May 9, 1933. J. C. HENDERSON 1,908,242

CONTAINER FOR TREATING METAL ARTICLES BY HEAT

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Fig. 1

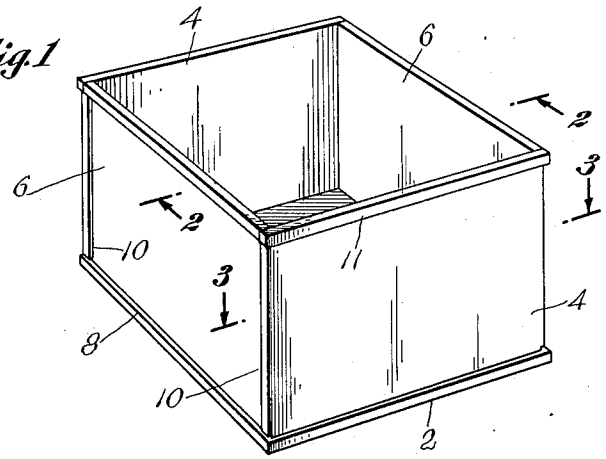


Fig. 2

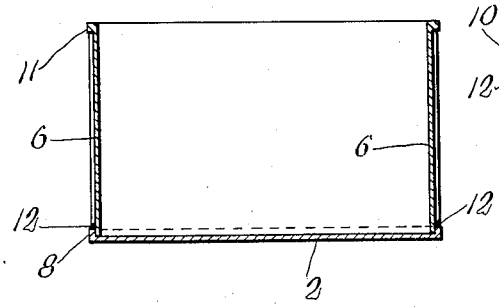


Fig. 3

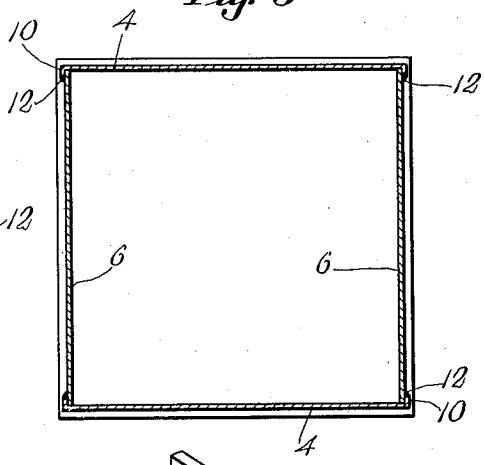


Fig. 4

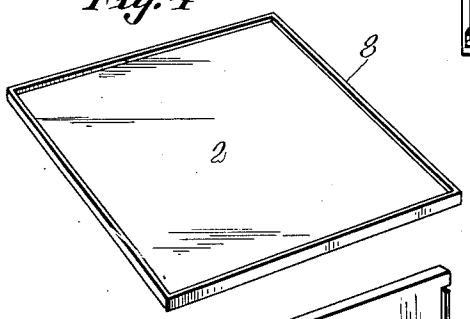


Fig. 5

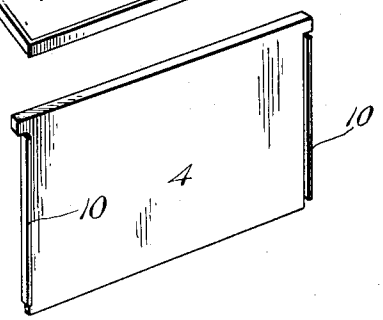
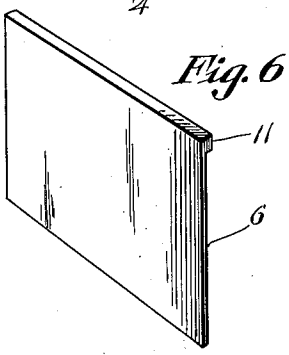


