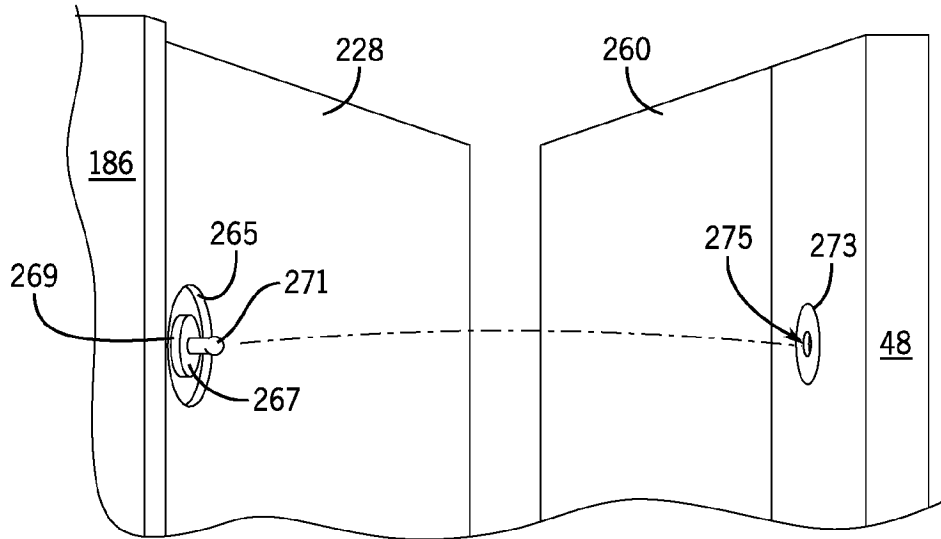
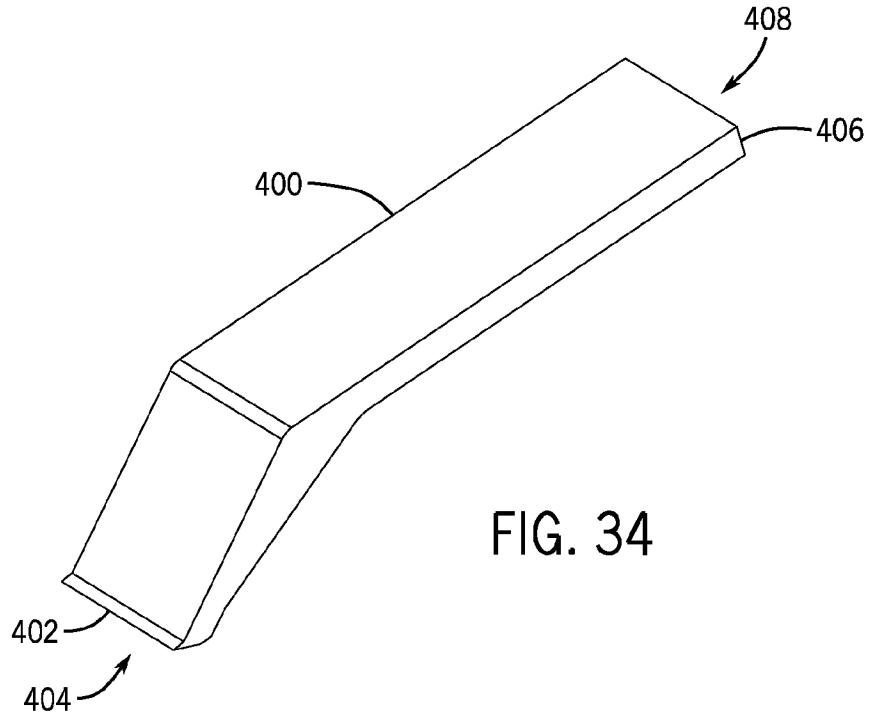


FIG. 32

FIG. 33



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## CABINERY SYSTEM HAVING REMOVABLE CABINET FACES

### BACKGROUND OF THE INVENTION

Embodiments of the invention relate generally to residential and commercial cabinetry, and, more particularly, to a cabinetry system wherein the exterior surface elements or face panels of the cabinets are removably coupled to the internal bodies or frames of the cabinets in a manner that facilitates quickly changing the appearance of the cabinetry system.

Replacing cabinetry accounts for a large percentage of the cost of a room renovation. In the case of a kitchen, for example, kitchen cabinets may account for fifty percent or more of the entire cost of the renovation. A large portion of the costs of a cabinet is accounted for in the cabinet's interior body or box, which constitutes the bulk of the material of the cabinet and is costly to ship due to its size and weight.

Therefore, it would be desirable to design a cabinetry system that includes cabinet faces that can be easily removed from the base structure of the cabinetry system and interchanged with other sets of cabinet faces to quickly and easily change the appearance of the cabinets without replacing the costly interior structure of the cabinets.

### BRIEF DESCRIPTION OF THE INVENTION

In accordance with one aspect of the invention, a door assembly includes at least one hinge assembly, a metal door plate coupled to the at least one hinge assembly, a door panel having a cavity formed in an inward-facing surface thereof, the cavity sized to receive the metal door plate, and a plurality of magnets coupling the door panel to an outward-facing surface of the metal door plate.

In accordance with another aspect of the invention, a cabinet assembly includes a cabinet box comprising a pair of side panels and a door assembly. The door assembly includes a hinge assembly, a metal door plate coupled to a side panel of the pair of side panels via the hinge assembly, and a door panel having a cavity formed in an inward-facing surface thereof. A first plurality of magnets are positioned within recesses formed within the inward-facing surface of the door panel and are coupled to an outward-facing surface of the metal panel.

