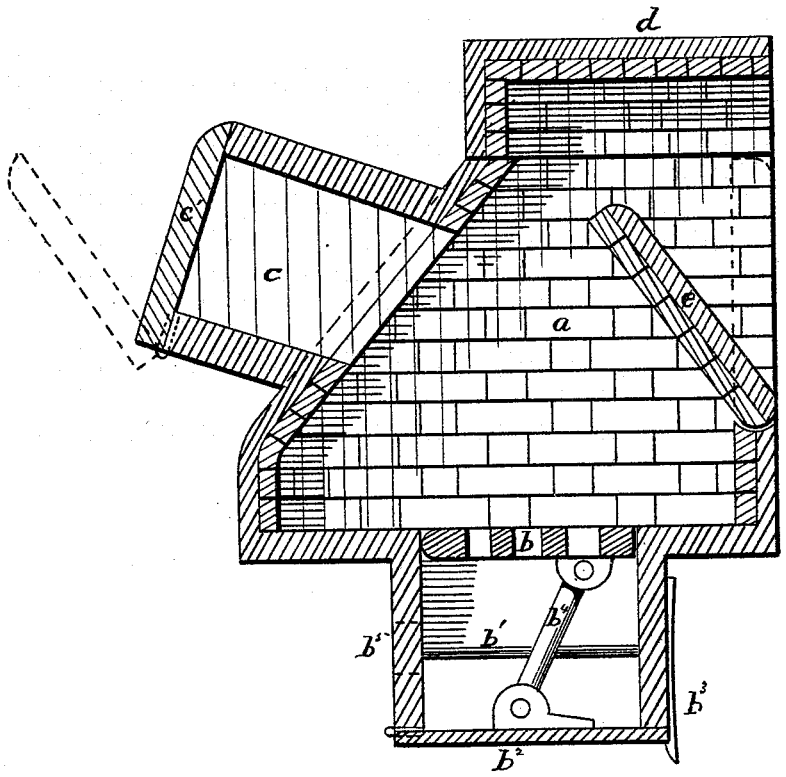
A. GALE.

FURNACES FOR HEATING IRON AND STEEL BLANKS.

No. 182,912. Patented Oct. 3, 1876.



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UNITED STATES PATENT OFFICE.

ALBERT GALE, OF ST. JOHNSBURY, VERMONT.

IMPROVEMENT IN FURNACES FOR HEATING IRON AND STEEL BLANKS.

Specification forming part of Letters Patent No. **182,912**, dated October 3, 1876; application filed May 3, 1876.

To all whom it may concern:

Be it known that I, ALBERT GALE, of St. Johnsbury, in the county of Caledonia and State of Vermont, have invented certain new and useful Improvements in Furnaces for Heating Iron and Steel; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in that class of box furnaces or forges employed for heating iron or steel blanks, used largely in establishments where cutlery, farm-tools, and similar implements are manufactured; and has for its object to provide a furnace which will utilize all the heat, and prevent unnecessary consumption of fuel. It consists in an adjustable front, whereby the open top or mouth of the fire-chamber may be contracted or enlarged, and in other improvements hereinafter fully explained.

In the drawings, Figure 1 is a vertical cross-section of a furnace constructed according to my invention.

A furnace of the class to which my improvements relate is ordinarily made in rectangular or box form, with the top open, and having its walls all connected and immovable, forming a fire and heating chamber, within which is placed the iron or steel. The lower portion (about one-third) of the chamber contains the fire, while the upper portion affords ample space within which to suspend the articles to be heated. The articles are not laid on nor thrust into, but are suspended by suitable means over, the fire, and within the chamber or across the open top or mouth. When the number of articles to be heated is large, so that when placed in the furnace they fill the entire heating-space, no heat will escape without being first utilized; but when the number is small, and only a small portion of the heating-space filled, the wide open top or mouth will permit the escape of a large amount of unused heat, so that it is necessary to keep as much fire to heat a small as a large number of articles. To provide against this loss I construct the front wall of the furnace, above the space occupied by the fire, separate from the other portions of the surrounding walls, and so attach it that its top may be turned inward and contract the mouth of the heating-chamber so as to adapt the space to and concentrate all the heat on the articles placed therein. This contraction of the mouth or top is not intended to nor does it affect the draft which is forced, by means of a blow-pipe, below the fire, but it adapts the heating-space of the chamber to the number of articles, and concentrates and prevents the loss of heat.

The furnace is set up on legs or masonry, so as to bring it within easy reach of the workmen, and so that the blow-pipe may be readily connected to the back side.

a is the fire-chamber, lined with fire-brick or other suitable material. *b* is the grate hinged to the bottom of the furnace, so that it will turn down into the ash-box b^1, for the purpose of cleaning the chamber *a*. b^2 is a door or trap, hinged to the bottom of the ash-box, closing the latter, and held by the spring-catch b^3. It is also connected with the grate *b* by the rod b^4, so that when it is opened it will cause the grate to turn down, and thus dump the fire out of the chamber *a*. b^5 is an opening for insertion of end of blow-pipe. *c* is the hopper for feeding the fuel to the fire. In furnaces of ordinary construction it is left open, and there is through it more or less draft, causing the fuel to become heated, thereby causing rapid and unnecessary consumption. To obviate this increased and unnecessary consumption, I close the hopper with the door *c'*, which is hinged to the lower lip of the hopper and may be open when fuel is to be put into the furnace. *d* is a removable cap placed over the top of the furnace or fire-chamber. It has one side open, to give necessary outlet for the fire, and to enable the workman to handle the articles that are being heated. It is used only when the articles to be heated are laid across the top of the fire-chamber, in which case it forms a kind of second chamber, protecting the implements or articles from currents of cold air, and confining the heat more immediately about the said articles.

The portion *e* of the front wall of the fur-

nace, above the space in the chamber taken up by the fire, is made in separate section and disconnected from the other walls except by journals or hinges. It fits neatly between the end walls, and keeps the front closed, so that no heat can escape outward. Its lower edge is slightly rounded, or made convex, and rests in a corresponding concavity in the top of the short fixed portion e'. It may be set in a vertical position, as indicated by dotted lines, or may have its top inclined inward, so as to contract, but not entirely close, the open top or mouth of the furnace.

When the front e is inclined inward, as shown in the drawings, there would be a greater tendency of the heat to pass through the hopper were the latter left open; but the hopper being closed by the door c', this increased tendency of the heat will be obviated, and all of said heat will ascend through the open top or mouth, so that no greater amount of fuel will be consumed.

The front e when inclined inward causes the heat to have a backward course, and strike against the rear wall of the cap d, by which it is turned toward the front. This arrangement causes a retention or concentration of the heat about the articles laid over the mouth of the fire-chamber that could not be otherwise secured.

It will be seen that in a furnace constructed according to my invention a greater result may be obtained from the consumption of a given quantity of fuel than can possibly be obtained in furnaces of ordinary construction.

Having described my invention, what I claim and desire to secure by Letters Patent, is—

1. In a furnace for heating blanks, the adjustable front e, in combination with a suitable device for supplying a blast of air to the fire-chamber, substantially as described.

2. The combination, with the chamber having the hopper c, of the adjustable front e, door c', and cap d, as and for the purpose specified.

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

ALBERT GALE.

Witnesses:

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