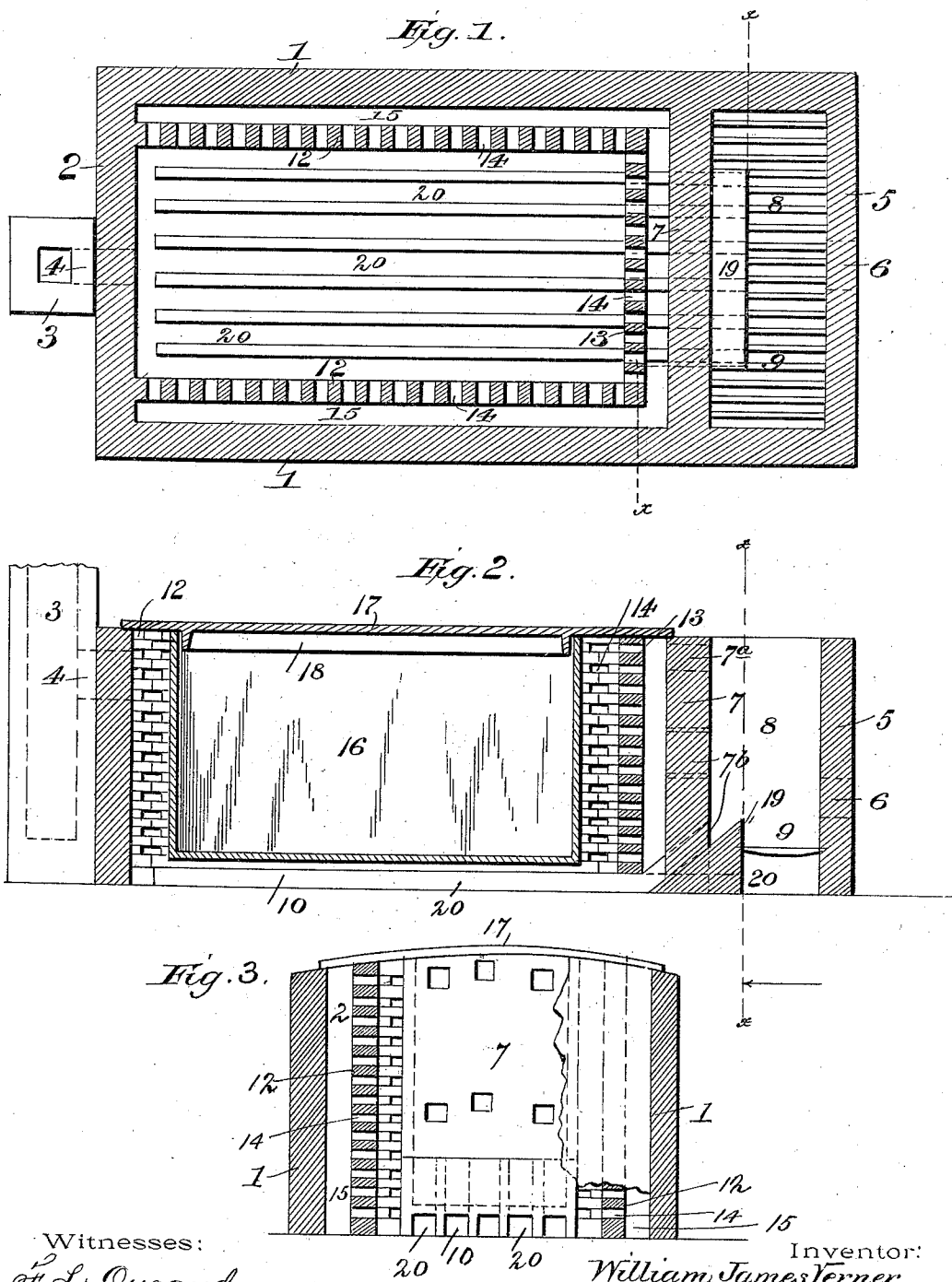


(No Model.)

W. J. VERNER.
ANNEALING FURNACE.

No. 542,698.

Patented July 16, 1895.



Witnesses:

F. L. Ourand.

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Inventor:

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UNITED STATES PATENT OFFICE.

WILLIAM JAMES VERNER, OF NEW CASTLE, PENNSYLVANIA, ASSIGNOR OF FIVE-EIGHTHS TO FRANK FELTON, CHARLES S. WALLACE, WILLIAM L. JOHNSON, AND CHARLES H. JOHNSON, OF SAME PLACE.

