March 23, 1948. R. C. BARLER ET AL 2,438,108

SHEET METAL CABINET AND METHOD OF MAKING THE SAME

Filed Nov. 17, 1943 3 Sheets-Sheet 1

Fig. 1.

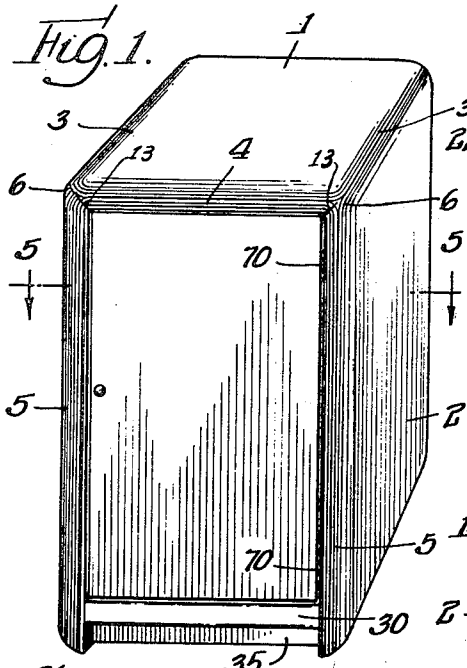


Fig. 3.

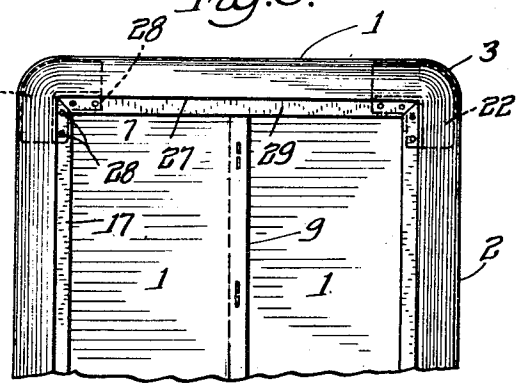


Fig. 4.

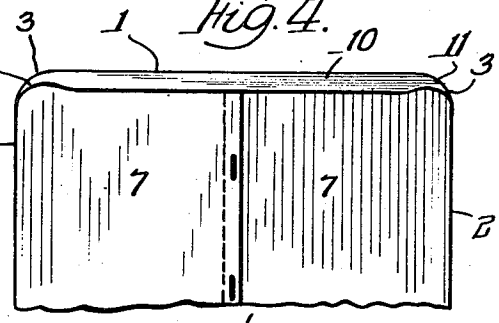


Fig. 2.

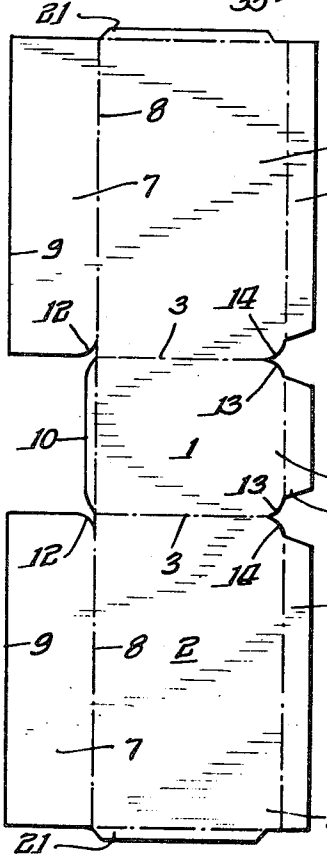


Fig. 6.

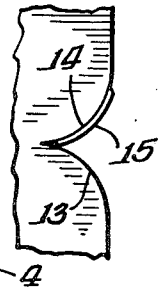


Fig. 5.

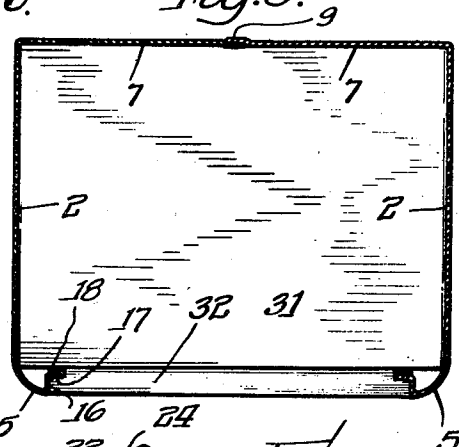


Fig. 7.

