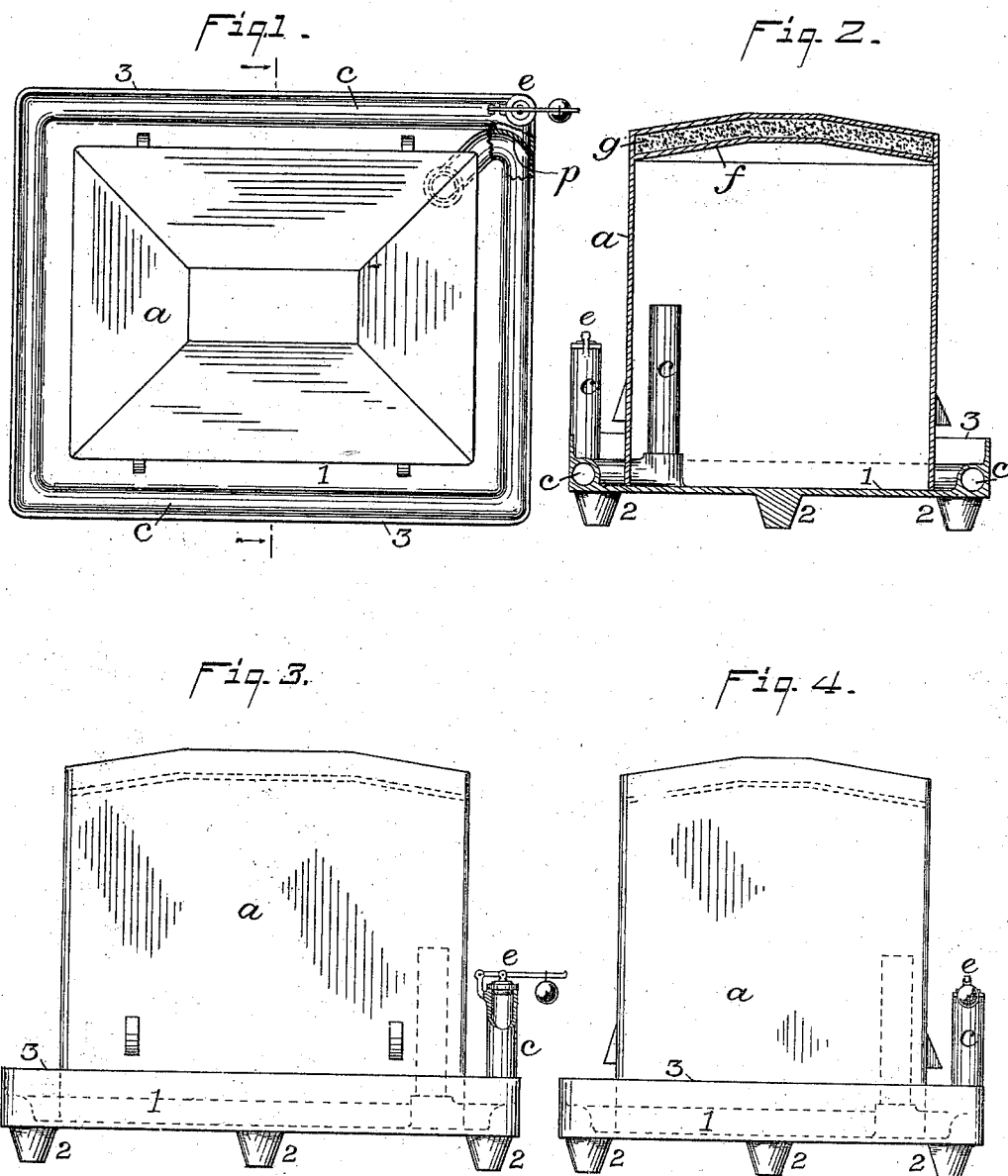


(No Model.)

R. BAILEY.
ANNEALING BOX AND PAN.

No. 545,868.

Patented Sept. 10, 1895.



Witnesses

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ANNEALING BOX AND PAN.

SPECIFICATION forming part of Letters Patent No. 545,868, dated September 10, 1895.

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To all whom it may concern:

Be it known that I, REGINALD BAILEY, a citizen of the United States, residing at Cumberland, in the county of Allegany and State of Maryland, have invented certain new and useful Improvements in Annealing Boxes and Pans; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Great difficulties are encountered in practicing the art of annealing metals, especially with certain classes of work, owing to the cracking and breaking of the annealing boxes and the consequent spoiling of the articles being treated, and many attempts have been made to devise boxes that would not be open to this objection. As is well understood by those acquainted with the annealing of all kinds of iron and steel sheets, black plates, &c., whether for stamping, galvanizing, or tinning purposes, the articles to be treated are packed in boxes cold and wet as they come from the bath where the acids or other chemicals used in the preliminary treatment are washed off, after which packing the boxes are sealed up air-tight before being put into the furnace or oven. As the boxes become heated after being placed in the furnace, the water on the inclosed articles evaporates and steam and gases are formed in the interior. There being no outlet from the boxes, this steam collects upon the interior surface of the top and sides and keeps them damp and wet. The boxes being heated from the exterior only, the inner walls, of course, offer greater resistance to expansion than the exterior surface, and the accumulations of condensed moisture on the interior surfaces still further add to this disparity in resistance to expansion.

