April 20, 1943. E. E. NOFZINGER 2,317,296

CABINET STRUCTURE

Filed Dec. 4, 1939 3 Sheets-Sheet 1

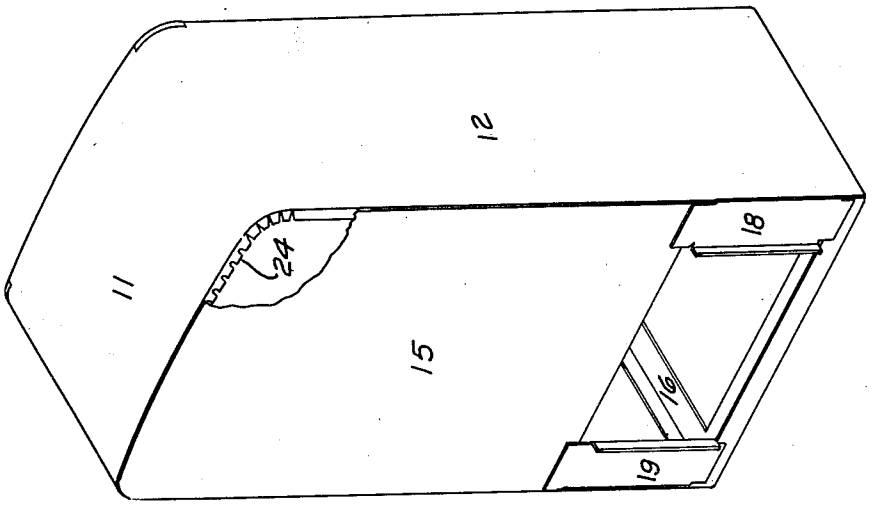



FIG. 2

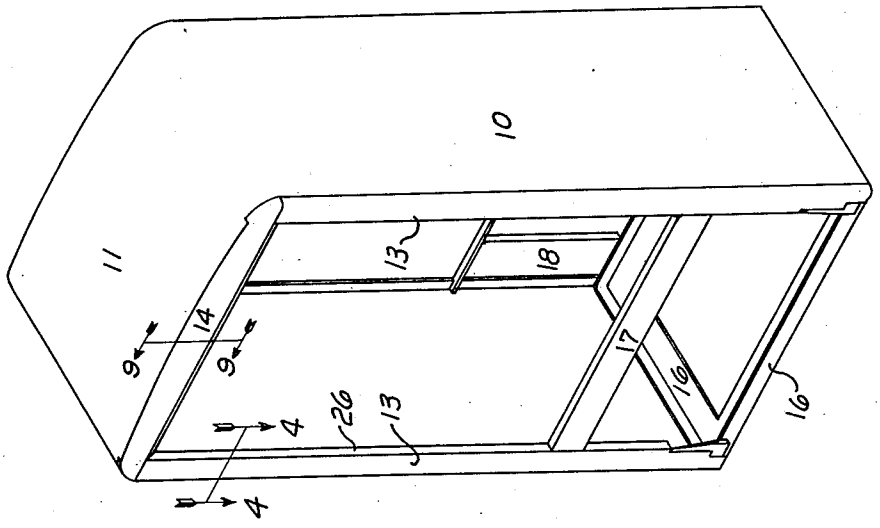



FIG. 1

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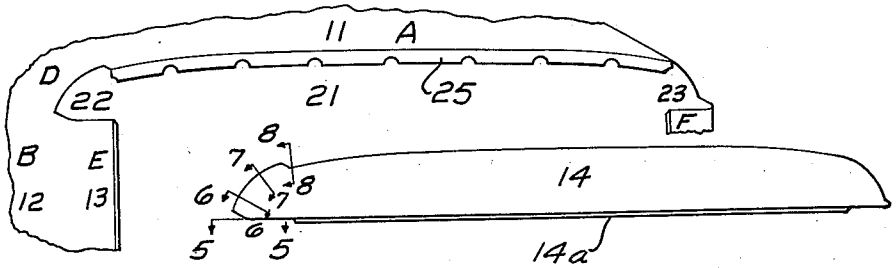



