

Dec. 31, 1935.

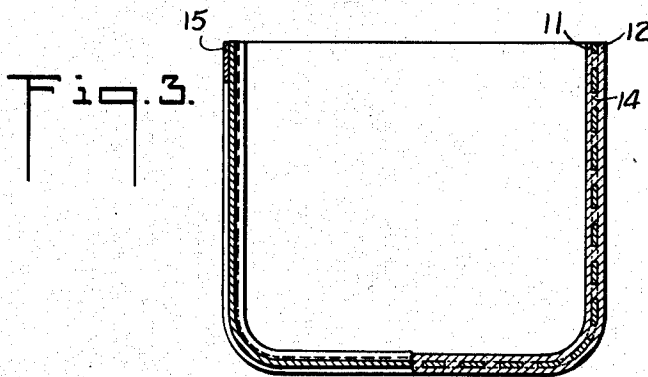
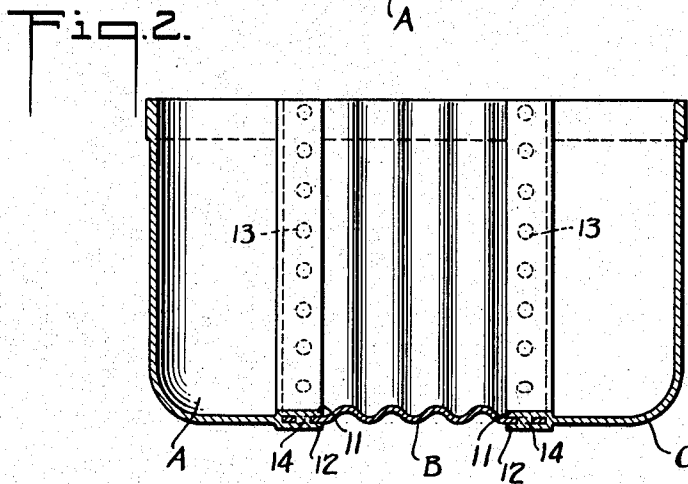
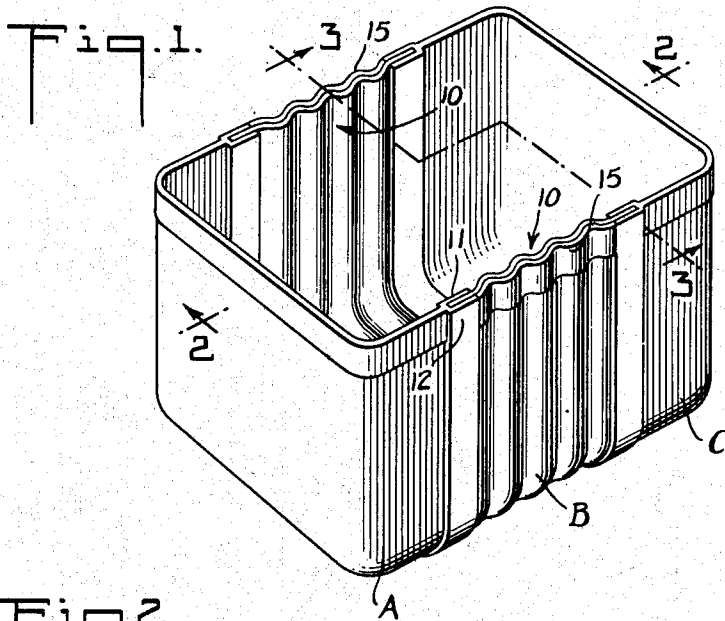
H. H. HARRIS

2,026,311

CARBURIZING BOX

Filed Aug. 9, 1934

2 Sheets-Sheet 1



INVENTOR
HENRY H. HARRIS
BY *Dyke & Schaines*
ATTORNEYS

Dec. 31, 1935.

