

MANUFACTURE OF SHEET IRON.

Patented Jan. 10, 1882.

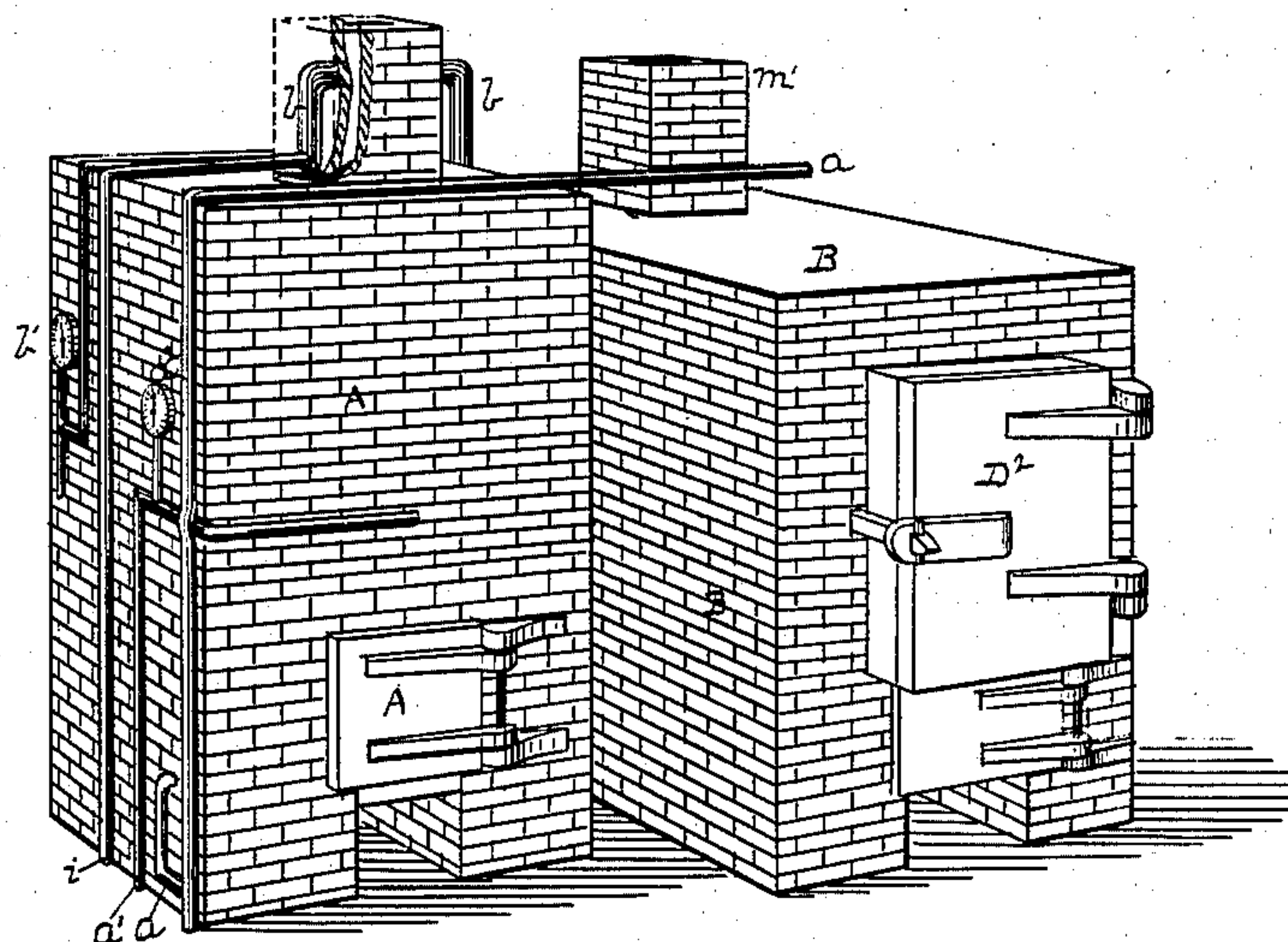


Fig. 1.

