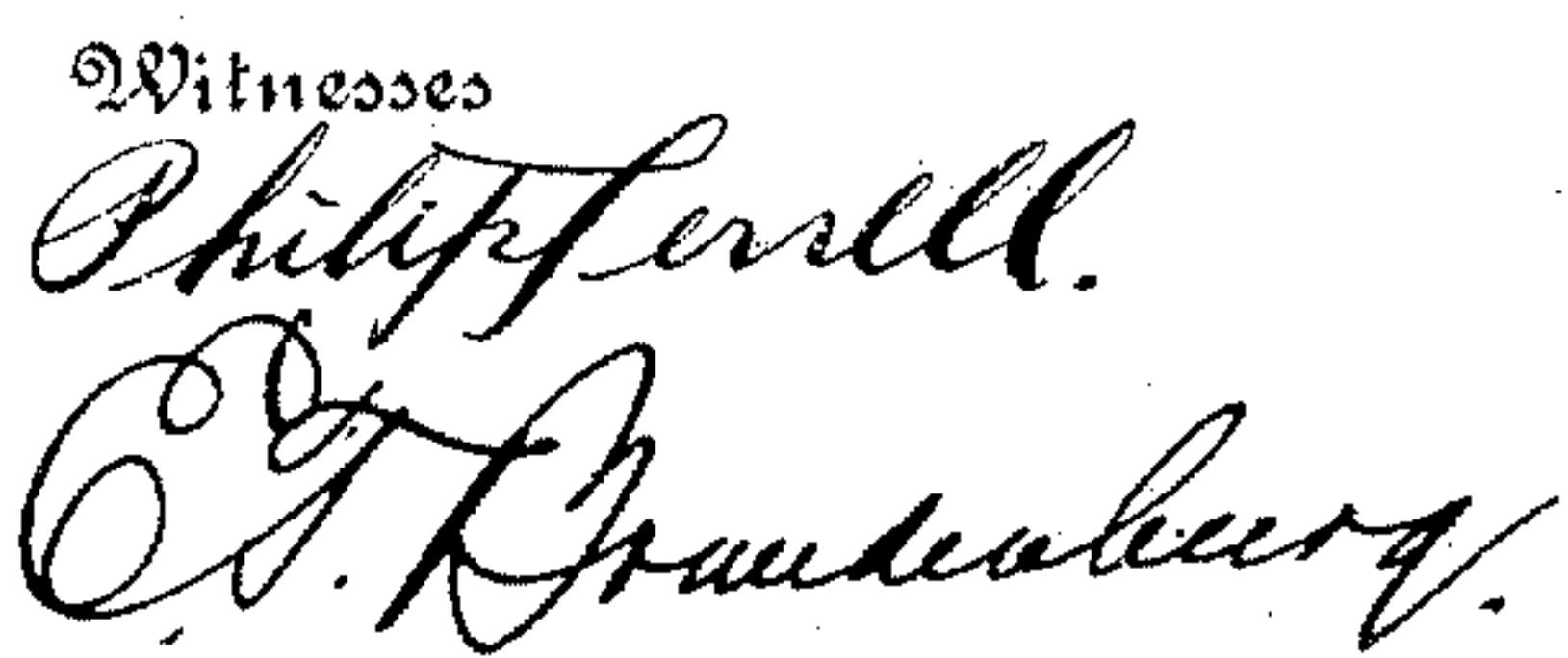


FURNACE.

915,387.

