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(54) EXPANDABLE SERVER CABINET

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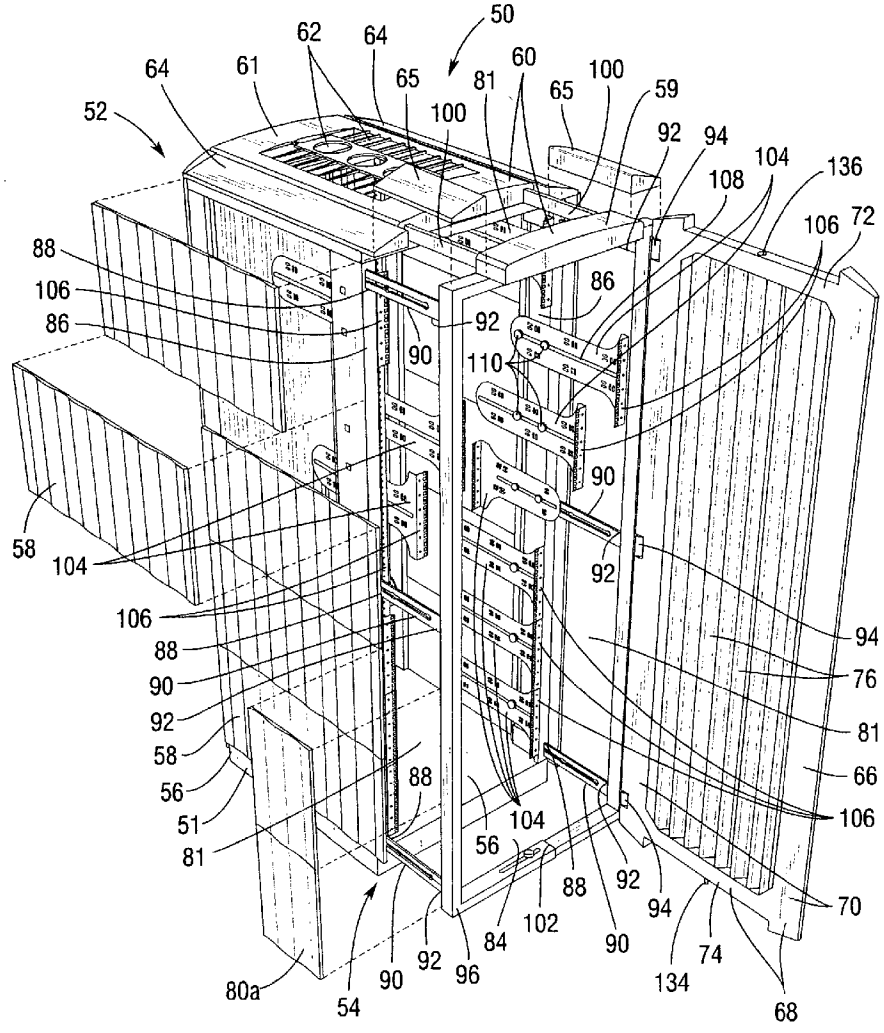
Publication Classification

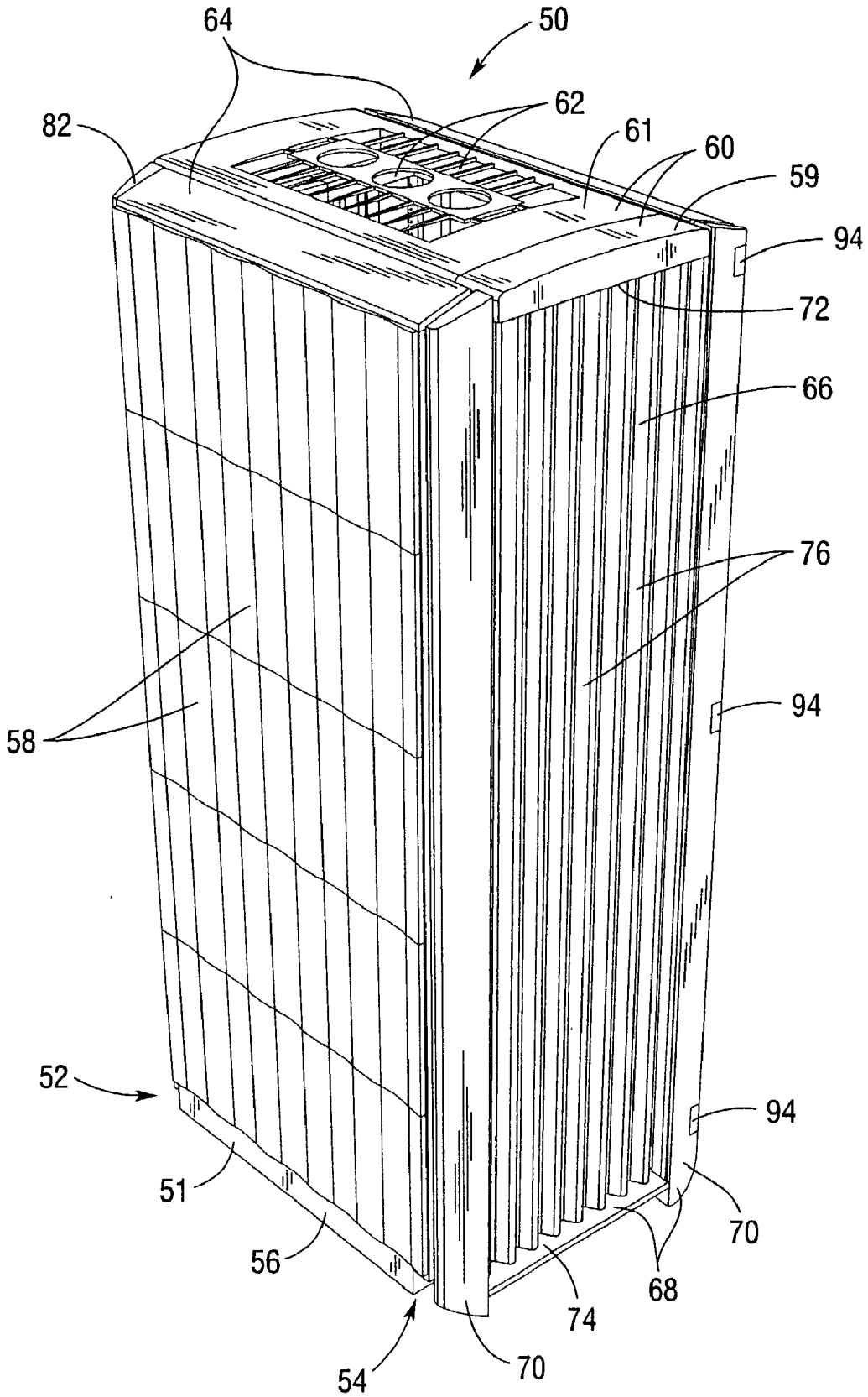
(51) **Int. Cl.**[7] **A47B 45/00**

(52) **U.S. Cl.** **312/205**; 312/223.1

(57) **ABSTRACT**

An expandable cabinet allows for the storing and positioning of electrical component boxes of different lengths. One or more expansion brackets are capable of being secured by one or more brace guides at fixed positions relative to a rear corner post or posts and the back portion of the cabinet fame. An expanded space is formed between a back door and back portion of the cabinet frame when the expansion brackets are extended in a rearward direction from the rear corner post or posts, enabling the expansion cabinet to accommodate electrical component boxes that are too large to fit within the cabinet frame. One or more box mounts are also installed within the cabinet at or near the rear corner posts and near the expanded space. Each box mount engages and positions a component box with respect to the back portion of the cabinet frame.





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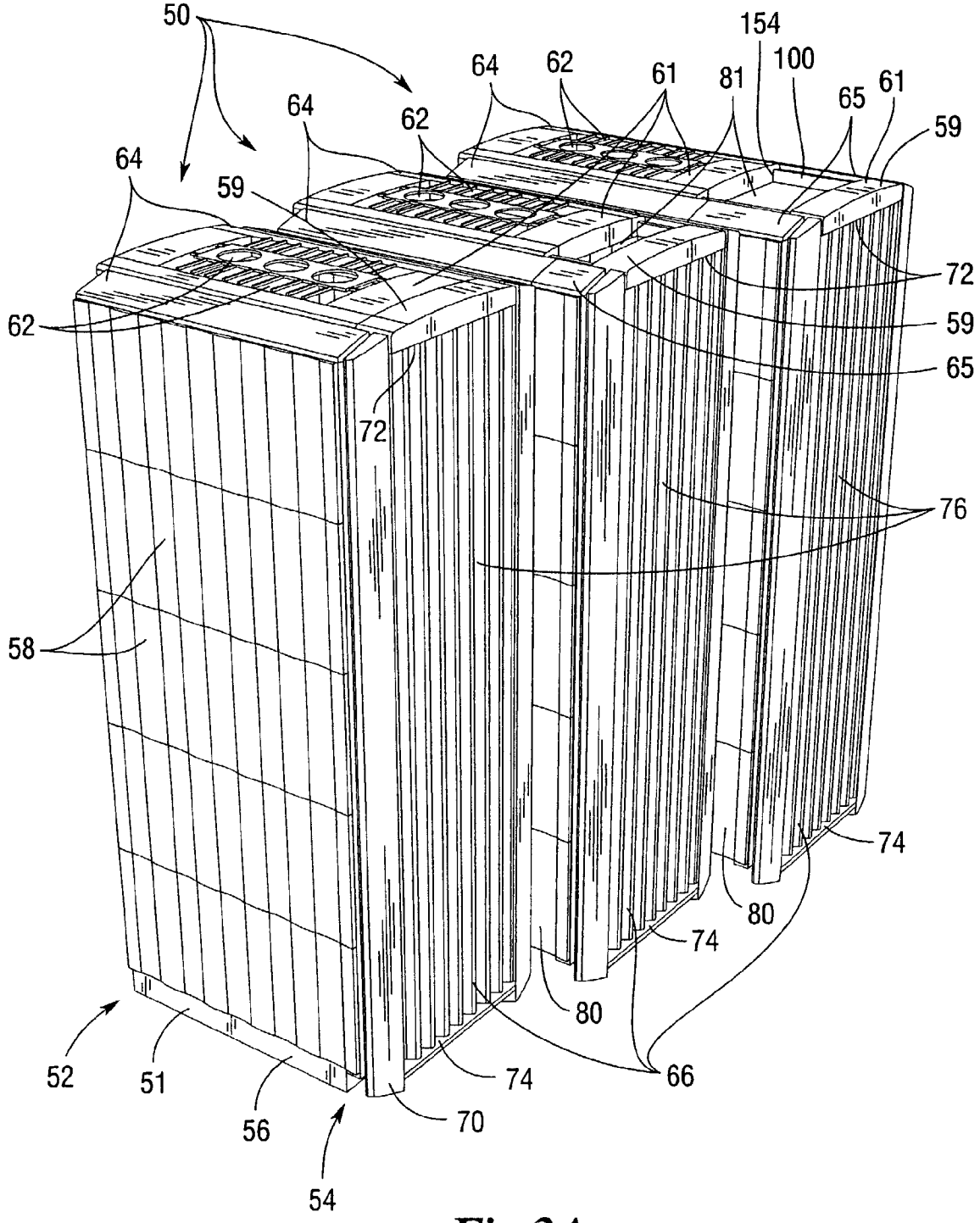
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Fig.2A

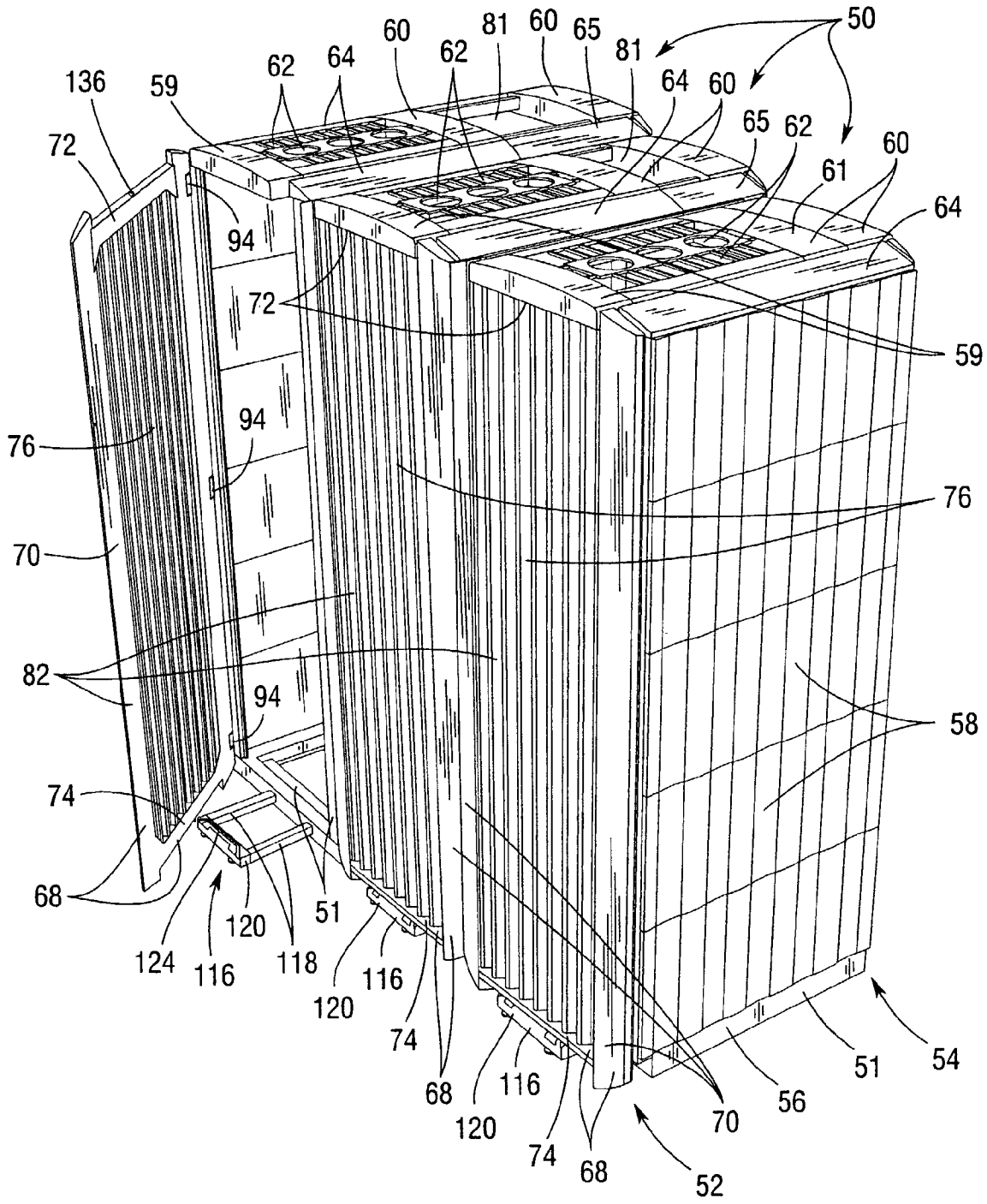
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Fig.2B

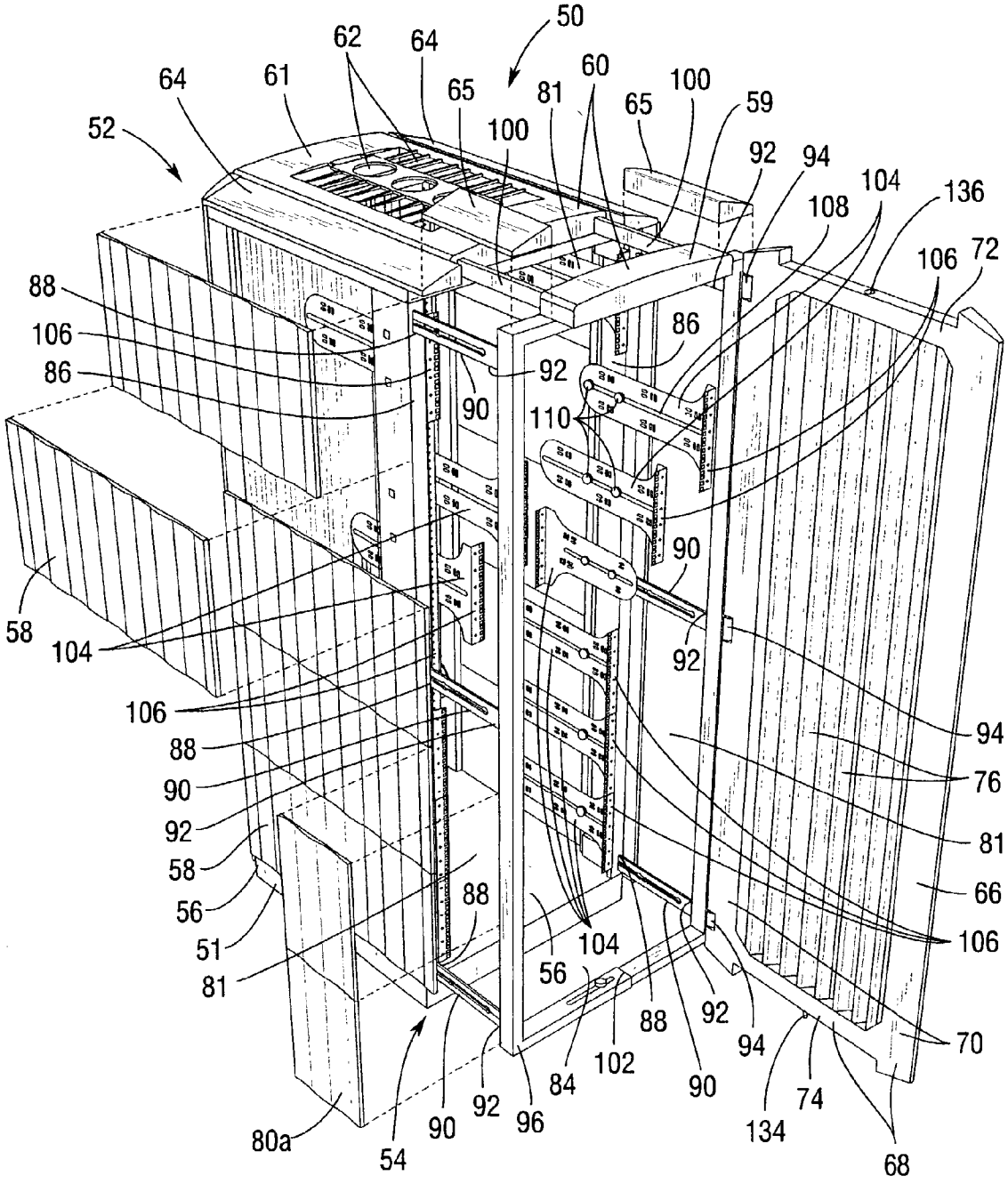
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Fig.3A

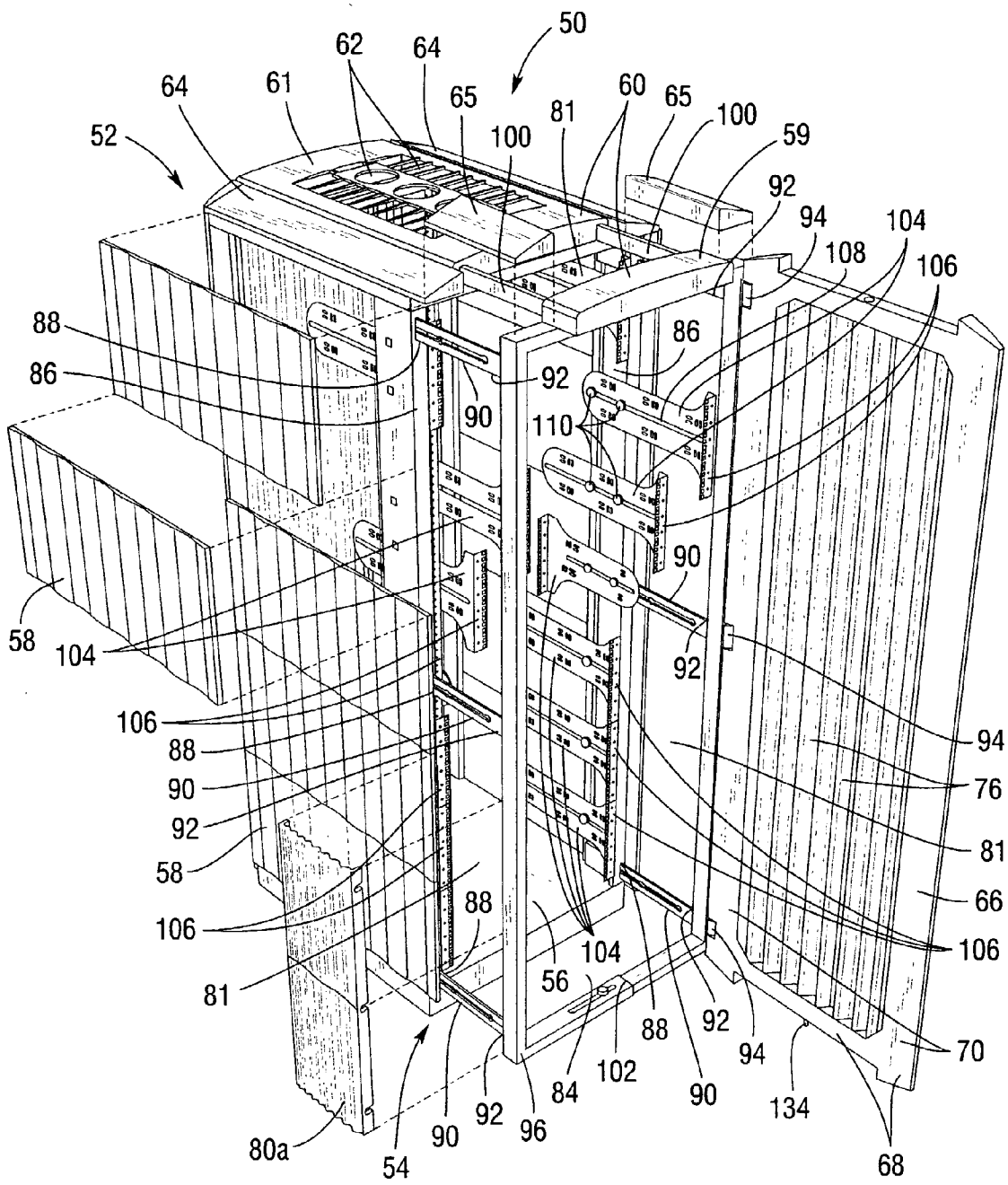
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Fig.3B

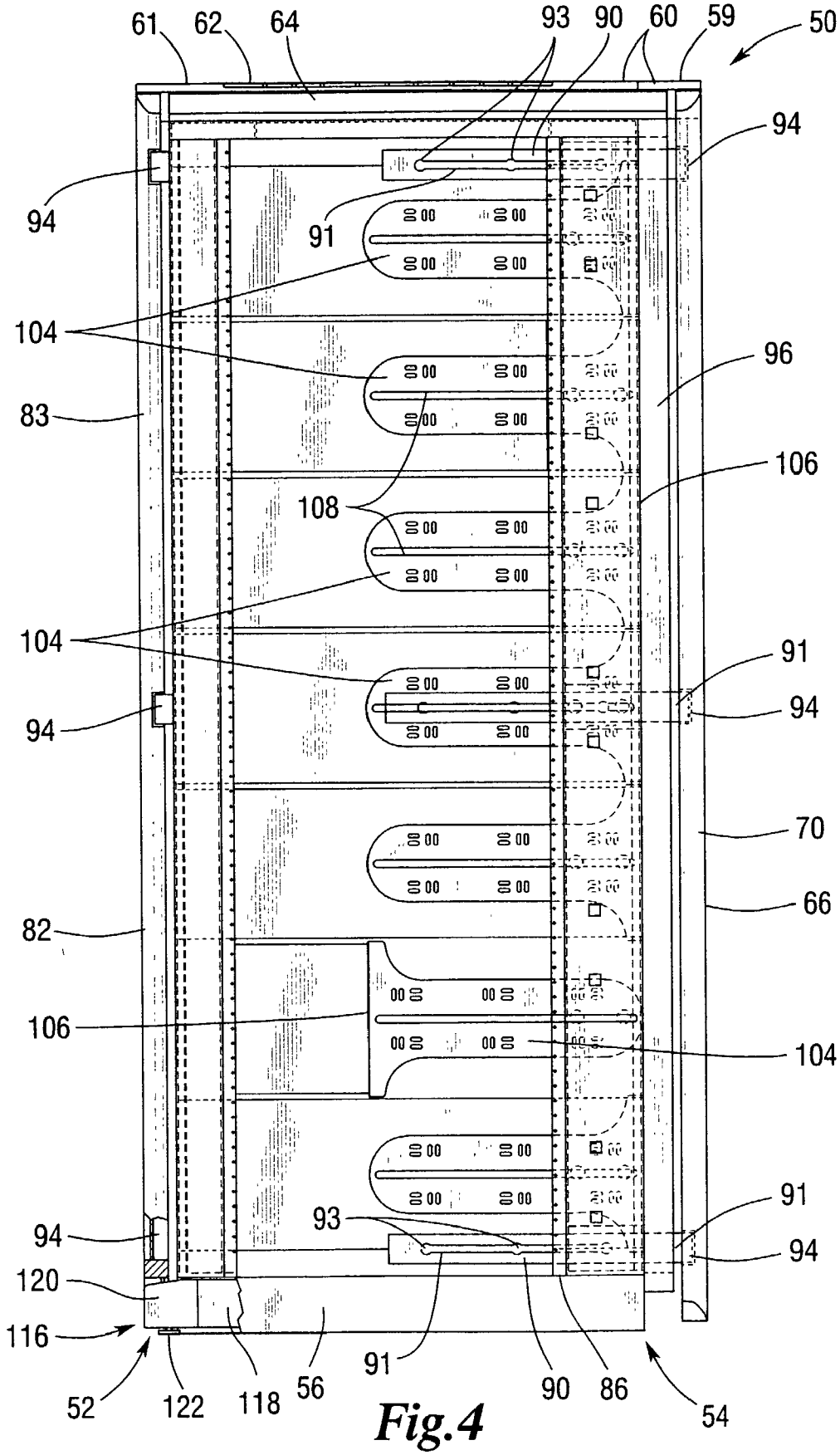
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Fig.4

