

C. C. BALDWIN.
 ANNEALING FURNACE WITH INLET SEALED BY STEAM.
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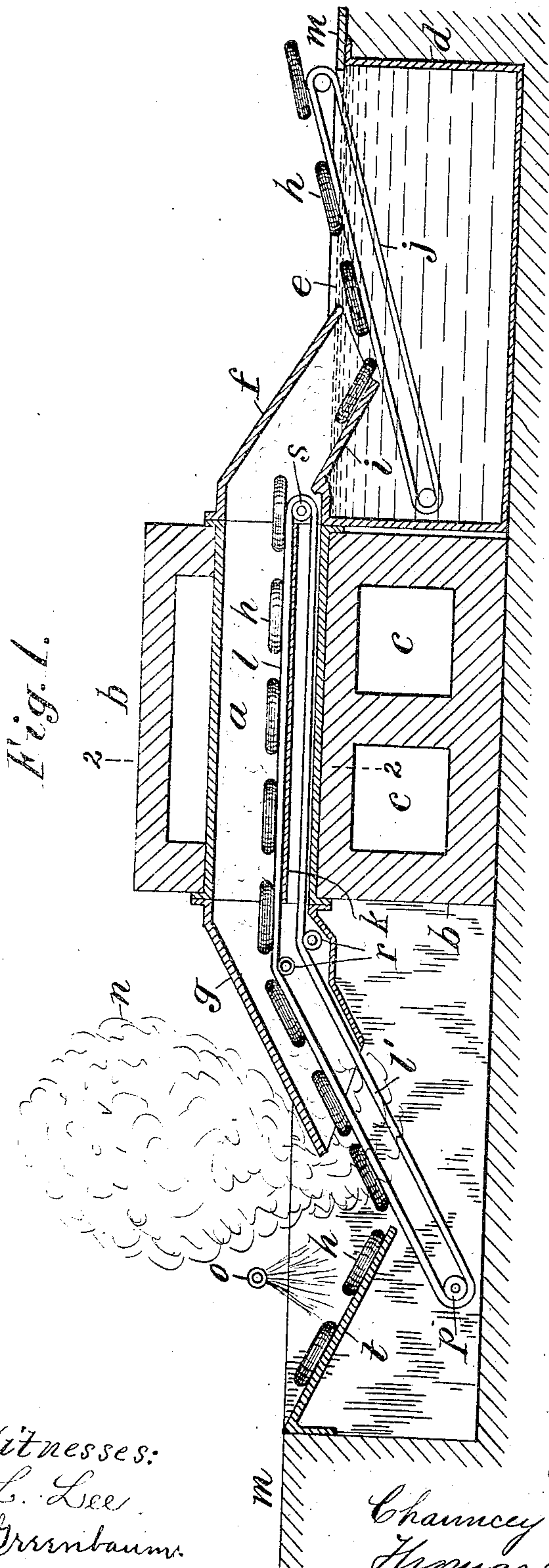


Fig. 1.

Fig. 4.



Fig. 3.