FIG. 3

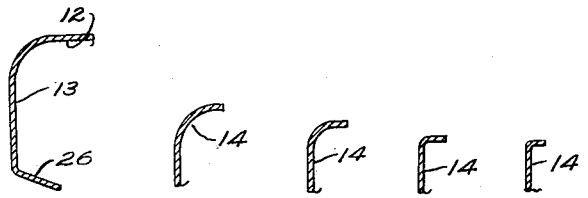



FIG. 4 FIG. 5 FIG. 6 FIG. 7 FIG. 8

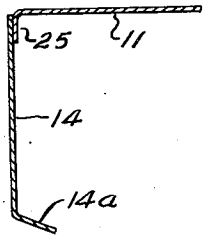



FIG. 9

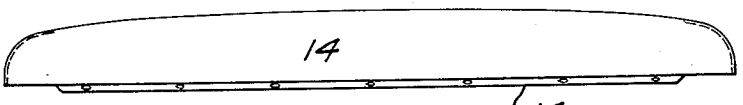



FIG. 10




FIG. 11

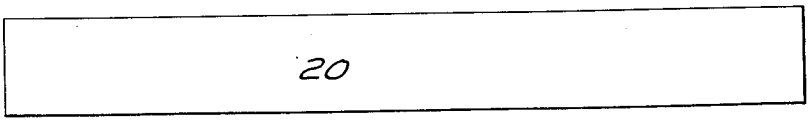



FIG. 12

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CABINET STRUCTURE

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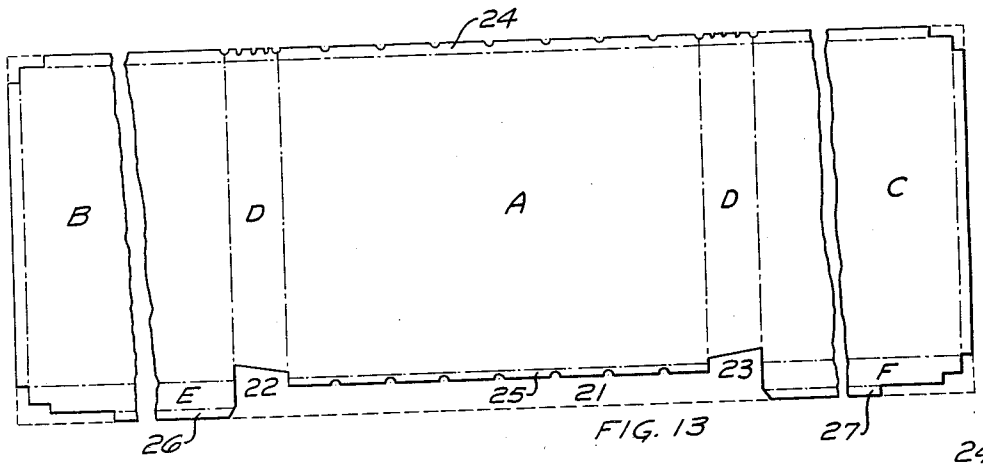