In accordance with a further aspect of the invention, a cabinetry system is disclosed having removable cabinet faces. The cabinetry system includes a cabinet box, a frame-shaped metal plate fastened to the cabinet box with at least one hinge, and a door panel magnetically coupled to the frame-shaped metal plate. The door panel has a frame-shaped cavity formed in an inward-facing surface of the door panel for receiving the frame-shaped metal plate. The cabinetry system also includes an end panel magnetically coupled to the cabinet box.

Various other features and advantages will be made apparent from the following detailed description and the drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate preferred embodiments presently contemplated for carrying out the invention.

In the drawings:

FIG. 1 is a perspective view of cabinetry system according to an embodiment of the invention.

FIG. 2 is an exploded perspective view of a cabinet assembly useable with the cabinetry system of FIG. 1, according to an embodiment of the invention.

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FIG. 3 is a detail view of a hinge assembly included within the cabinet assembly of FIG. 2.

FIG. 4 is an exploded perspective view of a door assembly, according to an embodiment of the invention.

FIG. 5 is a front elevational view of a door panel of the door assembly of FIG. 4, according to an embodiment of the invention.

FIG. 6 is a sectional view of the door panel of FIG. 5.

FIGS. 7, 8, and 9 are front, top, and side elevational views of a metal door panel of the door assembly of FIG. 4, according to an embodiment of the invention.

FIG. 10 is an exploded perspective view of a drawer assembly useable with the cabinetry system of FIG. 1, according to an embodiment of the invention.

FIGS. 11, 12, 13, and 14 are respective front, top, side, and rear elevational views of a drawer panel of the drawer assembly of FIG. 10.

FIG. 15 is a front view of a metal drawer plate of the drawer assembly of FIG. 10.

FIG. 16 is a perspective view of a base cabinet box having a storage compartment that is useable with the cabinetry system of FIG. 1, according to an embodiment of the invention.

FIGS. 17, 18, and 19 are respective top, front, and side elevational views of the base cabinet box of FIG. 16.

FIG. 20 is a perspective view of an upper cabinet box having a storage compartment that is useable with the cabinetry system of FIG. 1, according to an embodiment of the invention.

FIGS. 21, 22, and 23 are respective top, front, and side elevational views of the upper cabinet box of FIG. 20.

FIG. 24 is a detailed view of an optional recess for lighting provided in the upper cabinet box of FIG. 20, according to an embodiment of the invention.

FIGS. 25, 26, and 27 are respective top, front, and side elevational views of an end panel useable with the cabinetry system of FIG. 1.

FIG. 28 is an exploded perspective view of a toe kick assembly of the cabinetry system of FIG. 1.

FIG. 29 is a perspective view of an island cabinet assembly useable with the cabinet assembly of FIG. 1.

FIG. 30 is a perspective view of a toe kick assembly of the island cabinet assembly of FIG. 29.

FIG. 31 is a top view of the upper cabinets of the cabinet assembly of FIG. 1, illustrating a crown molding assembly, which may be integrated within the cabinet assembly of FIG. 1 in one embodiment of the invention.

FIG. 32 is a partially exploded perspective view showing a portion of the crown molding assembly of FIG. 31.

FIG. 33 is an assembled exploded perspective view showing a portion of the crown molding assembly of FIG. 31.

FIG. 34 is a perspective view of a removal tool useable with the cabinetry system of FIG. 1.

FIG. 35 is a detailed view of hardware components used to align and attach an end panel of the cabinetry system of FIG. 1 to a base cabinet box, in accordance with an alternative embodiment.

### DETAILED DESCRIPTION

Embodiments of the invention are directed to a cabinetry system that includes removable face panels, which permit the entire outward appearance of the cabinetry system to be changed within a short period of time. The removable face panels, which include door panels, drawer panels, end panels, and trim components, are coupled to the cabinet boxes and interior frame structure of the cabinetry system using a mag-



netic attachment system, which functions to consistently self-align these panels and trim components with the internal cabinet structure and enables removal of the panels and trim components with no (or minimal) tools. After being removed from the cabinets, one set of door and drawer panels may be stored in internal storage components provided within the cabinetry system while a second set of door and drawer panels are in use.

Such a system enables a homeowner to have a perceived 'new' kitchen with minimal time and effort. The homeowner may purchase different sets of removable face panels, each having its own style and/or color, and change the façade of their kitchen as often as they desire. For example, a homeowner may purchase different sets of door and drawer panels for seasonal use, or may purchase a different set of door based on changing tastes or design trends.

While the cabinetry system is described herein in the context of a residential kitchen cabinetry system, it is contemplated that the concepts disclosed herein may be extended to other cabinet applications, including residential bathroom and utility cabinets as well as cabinetry systems used in commercial office settings and hotel rooms, as non-limiting examples.

FIG. 1 illustrates a cabinetry system 10 according to one embodiment of the invention. As shown, cabinetry system 10 includes an assembly of upper cabinets 12 and an assembly of lower cabinets 14. In the illustrated embodiment, upper and lower cabinet assemblies 12, 14 each include a first portion 16, 18 and a second portion 20, 22 joined to one another by a respective corner cabinet 24, 26. The first portion 16 of upper cabinet assembly 12 includes upper cabinets 28, 30 and the second portion 20 includes upper cabinet upper cabinet 32. First portion 18 of lower cabinet assembly 14 includes base cabinets 34, 36, 38, and second portion 22 includes base cabinet 40.

