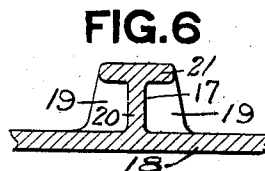
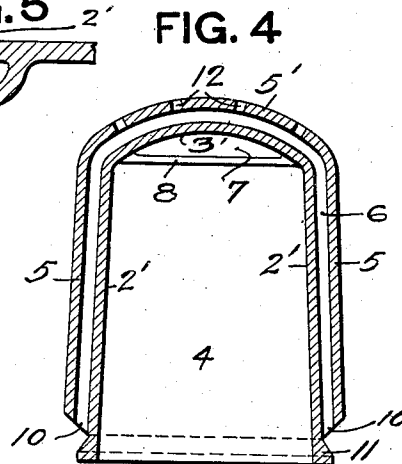
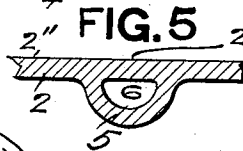
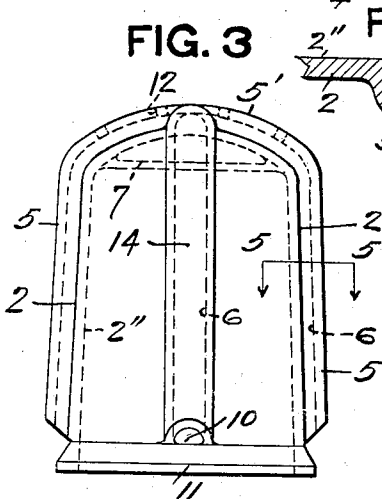
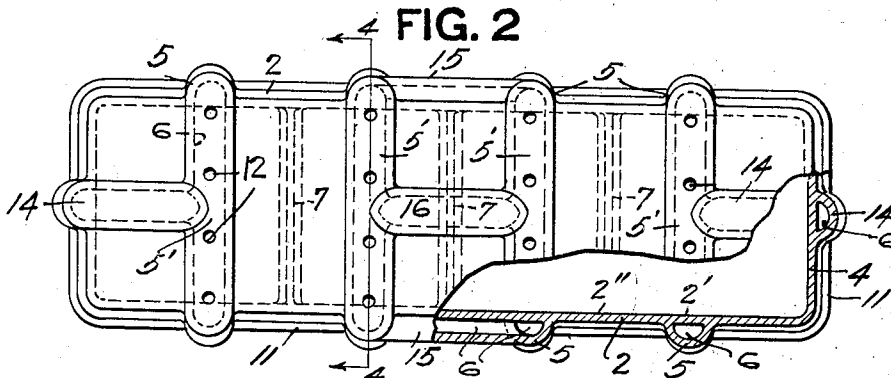
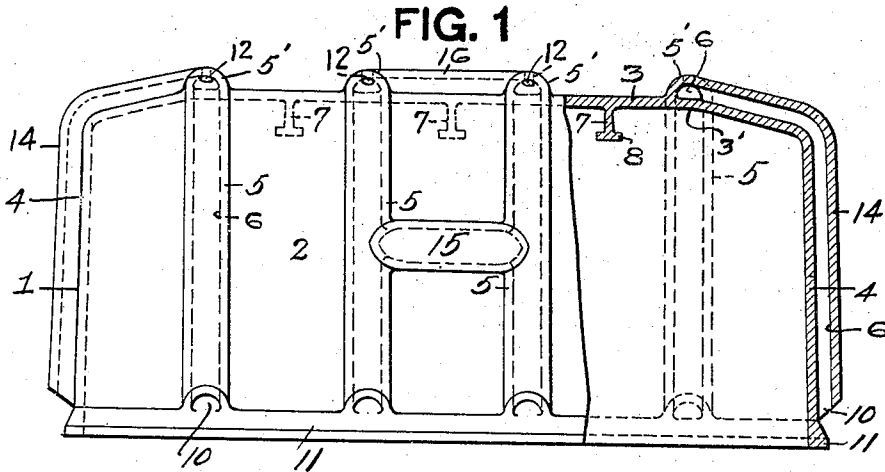


F. CORDES.
ANNEALING BOX.
APPLICATION FILED MAR. 27, 1911.

1,012,249.

Patented Dec. 19, 1911.



WITNESSES.

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ANNEALING-BOX.

1,012,249.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed March 27, 1911. Serial No. 617,154.

To all whom it may concern:

Be it known that I, FRANK CORDES, a citizen of the United States, and resident of Hulton Station, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Annealing-Boxes; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to annealing boxes, and has for its object the provision of a novel and useful form of box better suited to stand up and retain its shape under the excessively high temperatures and successive expansions and contractions to which boxes of this nature are subjected in use.

