

No. 622,301.

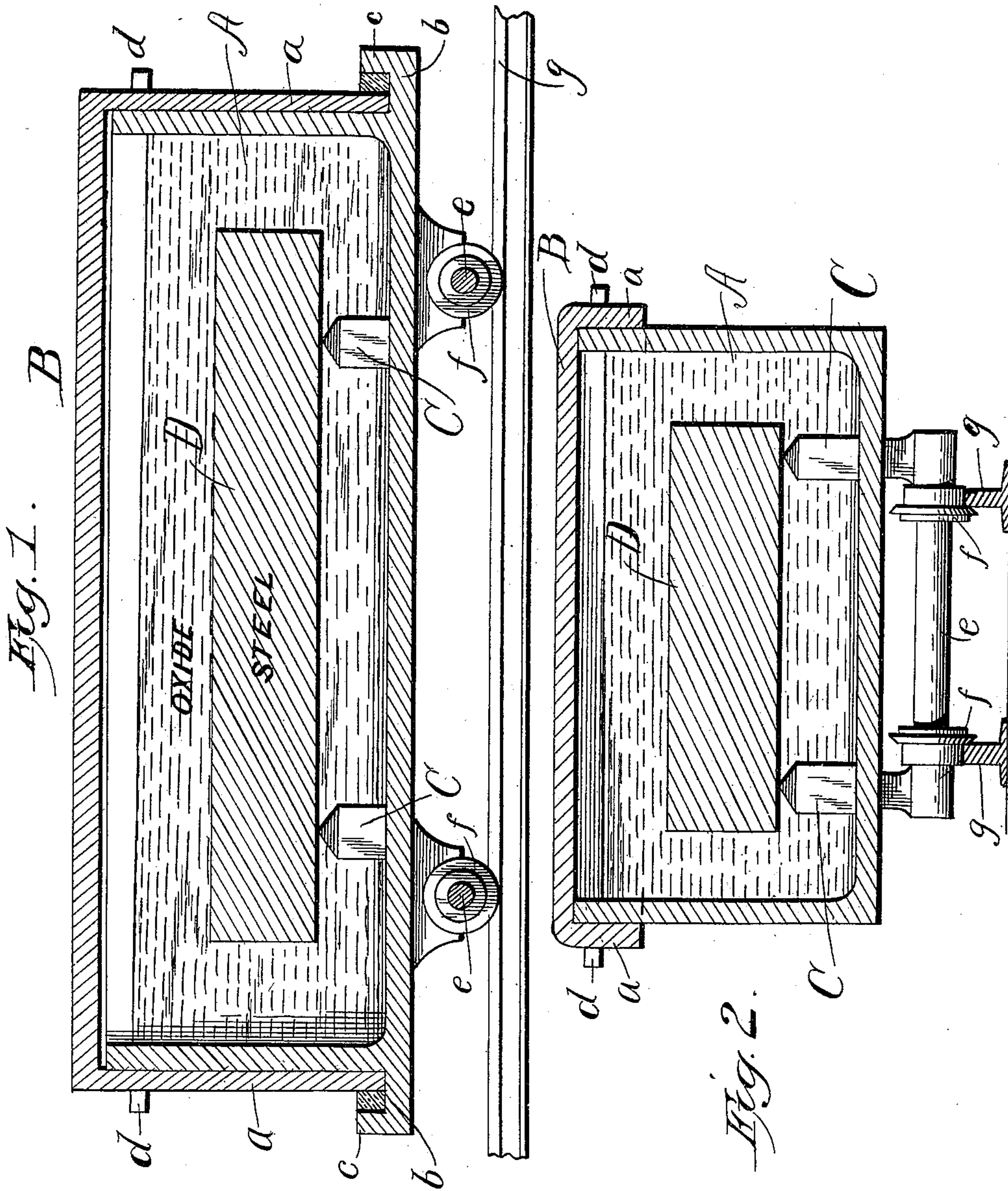
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E. D. WASSELL.

ART OF ANNEALING OPEN HEARTH OR BESSEMER STEEL.

(Application filed July 7, 1898.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

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ART OF ANNEALING OPEN-HEARTH OR BESSEMER STEEL.

SPECIFICATION forming part of Letters Patent No. 622,301, dated April 4, 1899.

Application filed July 7, 1898. Serial No. 685,332. (No specimens.)

To all whom it may concern:

Be it known that I, EDWIN DAVID WASSELL, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in the Art of Annealing Open-Hearth or Bessemer Steel; 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.