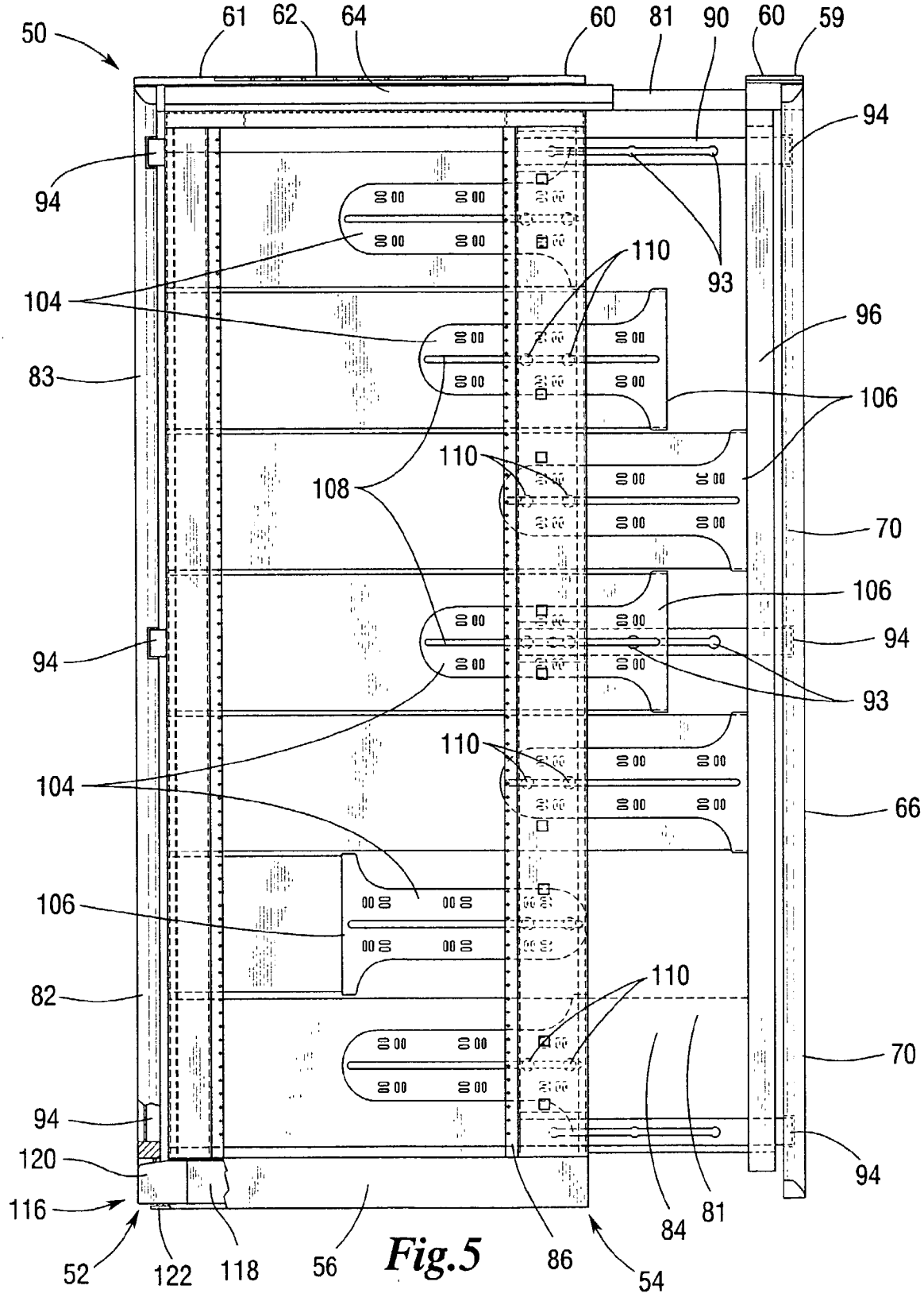
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Fig.5

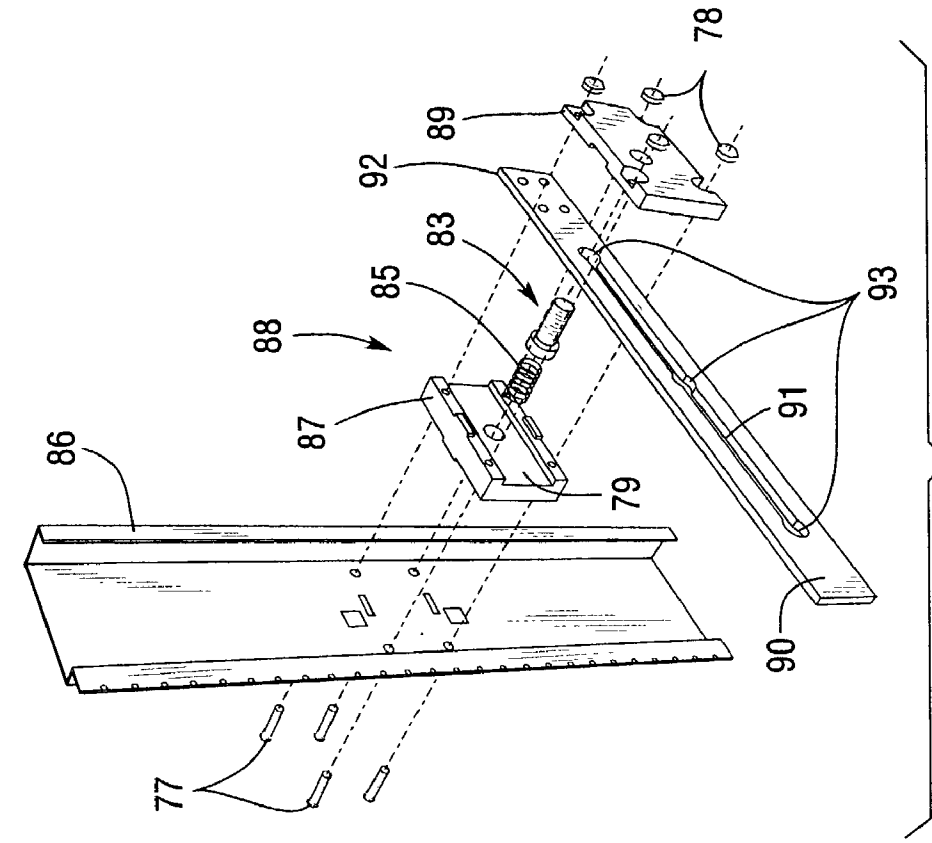
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Fig.7

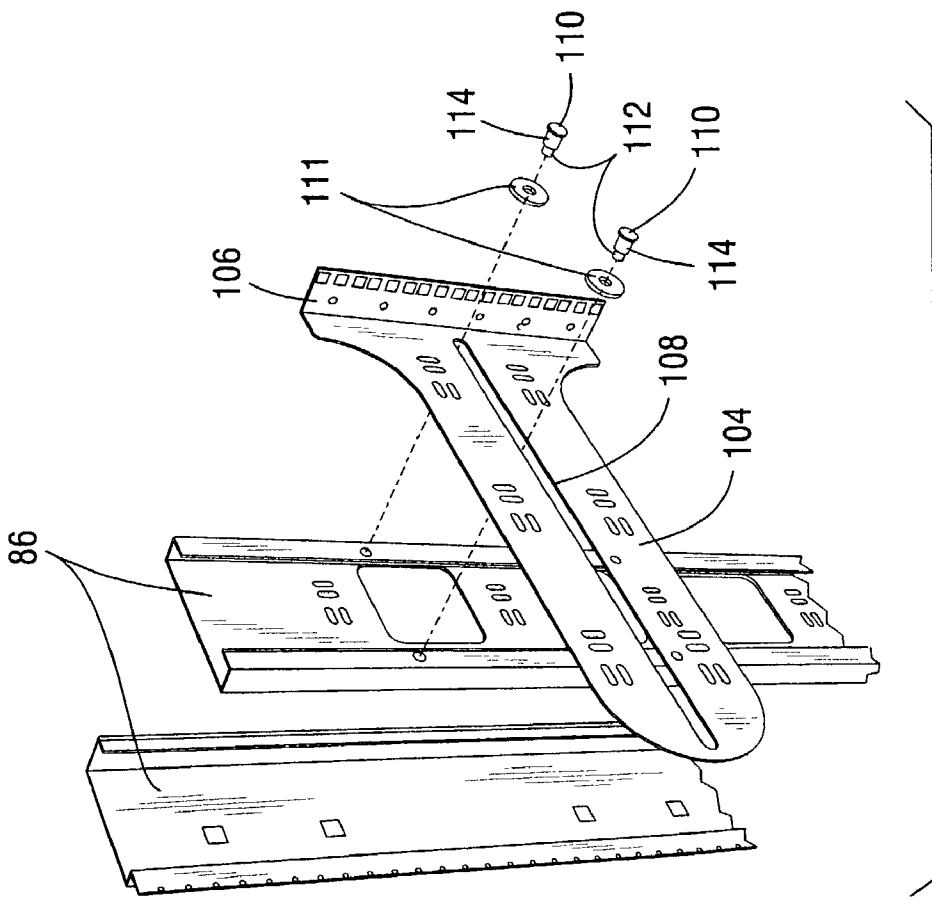
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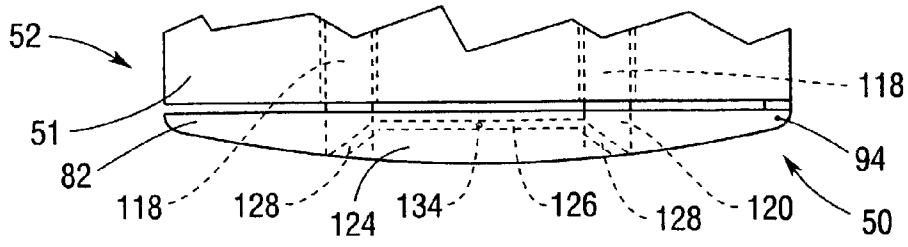
Fig.6



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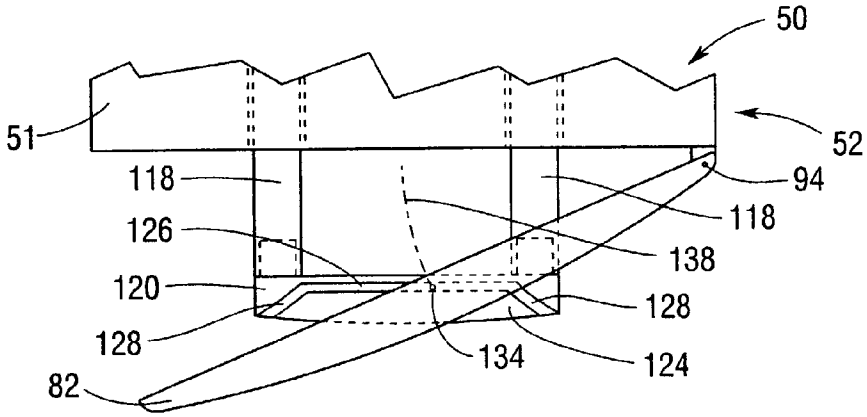

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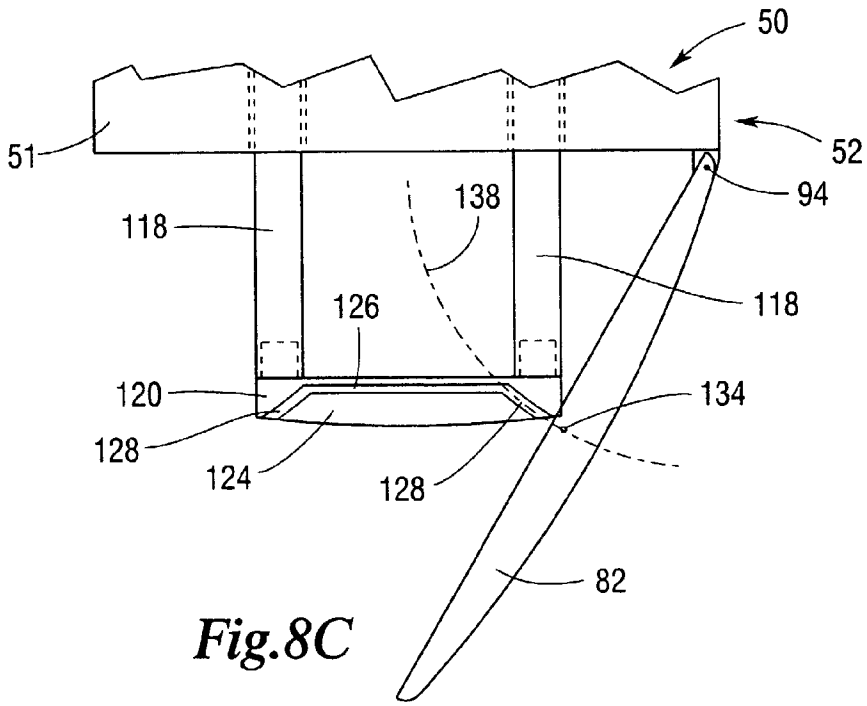

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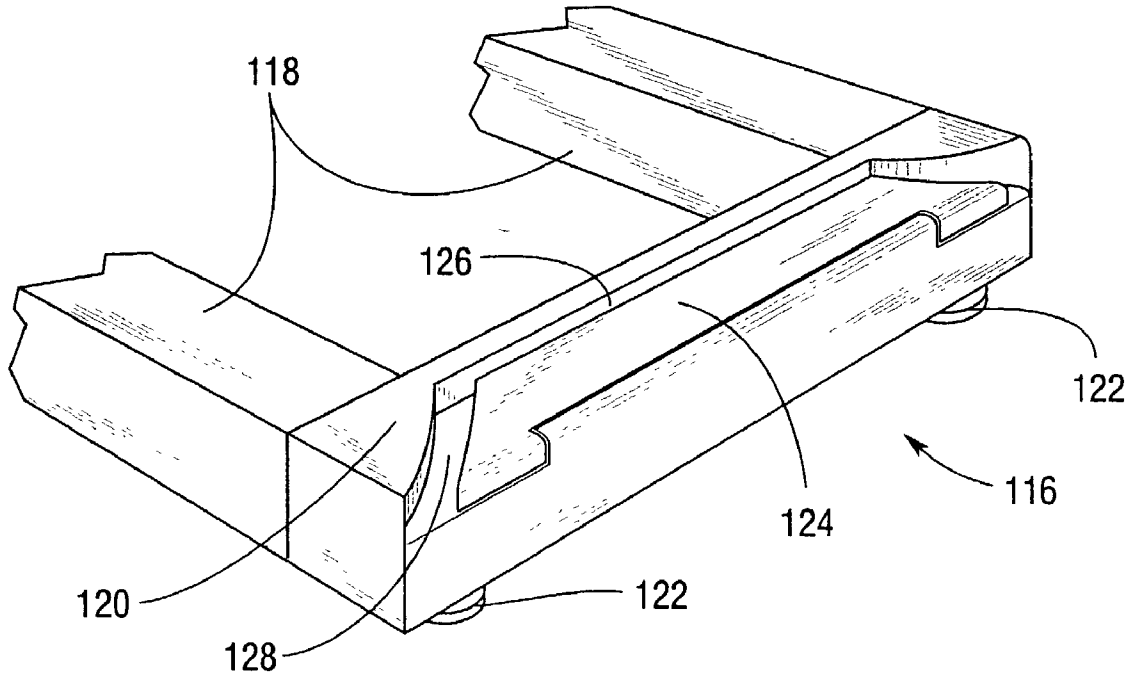
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Fig.9

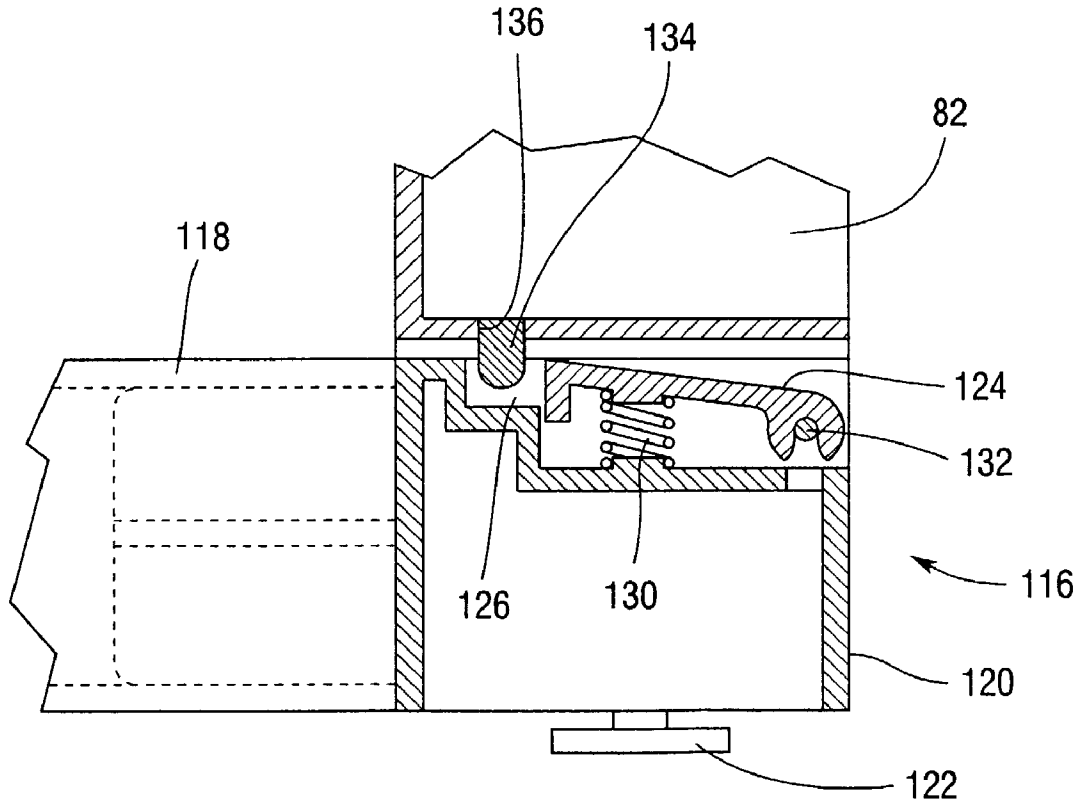
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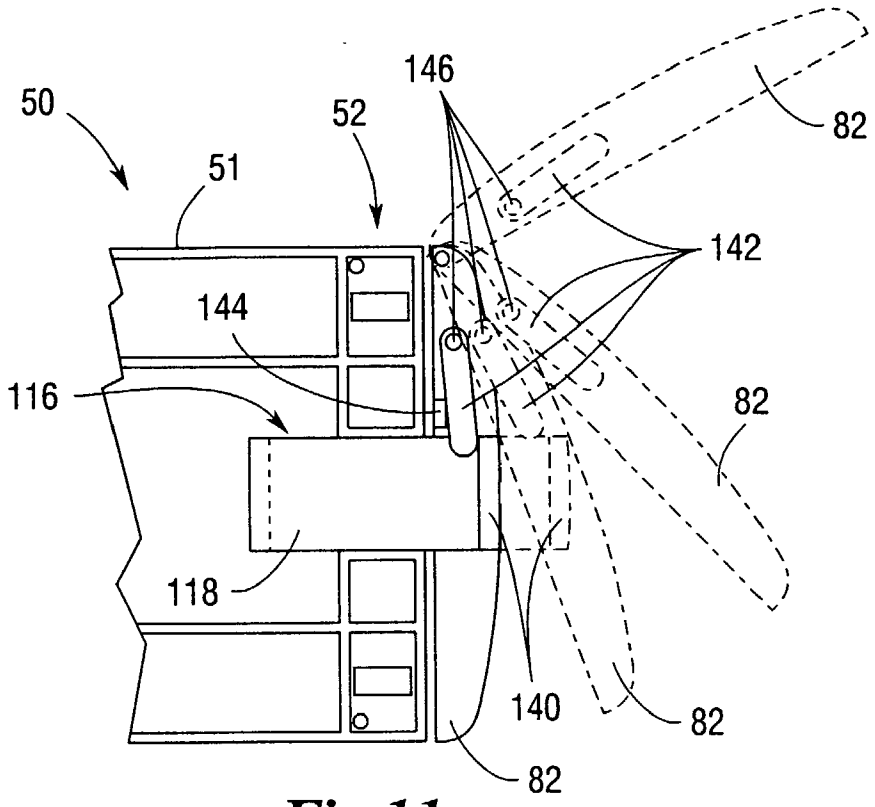
Fig.10



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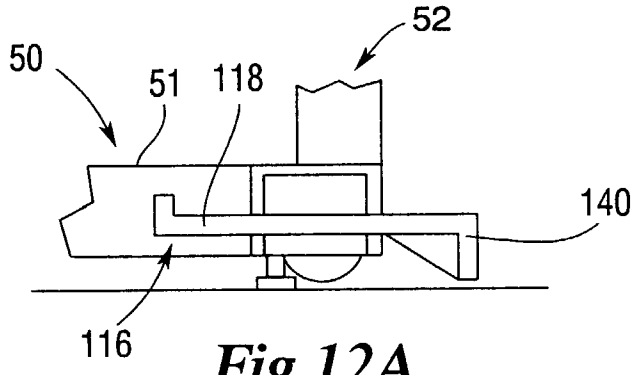

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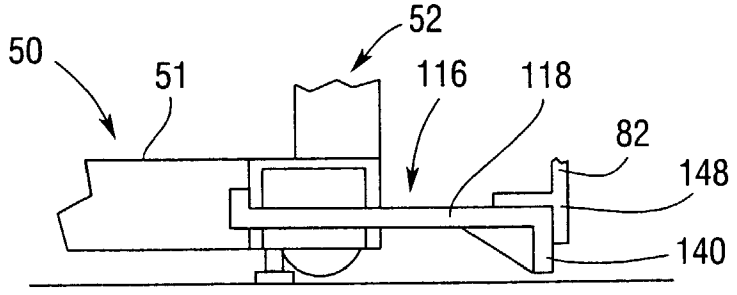

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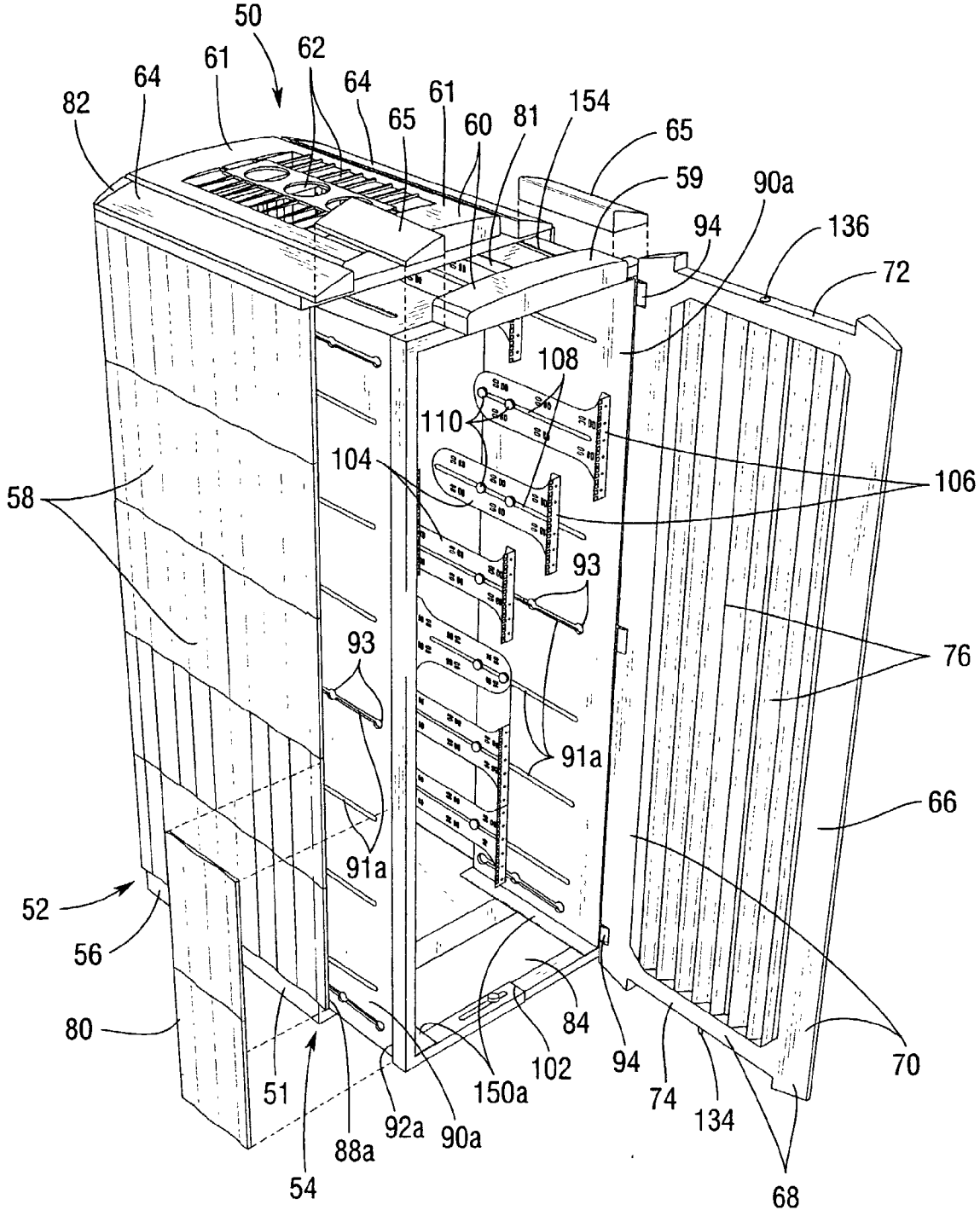
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Fig.13A