FIG. 13

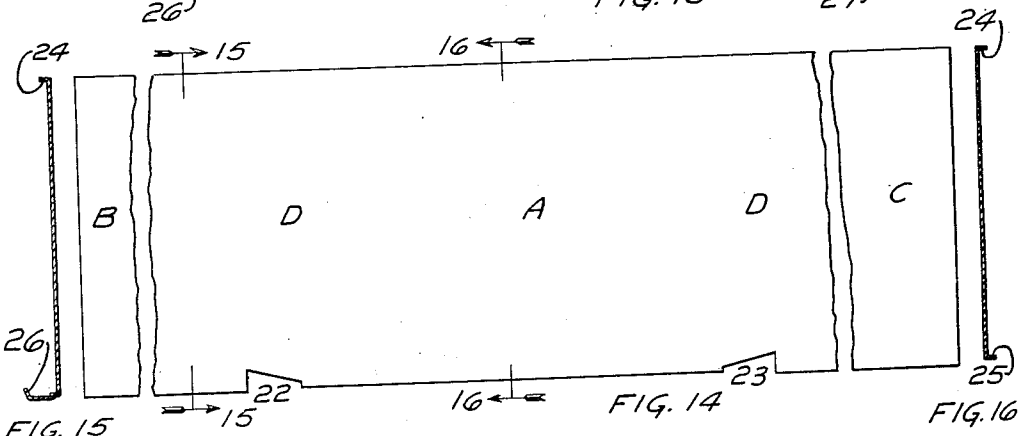



FIG. 15 FIG. 14 FIG. 16

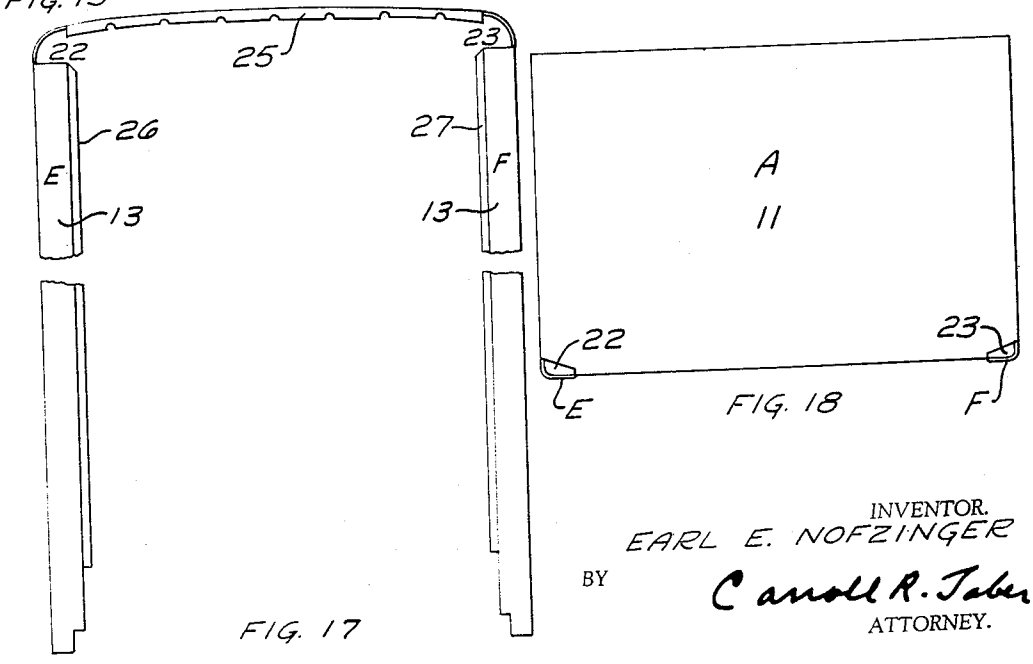



FIG. 17 FIG. 18

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# UNITED STATES PATENT OFFICE

2,317,296

## CABINET STRUCTURE

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Application December 4, 1939, Serial No. 307,381

6 Claims. (Cl. 220—62)

This invention relates to cabinet structures and more particularly to the method of making a structure of that character which is suitable for use as the outer casing of a refrigerator.

The principal object of this invention is to provide an economical method of producing a sheet metal cabinet which includes front, side and top walls wherein the corners at the junction of the three walls consist of complexly curved surfaces.

This object is attained by forming said corner portions from a separate relatively small sheet of metal, forming the remainder of the cabinet from a separate relatively large sheet of metal, and permanently securing the two parts together.

In a cabinet structure of the character mentioned, all of the forming operations can be performed by bending except those required for forming the corners at the junction of the three walls. The latter require die drawing operations. Thus, the present method involves forming the entire cabinet structure from only two separate sheets of metal. The major portion of the cabinet is formed from a relatively large sheet of metal by a series of bending operations. The remainder of the casing is formed from a relatively small sheet of metal by die drawing operations.