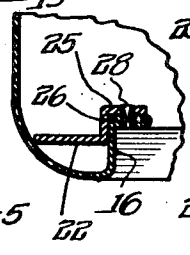
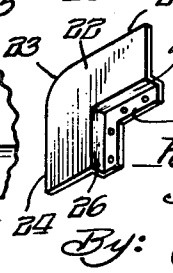


Fig. 8.



INVENTORS.
Richard C. Barler
John H. Yoder
By: Burton & Burton
Attys.

March 23, 1948. R. C. BARLER ET AL 2,438,108

SHEET METAL CABINET AND METHOD OF MAKING THE SAME

Filed Nov. 17, 1943 3 Sheets-Sheet 2

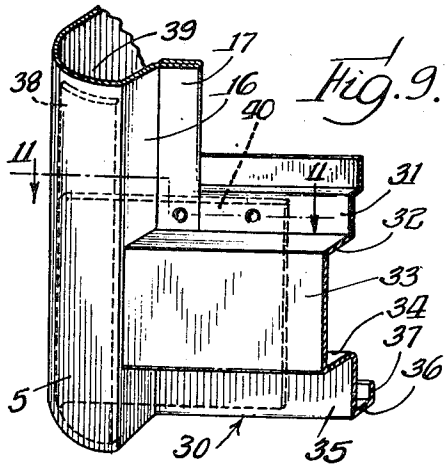


Fig. 9.

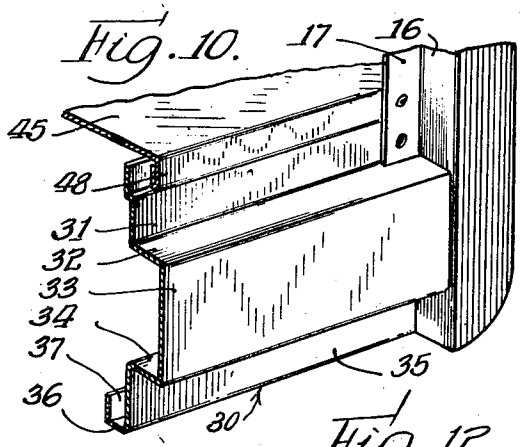


Fig. 10.

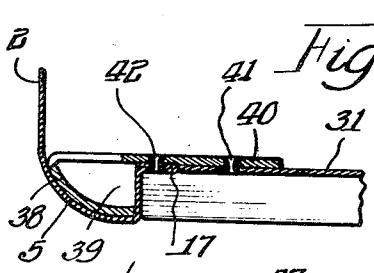


Fig. 11.

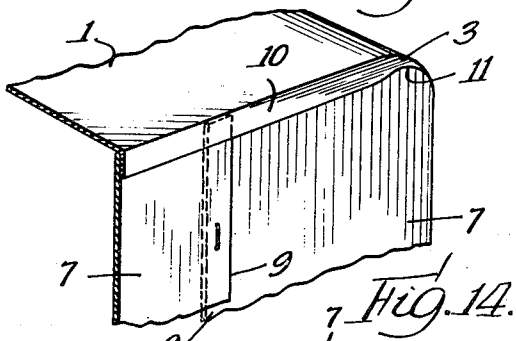


Fig. 12.

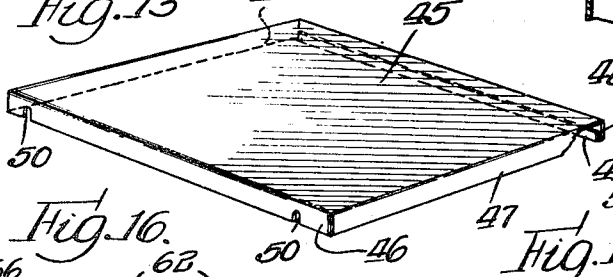


Fig. 13.

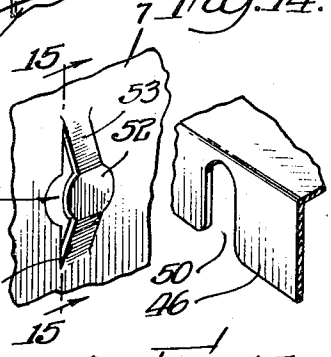


Fig. 14.

Fig. 16.

Fig. 17.

