# United States Patent [19]

**Stone**

[11] **3,748,009**

[45] **July 24, 1973**


[54] **CABINETS AND KITS FOR MAKING SAME**


[76] Inventor: **Norman L. Stone**, 7 Rye Ridge Pl., Harrison, N.Y.



[22] Filed: **July 21, 1971**

[21] Appl. No.: **164,593**

[52] **U.S. Cl.**..... **312/263**, 312/108, 312/111, 312/257

[51] **Int. Cl.**. **A47b 47/00**, A47b 43/00, F16b 12/00

[58] **Field of Search**..... 312/108, 111, 140, 312/263, 257; 20/20.92 E, 20.92 D, 20.92 G, 136



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 761,103 | 5/1904 | Richards | 312/108 |
| 982,858 | 1/1911 | Patterson | 312/262 X |
| 1,723,306 | 8/1924 | Sipe | 287/20.92 E |
| 2,346,982 | 8/1944 | Mastrangelo | 312/263 |
| 3,021,187 | 2/1962 | Mitchell | 312/263 |
| 3,301,618 | 1/1967 | Feldser et al. | 312/111 |
| 3,379,483 | 4/1968 | Oldford | 312/257 X |
| 3,527,486 | 9/1970 | Gamp | 287/20.90 E |
| 3,583,780 | 6/1971 | Berkowitz | 312/108 |
| 3,612,639 | 10/1971 | Williams | 312/257 |

FOREIGN PATENTS OR APPLICATIONS

| | | | |
|---|---|---|---|
| 25,378 | 10/1898 | Great Britain | 287/20.92 D |
| 1,933,183 | 5/1970 | Germany | 312/263 |



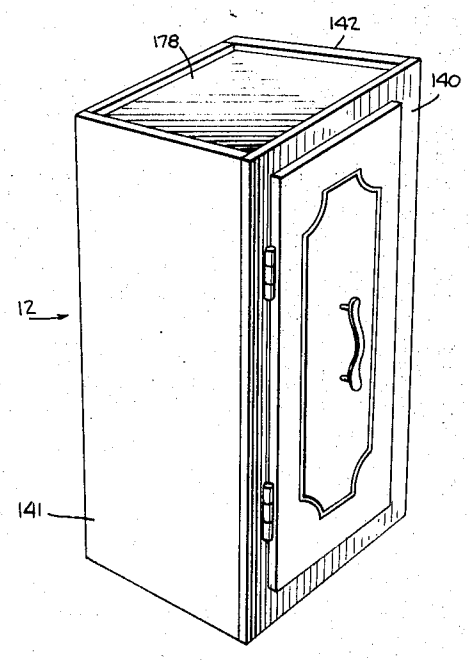
*Primary Examiner*—Paul R. Gilliam
*Attorney*—James E. Ryder et al.



[57] **ABSTRACT**

A cabinet and kit for making the cabinet are disclosed in which the walls are structurally interlocked so that the cabinet can be assembled easily and quickly without tools. One of the interlocks comprise a pair of orthogonal channels and mortices which mate with orthogonal tenons. Another interlock comprises a mortice and tenon wherein a strap spans part of the mortice and locks with a bracket mounted in a recess in the tenon.


**3 Claims, 9 Drawing Figures**



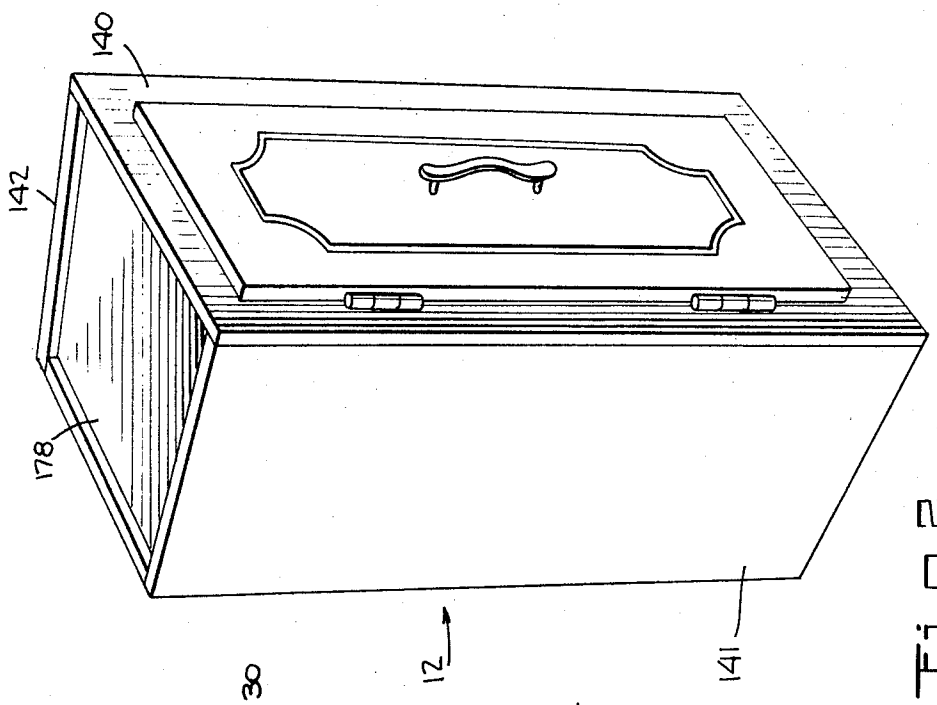



Fig. 2.

