

(No Model.)

M. J. MURDOCH.
REVERBERATORY FURNACE.

No. 525,113.

Patented Aug. 28, 1894.

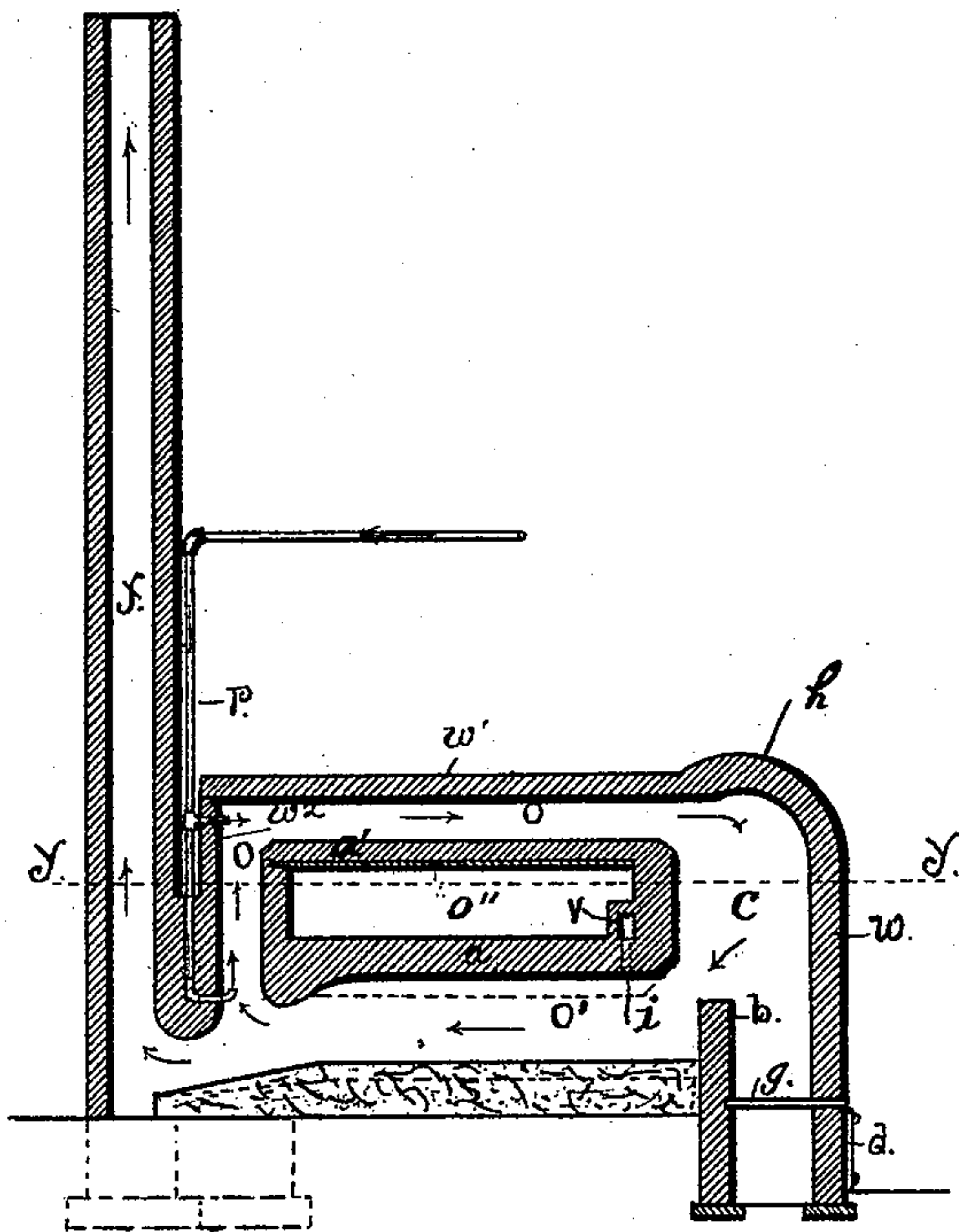


Fig. 2