2 SHEETS—SHEET 1.



Inventor  
Charles Schweizer  
by R.Y. Dyrenforth,  
his Attorney

C. SCHWEIZER.

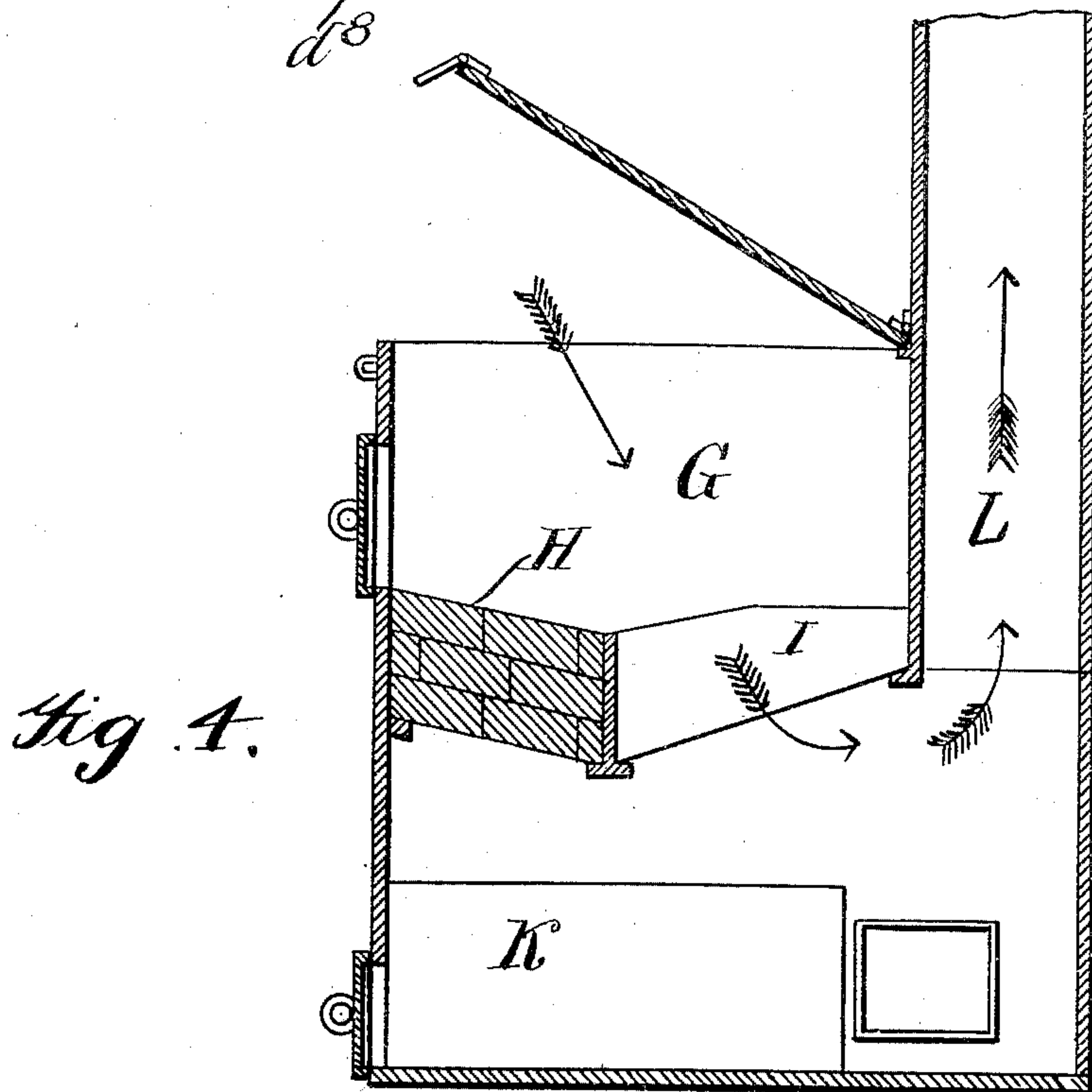
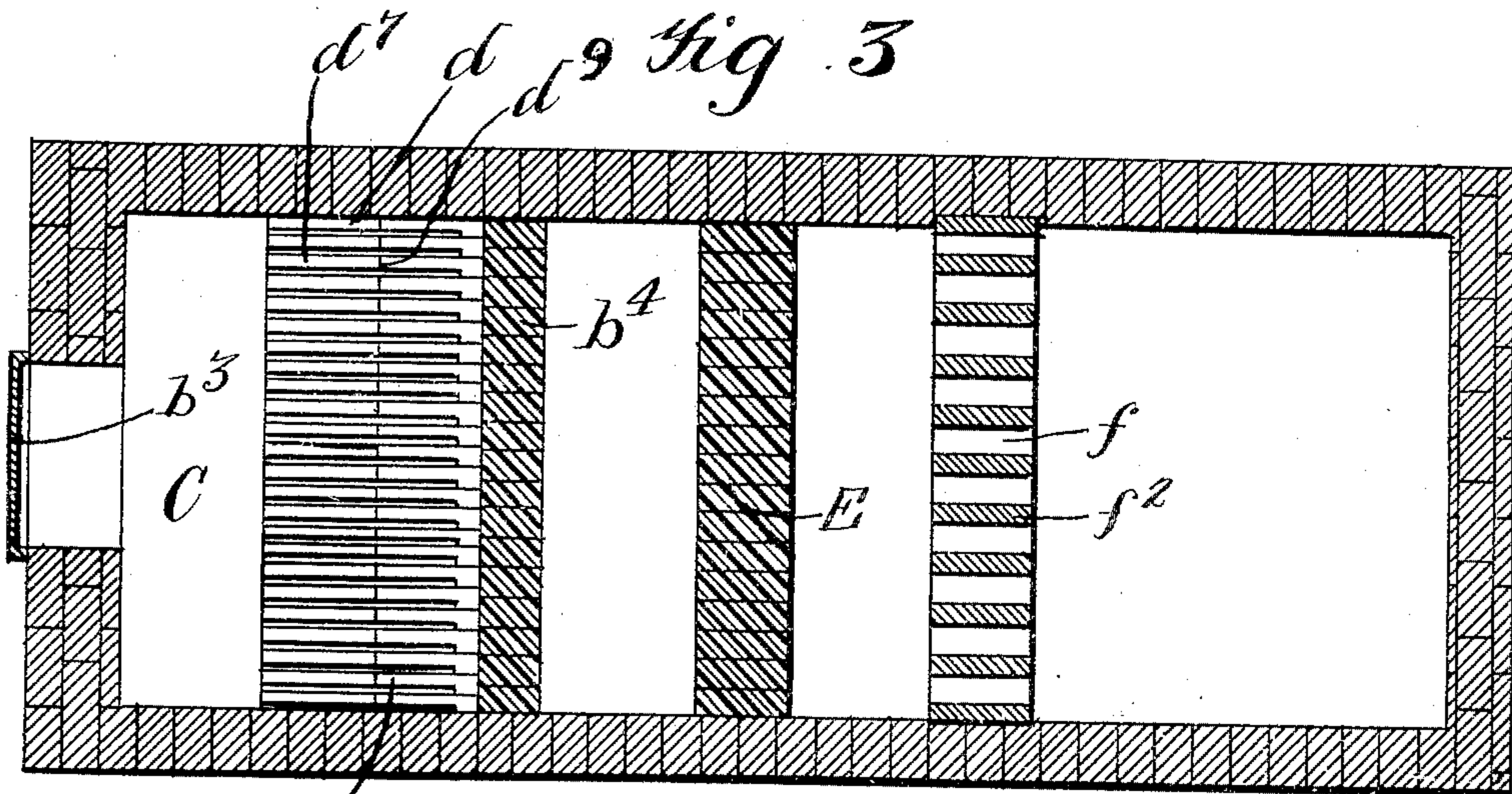
FURNACE.