My invention relates to the art of metallurgy, has especial reference to open-hearth or Bessemer steel, has for its object a great reduction in the time required to anneal such steel, and consists in a process of annealing heavy armor-plate, siege-guns, and other articles, as will be fully disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a vertical longitudinal section of a receptacle or box employed in carrying out my invention, and Fig. 2 a vertical transverse section of a modified form of the same.

Reference being had to the drawings and the letters thereon, A indicates the receptacle or box, having a cover B, provided with depending flanges *a*, which extend the entire depth of the ends and sides of the box and rest upon a base *b*, leaving a space between the flanges *a* and the flanges *c* to be packed with clay should it be found desirable, or the flanges *a* may be made to extend down only a short distance over the sides and ends of the box, as shown in Fig. 2.

C C are posts movable on the bottom of the box to suit articles of different dimensions and upon which the article to be treated rests, and for the purpose of illustration D indicates a piece of armor-plate in position in the annealing-box.

The cover B is provided with pins or studs *d* to be engaged by a crane or derrick to remove and replace the cover.

The box is provided with axles *e* and wheels *f* and travels upon rails *g* to be inserted and withdrawn from a suitable furnace. The armor-plate as it comes from the rolls reduced to the proper thickness and while still hot is taken directly to the annealing-box and placed upon the posts C C, and the space

around the plate is then filled with liquid oxid of iron supplied from a furnace used for liquefying the oxid. After the box has been filled with liquid oxid of iron the liquid is allowed to cool sufficiently to become set or hard, but not below 800° to 1,200°, and thereby completely exclude the atmosphere, when the cover is placed upon the box and the box, with its contents, moved into a suitable furnace, where the temperature is maintained at from 800° to 1,200° Fahrenheit, or more, if necessary, but not sufficient to decarbonize the metal, for about twenty-four hours, when the box is withdrawn from the furnace and allowed to cool. In the liquid oxid of iron I may use about five per cent. of lime for the protection of the steel being annealed, as the mixture of the lime with the oxid would prevent any of the impurities leaving the oxid of iron and being absorbed by the steel.

I do not confine myself to any particular oxid, but include any oxid fusible above 800° to 1,200° when used in liquid form in the manner herein described.

I desire to state, further, that I do not confine myself to the idea of filling the space around the plate with oxid of iron all at one time or pour of the liquid, but may before the armor-plate or other articles of steel are placed in the annealing-box pour or run into the annealing-box a given amount of the liquid oxid to a depth of eight or nine inches, more or less, and allow it to cool sufficient to support the plate to be annealed, in which case I would dispense with the posts C C. I also desire to state that in the annealing of small or light steel castings it would be necessary to pour the liquid oxid of iron into the annealing-box so as to form layers, each layer being sufficient to completely cover the casting or castings to be annealed, thus forming tiers, allowing each layer of the liquid time to cool and set before another layer is formed above it.

It may be proper to state for the benefit of those who may use my process of annealing heavy castings or plates of steel that if such castings or plates are hot—say cherry red—when the liquid oxid is poured into the annealing-box and around the plate or casting the oxid will not adhere to the steel being annealed, but the liquid oxid will remove all

oxid from the plate or casting, the surface of which, after being annealed, will be perfectly free from either oxid or sand.

5 The annealing-box may be used without the cap or cover if the liquid oxid is made deep enough above the upper surface of the armor-plate or other article of steel being annealed.

10 For complete and uniform annealing of the steel under this process the steel should be completely submerged or covered in the liquid oxid to a depth of from six to ten inches.

Having thus fully described my invention, what I claim is—

15 1. The process of annealing steel, which consists in covering the metal while heated with a liquid oxid, allowing the oxid to partially cool and form an air-excluding crust, maintaining the heat in the metal and the
20 oxid for a determinate time and finally removing the source of heat and allowing the metal and the oxid to slowly cool.

2. The process of annealing steel, which

consists in covering the metal while heated with liquid oxid of iron, allowing the oxid to
25 partially cool and form an air-excluding crust, maintaining the heat in the metal and the oxid for a determinate time and finally removing the source of heat and allowing the metal and the oxid to slowly cool.

30 3. The process of annealing steel, which consists in covering the metal while heated with a liquid oxid and lime, allowing the oxid and the lime to partially cool and form an air-excluding crust, maintaining the heat in the
35 metal, the oxid and the lime for a determinate time and finally removing the source of heat and allowing the metal, the oxid and the lime to slowly cool.

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

EDWIN DAVID WASSELL.

Witnesses:

H. E. SEIBERT,

CHAS. H. GEILFUSS.