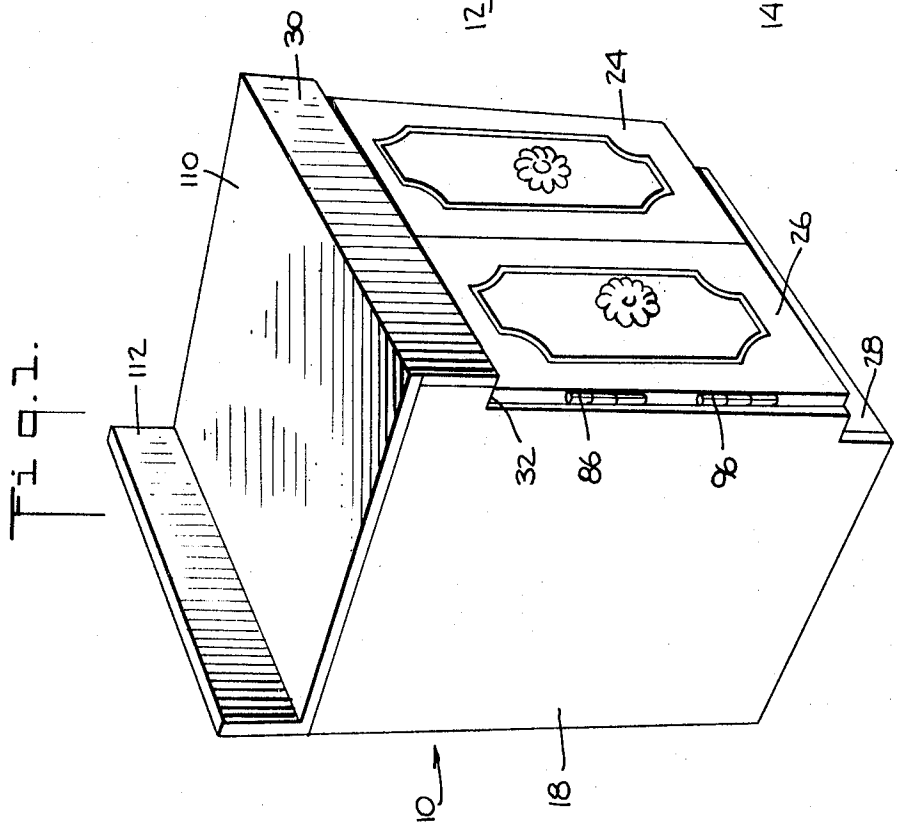



Fig. 1.

34
46
20
54
50
42
18
40
38

Fig. 4.

