

No. 724,550.

PATENTED APR. 7, 1903.

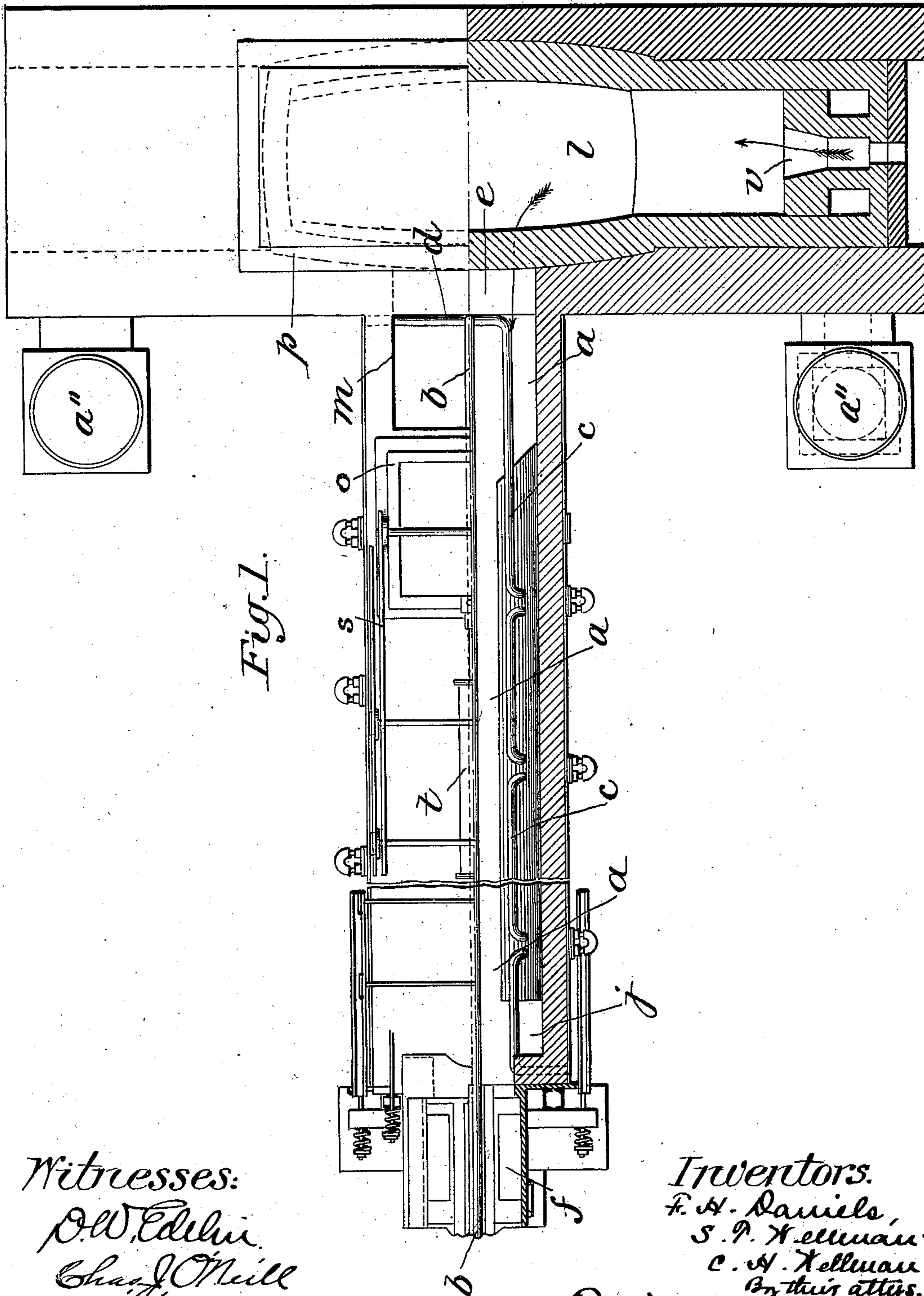
F. H. DANIELS & S. T. & C. H. WELLMAN.

INGOT HEATING FURNACE.