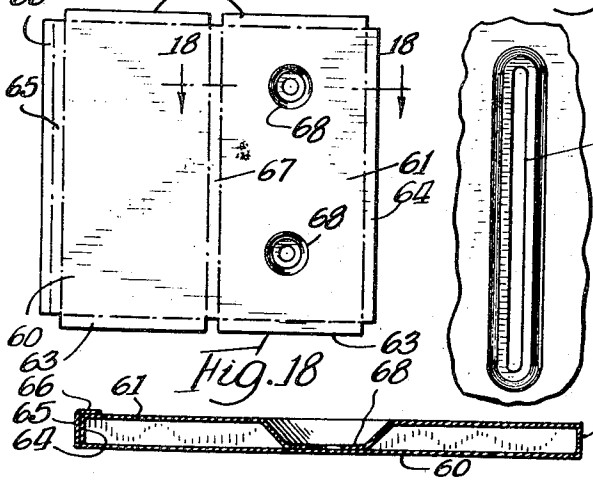


Fig. 18.

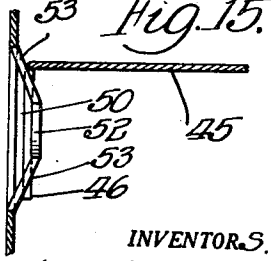


Fig. 15.

INVENTORS.
Richard C. Barler
John H. Yoder
By: Burke & Burke attys.

March 23, 1948. R. C. BARLER ET AL 2,438,108

SHEET METAL CABINET AND METHOD OF MAKING THE SAME

Filed Nov. 17, 1943 3 Sheets-Sheet 3

Fig. 19.

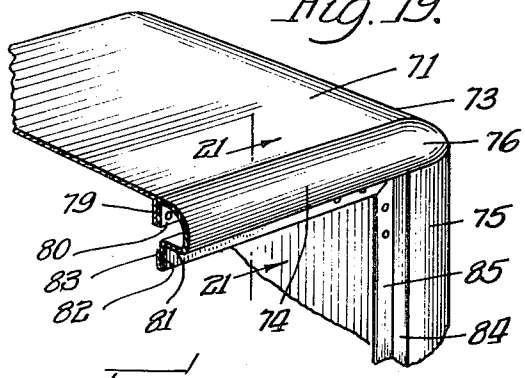


Fig. 20.

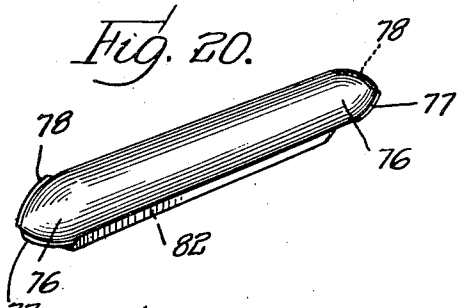


Fig. 21.

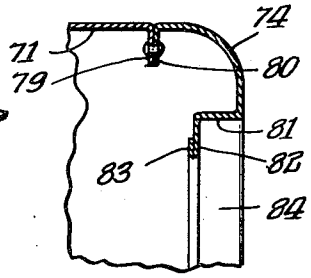


Fig. 23.

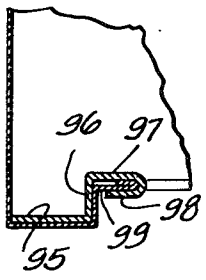


Fig. 22.

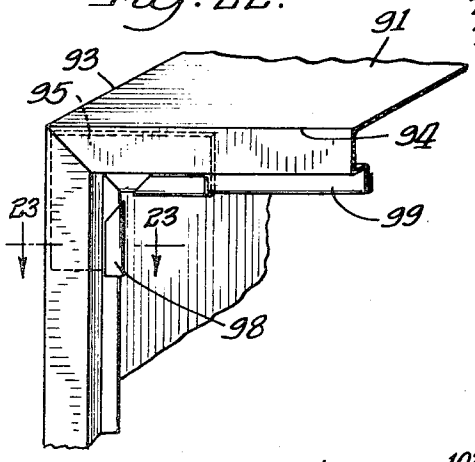


Fig. 25.

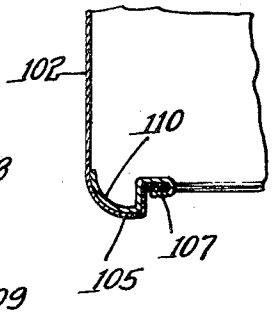


Fig. 26.