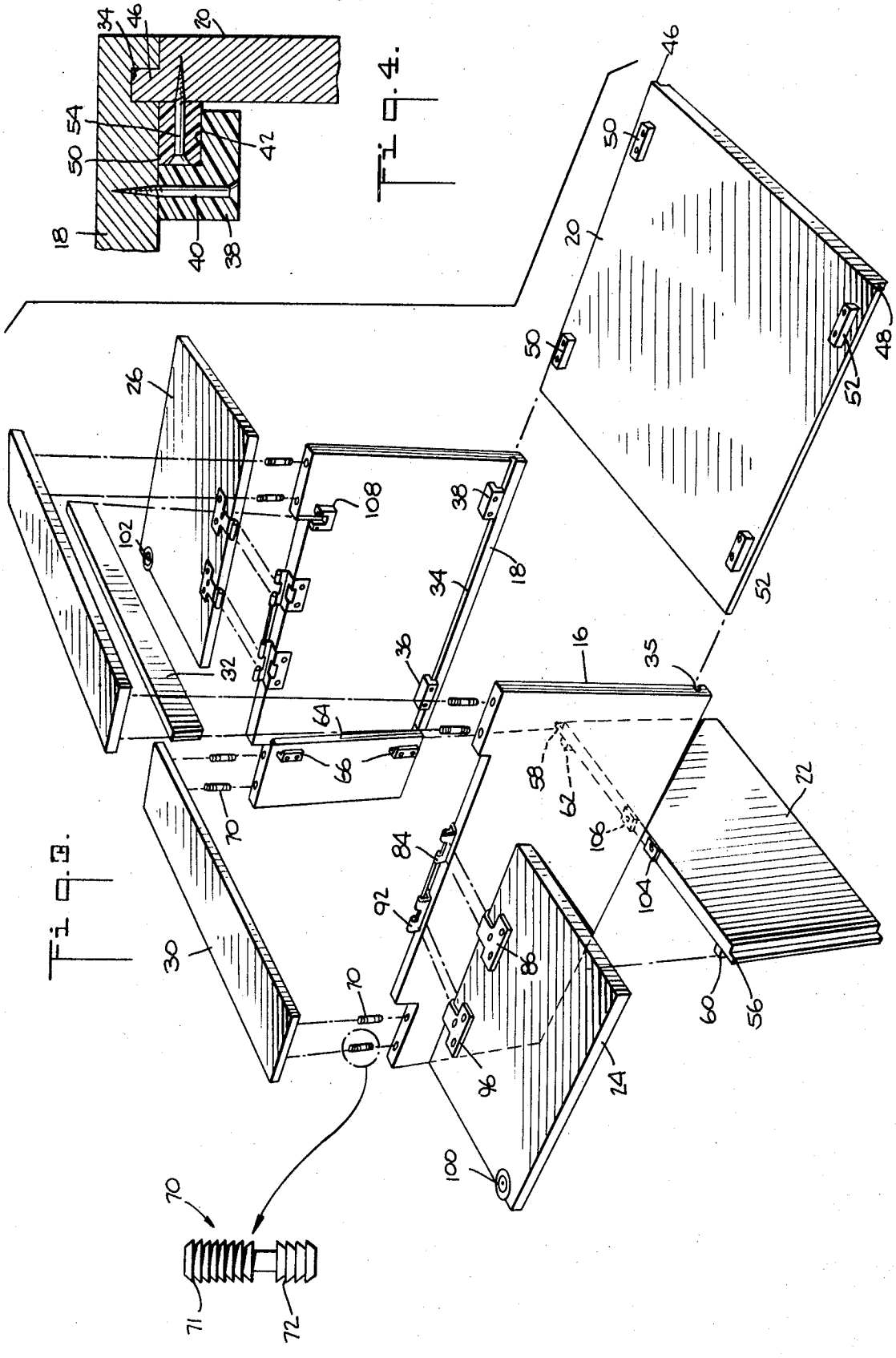
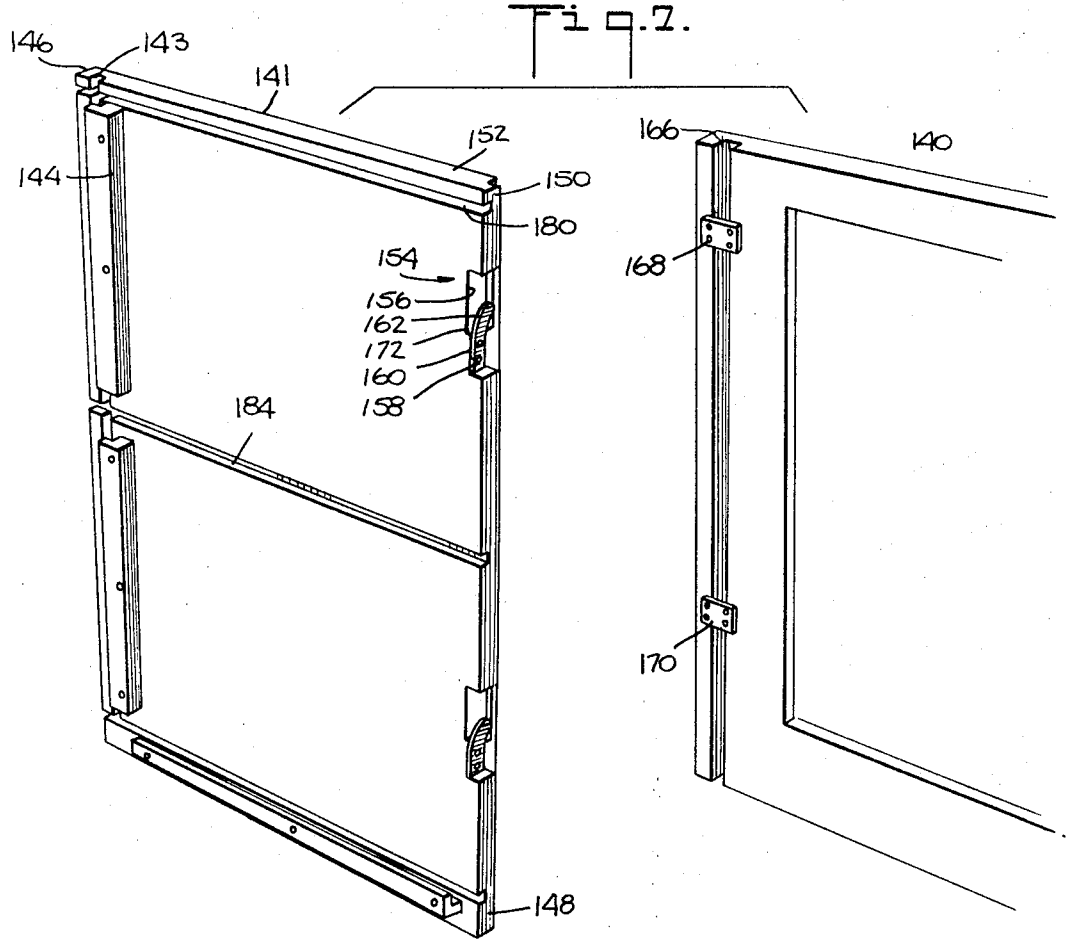

46
50
20
48
52
26
108
102
38
18
34
32
36
16
35
64
66
58
62
22
70
84
92
106
104
30
88
60
56
96
24
100
70
71
72

Fig. 3.

Fig. 7.