The principal features of my present invention are preferably embodied in a cast metal box of the integral type, the whole box being preferably cast in one piece of iron or steel. It will be understood, however, that all the elements of my invention are not necessarily confined to boxes having all the walls integrally cast, but that my invention contemplates the provision of a cast metal annealing box having side and end walls and a roof preferably of arched form joining the same, said walls having external outwardly extending bracing ribs or columns arranged at suitable intervals to strengthen the walls and prevent the sagging of the roof, said bracing ribs preferably continuing on the roof, and the inner faces of the side walls being of unbroken contour or preferably flat interiorly of the external bracing ribs. Heretofore these boxes have been made with corrugated side walls joined by an integral roof wall, the corrugations of the sides continuing over the roof. By my invention a wall of continuous thickness, and having a substantially flat or at least unbroken inner wall face, is provided, the external bracing rib construction therefore affording additional strength and preventing the elongation and distortion which is present in those boxes in which but a single wall thickness of corrugated form is provided.

My present invention further contemplates the provision in such boxes of continuous exterior ribs or columns of hollow or closed channel form which are particularly adapted to protect portions of the walls and to provide for the circulation around the annealing box of the hot air and

gas of the annealing furnace in heating the box and of the atmospheric air in cooling the box.

In the accompanying drawing Figure 1 is a side elevation partly in vertical longitudinal section of an annealing box illustrating my invention; Fig. 2 is a plan view partly in section of the box illustrated in Fig. 1 and Fig. 3 is an end view of the same; Fig. 4 is a vertical transverse section on the line 4—4 Fig. 2; Fig. 5 is a detail horizontal section through a channel rib on the line 5—5 Fig. 3; and Fig. 6 is a view similar to Fig. 5 illustrating a modification.

The box 1 illustrated is in the form of an integral casting having the side walls 2, roof wall 3 and end walls 4. Arranged externally and extending vertically at intervals up the side walls 2 are the integral bracing ribs or columns 5. The ribs 5 are preferably of hollow or channel form as illustrated and continue on the roof 3. The bracing ribs 5 also preferably extend continuously around the side walls 2 and roof 3, thus forming an inverted truss framework for the box 1 extending continuously across the side wall and roof thereof. The side walls 2, as well as the roof wall 3, are constructed of continuing contour and thickness immediately inside of the bracing ribs 5. Thus the portion 2' of the side wall 2 is continuous therewith interiorly of the rib 5. In like manner the portion 3' of the roof wall 3 is preferably provided continuous with the roof wall proper. The bracing rib is thus arranged to have an external thickness in addition to that of the wall proper, which is of substantially unbroken contour interiorly of said rib. As illustrated in the drawings the side walls 2 have their inner faces 2'' substantially flat or plane from end to end so that the tendency to permanent elongation and consequent injurious strain due to uneven and imperfect contraction after excessive expansion is obviated.

The roof 3 is of arched form and is preferably provided with the depending flanges or ribs 7 integral therewith. The ribs 7 are preferably in the form of inverted T-beams having the flanges 8 which form a compression member across the roof truss, and serve to brace and stiffen the roof wall 3; and are preferably located about midway between the external ribs 5. The

external ribs 5, being cast integral with the side walls 3, are provided with the bottom openings 10 above the base flange 11 of the box, which rests directly on the supporting base for the castings. The roof portion 5' of the ribs 5 also has the holes or apertures 12 opening outwardly from the channel 6 within the rib 5. The heated air and gases naturally rise in their circulation within the annealing oven and thus pass upwardly through the channels 6 and out of the apertures 12. The same construction of external ribs can be employed in the end walls, the ribs 14 being illustrated as extending up over said end walls and over the roof and connecting with the roof ribs 5' nearest the end wall, and it may also be employed in any longitudinal portion of the box, for example, connecting the side ribs 5, as illustrated at 15, or connecting the roof ribs 5', as illustrated at 16. By the employment of such external ribs I am enabled to form the main body of the box having walls of substantially the same thickness throughout and to properly brace the same by means of such vertically extending external ribs carried continuously from the side or end walls over onto the roof. In the use of such external bracing ribs of hollow form as above described, I obtain a peculiar action in the support of the box body both in heating the same and in subsequent cooling. In the heating up of the box the external hollow ribs protect the continuing portions of the box body within the same from the heat and flame so that the portions of the box body so covered by the ribs remain cooler and stiffer than the portions of the box body exposed to the direct action of the heat and flame, thus aiding in bracing the body of the box wherever said hollow ribs are located, while the hollow ribs on account of their arched shape also stiffen and strengthen the box body. In cooling the box these external ribs on account of the circulation of the air in contact with both the exterior and interior of the rib walls, cool more rapidly than the body of the box and in so cooling act to stiffen and strengthen the whole structure. The portions of the box walls protected by such ribs, for example, the portions 2' being protected from direct contact of the circulating air, may not cool as rapidly as the main portions of the box walls, but the exterior ribs being so constructed that they cool more rapidly than the body of the box, as above stated, stiffen the box body especially in the portions thereof so protected by the ribs, and therefore the portions of the box body protected by the ribs act with them to sustain the weight of the box in heating, and the ribs because they cool more rapidly than the box body serve to stiffen the same in cooling. The bracing ribs 5, 14 therefore act as columns which positively sup-