While cabinetry system 10 is illustrated in an L-shaped configuration, one skilled in the art will recognize that the concepts set forth herein are not limited to any particular arrangement of cabinets and may be adapted to cabinetry systems having more or less individual cabinets than that shown in FIG. 1. For example, alternative cabinetry system configurations may include, as non-limiting examples, U-shaped, galley, or single wall configurations, and cabinetry systems including only upper cabinets or only lower cabinets. Further, it is contemplated that the concepts set forth herein may be extended to wall-mounted and floor-mounted cabinetry as well as free-standing cabinetry systems including one or more individual cabinet sections.

Cabinets 24-40 are provided having door panels 42 and drawer panels 44 that are mounted in a full overlay configuration, as shown in FIG. 1. As used herein, the term "full overlay" refers to a frameless or Euro-style cabinet configuration wherein the door panels and drawer panels overlay substantially all of the front-facing surfaces of the interior cabinet boxes or internal structural frames of the cabinets when the doors and drawers are in a closed position. A minimal gap exists between adjacent the side surfaces of each door and drawer panel such that the front-facing surfaces of the interior cabinet boxes are not visible behind the door and drawer panels.

While the upper cabinets 24, 28, 30, and 32 are illustrated as each having a pair of door panels 42, it is further contemplated that any or all of cabinets 24-30 may be configured with a single door panel 42. Similarly, concepts disclosed herein may be extended to base cabinets 26, 34, 36, 38, 40 having alternative configurations than those illustrated in FIG. 1, such as, for example, single door cabinets, cabinets

having multiple drawer panels 44, and cabinets having one or multiple door panels 42 without any drawer panels 44.

Cabinetry system 10 also includes end panels 46, 48, 50, 52 that are coupled to the outward-facing end surfaces of the respective first portions 16, 18 and second portions 20, 22 of upper and lower cabinet assemblies 12, 14. Lower cabinet assembly 14 is mounted atop a toe kick assembly 54, which may be constructed to include storage compartments for door and drawer panels, as described in detail below. Optionally, a crown molding assembly 56 is provided above upper cabinet assembly 12.

Referring now to FIG. 2, an exploded view of upper cabinet 28 is provided to illustrate the interrelationship of the structural elements provided within an upper cabinet of cabinetry system 10. As shown, upper cabinet 28 includes a cabinet box or structural frame 58 and a pair of door assemblies 60. Each door assembly 60 includes a door panel 42, a metal door plate 62, and a pair of hinge assemblies 64. In one embodiment, cabinet box 58 is constructed of a cost-effective material such as, for example, a melamine substrate, particle board, or a medium-density fibreboard (MDF) core material. While upper cabinet 28 is illustrated having two door assemblies 60, it is contemplated that the cabinet construction may be extended to single door cabinets.

Each hinge assembly 64 comprises a first hinge portion 66 that is fixedly coupled to an interior surface 68 of a respective side panel 70 of cabinet box 58 and a second hinge portion 72 that is fixedly coupled to metal door plate 62, as shown in the detailed view of FIG. 3. Threaded hinge fasteners 74 and corresponding hinge nuts 76 couple hinge assembly 64 to metal door plate 62. Hinge assembly 64 is coupled to the interior of cabinet box 58 using threaded fasteners (not shown), which extend through openings 78 of first hinge portion 66 and engage side panels 70.

In a preferred embodiment hinge assemblies 64 are full overlay-style cabinet hinges, which permit door panels 42 to completely overlay or cover the front-facing surfaces 80, 82, 84, 86, 88 of the top panel 90, bottom panel 92, two side panels 70, and central panel 94 of cabinet box 58 when the door assemblies 60 are in a closed position. Hinge assemblies 64 allow the end surface 96 of door panel 42 to swing and rotate outwardly as the door panel 42 is opened such that the end surface 96 of the door panel 42 is substantially perpendicular to the front-facing side surface 86 of cabinet box 58 when door panel 42 is in a fully opened position. In a preferred embodiment, hinge assemblies 64 are slow-closing or soft-closing hinges such as, for example, slow closing, full overlay style hinges manufactured by Grass® or Blum®.

A height 98 of door panels 42 is substantially equal to a height 100 of cabinet box 58. Likewise a width 102 of cabinet box 58 is substantially equal to a combined width 104 of the door panels 42 within upper cabinets 28. In a cabinet having a single door panel 42, the width of the cabinet box 58 would be substantially equal to the cabinet box width 106 of a single door panel 42. As a result of the full overlay construction of upper cabinet 28, the front-facing surfaces 80-88 of cabinet box 58 are substantially hidden from view when door panels 42 are closed. Front-facing surfaces 80-88 may further be colored with a gray or other neutral color paint or coating to minimize the visibility of cabinet box 58 when door panels 42 are closed. The interior surfaces 68, 108 of cabinet box 58 may be similarly colored.

A door handle 110 is coupled to each door panel 42. While door handle 110 is illustrated in FIG. 2 as a pull-style handle that couples to door panel 42 with a pair of handle fasteners 112, it is contemplated that different styles of door hardware

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may be used in alternative embodiments, such as, for example, a knob having a single fastener.

Additional views of door assembly 60 and the elements thereof are provided in FIGS. 4-9. FIG. 4 shows a rear exploded view of door assembly 60. FIG. 5 shows a front elevational view of door panel 42. FIG. 6 is a cross-sectional view taken along line 6-6 of FIG. 5. FIGS. 7-9 are front, top, and side elevational views of metal door plate 62. The construction of door assembly 60 is described below with reference to FIGS. 2-9 together where appropriate.