146
143
141
144
152
150
180
154
156
162
172
160
158
184
148
166
140
168
170

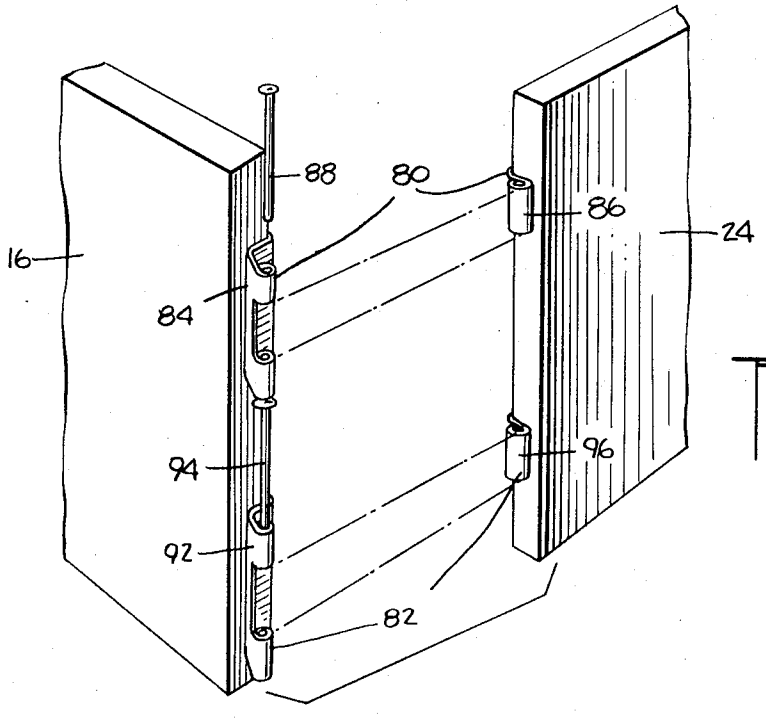

88
80
86
24
16
84
94
96
92
82

Fig. 8.

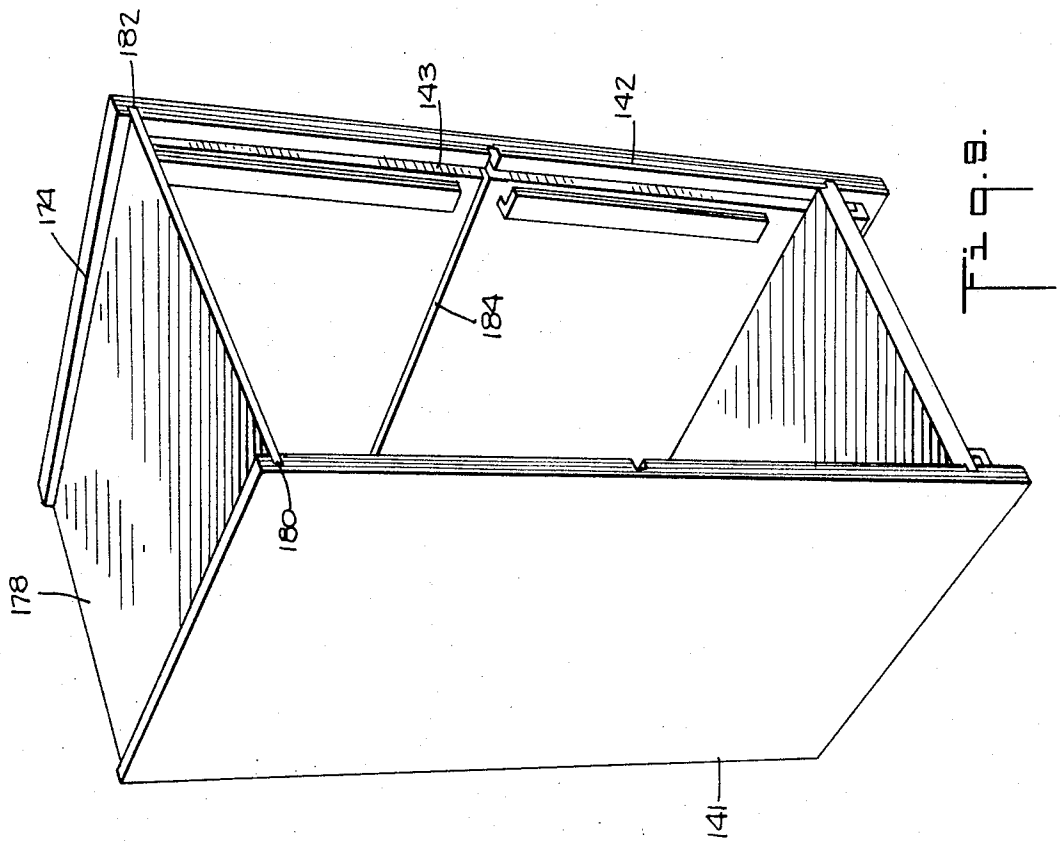



Fig. 5.

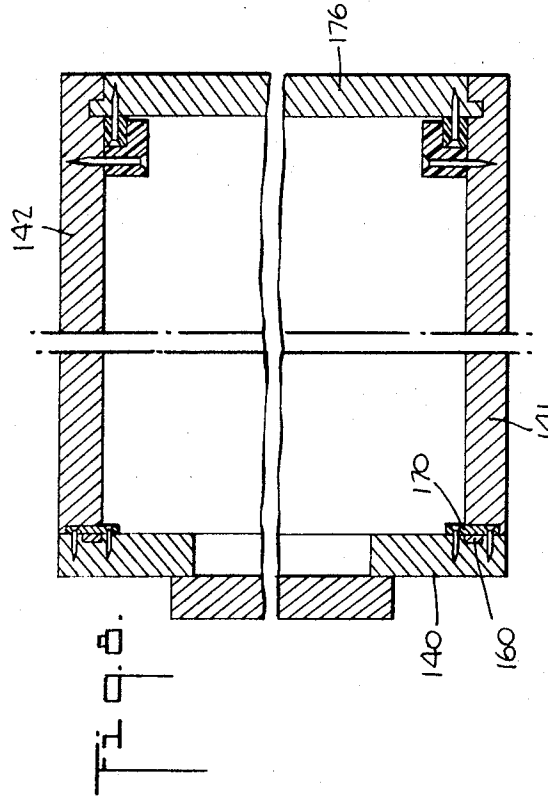



Fig. 6.