Fig. 6



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CONTAINER FOR TREATING METAL ARTICLES BY HEAT

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Fig. 7

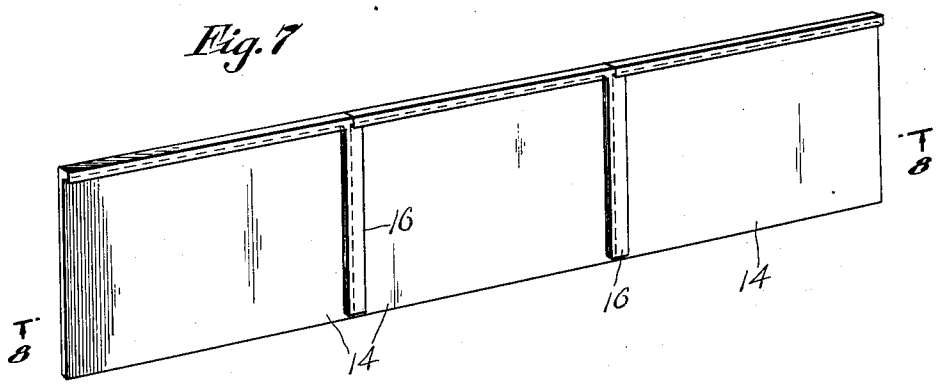


Fig. 8

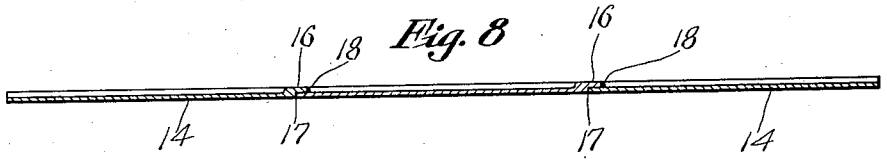


Fig. 9

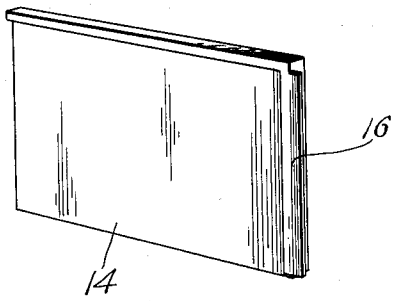


Fig. 10

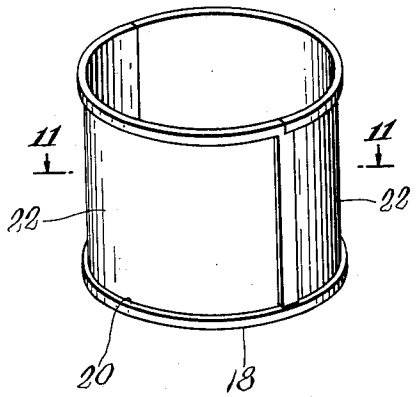
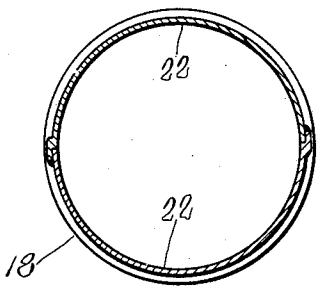


Fig. 11



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UNITED STATES PATENT OFFICE

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CONTAINER FOR TREATING METAL ARTICLES BY HEAT

Application filed September 23, 1930. Serial No. 483,915.

My invention relates to containers for treating metal articles by heat, and has special reference to carburizing containers.

Carburizing containers or boxes are commonly made of heat-resisting alloys, such as that described and claimed in my Patent No. 1,270,519, dated June 25, 1918, and heretofore usually have had their side and bottom walls either cast in a single piece or else made of rolled sheets. These carburizing boxes are sometimes as much as forty inches in length by eighteen inches in width, and consequently in case of single piece cast boxes a large mold must be made which requires large molding and flask equipment. Moreover, with such cast boxes in order for the metals to flow into the molds properly and to insure adequate strength, it is necessary to make the walls of substantial thickness, the required thickness varying with the cubical content of the box. The heat-resisting alloy is expensive and, therefore, any increase in thickness adds to the expense of manufacture, the boxes are heavy and bulky to handle, and the thick walls absorb more heat than necessary when the boxes are in use. Still another disadvantage of such cast boxes is that it is difficult to cast the walls of uniform thickness throughout, and any thin place in the walls would be likely to cause objectionable expansion and contraction strains to be set up in the boxes. Moreover blow-holes are likely to occur in the casting which are not visible when the box is cast.

While carburizing boxes made of cold rolled sheet metal require a less amount of material and are appreciably less expensive than a box made of a single casting, they also have numerous disadvantages. Cold rolled sheet metal is shaped and rolled from ingots and, therefore, the metal must be of low carbon content in order that it may be sufficiently malleable to roll easily. Owing to such low carbon content, however, such sheet metal boxes are not as rigid, do not stand up as well and become more easily warped than the cast boxes, the higher carbon and silicon content of the cast box giving much greater rigidity. Moreover, such sheet metal boxes have a tendency to creep and grow when made of heat-resisting alloy, which causes warping and distortion of the walls of the box, and frequently breaking of the welds. The metal sheets are liable to be scaly, split or otherwise defective although the defects may not be visible when the box is fabricated but materially affect the life of the box. The several side walls of the box are usually formed of a single piece of sheet metal, and the bending operation required is expensive.

The principal object of the present invention is to overcome the disadvantages above described of the carburizing boxes as heretofore constructed, while retaining all of their advantages.

In the drawings:

Figure 1 is a view in perspective of a carburizing box embodying the features of my invention in their preferred form;

Figs. 2 and 3 are sectional views taken on the lines 2—2 and 3—3 of Fig. 1;

Fig. 4, 5 and 6 are views in perspective of the bottom wall and two of the side walls of the box;

Fig. 7 is a view in perspective of a side wall of the box made up of a plurality of cast pieces secured together;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a view in perspective of a component part of the side wall shown in Fig. 7;

Fig. 10 is a view in perspective of a cylindrical box; and

Fig. 11 is a sectional view taken on the line 11—11 of Fig. 10.