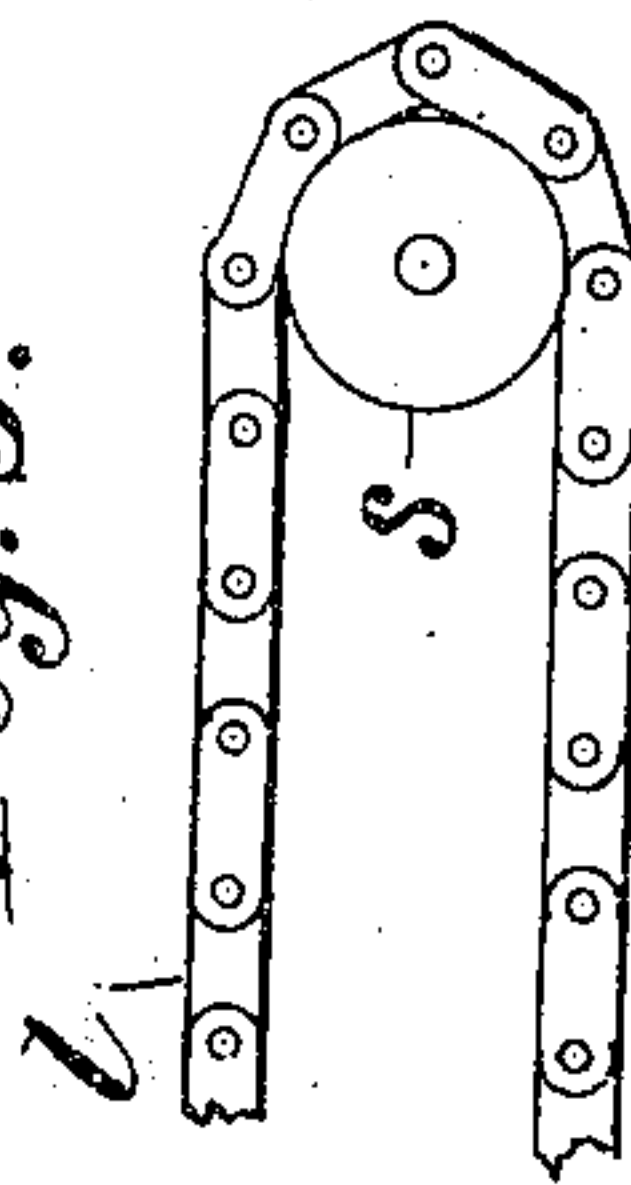
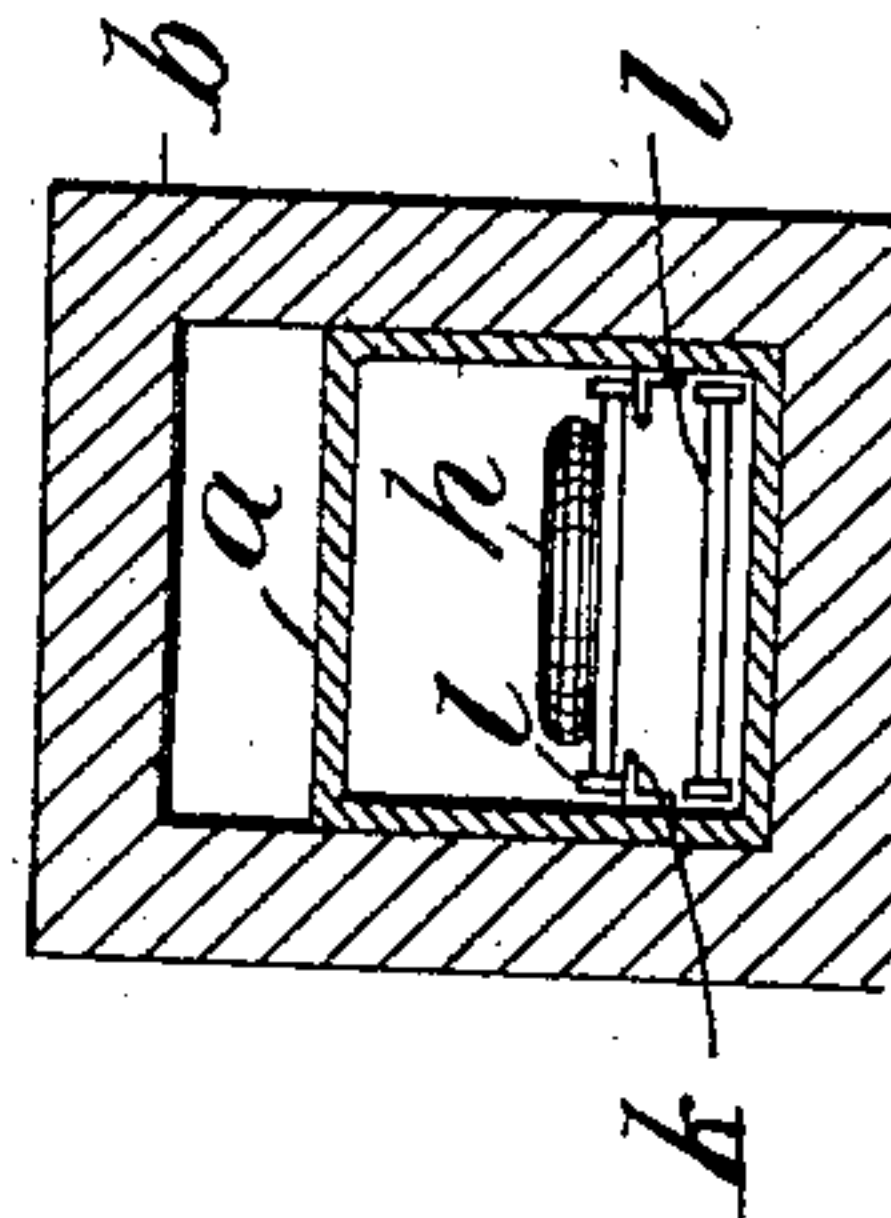


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ANNEALING-FURNACE WITH INLET SEALED BY STEAM.

932,945.