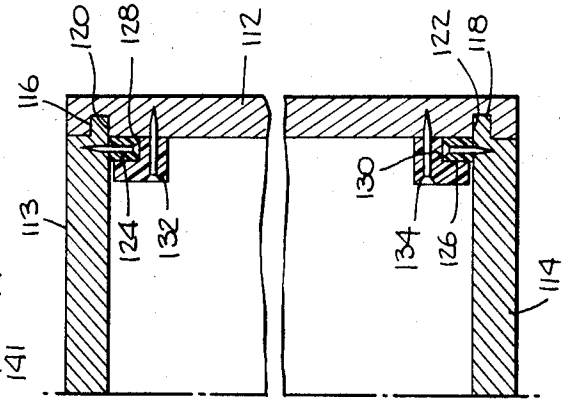



Fig. 6.

# CABINETS AND KITS FOR MAKING SAME

## BACKGROUND AND OBJECTIVES

This invention relates to cabinets and, more particularly, to a cabinet kit intended to be assembled by the consumer.

Cabinets such as kitchen cabinets and bathroom vanities conventionally are factory assembled and shipped to distributors and stores for sale to the ultimate consumer or user. Because of their size, these cabinets require considerable space during shipping and warehousing and such space is expensive. This is especially true if the item is manufactured in a foreign country and is transported by ship or other conventional cargo means. Consequently, it is desirable to be able to ship and store such cabinets in knocked-down form so that only the physical portions of the cabinets need to be shipped and stored rather than the air volume defined by the envelope of the cabinet. Furthermore, assembled cabinets are more likely to be damaged during shipment and storage than are cartoned parts. Another advantage to the kit form is the reduction in labor costs by eliminating the assembly procedure.

One problem with providing items in knocked down form is that assembly by the relatively unskilled consumer often is difficult, time consuming and unless properly performed results in an inferior product. Also, many items require special tools which the average consumer doesn't have. To overcome these problems it is desirable to provide a kit which may be assembled quickly and easily without the tools. This must be accomplished without sacrificing quality, particularly structural strength, since the cabinets are put through a constant daily usage where they support and store considerable weight.

Accordingly, it is one objective of this invention to provide a cabinet kit which can be easily and quickly assembled without the use of tools by a relatively unskilled person.

It is another objective of this invention to provide a cabinet construction which has increased structural strength and which may be assembled without the use of tools.

## BRIEF DESCRIPTION

Briefly described, this invention in one form comprises a cabinet such as a floor standing kitchen base cabinet having a pair of side walls, a rear wall, a top wall, a front wall with a door and drawer and shelves. The cabinet is supplied in kit form which includes basically only flat walls designed to be assembled into a kitchen cabinet without tools and in a minimum of time by a person with very little skill.

The kit includes a pair of side walls each of which has an L-shaped bracket mounted near the rear end thereof, the bracket and side wall defining a channel axially directed downwardly. A mortice orthogonal to the channel is provided adjacent the channel and extends substantially the entire height of the side wall.

The rear wall is formed with a pair of outwardly extending tenons on the opposed side edges thereof, the tenons being slideably received within the mortices of the side walls. A second tenon is mounted on the interior surface of the rear wall immediately adjacent the first tenons and orthogonal thereto, the second tenons being slideably received within the channel formed by the L-shaped bracket and side wall. The tenons are inserted in their respective mortices and channels by merely sliding the rear wall vertically with respect to the side walls thereby forming corner joints of considerable strength.



A top wall and bottom wall are used to serve the dual purpose of forming these respective surfaces as well as locking the rear wall in place to prevent sliding motion between the rear wall and side walls. The bottom wall is formed very similar to the rear wall in that it includes a pair of outwardly extending tenons on opposite sides thereof and a pair of tenons on the lower or exterior surface immediately adjacent and orthogonal to the tenons extending from the edges. These tenons are slideably received within the mortices and channels formed along the width of the side walls. The bottom wall extends to the extreme rear edge of the side wall and is mounted below the rear wall so that it prevents the rear wall from sliding downwardly. A top wall is mounted to the side walls by a simple tenon-mortice arrangement extending the entire width of the side walls and being above the rear wall thereby preventing the rear wall from sliding upwardly relative to the side walls. The combination of the bottom, top wall and side walls preclude all sliding movement of the rear wall relative to the side walls.

A front wall is formed with a mortice parallel and adjacent to the longitudinal or vertical edges of the front wall. A pair of spaced apart straps are mounted across each mortice, the strap being located near the top and bottom of the front wall. The front edge of the side walls are formed with a tenon extending substantially the entire length of the side walls, the tenon to be slideably received by the front wall mortice. Corresponding to the location of the strap on the front wall, the side wall tongue is provided with a stepped recess having a deeper upper portion and a shallower lower portion. A bracket having an outwardly sloped upper section is mounted on the shallower portion and is intended to fit in the front wall mortice between the strap and the front wall. To assemble the front wall on the side walls, the front wall is slid downwardly so that the side wall tongues fit within the mortices and the strap fits in the deeper portion of the side wall recesses. As the front wall is moved downwardly the bracket fits behind the strap and draws the front wall toward the side walls forming a firm joint. The front wall is moved downwardly until the strap abuts the shoulder which divides the deeper portion from the shallower portion of the side wall recess.

