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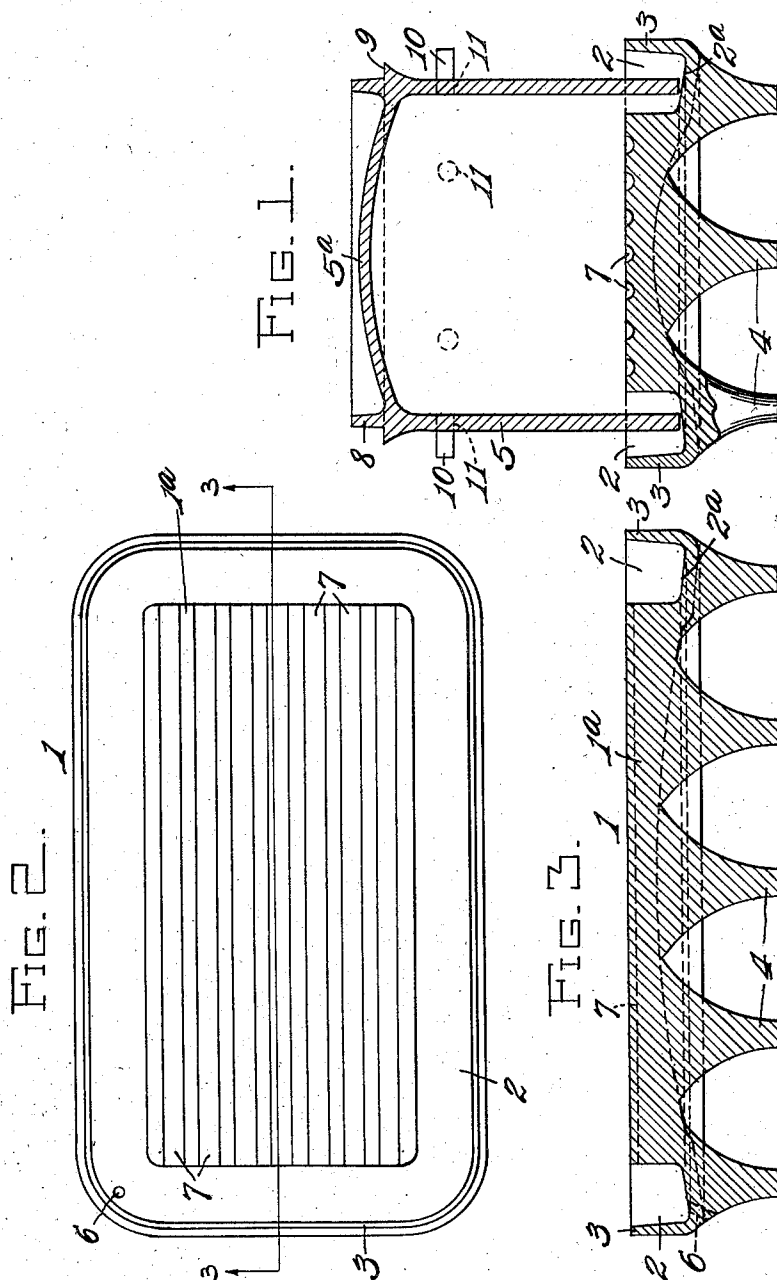
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I. J. KOEHNLINE ET AL