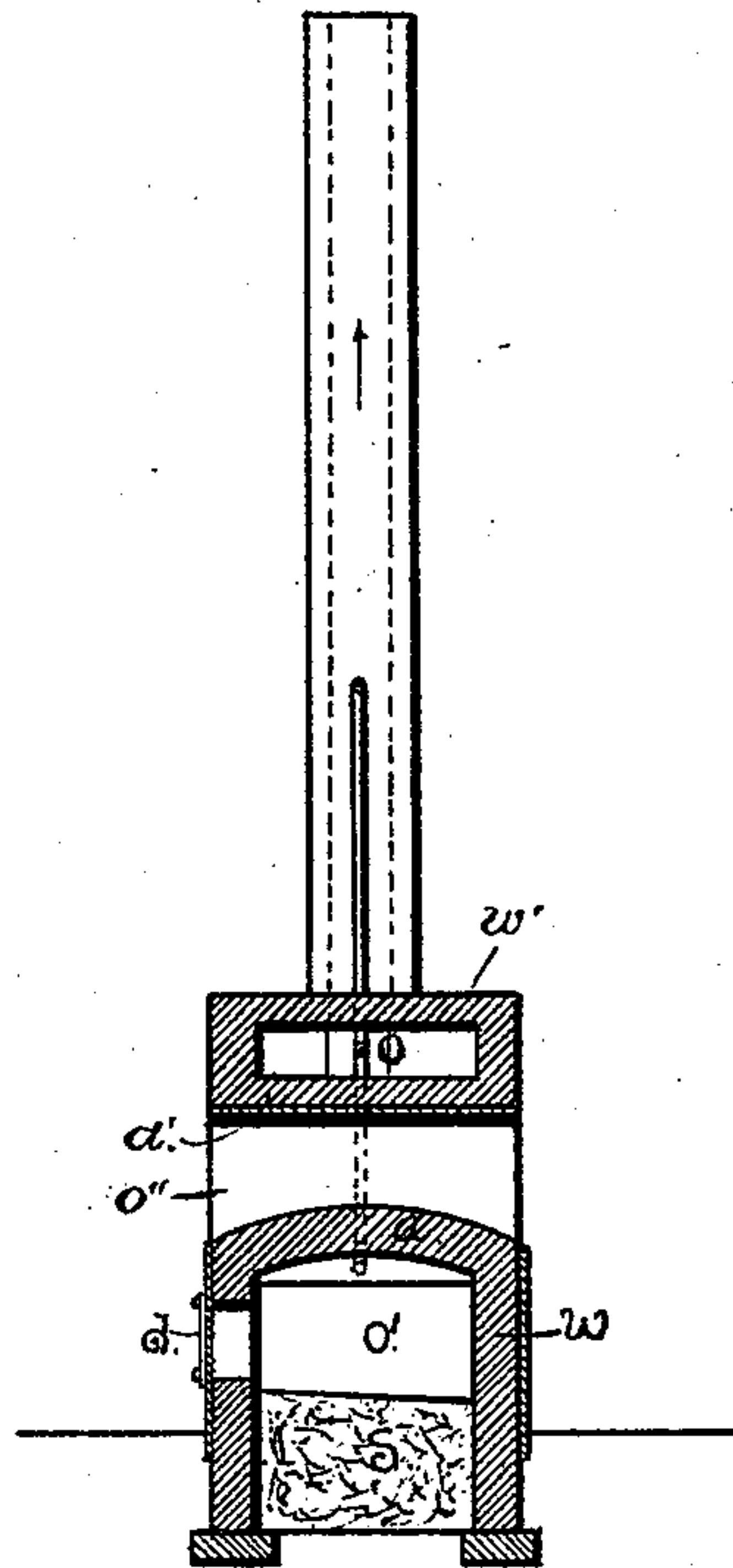


Fig. 3

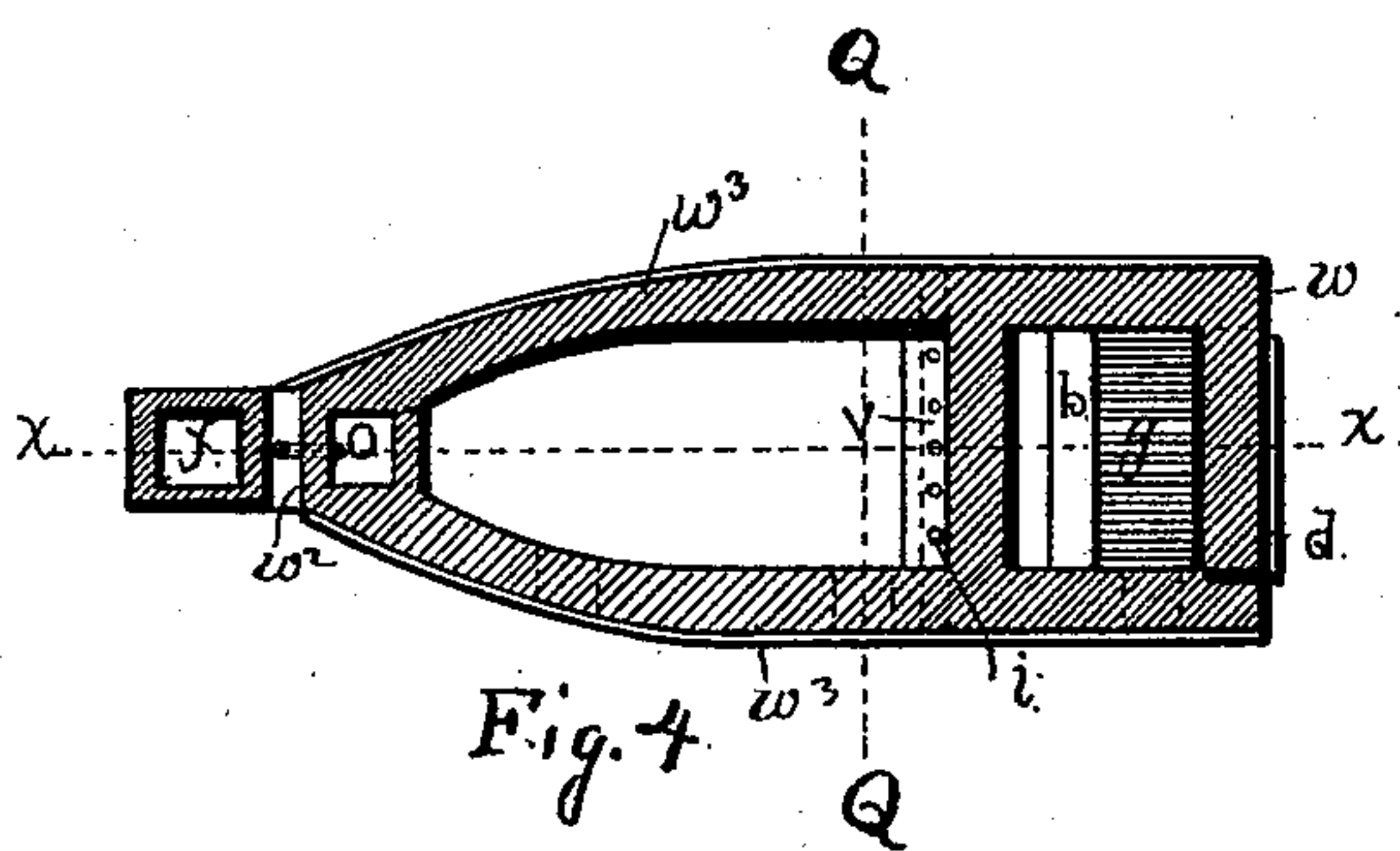


Fig. 4

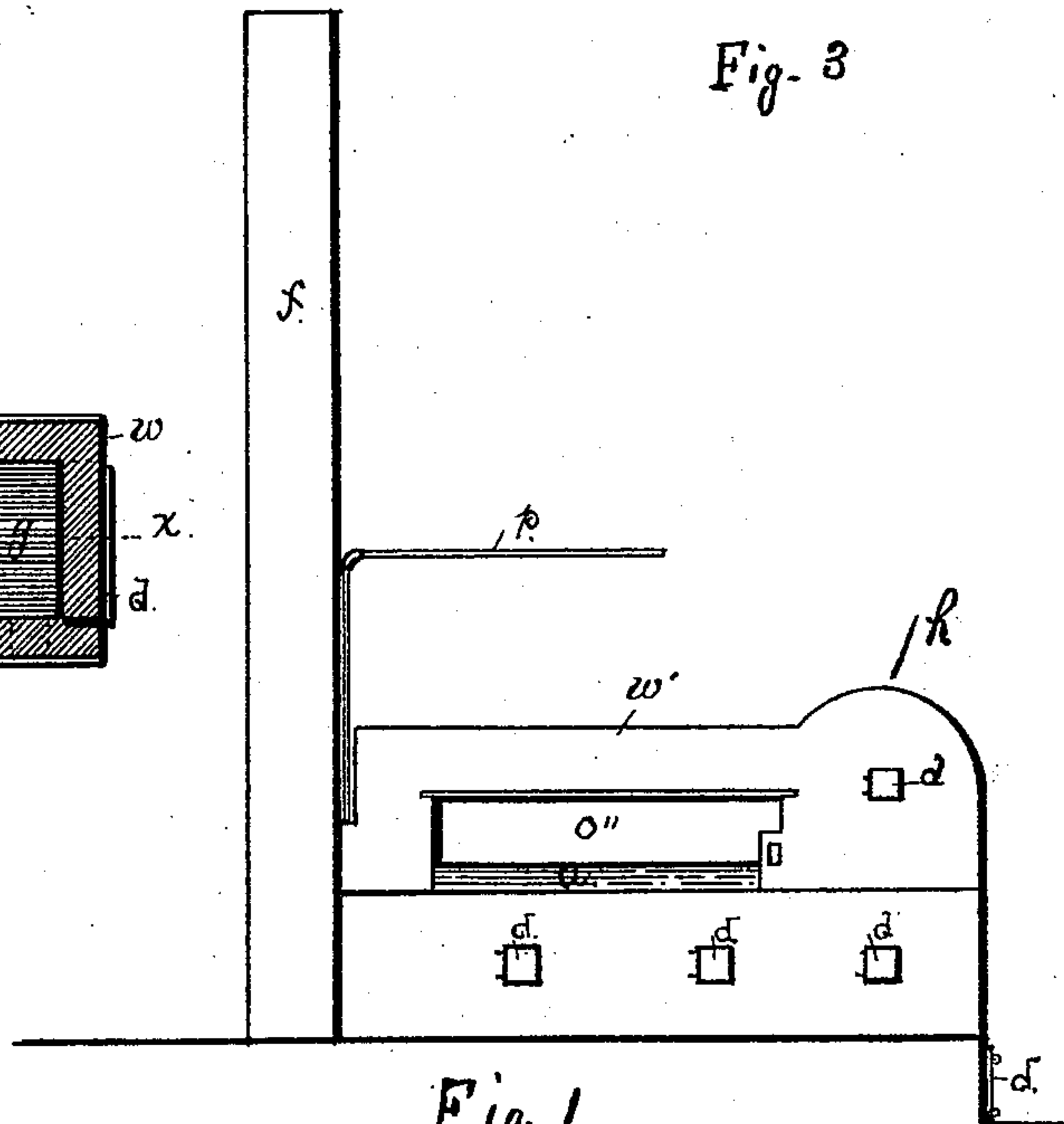


Fig. 1

Witnesses:
Owen & McInaw
E. R. Chapman

Inventor:
Michael J. Murdoch
Per L. D. Woodward
Attorney.

UNITED STATES PATENT OFFICE.

MICHAEL J. MURDOCH, OF YOUNGSTOWN, OHIO.

REVERBERATORY FURNACE.

SPECIFICATION forming part of Letters Patent No. 525,113, dated August 28, 1894.