The front wall is also provided with an opening to provide an entrance to the cabinet. The kit includes a door to be hingedly mounted on the front wall by means of conventional hinges. These hinges comprise three parts, two interlocking parts one of which is mounted on the wall and the other of which is mounted on the door and a pivot pin which interconnects the two parts. The kit is designed such that the hinge portions that are mounted on the wall are spaced apart a distance less than the height of the pivot pin but far enough apart to permit the trapped pivot pin to be lifted so that the door hinge portion may be inserted within the wall hinge portion and the pin then drops into place joining the two hinge portions. This arrangement simplifies mounting the doors on the wall and avoids the difficulty of properly aligning the different portions of the hinge so that the pins may be placed therethrough. Once the bottom hinge is assembled the

top hinge is easily aligned and the pin for that hinge may then be easily placed in position.

## DESCRIPTION OF THE DRAWINGS

These and other objectives and advantages may be better understood and appreciated from the detailed description below taken in combination with the drawings in which:

FIG. 1 is a perspective view of a vanity cabinet of conventional style but assembled in accordance with this invention.

FIG. 2 is a perspective view of a kitchen base cabinet of conventional style but assembled in accordance with this invention.

FIG. 3 is a perspective view of the parts of a kit which, when assembled, make the cabinet of FIG. 1.

FIG. 4 is a sectional view of a cabinet's rear corner construction formed with the joint of this invention.

FIG. 5 is a perspective view illustrating a hinge arrangement formed in accordance with this invention.

FIG. 6 is a sectional view of a cabinet's rear corner construction formed with the joint of the second embodiment of this invention.

FIG. 7 is a perspective elevational view of the interior surface of a side wall and front wall forming a cabinet front corner in accordance with this invention.

FIG. 8 is a plan sectional view showing a four corner construction of the cabinet of FIG. 2.

FIG. 9 is a perspective rear view of the cabinet of FIG. 2 with the rear wall removed.

## DETAILED DESCRIPTION

FIGS. 1 and 2 illustrate two types of cabinets which may be supplied in kit form in accordance with this invention. FIG. 1 shows a standard type bathroom vanity cabinet **10** and FIG. 2 shows a standard floor standing kitchen base cabinet **12.** Each of these cabinets, although made from a kit of this invention, when assembled appears precisely the same as the standard preassembled corresponding cabinets and has at least the same strength and rigidity.

A kit **14** for forming the vanity **10** of FIG. 1 is illustrated in FIG. 3. Each of the parts are shown in their relative position ready to be assembled, however, it is understood and would be obvious from looking at the individual parts that they may be packed in a relatively small carton by laying the various parts flat one on top of the other. Such an arrangement reduces the volume required for storage and shipment and helps to prevent damage to the vanity **10.** The kit **14** includes nine basic parts, namely, a pair of side walls **16, 18,** a rear wall **20,** a bottom wall and shelf combination **22,** a pair of front doors **24, 26,** a toe kick panel **28,** an upper front panel **30** and a front closure panel **32.** All of these parts can be assembled together to form the vanity **10** without the use of any tools by an unskilled or untrained person and in a minimum of time — in the order of 5 - 10 minutes. The parts can be made of various materials such as wood or plastic. One desirable construction is to use particle board laminated on both sides to provide a desirable finish on the interior and exterior and also to prevent warping.

The side walls **16, 18** are each provided with a mortice **34, 35** respectively running along the length of the rear end thereof and a pair of L-shaped brackets **36, 38** mounted adjacent to the mortice **34** and spaced apart. While a pair of L-shaped brackets are shown, it is understood that a single elongated bracket could be used. FIG. 4 clearly illustrates the purpose and arrangement of the L-shaped bracket **38** and its relationship with the mortice **34.** It can be seen that the L-shaped bracket is mounted on the interior surface of the side wall **18** such as by means of a countersunk screw **40** to form a channel **42** together with the side wall **18.** The channel is orthogonal to the mortice **34.**

The rear wall **20** is formed with tongues or tenons **46, 48** extending outwardly from the side edges thereof and sized and shaped to be slidably received within the mortices **34, 35** respectively. An additional pair of tenons **50, 52** are mounted on the interior surface of the rear wall along the sides thereof by countersunk screws **54** and are spaced apart and sized to be slideable received within the channels formed by the L-shaped brackets **36, 38** on the side walls. The rear wall **20** is mounted to the side walls **16, 18** by sliding the tenons **46, 48** into their respective mortices **34, 35** and by sliding the tenons **50, 52** into the channels **42** formed by the L-shaped brackets. This relationship can be more clearly seen from FIG. **4** from which it will be appreciated that the orthogonal relationship of the tenons with respect to each other and the orthogonal relationship of the channel and mortice provides a strong corner construction which permits relative movement between the rear wall and side walls only in a vertical direction. Limiting the length of the mortices **34, 35** limits the ability of the rear wall to slide in one direction. The side walls cannot be laterally moved away from the rear wall **20** because the tenons **50, 52** and L-shaped brackets **36, 38** prevent such movement while the rear wall cannot be moved rearwardly away from the side walls because the tenons **46, 48** are trapped within the mortices **34, 35.**

In order to permit easy sliding of the tenons in the channels and mortices, the L-shaped brackets and tenons **50, 52** are made of a low-friction material such as polyvinyl chloride.