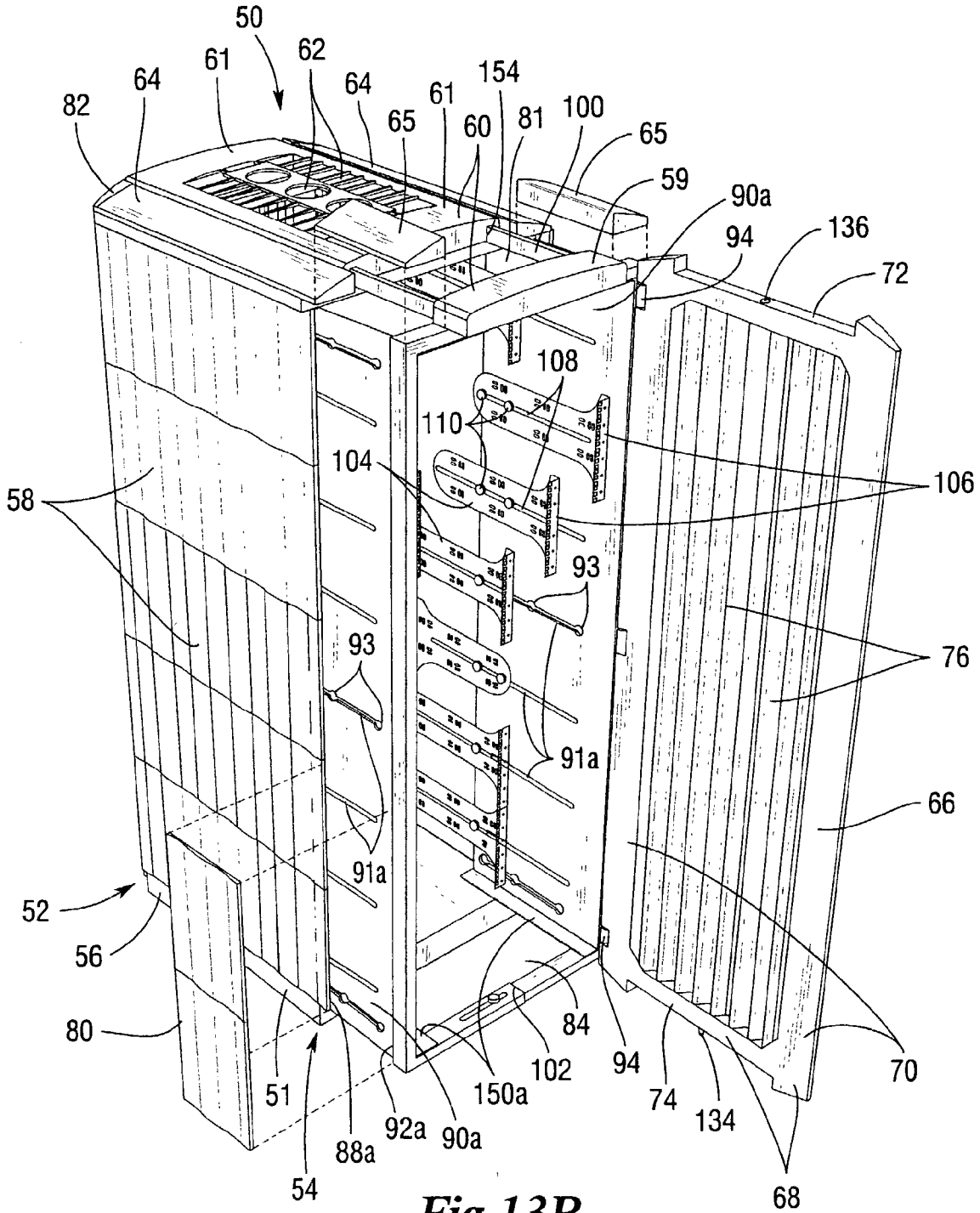
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Fig.13B

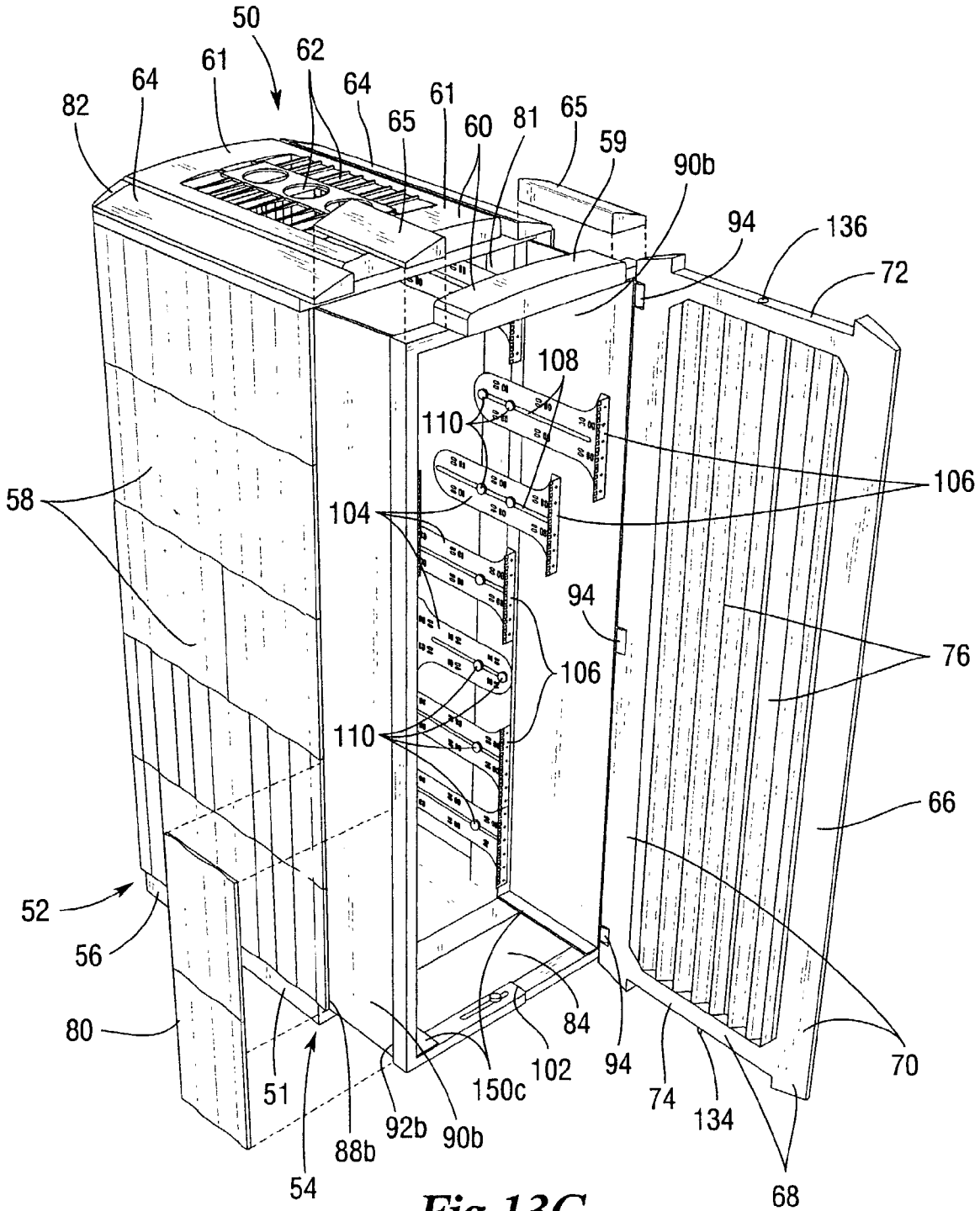
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Fig.13C

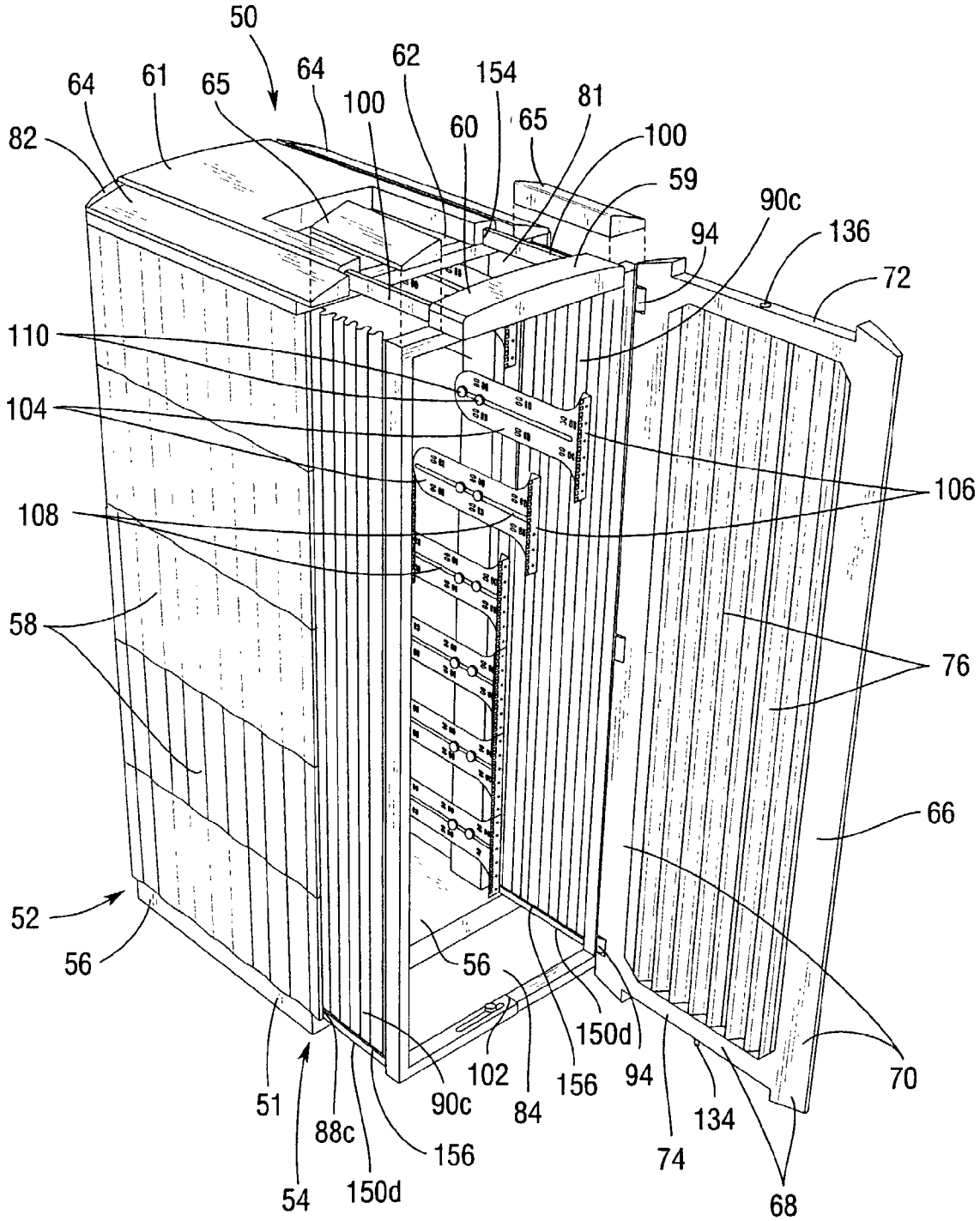
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Fig.14

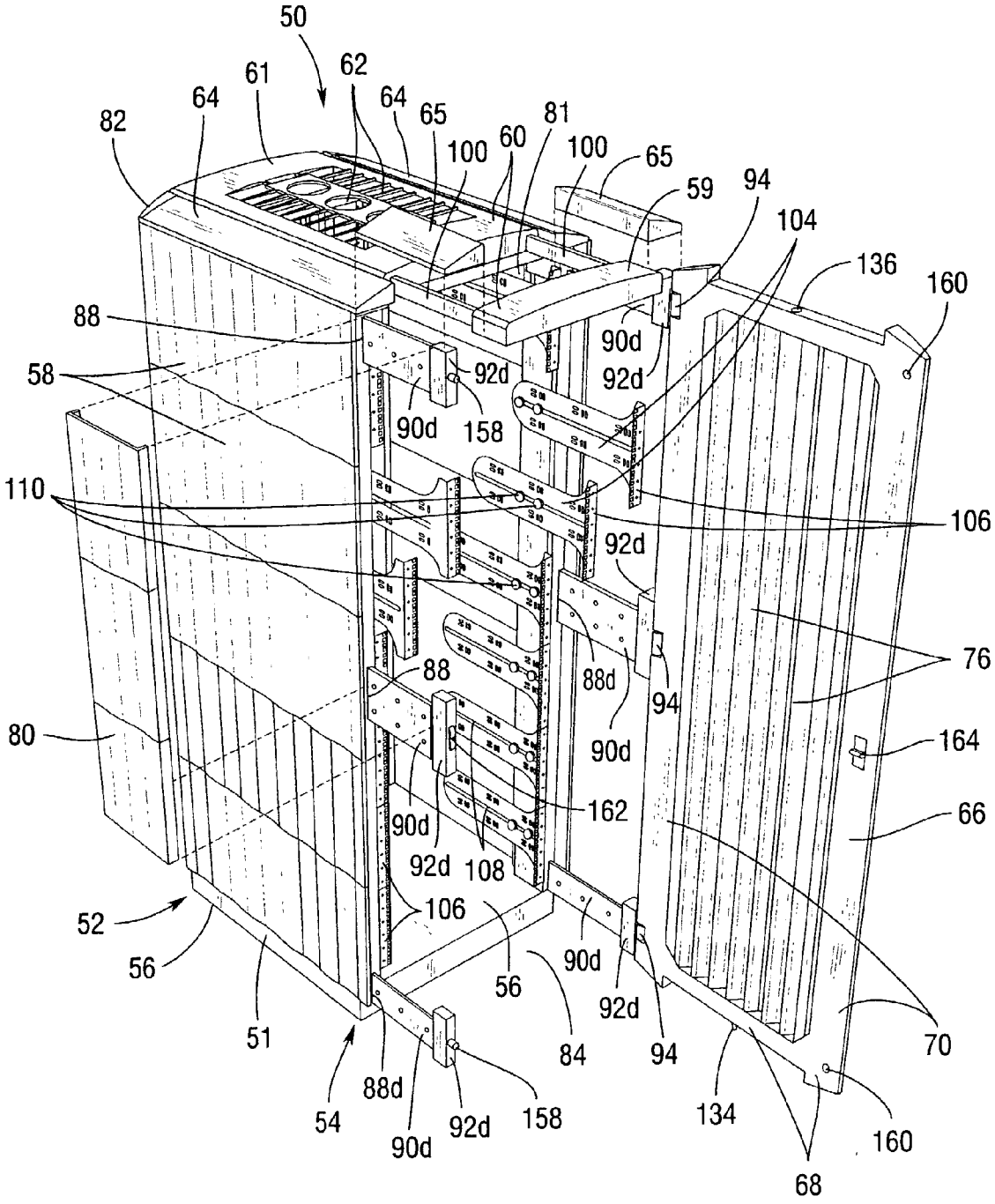
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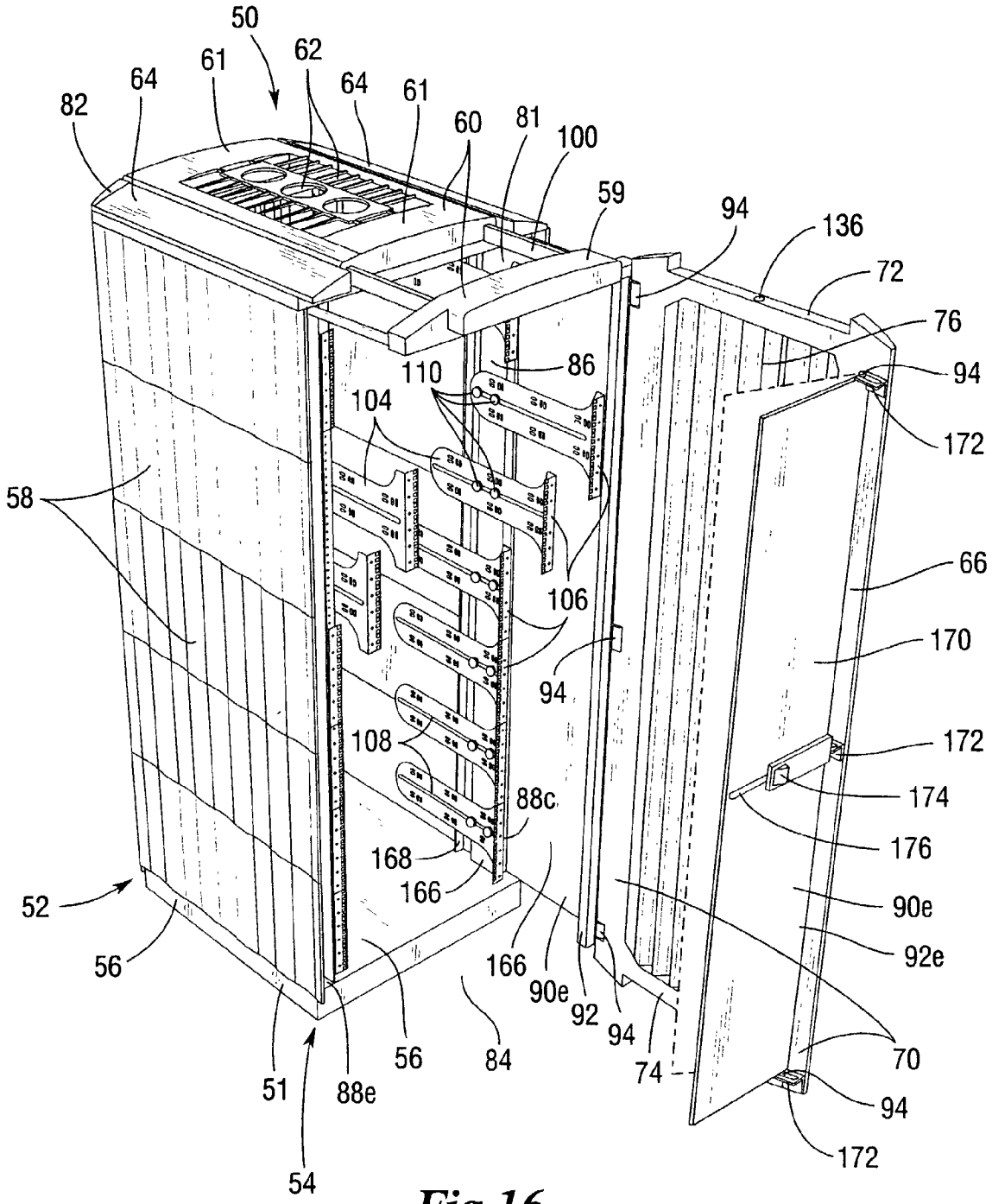
Fig.15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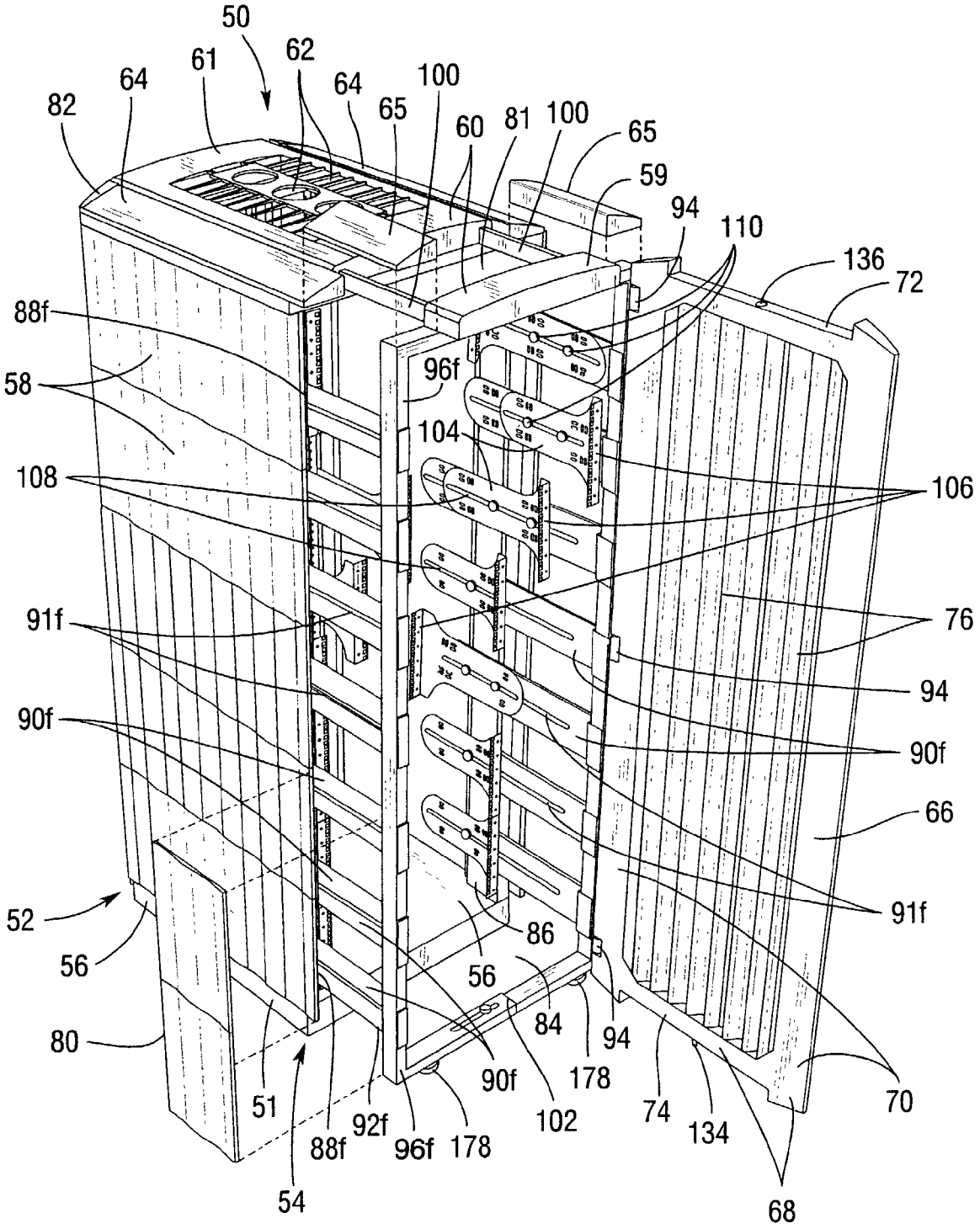
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Fig.17

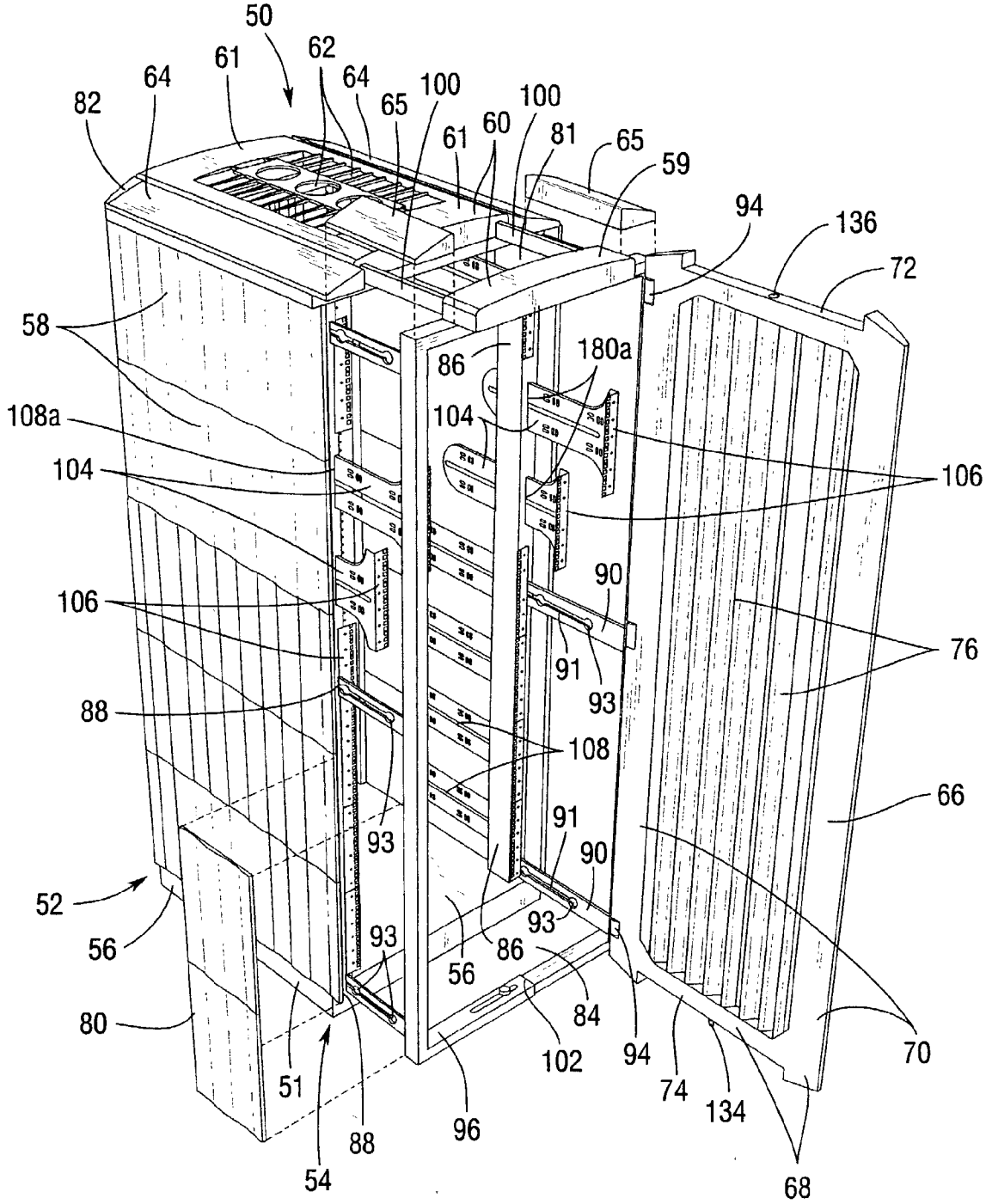
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Fig.18