Door panel 42 includes a front surface 114, which forms the outward-facing surface of door panel 42, and a rear surface 116, which faces the interior 118 of cabinet box 58 (FIG. 2) when door assembly 60 is in a closed position. A cavity 120 is formed within the rear surface 116 of door panel 42 and is sized to receive metal door plate 62. In one embodiment, cavity 120 has a depth 122 substantially equal to a thickness 124 of metal door plate 62 such that a rear surface 126 of metal door plate 62 is substantially coplanar with rear surface 116 of door panel 42 when door assembly 60 is assembled.

In the illustrated embodiment, metal door plate 62 is constructed in the shape of a frame, with door panel 42 having a corresponding frame-shaped cavity 120. In alternative embodiments, it is contemplated that metal door plate 62 and cavity 120 may be constructed having other shapes without deviating from the scope of the invention. For example, metal door plate 62 may be provided as a rectangular slab without a central opening, or may be provided having an L-shape, U-shape, or C-shape. In any of these alternative embodiments, the shape of cavity 120 would be modified to have a geometry substantially equal to the shape of metal door plate 62, such that metal door plate 62 would be received within cavity 120, as described above.

Rear surface 116 of door panel 42 also includes a pair of recesses 128 sized to receive a protrusion 130 extending outward from the second hinge portion 72 of hinge assembly 64 and hinge nuts 76. A pair of notches 132 are formed along one edge 134 of metal door plate 62 and are positioned to align with the recesses 128 of door panel 42.

Door panel 42 is attached to metal door plate 62 with a plurality of magnets 136, which are positioned within corresponding circular recesses 138 formed within door panel 42. In one embodiment, magnets 136 are retained within circular recesses 138 with an adhesive (not shown). As shown in FIG. 3, circular recesses 138 extend inward from a portion of rear surface 116 that is adjacent cavity 120. In the illustrated embodiment, door assembly 60 includes a pair of magnets 136 positioned along each side of door panel 42. However, it is contemplated that alternative embodiments may include more or less magnets based on design specifications. In a preferred embodiment, magnets 136 are rare earth magnets and have a diameter of approximately 1/4 inch.

Metal door plate 62 comprises a metallic material such as, for example, a power-coated steel or other ferrous metal, which is magnetically attracted to magnets 136. When installing door panel 42 on upper cabinet 28, the magnetic attraction between magnets 136 inset within door panel 42 and metal door plate 62 serves to couple door panel 42 to metal door plate 62, with the engagement of metal plate 62 within cavity 120 functioning to self-align door panel 42 during installation. The magnetic properties of metal door plate 62 permit the inward-facing surface of metal door plate 62 to be utilized as a magnetic message center.

Metal door plate 62 is independently coupled to and aligned with cabinet box 58. Therefore, the engagement between metal door plate 62 and cavity 120 self-aligns door panel 42 with cabinet box 58 during the installation process.

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Handle fasteners 112 extend through metal door plate 62 and door panel 42 and serve to further secure door panel 42 to metal door plate 62.

To remove door panel 42 from metal door plate 62, door handle 110 is removed and a tool, such as removal tool 400 (FIG. 34), is inserted into a slot 140 formed within metal door plate 62. The tool is pressed or levered against the rear surface 116 of door panel 42 with enough force to overcome the magnetic attraction between metal door plate 62 and magnets 136. In one embodiment, the tool is provided having a plastic-coated or rubberized tip to minimize damage to the rear surface 116 of door panel 42. Alternatively, the portion of the rear surface 116 of door panel 42 beneath slot 140 may be lined with felt or another material to minimize wear or damage to rear surface 116. In another embodiment, an optional secondary slot 142 (shown in phantom) may be provided.

Referring now to FIG. 10, an exemplary drawer assembly 144 is illustrated according to one embodiment of the invention. Drawer assembly 144 includes a drawer box 146, a metal drawer plate 148, a drawer panel 44, and a drawer handle 150. Additional details of metal drawer plate 148 and drawer panel 44 are shown in FIGS. 11-15. As such, FIGS. 10-15 are described together below as appropriate.

Similar to metal door plate 62, metal drawer plate 148 comprises a magnetic material such as steel or other ferrous metal. Metal drawer plate 148 is coupled to drawer box 146 via a plurality of fasteners 152 that are received within openings 154 formed through the thickness 156 of metal drawer plate 148. In the illustrated embodiment, metal drawer plate 148 has a generally rectangular shape. However, it is contemplated that the shape of metal drawer plate 148 may be modified in alternative embodiments. As one non-limiting example, metal drawer plate 148 may be constructed in a T-shape or in the shape of a cross shape.

Drawer panel 44 has a cavity 158 formed in a rear surface 160 thereof for receiving metal drawer plate 148. As shown, the geometry of cavity 158 is substantially equal to that of metal drawer plate 148 with a depth 162 substantially equal to the thickness 156 of metal drawer plate 148. When drawer assembly 144 is assembled, metal plate 148 is received within cavity 158 and the rear surface 164 of metal plate 148 is coplanar or flush with the rear surface 160 of drawer panel 44. The engagement of metal plate 148 within drawer panel cavity 158 functions to self-align drawer panel 44 with drawer box 146 when installing drawer panel 44.

A plurality of magnet recesses 166 extend inwardly from the surface 160 of drawer panel 44 and are sized to receive magnets 168, which are retained within magnet recesses 166 of drawer panel 44 with an adhesive (not shown). The depth 170 of magnet recesses 166 is substantially equal to a thickness of magnets 168 so that an outward facing surface of magnets 168 does not extend beyond the portion of rear surface 160 within drawer panel cavity 158.

