J. H. HELM.

Furnace for Link-Welding.

No. 200,195. Patented Feb. 12, 1878.

Fig. 1.

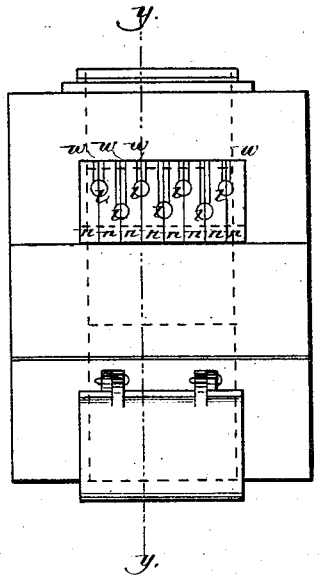


Fig. 3.

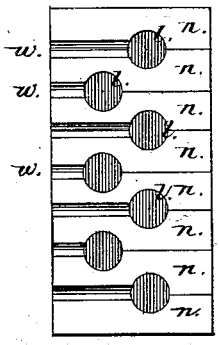


Fig. 4.

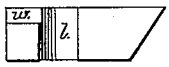
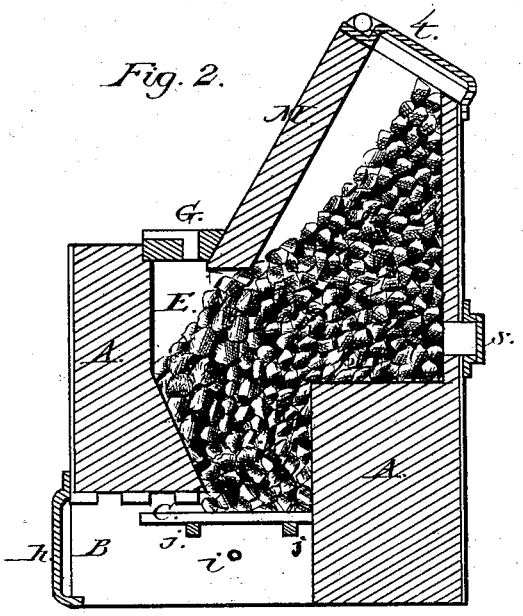


Fig. 2.



Witnesses

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IMPROVEMENT IN FURNACES FOR LINK-WELDING.

Specification forming part of Letters Patent No. **200,195**, dated February 12, 1878; application filed November 8, 1877.

To all whom it may concern:

Be it known that I, JOHN HENRY HELM, of Allegheny, county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Welding-Furnaces; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in welding-furnaces, and has relation more especially to that class of furnaces used in connection with the operation of welding chain-links; and consists in providing such furnace with a fuel-chamber, a portion of which is above and in the rear of the crown of the working-chamber, the front wall of said fuel-chamber being inclined, with its base overhanging the fire-chamber, and serving as a support for the inner end of the fire-brick which form the perforated crown of the working-chamber, the floor of said fuel-chamber being in the rear and above the plane of the grate of the fire-chamber, the lower part of the inner surface of the front or breast wall of the fire-chamber projecting inward to a vertical line in the rear of the openings or heating-cells in the crown of the working-chamber; the whole being so constructed and operating that the fuel is automatically fed into the fire and working chambers of the furnace, keeping them full by a constant supply of highly-heated fuel, and when the grate-bars are removed for cleaning the furnace there will be retained on the floor of the fuel-chamber a sufficient quantity of burning fuel to restart the fire on the replaced grate-bars without the trouble and expense of rekindling it, as in the ordinary way, and also so that the air forced up through the grate-bars and burning fuel shall not be in a direct line with the openings or heating-cells in the crown of the working-chamber.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the accompanying drawings, which form part of my specification, Figure 1 is a top view or plan of my improvement in welding-furnaces. Fig. 2 is a vertical section of the same at line *y* of Fig. 1. Figs. 3 and 4 are detail views of the brick for the crown of the furnace.

In the accompanying drawings, A represents the masonry-work of the furnace; B, the ash-pit; C, the grate; D, the fire-chamber; E, the working-chamber; F, the fuel-chamber, and G the crown. The ash-pit B is provided with a close-fitting door, *h*, and an opening, *i*, for the blast-pipe. The grate-bars of the grate C rest on two cross-bars, *j*. The fire-chamber D is above the grate C, and unites with the working-chamber E. The fire-chamber D and working-chamber E may be said to be one chamber, but are referred to separately in this case in order to more clearly set forth the working and points of my invention.