The carburizing box illustrated in Figs. 1 to 6 of the drawings is provided with a bottom wall 2, opposed side walls 4 and opposed side walls 6. The several walls are each made of a single sheet cast of the alloy referred to in my said patent. As shown, the bottom wall is provided with an upstanding marginal rib 8. The vertical edges of the side walls 4 are provided with inwardly projecting ribs 10, and these side walls and the side walls 6 are provided at

their upper edges with outwardly projecting ribs 10.

In assembling the parts of the boxes, the lower edges of the side walls 4 and 6 are positioned on the bottom wall against the marginal rib 8, and the vertical edges of the side walls 6 abut against the inner sides of the side walls 4 and are positioned against the inner sides of the vertical ribs 10.

When the parts are thus assembled, welding material indicated at 12 is applied to the corner formed by the marginal rib 8 of the bottom wall and the adjacent portion of the side walls, and to the corners formed by the vertical ribs 10 and adjacent portions of the side walls 6. The upper corners of the box formed by the abutting ribs 10 are also securely welded.

With this construction it will be apparent that an extremely strong and rigid box is provided. The ribs 8 and 10 not only reinforce the corners of the box but also provide shoulders for effectively receiving the welding material so that there is no danger of the welds being burned out and broken while the box is in use. The upper marginal rib or band 11 effectively reinforces said edge so as to prevent breaking down by heat.

In casting the walls, the patterns may consist merely of a piece of sheet metal having strips secured thereon to form the ribs on the side walls when cast. It has been found that with the heat-resisting alloy employed, the castings may be of a thickness of but three-sixteenths of an inch and that a wall of one-eighth of an inch in thickness gives the necessary strength in most cases. By making the walls of the box of thin sheet castings there is not the danger of blowholes as in the case of a single piece cast box, for the reason that the chilled surfaces of these thin castings meet each other and there is no intermediate area in which defects may occur.

It will be apparent that a minimum amount of material is employed in the box, and that the box may be inexpensively made. Also, if desired, the component walls of the box, may be shipped in unassembled condition to the user, who may easily assemble the parts and weld the seams, so that there is a substantial saving in transportation costs. Also, in case one wall of the box becomes burned out or otherwise injured, it may be easily replaced upon melting the welds.

In case it is desired to manufacture a box of such length that the walls thereof cannot be easily cast in a single piece, the walls may be made up of several pieces 14 (Figs. 7, 8 and 9) having their edges welded together. The welding seam is preferably formed by an offset portion 16 on one edge of one piece providing shoulders 17 and 18. The shoulder 17 abuts against the edge of the adjacent piece, and the shoulder 18 forms a corner with the adjacent portion of the adjacent piece for the reception of welding material.

In making a cylindrical box the bottom wall may consist of a circular cast sheet 18 having an upstanding longitudinal flange 20, and the side wall may consist of a plurality of pieces 22 having overlapping seams 24 which are welded, the welding seams being preferably of the construction of the seams shown in Figs. 7, 8 and 9.

In some cases where it is desired to make the box other than with straight sides, instead of casting the walls in curved form they may be bent, it being found that the thin castings of the alloy are capable of bending to a certain extent. Also, if desired the walls may be cast with reinforcing corrugations. Furthermore, the walls may be of varying thicknesses to secure reenforcement as desired, such as by greater thickness at the center, which of course is not possible with rolled sheets.

Carburizing boxes are usually used in inverted position, but in cases where they are used in upright position a flanged cover may be provided. It will be apparent that the flanged cover may be constructed in a manner similar to the body of the box.

As will be evident to those skilled in the art, my invention permits various modifications without departing from the spirit thereof or the scope of the appended claims.

What I claim is:

1. A container for use in heat treatment of the class described having, in combination, a bottom wall comprising a cast metal sheet having an upstanding marginal rib, and side walls each comprising a cast metal sheet having their lower edges positioned against the inner side of said marginal rib, and adjacent edges of adjacent sheets one having a marginal rib overlying the edge of the other sheet, and welding material applied to the corners formed by the upper edge of said rib on the bottom wall and adjacent portions of said side walls, and by the outer edges of the ribs on said side walls and the adjacent portions of the adjacent side walls so as to weld the side walls together and to the bottom wall, each of the side walls having an outwardly projecting marginal rib at its upper edge so as to form a reinforcing band for the upper edge of the container.

2. A metallic receptacle for use in heat-treating furnaces comprising spaced plates having flanges directed towards each other, plates having the ends thereof overlapping said flanges, and a flanged bottom member receiving the lower portions of said plates, said parts being joined together.

3. A metallic receptacle for use in heat

treating furnaces comprising side plates, channel end plates, and a cupped bottom of precast metal, and said parts being joined together by welding.

4. A metallic receptacle for use in heat treating furnaces comprising side plates, channel ends and cupped bottom, all of precast metal and joined together by welding, said cupped bottom forming a bumper and reinforcement.

In testimony whereof, I have signed my name to this specification.

JOHN C. HENDERSON.