H. H. HARRIS

2,026,311

CARBURIZING BOX

Filed Aug. 9, 1934

2 Sheets-Sheet 2

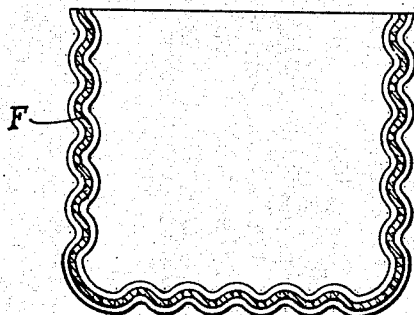
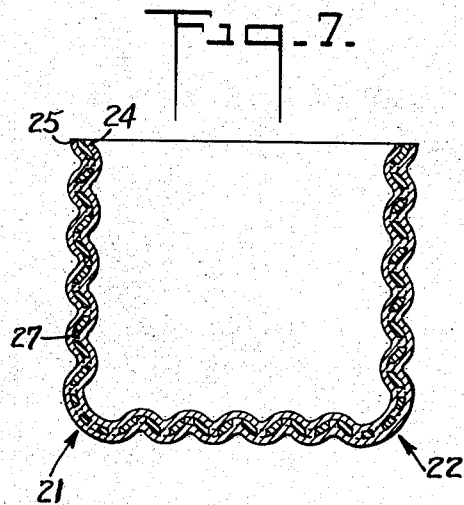
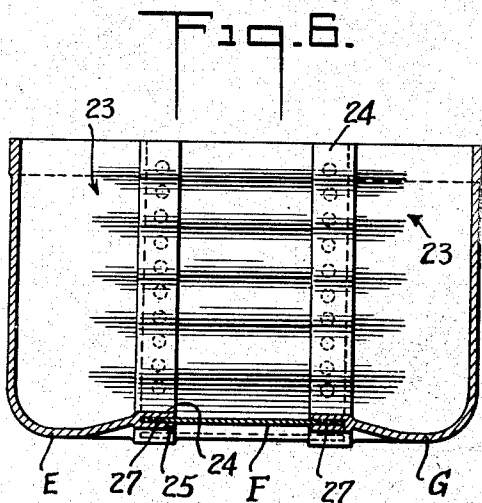
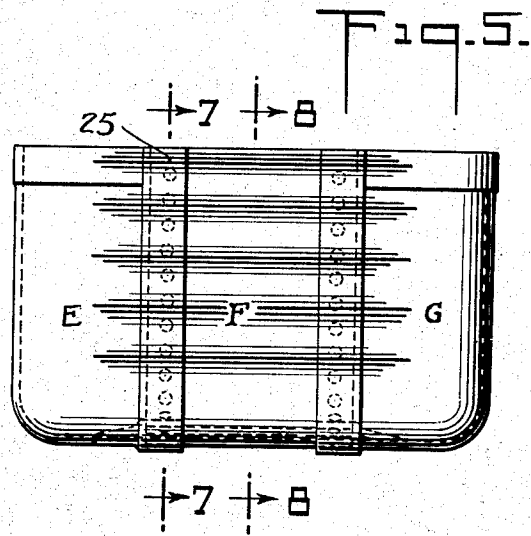
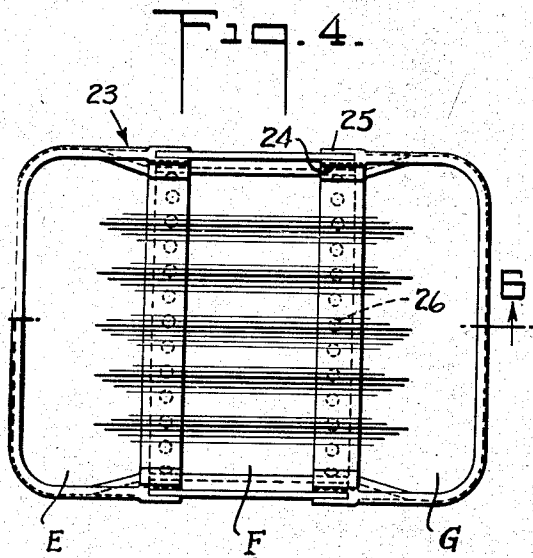


Fig. 8.

INVENTOR
HENRY H. HARRIS
BY *Dyke & Schaines*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,026,311

CARBURIZING BOX

Henry H. Harris, Boston, Mass.

Application August 9, 1934, Serial No. 739,138

2 Claims. (Cl. 263-49)

This invention relates to carburizing boxes and is an improvement on the invention of my Patent No. 1,882,580.

It is an object of my invention to provide a carburizing box which will stand up better and longer under the severe usage which such boxes receive.

It is a further object of my invention to provide a carburizing box which will have a longer service life in proportion to the difficulty and expense of making same.

Other objects will appear in the course of this specification.

When carburizing boxes are to be used in heat treating furnaces, metal articles to be carburized are placed in the boxes, together with a carburizing agent such as bone dust. Trays are placed over the boxes, the boxes with their trays are then usually inverted, and in this position are subjected in a heat treating furnace to heat usually supplied from beneath.

The boxes must stand up under rough handling, extremely high temperatures, sudden changes in temperature, and the pressure of a heavy load of contents while softened by heat, all with attendant warping and buckling, producing cracks and ultimately breaking the box down.

As a result, if the boxes were not made so as to have great durability under such treatment they would have to be replaced constantly at great expense, and it becomes a problem of some nicety and importance to devise a box having the longest life in proportion to the cost of producing same, in which my invention which is illustrated in the drawings herewith represents an advance over the art.

In said drawings,

Fig. 1 is a perspective view of one form of box constructed in accordance with my invention;

Fig. 2 is a longitudinal sectional view thereof on line 2-2 of Fig. 1; and

Fig. 3 is a broken transverse sectional view thereof on line 3-3 of Fig. 1.

Fig. 4 is a plan view of a second form of box constructed in accordance with my invention;

Fig. 5 is a side view thereof;

Fig. 6 is a longitudinal sectional view thereof on line 6-6 of Fig. 4;

Fig. 7 is a transverse sectional view thereof on line 7-7 of Fig. 5; and

Fig. 8 is a transverse sectional view thereof on line 8-8 of Fig. 5.

