

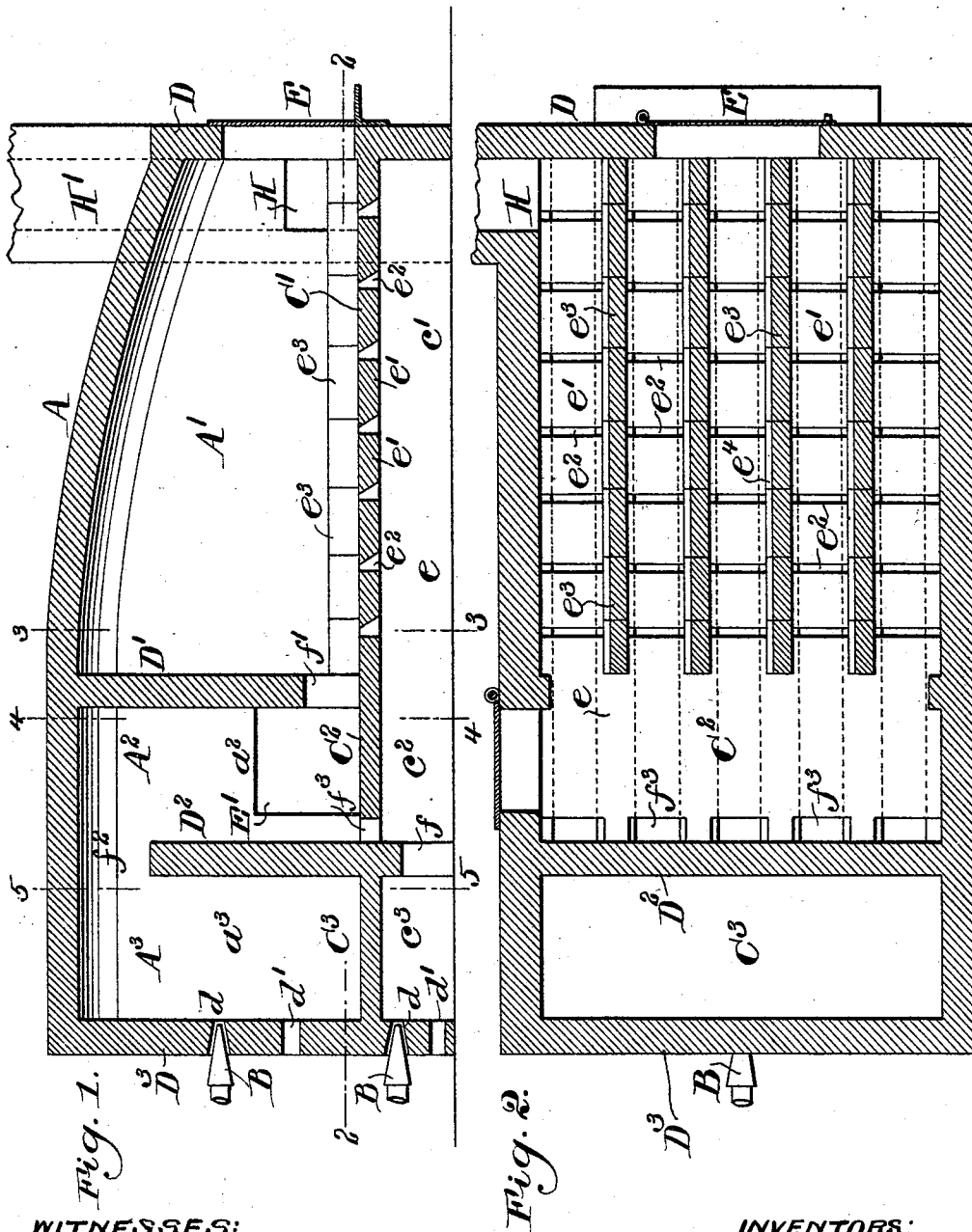
(No Model.)

2 Sheets—Sheet 1.

H. WHITELEY & J. MALLEN.
OIL FURNACE.

No. 538,854.

Patented May 7, 1895.