APPLICATION FILED MAY 13, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

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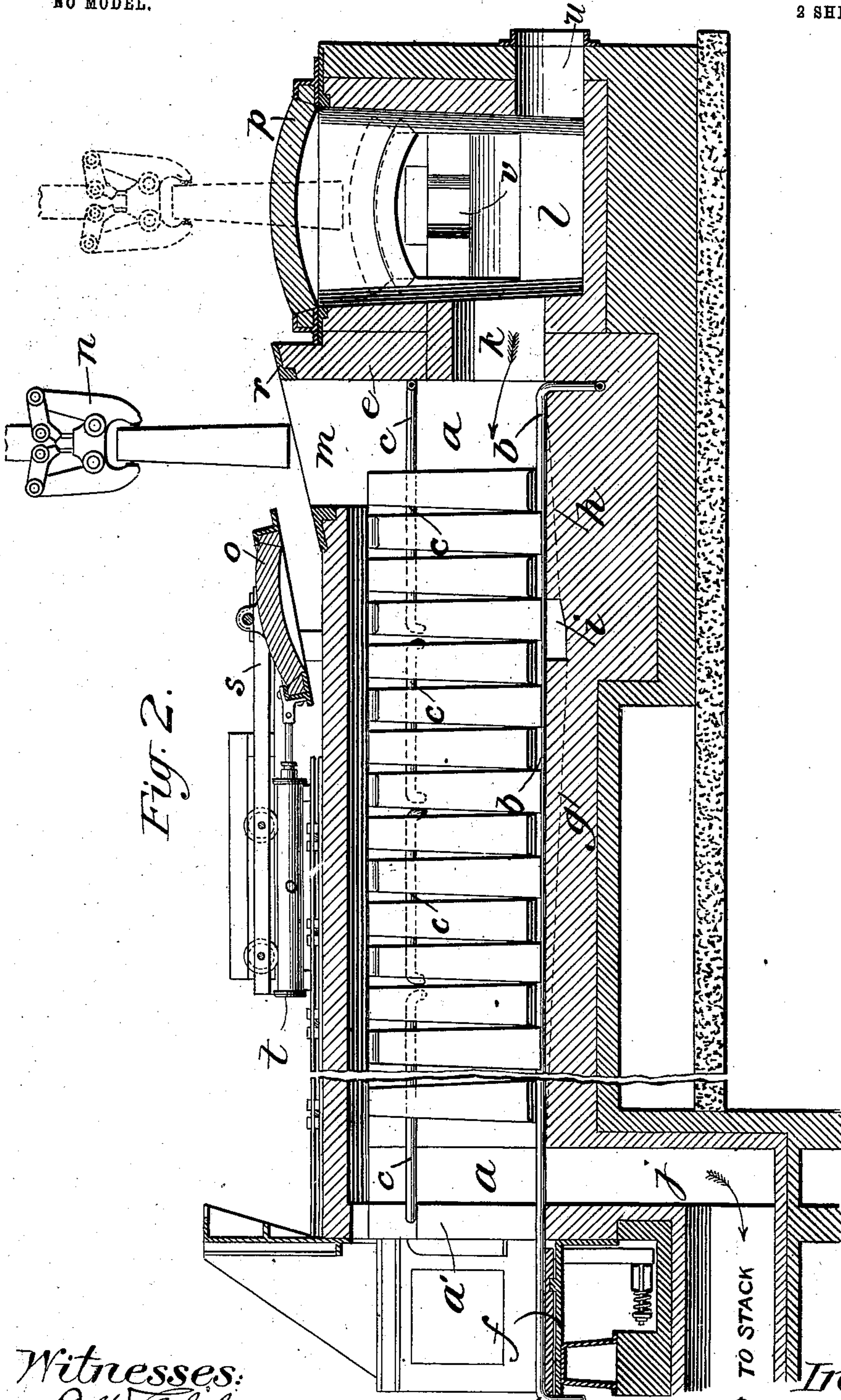


Fig. 2.

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UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS, AND SAMUEL T. WELLMAN AND CHARLES HENRY WELLMAN, OF CLEVELAND, OHIO; SAID WELLMAN AND WELLMAN ASSIGNORS TO THE WELLMAN-SEEVER-MORGAN ENGINEERING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

INGOT-HEATING FURNACE.

SPECIFICATION forming part of Letters Patent No. 724,550, dated April 7, 1903.

Application filed May 13, 1902. Serial No. 107,144. (No model.)

To all whom it may concern:

Be it known that we, FRED H. DANIELS, residing at Worcester, county of Worcester, State of Massachusetts, and SAMUEL T. WELLMAN and CHARLES HENRY WELLMAN, residing at Cleveland, county of Cuyahoga, State of Ohio, all citizens of the United States, have invented certain new and useful Improvements in Ingot-Heating Furnaces; and we hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In an application filed May 13, 1902, Serial No. 107,143, we have illustrated, described, and claimed, broadly, an ingot-heating furnace of the continuous type comprising two communicating chambers, one a heating-chamber into which the ingots are introduced at one end and pushed along to the other end, being meanwhile subjected to a heating temperature that is moderate as compared with that of the other chamber, this other chamber being a finishing-chamber in which a high temperature is maintained for finishing the ingots and preparing them for the rolling-down process. In the construction illustrated and described in that application as the embodiment of this broad invention the finishing-chamber communicated with the heating-chamber, so that not only the products of combustion passed freely from the former to the latter, but the ingots could be passed directly from the heating-chamber to the finishing-chamber without opening the heating-chamber and without the necessity of lifting the weight of the ingots, they being simply pulled through into the finishing-chamber by introducing an implement through a side door in the latter chamber.

The present invention while coming under the generic claims of the before-mentioned application presents a different specific construction in that the communication between the heating and finishing chambers, although the same as before so far as the passage of the products of combustion is concerned, is

not adapted for the direct transference of the ingots from the heating-chamber to the finishing, but requires the construction of a door in the former and the bodily lifting of the ingots from the heating-chamber over a bridge-wall into the finishing-chamber beyond.