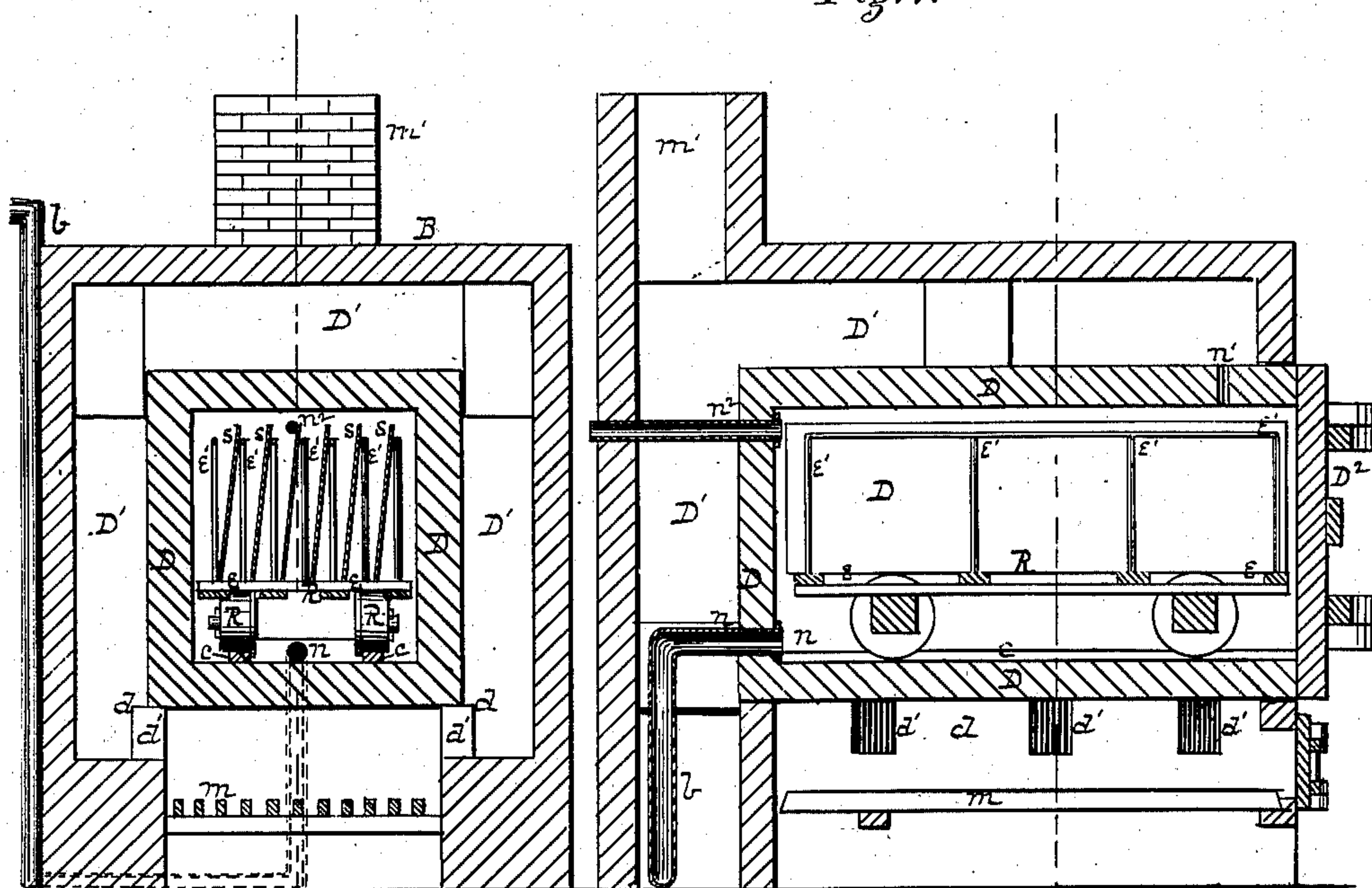


Fig: 2.

Fig. 3.

Witnesses

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MANUFACTURE OF SHEET-IRON.

SPECIFICATION forming part of Letters Patent No. 252,166, dated January 10, 1882.
Application filed January 25, 1878.

To all whom it may concern:

Be it known that I, W. DEWEES WOOD, of McKeesport, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in the Manufacture of Sheet-Iron; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is an exterior view, in perspective, of a steam-superheating and oil-vaporizing furnace, as also of a sheet-metal-heating furnace in which my improved process is worked. Figs. 2 and 3 are respectively longitudinal and transverse vertical sections of the latter furnace.

In sundry patents heretofore granted to me, and more particularly Nos. 137,585 (Reissue No. 5,474) and 172,235, I have described the use of carbons, both solid and liquid, in the manufacture of sheet-iron.

In further perfecting the process referred to in said patents, I have found that carbon may be advantageously employed in finishing sheet-iron, not only as a solid or liquid, but also as a gas or vapor; and my present improvement relates, chiefly, to the use of carbon in a gaseous or vaporous condition in connection with superheated steam in the process of finishing sheet-iron.

In Fig. 1, A represents in exterior view a furnace of any suitable construction, adapted to the superheating of steam and to vaporizing the oil or to converting the oil into a fixed gas; but as I make no claim to such furnace separately considered, I deem it unnecessary to show or explain the same in detail.