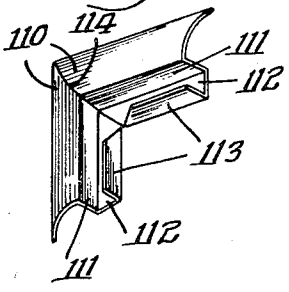
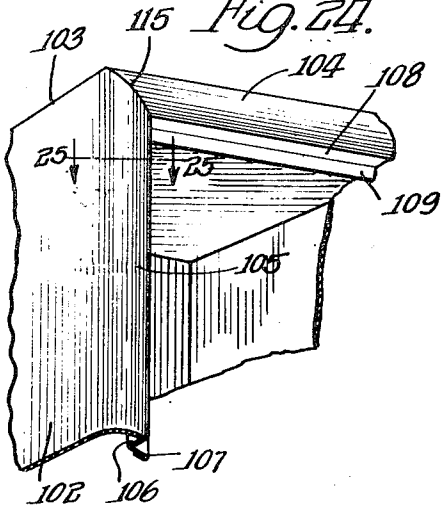


Fig. 24.



INVENTORS.

Richard C. Barler

John H. Yocier

By: Burton & Burton

attys.

Patented Mar. 23, 1948

2,438,108

UNITED STATES PATENT OFFICE

2,438,108

SHEET METAL CABINET AND METHOD OF MAKING THE SAME

Richard C. Barler, Goshen, and John H. Yoder, Waterford, Ind.; said Yoder assignor to said Barler

Application November 17, 1943, Serial No. 510,616

7 Claims. (Cl. 312—141)

1

This invention relates to sheet metal cabinet construction, and it is particularly concerned with features contributing to economical manufacture and assembly, especially when pre-enameled sheet metal is employed as the principal material.

One object of the invention is to provide a new and improved construction for a sheet metal cabinet.

Another object of the invention is to provide a sheet metal cabinet having top, side walls and a back wall formed from a single blank and adapted to be made of pre-enameled sheet metal requiring little or no additional finishing after forming and securement of the parts in their final position.

A further object of the invention is to provide a sheet metal cabinet having rounded corners and edges at the junction of its principal surfaces, said rounded portions being all formed, together with the walls which they connect, from a single blank of material.

It is also an object of the invention to provide a sheet metal cabinet having side walls, a back wall and a top wall formed integrally from a single blank and provided with a front sill and corner post structure which ties together the side walls at their lower ends to complete a relatively rigid cabinet structure.

The invention includes the provision of a double-walled panel adapted to serve as a door for the cabinet and formed from a single blank.

Other objects and advantages of the invention will appear from the following description taken in connection with the drawings in which:

Fig. 1 is a perspective view showing a completed cabinet embodying this invention.

Fig. 2 is a plan view of a blank of sheet material for the top, sides and back of the cabinet.

Fig. 3 is a front elevation of the upper portion of the cabinet with the door omitted.

Fig. 4 is a rear elevation of the upper portion.

Fig. 5 is a horizontal sectional view taken as indicated at line 5—5 on Fig. 1.

Fig. 6 is a fragmentary detail on an enlarged scale, showing the formation of the blank at a rounded corner of the cabinet.

Fig. 7 is a detail section on an enlarged scale, taken as indicated at line 7—7 on Fig. 3.

2

Fig. 8 is a perspective view of a corner reinforcing plate.

Fig. 9 is a perspective view showing a portion of the sill and a fragment of the cabinet corner with which it is interlocked.

Fig. 10 is a perspective view showing the sill and corner of the cabinet, together with a fragment of a shelf or bottom wall engaged with the sill.

Fig. 11 is a detail section taken as indicated at line 11—11 on Fig. 9.

Fig. 12 is a fragmentary perspective view of the upper rear portion of the cabinet with a portion in section.

Fig. 13 is a perspective view of a typical shelf.

Fig. 14 is a fragmentary perspective view showing the rear flange of the shelf and a fragment of the back wall, with a shelf-supporting lug formed therein.

Fig. 15 is a vertical section taken substantially as indicated at line 15—15 on Fig. 14, but including the shelf flange as engaged with the supporting lug.

Fig. 16 is a plan view of the blank for the door.

Fig. 17 is a fragmentary plan showing an alternative reinforcing structure for the door.

Fig. 18 is a section taken at the plane indicated by the line 18—18 on Fig. 16, but showing the completed form of the door.

Figs. 19 and 20 are perspective detail views showing a modified front and corner construction.

Fig. 21 is a detail section at the line 21—21 on Fig. 19.

Fig. 22 is a fragmentary perspective view showing another modified corner construction.

Fig. 23 is a detail section at the line 23—23 on Fig. 22.

Fig. 24 is a fragmentary perspective of a further modification of the corner construction.

Fig. 25 is a detail section at the line 25—25 on Fig. 24.

Fig. 26 is a perspective view of a corner reinforcing plate.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and re-arrangements of the parts may be made without departing from the scope of the invention, and that the same is

not limited to the particular form herein shown and described, except in so far as indicated by the appended claims.