In the first form, shown in Figs. 1-3, the box is made up of three parts, A, B and C. The end

parts A and C provide partial bottom and side walls and also end walls. The center part is U-shaped and open-ended, providing partial bottom and side walls.

The center part B is formed with a plurality of reverse curve corrugations extending continuously down one side, across the bottom and up the other side, producing substantially a bellows which is free to yield principally lengthwise of the box.

The end parts A and C preferably terminate in marginal portions facing each other and cast about the edges of the center part B, with forks 11 and 12 embedding same. To secure a locked joint, holes 13 are formed along the edges of part B, and ties 14 integral with the end parts are formed through these holes in the casting process, securely locking the parts together.

Strips 15 are welded to the center part B along its upper edge, forming a reinforcement at the middle of the longest sides of the box which is ordinarily the locus of failure where the box will first give way or crack after long service.

The end parts A and C are preferably made of relatively inexpensive cast metal, preferably nickel-chromium-iron alloy with high iron content. They could, however, be stamped of sheet metal, instead of cast, and the joints could be made in other ways, such as welding or riveting.

The center part B is preferably formed from a sheet of high grade ductile heat resistant alloy, such as a high nickel chromium alloy that is low in iron content, and the strips 15 are of the same material.

In use the irregular expansion and contraction of the box has its greatest and most varied effect longitudinally mid-way of the box. Such strains and variations are absorbed by the bellows part in this construction, same being relatively free, especially when made of sheet metal, to expand, contract and twist in different directions more freely than any previous construction.

The longitudinally wavy corner bends of this construction peculiarly adapt it to expansion, contraction and twisting. While a single corrugation formed in the center part has essentially a reinforcing effect, the reverse curves allow relatively free flexing to absorb strains which otherwise would ultimately break the box down. The solid anchoring of the more flexible center part in the more rigid end parts insures that the strains will be transmitted to the part which can harmlessly absorb them, instead of their breaking loose the joints.

In the second form, shown in Figs. 4-8, the box is made up of three parts E, F and G.

The end parts E and G provide partial bottom and side walls and also end walls. The center part F is U-shaped and open-ended, providing partial bottom and side walls. The two end parts are joined to the center part to form a unitary box closed at all sides but one.

The center part F is longitudinally corrugated all the way around, the corrugations running from joined edge to joined edge thereof, providing substantially a bellows with freedom to yield in most directions and principally across the bottom and up and down the sidewall portions, convex corrugations 21, 22 of larger radius being formed where the bottom wall bends up into the side walls.

The end parts E and G have generally flat walls except at the edges where they meet the center part F. Near these edges the walls of the end parts start gradually to assume a corrugated form indicated by reference character 23, which at the edges matches the corrugated form of the center part.

At the edges the end parts are formed with two forks 24, 25, which lie on both sides of the part F to secure the parts together. Positive locking between the parts is preferably secured by forming holes 26 along the edges of the center part and casting the end parts directly about the center part with the result that in the casting process ties 27 integral with the end parts are formed through the holes, securely locking the parts together.

The center part F is preferably formed from a sheet of a high grade ductile heat resistant alloy, such as a high nickel chromium alloy, with low iron content, while the end parts are preferably cast of a rugged relatively inexpensive metal or alloy, which may have a higher iron content.

In use the end portions provide the ruggedness to resist handling and rough usage; keep the expense down because made of cheaper material;

and are of a simple strong construction; but they cannot stand up so well under the strains of warping and buckling from temperature strains. The more ductile and flexible center part is provided to largely absorb these strains. The corrugated form of the center part gives it more adaptability to bend and twist. As an example, if one end part should expand along its inner edge more than the other end part, this can all be taken up by a fan-like spreading of the corrugated center part. The corrugating of the edges of the end parts makes a more pliable joint so that both parts can accommodate themselves to each other. The solid anchoring of the more flexible part in the more rigid parts insures that the strains will be taken up by those sections which can harmlessly absorb them, instead of their breaking loose the joints.

While I have shown two specific forms to illustrate my invention, it will be apparent that variations thereof may be made within the spirit of the invention, and hence I wish to be limited only by the scope of the appended claims.

I claim:

1. A metallic receptacle for use in heat treating furnaces comprising two end parts each being a single integral cast member of a relatively high iron content alloy and each providing an end wall and a partial bottom wall and partial side walls, and a center part formed of flexible sheet metal of a relatively low iron content alloy and providing a partial bottom wall and partial side walls and being formed throughout its area with a plurality of continuous reverse corrugations, the inner edges being cast about the edges of the center part and anchored thereto.

2. Device of claim 1 in which the corrugations are longitudinal and the end parts, at their edges adjacent the center part, gradually change from flat surfaces to corrugated form corresponding with the corrugations of the center part.

HENRY H. HARRIS.