WITNESSES:
Henry Dwyer
H. J. Pack

INVENTORS:
Henry Whiteley
James Mallen
by their atty
James T. Chambers

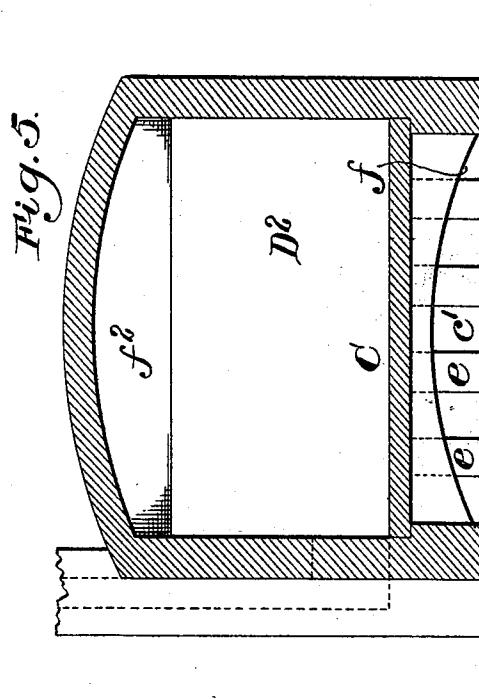
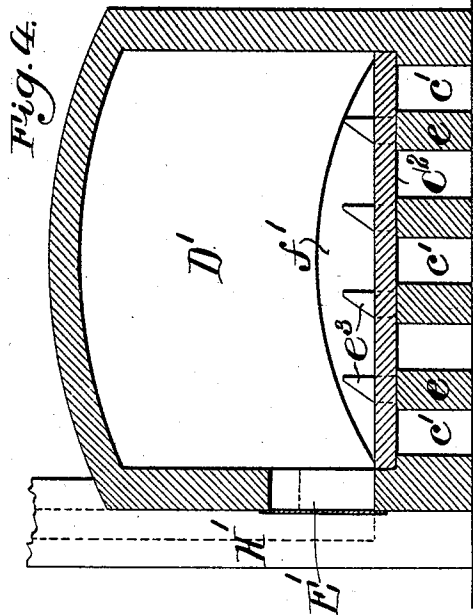
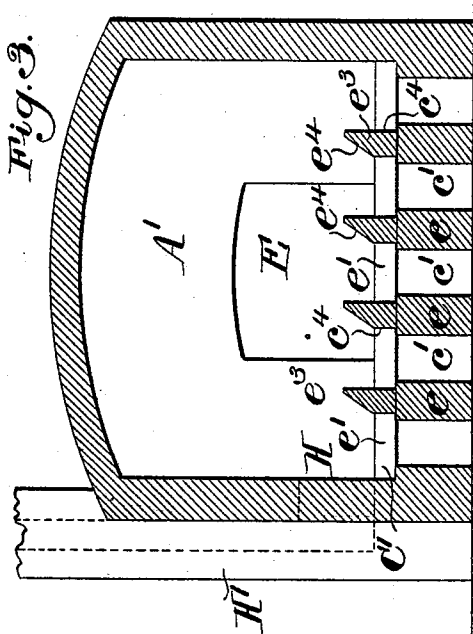
(No Model.)

2 Sheets—Sheet 2.

H. WHITELEY & J. MALLIN.
OIL FURNACE.

No. 538,854.

Patented May 7, 1895.



WITNESSES:
Henry Dwyer
H. J. Pack

INVENTORS
Henry Whiteley
James Madden
by their attys.
Francis T. Chamberlain

UNITED STATES PATENT OFFICE.

HENRY WHITELEY, OF PHILADELPHIA, PENNSYLVANIA, AND JAMES MALLIN, OF NORTH EAST, MARYLAND.

OIL-FURNACE.

SPECIFICATION forming part of Letters Patent No. 538,854, dated May 7, 1895.

Application filed December 18, 1894. Serial No. 532,145. (No model.)

To all whom it may concern:

Be it known that we, HENRY WHITELEY, residing in Philadelphia, county of Philadelphia, State of Pennsylvania, and JAMES MALLIN, residing in North East, in the county of Cecil, State of Maryland, citizens of the United States, have invented a certain new and useful Improvement in Oil-Furnaces, of which the following specification is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

Our invention relates to furnaces, and particularly to such furnaces as are employed to heat metal preparatory to subjecting it to forging processes.

The main object of our invention is to provide a furnace wherein a portion of the products of combustion may conveniently be employed in one chamber to heat billets of metal and then be employed with the remainder of the hot gases to heat sheets or other forms of metal in a second chamber. Another object is to provide a floor on which sheets of metal can be supported in such a manner that they will be fully subjected to the action of the heated gases.

To effect these ends our invention consists, first, in providing a furnace with certain chambers and passages for the heated gases, as will be more fully pointed out in the description and claims.

It further consists in providing pieces which support tiles or blocks so laid that spaces will be left between them, and in supporting on said piers, ridges, preferably consisting of scarfed bricks, on which the sheets of metal can be laid so that the heated gases can have free passage around them.