In the drawings:

Figure 1 is an isometric front view of a refrigerator casing embodying the present invention;

Figure 2 is an isometric rear view of the casing shown in Figure 1;

Figure 3 is an exploded fragmentary view of the upper front portion of the casing;

Figure 4 is a fragmentary sectional view taken on substantially the line 4—4 of Figure 1;

Figures 5, 6, 7 and 8 are fragmentary cross-sectional views taken on substantially the lines indicated in Figure 3;

Figure 9 is a fragmentary cross-sectional view taken on substantially the line 9—9 of Figure 1;

Figure 10 is a front elevational view of the header forming a part of the casing;

Figure 11 is an end view of the header shown in Figure 10;

Figure 12 is a diagrammatic view of the blank from which the header shown in Figure 10 is formed;

Figure 13 is a plan view of the blank from which the main body of the casing is formed;

Figure 14 is a plan view of the blank shown in Figure 13 after the first forming operation has been performed upon it;

Figure 15 is a sectional view taken on substantially the line 15—15 of Figure 14;

Figure 16 is a sectional view taken on substantially the line 16—16 of Figure 14;

Figure 17 is a front view of the blank shown in the preceding figures after being formed to its final shape; and

Figure 18 is a top view of the structure shown in Figure 17.

In Figures 1 and 2 there is shown the outer casing of a refrigerator. It includes a side wall 10, a top wall 11, a side wall 12, and a front wall 13, all of which are formed from a single sheet of metal, with one exception. The exception is the header 14 which forms the upper part of the front wall 13. The casing also includes a back wall 15 secured to the flanged rear edges of the side and top walls; a rectangular bottom frame 16 secured to the lower edges of the side walls, a cross frame member 17 positioned at the front of the casing between the side walls, and a pair of braces 18 and 19 each connecting the back wall and the bottom frame to one of the side walls.

The present invention resides in the method of forming the cabinet structure which consists of the front wall 13, the side walls 10 and 12, and the top wall 11.

As is clearly shown in Figures 1 to 9 inclusive, this structure embodies novel corner constructions. The horizontal corners between the top wall 11 and each of the side walls 10 and 12 consist of curved surfaces of substantial radii. Likewise, the vertical corners between the front wall 13 and each of the side walls 10 and 12 consist of curved surfaces of substantial radii. The horizontal corner between the top wall 11 and the front wall 13 is a sharp right angle having no radius at all. Thus, the corner portions at the junction of the three walls consist of complexly curved surfaces in order to provide for the smooth and graceful merging of each of the walls into the adjacent walls. The character of this gradual merging between the vertical corners and the horizontal corners at the front of the casing is illustrated in Figures 4 to 9 inclusive, Figure 4 showing a curved surface of substantial radius, and each of the successive figures showing a curved surface of decreasing radius, the corner shown in Figure 9 having no radius at all.

The cabinet structure consisting of the top wall 11, the front wall 13, and the two side walls 10 and 12 is fabricated from two separate stampings which are integrally joined to each other. The smaller or subordinate stamping consists of

the header 14 which includes the top horizontal portion of the front wall 13 and the corners at the junction of the three walls (see Figures 3, 10 and 11). The larger or main stamping includes the remainder or the top, front and side walls (see Figures 3, 17 and 18).

The complexly curved surfaces constituting the corners at the junction of the top, front and side walls are formed at the opposite extremities of the smaller blank or header 14 where such surfaces may be conveniently die drawn. All of the rest of the cabinet is formed from a single large stamping by a series of bending operations, thus obviating the inconvenience and expense of employing die drawing apparatus large enough to form the entire cabinet in one operation, assuming that such a method would otherwise be practicable.

The subordinate and main blanks from which the entire cabinet structure is formed are shown in Figures 12 and 13. The subordinate blank 20 is subjected to any suitable die drawing, pressing and trimming operations necessary to produce a header 14 of the configuration shown in Figures 3, 10 and 11. The particular steps employed to produce this configuration are not important and may be of conventional character. It is, of course, essential that the end portions of the header, which become the corners at the junction of the three walls, be in the form of complexly curved surfaces which will blend smoothly with the front, side and top walls.

For convenience of reference the main blank has been divided into several zones. Zone A is the portion of the blank which ultimately becomes the top wall 11. Zones B and C are the portions of the blank which ultimately become the side walls 12 and 10. Zones D are the portions which ultimately become the curved corner surfaces between the top wall 11 and the side walls 12 and 10. Zones E and F are the portions which ultimately become the opposite side portions of the front wall 13.