The cabinet structure which comprises this invention is designed to secure attractive appearance, coupled with low cost of production, and is especially concerned with providing a cabinet having rounded corners and edges. It is also planned so as to employ pre-coated sheets of metal which are finished with an enamel or lacquer able to withstand a limited amount of bending without cracking or crazing; accordingly, the necessary fastenings are reduced to a minimum, and are arranged to be made at portions of the cabinet where they will not be normally visible, and so as not to mar the external surface. With this method of construction, the time and expense involved in spraying or otherwise finishing a completed cabinet is eliminated, and low cost is realized without sacrifice of quality or appearance.

As seen in Fig. 1, the cabinet includes a top wall 1 and side walls 2 which are integral with the top wall and which are connected therewith by rounded portions 3, 3 instead of angular upper edges. The front edge of the top wall 1 is rounded at 4, and the front edges of the side walls are rounded at 5—5, thus requiring the junctions of the rounded edges 3, 4 and 5 to blend in rounded corners at 6, 6. To produce such a cabinet we provide a blank of sheet material, initially formed as shown in Fig. 2, in which the side walls 2, 2 are connected integrally with the area which is to form the top wall 1, and in which the back wall consists of two sections 7, 7, each integrally connected with one of the side walls 2. When the rounded edges are formed at 3, 3, bringing the side walls 2, 2 into planes at right angles to the top wall 1, the back wall sections 7, 7 are folded angularly along lines 8, 8, and their marginal portions 9, 9 are lapped upon each other, as seen in Fig. 5, and secured together in any convenient manner. Such securement may be accomplished by "stitching" with wire staples, or by means of rivets or eyelets or by lock-seaming, sometimes called "hemming" or, if desired, by spot-welding. It is also possible to cement or glue these lapped metallic surfaces to form a satisfactory joint.

The blank shown in Fig. 2 includes a rear flange 10 which, as shown in Fig. 4, is folded down so as to lap over the back sections 7, 7, and the end portions of the flange 10 are tapered, as shown at 11, to facilitate forming the rounded edges 3, 3 connecting the side walls 2, 2 with the top wall 1. The flange 10 may be glued or cemented to the back walls, if desired, or may be simply secured by means of a single rivet or staple at the middle of its length, engaging the overlapped portions 9, 9 of the back wall. As seen in Fig. 2, one upper corner of each back section 7 is rounded at 12 to conform to the rounded portion 3 joining the top and side walls. Before the side walls 2, 2 are swung into their final positions, the rounded margins 5, 5 are shaped, as desired, and the front margin 4 of the top wall is similarly shaped so that when the side walls are swung into planes perpendicular to the top wall, the rounded corners at 13 and 14 will meet in mitred fashion. Preferably, the material adjacent the rounded corner 14 includes a lip 15, as seen in Fig. 6, which will lap under the rounded edge 13 to close the joint.

Fig. 5 indicates that adjacent the rounded portions 5, 5 each side wall includes marginal material which is bent inwardly of the cabinet at 16, and then at right angles, to form a door-stop flange at 17, with a final portion 18 doubled over against the back of the flange 17 so as to provide a smooth, rounded edge instead of having a cut edge of the material exposed to the door opening. The front of the top wall is similarly formed, and the blank shown in Fig. 2 accordingly includes marginal portions 19, 19 extending from the side wall areas 2, 2 and a marginal portion 20 extending from the top wall for this purpose. The side walls also include bottom flanges 21 which are folded at right angles to the side walls in the final formation of the cabinet. These bottom flanges will rest on the floor, and they may be formed with rounded "domes" or bosses (not shown) to make them slide easily over a supporting surface. When the top and sides have been folded up, and the back sections have been swung into position, the rounded front upper corners of the structure are reinforced by the insertion of reinforcing plates 22, such as that shown in Fig. 8. Each plate includes a plain portion having a rounded corner 23 with adjoining edges 24, 24, while at its internal angle the material of the plate is offset at 25, forming shoulders 26, 26 at right angles to each other. These shoulders fit snugly against the inturned portions 16 of the side walls, and the corresponding inturned portions 27 of the top wall, and the offset angular part 25 is then secured by rivets or eyelets, shown at 28 as engaging the doubled door-stop flanges 17 of the side walls, and 29 of the top wall. The plates 22 thus rigidly join the rounded portion 4 and securely connect the door stop flanges 17 and 29 in a common plane.