Other novel features will be pointed out in the claims which are appended to and form a part of this specification.

Referring now to the accompanying drawings, which illustrate a furnace constructed according to our invention, Figure 1 is a sectional elevation of a furnace embodying our novel constructions and adapted to be heated by oil or gas burners. Fig. 2 is a plan view shown in section on the line 2 2 of Fig. 1; and Figs. 3, 4, and 5 are sections taken, respectively, on the lines 3 3, 4 4, and 5 5 of Fig. 1.

A is a furnace which is divided into a number of sections A' A^2 A^3 by means of partitions D' D^2 .

A' is a heating chamber which is specially adapted for sheets of metal, and is provided with a floor C' on which the sheets are supported. Any suitably constructed floor can be employed in this chamber, and unless it is particularly mentioned we do not wish the claims to be limited to the particular floor shown. We prefer, however, to employ the floor shown which is built up as follows: Piers ee are built lengthwise of said chamber. On these piers are laid tiles or blocks $e'e'$ in such a manner that spaces e^2e^2 will be left between them and serve as passages from the flues $c'c'$ formed by the piers and the covering tiles to the space above the floor. The ends of the tiles which cover one flue do not, however, abut against the corresponding ends of the tiles covering the adjacent flues, but a space as c^4 is left between them. In these spaces are arranged ridges e^3 which are supported on the piers and which are preferably composed of a series of bricks as shown, it being noted that the bricks are firmly supported on the piers and are held in position by the adjacent ends of the tiles e' .

In order that the sheets of metal which are to be heated in the chamber A' may be surrounded to as great extent as possible by the heated gases we prefer to make the supporting ridges with a narrow top. As shown the bricks are scarfed at e^4 .

E is a door conveniently placed in the end wall D of the furnace and H is an outlet flue situated above the level of the floor C' and leading to a stack or outtake pipe H' .

The heating gases are admitted to the chamber not only for the space beneath the floor but also through a passage f' formed in the partition D' and opening near or just above the level of the floor as shown. This passage f' leads from near the bottom of the chamber a^2 which chamber constitutes the upper part of the section A^2 of the furnace, which is divided into the chambers a^2c^2 by the partition C^2 . This partition forms the floor of the chamber a^2 and serves to support billets of metal which are placed in the chamber a^2 to be heated. To support the floor C^2 the

piers $e e$ may be extended back as far as the partition D^2 as shown. A passage f^2 is formed in the partition D^2 preferably near its top as shown, for the entrance of hot gases, and it will be noticed that by arranging the inlet passage f^2 near the top of the chamber a^2 and the outlet passage f' near its base that the hot gases will flow downward through the chamber impinging directly on the billets placed therein.

E' is a door arranged in the side wall of the furnace, by which access can be had to the chamber.

Any suitable furnace can be employed to furnish the necessary heat. We prefer, however, to employ gas or oil burners $B B$ which may be arranged in front of or project through openings as $d d$ in the front wall D^3 of the furnace. The section A^3 into which the burners project is conveniently divided into two chambers a^3 and c^3 by a partition C^3 , the upper chambers a^3 being connected with the chamber a^2 by the passage f^2 and the lower chamber c^3 being connected with the space beneath the floor C' by means of the passage f . $d' d'$ are air inlet openings in the wall D^3 . If desired a passage f^3 can be provided in the floor C^2 so that some of the heated gases from the lower chamber c^2 can flow into the lower part of the chamber a^2 and assist in heating the billets of metal therein.

In operation the billets of metal are introduced into the chamber a^2 through the door E' and are subjected to the action of a part of the heated gases escaping from the section A^3 , which gases however, from the arrangement of the chamber impinge directly on the metal therein. When the billets of metal are properly heated they are of course removed and replaced by others.

The chamber A' is especially adapted for the heating of metal sheets which are introduced through the door E , and are subjected to the action of the heated gases, which not only enter through the opening f' and flow along beneath the sheets but which also rise through the openings $e^2 e^2$ in the floor.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination in a furnace of a chamber a^2 an inlet opening f^2 for heated gases near the top of said chamber, a heating chamber A' having a floor C' provided with passages through it, and on which floor metal to be heated is adapted to be supported, a passage f' leading from near the bottom of the chamber a^2 into the chamber A' at or just above the level of the floor C' and flues or passages for conducting heated gases into the space beneath the perforated floor.