The present improvement will be fully understood from the following description when read in connection with the accompanying drawings, forming part of this specification.

In the drawings, Figure 1 is a plan view of the entire furnace, one-half being in horizontal section. Fig. 2 is a vertical longitudinal central section.

Referring to the views, *a* denotes the heating-chamber of the furnace. In its general construction and extent it is substantially like the heating-chamber of the patent granted to us March 13, 1900, No. 645,305. The ingots are introduced into this chamber through a door at the end *a'* and are supported on end while in and passing through the chamber on the water-pipe *b*, which may be of the ordinary construction and which preferably extends through the end *a'* onto a platform *f*, whereon the ingots are placed and from which they are pushed into the furnace by any sort of a mechanically-operated pusher.

The side walls of the heating-chamber are provided with lines of water-pipes *c*, against which the upper part of the ingot rests. These side pipes are substantially the same as in our former patent, except that at the discharge end of the furnace they preferably extend across from side to side, as illustrated at *d* in Fig. 1, so as to prevent the ingot at the discharge end from falling against the end wall *e* of the chamber. The bottom supporting-pipe *b* is preferably raised above the floor of the chamber *a*, and on each side of the pipe the floor of the chamber inclines gradually downward, as shown by dotted lines *g h*, toward a slag-discharge opening *i*.

At its discharge end the heating-chamber communicates, by means of an opening *k*, with an enlarged chamber *l*, which preferably extends transversely to the line of the heating-

chamber and constitutes a finishing-chamber, where the ingots are subjected to an intense heat preparatory to the rolling-down process. This finishing-chamber may be of any appropriate size and extent and is fired by generators *a''* at one or both ends, preferably the latter, as indicated in Fig. 1. This finishing-chamber also constitutes a reservoir of heat for the heating-chamber, and its products of combustion pass freely into and through the latter in the direction indicated by the arrows to the stack by way of the passage *j*.

The roof of the heating-chamber is provided at its discharge end immediately adjacent to the end wall *e* with an opening *m*, through which the ingots are adapted to be lifted by overhead tongs *n*, as indicated in Fig. 2, and the supporting-pipe *b* is continued clear out to the end of the heating-chamber underneath this opening, so as to hold the end ingots in an erect position and permit them to be lifted out by their upper ends, as clearly indicated in the drawings.

The finishing-chamber is also provided with an opening at its top in proximity to the opening *m*, and the openings of both chambers are closed by sliding doors *o* and *p*, which are preferably similar in construction and operated in any suitable manner. As indicated in Fig. 2, these doors are arranged to close on inclined seats *r*, thereby facilitating the operation of opening and closing the doors and the maintenance of a tight joint when closed. We illustrate the door *o* herein as supported upon a rolling carriage *s* and operated by means of a hydraulic cylinder *t*, the piston of which is connected to one edge of the door. The present invention, however, is not limited to any particular means for operating either of these doors.

The finishing-chamber *l* is provided also with a side door *u*, and the products of combustion pass into the chamber from the generator through the end passages *v* and thence into the heating-chamber through the opening *k*, before described.

In our application above referred to the finishing and heating chambers are connected together without the interposition of the end wall *e*, and the ingots are adapted to be pulled from the heating-chamber into the finishing-chamber, where they lie upon their sides on the floor of the latter. In the present construction, however, when it is desired to transfer the ingots from the heating to the finish-

ing chamber the doors *o* and *p* are slid open, and the end ingots are seized by the tongs *n* and lifted over the wall *e* and set up on end in the finishing-chamber, as indicated by dotted lines in Fig. 2, after which the doors are closed until other ingots are ready to be transferred.

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

1. An ingot-heating furnace comprising two communicating chambers in combination, viz., a continuous chamber into one end of which the ingots are introduced and through which they are progressively advanced in position to the passage of the products of combustion, and a finishing-chamber at the discharge end of the continuous chamber, said continuous chamber being heated by the products of combustion passing into and through it from the finishing-chamber, a door in the heating-chamber at the discharge end through which the ingots may be withdrawn, and a door in the finishing-chamber through which the ingots may be introduced to that chamber.

2. An ingot-heating furnace comprising two communicating chambers in combination, viz., a continuous chamber into one end of which the ingots are introduced and through which they are progressively advanced in position to the passage of the products of combustion, and a finishing-chamber at the discharge end of the continuous chamber, said continuous chamber being heated by the products of combustion passing into and through it from the finishing-chamber, a door in the roof of the heating-chamber at the discharge end through which the ingots may be lifted, and a door in the roof of the finishing-chamber through which the ingots may be lowered into that chamber, said door being in proximity to the door of the heating-chamber.

In testimony whereof we affix our signatures in the presence of witnesses.

FRED H. DANIELS.

SAMUEL T. WELLMAN.

CHARLES HENRY WELLMAN.

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C. W. COMSTOCK,

W. S. WELLMAN.