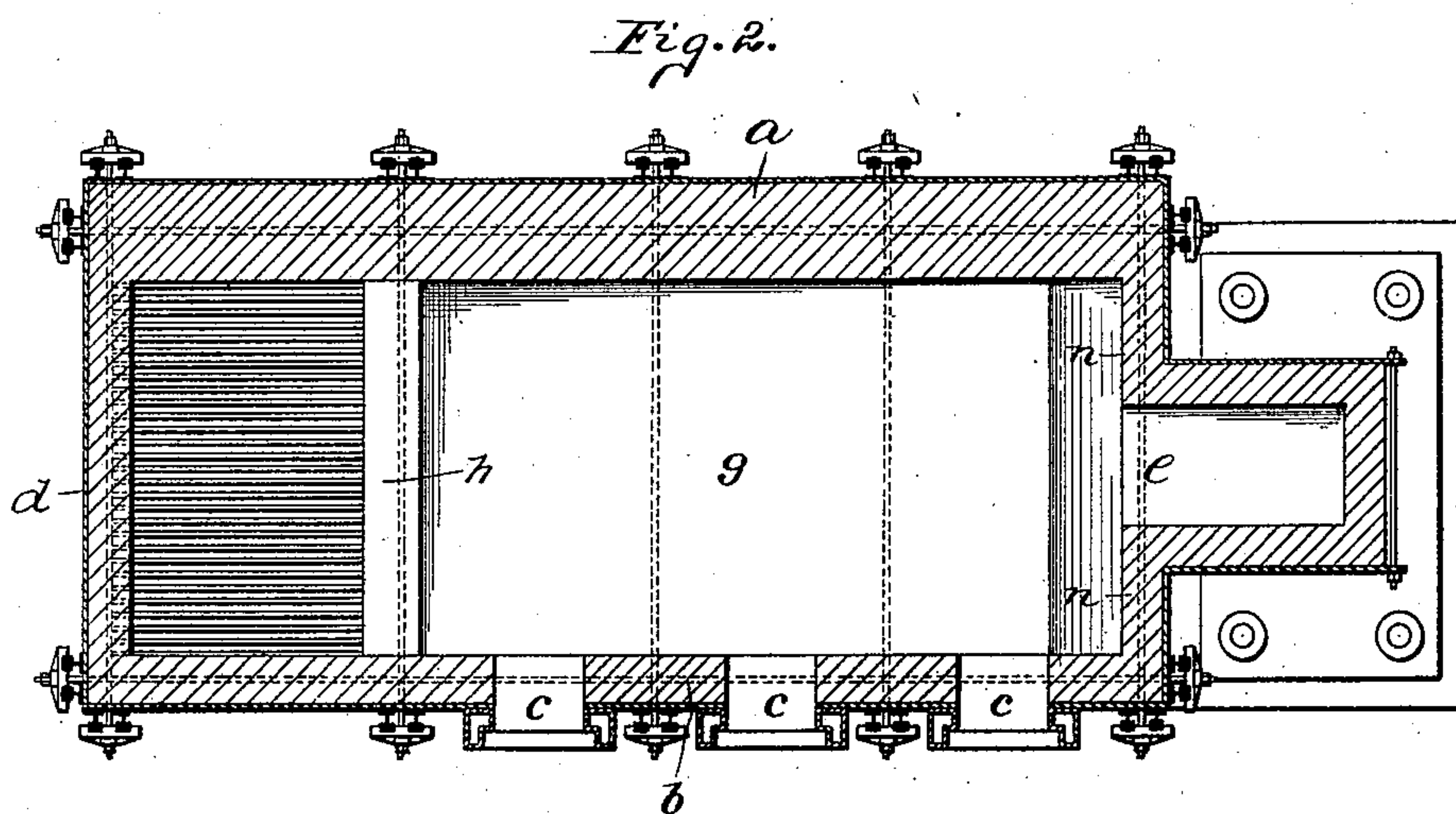
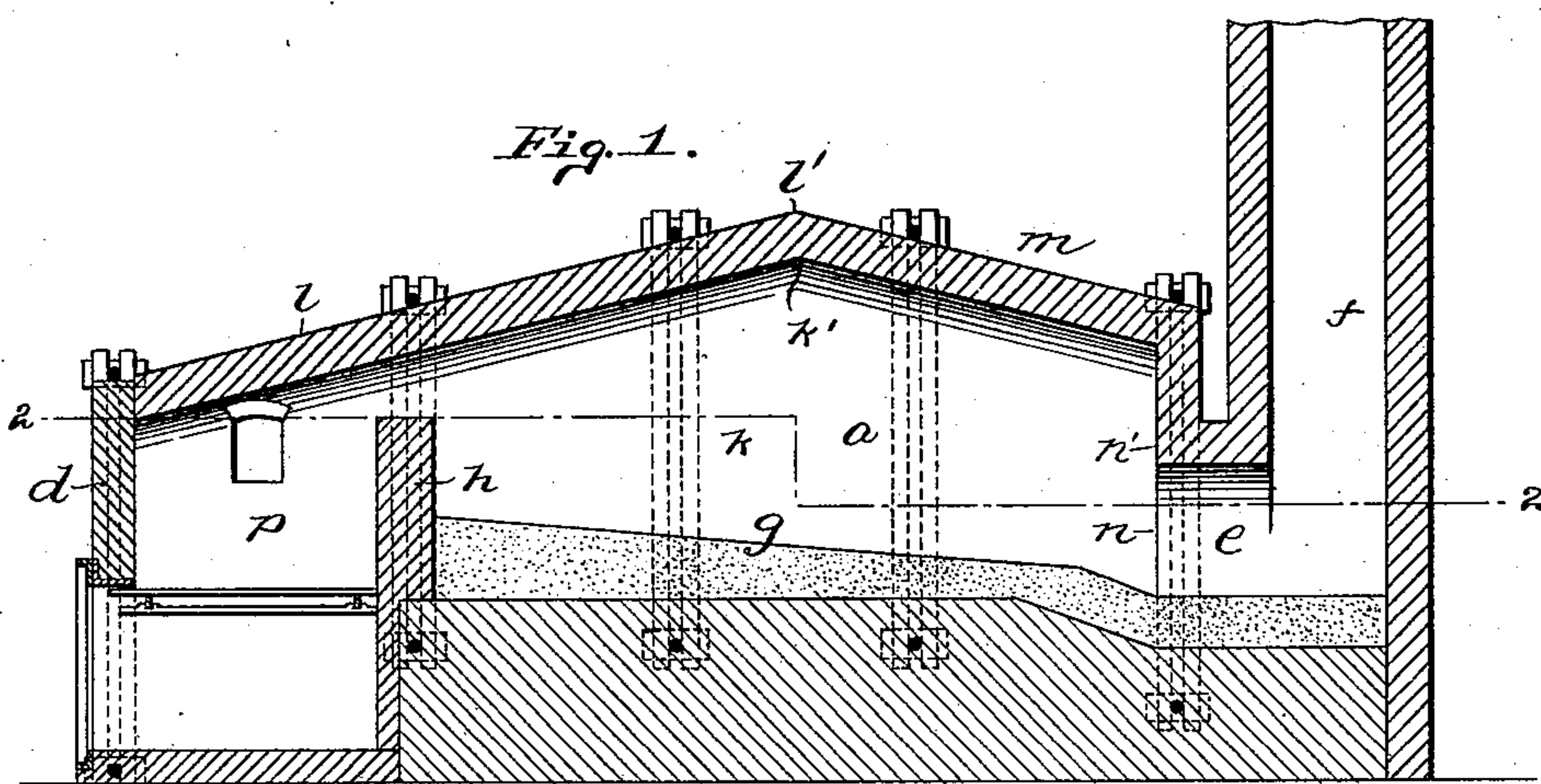