port the wall portions of the annealing box when at high temperature, both during the heating up and the cooling down stages. While I have referred to these members as "ribs" in the accompanying claims, it will be understood that I regard their use and form of construction as broadly new, and that the term "hollow closed form" is intended to designate any rib or column having a channel or aperture within it and between its wall and that of the box proper, the box wall inside of the rib forming with the rib in effect a closed hollow column, although the rib, considered by itself is of channel or of modified channel form.

Fig. 6 illustrates a modified form of external bracing ribs 17 of T-shape. The side wall 18 is shown of unbroken contour within the rib, and is further connected thereto and braced by the cross webs 19 joining the longitudinal web 20 and flange 21. This specific form of rib, together with other modified features of my main invention, is described and claimed in another application, Serial No. 617,153, filed of even date herewith.

What I claim is:

1. An integral cast metal annealing box having side walls and a roof, and provided with a series of vertically extending external bracing ribs arranged at intervals in said side walls and continuing over said roof, said walls and roof being of continuous thickness and unbroken contour interiorly of said ribs.
2. An integral cast metal annealing box having side walls and a roof and provided with upwardly extending bracing ribs arranged at intervals in said side walls and extending continuously over said roof, said walls and roof being of continuous thickness and unbroken contour interiorly of said ribs.
3. An integral cast metal annealing box having side walls and a roof connecting the same and provided with external bracing ribs arranged at intervals and extending continuously around said walls and roof, said walls and roof being of continuous thickness and unbroken contour interiorly of said ribs and having internal bracing ribs, substantially as described.
4. An annealing box having integral side walls and roof, external bracing ribs arranged at intervals and extending continuously around said walls and roof, and internal depending ribs arranged at intervals between said bracing members and extending transversely to brace said roof, substantially as described.
5. A cast metal annealing box having side walls and an arched roof integral therewith and provided with externally arranged continuous bracing ribs extending around the box, the side and roof walls being of continuous thickness and unbroken contour interiorly

of said ribs, and the roof having flanges arranged between said ribs.

5 6. An annealing box having its walls provided with bracing ribs of closed hollow form, substantially as described.

7. An annealing box having side walls provided with externally arranged bracing ribs of closed hollow form.

10 8. A cast metal annealing box having side walls and a roof integrally connecting the same, and bracing ribs of closed hollow form extending upwardly on said side walls and continuing on said roof.

15 9. A cast metal annealing box having integral side walls and roof provided with bracing ribs of closed hollow form arranged at intervals and extending continuously around said walls and roof.

20 10. A cast metal annealing box having side walls and a roof integrally connecting the same, and externally arranged bracing ribs of hollow form extending continuously around said walls and roof, said walls being of continuous thickness and unbroken contour within said ribs, substantially as described.

30 11. An annealing box provided with side and roof walls and having bracing ribs of hollow form extending up said side walls and continuing over said roof, said hollow

ribs being provided with openings at their lower ends and apertures in their upper portions, substantially as described.

12. An annealing box having a roof wall provided with interior transverse bracing ribs and side walls provided with vertically arranged bracing ribs of closed hollow form extending upwardly to brace said roof.

13. An annealing box of the character described having side and end walls and a roof, said side walls being provided with bracing ribs of closed hollow form extending upwardly and continuing on said roof, and said roof having like bracing ribs intersecting with aforesaid ribs.

45 14. An annealing box of the character described having side, end and roof walls and bracing ribs of closed hollow form arranged on each of said walls.

15. An annealing box having side walls and a roof and upwardly extending bracing ribs of closed hollow form arranged at intervals along said side walls, substantially as described.

55 In testimony whereof, I the said FRANK CORDES, have hereunto set my hand.

FRANK CORDES.

Witnesses:

ROBERT C. TOTTEN,
JOHN F. WILL.