ANNEALING BOX

Filed Aug. 15, 1923

2 Sheets-Sheet 1



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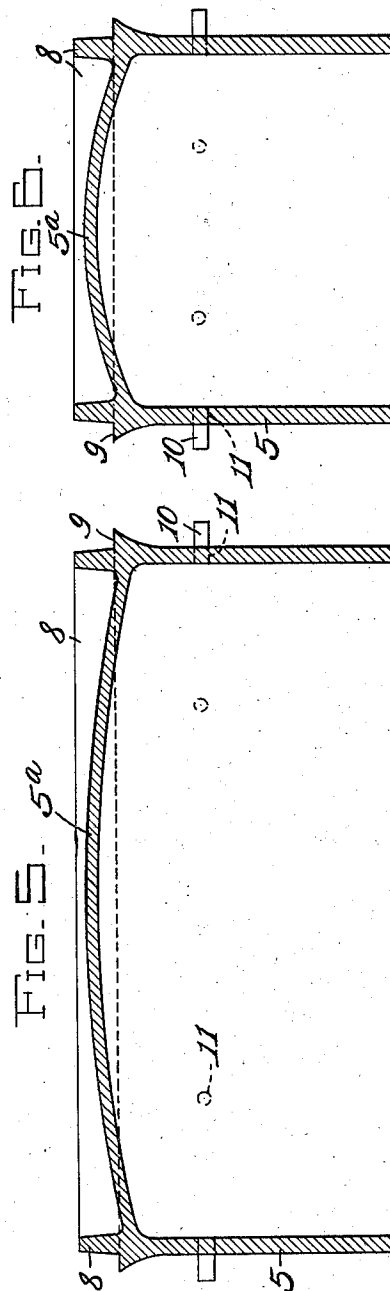
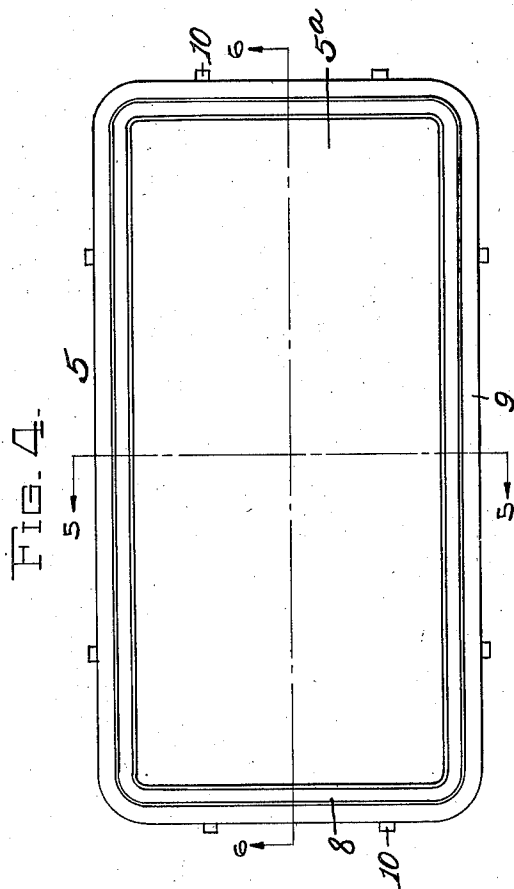
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ANNEALING BOX

Filed Aug. 15, 1923

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

IRVIN JOHN KOEHLIN, OF BRIDGEPORT, AND WILLIAM EARL ARMSTRONG, OF
MARTINS FERRY, OHIO.

ANNEALING BOX.

Application filed August 15, 1923. Serial No. 657,633.

To all whom it may concern:

Be it known that we, IRVIN JOHN KOEHLIN and WILLIAM EARL ARMSTRONG, citizens of the United States of America, and residents, respectively, of Bridgeport, in the county of Belmont and State of Ohio, and Martins Ferry, in the county of Belmont and State of Ohio, have invented certain new and useful Improvements in Annealing Boxes, of which the following is a specification.

This invention relates broadly to annealing boxes, and more specifically to that type of boxes in which piles or stacks of steel sheets and the like are inclosed while being annealed.

The primary object of the invention is to provide a structurally improved annealing box adapted to resist over relatively long periods of time the intense heat to which such boxes are subjected.

A further object is to provide an annealing box in which the various sheets of the thereby enclosed pile or stack are annealed to a substantially uniform extent, thereby practically eliminating the production of under-annealed bottom sheets and over-annealed top sheets.

With these and other important objects in view, the invention resides in the features of construction, arrangement of parts and combinations of elements which will hereinafter be exemplified, reference being had to the accompanying drawings in which we have elected to disclose the invention in a form suitable for the annealing of steel sheets of such thicknesses and dimensions as are used in the manufacture of tin plate, but it is to be understood that the invention may be adapted to other purposes and used in modified forms without departing from the spirit of the invention; and we do not, therefore, desire to be limited except as may be required by the appended claims.

In said drawings—

Figure 1 is a transverse vertical section of the invention;

Figure 2 is a top plan view of the stand;

Figure 3 is a longitudinal section on line 3—3, Fig. 2;

Figure 4 is a top plan view of the cover; and—

Figures 5 and 6 are sections of the same taken, respectively, on lines 6—6 and 5—5, Fig. 4.

Referring to said drawings, 1 indicates generally a base or stand formed of iron or steel or a heat resisting alloy in a single casting and comprising a flat horizontal bed portion 1^a of rectangular form adapted for receiving thereon the pile or stack of metal sheets to be annealed. Surrounding said bed portion 1^a and separated therefrom by a deep channel 2 is an upright flange-like outer wall or rim 3. Said stand 1 is provided with a plurality of suitably disposed tapered legs 4 which form an integral part of the casting and which are of such relatively large size and substantial form that they effectually resist the effects of the furnace heat, oxidation and rough handling to which the stand is subjected and which result in the riveted and welded-on legs of pre-existing forms of annealing stands quickly becoming either loosened or weakened to the extent that they readily break off. Said legs have their upper end portions meeting each other on the under side of the stand in such manner that they complement each other in the formation of a series of arches, as shown in Figs. 1 and 3, and, as is apparent, this construction affords such mechanical strength that the life of the box is very materially prolonged as compared with that of the aforesaid pre-existing forms of stands.