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To all whom it may concern:

Be it known that I, CHAUNCEY C. BALDWIN, a citizen of the United States, residing at 179 Water street, Perth Amboy, county of Middlesex, and State of New Jersey, have invented certain new and useful Improvements in Annealing-Furnaces with Inlet Sealed by Steam, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of annealing furnaces in which coils of wire or other metal articles which require annealing are conveyed through a heated retort from which the atmosphere is excluded to avoid the oxidation of the articles. Heretofore, the inlet mouth-piece of such annealing retorts has been closed by a water-seal or by a mechanical air-lock of some kind, but I have found by extensive practice that these means of closing the inlet can be wholly superseded by the discharge of steam from the retort itself through the inlet mouth-piece. A water-seal at the outlet mouth-piece is, however, desirable for the purpose of introducing the heated metal to a cooling bath before it is at all exposed to the atmosphere. Heretofore, live steam has been supplied to the interior of the retort for the purpose of driving any air out of the retort, but the live steam heretofore supplied to the interior of the retort for such a purpose has involved a very considerable running expense; while the steam which I employ to seal the inlet mouth-piece of the retort costs nothing, as it is generated by the heat within the retort itself.

My invention is based upon the discovery that a current of steam issuing from the mouth-piece of the retort effectually prevents the intrusion of air. The steam operates most effectively if the mouth-piece be bent downward to or near the level of the bottom of the retort.

My invention also includes the discovery, that where the outlet mouth-piece of the retort is sealed with water, steam is constantly generated and discharged from the surface of the water within such outlet mouth-piece by the heat in the retort itself and by the heat in the annealed articles which are quenched in such water as they pass out of the retort. Where the mouth-piece is open,

the air which may be contained in the retort when the fires are started to heat it, is effectually discharged from the retort by the generation of steam upon the surface of the water within the outlet mouth-piece, such steam rising within the retort and expelling the air and finally emerging in a continuous current from the inlet mouth-piece.

If it be desired, the articles may be moistened with water before they are fed into the retort, to increase the generation of steam.

Figure 1 of the drawing shows diagrammatically a longitudinal section of a furnace provided with the improvements; Fig. 2 is a cross section on line 2—2 in Fig. 1; Figs. 3 and 4 show a part of the conveyer in elevation and plan upon a larger scale than Fig. 1.

a designates the retort, mounted in brick-work *b* which is heated by furnaces *c* in any suitable manner. A tank *d* having water kept at a suitable level *e* is fixed adjacent to the outlet end of the retort, and the outlet mouth-piece *f* extends below the surface of the water sufficiently to seal the same to the admission of air. The inlet mouth-piece *g* slopes downwardly below the bottom line of the retort, and rolls *r* and *s* at opposite ends of the retort guide a portion *l* of an endless chain-conveyer through the retort; another portion *l'* sloping downwardly through the inlet mouth-piece to a driving-roll *p* at a lower level than the rolls *r*.

Figs. 3 and 4 show the form ordinarily used for the conveyer with two side chains and crossbars *l²* to carry the load. In Figs. 1 and 2, ledges *h* are shown secured in the sides of the retort to support the upper portion of the conveyer which carries the coils *h*, the lower portion which moves in the reverse direction lying close to the floor of the retort.

A gravity-slide *t* is provided at the outer end of the conveyer portion *l'* upon which an attendant lays the coils *h*, and down which they slide by gravity to the conveyer, as indicated by the arrow *v*. Before they enter the mouth-piece the coils may be sprinkled with water from a pipe *o*, the water serving to generate steam when the coils are heated. The conveyer carries the coils only to the outlet end of the retort, as indicated by the arrow *u*, and there discharges them to a sloping chute *i* which extends from the floor of the retort downward

into the water of the tank *d* within the outlet mouth-piece. The coils slide down this chute by gravity and are chilled in the water.

To remove the coils from the water, an independent discharge elevator *j* is sloped upwardly from the bottom of the chute above the top of the tank, receiving the coils as they slide down the chute into the water and carrying them successively above the level of the water to the edge of the tank, where they fall upon the floor *m*.

With the arrangement shown in the drawing, the mouth-pieces *f* and *g* extend below the floor level, so that a pit is required at each end of the retort, one of which pits holds the tank *d*, while the other contains the conveyer *l'* and the gravity-slide *t*, and requires no supply of water for sealing the inlet mouth-piece, as such mouth-piece is sealed by steam. The retort is cleared from air before introducing any articles which require annealing by the spontaneous generation of steam from the surface of the water in the outlet mouth-piece when the furnaces are heated.