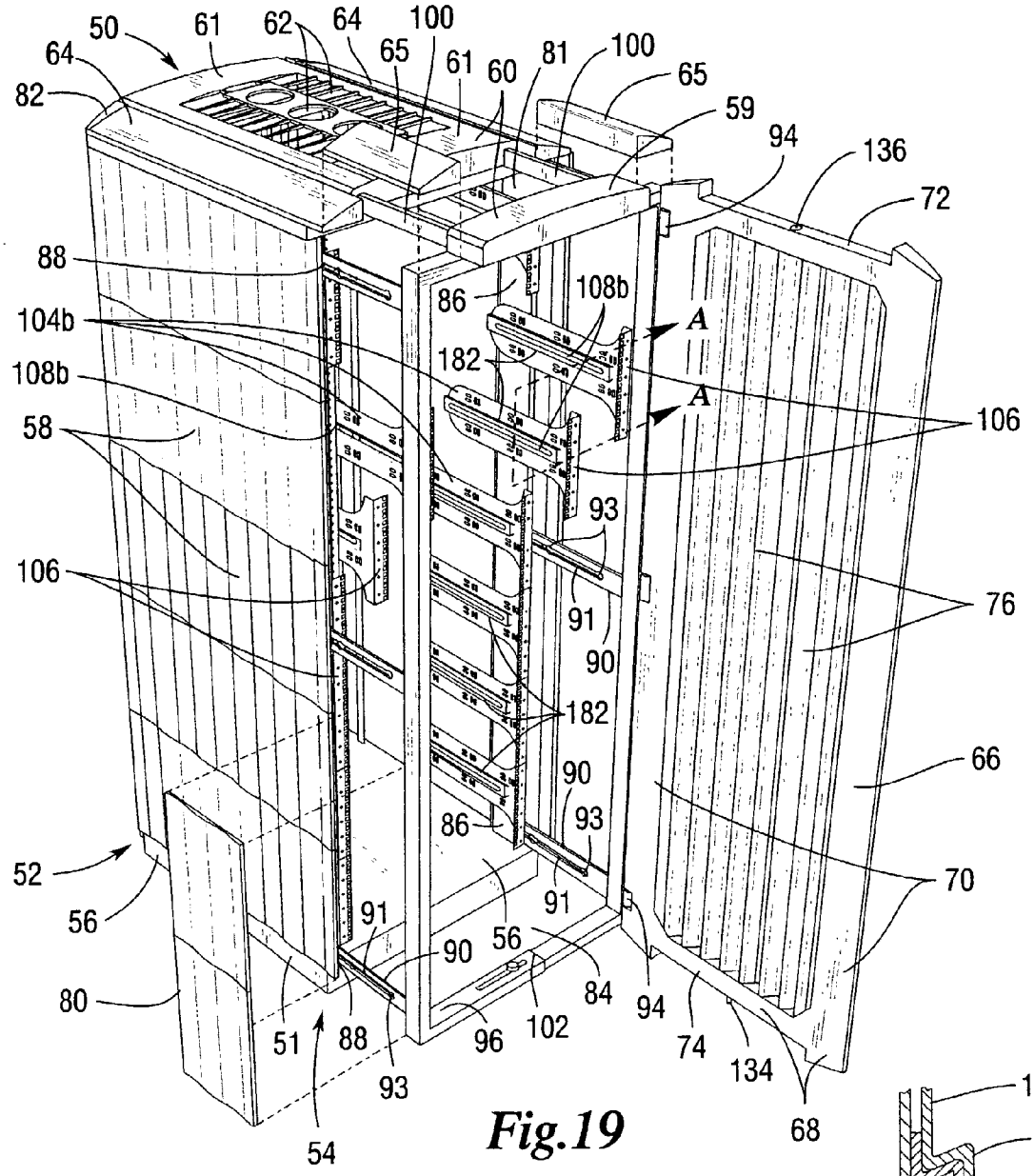
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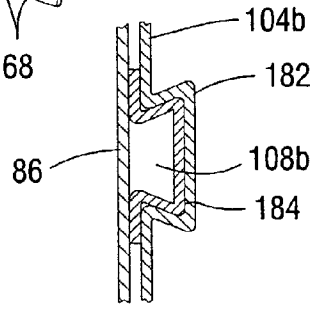
Fig.19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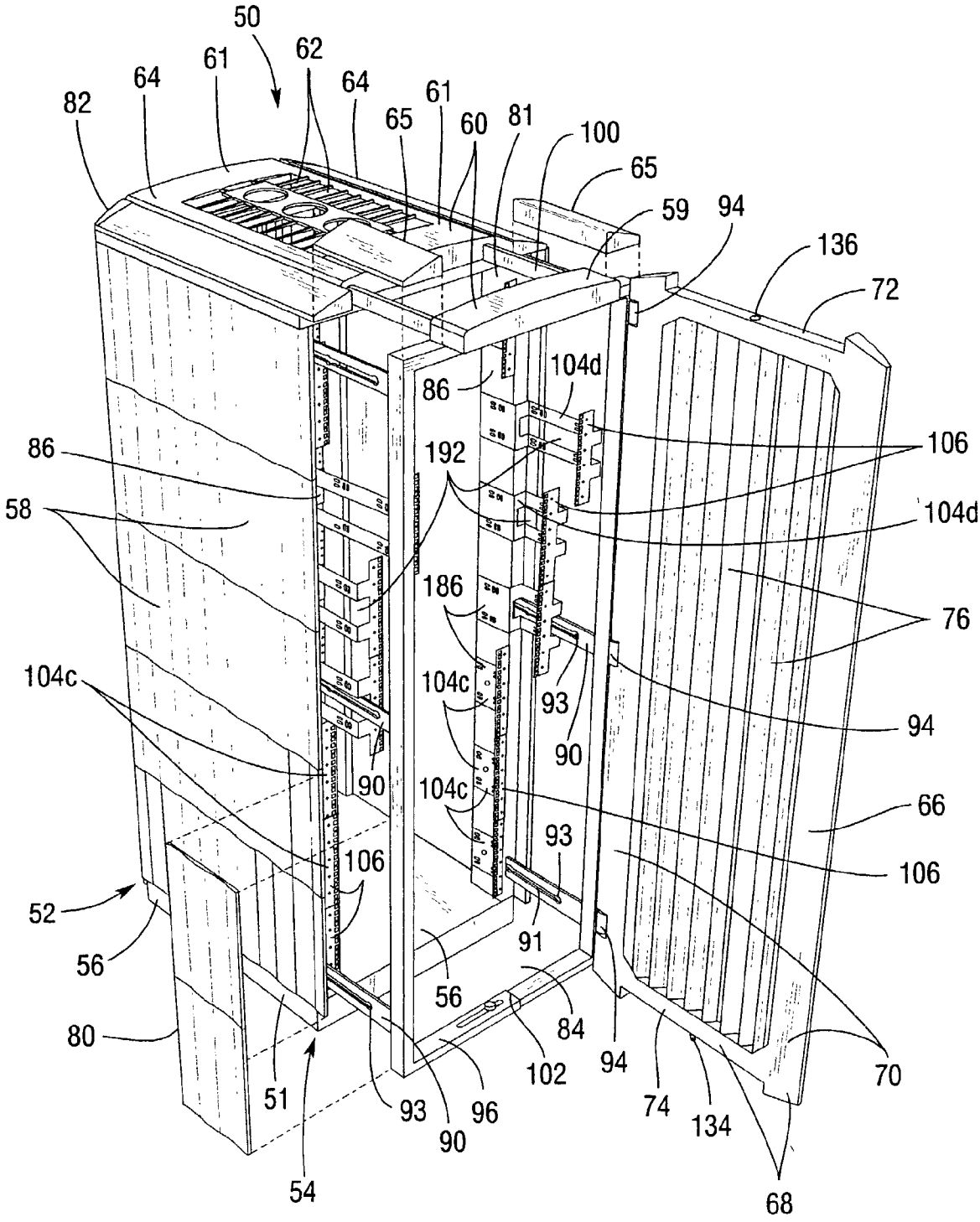
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Fig.21A

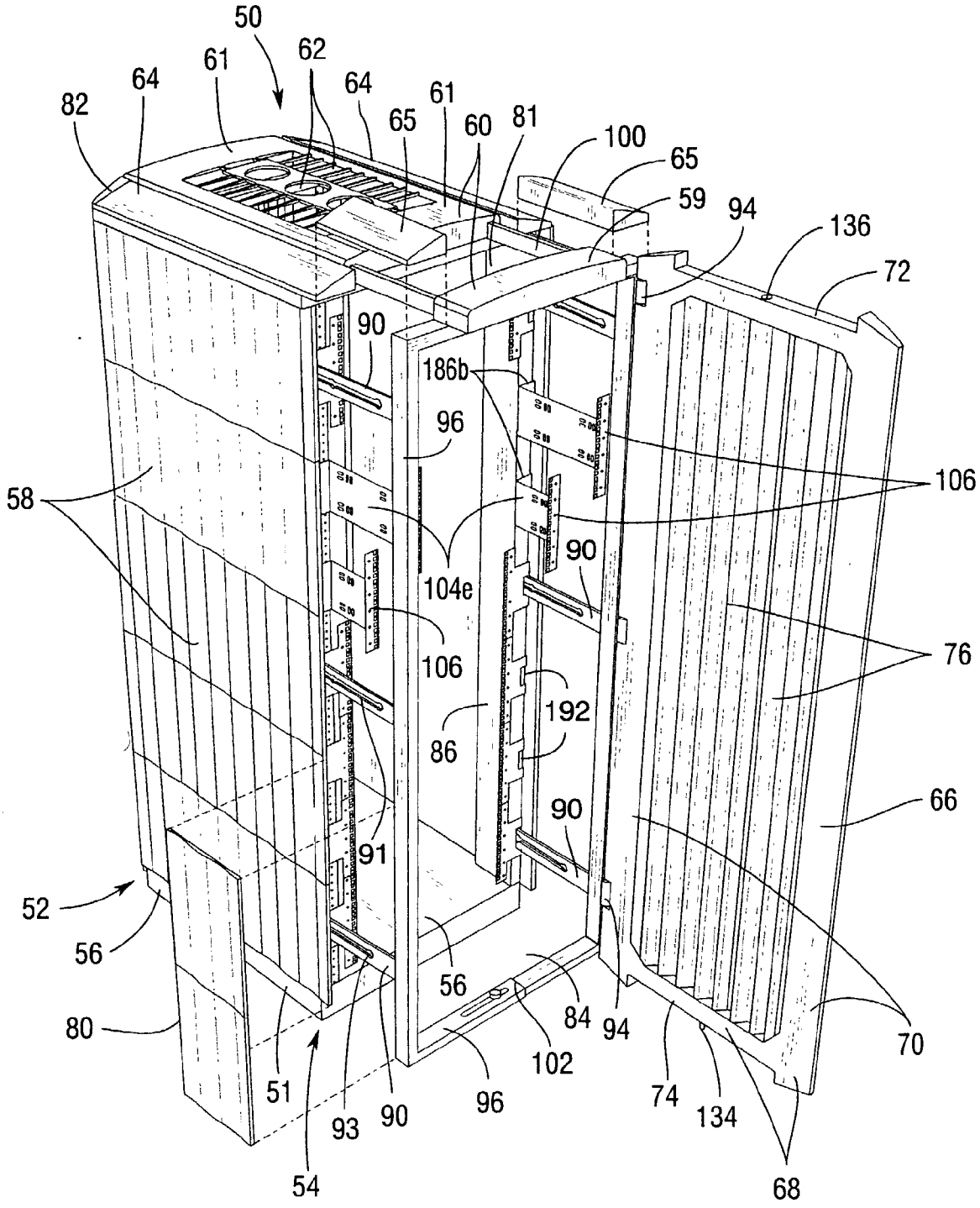
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Fig.21B

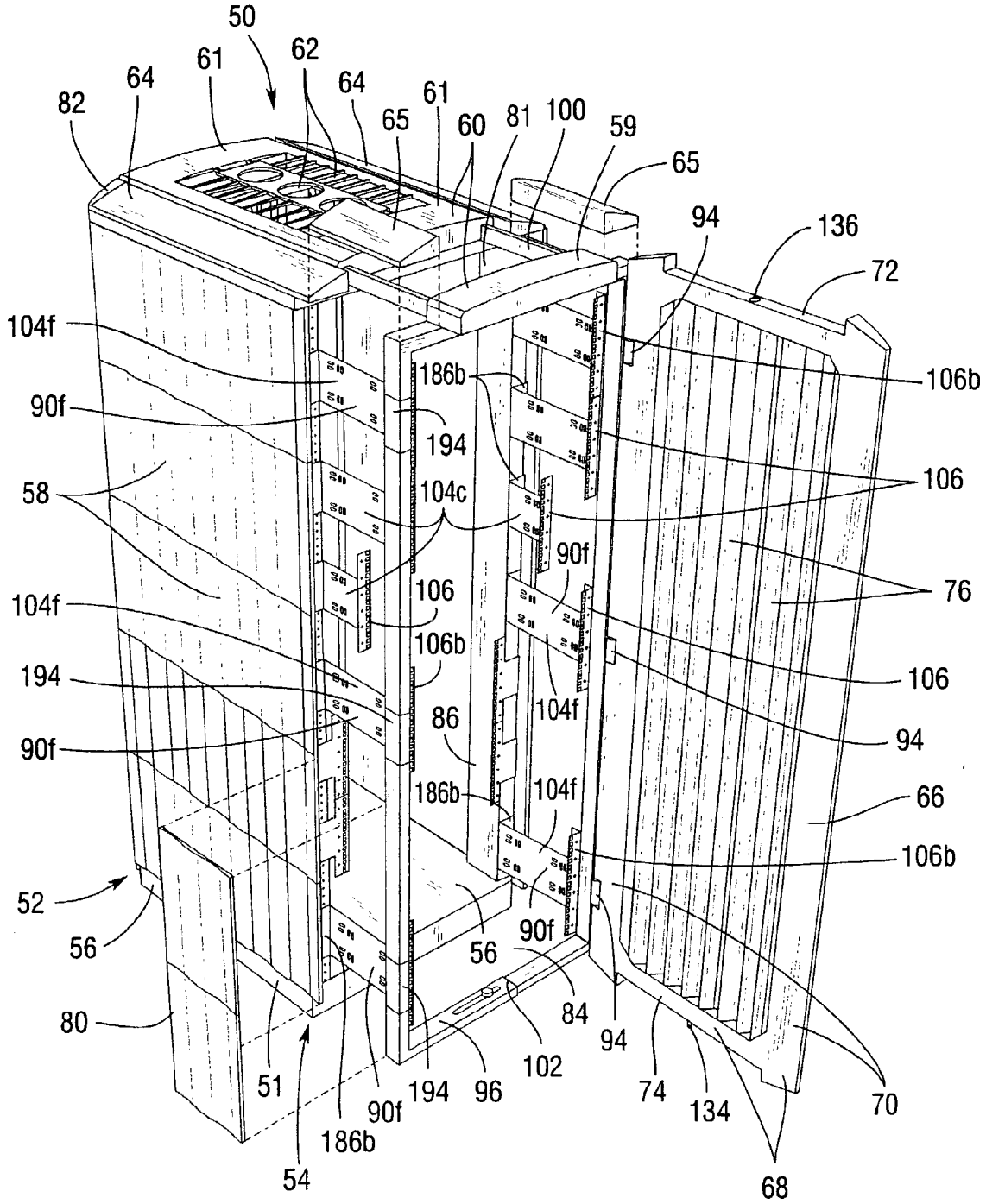
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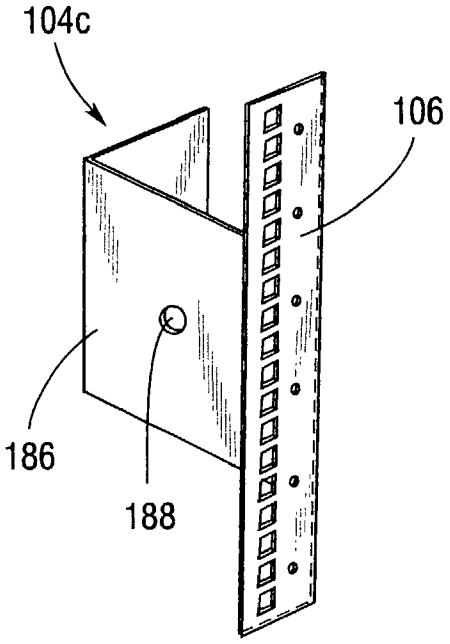
Fig.21C



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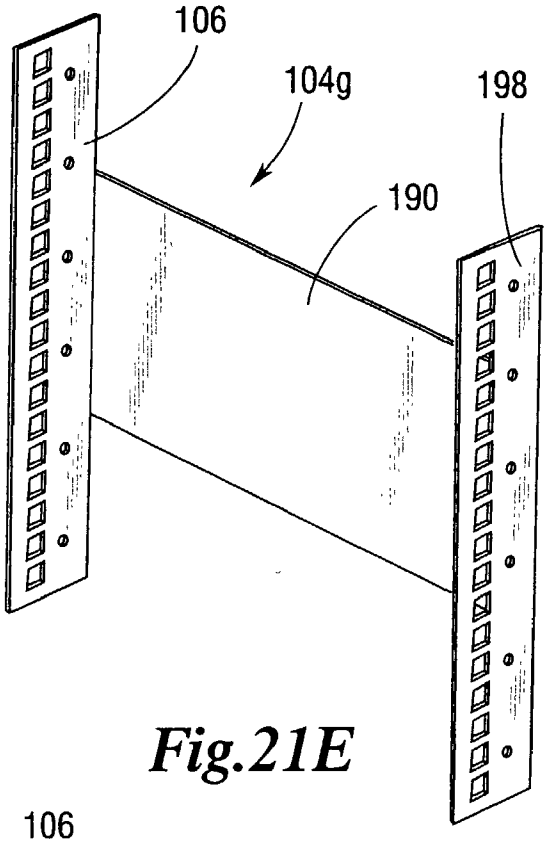

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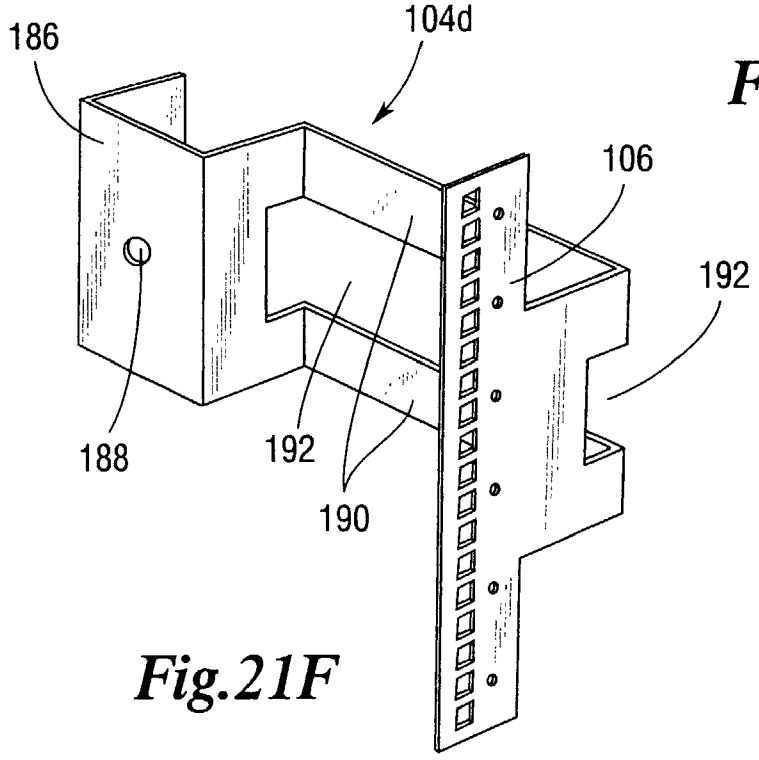

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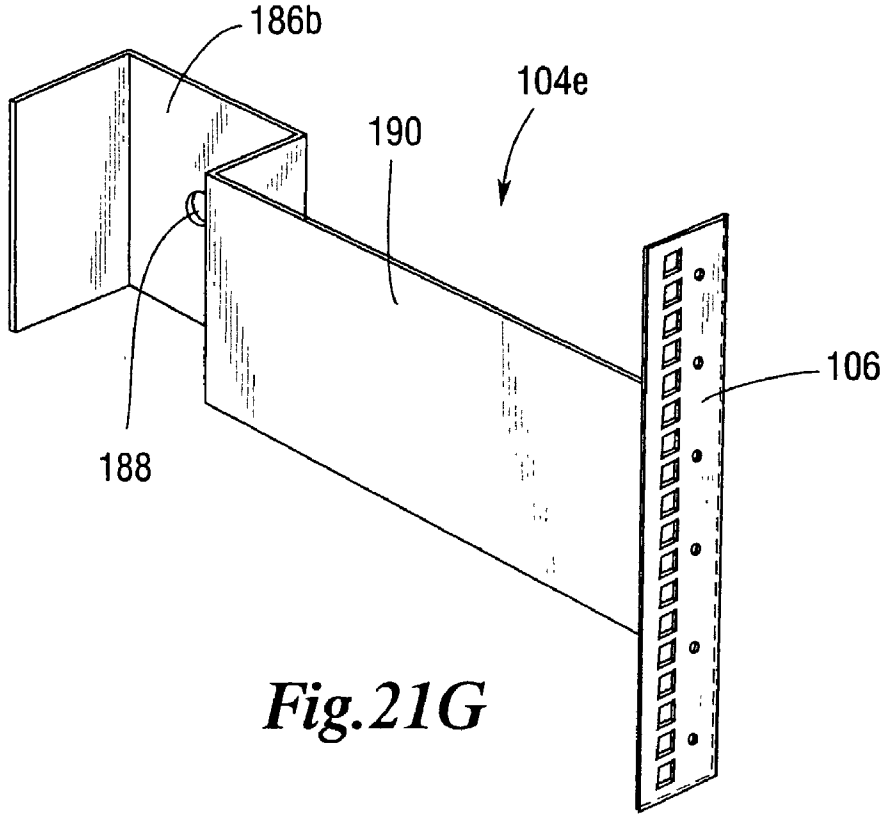

Fig.21G

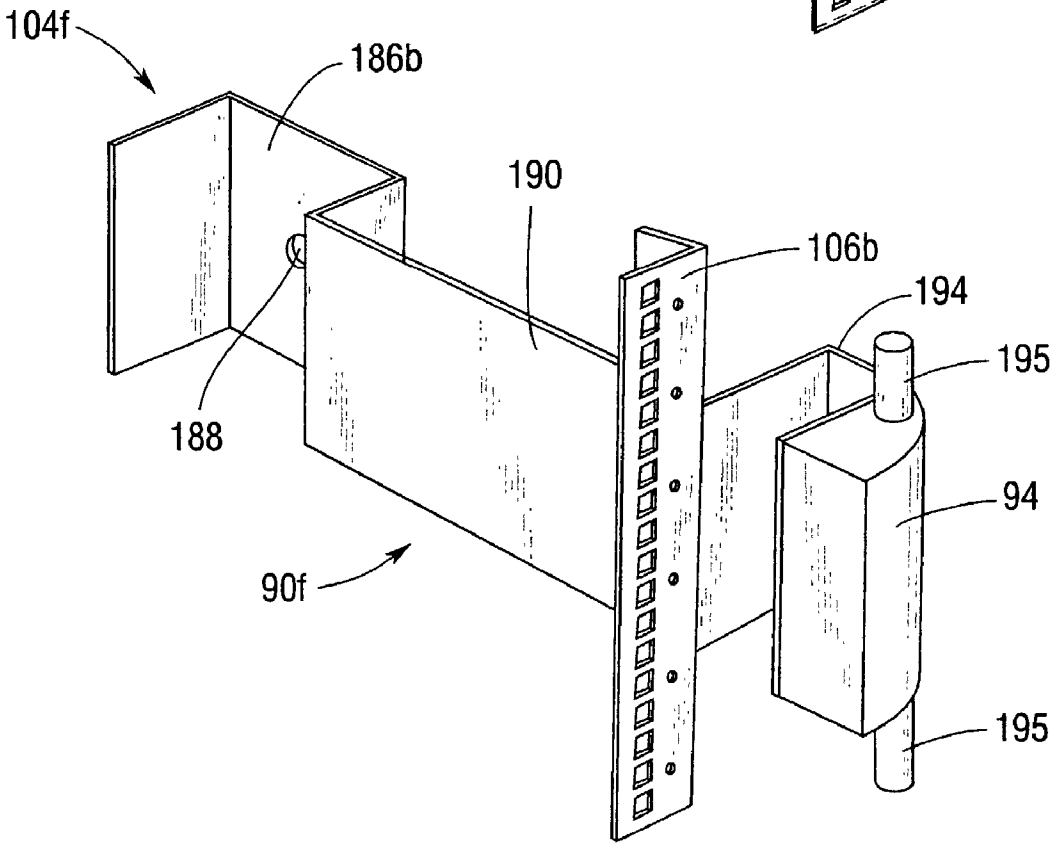

Fig.21H

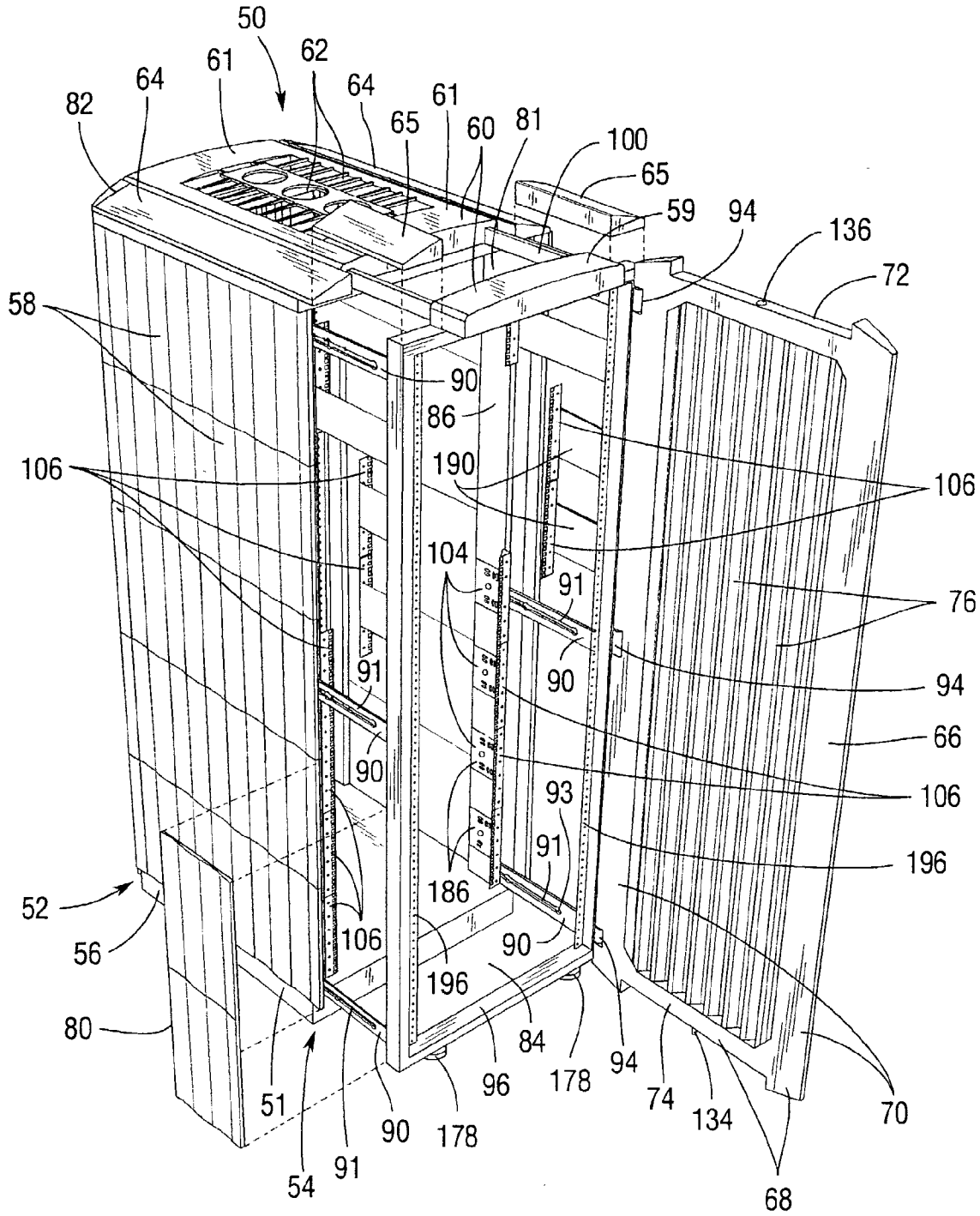
50
62
61
64
82
64
61
65
60
81
100
65
59
94
136
72
58
90
86
106
190
106
104
91
76
91
90
94
90
66
106
93
91
196
52
186
56
106
90
196
80
84
94
96
178
74
134
70
51
90
178
54
91
68