The present invention is based upon the theory that the cracking and breaking of the annealing-boxes is caused, more than anything else, by this unequal expansion of the exterior and interior surfaces; and, having for its object to provide a box that will successfully withstand the greatest heat required in the process of annealing, it consists, broadly speaking, in providing an air-vent pipe opening into the interior of the box, said pipe being secured to the base of the box and adapted

and constructed to permit the escape of steam and gases from the interior of the box, while at the same time preventing the entrance of air into the interior.

The best form in which I have embodied my invention up to this time is illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view; Fig. 2, a transverse section; Fig. 3, a side elevation, and Fig. 4 an end elevation.

Referring to the views, 1 denotes the pan or base of the box, the same being provided with feet 2 at convenient points so as to elevate it slightly from the bottom of the furnace or kiln. Around the edges this pan or base has a vertical flange 3, as shown in all the figures of the drawings.

The letter *a* indicates the cover for the base or pan and constitutes the body portion of the box. The cross-sectional area of this body portion is less than the superficial area of the pan, and the object of this arrangement is that when the cover is in place on the base a narrow space will be left between its exterior wall and the edge of the base, the purpose of which will be presently explained.

As the upper part of the box is subjected to the greatest heat, I prefer to provide it with an interior diaphragm at the top slightly below the exterior top wall of the box, with an intervening space between, the object of this arrangement being to reinforce the metal of the upper part of the box. This diaphragm is denoted by *f* in the drawings, and *g* indicates a filling of sand or equivalent material, which may be packed in the intervening space between the top wall of the diaphragm, if desired. This construction effectually prevents the cracking or breaking of the top of the box, and, in the event that a defective box should be used or an excessive temperature be developed in the furnace, so that the top wall should happen to be cracked notwithstanding, the interior diaphragm would still remain intact and constitute the top of the box. Moreover, the interposition of the diaphragm strengthens the upper part of the side of the box and prevents cracking from the edges downward.

The letter *c* in the several figures denotes an air-vent pipe, one end of which extends upwardly and opens into the interior of the

box and the other is open to the atmosphere in a way to permit the escape of steam or gases from the interior of the box without permitting the entrance of air from without into the same. As shown in Figs. 1 and 2, this pipe is secured to the pan or base 1, in the narrow space left between the exterior wall of the cover *a* or body of the box and the vertical flange 3 around the edge of the pan, and I prefer to make it in the form of a flue cast in the pan instead of an ordinary pipe secured thereto. The outer end of the pipe preferably projects vertically upward, as shown in the drawings, and has provision at its upper end against the entrance of external air into the interior. In the drawings I have shown a weighted safety-valve *e* for this purpose, but any sort of an automatically operating one-way valve would accomplish the same purpose. Indeed, if the opening at the outer end of the pipe be sufficiently small relatively to that of the end-opening into the interior of the box the valve might be necessary only as an extra precaution.

The main purpose of making the vent-pipe or duct encircle the box at the base is to more effectually prevent the entrance of air from without, the idea being to provide an annealing-box that, while in fact not mechanically sealed, will be air-tight; or, in other words, to provide such a box that will be in effect sealed against the entrance of air from without and at the same time open to the escape of the steam and gases generated within. By arranging the pipe around the edge of the pan or base I secure a sufficient length of vent flue or duct to prevent the outer air from entering the interior of the box, it being obvious that, the pipe being highly heated and freely open to the interior of the box, any pressure of gas or steam inside the box would exist in the pipe, and in order for the air to find its way into the interior it would have to pass through a considerable length of flue against the pressure existing therein.

Such being the construction of the present

preferred form of my invention, no particular description of the operation of the same seems necessary further than to say that as soon as the pressure of whatever steam or gases form on the inside of the box becomes sufficient to traverse the length of the pipe the box vents itself, thus preventing that deposit of moisture on the interior of the wall which causes the cracking and breaking of the same, and actually preventing the formation of gases which might injure the articles being treated and which are not formed except under considerable pressure.

Although I have shown the inner end of the vent-pipe extending well up into the cover *a* of the box, it is only necessary that it should extend in practice sufficiently above the bottom above the point where any accumulation of water from the plates might enter, and it is quite immaterial to the invention how far or in what direction the outer end of the pipe extends.

Having thus described my invention, what I claim is—

1. The combination of an annealing box, and an air-vent pipe or flue cast in the base or pan of the box exteriorly of the body of said box, said pipe having one end extending into the box and the other open to the atmosphere outside the box; substantially as described.

2. The combination of an annealing box, and an air-vent pipe or flue cast in the base or pan of the box exteriorly to the body of said box, said pipe having one end extending into the box and the other open to the atmosphere outside the box and provided with an automatic safety valve; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

REGINALD BAILEY.

Witnesses:

CHAS. WILLIAMS,
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