When the steam escapes in a cloud from the inlet mouth-piece the coils may be fed into the retort and annealed without oxidation, as the expulsion of the air thus prepares the retort for annealing bright wire. The heat of such coils when plunged successively into the water in the outlet mouth-piece increases the generation of steam therein and maintains a constant discharge of steam from the inlet mouth-piece. It is immaterial what means are used for conveying the articles into the retort through the inlet mouth-piece which is open to the atmosphere and supplied with steam from the interior of the retort.

The construction of this annealing furnace secures the most economical operation, as it avoids the use of live steam from a steam boiler to expel the air from the retort and to keep it free from air; and the use of steam for sealing the inlet mouth-piece avoids the necessity of using a mechanical air-lock at the inlet of the retort, which air-lock greatly impedes the introduction of the articles to the retort and involves the consumption of power to operate the same.

With my construction, the inlet mouth-piece is constantly open to the atmosphere, so that the conveyer can operate without obstruction through the same, and the articles upon the conveyer can thus be carried directly into the retort without any interruption or obstruction.

The use of the gravity-slide *t* for feeding the coils or other articles to the inlet-conveyer enables an operator to supply the apparatus with coils or articles continuously, and the delivery of such coils or articles upon the floor *m* adjacent to the tank *d* provides for their continuous delivery from the

apparatus until an operator can remove them.

Having thus set forth the nature of the invention what is claimed herein is:

1. An annealing furnace having a heated retort, an inlet mouth-piece extended downward from the inlet of the retort and open to the atmosphere, means for conveying articles into the retort through such inlet mouth-piece, an outlet mouth-piece extended downward from the outlet end of the retort, and a tank with liquid covering such mouth-piece, the inlet being sealed by steam supplied from the interior of the retort, preventing the entrance of air.

2. An annealing furnace having a heated retort, an inlet mouth-piece extended downward from the inlet end of the retort and open to the atmosphere, an outlet mouth-piece extended downward from the outlet end of the retort, a tank with liquid covering such mouth-piece, and steam being supplied from the interior of the retort to the inlet mouth-piece to prevent the entrance of air, a conveyer extended through the inlet mouth-piece and through the retort to the outlet mouth-piece, and a chute delivering the articles from the retort by gravity to the water in the tank.

3. An annealing furnace having a heated retort, an inlet mouth-piece extended downward from the inlet end of the retort and open to the atmosphere, an outlet mouth-piece extended downward from the outlet end of the retort, a tank with liquid covering such outlet mouth-piece, and steam being supplied from the interior of the retort to the inlet mouth-piece to prevent the entrance of air, a conveyer extended through such inlet mouth-piece and through the retort to the outlet mouth-piece, a chute delivering the articles by gravity from the retort to the water in the tank and an independent elevator operating in the tank to receive the articles from the chute and discharge them from the tank.

4. An annealing furnace having a heated retort, an inlet mouth-piece extended downward from the inlet end of the retort and open to the atmosphere, an outlet mouth-piece extended downward from the outlet end of the retort, a tank with liquid covering such mouth-piece, steam being supplied from the interior of the retort to the inlet mouth-piece to prevent the entrance of air, rolls at the opposite ends of the retort and a roll below the inlet mouth-piece with endless chains fitted to such rolls, and operating to convey articles through the inlet mouth-piece and the retort and deliver them at the end of the retort, at its junction with the outlet mouth-piece.

5. An annealing furnace having a heated retort, an inlet mouth-piece extended downward from the inlet of the retort and open

to the atmosphere, a conveyer arranged and operating through the inlet mouth-piece and the retort to carry the metallic articles for annealing through the same, means for wet-
5 ting the said articles with water when placed upon the conveyer, a mouth-piece extended downward from the outlet end of the retort, and a tank with liquid covering such mouth-piece, the air being excluded from
10 the retort and the inlet mouth-piece by steam generated from the moisture upon the articles.

6. An annealing furnace having a heated retort, an inlet mouth-piece extended down-
15 ward from the inlet end of the retort and open to the atmosphere, an outlet mouth-piece extended downward, a tank with

liquid covering such outlet mouth-piece, steam being supplied from the interior of the retort to the inlet mouth-piece to pre- 20 vent the entrance of air, a conveyer having a portion within the retort, and sloping portion *l'* leading into the inlet mouth-piece, the gravity-slide *t* for supplying the articles to such conveyer, and a spray-pipe with 25 supply of liquid for wetting the articles as they pass into the retort.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHAUNCEY C. BALDWIN.

Witnesses:

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EDW. M. EINHORN.