Drawer handle 150 is coupled to a front surface 172 of drawer panel 44 using one or more fasteners 174, which extend through openings 176 in a front panel 178 of the drawer box 146, openings 180 in metal drawer plate 148, and finally through openings 182 in drawer panel 44 to engage drawer handle 150. As shown, metal drawer plate 148 may be manufactured having a plurality of metal plate openings 180 to accommodate various types of drawer hardware. In the illustrated embodiment, metal drawer plate 148 is provided having a pair of slotted openings to accommodate door hardware of various widths and a central circular opening to accommodate knob-style hardware. However, it is contemplated that metal drawer plate 148 may be provided with a single opening to receive a fastener for knob-style hardware

or a pair of circular openings spaced to receive fasteners for pull-style hardware of predetermined width.

Drawer assembly 144 is received within a drawer opening 184 of a structural frame or cabinet box, such as lower cabinet box 186 of FIGS. 16-19, which corresponds to base cabinet 38 of FIG. 1. Drawer assembly 144 is mounted to lower cabinet box 186 with drawer slide hardware 187. In one embodiment, drawer slide hardware 187 comprises under-mount soft-closing drawer slides. When drawer assembly 144 is positioned in a closed position within lower cabinet box 186, the rear surface 160 of drawer panel 44 rests against front-facing surfaces 188, 190, 192, 194 of lower cabinet box 186. Similar to door assembly 60, drawer assembly 144 is constructed having a full overlay construction, with the drawer width 196 substantially equal to the width 198 of lower cabinet box 186 between side panels 200, 202. As such, front-facing surfaces 188-194 of lower cabinet box 186 are substantially hidden from view when drawer assembly 144 is in a closed position.

A door assembly, similar to door assembly 60 (FIG. 4), may be provided to enclose the lower compartment 204 of lower cabinet box 186. Alternatively, lower cabinet box 186 may be constructed to receive one or more additional drawer assemblies, similar to drawer assembly 144.

To remove drawer panel 44 from drawer assembly 144, drawer assembly 144 is positioned in a fully extended or open position and drawer handle 150 is removed by unscrewing fasteners 174. Drawer panel 44 is then pulled backwards or away from drawer box 146 until the magnetic attraction between magnets 168 and metal plate 148 is overcome and drawer panel 44 disengages from metal plate 148.

The construction of door assembly 60 and drawer assemblies 144 facilitates removal and installation of door panels 42 and drawer panels 44 within cabinetry system 10. Because the full overlay construction substantially hides the upper cabinet boxes 58 and lower cabinet boxes 186 behind the respective door panels 42 and drawer panels 44, the aesthetics of the cabinetry system 10 may be altered by simply replacing one set of door and drawer panels 42, 44 with another set of door and drawer panels 42, 44 of different color and/or style. The incorporation of metal door plate 62 into door assembly 60 and metal plate 148 into drawer assembly 144 assists to properly align the new door and drawer panels 42, 44 with the upper cabinet boxes 58 and lower cabinet box 186.

In one embodiment of the invention, cabinetry system 10 includes storage compartments within which one set of door and drawer panels 42, 44 may be stored when a second set of door and drawer panels 42, 44 are in use. FIG. 16 illustrates one such base cabinet storage compartment 206 that may be provided within one or both of base cabinets 36, 40 of cabinetry system 10 (FIG. 1). As shown in FIG. 16, lower cabinet box 186 includes a drawer opening 184 sized to receive drawer assembly 144 (FIG. 10) and a lower compartment 204, which is partially enclosed by a first portion 208 of a first side panel 200, second side panel 202, a dividing panel 212, a top panel 214, and a bottom panel 216. The width 218 of first side panel 210 is equal to the interior depth 220 of lower cabinet box 186. The width 222 of second side panel 228 is less than lower cabinet box depth 220. The base cabinet storage compartment 206 is formed in the rear portion of lower cabinet box 186 between a second portion 224 of first side panel 210, dividing panel 212, and a rear panel 226 of lower cabinet box 186. Base cabinet storage compartment 206 provides storage for a number of door panels 42 and/or drawer panels 44 when not in use. In one embodiment, one or more divider panels (not shown) may be positioned within base cabinet storage compartment 206 to create storage slots

for door panels 42 and/or drawer panels 44. Tool 400 also may be stored within base cabinet storage compartment 206.

Similar storage compartments may be provided in one or both of upper cabinets 30, 32. As shown in FIG. 20, upper cabinet box 228 includes an upper cabinet storage compartment 230, which is partially enclosed by a first portion 232 of a central panel 234, a side panel 236, a dividing panel 238, a rear panel 240, and top and bottom panels 242, 244. The front compartment 246 of upper cabinet box 228 may be provided with a number of shelves (not shown) to serve as a spice cabinet or glassware cabinet. It is contemplated that one or more shelves (not shown) may likewise be positioned within left compartment 248 of upper cabinet box 228.

Optionally, a dado or groove 250 (shown in phantom) may be formed in a lower surface 252 of bottom panel 244 for receiving under cabinet strip lighting (not shown). Upper cabinets 24, 28, 32 may include a similar dado or groove. Further, it is contemplated that the cabinet boxes of base cabinets 34, 36 and upper cabinet 28 are constructed similar to lower cabinet box 186 and upper cabinet box 228, albeit with the storage compartments 206, 230 omitted.