The rounded margins 5, 5 of the side walls are open at their lower ends, and to provide a rigid connection between them the cabinet includes a sill member 30 arranged to act as a cross-tie. The sill includes a vertically disposed top flange 31, having its uppermost portion slightly offset as seen in Figs. 9 and 10. From the flange 31, the material is bent at right angles to form a horizontal ledge 32, which completes the framing of the door opening. From the horizontal portion 32 the sill extends vertically at 33 and is then bent rearwardly at 34 and downwardly at 35, the latter portion extending to the floor. A floor-engaging flange 36 extends inwardly and rearwardly from the part 35, and its edge is preferably turned up, as shown at 37, to provide a rigid and firm footing for the front edge of the cabinet. The channel section of the sill, composed of the parts 32, 33 and 34, is fitted between the flat cheek portions 16 with its vertical flanges 31 and 35 disposed against the door-stop flanges 17 of the side wall members. To interlock the sill with the side walls there is secured to each end of the sill member a corner post 38, rounded to fit the interior contour of the portion 5 of the side wall, and including a connecting plate 40 which laps against the inner face of the sill flanges 31 and 35 and is permanently secured thereto by spot-welding, if desired. To fix the sill permanently in position, a rivet 42 may be inserted through the folded flange 17, 18 and the plate 40, and, if desired, this rivet may be formed integrally with the plate 40, as shown in Fig. 11. Thus the sill becomes a tie, definitely spacing and holding the side walls in position, and its corner post portions extending for a limited distance above the sill in the rounded parts 5 of the side walls 2 render the structure extremely rigid, with a fixed rectangular opening to receive the door.

A typical shelf is shown in Fig. 13, comprising a flat area 45 with a rear flange 46, end flanges 47 and a front flange 48, preferably having its lower edge folded up, as seen at 49. The rear flange of each shelf is provided with downwardly open notches 50, and the rear wall 7 is formed with cut-out lugs 51, each including a button or disk portion 52, with strap portions 53 connecting it to the back wall 7, but in offset relation thereto, as seen in Fig. 14.

The strap portions 53 are slightly narrower than the notches 50 of the shelf flanges 46, so that each notch may be slipped down over one of the straps 53, permitting the adjacent portions of the flange 46 to be engaged between the button portion 52 of the lug and the plane of the back wall.

The shelf of this type which forms the bottom wall of the cabinet is disposed with its front flange 48 hooked over the offset of flange 31 of the sill, as shown in Fig. 10, thus contributing further to the rigidity of the cabinet structure. This shelf is exactly like all the others.

To complete the cabinet, a rectangular door is formed from a single blank, which is illustrated in Fig. 16. This includes an outer panel 60 and an inner panel 61, with flanges 62, 62 extending from both panel areas at the top, and flanges 63, 63 extending from both panel areas at the bottom edges thereof. The inner panel 61 has a vertical flange 64 at its free edge, and the outer panel 60 has a marginal portion, to be folded over to form a spacing flange 65 and a securing flange 66. Between the panels 60 and 61 there is a narrow area 67 which forms a spacing flange when the door is folded into final form. When thus folded, the flanges 62, 62 are lapped upon each other, and, similarly, the flanges 63, 63 are lapped upon each other. The flange 65 laps over the flange 64, as seen in Fig. 18, and the securing flange 66 is bent firmly against the inner panel 61. To prevent buckling or vibration of the panels of the door, the inner panel 61 is formed with depressed areas 68, which may be circular, as shown in Fig. 16, or which may be combined in a single oblong area, as shown in Fig. 17, at 69. These depressed portions 68 may be cemented or glued to the inner surface of the outer panel 60, or, if desired, the outer panel may be originally bent enough to stress it inwardly, so that it is forced back into its flat form by the engagement of the areas 68 or 69 with its inner surface, insuring a continued stress between the panels 60 and 61 which will maintain their planar form. The final folding of the flange 66 is usually found to be sufficient securement for a door of this construction, but, if desired, the flange may be additionally fastened by any convenient means. Suitable hinges 70 are shown in Fig. 1, connecting the door with the portion 16 of one of the side walls to complete the cabinet.

A special advantage of this type of construction is that the sheet metal employed may be steel or aluminum, polished before forming, or it may be pre-enameled as by the roller coating process now known to those skilled in the art, and may be formed into the final required shapes without scarring or breaking the polished or enameled surfaces; accordingly, after the cabinet has been formed of such pre-enameled stock it will require little or no additional finishing to complete it. If, at any of the sharply bent edges, as, for example, at the mitred joint of the rounded corners 6, 6, the enamel should be bruised or cracked, it may be touched up by hand with matching material, but, in general, no additional finishing will be required. Even the door panel shown in Figs. 16, 17 and 18 may be of pre-enameled stock, and the final securement of the two opposite panels 60 and 61 may be effected by clinching of the marginal flange 66 and by securing the depressed portions 68 to the inner face of the panel 60 by means of a suitable glue or cement which is readily available.

