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ANNEALING BOX

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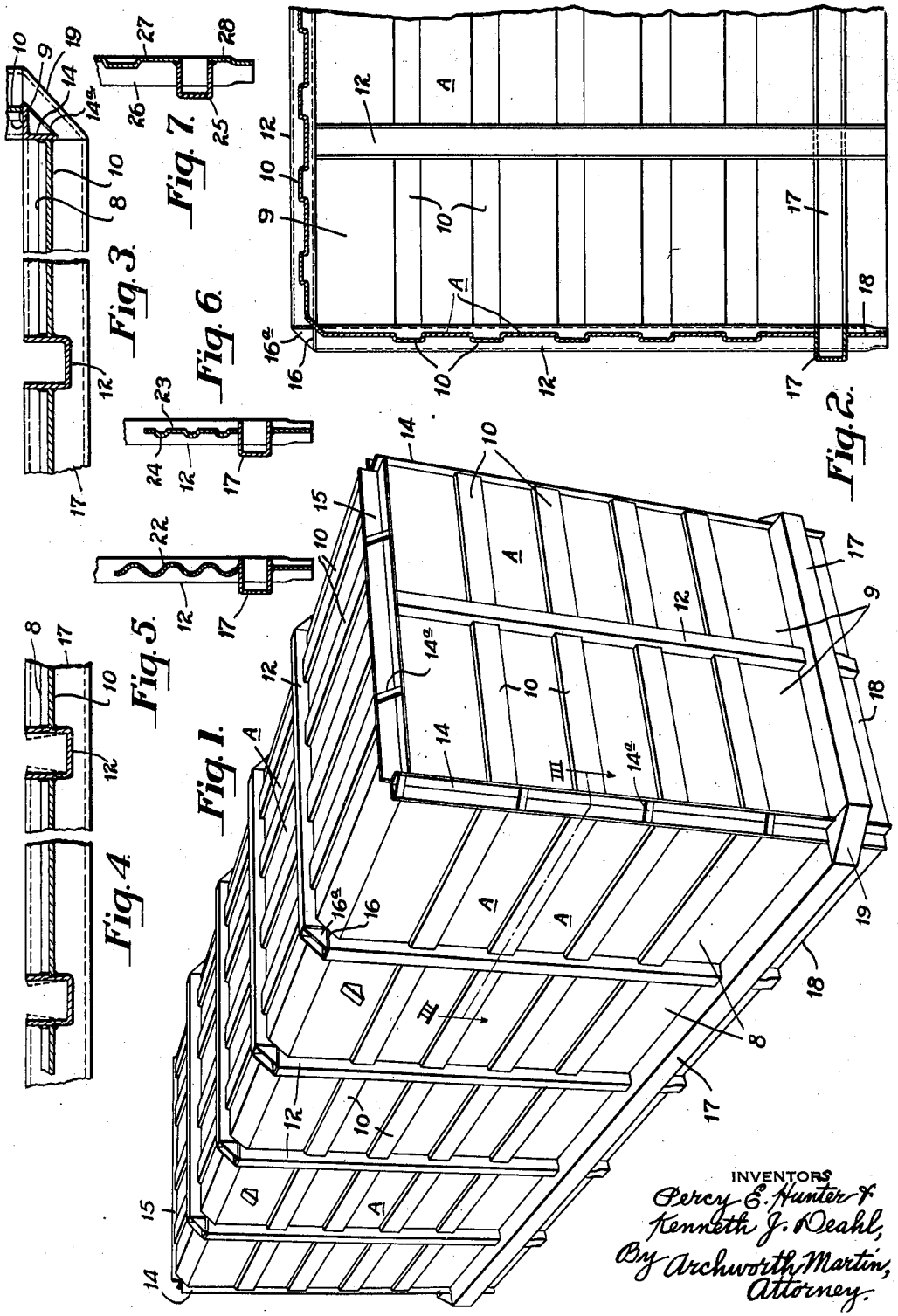


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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ANNEALING BOX

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6 Claims. (Cl. 263—49)

Our invention relates to annealing boxes, and more particularly to those formed of sheet steel or of heat-resisting sheet alloy steel, wherein the sheets composing the box are welded together, but certain features of the invention are of advantage also in various other types of annealing boxes.

One object of our invention is to provide an annealing box which for a given weight or gauge of metal, will have greater strength and resistance to deformation than will boxes of other forms. This saving in weight is of particular advantage by way of economy in cost of the sheets of which the boxes are formed, and especially so in the case of heat-resisting alloys.

Another object of our invention is to provide an improved annealing box of corrugated metal plates wherein improved means is provided for resisting the tendency of the box walls to sag and bulge and to prevent spreading and flattening of the corrugations.

Some of the forms which our invention may take are shown in the accompanying drawing, wherein Figure 1 is a perspective view of an annealing box; Fig. 2 is a fragmentary cross-sectional view thereof; Fig. 3 is a view on an enlarged scale taken on the line III—III of Fig. 1; Fig. 4 is a view similar to Fig. 3, showing the manner in which the stiffener flanges may flex to permit expansion of the flat wall areas; Fig. 5 is a modification showing another form of corrugated wall sheet; Fig. 6 shows still another modification thereof, and Fig. 7 is a sectional view showing a modification of a portion of a sidewall of a box.

Referring first to Figs. 1, 2 and 3, the box is shown as composed of a series of panel-like members 8 and 9. Each of the panels 8 may be integrally continuous over the top and down the opposite side of the box, or the sides of the box may each be formed of separate panels 8 and the top wall or panel of the box simply welded to the upper edges of the side panels. The panels 8 and 9 are provided with horizontally-extending corrugations 10 of channel or U form, for the purpose of bracing the box against twisting or bending stresses in directions transversely of the corrugations, and also to permit of expansion and contraction of the box walls without permanent deformation of the walls.