End panels 46, 48 couple to upper cabinet box 228 and lower cabinet box 186 and hide the contents of upper cabinet storage compartment 230 and base cabinet storage compartment 206 from view. While end panel 48 is illustrated in FIGS. 25-27, one skilled in the art will recognize that end panel 46 and upper cabinet box 228 may be configured in a similar manner. Referring to FIGS. 16 and 25-27 together, a plurality of base cabinet magnets 254, similar to magnets 136, are recessed within end surfaces 256 of lower cabinet box 186 at locations that align with the locations of end panel magnets 258 recessed within an inward-facing surface 260 of end panel 48. The magnetic attraction between base cabinet magnets 254 and end panel magnets 258 aids in aligning end panel 48 with lower cabinet box 186 during installation. While end panel magnets 258 are illustrated about the outer perimeter of end panel 48, additional magnets may be provided in a central region of panel 48.

In one embodiment, one or more bosses or protrusions 262 extend outward from end panel 48 and are received within corresponding one or more slots 264 formed within one or more end surfaces 256 of lower cabinet box 186. Alternatively, protrusions may be extended outward from lower cabinet box 186 and slots 264 may be formed within end panel 48. The engagement between slot(s) 264 and protrusion(s) 262 support the weight of end panel 48 and aid in retaining end panel 48 on base cabinet 36. A similar arrangement of magnets, slots, and bosses is contemplated to attach end panel 46 to upper cabinet box 228. As non-limiting examples protrusions 262 may be provided as metal brackets coupled to base cabinet 36 or wood or metal dowels protruding outward from base cabinet 36.

In an alternative embodiment illustrated in FIG. 35, a self-centering locating pin assembly having a pin body 269 and a receiving body 273 are used to retain end panel 48 on base cabinet box 186 in combination with corresponding pairs of magnets 254. As shown, pin body 269 includes a base portion 267 that is positioned within a recess 265 formed on side panel 228 of base cabinet box 186 and a stem portion 271 extending outwardly therefrom. Stem portion 271 is received within an opening 275 formed within receiving body 273.

Referring now to FIG. 28, a toe kick assembly 54 is disclosed according to one embodiment of the invention. Toe kick assembly 54 includes a toe kick storage frame 266, which is positioned beneath first portion 18 of lower cabinet assembly 14 (FIG. 1) and provides additional storage compartments for door panels and/or drawer panels. A similar toe

kick storage frame **268** is positioned beneath second portion **22** of lower cabinet assembly **14** and is manufactured in a similar manner as toe kick storage frame **266** described below.

Toe kick storage frame **266** includes a front panel **270** and a rear panel **272** coupled together by a pair of side panels **274**, **276**. One or more support panels **278** are provided between side panels **274**, **276** to provide structural support for lower cabinet assembly **14**. The number of support panels **278** may be varied based on the overall length of the first portion **18** of lower cabinet assembly **14**. A pair of top support panels **280**, **282** extend along the top surfaces of support panels **278** and are coupled to side panels **274**, **276**, front panel **270**, and rear panel **272** as shown. In an alternative embodiment, a single top support panel may be provided that spans the distance between front panel **270** and rear panel **272**.

A bottom panel **284** forms the bottom surface of three individual storage compartments **286**, **288**, **290** formed within storage frame **266**. Bottom panel **284** may be lined with a protective material such as felt, for example, to protect the surface of bottom panel **284** from wear. Openings **292**, **294**, **296** extend through front panel **270** and provide access to compartments **286**, **288**, **290**.

Toe kick assembly **54** includes facie panels **298**, which are provided having a similar color or wood style to coordinate with door panels **42** and drawer panels **44**. Facie panels **298** are magnetically coupled to toe kick storage frame **266** in a similar manner as described with respect to end panel **48** and lower cabinet box **186**. In particular, a number of magnets **300** are recessed within respective inward-facing surfaces of each facie panel **298**. Corresponding magnets **302** are recessed within respective outward-facing surfaces **304**, **306** of front panel **270** and side panel **276**. In one embodiment, toe kick assembly **54** also includes magnets **300** embedded within the mating end surfaces **308**, **310** of facie panels **298**. According to one non-limiting embodiment, magnets **300**, **302** are positioned every 18-24 along the length of facie panels **298** and panels **270**, **276**. In an alternative embodiment, magnets may be positioned in pairs (one high magnet and one low magnet) along the length of each panel **298**, **270**, **276**.

Referring to FIG. **29**, an island assembly **312** may be included within the cabinetry system **10** of FIG. **1**, according to an embodiment of the invention. In the illustrated embodiment, island assembly **312** includes four base cabinets **314**. Each base cabinet **314** includes an end panel **316** coupled to an outward-facing surface of its respective cabinet **314** in a similar manner as described with respect to end panel **48**. End panels **316** may be manufactured to match the style of door panels **42**, or with plain or flat surfaces similar to end panel **48**. It is contemplated that base cabinets **314** may be manufactured in a similar manner as any of base cabinets **34-40** of FIG. **1**. Further, one or more of base cabinets **314** may include a base cabinet storage compartment and removable end panels **316**, similar to that described above with respect to base cabinet **38**.

Base cabinets **314** rest on an island toe kick assembly **318**, which is illustrated in FIG. **30**. Similar to toe kick assembly **54** (FIG. **28**), island toe kick assembly **318** includes a storage frame **320** formed by a front panel **322** and rear panel **324** jointed together by two side panels **326**, **328**. A dividing panel **330** and a pair of top panels **332**, **334** provide structural support for base cabinets **314**. A base panel **336** is coupled to front, rear, and side panels **322-328**. A first storage compartment **338** is accessible through an opening **340** in front panel **322** and an opening **342** in rear panel **324**. Similarly, a second storage compartment **344** is accessible through openings **346**, **348** formed in front and rear panels **322**, **324**, respectively.