(No Model.)

B. C. LAUTH.  
METALLURGICAL FURNACE.

No. 594,112.

Patented Nov. 23, 1897.



*Witnesses:*

Walter Hamariss  
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# UNITED STATES PATENT OFFICE.

BERNARD C. LAUTH, OF PITTSBURG, PENNSYLVANIA.

## METALLURGICAL FURNACE.

SPECIFICATION forming part of Letters Patent No. 594,112, dated November 23, 1897.

Application filed April 6, 1896. Serial No. 586,301. (No model.)

*To all whom it may concern:*

Be it known that I, BERNARD C. LAUTH, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metallurgical Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to metallurgical furnaces, its object being to provide a simple straight draft-furnace more particularly for heating with solid fuel, though it may be employed with gaseous fuel, and to utilize the heat both by radiation, direct contact with the metal to be heated, and the retarding of the heated gases in their course through the furnace-chamber.

In an application of even date herewith, Serial No. 586,300, the furnace embodying my present invention is illustrated and included in the generic claim contained therein.

The present invention comprises, generally stated, a furnace having a fire-chamber at one end and a neck or outlet-flue at the other end and between them a hearth, while it is provided with a peaked roof formed of straight upwardly-inclined roof-walls extending from the ends of the furnace at an angle of not less than twenty-five degrees from the horizontal and meeting at about the center of the hearth and forming a high furnace-chamber over the hearth, the furnace having a neck or outlet which is narrower than the hearth and located below the lower end of the peaked roof. As so constructed it provides for the heating of the metal upon the hearth both by radiation from the top wall as the gases, flame, or heated products pass upwardly along the straight roof-wall until they reach the peak on their route, when they are deflected downwardly into the furnace-chamber and into contact with the metal on the hearth and are also retarded within the furnace-chamber in their course to the narrow neck leading therefrom at or about the level of the hearth.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a vertical central section of a heating-furnace embodying my invention;

and Fig. 2 is a horizontal cross-section on the line 2 2, Fig. 1.