The panels are of narrow width relative to the box wall, and stiffening members 12 which may be of channel, U-shape, or hollow rib-like form are interposed between the edges of adjacent panels, the edges of the panels, including the ends of their corrugations as well as their flat intermediate areas being welded to the sides of the ribs 12, as shown more clearly in Fig. 3.

The panels 8 and 9 are welded to their associated ribs 12 at points intermediate the inner and outer edges of said ribs instead of having the ribs welded to the panels in simply overlying relation.

One advantage of this arrangement is that for a given depth of stiffening rib, the box will be of less over-all dimension than if the ribs were placed against the outer surfaces of the panels, and the box will have greater internal area for a given over-all dimension than if the ribs were placed against the inner faces of the panels.

Another advantage in having the panel ends abut against the sides of the ribs is that the ribs need not be specially formed to fit over the corrugations of the panels.

Another advantage in having the panels of narrow width arises out of the fact that sheets of narrow width can be more cheaply corrugated than wider sheets, greater strength is imparted to the box through proper spacing of the ribs, and furthermore, in the case of alloy steels particularly, a wide sheet is far more costly than several narrow sheets having a total width equal to the width of the wider sheet.

The ribs 12 not only serve to stiffen the box walls against sagging or bulging, but also serve as tie members which prevent the corrugations 10 from being so greatly distorted under temperature changes that they cannot return to approximately their proper shape at normal atmospheric temperatures.

The end panels and the side panels, at each vertical corner of the box are welded to the sides of an angle 14 and at each end of the box an angle 15 is welded to the end of the top wall of the box and the upper edge of the adjacent end wall thereof. The angles 14 and 15 are provided with tie or brace bars 14a that serve additionally to stiffen the angles, but such ties may be dispensed with, if desired.

The stiffening ribs 12 at the top of the box are connected to the adjacent vertical ribs by the welding of angles or bracket plates 16 to the ends of the ribs, and such angles may have triangularly-shaped reinforcing plates 16a welded thereto, if desired.

Near the bottom of the box, stiffening ribs 17 formed similarly to the ribs 12 are welded to the lower edges of the panels 8 and 9, and to the ribs 12, the ribs 17 being cut out to fit over the ribs 12. Bottom marginal plates 18 are welded

to the lower sides of the ribs 17 and to the vertical sides of the ribs 12. The ribs 17 at the corners of the box are connected by triangularly-shaped corner plates or filler blocks 19 welded to the ends of the ribs and to the corner angles 14 thus providing a continuous stiffening rib above the bottom of the box.

In Fig. 5, we show a corrugated panel 22 which may be used instead of panels formed with flat walled corrugations as are the panels 8.

In Fig. 6, still another form of panel 23 is shown which has narrow curved corrugations 24 instead of the channel-like corrugations 10 of the panels 8. In this instance, as in the case of the panels of Figs. 1 to 5, the edges of the panels will be welded to the stiffeners 12 and 17.

In Fig. 7, we show a wall construction wherein we employ a channel rib 25 which is exposed inwardly of the box, and which is welded to the vertical stiffening ribs 26, that correspond to the ribs 12. Corrugated panels 27 are welded to the ribs 26 and their lower edges overlie the upper flange of the channel 25 and are welded thereto adjacent to the inner edge of said flange. Bottom marginal plates 28, which correspond to the plates 18, engage the lower flange of the channel 25 and are welded thereto near its inner edge.

It will be seen that the panels and ribs are connected together in non-overlapping relation, so that there is at no place a double thickness of metal. Consequently, there is uniform thickness of metal for heat absorption at substantially all points throughout the box, and there is therefore less danger of distortion of the box through wide differences in heating and cooling conditions at adjacent areas such as would occur where plates are overlapped at their lines of juncture.

In case of damage to the box, any portion thereof may be readily replaced without disturbing other portions thereof and without modifying the characteristics of the box. For example, a panel or rib may be renewed without adding weight to the box while strength and rigidity is maintained as in the original structure.

Another important feature of our invention resides in the provision in each wall of a series of relatively small, substantially flat areas A between the channels or hollow ribs 10 and 12, the four edges of each said area being connected to flanges of said channels, by welds or bends. This arrangement permits the various areas A to expand under localized heat, with no resistance except the sidewise bending of their associated flanges, as shown by the dotted lines in Fig. 4. The areas can therefore expand in all directions, with minimum danger of buckling and permanent distortion.

We claim as our invention:—

1. A sheet-metal annealing box comprising panels having corrugations formed therein, and hollow rib members disposed between adjacent panels, along lines extending transversely of the corrugations, and being welded to the edges of the panels and to the ends of the corrugations.

2. A sheet metal annealing box comprising panels disposed in right angle relation to each other, and an outwardly exposed angle having its legs welded in abutting relation to the adjacent edges of the panels.

3. A sheet metal annealing box having its walls comprising a series of relatively small, substantially flat areas which are bounded by channel-like elements interposed between and having their flanges connected to adjacent edges of said areas.

4. A sheet-metal annealing box having its walls comprising a series of relatively small, substantially flat areas which are bounded by channel-like elements interposed between and having their flanges connected to adjacent edges of said areas, along lines adjacent to the edges of said flanges.

5. A sheet-metal annealing box comprising panels disposed at right angles to one another, and a hollow rib disposed in parallelism with adjacent edges of the panels and having sides each of which is in a plane perpendicular to the plane of the adjacent panel and welded thereto.

6. A sheet-metal annealing box comprising panels, and channel-shaped rib members disposed between the edges of adjacent panels and having their flanges in planes perpendicular to the plane of the panels, the sides of the flanges being welded to the adjacent edges of the panels.

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