Island toe kick assembly **318** also includes facie panels **350**, **352**, **354**, **356**, which couple to respective front, rear, and side panels **322-328** of storage frame **320** and to one another using magnets **358** in a similar manner as described with respect to toe kick assembly **54**. Magnets **358** permit facie panels **350-356** to be interchanged without the use of tools.

Referring now to FIGS. **31-33**, details of the crown molding assembly **56** of cabinetry system **10** are provided according to one embodiment of the invention. Similar to toe kick assembly **54** and island toe kick assembly **318**, crown molding assembly **56** is likewise manufactured to facilitate removal and replacement of crown molding trim boards or panels **360** when it is desired to change to color or style of cabinetry system **10**. In addition to trim panels **360**, crown molding assembly **56** includes a plurality of mounting brackets **362** coupled to inside surfaces **364** of trim panels **360** with fasteners **366** and a mounting frame **368**, which is coupled to upper cabinet assembly **12**. In one embodiment, trim panels **360** may include threaded inserts (not shown) for receiving fasteners **366**. These threaded inserts would permit mounting brackets to be moved between different sets of trim boards without fear of stripping the fastener openings in the trim boards.

As shown, each mounting bracket **362** includes a first vertical portion **370** that is coupled to trim panels **360**, a horizontal portion **372** that rests on a top surface **374** of mounting frame **368**, and a second horizontal portion **376** that rests against an inside surface **378** of mounting frame **368**. As shown in FIG. **31**, one or more mounting brackets **362** is spaced along the length of each trim panel **360**. In one non-limiting embodiment, mounting brackets **362** are approximately 6 inches long and are positioned approximately every 16-24 inches along the length of a respective trim panel **360**.

In one embodiment, mounting brackets **362** are manufactured from a magnetic material such as steel or other ferrous metal, which is magnetically attracted to optional magnets **380** (shown in phantom) that are recessed within the top surface **374** of mounting frame **368**. In one embodiment two magnets **380** are provided for coupling to each mounting bracket **362**, however, it is contemplated that more or less magnets may be used based on various design specifications such as the weight or profile of the trim panel **360**, for example.

In an embodiment where magnets **380** are omitted, mounting brackets **362** may be manufactured from a non-ferrous material and mounting brackets **362** may be coupled to mounting frame **368** by a friction fit. In such an embodiment, an inner edge **363** of mounting frame **368** may be provided having a rounded edge to facilitate coupling trim panel **360** to mounting frame **368**.

As shown, mounting brackets **362** retain trim panel **360** in position above mounting frame **368**. Optionally, additional magnets **380** may be recessed within adjacent side surfaces **382** of trim panels **360** to assist in aligning adjacent trim panels **360** and maintaining a tight joint between adjacent trim panels **360**.

Referring now to FIG. **34**, a removal tool **400** useable with cabinetry system **10** is illustrated according to one embodiment of the invention. Tool **400** includes a knife edge **402** located on a first end **404** of the tool **400** and a flat edge **406** located on a second end **408** of the tool **400**. In one embodiment, first and second ends **404**, **408** of tool **400** are sized such that either edge **402** or edge **406** of tool **400** may be inserted into slots **140**, **142** of metal door plate **62**. When knife edge **402** is inserted into slot **140**, for example, a prying technique (similar to a technique used to remove a paint can lid) is used to separate metal door plate **62** from door panel **42**. When flat

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edge 406 is inserted in to slot 140, a pushing technique is used to separate metal door plate 62 from door panel 42. Where metal door plate 62 includes two slots 140, 142, an operator may first insert tool 400 into a first slot 140 to separate the upper corner of door panel 42 from metal door plate 62 and next insert tool 400 into a second slot 142 to separate the lower corner of door panel 42.

In addition to aiding in the removal of door panels 42, tool 400 may be used to remove drawer panels 44 and the facie panels 298, 352 of toe kick assemblies 54, 318. In one embodiment, panels 298, 352 may be manufactured including a relish or back cut recess routed into the rear portion of the upper surface of one of the panels 298, 352. After removing an end panel 48, 316, knife edge 402 of tool 400 would be inserted into this recess and used to lever or pry the respective panel 298, 352 away from the structural frame. In alternative embodiments where panels 298, 352 do not include a recess, knife edge 402 is inserted at the interface between the structural frame 266, 320 of the toe kick assembly 54, 318 and the respective panel 298, 352.

As described above, cabinetry system 10 includes face panels that may be easily removed from the interior cabinet bodies and exchanged for different panels, permitting the entire outward appearance of the cabinetry system 10 to be changed in a short period of time. These face panels include removable drawer panels and door panels that are magnetically coupled to metal panels integrated within the cabinetry system, removable end panels that are magnetically coupled to respective cabinet boxes, and removable trim components, including toe kick facie panels and crown molding trim panels, as described above.

Therefore, according to one embodiment of the invention, a door assembly includes at least one hinge assembly, a metal door plate coupled to the at least one hinge assembly, a door panel having a cavity formed in an inward-facing surface thereof, the cavity sized to receive the metal door plate, and a plurality of magnets coupling the door panel to an outward-facing surface of the metal door plate.