Fig.22

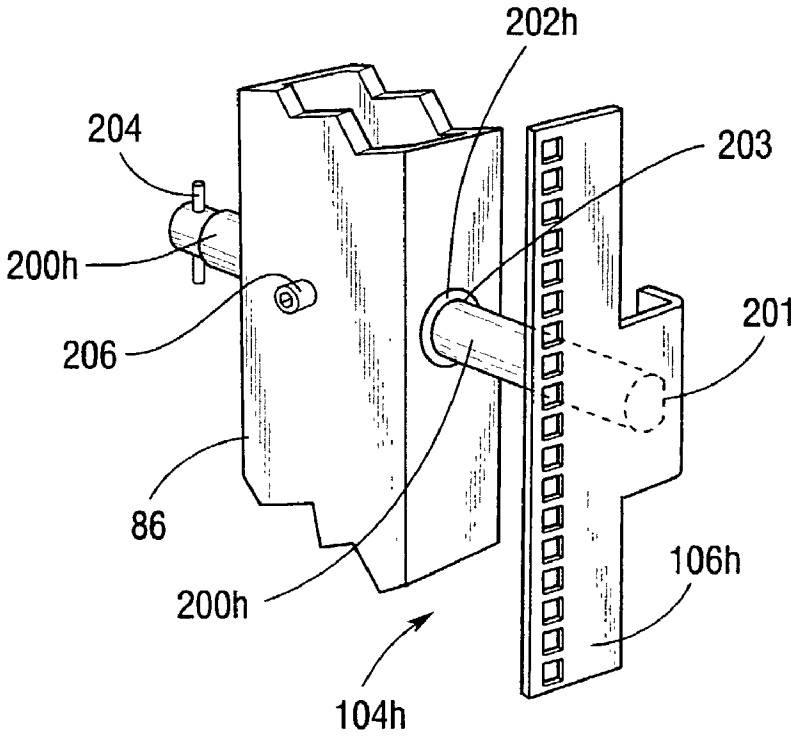
202h
204
203
200h
201
206
86
106h
200h
104h

Fig.23

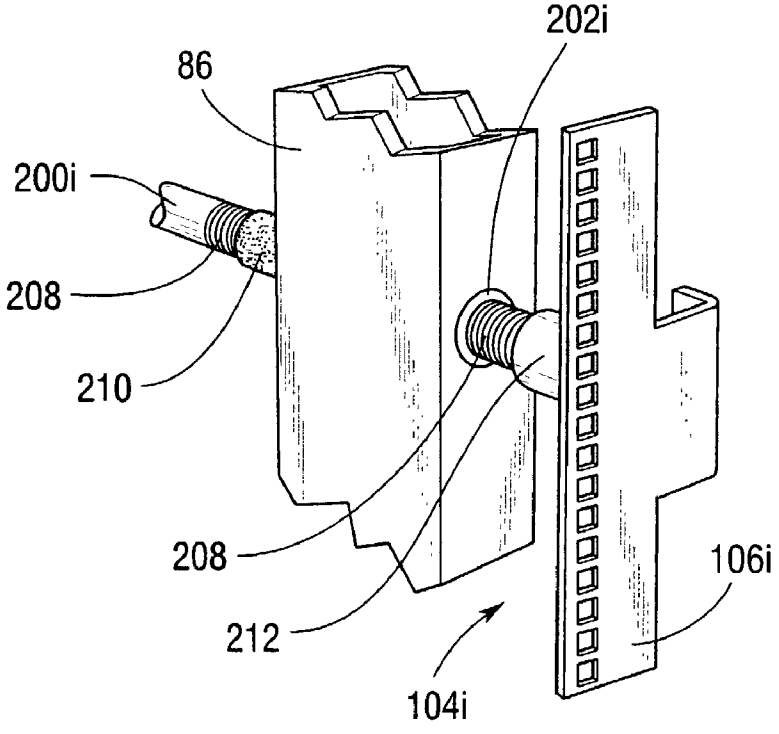
202i
86
200i
208
210
208
106i
212
104i

Fig.24

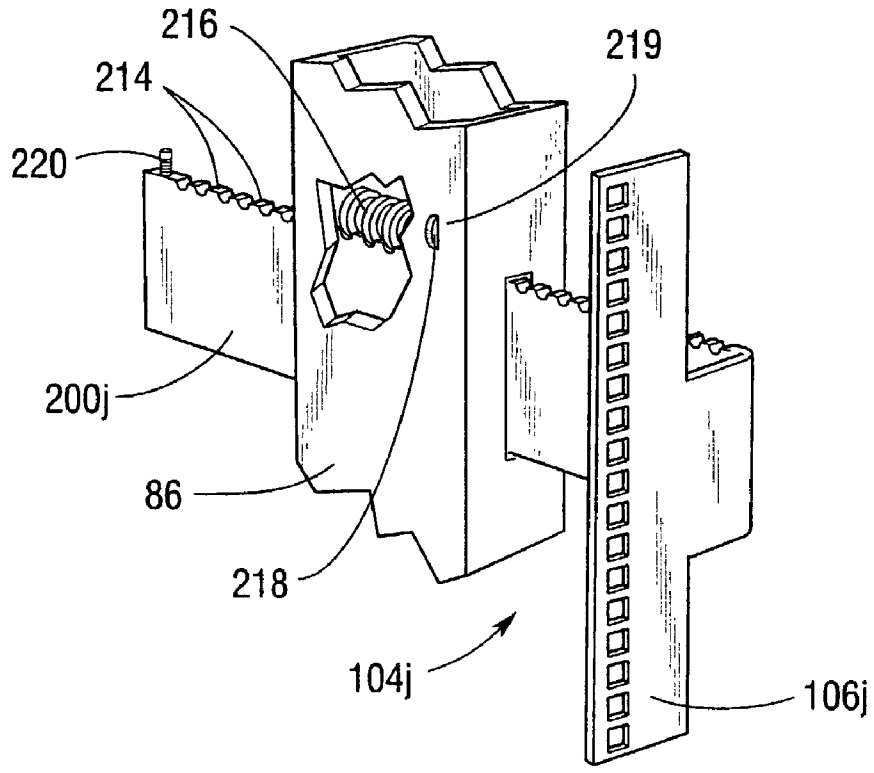
216
214
220
219
200j
86
218
104j
106j

Fig.25

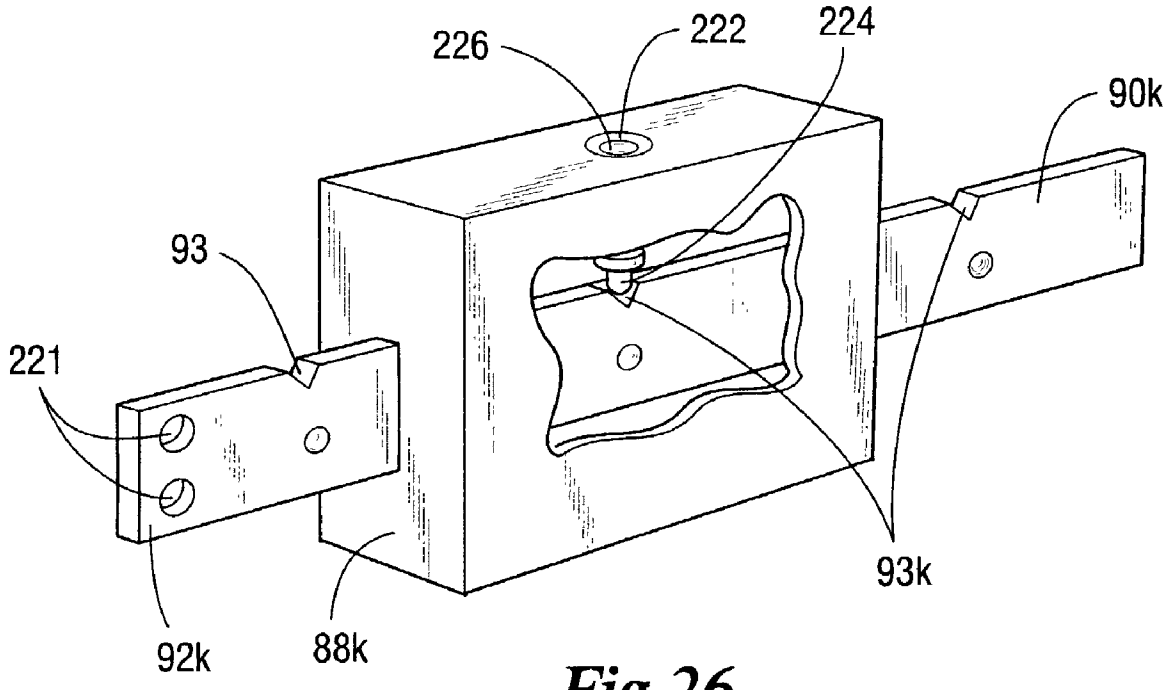
226
222
224
90k
93
221
93k
92k
88k

Fig.26

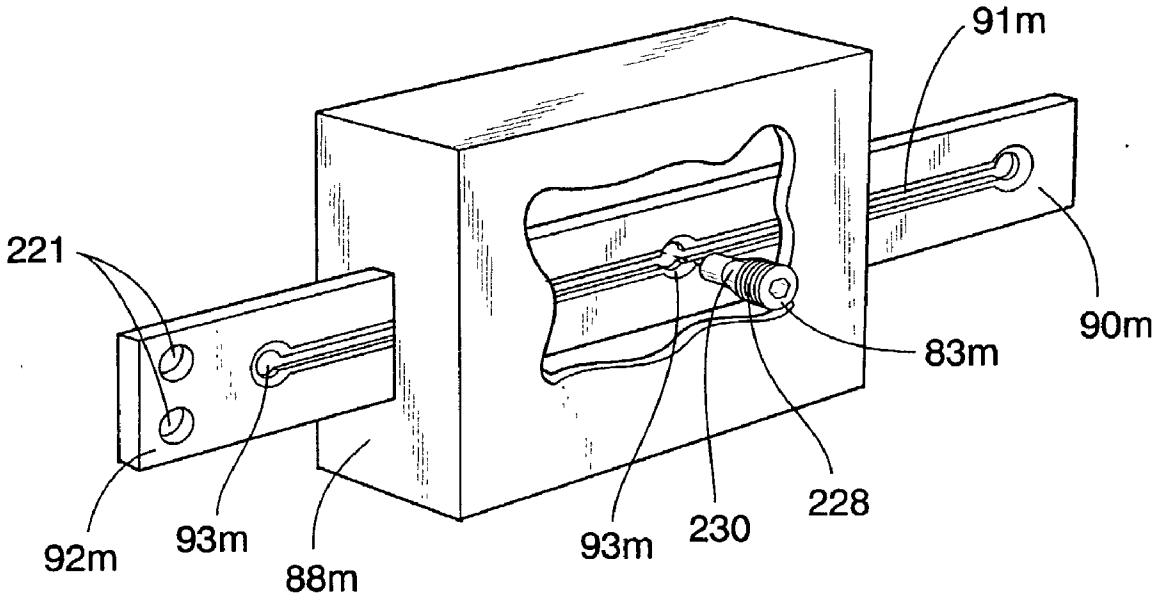
91m
221
90m
83m
92m
93m
88m
93m
230
228

Fig.27

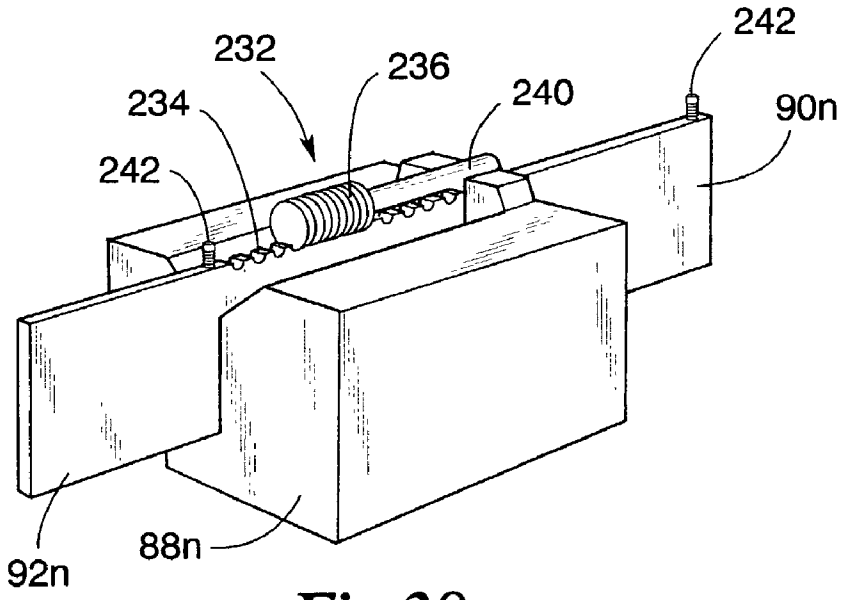
242
232
236
240
234
90n
242
92n
88n

Fig.28

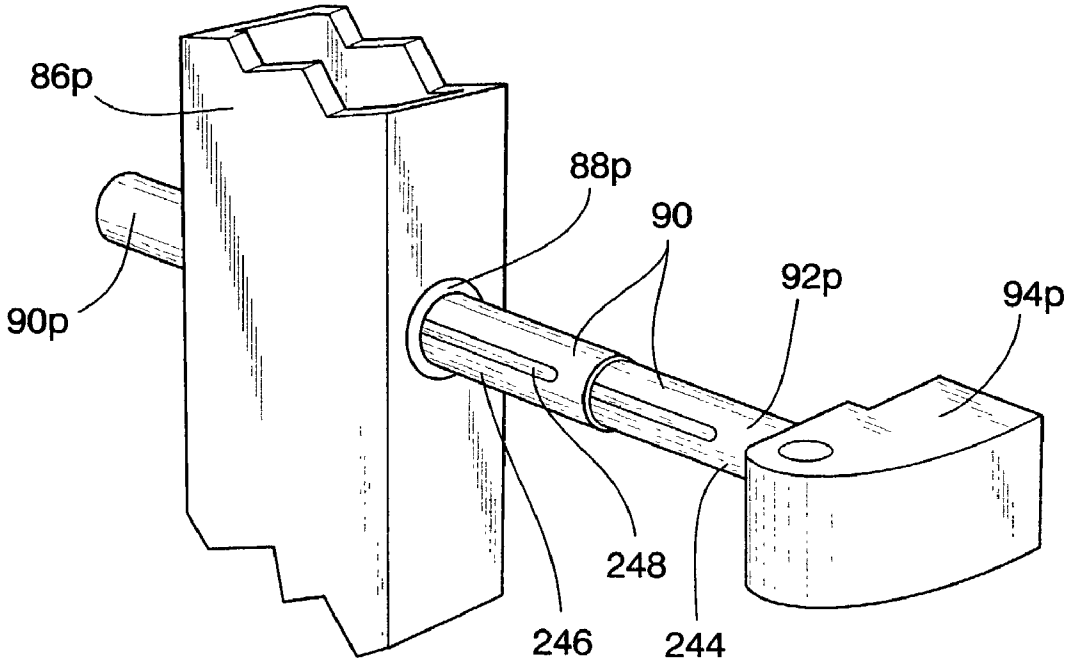
86p
88p
90
92p
94p
90p
248
246
244

Fig.29

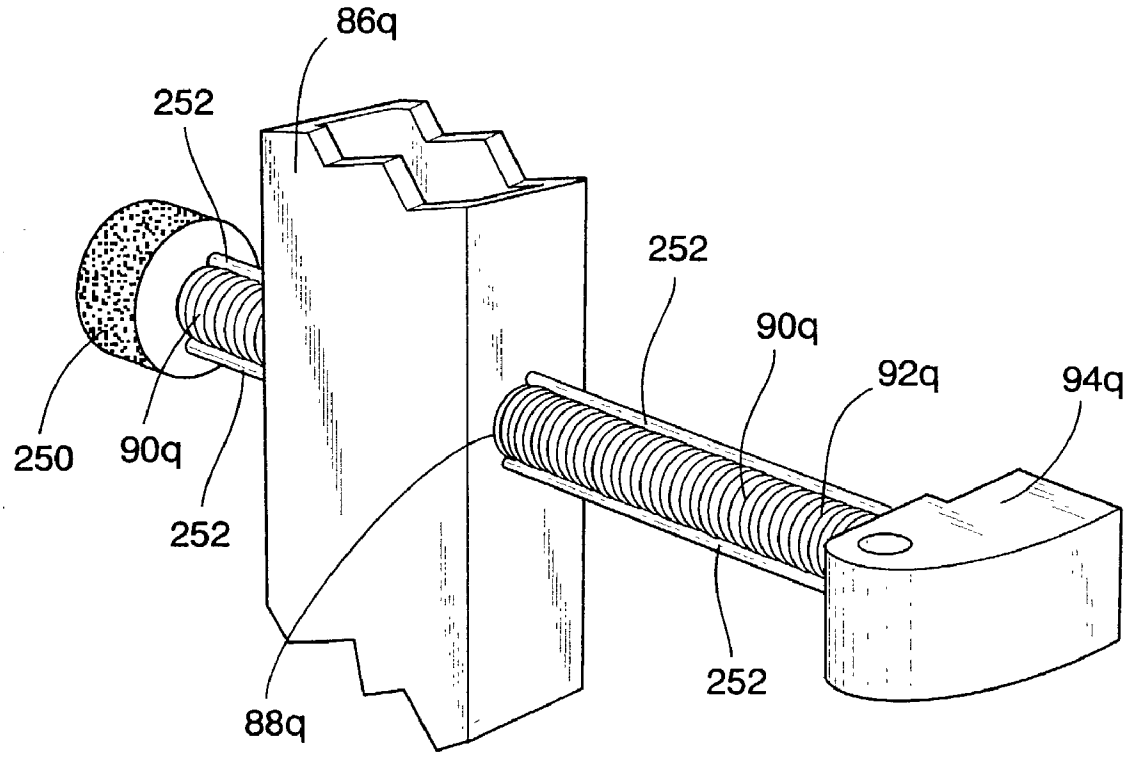
86q
252
252
90q
92q
94q
250
90q
252
252
88q

Fig.30

EXPANDABLE SERVER CABINET

BACKGROUND

[0001] Electronic component boxes such as those used for computer servers are frequently stored in dedicated locations such as a central computer room. Server cabinets can be used to store these component boxes for security, organizational, and aesthetic purposes in these locations. Such locations also tend to be limited in floor space, making it necessary for individual components to be stored efficiently in a way that maximizes the usage of space that is available. For these reasons, existing server cabinets are commonly available in a variety of fixed sizes, the cabinets typically being configured to store multiple computer servers in a stacked or vertical arrangement.

[0002] Servers can also vary considerably in size, particularly in length. Many cabinet systems are designed to conform to accepted industrial dimensional standards such as those set forth by the Electronic Industries Association (EIA) in EIA Standard EIA-310-D that is incorporated herein by reference. However, it is not required that cabinets conform to these standards, especially if the supplier and user agree to customized modifications. Even cabinets that do conform to one or more of such dimensional and construction standards can vary according to the specific standard or application for which the cabinet is intended.

[0003] As a user continually upgrades and adds to a computer system, new servers that are added are frequently larger than existing or replaced units. Often, a new server may be too large to fit into an existing cabinet, making it necessary for the user to acquire a new and larger cabinet and possibly forcing the user to incur substantial costs.

[0004] In some cases, the existing cabinet may be modular, allowing the user to simply add on to the existing cabinet by attaching an additional cabinet to effectively expand the size of the combined cabinet system. However, even this alternative requires that an additional cabinet module be acquired. In some cases, the size and construction of the modular addition may also be governed by applicable industrial standards. The addition of a modular component can also be costly and, depending on the size of the added server, result in a combined modular cabinet that is substantially larger than what is needed for storage. Thus, a combined modular cabinet is often at least partially empty, resulting in a substantial amount of valuable floor space being needlessly occupied and therefore essentially wasted.

SUMMARY

[0005] The invention is an expandable cabinet for storing and positioning electrical component boxes of different lengths. The cabinet has a cabinet frame having front and back portions and a base. Rear corner posts extend upward from the base at or near the back portion of the cabinet and provide structural support for servers or other types of electrical boxes that are stored in the cabinet.

[0006] At least one corner post includes a brace guide that is configured to securely position an expansion bracket so that the expansion bracket extends outward from about the back portion of the cabinet frame. One or more expansion brackets are capable of being secured by one or more brace guides at fixed positions relative to the rear corner posts and the back portion of the cabinet fame.

[0007] Each expansion bracket has a protruding end that extends out from the back portion of the cabinet frame. A back door hinge is mounted behind the back portion of the cabinet frame and is positioned to move with the protruding end of at least one expansion bracket. A back door is fastened to the back door hinge and is positioned to extend across the back portion of the cabinet frame. In some embodiments, a door sub-frame is connected to the protruding end of each expansion bracket and can assist in the positioning of the back door or enable each expansion bracket to move in unison with respect to the back portion of the cabinet frame.

[0008] An expanded space is formed between the back door and back portion of the cabinet frame when the at least one bracket is extended in a rearward direction from the rear corner post or posts. The expanded space enables the expansion cabinet to accommodate electrical component boxes that are too large to fit within the cabinet frame.

[0009] When a particular electrical component box is added to the cabinet, the component box is positioned in relation to both the front and back portions of the cabinet frame. To allow for the positioning of component boxes having different lengths, one or more box mounts are also installed in a horizontal position within the cabinet at or near the rear corner posts and near the expanded space between the back door and back portion of the cabinet frame. The position of each box mount can be varied within the expanded space. As an electrical component box is added to the cabinet, the position of one or more of the box mounts can be adjusted according to the length of the particular component box to allow the box mounts to engage and position the component box with respect to the back portion of the cabinet frame.

[0010] Those skilled in the art will realize that this invention is capable of embodiments which are different from those shown and that details of the structure of the expandable cabinet described herein can be changed in various manners without departing from the scope of this invention. Accordingly, the drawings and descriptions are to be regarded as including such equivalent expandable cabinets as do not depart from the spirit and scope of this invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] For a more complete understanding and appreciation of this invention and many of its advantages, reference will be made to the following detailed description taken in conjunction with the accompanying drawings.

[0012] **FIG. 1** is a rear perspective view of an expandable cabinet of the invention;

[0013] **FIG. 2A** is a rear perspective view of multiple adjacent expandable cabinets according to the invention;

[0014] **FIG. 2B** is a front perspective view of the expandable cabinets of **FIG. 2A**;

[0015] **FIG. 3A** is a partially exploded rear perspective view of the expandable cabinet of **FIG. 1**;

[0016] **FIG. 3B** is a partially exploded rear perspective view of an expandable cabinet of the invention;

[0017] **FIG. 4** is a cross sectional side view of the expandable cabinet of **FIG. 1** prior to expansion;

[0018] **FIG. 5** is a cross sectional side view of the expandable cabinet of **FIG. 1** after expansion;

[0019] **FIG. 6** is an exploded view of an individual T-bone style of box mount and rear corner post assembly according to an embodiment of the invention;

[0020] **FIG. 7** is an exploded view of a brace guide and expansion bracket assembly according to one embodiment of the invention;

[0021] **FIG. 8A** is a top view of a cabinet and front door stabilizer prior to extension of the stabilizer according to one embodiment of the invention;

[0022] **FIG. 8B** is a top view of the cabinet and front door stabilizer of **FIG. 8A** during extension of the stabilizer;

[0023] **FIG. 8C** is a top view of a cabinet and front door stabilizer of **FIG. 8B** after extension of the stabilizer;

[0024] **FIG. 9** is a perspective view of the door stabilizer of **FIG. 8A**;

[0025] **FIG. 10** is a cross sectional side view of the door stabilizer of **FIG. 8A**;

[0026] **FIG. 11** is a bottom view of a cabinet and front door stabilizer according to one embodiment of the invention;

[0027] **FIG. 12A** is a side cross sectional view of the cabinet and front door stabilizer of **FIG. 11** prior to extension of the stabilizer;

[0028] **FIG. 12B** is a side cross sectional view of the cabinet and front door stabilizer of **FIG. 11** after extension of the stabilizer;

[0029] **FIG. 13A** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0030] **FIG. 13B** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0031] **FIG. 13C** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0032] **FIG. 14** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0033] **FIG. 15** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0034] **FIG. 16** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0035] **FIG. 17** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0036] **FIG. 18** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0037] **FIG. 19** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0038] **FIG. 20** is a side cross sectional view of a dovetail form of the expandable cabinet of **FIG. 19**;

[0039] **FIG. 21A** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0040] **FIG. 21B** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0041] **FIG. 21C** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0042] **FIG. 21D** is a perspective view of a box mount according to certain embodiments of the invention;

[0043] **FIG. 21E** is a perspective view of a box mount according to certain embodiments of the invention;

[0044] **FIG. 21F** is a perspective view of a box mount according to certain embodiments of the invention;

[0045] **FIG. 21G** is a perspective view of a box mount according to certain embodiments of the invention;

[0046] **FIG. 21H** is a perspective view of a box mount according to certain embodiments of the invention;

[0047] **FIG. 22** is a partially exploded rear perspective view of an expandable cabinet according to the invention;

[0048] **FIG. 23** is a perspective view of a box mount positioned on a rear corner post according to one embodiment of the invention;

[0049] **FIG. 24** is a perspective view of a box mount positioned on a rear corner post according to one embodiment of the invention;

[0050] **FIG. 25** is a perspective view of a box mount positioned on a rear corner post according to one embodiment of the invention;

[0051] **FIG. 26** is a perspective cut-away view of a brace guide and expansion bracket according to one embodiment of the invention;

[0052] **FIG. 27** is a perspective cut-away view of a brace guide and expansion bracket according to one embodiment of the invention;

[0053] **FIG. 28** is a perspective view of a brace guide and expansion bracket according to one embodiment of the invention;

[0054] **FIG. 29** is a perspective view of a brace guide and expansion bracket according to one embodiment of the invention; and

[0055] **FIG. 30** is a perspective view of a brace guide and expansion bracket according to one embodiment of the invention.

DETAILED DESCRIPTION

[0056] Referring to the drawings, identical reference numerals designate the same or corresponding part throughout the several figures as shown in the drawings.

[0057] **FIG. 1** depicts a rear view of an expandable cabinet **50** of the invention prior to expansion. The cabinet **50** is built around a cabinet frame **51** that includes a base **56**, a front portion **52**, and a back portion **54**. Side panels **58** extend along each side of the cabinet **50** between the front portion **52** and back portion **54**. As best understood with brief reference to the exploded view of **FIG. 3**A, the side panels **58** are modular and can be removed to allow for side access to the interior of the cabinet **50**.