One convenient or suitable construction of steam-superheating apparatus to be employed in the furnace A is that referred to in patent to Charles J. Eames, No. 186,465, of January 23, 1877, and a suitable vaporizer for converting the oil into a vapor or gas is shown and described in Patent No. 132,266, of October 15, 1872, to same party; but instead of these devices other known construction of apparatus adapted to superheat steam and convert petroleum or other hydrocarbon into a vapor or gas may be employed. I have shown, how-

ever, a steam-pipe, *a*, which leads from any suitable steam-generator, for conveying the steam to the superheater in the furnace.

The pipe *a'*, leading from a pump, tank, or other source of supply under pressure and provided with a pressure-gage, *a*², is the oil-pipe which leads to the vaporizer inside. The commingled steam and carbonaceous vapor or gas are conducted off and carried over to the sheet-metal-finishing furnace B by a suitable pipe, *b*, to which I also apply, by a suitable pipe-connection, a pressure-gage, *b'*. For material I employ any suitable hydrocarbon capable of being readily converted by heat into a vapor or gas, using, by preference, petroleum or such of the residual products or distillates thereof as contain a considerable percentage of carbon, or the same compounded with flaxseed or other oils.

The furnace B is made in oven form with a fire-grate, *m*, in its lower part, and a stack or chimney, *m'*.

On suitable side walls, *d d*, I support a close box or chamber, D, in which the sheet-iron is to be treated. This box or chamber has side and top flues, D', so that the heat evolved from the fire on the grate-bars *m*, passing through flue-holes *d'* in the side walls, *d*, may so surround or encompass the box or chamber D as to raise the same and its contents to the desired high degree of temperature. Access is had to the inside of the box or chamber through a door, D², which is made so as to fit closely and prevent the escape of gas or vapor to any dangerous extent.

On rails *c* in the bottom of the chamber D, in connection with a track outside, I run in and out a car or truck, R. The platform *e* of this truck is made, by preference, as open as possible, but so as to support the sheets *s* which are to be treated. These sheets I place on the car edgewise, and keep them in that position and at the proper distance apart by any suitable open-work—such as posts and rails *e'*. In this way I secure the action and effect desired over the entire surfaces of the sheets.

The conduit-pipe *b* enters the box or chamber D at any suitable point, as at *n*, so as to discharge the commingled superheated steam and the gas or vapor, or both, into the box or chamber.

An escape-port, to guard against undue pressure, is provided at n' or other suitable point; but to prevent all danger of explosion I prefer to connect the vent with a pipe leading outside, as at n^2 . All the pipes referred to are to be provided with suitable cocks or valves for regulating the flow or supply. At i , I have shown a pipe which connects with the pipe m for carrying off the excess or waste.

By the ordinary operation of "breaking down" and rolling I bring the sheets to about Nos. 20 to 22 (more or less) wire-gage. The sheets are scaled in any of the ways known to the art, and are then placed on the car. The latter is run into the chamber D, and the door is closed and made tight. The commingled steam and gas or vapor are then turned on, and a vigorous fire kept up below. The sheets remain subject to these agencies until they are brought up to, or about to, a red heat—say from 900° to $1,100^{\circ}$ Fahrenheit, more or less—and for a short time thereafter—say thirty minutes or so, more or less—after which the gas and steam are turned off, and the sheets are allowed to cool down to below a red heat while still in the chamber, and before being brought into contact with external air. The result of this process is that the sheets are coated with a black or dark film, glaze, or coating, such as is known in the art and generally called a "magnetic oxide of iron," with the addition thereto apparently of some carbonaceous elements, the whole glaze constituting probably a magnetic carburet of iron. They are then (if further reduction is desired) rolled or hammered in packs in the usual way.

While I have made specific description of the car and its supports, I do not limit myself absolutely thereto in so far as relates to the mechanical appliances for working the inven-

tion, since in this respect it is only necessary that each sheet be subjected on both faces to the action of the steam and gas or vapor while in a close chamber which is externally heated, and to this end the devices may be varied in structure and arrangement at pleasure.

Without limiting myself absolutely to any particular theory of chemical or mechanical action as regards the operation of the steam and the gas or vapor on the iron, I am now of opinion that such operation is substantially the same as that described in Patent No. 172,235, the carbon of the gas or vapor being baked into or onto the surface of the previously-scaled sheet by the steam and exterior heat, while the sheets are inclosed in a close chamber, and protected thereby against injurious reoxidation; and so far as regards this feature of my present invention, I now consider it as an embodiment of my previous invention, differing only to the extent of specially adapting the latter to the use of carbons brought to a gaseous or vaporous condition before being brought in contact with the iron, as distinguished from the like use of carbons gasified or vaporized after being applied to the iron.

I claim herein—

As a step in the process of finishing sheet-iron, subjecting the sheets in a close exteriorly-heated chamber to the action of a hydrocarbon vapor or gas and superheated steam, substantially as set forth.

In testimony whereof I have hereunto set my hand.

W. DEWEES WOOD.

Witnesses:

J. J. McCORMICK,
CLAUDIUS L. PARKER.