The bottom wall **22** is similar to the rear wall **20** in that it includes a pair of tenons **56, 58** extending outwardly from the side edges and a second pair of tenons **60, 62** mounted on the outer or undersurface of the bottom wall. The tenons **56, 58** of the bottom wall **22** slidably fit within travsverse mortices, one of which is shown at **64** extending from the rear toward the front of the side walls **16, 18.** Pairs of L-shaped brackets **66** are mounted below the mortice **64** to form a channel orthogonal to and adjacent to the mortice. The bottom wall **22** is slid into its corresponding mortices and channels and, because it is below the lower end of the rear wall **20,** prevents the rear wall **20** from being slid downwardly and thereby serves as a means for preventing sliding motion of the rear wall.

The toe kick panel **28** is sized to fit across the lower end of the front of the side walls **16, 18** and is attached thereto by plastic connector pins **70** which are force fitted within cylindrical channels **73, 74** formed in the front edge of the side walls **16, 18** and similar channels (not shown) formed in the interior surface of the toe kick panel **28.** The connector pin **70** is molded with two serrated sections **71, 72** each facing toward the center of the pin. The serrations permit easy insertion of the pin into the cylindrical channels and yet are extremely difficult to remove.

The doors **24, 26** are hingedly mounted onto the side walls **16, 18** by conventional hinges **80, 82.** Turning to

FIG. 5, one door 24 is shown about to be mounted onto its corresponding side wall 16 by means of a pair of hinges 80, 82. The hinge 80 is formed of three parts, a first portion 84 mounted on the side wall 16, a second portion 86, mounted on the door 24 and a pivot pin 88. The first and second portions 84, 86 have a cylindrical passageway and mate together so that the pin 88 can pass through both portions locking them together in conventional form. The second hinge 82 has the same construction as the first hinge 80; however, its location on the door 24 and side wall 16 relative to the first hinge 80 is important. The first portion 92 of the second hinge 82 which is mounted on the door 16 is spaced below the first hinge 80 by an amount less than the length of the pivot pin 94 and yet far enough to permit the pivot pin 94 to be raised sufficiently so that the second portion 96 of the hinge 82 can be mated with the first portion 92. In this manner, the pin 94 cannot be totally removed from the hinge 82 but can be lifted only so far as is required for the hinge to be able to be assembled or disassembled. This simplifies mounting of the doors because it is only necessary to lift the pin 94 and slide the hinge portions 92, 96 together until such point as their cylindrical passageways are aligned. At that moment the pin 94 drops into place locking the hinge together. It is then a simple matter to properly align the portions of the top hinge 80 to permit insertion of the pivot pin 88. This arrangement reduces the sometimes cumbersome task of trying to properly mate and align the hinges in order to insert the pivot pin.

The doors are also provided with magnets 100, 102 mounted in the lower inside corner thereof which are magnetically attracted to other magnets 104, 106 mounted on the front edge of the bottom wall 22. These combinations of magnets hold the front doors 24, 26 closed.

As can be seen in FIGS. 1 and 3, the side walls 16, 18 of the vanity project beyond the doors at their upper portion in conventional style. The front closure panel 32 serves the purpose of closing the space between the doors and the front of the top portion of the vanity. The front closure panel is mounted on the cabinet by simply sliding it into U-shaped brackets, one of which is shown at 108. After the closure panel 32 is inserted in the U-shaped brackets, the upper front panel 30 is then mounted onto the front edges of the side walls 16 and 18 by means of the connector pins 70 as described before in connection with the toe kick panel 28.

The vanity 10 shown in FIG. 1 has a flat top 110 with a splash panel 111 on the back thereof. This top can be mounted on the side walls and the rear wall by means of the connector pin 70. The vanities of this sort are used for various purposes, one of which is to support a sink instead of a flat counter top. The kit 14 does not show a top however it is understood that any of the conventional tops can be supplied with the kit depending upon the intended use for the vanity 10.

The vanity 10 uses a rear wall 20 which is mounted between the side walls 16, 18 as can be partially seen by the corner construction shown in FIG. 4. Alternatively, the rear wall can be mounted so that its inner surface abuts against the ends of the side walls 16, 18. Such a construction is illustrated in FIG. 6 where it can be seen that a rear wall 112 is mounted onto the rear edge of sidewalls 113, 114. With this construction, the side walls 113, 114 each have a longitudinal tenon 116, 118 extending from the rear edge thereof and which is slideably received within longitudinal mortices 120, 122 in the rear wall 112. The side walls 113, 114 also have longitudinal tenons 124, 126 affixed to the interior surface thereof to be received within channels 128, 130 formed by L-shaped brackets 132, 134 mounted on the interior surface of the rear wall 112 in such a fashion as to form the channels 128, 130 orthogonal to the mortices 120, 122 respectively. Of course, if desired, the mortices 120, 122 could be formed in the end edges of the side walls 113, 114 and the rear wall 112 could be provided with mating tenons. However, it is necessary that the L-shaped brackets 132, 134 be mounted on the rear wall 112 in order to prevent the rear wall from being moved rearwardly away from the side walls 113, 114.