[0058] **FIG. 1** also depicts a cover **60** having a main section **61** that extends over the cabinet **50** from the front portion **52** to the back portion **54** of the cabinet frame **51**. As depicted, the main section **61** of the cover **60** is located in a

fixed position relative to the cabinet frame **51** and can be configured to allow venting through a number of ventilation passages **62** that allow air to pass freely between the interior and exterior of the cabinet **50**. Tapered corner angles **64** are attached between the cover **60** and side panels **58** and extend between the front portion **52** and back portion **54** of the cabinet frame **51**.

[**0059**] A back door **66** extends across the width of the back portion **54** of the cabinet frame **51**, the back door **66** also having a vertical dimension from the cover **60** to the base **56** of the cabinet frame **51**. The back door **66** is constructed around a door chasis **68** having extruded side rails **70** which interlock with a top brace **72** and a bottom brace **74** to provide rigidity for the back door **66**. A free member **59** of the cover **60** is fixed to the top brace **72** of the back door **66**.

[**0060**] A corrugated grille **76** occupies the open frame area between the top and bottom braces **72** and **74** and between the side rails **70**. The grille **76** is constructed to allow a sufficient amount of air to pass through the back door **66** to permit cooling of the interior of the cabinet **50** while providing security to electrical boxes stored in the cabinet **50** if necessary. As shown in **FIG. 1**, the grille **76** has a corrugated configuration which contributes to the rigidity of the back door **66**. When assembled in this manner, the back door **66** provides a maximum level of rigidity for a minimum amount of weight. As depicted in **FIG. 1**, the back door **66** can be constructed to be symmetrical along its horizontal axis.

[**0061**] Referring now to **FIGS. 2A and 2B**, multiple expandable cabinets **50** are depicted in positions that are immediately adjacent each other, each cabinet **50** having a different level of expansion. When positioned in this depicted arrangement, each cabinet **50** may have one or more side panels **58** that are removed at locations that are between the interiors of two or more cabinets **50**, leaving a continuous open storage space between multiple cabinets **50** that is closed off from the exterior of the combined cabinets **50** for security. Filler panels **80** can be added to close off gaps between back doors **66** of cabinets **50** that have different levels of expansions to complete the enclosure of the combined storage space within the multiple cabinets **50**. Corner angle fillers **65** are also added between the tapered corner angles **64** and back doors **66** to fill in the gaps caused by expansion that exist above the top filler panels **80**. Both the filler panels **80** and tapered corner angles **64** can be customized in size to exactly fit the level of expansion or can comprise multiple smaller filler components that are fit together to form an appropriately sized filler panel **80** or tapered corner angle **64**.

[**0062**] However, even after the cabinets **50** have been expanded, cover expansion gaps **81** are left uncovered between the components of the covers **60** of each expanded cabinet **50** in order to allow for the feeding of connection wires from outside sources to the electrical boxes that are stored within the expanded cabinets **50**.

[**0063**] Each cabinet also includes a front door **82** extending across the width of the front portion **52** of the cabinet frame **51** and vertically extending from the cover **60** to the base **56** of the cabinet frame **51**. The front door **82** can be substantially identical to and interchangeable with the back door **66**, both doors having identical door chasis **68** and corrugated grilles **76**, having door hinges **94**, and being symmetrical along their horizontal axes.

[**0064**] As best understood with a comparison of **FIGS. 2A and 2B**, the multiple cabinets **50** are positioned so that the front door **82** of each cabinet **50** is flush with respect to the front doors **82** of the other cabinets **50** as shown in **FIG. 2B**. The relative positioning of each back door **66** depends on the different levels of expansion of the individual cabinets **50**. **FIG. 2A** depicts the relative positioning of back doors **66** where individual cabinets **50** have been expanded to different levels so that the back doors **66** are offset with respect to each other.

[**0065**] The exploded view of a single expanded expandable cabinet **50** of **FIG. 3A** depicts portions of the cabinet interior including an expansion space **84**. Two rear corner posts **86** are positioned to extend vertically from the base **56** of the back portion **54** of the cabinet frame **51**. In the embodiment depicted in **FIG. 3A**, each rear corner post **86** acts as a major structural member of the cabinet frame **51** and connects to the main section **61** of the cover **60** to fix the main section **61** in position relative to the rest of the cabinet frame **51**. At least one of the rear corner posts **86** is to include at least one brace guide **88**. In the embodiment of this invention shown in **FIG. 3A**, each rear corner post **86** includes brace guides **88** that are located at different vertical positions along the height of each post **86**. Each brace guide **88** is configured to accommodate an expansion bracket **90**. Two or more of the brace guides **88** are also configured to lock the expansion brackets **90** into one of multiple possible positions relative to the rear corner posts **86**.

[**0066**] Each expansion bracket **90** has a protruding end **92** that is positioned to extend in a rearward direction from each rear corner post **86**. A door hinge **94** is mounted behind the back portion **54** of the cabinet frame **51** in a manner so as to move with the expansion bracket or brackets used in the embodiment of this invention shown in FIG. **3A**. The door hinge **94** is connected to the protruding end **92** of each expansion bracket **90** extending from one of the two rear corner posts **86** to allow for hinged mounting of the back door **66** to the cabinet **50**. Each door hinge **94** can be attached to an expansion bracket **90** with a mounting screw (not shown). For security, the mounting screws frequently include driving heads that are positioned to be accessible for tightening or loosening when the back door **66** is in an open position and to be concealed and therefore inaccessible for tightening or loosening from outside the cabinet **50** when the door is in a closed position.

[**0067**] Referring to the exploded brace guide **88** and expansion bracket **90** assembly of **FIG. 7**, the brace guides **88** include an inside brace guide segment **87** and an outside brace guide segment **89**, each mounted to a rear corner post **86** with brace guide mounting screws **77** and brace guide mounting nuts **78**. The expansion bracket **90** is reciprocally mounted in a brace guide glide **79** that allows the expansion bracket **90** to slide in a rearward direction from the rear corner post **86** and from the back portion **54** of the cabinet frame **51** when the cabinet **50** is being expanded.

[**0068**] As depicted in **FIG. 7**, two or more of the brace guides include an expansion bracket slot **91** that extends down the axial midpoint of the expansion bracket **90** and includes internal notches **93** which mark preprogrammed incremental expansion stops. In the brace guides **88** that are

configured to effect locking, a lock pin **83** is spring loaded with a locking spring **85**. The lock pin **83** includes a smaller diameter portion **95** and a larger diameter portion **97**, the smaller diameter portion **95** being positioned to pass through the bracket slot **91** when the cabinet **50** is being expanded. The locking spring **85** biases the larger diameter portion **97** of the lock pin **83** against the slot **91**, the larger diameter portion **97** being positioned to engage the internal notches **93** when the expansion bracket **90** slides into an incremental stop. This locks the expansion bracket **90** in one of a plurality of positions after expansion of the cabinet **50** and allows the cabinet **50** to be expanded to different levels depending on the amount of expansion that is desired.

[**0069**] As shown in **FIG. 3A, a** cabinet **50** can include a top pair of expansion brackets **90** near the cover **60** (top) of the cabinet **50**, a lower pair of expansion brackets **90** near the base **56** (bottom) of the cabinet **50**, and a midpoint pair of expansion brackets mounted at a position along the posts **86** that is between the top and lower pairs. Frequently, only the midpoint pair of expansion brackets **90** will have brace guides **88** that are configured to effect locking. **FIG. 3A** depicts a door frame **96** connected to remain in fixed relation to the protruding ends **92** of each of the expansion brackets **90**. This causes all of the expansion brackets **90** to move in unison during expansion or contraction of the cabinet **50** and restricts dependent movement of any single expansion bracket **90**. Thus, when the midpoint pair of expansion brackets **90** are locked in a particular position, this causes the expansion brackets **90** of the top or lower pairs to also be located in similar positions with respect to the rear corner posts **86**.

[**0070**] A free member **59** of the cover **60** is attached to the top of the door frame **96**. Alignment legs **100** extend forward from and in fixed relation to the free member **59** of the cover **60** and are positioned to be in sliding engagement with the main section **61** of the cover **60**. The door frame **96** and free member **59** of the cover **60** enable the expansion brackets **90** and alignment legs **100** to move in unison as the cabinet **50** is expanded. As the protruding ends **92** of the expansion brackets **90** move in unison, the door frame **96** and the free member **59** of the cover **60** move away from the back portion **54** of the cabinet frame **51**. An expansion space **84** is defined as the clearance between the back door **66** and the back portion **54** of the cabinet frame **51**. As the door frame **96** and free member **59** of the cover **60** move away from the back portion **54** of the cabinet frame **51**, the expansion space **84** increases.

[**0071**] Expansion of the cabinet **50** leaves expansion gaps **81** existing between the door frame **96** and back portion **54** of the cabinet frame **51**. After expansion, filler panels **80** can be installed to cover the expansion gaps **81** and thereby enclose the expansion space **84** for aesthetic and security purposes. The filler panels **80** will normally be dimensioned to fit within the exact expansion gap **81** that is left following expansion to an incremental step as defined by the preprogrammed incremental expansion stops set by the internal notches **93** of the expansion brackets.

[**0072**] **FIG. 3B** depicts an accordion filler panel **80***a* that is configured to compress or expand in accordance with changes in the size of the expansion gap **81** that the accordion filler panel **80** covers. Such alternative filler panels can be used where changes in cabinet size occur frequently, the accordion filler panel **80***a* providing an appropriate cabinet covering for multiple expansion levels. Thus, it will be appreciated that many types of filler panels can be appropriately implemented and are contemplated to be within the scope of the invention.

[**0073**] An accordion filler panel **80***a* can also allow for the enclosure of a cabinet interior where the shape of the cover expansion gap **81** becomes warped due to misalignment of the expansion brackets **90** and alignment legs **100** with respect to the back portion **54** of the cabinet frame **51**. Such misalignment can occasionally result as weight is added to the interior of the cabinet **50**, slightly varying the shape of the back portion **54** of the cabinet frame **51** with respect to the door fame **96**. If the severity of a particular misalignment condition results in interference with expansion or reduction of the cabinet size, the expansion brackets **90** and alignment legs **100** can also be aligned by adjusting the door frame **96** with a slip joint **102** positioned at a two-piece connection point adjacent the base of the cabinet **50**.

[**0074**] The slip joint **102** can also be used to reduce the need for precision in the assembly or manufacture of the door frame **96** and expansion brackets **90**. Due to slight variations in the manufacturing process or assembly of the door frame **96** and cabinet frame **51**, brace guides **88** and expansion brackets **90** can on occasion be slightly out of alignment prior to assembly of the cabinet **50**. The slip joint **102** can be adjusted at the time of assembly or during expansion to relieve stresses on the expansion brackets **90** from binding with the brace guide glides **79** due to such minor misalignments. Such adjustment can then allow the expansion brackets **90** to reciprocate more smoothly in the brace guides **88**.

[**0075**] Following expansion of the cabinet **50**, box mounts **104** must also be adjusted to permit electrical component boxes to be mounted within the cabinet **50** in a way that will allow the component boxes to occupy the newly created expansion space **84**. As best understood with reference to **FIGS. 3A and 3B**, multiple pairs of box mounts **104** are configured in horizontal positions and are located along the heights of the two rear corner posts **86**, with one box mount **104** from each pair being mounted to one of the two corner posts **86**.

[**0076**] When installed in an expanded cabinet **50**, the front of each electrical component box is mounted in a fixed position relative to the front portion **52** of the cabinet **50** to allow for easy access to the controls or other features of the component box by opening the front door **82** of the cabinet **50**. Therefore, due to the varying lengths of different component boxes, it must be possible for the back of each component box to be mounted at different points of connection with respect to the rear corner posts **86**.

[**0077**] **FIGS. 3A and 3B** each depict embodiments of the invention having a total of seven pairs of box mounts **104** located at positions along the heights of the two corner posts **86**. Although the invention is shown and described in **FIGS. 3A and 3B** as incorporating T-bone style box mounts **104**, it will be appreciated that other box mount configurations are also possible and are contemplated to be within the scope of the invention. Each box mount **104** includes a mounting rail **106** for engaging the back end of a component box and to allow for positioning in at least one of the plurality of positions within the expandable cabinet **50**. As shown in

FIGS. 3A and 3B, each pair of box mounts **104** can be adjusted to different positions so that the mounting rails **106** of each pair are located at positions that correspond to the length of individual server boxes.

[**0078**] **FIG. 6** is an exploded view of an individual T-bone style of box mount **104** and rear corner post **86** assembly as incorporated into the embodiments shown in **FIGS. 3A and 3B**. The box mount **104** includes a box mount slot **108** extending along a substantial portion of the length of the box mount **104**. Two guide pins **110** extend through nylon washers **111** and the box mount slot **108**, connecting the box mount **104** to the adjacent corner post **86**. Each guide pin **110** includes a threaded portion **112** and an expanded radius portion **114**. The threaded portion **112** of each guide pin **110** is configured to engage the corner post **86** and allows the guide pin **110** to be axially adjusted.

[**0079**] The box mount **104** is configured to slide along its box mount slot **108** on the expanded radius portion **114** of each guide pin **110** and against the nylon washers **111** while the box mount **104** is being positioned with respect to the rear corner posts **86**. Once the box mount **104** is positioned, the guide pins **110** can be tightened so that the guide pins **110** and nylon washers **111** co-act to either lock the box mount **104** in place or fix the friction rate between the guide pins **110** and washers **111** so that the box mount **104** stays in position but remains movable.

[**0080**] When the cabinet **50** is expanded, the box mount **104** can be positioned so that the mounting rail **106** is located within the expansion space **84**, thereby allowing the back end of an electrical component box to also partially occupy the expansion space **84** when the back of the component box is attached to the box mount **104**. However, the guide pins **110** bear the weight of the load exerted on the box mount **104**. This has the effect of transferring the load of the box mount **104** directly to the rear corner posts **86** regardless of the positioning of the mounting rail **106** and regardless of whether the cabinet **50** has been expanded.

[**0081**] Although expansion occurs only at the back portion **54** of the cabinet **50**, most electrical component boxes are accessed through the front door **82** of the cabinet **50**. Electrical component boxes are typically equipped with slides that allow each component box to temporarily slide beyond the front portion **52** of each cabinet **50**. This allows for quick access to internal components of an electrical component box without requiring complete removal of a component box from its cabinet mounting. However, this also typically results in a disproportionate amount of weight being temporarily present at the front portion **52** of the cabinet **50**, thereby shifting the center of gravity of each cabinet **50** toward or beyond the front portion **52** and possibly beyond the support footprint of the base **56**, reducing the stability of the cabinet **50**.

[**0082**] Referring briefly to **FIG. 2**B, stability can be increased with the addition of a stabilizer **116** to the base **56** of each cabinet **50**. A magnified view of the stabilizer **116** of **FIG. 2B** is depicted in **FIG. 9**. The stabilizer **116** includes a pair of stabilizer legs **118** which are reciprocally mounted to fit within the base **56** and to be extended from the front portion **52** of the cabinet **50**. A cross member **120** extends across the stabilizer **116** to connect the stabilizer legs **118** and to permit the stabilizer legs **118** to move in unison during extension from or retraction to the base **56**. Glide legs **122** are positioned at either end of the cross member **120** to support the stabilizer **116** and to allow the stabilizer **116** to slide over floor space adjacent to the front portion **52** of the cabinet **50** when the front door **82** is opened.

[**0083**] The cross member **120** includes a spring loaded pin trap **124** extending along the length of the cross member **120**. A pin track **126** is formed behind the pin trap **124** and against the cross member **120**. The pin track **126** includes exit points **128** at either end of the pin trap **126** that open toward the front of the stabilizer **116**.

[**0084**] A cross sectional view of the stabilizer **116** is depicted in **FIG. 10** showing the pin trap **124** biased with a trap spring **130** to an upward position on its pivot **132**. The stabilizer **116** is shown with the front door **82** of the cabinet **50** positioned over the cross member **120** of the stabilizer **116**. The front door **82** has a roller pin **134** that is positioned in a roller pinhole **136** located at a fixed position on the front door **82**. The roller pin **134** is removable and roller pinholes **136** are included at both the top and bottom of the front door **82** to allow for upside down hinge reversal of the door. Roller pinholes **136** are also included on the back door **66** since the front door **82** and back door **66** are identical and interchangeable. The roller pin **134** is also shown to be in engagement with the pin track **126** of the cross member **120**.

[**0085**] **FIG. 8A** is a top view of the front door **82** and stabilizer **116** configuration of **FIG. 10** positioned at the front portion **52** of the cabinet **50**, the front door **82** being in a closed position and the roller pin **134** being in engagement with the pin track **126**. When the front door **82** is opened slightly, as shown in **FIG. 8**B, the roller pin **134** travels with the front door **82** along a pin path **138** while maintaining its engagement with the cross member **120** of the stabilizer **116**. This engagement exerts an extension force against the pin trap **124** and begins to extend the stabilizer **116** from the base **56** of the cabinet **50**. As the roller pin **134** travels along the pin path **138**, it also moves along the pin track **126** toward the exit point **128** at one end of the pin trap **124**.

[**0086**] Referring now to **FIG. 8**C, the roller pin **134** exits the pin track **126** at the exit point **128** once the stabilizer **116** is fully extended. The front door **82** can then continue to be opened without further interfering with the stabilizer **116**. The stabilizer **116** thus acts to extend the support base of the cabinet **50** past the front portion **52** and allows for greater stability as electrical component boxes are serviced in the cabinet **50**.

[**0087**] While the front door **82** is in an open position and the cabinet **50** is loaded or unloaded, it is possible that the stabilizer **116** could be bumped or otherwise partially retracted by accident so that an exit point **128** of the pin track **126** would be out of line with the pin path **138**. If this were to happen, the roller pin **134** would contact the pin trap **124** as the front door **82** rotated toward the front portion **52** of the cabinet **50**. As best understood by comparing **FIG. 9** with **FIG. 10**, the pin trap **124** is tapered so that if the roller pin **134** were to make contact with any portion of the pin trap **124**, the force of the rotating front door **82** would cause the roller pin **134** to exert a compression force against the trap spring **130**. This compression force would lower the pin trap **124** on its pivot **132** sufficiently for the roller pin **134** to bypass the pin trap **124** and engage the pin track **126**.

[**0088**] Once the roller pin **134** returns to engage the pin track **126**, the force of the rotating front door **82** is used to

exert retracting forces, exerted through the roller pin **134** against the cross member **120**, to retract the stabilizer **116** into the base **56** of the cabinet **50**. Retraction of the stabilizer **116** then frees up adjacent floor space until it is again necessary to open the front door **82** to add or remove electrical component boxes from the cabinet **50**.

[**0089**] Although the invention has been shown and described as having a stabilizer having a roller pin and pin trap to effect extension and retraction, it will be appreciated that other stabilizer configurations are also possible and are contemplated to be within the scope of the invention. An example of an alternate configuration is depicted in **FIGS. 11, 12A** and **12**B. A stabilizer **116** includes an engagement angle **140** positioned at the end of a stabilizer leg **118**. The stabilizer leg **118** is reciprocally mounted to be extended from or to retract into the base **56** of the cabinet **50**. The front door **82** of the cabinet **50** includes a spring-loaded lever **142** that rests against a stop **144** when the front door **82** is in a closed position. The lever **142** is mounted on a pivot **146** that is in fixed position on the front door **82**. The lever **142** is also spring biased to remain in contact with the stop **144** and also contacts the engagement angle **140** while the front door **82** is in the closed position.

[**0090**] When the front door **82** is opened, the lever **142** exerts an extension force against the engagement angle **140** to extend the stabilizer **116** and increase the support base of the cabinet **50**. When the stabilizer **116** is fully exerted, the fixed position of the pivot **146** travels with the rotating front door **82**, moving the lever **142** away from the reach of the engagement angle **140** and preventing further engagement with the stabilizer **116**.

[**0091**] After the electrical component boxes in the cabinet **50** have been serviced, the front door **82** can be rotated toward the closed position. If the stabilizer **116** has been bumped or otherwise partially retracted by accident, the lever **142** rotates against its spring bias to bypass the engagement angle **140** as the lever **142** and engagement angle **140** make contact. Referring to the side cross sectional views of **FIGS. 12A and 12***b*, the front door **82** includes an overhang **148** which is configured to contact the engagement angle **140** and force the stabilizer **116** to retract back into the base **56** of the cabinet **50** as the front door **82** returns to its closed position.

[**0092**] It will be further appreciated that variations are also possible with respect to the configuration of the cabinet frame **51**, box mounts **104**, expansion brackets **90**, back door **66** and hinge **94**, and other elements, each variation being contemplated to be within the scope of the invention.

[**0093**] Referring to **FIG. 13A, a** cabinet **50** is depicted in which the expansion brackets **90***a* comprise an extendable two-piece sleeve that extends along the height of the cabinet **50**. The expansion brackets **90***a* are mounted on brace guides **88***a* that are formed by the inside surfaces of the corner posts **86** (rear corner posts **86** hidden in the view of **FIG. 13A**) to guide and orient the expansion brackets **90***a* during expansion. Each expansion bracket **90***a* includes a support angle **150***d* to enable the expansion bracket **90***a* to glide along the base **56** of the cabinet **50** during expansion.

[**0094**] Vertically spaced expansion bracket slots **91***a* extend along the length of each expansion bracket **90** to allow clearance for the guide pins **110** of each box mount **104** to connect to the corner posts **86** of the cabinet **50** as the expansion bracket **90***a* moves along its brace guides **88***a* during expansion. Some expansion bracket slots **91***a* include internal notches **93** to allow for programmed incremental expansion of the cabinet. Filler panels **80** and corner angle fillers **65** can also be added to the sleeve exterior of each expansion bracket **90***a* for aesthetic purposes. However, in this embodiment filler panels **80** are not necessary for security purposes since the sleeve encloses the expansion space **84** of the cabinet **50**. Thus, the filler panels **80** can be omitted from this embodiment if desired.

[**0095**] In **FIG. 13**A, the sleeve comprising the expansion brackets **90***a* is depicted as having alignment pin slots **154** positioned near the cover **60** of the cabinet **50**. The alignment pin slots **154** are configured to engage alignment pins (not shown) mounted within the interior of the cabinet **50** and to enhance proper alignment of the sleeve during expansion. A cover expansion gap **81** separates the individual expansion brackets **90***a* of the sleeve and leads from the exterior to the expansion space **84** of the cabinet **50** when the cabinet **50** is expanded.

[**0096**] In **FIG. 13**B, the sleeve comprising the expansion brackets **90***a* is depicted as having alignment legs **100** that are positioned to be in sliding engagement with the main section **61** of the cover **60**. The alignment legs **100** extend forward from and are positioned in fixed relation to the free member **59** of the cover **60** and extension brackets **90***a* to maintain alignment of the expansion brackets **90***a* when the cabinet **50** is expanded.

[**0097**] **FIG. 13C** depicts a cabinet **50** in which the expansion brackets **90***b* of the sleeve are positioned to extend from a brace guide **88***b* formed between the rear corner posts **86** and side panels **58** of the cabinet **50**. Since this configuration does not require the expansion brackets **90***b* to extend between each box mount **104** and rear corner post **86**, this embodiment eliminates the need for expansion bracket slots in the sleeve.

[**0098**] **FIG. 14** depicts a cabinet **50** having expansion brackets **90***c* comprising a two-piece accordion sleeve extending along the height of the cabinet **50**. Brace guides **88***c* are formed by the inside surfaces of the corner posts **86** (rear corner posts **86** hidden in the view of **FIG. 14**). Each expansion bracket **90***c* includes a support angles **150***c* to support and enable the expansion bracket **90***c* to glide along the base **56** of the cabinet **50** during expansion. The support angles **150***c* each include two return edges **156**, each return edge **156** running along the length of the support angle **150***c* to orient an accordion sleeve from moving out of alignment.

[**0099**] Guide pins **110** of each box mount **104** connect to the rear corner posts **86** of the cabinet **50**. Filler panels **80** and corner angle fillers **65** can be added to the sleeve exterior of each expansion bracket **90***c* for aesthetic purposes, though the filler panels **80** are not necessary for security purposes since the accordion sleeve flexes to enclose the expansion space **84** between the door frame **96** and back portion **54** of the cabinet **50**.

[**0100**] The invention can also be configured so that the back door **66** does not require a door frame. **FIG. 15** depicts a cabinet **50** having independently mounted expansion brackets **90***d* that are positioned to extend and reciprocate from rear corner posts **86** without being connected to a door

frame. Alignment lugs **158** are positioned at the protruding ends **92***d* of two of the expansion brackets **90***d* to engage alignment holes **160** positioned on the back door **66** when the door is in the closed position. The protruding end **92***d* of one expansion bracket **90***d* includes a female roller latch connector **162** positioned to engage a male roller latch connector **164** when the door is in the closed position. Filler panels **80** can be attached directly to panel engagement surfaces **164** on the expansion brackets **90***d* to enclose and secure the added expansion space **84**.

[**0101**] In the embodiment of **FIG. 15**, each expansion bracket **90***d* that has a hinge **94** positioned at its protruding end **92***d* and which is connected to an extruded side rail **70** of the back door **66** must move in unison with every other expansion bracket **90***d* having a hinge **94** that is also connected to the back door **66**. However, each expansion bracket **90***d* that does not connect to the back door **66** with a hinge **94**, i.e. the expansion brackets having alignment lugs **158** or a female roller latch connector **162**, must be extended or retracted individually to the same extent as the other expansion brackets **90***d*.

[**0102**] In some embodiments of the invention, the expansion brackets **90** can be configured so that door hinges **94** are connected to or are positioned adjacent each of the extruded side rails **70** of the back door **66**. For example, **FIG. 16** depicts a cabinet **50** having an expansion bracket **90***e* comprising a sliding plate **166** and plate return **168**. The sliding plate **166** of the expansion bracket **90***e* extends approximately from the base **56** to the cover **60** of the cabinet **50** and is configured to extend from the back portion **54** of the cabinet **50** from a brace guide **80** formed between one rear corner post **86** and side panels **58**. During expansion, the sliding plate **166** can be extended from the back portion **54** of the cabinet **50** until the plate return **168** contacts the adjacent corner post **86**. The free member **59** of the cover **60** moves with the alignment legs **100** to be fully extended with the sliding plate **166**.

[**0103**] Once the sliding plate **166** is fully extended, the back door **66** can be closed to enclose the expansion space **84**. One expansion bracket **90***e* includes a swing plate **170** that is mounted to the back door **66** on a spring biased door hinge **94** having an offset **172**. The swing plate **170** of the expansion bracket **90***e* is configured to be inserted into a brace guide **80** that comprises an insertion slot between the corner post **86** and side panels **58**. A hook latch **174** is positioned on the swing plate **170** and can be adjusted along the latch track **176** to engage a catch (not shown) mounted to a fixed position inside the cabinet **50**.