Like letters of reference indicate like parts in each view.

The furnace illustrated in the drawings which embodies the present invention has the side walls *a b*, the side wall *b* containing the ordinary working doors *c* and the furnace having the end wall *d* at one end and the outlet-flue *e* at the other end leading to the stack or other exit for the gases, as at *f*. The furnace illustrated is a heating-furnace having the hearth *g*, while it has the regular bridge-wall *h*.

I will now describe the peculiarities of construction of the furnace embodying the present invention. It will be noticed that the furnace has a high furnace-chamber *k*, which is formed by the straight roof-walls meeting over the center or peak *k'* of the furnace-chamber, the wall *l* extending at an angle of not less than twenty-five degrees from the end wall *d* upwardly to the peak *l'*, while the wall *m* extends up at an angle from the end wall *n* in the opposite direction to the peak *l'*, the furnace therefore having a straight peaked roof formed of straight upwardly-inclined roof-walls *l* and *m* meeting at the peak *l'*. It will be noticed that the neck or outlet-flue *e* is located below the lowest point of the inclined roof-wall *m*, the end wall *n* of the furnace extending over the neck *e*, as at *n'*, so that the gases are compelled to pass downwardly after reaching the lower end of the peaked roof to reach the neck or outlet-flue *e*. It will also be noticed that this outlet-flue is narrower than the body of the furnace, and that on each side thereof are the end walls *n* above referred to, which are formed at substantially right angles to the side walls, so compelling the gases not only to pass downwardly, but to pass inwardly from the side walls to reach the neck *e*. Though the faces of the end walls may be slightly changed as to angle, it is desirable that they shall cause the downward movement of the gases and the inward movement thereof toward the neck, so acting to retard the gases in their flow through the furnace-chamber, and that the flame and heated gases shall be compelled to pass downwardly close to the hearth before escaping from the chamber.



When the furnace as above constructed is in use, the fire is started within the fire-chamber *p*, air being supplied to the same in any suitable way, and the gases, flame, and heated products pass out of this fire-chamber along the upwardly-inclined roof-wall *l*, so that the heat therefrom is radiated down from this roof-wall in the high furnace-chamber *k* upon the hearth *g*, and the heat from the gases is first utilized by radiation. As the gases reach the apex of the furnace they strike the roof-wall *m*, extending in the opposite incline, and part thereof will be deflected by this roof-wall down onto the hearth and be brought into direct contact with the metal thereon. The mass of the flame and gases are deflected in their course, having a swirling motion within the furnace-chamber, and any gases which will hug the wall *m* are compelled to pass in a downward course along the same, and the heat therein will be radiated upon the metal on the hearth. These gases are compelled to pass downwardly by the upper portion *n'* of the end wall *n* of the furnace, which causes a swirling motion of these gases, deflecting them downwardly upon the portion of the hearth near the neck and into contact with the metal thereon. This downward course of the gases also causes the backward swirling motion of the gases first deflected down at the apex of the roof, the gases being thus retarded in their course to the outlet-flue in such way as to utilize practically all the heat contained therein either by radiation or by direct contact with the metal. The gases are further retarded in their course to the neck by the portions of the end wall on each side of the outlet-flue which compel

the gases to pass inwardly from the side walls to such flue.

The furnace is simple in construction, and practical use has shown that a very high heat can be obtained therein and practically all the heat utilized within the furnace-chamber, and that an even heat may be maintained throughout the furnace-chamber.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A metallurgical furnace having a fire-chamber at one end, an outlet-flue at the other and a hearth between them, and having a peaked roof formed of straight upwardly-inclined roof-walls extending at an angle of not less than twenty-five degrees from the horizontal from the ends of the furnace over the hearth and meeting at about the center thereof, and forming a high furnace-chamber, substantially as and for the purposes set forth.

2. A metallurgical furnace having a fire-chamber at one end, a hearth, and an end wall at the other end, and an outlet-flue leading from the same below the top of the wall and narrower than the hearth, and having a peaked roof formed of straight upwardly-inclined roof-walls extending at an angle of not less than twenty-five degrees from the horizontal from the end walls over the hearth and meeting at or about the center thereof and forming a high furnace-chamber, substantially as and for the purposes set forth.

In testimony whereof I, the said BERNARD C. LAUTH, have hereunto set my hand.

BERNARD C. LAUTH.

Witnesses:

JAMES I. KAY,  
ROBERT C. TOTTEN.