ANNEALING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 542,698, dated July 16, 1895.

Application filed March 13, 1894. Serial No. 503,485. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JAMES VERNER, a citizen of the United States, and a resident of New Castle, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Annealing-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in furnaces for annealing steel and iron plates or sheets, wire, and metal of any shape.

As is well known to those skilled in the art, iron or steel after it has been rolled or fashioned into sheets, plates, or other forms is hard and brittle, rendering it necessary to subject it to an annealing process in order to soften it and make it pliable. This is usually accomplished by placing the same in an airtight cast-iron box which is pushed into a furnace and subjected to a high degree of heat. After undergoing the heating process, which usually occupies about three days, the fires are drawn and allowed to cool gradually before removing the sheets or plates.

The above method is objectionable in many respects, which objections my invention is intended to obviate, and it consists in the novel construction and combination of parts hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a horizontal sectional view of an annealing-furnace constructed in accordance with my invention, the box for containing the articles to be annealed being removed. Fig. 2 is a longitudinal sectional view, the said box being in place. Fig. 3 is a transverse section on the line *x x*, Fig. 1.

In the said drawings, the reference-numeral 1 designates the side wall of the furnace, built of fire-brick; 2, the rear end wall, having stack 3 provided with an opening 4, leading to the interior of the furnace.

The numeral 5 designates the front wall having stoke-hole 6, and 7 an inner wall forming a fire-box 8, provided with a grate 9.

This inner wall is provided with top and bottom flues 7^a and 7^b leading from the fire-box to the combustion-chamber.

The numeral 10 designates the bottom of the furnace, upon which is built a combustion-chamber consisting of the side walls 12 and front wall 13, of suitable refractory material, perforated with numerous holes 14. There are spaces 15 between the side walls 12 and walls 1 of the furnace, and a similar space between the wall 13 and wall 7. Located within this combustion-chamber and resting upon the bottom 10 of the main or outside furnace is a rectangular box 16 for containing the articles to be annealed. This box is made of wrought or cast iron provided outside with a casing of fire-brick or other refractory material, and when in place a space will be formed between it and the combustion-chamber and between its rear wall and the rear wall 2 of the outer furnace. This box is provided with a cover 17, having a downwardly-depending rectangular flange 18, which fits within the box and makes a tight joint.

The numeral 19 designates the bridge-wall, formed with a number of flues 20, which extend through the bottom 10 of the furnace and communicate with the space between the rear end of box 16 and the rear of wall 2.

The operation is as follows: The articles to be annealed are placed in box 16 and the cover placed thereon. Fire is then made in the fire-box, and the products of combustion will pass through the flues in the wall 7 into the combustion-chamber, and will pass around the annealing-box, thoroughly heating the same. At the same time a portion of the products of combustion will pass through the flues 20 in the bottom 10, heating the bottom of the annealing-box. The products of combustion will then escape through the open rear ends of flues 20 into the space between the rear wall 2 and the rear end of the annealing-box, and will finally escape through the smokestack. As will be seen in Fig. 2, the front end of the flues 20 communicate with the ash-pit, so that air therefrom will enter the combustion-chamber, so as to insure the proper consumption of the products of

combustion from the fire-box. It will thus be seen that the annealing-box will be thoroughly heated on the sides and bottoms, and when the articles therein have been subjected
5 to the heating process for a sufficient length of time the cover is taken off and the articles removed to make room for a new charge. By this method it is not necessary to draw the fire or to remove the annealing-box to cool
10 the articles contained therein. In the ordinary annealing-furnaces in which the boxes are alternately heated and cooled, the latter soon become warped so that they have to be replaced by new ones.

15 As the annealing-box in my furnace remains permanently in the furnace the above objections are obviated.

Having thus described my invention, what I claim is—

20 The combination with the fire box, provided

with a grate, of the combustion chamber consisting of the side and front walls provided with perforations, the flues in the bottom of the combustion chamber communicating with the fire box below the grate, the bridge wall 25 provided with flues, and the annealing box located in the combustion chamber and provided with a cover having the downwardly extending rectangular flange, the construction being such that a space is formed between 30 the combustion chamber and the walls of the furnace, substantially as described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

WILLIAM JAMES VERNER.

Witnesses:

W. E. JACKSON,

J. E. VAN GORDER.