[**0104**] As the back door **66** is closed, the swing plate **170** of the expansion bracket **90***e* can be swung on its door hinge **94** to orient the swing plate **170** in line to enter the insertion slot of the brace guide **80**. The offset **172** of the door hinge **94** prevents the swing plate **170** from binding with the insertion slot as the back door **66** closes. However, the extent to which the swing plate **170** must be inserted into the insertion slot of the brace guide **80** decreases as the level of cabinet expansion increases. Thus, the potential for binding between the swing plate **170** and brace guide **80** and the importance of the offset **172** of the door hinge **94** are reduced for greater levels of expansion. Once inserted, the spring bias of the door hinge **94** biases the swing plate **170** toward the side panels **58** of the cabinet **50**, causing the hook latch **174** to lock the expansion bracket **90***e* in position within the cabinet **50**.

[**0105**] The invention can also be configured so that the expansion brackets **90** are themselves load bearing and/or can be configured so that the box mounts **104** and expansion brackets **90** are integrated into a single assembly. For example, the cabinet **50** of **FIG. 17** includes multiple integrated expansion brackets **90***f* and box mounts **104**, the expansion brackets **90***f* themselves having a heavy load-bearing construction. The guide pins **110** of each box mount **104** connect the box mount **104** to the expansion bracket slot **91***f* of an expansion bracket **90***f*. The guide pins **110**, along with the inside surfaces of the rear corner posts **86**, form the brace guides **88***f* for the expansion brackets **90***f*. Each expansion bracket **90***f* extends from one of the corner posts **86** to the door frame **96***f*, each expansion bracket **90***f* being in fixed position with respect to the door frame **96***f* and reciprocally connected to a rear corner post **86**. Thus, guide pins **110** transfer the weight of the load of each box mount **104** directly to the expansion bracket **90***f*.

[**0106**] In this embodiment, support glides **178** provide additional support for the door frame **96** against the floor space below the cabinet **50**, requiring the door frame **96** to bear load forces exerted by the expansion brackets **90***f*. Since each expansion bracket **90***f* extends between a corner post **86** and the door frame **96***f*, the expansion bracket **90***f* allows for the distribution of the load of each box mount **104** between the corner post **86** and door frame **96***f*.

[**0107**] It will be appreciated that in some embodiments, guide pins can be omitted and replaced with alternate means for mounting and fastening box mounts **104** in fixed positions with respect to the rear corner posts **86** of the cabinet **50**. Referring to **FIG. 18, a** cabinet **50** is depicted in which individual box mounts **104** are insert mounted through box guides **180***a* to extend through corner posts **86**. Each box guide **180***a* comprises a passage extending through a corner post **86** that is sized to allow for frictional engagement with a box mount **104**, the frictional engagement between the box guide **180***a* and box mount **104** being sufficient to secure the box mount **104** in fixed position with respect to the rear corner post **86**. Movement of each box guide **180***a* against the force of the frictional engagement with the box guide **180***a* allows the box guide **180***a* to be adjusted and positioned in a selected horizontal position according to the length of a particular server.

[**0108**] **FIGS. 19 and 20** depict another cabinet **50** of the invention in which guide pins can be omitted due to the frictional mounting of the box mounts **104***b*. **FIG. 19** depicts the cabinet **50** in which the box mounts **104***b* include female dovetail forms **182** extending along box mount slots **108***b*. **FIG. 20** depicts the cross sectional view of the female dove tail form **182** taken along the line A-A of **FIG. 20**.

[**0109**] As best understood with a comparison of **FIGS. 19 and 20**, each female dovetail form **182** frictionally engages a male dove tail form **184**. Each male dove tail form **184** is positioned along one vertical location of a rear corner post **86** and extends through the box mount slot **108***b* of a box mount **104***b* to make frictional contact with the inside surfaces of the female dove tail form **182**. This frictional engagement between the male and female dove tail forms **184** and **182** allows for sufficient reciprocal movement of the

box mount **104***b* for adjustment while creating sufficient locking force to maintain each box mount **104***b* in fixed position with respect to the rear corner posts **86** within the cabinet **50**.

[**0110**] It will also be appreciated that some embodiments of the invention may incorporate one or more box mounts **104** that, while allowing for the positioning of an electrical box to at least one of a plurality of positions, do not allow for adjustment while being mounted within the expandable cabinet **50**. **FIG. 21A** depicts a cabinet **50** of the invention having multiple box mounts **104***c* and **104***d* positioned along the height of each corner post **86**, each box mount **104***c* and **104***d* engaging one corner post **86** with a post fitting **186**.

[**0111**] **FIGS. 21D and F** depict examples of box mounts **104***c* and **104***d* that can be incorporated into the cabinet **50** of **FIG. 21A**. As best understood with a comparison of each of **FIGS. 21D and F** with **FIG. 21**A, the depicted box mounts **104***c* and **104***d* each include a post fitting **186** that is shaped to engage a corner post **86** along a surface of the corner post **86** that faces inward toward the interior of the cabinet **50**. As shown in both figures, a through hole **188** can extend through each post fitting **186** to allow for the insertion of a positioning pin or other locking member to engage the adjacent corner post **86** and to secure the post fitting **186** in position. Although the post fittings **186** of **FIGS. 21D and F** are shown and described as each having a through hole **188** to allow for fastening against the corner posts **86**, it will be appreciated that other fastening methods are also possible and contemplated to be within the scope of the invention.

[**0112**] Each box mount **104***c* and **104***d* includes a mounting rail **106** for engaging a component box, the mounting rail **106** being positioned in one of a plurality of positions that is in fixed relation to the post fitting **186**. **FIG. 21D** depicts a box mount **104***c* in which the mounting rail **106** is connected directly to the post fitting **186** to allow for the mounting of shorter component boxes. **FIG. 21F** depicts a box mount **104***d* in which the mounting rail **106** connects to the post fitting **186** by way of a spacer **190**. As best understood by comparing **FIG. 21F** with **FIG. 21**A, different box mounts **104***d* can have spacers **190** of different lengths to allow for the positioning of component boxes of varying length, the required spacer length of the specific box mount used depending on the length of the particular component box that is being mounted. However, these box mounts **104***d* do not allow for adjustment while they are mounted within the cabinet **50**. Such box mounts are limited to positioning a component box to only one of a plurality of positions within a cabinet **50**. A clearance notch **192** extends the length of the spacer **190** to allow clearance for an expansion bracket **90** when the box mount **104***d* is positioned at a location that is adjacent the expansion bracket **90**.

[**0113**] **FIG. 21B** depicts a cabinet configuration in which fixed box mounts **104***e* include post fittings **186***b* that are shaped to engage corner posts **86** by each extending between a corner post **86** and side panels **58**. An individual box mount **104***e* for use in this configuration is depicted in **FIG. 21G**. As best understood by comparing **FIGS. 21C and 21G**, individual box mounts **104***e* of this embodiment also include spacers of different sizes to allow for the positioning of component boxes of varying length, each box mount **104***e*, as depicted, being capable of positioning a component box to only one of a plurality of positions.

[**0114**] A slight modification to this embodiment allows for the expansion brackets **90** and box mounts **104** to be integrated into a single component. **FIG. 21H** depicts a box mount **104***f* having a post fitting **186***b* configured to extend between a corner post **86** and side panels **58**. The box mount **104***f* also has an angled mounting rail **106***b* attached to the spacer **190**. A frame fitting **194** extends from the spacer **190** of the box mount **104***f*.

[**0115**] Referring now to **FIG. 21**C, the frame fittings **194** on the box mounts **104***f* located adjacent the cover **60**, base **56**, and at a midpoint position between the cover **60** and base **56** enable those box mounts **104***f* to engage and support the door frame **96** at a fixed position with respect to the back portion **54** of the cabinet **50**. This allows some box mounts **104***f* to also function as an expansion bracket **90**. As best understood with a comparison of **FIGS. 21C and H**, some box mounts **104***f* can have a hinge **94** connected to the frame fitting **194** to allow for the mounting of a back door **66** to the cabinet **50**. The hinge **94** can include spring loaded pins **195** that each extend to engage vertically disposed circular tracks in the adjacent side rail **70** of the back door **66**. The spring loaded pins **195** can also permit enhanced interchangeability between the back door **66** and front door **82** or allow for easy reconfiguration of the front door **82** or back door **66** to open from the right side rather than from the left side.

[**0116**] It is also contemplated that the invention can be configured so that servers can be supported by both the rear corner posts **86** and door frame **96**. For example, **FIG. 21E** depicts a box mount **104***g* having a mounting rail **106** and a box attachment rail **198** connected with a spacer **190** having a fixed and predetermined length. Referring to **FIG. 22**, the box mounts **104***g* of **FIG. 21E** are depicted with box attachment rails **198** connected to frame mounting rails **196** extending along the height of the door frame **96**. When installed in the cabinet **50**, servers utilizing the expansion space **84** can be mounted to the mounting rail **106** of the box mount **104***g*, thereby transferring the load of each server to the door frame **96** and support glides **176**.

[**0117**] As best understood by comparing **FIG. 22** with **FIGS. 21D and E**, the box mounts **104***g* of **FIG. 21E** can be used in conjunction with box mounts **104***c* of **FIG. 21**D, to allow for the simultaneous mounting of smaller component boxes that do not require utilization of the expansion space **84**. Thus, by combining box mounts of different types and/or lengths, the same cabinet **50** can be used to engage component boxes at a plurality of positions, each position of engagement depending on the size of the component box. When mounted within the cabinet **50**, the loads of such smaller component boxes are transferred through the post fittings **186** to the corner posts **86** and base **56**.

[**0118**] Other variations in the configuration of the box mounts **104** are also contemplated. **FIG. 23** depicts a segment of a rear corner post **86** of a cabinet **50**. A box mount **104***h* includes a reciprocating arm **200***h* and mounting rail **106***h*. The reciprocating arm **200***h* has a flat surface **201***h* along its axial length which co-acts with an inside flat surface **203***h* of the support bearing **202** to prevent rotation of the reciprocating arm **200***h*. The reciprocating arm **200***h* extends through the corner post **86** on a support bearing **202***h*, the support bearing **202***h* enabling the reciprocating arm **200***h* to slide smoothly there through during adjustment. A box guide stop **204** is positioned to restrict movement of

the box mount **104***h* when the reciprocating arm **200***h* is fully extended into the expansion space **84** of the cabinet **50**. A locking screw **206** allows the box mount **104***h* to be secured to any one of a plurality of fixed positions after adjustment.

[**0119**] **FIG. 24** depicts a segment of a rear corner post **86** of another embodiment cabinet of the invention which allows for threaded adjustment of the box mount **104***i*. The box mount **104***i* includes a reciprocating arm **200***i* having a threaded portion **208** that extends through the support bearing **202***i* in the corner post **86**. The threaded portion **208** of the reciprocating arm **200***i* also extends through a turning sleeve **210** that is rotatably mounted on the corner post **86**. The reciprocating arm **200***i* attaches to the mounting rail **106** with a slip sleeve **212** that allows the mounting rail **106** to float in an upright position with respect to the corner post **86** (as shown) since the mounting rail is attached to an electrical component box, as explained above. When rotated, the turning sleeve **210** causes the reciprocating arm **200***i* to move through the support bearing **202** to effect adjustment of the box mount **104***i* to a plurality of positions within the cabinet. After adjustment, the turning sleeve **210** serves to lock the box mount **104***i* in a fixed position.

[**0120**] Referring now to **FIG. 25, a** segment of the rear corner post **86** of another embodiment cabinet **50** is depicted, the embodiment having a worm and rack assembly for adjusting the box mount **104***j*. A reciprocating arm **200***j* extends through the rear corner post **86** and includes a toothed rack **214** along its top surface. A rotating worm **216** is mounted inside the corner post **86** immediately above the reciprocating arm **200***j* so that the worm **216** engages the rack **214**. The worm **216** is axially connected to an adjuster **218** which extends through an adjuster notch **219** to the exterior of the corner post **86**. Manual rotation of the adjuster **218** from the exterior of the corner post **86** causes the worm **216** to rotate, this rotation causing the reciprocating arm **200***j* of the box mount **104***j* to move to different positions due to the engagement of the worm **216** with the rack **214**. After adjustment, the worm **216** serves to lock the box mount **104***j* in a fixed position.

[**0121**] Variations in the construction of the expansion brackets **90** are also contemplated, especially where the expansion brackets **90** are adjustable to multiple fixed positions. As best understood with reference to **FIGS. 7 and 26-30**, the brace guide **88** of each expansion bracket **90** can be constructed either as a modular unit that is positioned on or within a rear corner post **86** of a cabinet **50**, or alternatively, be incorporated directly into the structure of a corner post **86**.

[**0122**] Referring to **FIG. 26**, an expansion bracket **90***k* is depicted extending through a modular unit brace guide **88***k*. The expansion bracket **90***k* includes angled notches **93***k* that each correspond to one of a plurality of predetermined expansion bracket positions. Mounting holes **221** are positioned at the protruding end **92***k* of the expansion bracket **90***k* to allow for the attachment of a door frame **96** or door hinge **94**.

[**0123**] A detent assembly **222** is installed into the brace guide **88***k*. The detent assembly **222** includes a detent **224** that is spring biased to extend downward and engage and lock against notches **93***k* of the expansion bracket **90***k* when the expansion bracket **90***k* moves into one of the predetermined positions. The detent **224** is tapered at its tip to allow a notch **93***k* to compress the detent **224** against its spring bias when the expansion bracket **90***k* is manually adjusted. This compression of the detent **224** disengages the detent **224** from the notch **92** that it engages, thereby allowing for extension or retraction of the expansion bracket **90**. The detent assembly **222** also includes a tightness adjuster **226**. The tightness adjuster **222** allows for manual adjustment of the spring bias of the detent **224** with an allen wrench or similar tool, thereby allowing for adjustment of the amount of manual force that is required to adjust the positioning of the expansion bracket **90***k*.

[**0124**] Referring now to **FIG. 27**, an expansion bracket **90***m* includes conical internal recesses **93***m* located at positions along an expansion bracket slot **91***m*. Each internal recess **93***m* corresponds to one of a plurality of predetermined expansion bracket positions. A lock pin **83***m* having a conical section **230** is positioned to extend through the side of the brace guide **88***m* to be aligned for engagement with the expansion bracket slots **91***m* when the expansion bracket **90***m* is at one of the predetermined positions. The lock pin **83***m* is mounted to the brace guide **88***m* with pin threads **228**. When mounted to the brace guide **88***m*, the conical section **230** of the lock pin **83***m* is aligned to engage one of the expansion bracket slots **91***m* when the expansion bracket **90***m* is at one of the predetermined positions. An alien wrench or similar tool can then be used to rotate the lock pin **83***m* on its pin threads **228** to further extend the conical section **230** of the lock pin **83***m* toward the conical internal recesses **93***m* of the expansion bracket **90***m* to lock the expansion bracket **90***m* in position.

[**0125**] **FIG. 28** depicts an expansion bracket **90***n* having a rack adjuster assembly **232**. The rack adjuster assembly **232** includes a gear rack **234** and drive screw **236**, the drive screw **236** being connected to a rotation shaft **240**. When rotated, the rotation shaft **240** causes the drive screw **236** to move the expansion bracket **90***n* along the gear rack **234** until the expansion bracket **90***n* is adjusted to the desired position. Bracket stops **242** restrict movement of the expansion bracket **90***n* past the fully extended or fully retracted position to prevent damage to the drive screw **236**. After adjustment, the drive screw **236** locks the expansion bracket **90***n* in position.

[**0126**] Certain embodiments of the invention can also be configured to include a brace guide **88***p* comprising a bearing or threaded sleeve that extends through each rear corner post **86***p*. **FIG. 29** depicts a corner post **86***p* having a telescoping expansion bracket **90***p* mounted within a brace guide **88***p* that comprises a bracket bearing which extends through the corner post **86***p*. The expansion bracket **90***p* includes male and female telescoping segments **244** and **246** and a detent groove **248**. The protruding end **92***p* of the male telescoping segment **244** allows for attachment of a hinge **94***p* (as shown) or door frame **96** as appropriate.

[**0127**] During adjustment of the expansion bracket **90***p*, the male telescoping segment **244** reciprocates within the female telescoping segment **246** while the detent groove **248** provides frictional resistance between the male and female telescoping segments **244** and **246** to allow for precise positioning of the male telescoping segment **244**. After adjustment, the frictional resistance of the detent groove **248** maintains the positioning of the male telescoping segment **244**.

[0128] **FIG. 30** depicts an embodiment of the invention in which the brace guide **88***q* comprises a threaded sleeve extending through the rear corner post **86***q*. The depicted expansion bracket **90***q* is threaded along its length and has a slip sleeve connection to a hinge **94***q* (as shown) or door frame **96** at the protruding end **92***q*. The expansion bracket **90***q* extends through the corner post **86***q*, engaging the internal threaded surface of the brace guide **88***q*. An adjustment knob **250** is attached to the end of the expansion bracket **90***q* to allow the expansion bracket **90***q* to be manually rotated for adjustment. Rail guides **252** extend along the length of the expansion bracket **90***q* from the hinge **94***q* or door frame **96** at the protruding end **92***q*. The rail guides extend through the corner post **86***q* but terminate prior to the adjustment knob **250** to allow for alignment of the hinge **94***q* or door frame **96***q* during the rotation of the expansion bracket **90***q*. The engagement between the internal threads of the brace guide **88***q* and external threads of the expansion bracket **90***q* also serve to maintain the positioning of the expansion bracket **90***q* after adjustment.

[0129] It will also be appreciated that in some embodiments, the expansion brackets may be secured in one position relative to the rear corner posts through frictional contact between one or more expansion brackets and members of the cabinet frame **51**. For example, since the sleeve comprising the expansion brackets **90**, as depicted in **FIG. 13**C, lacks expansion bracket slots, the expansion brackets **90** can be secured with a lock nut (not shown) mounted either on the expansion brackets **90***b* of the sleeve, the support angle **150***c*, or on the cabinet frame **51**. In **FIG. 14**, the expansion brackets **90***c* comprising the accordian sleeve can be secured in one position with a lock nut (not shown) mounted either on the support angle **150***d*, or on the cabinet frame **51**. In some embodiments, such as **FIG. 16, a** lock nut or other similar component can be mounted on a sliding plate **166**, swing plate **170**, rear corner post **86**, or other suitable location. In some embodiments, the frictional contact between the expansion brackets **90**, brace guides **88**, rear corner posts **86**, cabinet frame **51**, and/or other components will be sufficient to alone secure the expansion brackets in at least one of a plurality of positions.

[0130] This invention has been described with reference to several illustrated embodiments and variations thereof. Many modifications and alterations of these embodiments and variations will occur or become apparent to others upon reading and understanding the preceding specification. It is intended and will be appreciated that this invention is to be construed as including all such alterations and modifications insofar as they come within the spirit and scope of the appended claims or equivalents of these claims.

1. An expandable cabinet for storing and positioning electrical component boxes of different lengths, said expandable cabinet comprising:

a cabinet having a cabinet frame, said cabinet frame having a front portion, a back portion, a top, a base and rear corner posts positioned at about said back portion of said cabinet frame, said rear corner posts extending from about said base, at least one of said rear corner posts having at least one brace guide;

an expansion bracket mounted on said at least one said brace guide, each expansion bracket having a protruding end extending in a rearward direction from a rear corner post, at least one of said expansion brackets capable of being secured in at least one of a plurality of positions relative to said rear corner post;

a door hinge mounted behind said back portion of said cabinet frame in a manner so as to move with at least one said expansion bracket, a back door mounted on said door hinge in a position to extend across said back portion of said cabinet frame to form an expanded space of said expandable cabinet when said at least one expansion bracket is extended in a rearward direction from said rear corner post; and

at least one box mount positioned in a horizontal position with respect to at least one of said rear corner posts, each said at least one box mount configured to engage an electrical component box and position the box in at least one of a plurality of positions within said expandable cabinet.

2. The expandable cabinet of claim 1 further comprising:

a door frame connected to each said protruding end of each said expansion bracket; and

said door being mounted with said door hinge on said protruding end of at least one of said expansion brackets, said door having a top brace, a bottom brace, and two side rails, each said side rail extending from said top brace to said bottom brace.

3. The expandable cabinet of claim 1 further comprising:

a door frame connected to each said protruding end of each said expansion bracket; and

said door further comprising a top brace, a bottom brace, and two side rails, each said side rail extending from said top brace to said bottom brace, one of said side rails of said door being pivotally mounted with said hinge on at least one of said expansion brackets.

4. The expandable cabinet of claim 1 further comprising:

a door frame mounted to each said protruding end of each said expansion bracket, said door having a top brace, a bottom brace, and two side rails, each said side rail extending from said top brace to said bottom brace, one of said side rails being pivotally mounted to said door hinge; and

a door grille, said door grille extending between said top brace and said bottom brace of said door, said door grille being sufficiently perforated to allow cooling air to pass through said door.

5. The expandable cabinet of claim 1 further comprising:

a cover, said cover having a main section positioned at said top of said cabinet frame and a free member;

a pair of channels extending into said main section of said cover, each of said channels opening at about said back portion of said cabinet frame; and

a pair of alignment legs, each of said alignment legs being positioned in a manner so as to move with said free member of said cover, each of said alignment legs extending into one of said channels of said main section of said cover, said alignment legs being configured to reciprocate within said channels.

6. The expandable cabinet of claim 1 further comprising:

a cover, said cover having a main section positioned at said top of said cabinet frame and a free member;

a pair of channels extending into said main section of said cover, each of said channels opening at about said back portion of said cabinet frame;

a pair of alignment legs, each of said alignment legs being positioned in a manner so as to move with said free member of said cover, each of said alignment legs extending into one of said channels of said main section of said cover, said alignment legs being configured to reciprocate within said channels; and

a cover expansion gap being defined as the clearance between said main section and said free member of said cover when said main section and said free member are moved apart from each other.

7. The expandable cabinet of claim 1 further comprising:

a lower pair of expansion brackets slidably mounted on said brace guides at a location that is proximate said base of said cabinet frame;

a top pair of expansion brackets slidably mounted on said brace guides at a location that is proximate said cover of said cabinet frame; and

a midpoint pair of expansion brackets slidably mounted on said brace guides at a location that is between said pair of lower expansion brackets and said pair of top expansion brackets, said midpoint expansion brackets having locking notches for locking said door frame at predetermined positions relative to said brace guide, thereby locating said lower expansion brackets, said midpoint expansion brackets, and said top expansion brackets in positions relative to said rear corner posts.

8. The expandable cabinet of claim 1 further comprising a door frame mounted to each said protruding end of each said expansion bracket wherein said door frame causes each of said expansion brackets to move in unison during expansion or contraction of said cabinet.

9. The expandable cabinet of claim 1 further comprising a door frame mounted to each said protruding end of each said expansion bracket, said door frame having a slip joint positioned to

allow for alignment of said expansion brackets during expansion or contraction of said cabinet.

10. The expansion cabinet of claim 1 further comprising side panels positioned along either side of said cabinet and extending from about said front portion to about said back portion of said cabinet and also extending from about said base to about said top of said cabinet.

11. The expandable cabinet of claim 1 further comprising filler panels extending from about said back portion of said cabinet to about said protruding ends of said expansion brackets and also extending from about said base to about said top of said cabinet when said cabinet has been expanded.

12. The expandable cabinet of claim 1 further comprising a door frame positioned on said protruding ends of said expansion brackets and positioned to move with said expansion brackets, said cover comprising:

a main section positioned at said top of said cabinet frame, said main section having a ventilation passage to allow air to pass freely into and out of said cabinet; and

a free member positioned above said door frame, said free member being positioned to move with said door frame.

13. The expandable cabinet of claim 1 further comprising a front door pivotally mounted to said front portion of said cabinet frame, said front door being sized to allow for the installation of an electrical component box through said front portion of said cabinet.

14. The expandable cabinet of claim 1, said cabinet having a support base and further comprising:

a front door pivotally mounted to said front portion of said cabinet frame, said front door being sized to allow for the installation of an electrical component box through said front portion of said cabinet; and

a stabilizer reciprocally connected to said cabinet, said stabilizer leg being extendable from said cabinet and having a length that is sufficiently long to expand the support base of the cabinet when said stabilizer leg is extended.

15. The expandable cabinet of claim 1, said cabinet having a support base and further comprising:

a front door pivotally mounted to said front portion of said cabinet frame, said front door being sized to allow for the installation of an electrical component box through said front portion of said cabinet;

a stabilizer having at least one stabilizer leg reciprocally connected to said cabinet, said stabilizer leg being extendable from said cabinet and having a length that is sufficiently long to expand the support base of the cabinet when said stabilizer leg is extended;

said front door being configured to engage and extend said stabilizer from the cabinet as said front door is opened from a closed position, said stabilizer expanding the support base of the cabinet when said stabilizer leg is extended;

said front door being configured to disengage said stabilizer when said stabilizer has been fully extended and said front door continues to be opened further; and

said front door being configured to again engage and retract said stabilizer when said front door is returned to a closed position from an open position.

16. The expandable cabinet of claim 1 further comprising:

a plurality of locking notches positioned along said expansion brackets for locking said door frame at predetermined incremental positions relative to said brace guide; and

at least one lock pin mounted in at least one of said brace guides, said lock pin being positioned to engage said internal notches of at least one of said expansion brackets when said at least one of said expansion brackets slides into one of said predetermined incremental positions.

17. The expandable cabinet of claim 1 wherein:

each said box mount comprises a T-bone bracket, each said T-bone bracket having a mounting rail for engaging an electrical component box and a box mount slot extending along a substantial portion of the length of said box mount, each said T-bone bracket being adjustable for positioning in a plurality of positions within said expandable cabinet; and

at least one adjustable guide pin is mounted on each of said rear corner posts, each of said guide pins being configured to extend through one of said box mount slots to connect one of said T-bone brackets to one of said rear corner posts, each said guide pin being configured to secure one of said T-bone brackets in a fixed position within said expandable cabinet.

18. The expandable cabinet of claim 1 wherein:

each said box mount comprises a T-bone bracket, said T-bone bracket having a mounting rail for engaging an electrical component box and a box mount slot extending along a substantial portion of the length of said box mount, said T-bone bracket being adjustable for positioning in a plurality of positions within said expandable cabinet; and

at least one adjustable guide pin and at least one washer are provided, said pin having a threaded portion configured to engage one of said rear corner posts and to allow for axial adjustment of said guide pin thereon, each said guide pin being configured to extend through one said washer and through said box mount slot to connect said T-bone bracket to one of said rear corner posts, each said guide pin co-acting with one said washer to lock said T-bone bracket in position when said threaded portion of said guide pin is tightened.