The inner surface of the front or breast wall K of the fire-chamber D projects inward to a vertical line beyond the openings or heating-cells *l* in the crown G, to prevent the air from passing upward in a direct line through the grate, fire-chamber, and working-chamber to the openings or heating-cells *l;* otherwise the direct currents of air, combined with the heat and flame of the furnace, would cause a wasting action on the links placed in the openings or heating-cells *l*. This inward projection of the breast-wall K also causes the fuel, as it is fed down from the fuel-chamber F, to hug the walls of the fire-chamber D, so that it is always properly filled with fuel, automatically fed to the fire-chamber D from the fuel-chamber F by the gravity of the fuel. By thus keeping the fire-chamber D filled with fuel in a heated condition prior to entering said chamber, and by the inward projection of the breast-wall K, the air-blast, which enters the ash-pit B at the opening *i*, is caused to pass up through the grate C, and up through the burning mass of fuel in the fire and working-chambers, thereby producing a continuous clear and white welding-heat, without that cutting and wasting action common to welding-furnaces. The front wall M of the fuel-chamber is inclined at an acute angle to the vertical plane passing through the fire and working chambers, and the base of said wall overhangs said chambers, and serves as a sup-

port and an abutment for the inner and beveled ends of the fire-brick *n*, which form the crown G of the furnace.

By this construction and arrangement of the wall M the fuel in the fuel-chamber F is supplied to the working and fire chambers at a white heat, and said chambers are kept filled to the proper height and nearness to the crown G for efficient working of the furnace, whereby much time and fuel are saved, the workmen not being required to wait for the furnace and fuel to attain the proper degree of heat every time fresh fuel is supplied, as in the ordinary case.

It is a necessity in a welding-furnace to keep the fuel burning at a welding-heat, for at less than such heat the furnace will be inoperative. The bottom *p* of the fuel-chamber F is in the rear of the grate and above it. By this arrangement and position of the bottom *p* the grate-bars C can be withdrawn for the purpose of cleaning the furnace and grate, and a sufficient quantity of burning fuel will remain on the bottom *p* to restart the fire in the fire-chamber without the loss of time, labor, and expense of rekindling it, as in the old mode. In restarting the fire, after cleaning the grate and furnace, the operator inserts a poker or other suitable tool through the door S, and forces the fuel off the bottom *p* down onto the grate C. He then charges the fuel-chamber with fuel, and closes down the lid *t*.

The crown G is constructed of large fire-brick *n*, having a groove or grooves in the side, which, when brought together, form the heating openings or cells *l*, which, in form and size, should correspond to the article to be heated. The fire-brick *n* are also furnished with grooves at their top edge, forming, when brought together, the recess *w*, for the reception of the rods which support the links in the openings or cells *l* while being heated.

By constructing the fire-brick *n* as hereinbefore described, the number of the cells *l* and recesses *w* can be increased or diminished at pleasure, whereby the heating capacity of the crown G can be adapted to the work and speed of the workmen. It is frequently the case that the workman burns and destroys blanks by undertaking to use too many cells.

Furnaces such as are hereinbefore described need no chimney, as coke is the usual fuel, which burns with a clear flame, and with but very little smoke. The outlet for the flame and heat are the heating-cells in the crown of the furnace. The inward projection of the wall of chamber D will cause the burning fuel (coke) to hug the walls of the fire and working chambers, so that no air can pass up between the walls and fuel, but must pass through the burning fuel, so that no free oxygen will be allowed to pass out through the heating-cells in the crown of the furnace. If free oxygen passes up through the heating-cells it causes a wasting action on the links while being heated for welding. As the fuel burns away, fresh fuel falls into the working and fire chambers from the fuel-chamber, and thus the fuel is automatically fed into working and fire chambers, so as to keep them always full, which at all times is necessary to the proper working of the furnace for welding.

The inner surface of the front or breast wall, projecting to a vertical line beyond the heating-cells *l* in the crown G, also economizes fuel by preventing undue consumption of it.

Having thus described my improvement, what I claim as of my invention is—

1. In a welding-furnace, a fuel-chamber above the fire-chamber, having its bottom above and in rear of the grate, substantially as herein described, and for the purpose set forth.

2. In a welding-furnace, the fire-chamber, the inner surface of the front or breast wall slanting inward to a vertical line beyond the heating-cells in the crown of the furnace, in combination with the fuel-chamber above and in rear thereof, substantially as herein described, and for the purpose set forth.

3. In a welding-furnace, the crown G, constructed of a series of fire-bricks having grooves in their sides and in their top edge, forming, when brought together, cells *l* and recesses *w*, substantially as herein described, and for the purpose set forth.

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Witnesses:
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