According to another embodiment of the invention, a cabinet assembly includes a cabinet box comprising a pair of side panels and a door assembly. The door assembly includes a hinge assembly, a metal door plate coupled to a side panel of the pair of side panels via the hinge assembly, and a door panel having a cavity formed in an inward-facing surface thereof. A first plurality of magnets are positioned within recesses formed within the inward-facing surface of the door panel and are coupled to an outward-facing surface of the metal panel.

According to yet another embodiment of the invention, a cabinetry system is disclosed having removable cabinet faces. The cabinetry system includes a cabinet box, a frame-shaped metal plate fastened to the cabinet box with at least one hinge, and a door panel magnetically coupled to the frame-shaped metal plate. The door panel has a frame-shaped cavity formed in an inward-facing surface of the door panel for receiving the frame-shaped metal plate. The cabinetry system also includes an end panel magnetically coupled to the cabinet box.

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 have structural elements that do not differ from the literal language

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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 door assembly comprising:  
at least one hinge assembly;

a metal door plate coupled to the at least one hinge assembly;

a door panel having a cavity formed in an inward-facing surface thereof, the cavity sized to receive the metal door plate and sized to completely surround an outer perimeter of the metal door plate; and

a plurality of magnets coupling the door panel to an outward-facing surface of the metal door plate.

2. The door assembly of claim 1 wherein the plurality of magnets are positioned within recesses formed within an inward-facing surface of the door panel.

3. The door assembly of claim 1 further comprising a door handle coupled to the door panel via at least one fastener that extends through an opening formed in the door panel and a corresponding opening formed in the metal door plate.

4. The door assembly of claim 1 wherein the plurality of magnets comprise rare earth magnets.

5. The door assembly of claim 1 wherein the metal door plate comprises a frame-shaped structure; and  
wherein the cavity in the door panel is frame-shaped.

6. The door assembly of claim 1 wherein a notch is formed along an edge of the metal panel, the notch sized to receive a portion of the at least one hinge assembly.

7. The door assembly of claim 1 wherein a thickness of the metal door plate is substantially equal to a depth of the cavity of the door panel.

8. The door assembly of claim 1 wherein a slot is formed through the metal door plate, the slot sized to receive a tool for disengaging the door panel from the metal door plate.

9. The door assembly of claim 1 wherein the at least one hinge assembly comprises a fully-overlay hinge.

10. A cabinet assembly comprising:

a cabinet box comprising a pair of side panels; and

a door assembly comprising:

a hinge assembly;

a metal door plate coupled to a side panel of the pair of side panels via the hinge assembly;

a door panel having a cavity formed in an inward-facing surface thereof; and

a first plurality of magnets positioned within recesses formed within the inward-facing surface of the door panel adjacent the cavity, the first plurality of magnets coupled to an outward-facing surface of the metal door plate;

wherein a depth of the cavity is substantially equal to a thickness of the metal door plate defined between the outward-facing surface of the metal door plate and an inward-facing surface of the metal door plate, opposite the outward-facing surface.

11. The cabinet assembly of claim 10 further comprising a drawer assembly coupled to the cabinet box, the drawer assembly comprising:

a drawer box;

a metal drawer plate coupled to a front surface of the drawer box; and

a drawer panel coupled to the metal drawer plate, an inward-facing surface of the drawer panel having a cavity formed therein to receive the metal drawer plate.

12. The cabinet assembly of claim 11 further comprising a drawer handle coupled to the drawer panel with a fastener that

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extends through the drawer panel, the metal drawer plate, and a front panel of the drawer box.

**13.** The cabinet assembly of claim **11** wherein the drawer assembly further comprises a plurality of magnets coupled to the inward-facing surface of the drawer panel.

**14.** The cabinet assembly of claim **10** further comprising an end panel removably coupled to a first side panel of the pair of side panels by a second plurality of magnets.

**15.** The cabinet assembly of claim **10** wherein the cabinet box further comprises:

a rear panel coupled to a first side panel of the pair of side panels; and

a dividing panel coupled between the first side panel and a second side panel of the pair of side panels;

wherein the rear panel, first side panel, and dividing panel partially enclose a rear storage compartment of the cabinet box; and

wherein the dividing panel, first side panel, and second side panel partially enclose a front storage compartment of the cabinet box.

**16.** A cabinetry system having removable cabinet face panels, the cabinetry system comprising:

a cabinet box;

a frame-shaped metal plate fastened to the cabinet box with at least one hinge;

a door panel magnetically coupled to the frame-shaped metal plate, the door panel having a frame-shaped cavity formed in an inward-facing surface of the door panel for receiving the frame-shaped metal plate; and

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an end panel magnetically coupled to the cabinet box; wherein the frame-shaped cavity has a depth that is substantially equal to a thickness of the frame-shaped metal plate;

wherein the frame-shaped cavity has a width that is substantially equal to a maximum width of the frame-shaped metal plate.

**17.** The cabinetry system of claim **16** further comprising a drawer assembly comprising:

a drawer box positioned within the cabinet box;

a metal drawer plate coupled to the drawer box with at least one threaded fastener; and

a drawer panel magnetically coupled to the metal drawer plate.

**18.** The cabinetry system of claim **16** further comprising: a support structure positioned below the cabinet box; and at least one trim panel magnetically coupled to the structure.

**19.** The cabinetry system of claim **16** further comprising: a mounting frame fixedly coupled to an upper surface of the cabinet box; and

a trim panel magnetically coupled to the mounting frame.

**20.** The cabinetry system of claim **19** further comprising a mounting bracket having a first portion fixedly coupled to the trim panel and a second portion magnetically coupled to the mounting frame.

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