Initially the main blank is trimmed to provide the configuration shown in full lines in Figure 13, the original form of the blank being shown in dotted lines. This initial shearing operation results in the formation of an elongated notch 21 in the front edge of the blank which is provided with recesses 22 and 23 at its opposite extremities of greater lateral extent than the mid-portion of the notch. In the finished blank the header 14 is received in the notch 21.

After the shearing operation the next step preferably consists in bending the front edge of the blank in the zones E and F to form flanges extending substantially at right angles to the main body of the blank. The next operation preferably consists in bending the edge portions 24, 25, 26 and 27 through substantially 90 degrees, to produce the configuration shown in Figures 14, 15 and 16.

The final operation upon the main blank consists in bending the end zones B and C to a position substantially at right angles to the mid-portion A of the blank to produce the U-shape configuration shown in Figures 17 and 18.

It will, of course, be understood that the bending operations are of a character to produce the desired curvature in the zones D, E and F. It should also be understood that the sequence of the bending operations is immaterial. For example, the blank may be bent into the U-shaped form illustrated in Figure 17 before the flanges 24, 25, 26 and 27 are formed and/or before the zones E and F are bent into the position shown in Figures 15 and 17.

The manner in which the main and subordinate stampings are assembled is illustrated in Figure 3. The subordinate stamping or header 14 is inserted in the notch 21 with the opposite end portions of the header 14 received in the recesses 22 and 23 of the notch. After being thus assembled the two parts are secured together by butt welding the end portions of the header 14 to the adjacent edges of zones E and D on one side of the structure and zones F and D on the other side of the structure. The upper portion of the header engages the depending flange 25 at the front of the zone A in overlapping relation and is secured thereto by spot welding and the joint is then filled with brazing rod. The header includes an inwardly extending flange 14a at its lower edge which cooperates with the flanges 26 and 27 to form a beveled door frame.

After the welding operations just referred to have been performed, the joints between the main and subordinate stampings are metal finished. Consequently, when the cabinet is provided with a suitable ornamental finish, such as porcelain enameling or the like, the joints between the main and subordinate stampings, particularly in the region of the corners at the junction of the three walls, are effectively concealed, thus giving the appearance of a structure formed from a single piece of metal.

The expression "curved surface" as used herein, in connection with the junction between the front wall and the side wall, the front wall and the top wall, and the side wall and the top wall, is intended to define such junctions whether they be actual curves of substantial radius such as shown in Figure 4 or whether they be abrupt angles of substantially no radius as shown in Figure 8.

The scope of the invention is indicated in the appended claims.

I claim:

1. A cabinet comprising a first sheet metal blank having an elongated generally rectangular notch formed in one edge thereof and provided with recesses adjacent the opposite ends of said notch, said blank being bent at substantially right angles to the plane thereof along a longitudinal line extending in close proximity to the edge of the blank defining the inner margin of said notch to form laterally extending flange portions at the opposite sides of said notch, said blank also being bent along parallel transverse lines intersecting said notch in the region of said recesses to form a generally U-shaped configuration, and a second sheet metal blank in the form of a header having enlarged portions at its opposite ends, said header being positioned in said notch with the enlarged ends of the header disposed in said recesses to form the corners at the junction of the contiguous wall portions, the two blanks being permanently secured together.

2. A cabinet as defined in claim 1 wherein said recesses formed in the said first blank are of generally triangular shape and wherein the enlarged portions at the opposite ends of the second blank are convexly curved.

3. A cabinet comprising a first sheet metal blank formed to provide top and side walls and marginal front wall portions contiguous to said side walls, the front edge of said blank being

provided with a recess at the junction of each side wall with the top wall, and a second blank formed to provide enlarged portions at its opposite ends and an intermediate wall portion, said second blank being permanently secured to the first blank with the enlarged portions of the second blank received in the recesses of the first blank, whereby said second blank constitutes a marginal front wall portion contiguous to the top wall and corner portions at the junction of the top wall with each of the side walls.

4. A cabinet as defined in claim 3 wherein the top wall is bowed outwardly to form a crown extending from one side wall to the other side wall.

5. A cabinet as defined in claim 3 wherein each of the recesses formed in said first blank extends into the adjacent top, side and marginal front wall portions.

6. A cabinet as defined in claim 3 wherein the enlarged portions at the opposite ends of said second blank are convexly curved.

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