Figs. 19 to 26 illustrate certain modifications in construction which come within the scope of the present invention, and which may be employed alternatively with features already described. Fig. 19 shows, in fragmentary fashion, one upper front corner of a cabinet in which the top wall 71 is curved downwardly at 73 to meet the side wall, but instead of having its front edge rounded, as in Fig. 1, it is provided with a separate front corner molding member 74 which is rounded in cross-section. The forward margins of the side walls are rounded at 75 in the same manner as the side walls 2 are rounded at 5; but the member 74 is formed with spherically shaped end portions 76, each constituting substantially one-eighth of a sphere, and these portions fill the space between the upper ends of the rounded edges 75 and the forward ends of the rounded edges 73. In order to insure a smooth and tight joint, each of the rounded end portions 76 is provided with lips 77 and 78 which lap under the margins 75 and 73 respectively, when the part 74 is placed in position. To secure this part in place, the top wall 71 has a depending front flange 79 which abuts the rear flange 80 of the part 74, and may be riveted thereto, as shown in Figs. 19 and 21.

The molding member 74 includes a horizontal shoulder portion 81 and a depending door stop flange 82, with its marginal portion bent back at 83 so that only the folded edge is exposed at the door opening. Corresponding shoulder portions and door stop flanges 85 are formed in the marginal portions beyond the rounded edges 75 of the side walls. The upper corners of the door frame may be reinforced by plates 22, similar to those used with the structure of Figs. 1 and 3, and as shown in Figs. 7 and 8.

Fig. 22 is a fragmentary view showing the forward upper corner of a cabinet in which there are no rounded edges. The top wall 91 meets the side wall in a sharp, angular fold at 93, and the front margin of the top wall 91 is folded down at right angles along the line 94, providing a mitred construction which outlines the door frame. The reinforcing plate for a corner of this type is shown at 95, including a flat, L-shaped portion with rearwardly bent parts 96 forming shoulders and offset portions 97 connected therewith. These offset parts terminate in flanges 98 which are bent and clinched around the door stop flanges 99, as shown in Figs. 22 and 23. This type of securement will avoid the need for rivets or eyelets to hold the reinforcing angle plates in position, and said plates will secure and stiffen the corner portions of the cabinet.

Figs. 24 to 26 show a further modification in which the top wall of the cabinet is integrally joined with the side wall 102 at a sharply folded edge 103, but in which the forward margin of the top wall is rounded at 104 and the forward margin of the side wall is rounded at 105. Fig. 24 shows the inwardly extending portion 106 and the door stop flange 107 which are integral with the rounded part 105 of the side wall, while the front margin of the top wall includes correspond-

ing surfaces 108 and 109. The mitred corner formed between the rounded portions 104 and 105 is reinforced by a special corner plate having forwardly convex portions 110, 110 integrally connected at right angles, together with shoulder portions 111 and offset portions 112, the latter fitting behind the door stop flanges 107 and 109 when the reinforcing plate is positioned inside of the upper corner of the cabinet. This member, like that shown in Fig. 22, may have flanges 113 adapted to be folded over and clinched against the outer faces of the door stops 107 and 109 in a manner indicated in Fig. 25, so that the reinforcing plate is firmly held in position with its line of intersection 114 between the two convex faces 110 fitted into position directly behind the line of junction 115 between the rounded edges 104 and 105.

It may be understood that any of the modified structures just described may be used in conjunction with the sill and corner reinforcement shown in Figs. 9 and 10 for the lower end of the cabinet and also with the door and shelf structures already described herein.

We claim as our invention:

1. A sheet metal cabinet having a top wall and side walls formed from a single blank in which the side walls extend integrally from the top wall, the portion connecting each side wall with the top wall being smoothly rounded, the front margins of the side walls being rounded inwardly toward each other, and a separate member attached to the front edge of the top wall forming a downwardly rounded margin therefor and including spherically rounded end portions forming the upper front corners of the cabinet and having slightly offset marginal lips lapping under the rounded front margins and the rounded upper margins of the side walls.

2. In a cabinet as defined in claim 1, said separate member having a depending rear flange joined to a depending front flange of the top wall, and corner reinforcing members engaging inner surfaces of the end portions of said member and the front marginal portions of the side walls and secured thereto.