The channel 2 is designed to receive therein the lower edge portion of a rectangular cover 5 of inverted box-like form for enclosing a pile or stack of sheets carried by the bed portion 1^a of the stand. Said channel is further designed for the reception of a bed of sand of substantial thickness whereby a seal is formed between the stand 1 and the seated lower edge portion of the cover. Said channel has an inclined bottom surface 2^a, the same inclining outward to the rim 3 and being designed to drain outward to a point outside the seated lower edge of the cover such water drains into the sand from the pile of sheets which, when, transferred to the bed plate 1^a from the pickling tank, are quite wet with water. The water which so drains outward drains from the channel 2 through one or more suitably located holes, as the hole 6 shown in Fig. 2, toward the bottom of said channel slightly inclines or slopes. This drainage of the water from within the enclosure in large measure prevents the production of so-called smoked sheets which is consequent when blow holes

in the sand seal have been formed by water or moisture escaping in the form of steam.

The surface of the bed portion 1^a has therein a plurality of suitably arranged 5 grooves or channels 7 which permit the insertion of chains or hooks under the pile of sheets which rest thereover for effecting removal of such pile from the stand.

The cover 5 is formed in a single casting 10 and preferably has its top 5^a made of arched form, as shown in Figs. 5 and 6, thereby to afford increased resistance against warping. A rim 8 is provided about the top 5^a of said cover, the same constituting an enclosure 15 within which may be retained a cushion-like layer of sand for protecting said top from the abrasion and oxidation which results when the heat and flame of the furnace is permitted to play unobstructedly 20 on the tops of annealing box covers.

A ledge 9 is formed annularly on the cover adjacent to the bottom of the rim 8, as shown, said ledge being designed as a support upon which may be carried a protective 25 wall of fireclay, which can be renewed from time to time as required. In the absence of such fireclay wall, the ledge furnishes such additional resistance to flame abrasion at the junction of the top 5^a with the vertical 30 walls of the cover that the life of the cover is greatly prolonged.

A plurality of pins 10 are mounted in suitably located seats or recesses 11 provided therefor in the walls of the cover, said pins 35 being designed to provide for the attaching of the usual carrier chains of a crane whereby the cover is handled.

It will be noted that the pile or stack of sheets placed upon the bed portion of the 40 stand 1 are supported in a position in which they are wholly elevated above the sand seal and that consequently the sheets of such pile or stack are uniformly subjected to heat through transference from the upright walls 45 of the cover. In prior forms of annealing boxes the lowermost sheets of the pile are located below the level of the sand by which the seal between the stand and its cover is formed and, therefore, such sheets are shielded 50 by the sand to the extent that they are slack, or underannealed, when the sheets thereover have been properly annealed; or,

if the pile is subjected to a temperature sufficiently high to effect proper annealing of these bottom sheets, the sheets thereover 55 are over-annealed, or burned. As hereinbefore stated, the production of uniformly annealed sheets is substantially assured by the employment of the construction of an annealing box herein described. 60

Furthermore, the improved construction of box described effectually resists the effects of the intense heat to which such boxes are subjected to the extent that the life of the box is greatly prolonged over those ordinarily used. 65

What is claimed is—

1. An annealing box comprising a cast metal stand embodying a bed portion, an upright outer rim, and integral supporting 70 legs, said bed portion and said rim being separated by a deep channel adapted for containing a bed of sand, the bottom of said channel having a drainage hole therein and having its surfaces inclined downwardly and 75 outwardly toward said hole, said legs being of tapered form and disposed in substantially meeting relation beneath said bed whereby they complementally form a series of arches, and a cover of inverted box-like 80 form adapted to seat upon said stand with its lower edges embedded in the sand bed in said channel.

2. An annealing box comprising a cast metal stand embodying a bed portion and a 85 rim separated by a channel adapted for containing a deep bed of sand, and a cover of inverted box-like form adapted to be superposed over said stand with its lower 90 edges received in said channel, said cover having a rim surrounding its top and forming an enclosure adapted to retain therein a cushion of sand, and an external ledge formed about the walls of said cover adjacent 95 to the base portion of the rim of the latter.

In testimony whereof we affix our signatures in presence of two witnesses.

IRVIN JOHN KOEHLNLINE.
WILLIAM EARL ARMSTRONG.

Witnesses:

G. O. SMITH,
H. E. DUNLAP.