19. The expandable cabinet of claim 1 further comprising:

a door frame connected to each said protruding end of each said expansion bracket;

said door being mounted with said door hinge on said protruding end of at least one of said expansion brackets, said door having a top brace, a bottom brace, and two side rails, each said side rail extending from said top brace to said bottom brace; and

said door hinge being attached to each said expansion bracket with a mounting screw, said mounting screw having a mounting head that is positioned to be accessible for tightening and loosening when said back door is in an open position and inaccessible from outside the cabinet when said back door is in a closed position.

20. The expandable cabinet of claim 1 wherein said expansion brackets comprise an extendable sleeve extending along the height of said cabinet, each said corner post having an inside surface that forms one of said brace guides, said expansion brackets having a plurality of vertically spaced expansion bracket slots to permit mounting of said box mounts to said rear corner posts.

21. The expandable cabinet of claim 1 wherein said expansion brackets comprise an extendable accordion sleeve extending along the height of said cabinet, each said corner post having an inside surface that forms one of said brace guides, said expansion brackets having a plurality of vertically spaced expansion bracket slots to permit mounting of said box mounts to said rear corner posts.

22. The expandable cabinet of claim 1 wherein at least one of said expansion brackets is independently mounted to reciprocate from said rear corner posts.

23. The expandable cabinet of claim 1 wherein at least one of said expansion brackets is independently mounted to reciprocate from said rear corner posts, said door having an alignment hole, at least one expansion bracket having an alignment lug extending from said protruding end of said expansion bracket, said alignment lug being configured to engage said alignment hole of said door when said door is in a closed position.

24. The expandable cabinet of claim 1 wherein a first of said expansion brackets comprises a sliding plate and plate return and wherein a second of said second expansion brackets comprises a swing plate mounted to said back door, said swing plate being configured to be inserted into a brace guide after expansion of said cabinet.

25. The expandable cabinet of claim 1 wherein:

a plurality of side panels are positioned along either side of said cabinet and extending from about said front portion to about said back portion of said cabinet and also extending from about said base to about said top of said cabinet;

said brace guides are formed between each said rear corner post and said side panels;

a first of said expansion brackets comprises a sliding plate and plate return positioned to reciprocate from one of said brace guides; and

a second of said expansion brackets comprises a swing plate mounted to said back door, said swing plate being configured to be inserted into one of said brace guides after expansion of said cabinet.

26. The expandable cabinet of claim 1 further comprising a door frame mounted to at least one said protruding end of one said expansion bracket, at least one said box mount being configured to transfer at least part of the load of an electrical component box to an expansion bracket, at least one said expansion bracket being configured to transfer at least part of the load of at least one said box mount to said door frame, said door frame being configured to support at least part of the loads of said electrical component boxes.

27. The expandable cabinet of claim 1 further comprising:

a door frame mounted to each said protruding end of each said expansion bracket wherein said door frame causes each of said expansion brackets to move in unison during expansion or contraction of said cabinet; and

each said box mount being configured to transfer at least part of the load of an electrical component box to said expansion brackets, each said expansion bracket being configured to transfer at least part of the load of at least one said box mount to said door frame, said door frame being configured to support at least part of the loads of said electrical component boxes.

28. The expandable cabinet of claim 1 further comprising:

a door frame mounted to each said protruding end of each said expansion bracket wherein said door frame causes each of said expansion brackets to move in unison during expansion or contraction of said cabinet; and

each said box mount being configured to transfer at least part of the load of an electrical component box to said

expansion brackets, each said expansion bracket being configured to transfer at least part of the load of at least one said box mount to said door frame, said door frame being configured to support at least part of the loads of said electrical component boxes independently of said base of said cabinet frame.

29. The expandable cabinet of claim 1 wherein said box mounts are frictionally mounted on said rear corner posts, said rear corner posts being configured to allow for frictional adjustment and positioning of said box mounts to a plurality of positions within said expandable cabinet.

30. The expandable cabinet of claim 1 wherein said box mounts have female dove tail forms having inside surfaces and extending along a substantial portion of the length of said box mounts, said rear corner posts having male dove tail forms that frictionally engage said inside surfaces of said female dove tail forms to create a locking force and to position said box mount within said cabinet.

31. The expandable cabinet of claim 1 wherein said box mounts have female dove tail forms having inside surfaces and extending along a substantial portion of the length of said box mounts, said rear corner posts having male dove tail forms that frictionally engage said inside surfaces of said female dove tail forms to create a locking force and to position said box mount within said cabinet, said male dove tail forms providing lineal support against said female dovetail forms for supporting said box mounts.

32. The expandable cabinet of claim 1 wherein each said box mount includes a post fitting for attaching said box mount to one of said rear corner posts, said post fitting allowing said box mount to be mounted in only one position within said expandable cabinet when said box mount is mounted within said cabinet.

33. The expandable cabinet of claim 1 wherein said box mounts include post fittings for attaching said box mounts to said rear corner posts, spacers for establishing the position in which an electrical component box will be mounted, and mounting rails for engaging and positioning said box mount within said expandable cabinet, said post fittings allowing said box mounts to each be mounted in only one position within said expandable cabinet when said box mounts are mounted within said cabinet.

34. The expandable cabinet of claim 1 further comprising:

a door frame mounted to at least one said protruding end of one said expansion bracket, said door frame having frame mounting rails extending along the height of said door frame, said door frame being configured to support at least part of the loads of the electrical component boxes; and

said box mount having a box attachment rail for engaging one of said frame mounting rails of said door frame, a mounting rail for engaging and positioning an electrical component box, and a spacer for establishing the position in which the electrical component box will be mounted, said box mount being configured to transfer at least part of the load of an electrical component box to said door frame.

35. The expandable cabinet of claim 1 wherein said box mount comprises a reciprocating arm and a mounting rail, said reciprocating arm extending through said corner post on a support bearing.

36. The expandable cabinet of claim 1 wherein said box mount comprises a reciprocating arm and a mounting rail, said reciprocating arm extending through said corner post on a support bearing and having a threaded portion extending through a turning sleeve, said turning sleeve allowing for adjustment of said box mount through said support bearing.

37. The expandable cabinet of claim 1 wherein said box mount comprises a reciprocating arm connected to a mounting rail with a slip sleeve, said reciprocating arm extending through said corner post on a support bearing and having a threaded portion extending through a turning sleeve, said turning sleeve allowing for adjustment of said box mount through said support bearing, said slip sleeve allowing said mounting rail to float in an upright position with respect to said rear corner post.

38. The expandable cabinet of claim 1 wherein said box mount comprises a reciprocating arm that is adjusted with a worm and rack assembly, said worm and rack assembly having a toothed rack fixed to said reciprocating arm, said toothed rack engaged to a rotating worm that is connected to said rear corner post.

39. The expandable cabinet of claim 1 wherein said expansion bracket includes a plurality of notches located at positions along the length of said expansion bracket and each corresponding to one of a plurality of predetermined expansion positions for said expansion bracket, said brace guide including a detent assembly having a detent that is biased to engage said notches of said expansion bracket and to secure said expansion bracket in position when said expansion bracket is in one of the predetermined expansion positions.

40. The expandable cabinet of claim 1 wherein said expansion bracket includes a plurality of conical internal recesses located at positions along the length of said expansion bracket and each corresponding to one of a plurality of predetermined expansion positions for said expansion bracket, said brace guide including a lock pin having a conical section and pin threads, said threads allowing said lock pin to be rotated so that said conical section can engage one of said conical internal recesses of said expansion bracket and can secure said expansion bracket in position when said expansion bracket is in one of the predetermined expansion positions.

41. The expandable cabinet of claim 1 wherein said expansion bracket includes a gear rack positioned to engage a drive screw, said drive screw being connected to said rear corner post and configured to move said expansion bracket when said drive screw is rotated.

42. The expandable cabinet of claim 1 wherein said expansion bracket comprises a male telescoping segment, a female telescoping segment, and a detent groove, said male telescoping segment positioned to reciprocate within said female telescoping segment, said detent groove providing frictional resistance between said male and female telescoping segments to allow for precise positioning of said male telescoping segment.

43. The expandable cabinet of claim 1 wherein said brace guide comprises a threaded sleeve extending through said rear corner post, said expansion bracket being threaded along its length and configured to engage said threaded sleeve of said brace guide, said expansion bracket being configured to move against said threaded sleeve of said brace guide when said expansion bracket is rotated.

44. An expandable cabinet for storing and positioning electrical component boxes of different lengths, said expandable cabinet comprising:

a cabinet having a cabinet frame, said cabinet frame having a front portion, a back portion, a base and a pair of rear corner posts positioned at about said back portion of said cabinet frame, said rear corner posts extending from about said base, each of said rear corner posts having at least one brace guide;

an expansion bracket mounted on each said brace guide, each said expansion bracket having a protruding end extending in a rearward direction from a rear corner post, each of said expansion brackets capable of being secured at a plurality of positions relative to said rear corner post;

a door frame connected in fixed relation to the protruding ends of each said expansion bracket;

a door hinge mounted behind said back portion of said cabinet frame in a manner so as to move with at least one said expansion bracket, a back door mounted on said door hinge in a position to extend across said back portion of said cabinet frame to form an expanded space of said expandable cabinet when said at least one expansion bracket is extended in a rearward direction from said rear corner post; and

at least one box mount installed in a horizontal position with respect to each of said rear corner posts that can be varied within the expanded space, each said at least one box mount configured to engage an electrical component box and position the box within said expandable cabinet.

45. The expandable cabinet of claim 44 wherein said door has a top brace, a bottom brace, and two side rails, each said side rail extending from said top brace to said bottom brace.

46. The expandable cabinet of claim 44 wherein said door has a top brace, a bottom brace, and two side rails, each said side rail extending from said top brace to said bottom brace, one of said side rails of said door being pivotally mounted with said hinge on at least one of said expansion brackets.

47. The expandable cabinet of claim 44 wherein said door has a top brace, a bottom brace, two side rails and a door grille, each said side rail extending from said top brace to said bottom brace, one of said side rails being pivotally mounted to said door hinge, said door grille extending between said top brace and said bottom brace of said door, said door grille being sufficiently perforated to allow cooling air to pass through said door.

48. The expandable cabinet of claim 44 further comprising:

a cover, said cover having a main section positioned at said top of said cabinet frame and a free member;

a pair of channels extending into said main section of said cover, each of said channels opening at about said back portion of said cabinet frame; and

a pair of alignment legs, each of said alignment legs being positioned in a manner so as to move with said free member of said cover, each of said alignment legs extending into one of said channels of said main section of said cover, said alignment legs being configured to reciprocate within said channels.

49. The expandable cabinet of claim 44 further comprising:

a cover, said cover having a main section positioned at said top of said cabinet frame and a free member;

a pair of channels extending into said main section of said cover, each of said channels opening at about said back portion of said cabinet frame;

a pair of alignment legs, each of said alignment legs being positioned in a manner so as to move with said free member of said cover, each of said alignment legs extending into one of said channels of said main section of said cover, said alignment legs being configured to reciprocate within said channels; and

a cover expansion gap being defined as the clearance between said main section and said free member of said cover when said main section and said free member are moved apart from each other.

50. The expandable cabinet of claim 44 further comprising:

a lower pair of expansion brackets slidably mounted on said brace guides at a location that is proximate said base of said cabinet frame;

a top pair of expansion brackets slidably mounted on said brace guides at a location that is proximate said cover of said cabinet frame; and

a midpoint pair of expansion brackets slidably mounted on said brace guides at a location that is between said pair of lower expansion brackets and said pair of top expansion brackets, said midpoint expansion brackets having locking notches for locking said door frame at predetermined positions relative to said brace guide, thereby locating said lower expansion brackets, said midpoint expansion brackets, and said top expansion brackets in positions relative to said rear corner posts.

51. The expandable cabinet of claim 44 wherein said door frame causes each of said expansion brackets to move in unison during expansion or contraction of said cabinet.

52. The expandable cabinet of claim 44 wherein said door frame has a slip joint positioned to allow for alignment of said expansion brackets during expansion or contraction of said cabinet.

53. The expansion cabinet of claim 44 further comprising side panels positioned along either side of said cabinet and extending from about said front portion to about said back portion of said cabinet and also extending from about said base to about said top of said cabinet.

54. The expandable cabinet of claim 44 further comprising filler panels extending from about said back portion of said cabinet to about said protruding ends of said expansion brackets and also extending from about said base to about said top of said cabinet when said cabinet has been expanded.

55. The expandable cabinet of claim 44 further comprising a cover, said cover having a main section positioned at said top of said cabinet frame and a free member, said main section having a ventilation passage to allow air to pass freely into and out of said cabinet, said free member being positioned above said door frame to move with said door frame.

56. The expandable cabinet of claim 44 further comprising a front door pivotally mounted to said front portion of

said cabinet frame, said front door being sized to allow for the installation of an electrical component box through said front portion of said cabinet.

57. The expandable cabinet of claim 44, said cabinet having a support base and further comprising:

a front door pivotally mounted to said front portion of said cabinet frame, said front door being sized to allow for the installation of an electrical component box through said front portion of said cabinet; and

a stabilizer reciprocally connected to said cabinet, said stabilizer leg being extendable from said cabinet and having a length that is sufficiently long to expand the support base of the cabinet when said stabilizer leg is extended.

58. The expandable cabinet of claim 44, said cabinet having a support base and further comprising:

a front door pivotally mounted to said front portion of said cabinet frame, said front door being sized to allow for the installation of an electrical component box through said front portion of said cabinet;

a stabilizer having at least one stabilizer leg reciprocally connected to said cabinet, said stabilizer leg being extendable from said cabinet and having a length that is sufficiently long to expand the support base of the cabinet when said stabilizer leg is extended;

said front door being configured to engage and extend said stabilizer from the cabinet as said front door is opened from a closed position, said stabilizer expanding the support base of the cabinet when said stabilizer leg is extended;

said front door being configured to disengage said stabilizer when said stabilizer has been fully extended and said front door continues to be opened further; and

said front door being configured to again engage and retract said stabilizer when said front door is returned to a closed position from an open position.

59. The expandable cabinet of claim 44 further comprising:

a plurality of locking notches positioned along said expansion brackets for locking said door frame at predetermined incremental positions relative to said brace guide; and

at least one lock pin mounted in at least one of said brace guides, said lock pin being positioned to engage said internal notches of at least one of said expansion brackets when said at least one of said expansion brackets slides into one of said predetermined incremental positions.

60. The expandable cabinet of claim 44 wherein:

each said box mount comprises a T-bone bracket, each said T-bone bracket having a mounting rail for engaging an electrical component box and a box mount slot extending along a substantial portion of the length of said box mount, each said T-bone bracket being adjustable for positioning in a plurality of positions within said expandable cabinet; and

at least one adjustable guide pin is mounted on each of said rear corner posts, each of said guide pins being configured to extend through one of said box mount slots to connect one of said T-bone brackets to one of said rear corner posts, each said guide pin being configured to secure one of said T-bone brackets in a fixed position within said expandable cabinet.

61. The expandable cabinet of claim 44 wherein:

each said box mount comprises a T-bone bracket, said T-bone bracket having a mounting rail for engaging an electrical component box and a box mount slot extending along a substantial portion of the length of said box mount, said T-bone bracket being adjustable for positioning in a plurality of positions within said expandable cabinet; and

at least one adjustable guide pin and at least one washer are provided, said pin having a threaded portion configured to engage one of said rear corner posts and to allow for axial adjustment of said guide pin thereon, each said guide pin being configured to extend through one said washer and through said box mount slot to connect said T-bone bracket to one of said rear corner posts, each said guide pin co-acting with one said washer to lock said T-bone bracket in position when said threaded portion of said guide pin is tightened.

62. The expandable cabinet of claim 44 wherein said door is mounted with said door hinge on said protruding end of at least one of said expansion brackets, said door having a top brace, a bottom brace, and two side rails, each said side rail extending from said top brace to said bottom brace, said door hinge being attached to said expansion bracket with a mounting screw, said mounting screw having a mounting head that is positioned to be accessible for tightening and loosening when said back door is in an open position and inaccessible from outside the cabinet when said back door is in a closed position.

63. The expandable cabinet of claim 44 wherein said expansion brackets comprise an extendable sleeve extending along the height of said cabinet, each said corner post having an inside surface that forms one of said brace guides, said expansion brackets having a plurality of vertically spaced expansion bracket slots to permit mounting of said box mounts to said rear corner posts.

64. The expandable cabinet of claim 44 wherein said expansion brackets comprise an extendable accordion sleeve extending along the height of said cabinet, each said corner post having an inside surface that forms one of said brace guides, said expansion brackets having a plurality of vertically spaced expansion bracket slots to permit mounting of said box mounts to said rear corner posts.

65. The expandable cabinet of claim 44 wherein at least one said box mount is configured to transfer at least part of the load of an electrical component box to an expansion bracket, at least one said expansion bracket being configured to transfer at least part of the load of at least one said box mount to said door frame, said door frame being configured to support at least part of the loads of said electrical component boxes.

66. The expandable cabinet of claim 44 wherein said door frame causes each of said expansion brackets to move in unison during expansion or contraction of said cabinet, each said box mount being configured to transfer at least part of the load of an electrical component box to said expansion brackets, each said expansion bracket being configured to transfer at least part of the load of at least one said box

mount to said door frame, said door frame being configured to support at least part of the loads of said electrical component boxes.

67. The expandable cabinet of claim 44 wherein said door frame causes each of said expansion brackets to move in unison during expansion or contraction of said cabinet, each said box mount being configured to transfer at least part of the load of an electrical component box to said expansion brackets, each said expansion bracket being configured to transfer at least part of the load of at least one said box mount to said door frame, said door frame being configured to support at least part of the loads of said electrical component boxes independently of said base of said cabinet frame.

68. The expandable cabinet of claim 44 wherein said box mounts are frictionally mounted on said rear corner posts, said rear corner posts being configured to allow for frictional adjustment and positioning of said box mounts to a plurality of positions within said expandable cabinet.

69. The expandable cabinet of claim 44 wherein said box mounts have female dove tail forms having inside surfaces and extending along a substantial portion of the length of said box mounts, said rear corner posts having male dove tail forms that frictionally engage said inside surfaces of said female dove tail forms to create a locking force and to position said box mount within said cabinet.

70. The expandable cabinet of claim 44 wherein said box mounts have female dove tail forms having inside surfaces and extending along a substantial portion of the length of said box mounts, said rear corner posts having male dove tail forms that frictionally engage said inside surfaces of said female dove tail forms to create a locking force and to position said box mount within said cabinet, said male dove tail forms providing lineal support against said female dovetail forms for supporting said box mounts.

71. The expandable cabinet of claim 44 wherein each said box mount includes a post fitting for attaching said box mount to one of said rear corner posts, said post fitting allowing said box mount to be mounted in only one position within said expandable cabinet when said box mount is mounted within said cabinet.

72. The expandable cabinet of claim 44 wherein said box mounts include post fittings for attaching said box mounts to said rear corner posts, spacers for establishing the position in which an electrical component box will be mounted, and mounting rails for engaging and positioning said box mount within said expandable cabinet, said post fittings allowing said box mounts to each be mounted in only one position within said expandable cabinet when said box mounts are mounted within said cabinet.

73. The expandable cabinet of claim 44 wherein said door frame has frame mounting rails extending along the height of said door frame, said door frame being configured to support at least part of the loads of the electrical component boxes, said box mount has a box attachment rail for engaging one of said frame mounting rails of said door frame, a mounting rail for engaging and positioning an electrical component box, and a spacer for establishing the position in which the electrical component box will be mounted, said box mount being configured to transfer at least part of the load of an electrical component box to said door frame.

74. The expandable cabinet of claim 44 wherein said box mount comprises a reciprocating arm and a mounting rail, said reciprocating arm extending through said corner post on a support bearing.

75. The expandable cabinet of claim 44 wherein said box mount comprises a reciprocating arm and a mounting rail, said reciprocating arm extending through said corner post on a support bearing and having a threaded portion extending through a turning sleeve, said turning sleeve allowing for adjustment of said box mount through said support bearing.

76. The expandable cabinet of claim 44 wherein said box mount comprises a reciprocating arm connected to a mounting rail with a slip sleeve, said reciprocating arm extending through said corner post on a support bearing and having a threaded portion extending through a turning sleeve, said turning sleeve allowing for adjustment of said box mount through said support bearing, said slip sleeve allowing said mounting rail to float in an upright position with respect to said rear corner post, said mounting rail is attached to an electrical component box.

77. The expandable cabinet of claim 44 wherein said box mount comprises a reciprocating arm that is adjusted with a worm and rack assembly, said worm and rack assembly having a toothed rack fixed to said reciprocating arm, said toothed rack engaged to a rotating worm that is connected to said rear corner post.

78. The expandable cabinet of claim 44 wherein said expansion bracket includes a plurality of notches located at positions along the length of said expansion bracket and each corresponding to one of a plurality of predetermined expansion positions for said expansion bracket, said brace guide including a detent assembly having a detent that is biased to engage said notches of said expansion bracket and to secure said expansion bracket in position when said expansion bracket is in one of the predetermined expansion positions.

79. The expandable cabinet of claim 44 wherein said expansion bracket includes a plurality of conical internal recesses located at positions along the length of said expansion bracket and each corresponding to one of a plurality of predetermined expansion positions for said expansion bracket, said brace guide including a lock pin having a conical section and pin threads, said threads allowing said lock pin to be rotated so that said conical section can engage one of said conical internal recesses of said expansion bracket and can secure said expansion bracket in position when said expansion bracket is in one of the predetermined expansion positions.

80. The expandable cabinet of claim 44 wherein said expansion bracket includes a gear rack positioned to engage a drive screw, said drive screw being connected to said rear corner post and configured to move said expansion bracket when said drive screw is rotated.

81. The expandable cabinet of claim 44 wherein said expansion bracket comprises a male telescoping segment, a female telescoping segment, and a detent groove, said male telescoping segment positioned to reciprocate within said female telescoping segment, said detent groove providing frictional resistance between said male and female telescoping segments to allow for precise positioning of said male telescoping segment.

82. The expandable cabinet of claim 44 wherein said expansion bracket comprises a male telescoping segment, a female telescoping segment and a detent groove, said male

telescoping segment and said female telescoping segment each having a major dimension and an axis of reciprocation that extends approximately along said major dimension, said male telescoping segment positioned to reciprocate within said female telescoping segment, said detent groove providing frictional resistance between said male and female telescoping segments to allow for precise positioning of said male telescoping segment, said detent groove also preventing rotation of said male telescoping segment about said axis of reciprocation of said male telescoping segment with respect to said axis of reciprocation of said female telescoping segment.

83. The expandable cabinet of claim 44 wherein said brace guide comprises a threaded sleeve extending through said rear corner post, said expansion bracket being threaded along a portion of its length and configured to engage said threaded sleeve of said brace guide, said expansion bracket being configured to move against said threaded sleeve of said brace guide when the threaded portion of said expansion bracket is rotated.

84. An expandable cabinet for storing and positioning electrical component boxes of different lengths, said expandable cabinet comprising:

a cabinet having a cabinet frame, said cabinet frame having a front portion, a back portion, a base and a pair of rear corner posts positioned at about said back portion of said cabinet frame, said rear corner posts extending from about said base, each of said rear corner posts having at least one brace guide;

an expansion bracket mounted on each said brace guide, each said expansion bracket having a protruding end extending in a rearward direction from a rear corner post, each of said expansion brackets capable of being secured at a plurality of positions relative to said rear corner post;

a door frame mounted to each said protruding end of each said expansion bracket wherein said door frame causes each of said expansion brackets to move in unison during expansion or contraction of said cabinet;

a door hinge mounted behind said back portion of said cabinet frame in a manner so as to move with at least one said expansion bracket;

a back door mounted on said door hinge in a position to extend across said back portion of said cabinet frame to form an expanded space of said expandable cabinet when said at least one expansion bracket is extended in a rearward direction from said rear corner post;

said back door having a top brace, a bottom brace, two side rails, and a door grille, each said side rail extending from said top brace to said bottom brace, one of said side rails of said door being pivotally mounted with said hinge on at least one of said expansion brackets, said door grille extending between said top brace and said bottom brace of said door, said door grille being sufficiently perforated to allow cooling air to pass through said back door;

a cover, said cover having a main section positioned at said top of said cabinet frame and a free member; a pair of channels extending into said main section of said cover, each of said channels opening at about said back portion of said cabinet frame; a pair of alignment legs, each of said alignment legs being positioned in a manner so as to move with said free member of said cover, each of said alignment legs extending into one of said channels of said main section of said cover, said alignment legs being configured to reciprocate within said channels;

a lower pair of expansion brackets slidably mounted on said brace guides at a location that is proximate said base of said cabinet frame; a top pair of expansion brackets slidably mounted on said brace guides at a location that is proximate said cover of said cabinet frame; a midpoint pair of expansion brackets slidably mounted on said brace guides at a location that is between said pair of lower expansion brackets and said pair of top expansion brackets, said midpoint expansion brackets having locking notches for locking said door frame at predetermined positions relative to said brace guide, thereby locating said lower expansion brackets, said midpoint expansion brackets, and said top expansion brackets in positions relative to said rear corner posts;

a plurality of locking notches positioned along said expansion brackets for locking said door frame at predetermined incremental positions relative to said brace guide; at least one lock pin mounted in at least one of said brace guides, said lock pin being positioned to engage said internal notches of at least one of said expansion brackets when said at least one of said expansion slides into one of said predetermined incremental positions;

a front door pivotally mounted to said front portion of said cabinet frame, said front door being sized to allow for the installation of an electrical component box through said front portion of said cabinet; and

at least one box mount installed in a horizontal position with respect to each of said rear corner posts, each said box mount comprising a T-bone bracket having a mounting rail for engaging an electrical component box and a box mount slot extending along a substantial portion of the length of said box mount, each said T-bone bracket being adjustable for positioning in a plurality of positions within said expandable cabinet, each said guide pin being configured to secure one of said T-bone brackets in a fixed position within said expansion cabinet.

85. The expandable cabinet of claim 84, said cabinet having a support base and further comprising a stabilizer reciprocally connected to said cabinet, said stabilizer leg being extendable from said cabinet and having a length that is sufficiently long to expand the support base of the cabinet when said stabilizer leg is extended.

86. The expandable cabinet of claim 84, said cabinet having a support base and further comprising:

a stabilizer having at least one stabilizer leg reciprocally connected to said cabinet, said stabilizer leg being extendable from said cabinet and having a length that

is sufficiently long to expand the support base of the cabinet when said stabilizer leg is extended;

said front door being configured to engage and extend said stabilizer from the cabinet as said front door is opened from a closed position, said stabilizer expanding the support base of the cabinet when said stabilizer leg is extended;

said front door being configured to disengage said stabilizer when said stabilizer has been fully extended and said front door continues to be opened further; and

said front door being configured to again engage and retract said stabilizer when said front door is returned to a closed position from an open position.

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