3. In a sheet metal cabinet having side walls and a top wall with front marginal portions of said walls bent to extend toward a door opening, the extreme marginal portions being bent back toward the interior of the cabinet and then at right angles to form door stop flanges, a reinforcing plate for each upper front corner of the cabinet having an L-shaped portion with an offset portion at the internal angle thereof joined to the L-shaped portion by shoulders, and means securing said offset portion against the inner faces of the door stop flanges of the top and side wall margins adjacent their junction with each other, with the shoulders of said plate disposed against the inner faces of said bent back parts of the top and side wall margins.

4. A sheet metal cabinet having a top wall, side walls and a back wall, in which the side walls extend integrally from the top wall and the back comprises two sections extending integrally from said side walls respectively, and connected together, completing the back wall and spacing the side walls from top to bottom, the portion connecting each side wall with the top wall being smoothly rounded, the front margin of the top wall being rounded downwardly and the front margins of the side walls being rounded inwardly toward each other, the front corners of the top and the upper front corners of the sides being rounded to form mitered joints with said top corners, the extreme marginal portions of said top and sides beyond their rounded portions being bent back toward the interior of the cabinet, and reinforcing angle fittings each disposed opposite the inner, unexposed surfaces of adjoining rounded portions and their bent-back marginal portions and secured in rigid engagement with said bent-back portions.

5. A sheet metal cabinet having a top wall, side walls and a back wall, in which the side walls extend integrally from the top wall and the back comprises two sections extending integrally from said side walls respectively, and connected together, completing the back wall and spacing the side walls from top to bottom, the portion connecting each side wall with the top wall being smoothly rounded, the front margin of the top wall being rounded downwardly and the front margins of the side walls being rounded inwardly toward each other, the front corners of the top and the upper front corners of the sides being rounded to form mitered joints with said top corners, the extreme marginal portions of said top and sides beyond their rounded portions being bent back toward the interior of the cabinet and then at right angles to form door-stop flanges, and a reinforcing plate for each upper front corner of the cabinet having a flat L-shaped portion with an offset portion at the internal angle thereof joined to the flat portion by shoulders, and means securing said offset portion against the inner faces of the door-stop flanges of the top wall and side wall adjacent their junction, with the shoulders of said plate disposed against the inner faces of said bent-back parts of the margins of said top and side walls.

6. A sheet metal cabinet having a top wall, side walls and a back wall, in which the side walls extend integrally from the top wall and the back comprises two sections extending integrally from said side walls respectively, and connected together, completing the back wall and spacing the side walls from top to bottom, the front margins of the side walls being bent inwardly toward each other and their extreme marginal portions being bent back toward the interior of the cabinet and then at right angles forming door-stop flanges, and a sill member dimensioned to fit between said bent-back portions and in front of said door-stop flanges and having corner posts attached rigidly to its ends and formed to fit snugly into the inwardly bent margins of the side walls and to engage respectively with the unexposed faces of said bent-back portions, whereby the sill ties the side walls together and its corner posts stiffen the angles between the sill and said side walls.

7. A sheet metal cabinet having a top wall, side walls and a back wall, in which the side walls extend integrally from the top wall and the back comprises two sections extending integrally from said side walls respectively, and connected together, completing the back wall and spacing the side walls from top to bottom, a sill member with means at its ends engaging the front lower marginal portions of the side walls, said sill including a rearwardly open channel section which fits between said marginal portions of the side walls and a vertically disposed flange extending upwardly from the rear edge of the upper wall of said channel section, and a shelf having a depending rear flange and a depending front flange, the back wall of the cabinet having means with which said rear flange of the shelf is interlocked

and the front flange of the shelf snugly overlapping the front face of said vertically disposed flange of the sill.

RICHARD C. BARLER.
JOHN H. YODER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
868,309	Wege	Oct. 15, 1907
896,751	Norton	Aug. 25, 1908
1,079,507	McClernan	Nov. 25, 1913
1,183,842	Alling	May 23, 1916
1,742,976	Vance	Jan. 7, 1930
1,926,600	Roland	Sept. 12, 1933
1,937,935	Zimmerman	Dec. 5, 1933
2,156,644	Thomasen	May 2, 1939
2,214,422	Kronquest	Sept. 10, 1940
2,226,670	Pratt	Dec. 31, 1940
2,265,406	Tautz	Dec. 9, 1941
2,311,645	Dempsey	Feb. 23, 1943
2,317,296	Nofzinger	Apr. 20, 1943
2,337,660	Hultberg	Dec. 28, 1943