The kitchen cabinet 12 shown in FIG. 2 employs the same basic construction described in detail above with respect to the vanity 10. However, a different construction is used to reliably mount the front wall 140 onto the side walls 141, 142. As can be seen in FIGS. 7 and 8 a side wall 141 is formed with a longitudinal mortice 143 and a longitudinal L-shaped bracket 144 adjacent the rear end 146 of the wall in the same fashion and for the same purpose described earlier with reference to the vanity 10. The front end 148 of the side wall 141 is formed with a tongue or tenon 150 on the interior side of the front end 148. Spaced from the upper edge 152 of the side wall there is provided a pair of spaced apart stepped recess 154 having an upper portion 156 deeper than the lower portion 158. A bracket 160 is mounted on the lower portion 158 and is formed with an outwardly sloped upper end 162.

The front wall 140 to be mounted onto the side wall 141 is provided with a mortice 166 extending the vertical length thereof. A pair of straps 168, 170 are fixedly mounted onto the interior surface of the front wall 140 and span the mortice 166. The straps are spaced apart the same distance as are the recesses 154 in the side wall 141.

To mount the front wall 140 onto the side wall 141 the side wall tenon or tongue 150 is inserted into the front wall mortice 166 and the straps 168, 170 are aligned with the upper portion of the recess 154 which is above the top of the bracket 160 so that the strap fits behind the bracket or, in other words, so that the bracket 160 fits within the mortice 166 behind the strap 168. The front wall is then pushed downwardly and the curvature of the upper end 162 of the bracket 160 draws the front wall 140 rearwardly to better seat the tenon 150 in the groove 166 and firmly lock the front wall to the side wall. The front wall is moved downwardly until the strap 168 abuts against the shoulder 172 which forms the end of the deeper portion 156 of the recess 154. In this position the upper ends of the front wall and side wall are in alignment.

The other end of the front wall 140 is affixed to the other side wall 142 in the same manner and the rear wall 176 is attached to the side walls 141, 142 in the same manner as described above with respect to the vanity 10. The base cabinet 12 has a top wall 178 which is slidably received within a pair of grooves 180, 182 in the side walls 141, 142, the grooves extending from front to rear and being orthogonal to the mortice 143 and L-shaped bracket 144. The top wall 178 also serves to lock the rear wall 176 in position and prevent relative sliding movement between the rear wall and the front walls. As can be seen in FIG. 9, the base cabinet

is provided with another horizontal groove **184** in which can be fitted a shelf (not shown).

A typical base cabinet **12** having standard dimensions of **36''** high × **24''** deep × **12''** wide takes up 6 cubic feet of warehouse space while the kit for making the same cabinet takes up slightly more than 2 cubic feet. In other words, the kit requires approximately one-third the warehouse space that the cabinet requires.

While two specific cabinets, namely a vanity **10** and a base cabinet **12** have been shown and described above, it is obvious that other styles and types of cabinets can be constructed by the same manner disclosed herein. The rear corner construction formed by the orthogonal mortice and channel arrangement (FIGS. **4** and **6**) forms a very strong joint and when rear wall sliding prevention means, such as a top wall and bottom wall are used to prevent the rear wall from sliding relative to the side walls, a very firm solid construction results. If it is desired to mount the cabinets on a wall in an elevated position, the cabinets can be provided with apertures through the rear wall to receive mounting means such as hooks or bolts in a conventional manner. When so mounted the rear corner construction must withstand considerably force since those corners will experience substantially the entire weight of the cabinet and its contents. Cabinets formed in accordance with this invention can withstand the force.

It will be appreciated that the aforementioned objectives, namely, to provide a kit and resulting cabinet which may be easily and quickly assembled without tools by the average consumer and which has the structural strength required, has been provided by this invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

**1.** A cabinet kit, cabinet or the like comprising a set of interlockable parts including

a. a first end wall
b. a second end wall
c. a first side wall
d. a second side wall
e. at least one L-shaped member projecting from the interior surface of one of said first end wall and said first side wall, the L-shaped member and said interior surface forming a first channel,
f. a first tenon projecting from the interior surface of said other of said first end wall and first side wall and being adapted to be slideably received within said first channel,
g. a mortice orthogonal to said channel formed in one of said first end wall and first side wall,
h. a second tenon orthogonal to said first tenon projecting from the other of said first end wall and first side wall and being adapted to be slideably received by said mortice,
i. said second side wall having the same construction as the first side wall,
j. a groove formed in the interior surface of one of said second end wall and first side wall and at least two spaced apart straps fixedly mounted on said interior surface across said groove,
k. a tongue extending from the other of said second end wall and first side wall adapted to be slideably received within said groove, a pair of recesses formed in said tongue each recess being aligned with one of said straps and having a first and second portion, the first portion being deeper than the second portion, a bracket mounted in said second portion and having an outwardly sloped section, the end of said section being spaced longitudinally and transversely from the remote end of the first portion such that upon insertion of the tongue in the groove, the strap is received within the first portion and the bracket is received in the groove between the strap and the wall in which the groove is formed, when the second end wall and first side wall are slid relative to each other the sloped section of the bracket draws the second end wall and first side wall tightly together,
l. said second side wall having the same construction as said first side wall.

**2.** A cabinet kit, cabinet or the like as defined in claim **1** wherein said L-shaped member and first tenon are formed from a plastic having a low coefficient of friction.

**3.** A cabinet kit, cabinet or the like as defined in claim **1** including a second mortice adjacent to a second edge in said first side wall and a third mortice adjacent to a second edge in said second side wall, said second and third mortices being orthogonal to said first end wall and a third end wall having a tongue on opposite sides thereof adapted to be slideably received within said second and third mortices third end wall and to abut an edge of said first end wall preventing sliding motion thereof relative to said first and second side walls.

* * * * *