2. The combination in a furnace of a chamber a^2 an inlet passage leading thereto for heated gases, an outlet f' opening therefrom into a chamber A' , said chamber A' having a floor C' consisting of piers $e e$ and tiles $e' e'$ laid thereon so as to leave passages $e^2 e^2$ be-

tween them, and so as to form flues $c' c'$ and a passage for heated gases opening into the flues $c' c'$.

3. The combination in a furnace of a combustion or mixing section A^3 , a preheating chamber a^2 and a heating chamber A' , a passage f^2 leading from the combustion or mixing chamber A^3 to the chamber a^2 , a passage leading from the chamber a^2 to the heating chamber A' whereby a portion of the products of combustion pass through the preheating chamber, a passage f for conducting heated gases from the chamber A^3 into the chamber A' and an outlet flue H leading from said chamber.

4. The combination in a furnace of a combustion or mixing section A^3 , heating chambers a^2 and A' , a floor C' in the chamber A' having passages $e^2 e^2$ formed in it, a passage f^2 leading from the section A^3 into the top of the chamber a^2 a passage f' leading from near the bottom of said chamber a^2 into the chamber A' and opening thereunto just above the level of the floor C' , a passage f leading from the section A^3 and adapted to conduct gases therefrom into the space beneath the floor C' whereby a portion of the heated gases will be conducted through the chamber a^2 and impinge on billets of metal placed therein, and an outlet flue H situated above the level of the floor C' .

5. In a furnace a combustion section A^3 divided into upper and lower chambers $a^3 c^3$, a chamber a^2 , a passage f^2 leading from the section a^3 of the chamber A^3 into the chamber a^2 , a heating chamber A' having a floor C' therein, a passage f' leading from the chamber a^2 into the chamber A' above the level of the floor, a passage leading from the lower chamber or section c^3 to the space beneath the floor C' and an outlet flue H leading from the chamber A' above the flue C' .

6. In a furnace the combination of the section A^3 divided into chambers $a^3 c^3$ by the partition C^3 , a chamber a^2 connected to the section a^3 by a passage f^2 and having a floor C^2 a heating section or chamber A' having a floor C' , a passage f' opening from the chamber a^2 into the chamber A' just above the level of the floor C' , a passage leading from the section c^3 to the space below the floor C' , an opening f^3 in the floor C^2 through which heated gases can pass into the chamber a^2 from the space into which the passage f opens, and an outlet flue H leading from the chamber A' above the level of the floor C' .

7. In a furnace the combination of a mixing or combustion section A' divided into upper and lower chambers $a^3 c^3$ openings $d d$ in the walls of said chambers, burners $B B$ for gas or oil arranged in front of or projecting through said openings, heating chambers a^2 A' piers $e e$ extending longitudinally in said chamber A' , tiles $e' e'$ laid thereon, so that passages $e^2 e^2$ will be left between them and so that flues $c' c'$ will be formed, a passage f^2 leading into the chamber a^2 , a passage f' lead-

ing from said chamber into the chamber A' and opening into it just over the level of the floor therein and a passage *f* leading from the chamber *c*³ and opening into the flues *c'* *c'* which extend beneath the floor in the chamber A'.

8. In a furnace a floor for supporting metal to be heated, consisting of a number of piers *e e* a series of tiles laid thereon so as to leave passages *e*² *e*² between them and ridges *e*³ *e*³ supported on the piers *e* and projecting up between the tiles to prevent the metal from lying on the tiles.

9. In a furnace a floor for supporting metal to be heated, consisting of a number of piers *e e*, a series of tiles laid thereon so as to leave passages *e*² *e*² between them, and ridges *e*³ *e*³, each consisting of a row of bricks, supported on the piers *e* and projecting up between the tiles to prevent the metal from lying on the tiles.

10. In a furnace a floor for supporting metal

to be heated consisting of a number of piers *e e*, a series of tiles laid thereon, as described, and so as to leave passages *e*² *e*² between them and openings *c*⁴ and ridges *e*³ *e*³, each ridge consisting of a row of bricks set in the openings *c*⁴ and supported on the piers whereby the bricks forming the ridge will be held in place by the tiles as specified.

11. In a furnace a floor for supporting metal to be heated consisting of a number of piers *e e*, a series of tiles laid thereon as described and so as to leave passages *e*² *e*² between them and openings *c*⁴ and ridges *e*³ *e*³ each ridge consisting of a row of scarfed bricks set in the openings *c*⁴ and supported on the piers whereby the bricks forming the ridge will be held in place by the tiles as specified.

HENRY WHITELEY.
JAMES MALLIN.

Witnesses:

J. B. JARDELLA,
G. H. ROBINS.