Application filed November 8, 1893. Serial No. 490,387. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL J. MURDOCH, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Reverberatory Furnaces; and I do hereby declare the following to be a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to that class of reverberatory furnaces used in iron manufacture known as heating and puddling furnaces, and its object is a smoke consuming furnace that is simple in its construction, and that in operation is certain, under all circumstances, to consume all of the smoke that is generated therein, thus providing a furnace of great economic value in the use of fuel, and which also does away with the "smoke nuisance" in the neighborhoods in which used. I accomplish this object by the means hereinafter described and illustrated in the drawings, in which—

Figure 1 is a side elevation view of my furnace showing its exterior form. Fig. 2 is a similar view of a longitudinal vertical section of the same on the line $x x$ of Fig. 4. Fig. 3 is a cross section view of the same on the line $Q Q$ of Fig. 4; and Fig. 4 is a horizontal section view of the same on the line $y y$ of Fig. 2. The parts are indicated by letters and similar letters refer to similar parts in all the views.

My invention proceeds upon the idea of carrying all smoke, gases and carbonaceous particles that survive combustion from the point where they otherwise would escape into the flue backward through the upper portion of the furnace where, having become sufficiently intermingled with steam and air, they are at once consumed. The wall w is so formed at the grate end of the furnace as to give a considerable vertical capacity to the combustion chamber c above the grate g , the same being covered by the dome h . The roof a to the working chamber o' is the same as in the or-

dinary puddling furnaces except that at each end an upward wall is built to support the second roof a' which forms the floor of the smoke return conduit o . It is provided on its upper surface at the end near the combustion chamber with the transverse flue v through the bottom of which is a series of small apertures for air inlets to the working chamber o' near the bridge wall b , the air inlets being aligned so as to evenly distribute the air into the space beneath.

The smoke return conduit o , formed by the furnace top wall w' and the second roof a' , is an open, flue like space, in breadth the distance between the side walls w^3 of the furnace, and of suitable capacity to carry back to the combustion chamber c all the smoke generated. Its vertical portion is near to and parallel with the flue f , and its horizontal portion is above and parallel with the roof a' .

The pipe p extending from a steam generating boiler to the flue f is there turned at an angle, and passing down the outer side of the flue to a point on the horizontal plane of the lower surface of the working chamber roof a is again turned at an angle and passed through the wall w^2 terminating a little distance inward. Two or more pipes may be used if desired. I have, however, found one to be generally sufficient.

The value of steam, especially of dry steam, ejected into a burning mass to promote combustion is well understood. It is for this, and also for the effect of its pressure in causing the smoke to pass backward through the conduit o , that I use it in my furnace.

The several doors d are for access to the various interior spaces in the walls in which they are placed. The form of the furnace shown in the drawings does not differ substantially from that of the heating and puddling furnaces now in use, and hence need not be more particularly described. The same is true of the grate g , the bridge wall b , the working chamber bottom s and the flue f .

It will be seen that the new features consist of a steam pipe p , the smoke return conduit o , the dome shape of the furnace top wall above the combustion chamber c , and the working chamber roof a having the hol-

low space o'' and the air inlets i , all of which have been fully described and will now be understood.

What I claim is—

5 1. A reverberatory furnace having the working chamber o' , the flue f communicating with the chamber o' opposite the grate end, the return conduit o having vertical connection with the rear end of the working
10 chamber independent of the flue f , and communicating at its forward end with the combustion chamber, the transverse flue V near the forward end of the working chamber communicating at its ends with the air and hav-
15 ing a series of inlets i , and a steam pipe disposed to create a draft through the vertical and horizontal portions of the return conduit to convey the smoke and gases back to the
20 combustion chamber, substantially as described.

2. The herein described reverberatory furnace having its side walls converging, and having a dome over the combustion chamber,

a working chamber communicating with the combustion chamber, a flue f leading into the
25 rear end of the working chamber, a return conduit above the working chamber formed between the side, end and top walls of the furnace having vertical connection with the
30 rear end of the working chamber independent of the flue f , and having communication with the combustion chamber by means of the said dome, a transverse passage V extending through the side walls of the furnace hav-
35 ing vertical inlets i , and a steam pipe having communication with the furnace and arranged to create a draft through the vertical and
40 horizontal portions of the said return conduit, substantially as described for the purpose specified.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

MICHAEL J. MURDOCH.

Witnesses:

W. S. STILSON,

OWEN E. MCGRAW.