APPLICATION FILED MAY 15, 1906.

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2 SHEETS—SHEET 2.



Inventor

Charles Schweizer

Witnesses

Philip Terrell  
C. J. Brandenburg

By

A. E. Dyckhoff,  
His Attorney



# UNITED STATES PATENT OFFICE.

CHARLES SCHWEIZER, OF BOSTON, MASSACHUSETTS.

## FURNACE.

No. 915,387.

Specification of Letters Patent.

Patented March 16, 1909.

Application filed May 15, 1906. Serial No. 317,013.

*To all whom it may concern:*

Be it known that I, CHARLES SCHWEIZER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Furnaces; and I do 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.

One of the objects of my invention is the provision of a novel construction of furnace adapted especially for the drying and burning of bagasse, green shavings, peat, sawdust, waste wood, and any waste material containing any combustible matter; complete combustion being effected, with no smoke.

Another object is to apply principles of my invention to a furnace or stove adapted more particularly and especially for use in hospitals for burning puss-rags, bandages, and other foul hospital material, so that there will be no odor, noxious gases, or vapors arising from the burning material, and no danger from the spread of infectious diseases.

With these and other objects in view, the invention comprehends the novel construction, combination, and arrangement of parts of a device characterized by my invention, as will be fully hereinafter described in the specification, summed up in the claims, and illustrated in the drawings, in which:

Figure 1 is a longitudinal section of my bagasse furnace; Fig. 2 is a detached perspective view of my form of grate; Fig. 3 is a horizontal section on line 3—3, Fig. 1; Fig. 4 is a central vertical longitudinal section of my rag-burning hospital-furnace.

Referring to the drawings, and first to Figs. 1, 2 and 3, A designates any ordinary or preferred form of tubular boiler, properly supported in suitable settings. Beneath the front portion of the boiler is arranged a fire-box or combustion-chamber proper, B, which may be provided, for instance at the top, with a fuel-entrance opening  $b$ , normally closed by a door  $b^2$ , and, at the front, with a door  $b^3$ . Either the door  $b^2$ , or the door  $b^3$ , or both, may be provided with air-inlet openings to support combustion. The combustion-chamber B is terminated at the rear by an upright wall  $b^4$ , preferably supported by an arch  $b^5$ . Separating the ash-pit  $B^5$  and the combustion-chamber B is a

downward-inclined, solid hearth C, desirably of fire-brick and of some depth, and a grate D, comprising a series of spaced, hipped or double-inclined grate-bars  $d$  arranged in an upward-inclined position, as shown in Fig. 1. Each grate-bar is disposed relative to the hearth C so that its end  $d^2$ , which is of greater depth than the end  $d^6$  and of the same depth, desirably, as the hearth C, is in juxtaposition to the inner end of the hearth, whereby the downward-inclined top surface of the hearth C and the upward-rising surface  $d^3$  of the grate form a pocket or valley  $d^4$ . More in detail, each grate-bar  $d$ , of suitable, highly-refractory substance, comprises a preferably straight bottom  $d^5$ , straight sides  $d^2$  and  $d^6$ , the first of greater depth than the latter, and a hipped or double-inclined top, that is, a top in two different planes,  $d^7$ ,  $d^8$ , meeting toward the center of the bar and forming a ridge  $d^9$ .

The hearth C is for the purpose of drying-out material placed thereon, such as sugar-cane or bagasse, which carries about 25% or 30% of moisture, or green wood, or any material containing moisture. The hearth C extracts the gases from the materials placed thereon and, at the same time, dries the materials, but does not burn them; whereupon the fireman pushes the material forward onto the grate D. The top surface of the grate being hipped or double-inclined, the sugar-cane does not lie solid on the top of the grate, but allows for passage of air to promote combustion, and the sugar-cane thereby burns readily. As the products of combustion pass down through the spaces between the grate-bars, the latter quickly become highly heated and incandescent, and the products thus pass over these highly-heated and incandescent surfaces, which effects complete combustion, avoiding waste of fuel and affording intense heat. The fire-brick hearth C, by itself, forms a very important and valuable feature of my invention, as does also the peculiar relative arrangement of the hearth with the grate. Back of wall  $b^4$  may be a bridge-wall E extending from the bottom of the furnace and terminating some distance short of the bottom of the boiler. To the rear of the bridge-wall, a suitable distance, I desirably provide a wall F extending from the crown-sheet of the boiler entirely to the bottom of the furnace. Through this wall is cut an opening  $f$  and in



this opening are disposed and secured a series of spaced, fire-brick tiles  $f^2$ , which act as additional combustion producers. As the products of combustion pass through the spaces between these additional combustion producers, the latter become highly heated and incandescent. The products of combustion are divided and separated as they pass over these intensely heated and incandescent surfaces, whereby there is effected a re-ignition and consumption of the hitherto unconsumed products. The combustion producers  $f^2$  thus constitute a secondary fire-box, and result in a secondary and supplemental fire. Owing to the sudden and greatly increased destruction of the products just described there is produced an induced draft through the combustion-producers  $f^2$ , which tends to draw the unconsumed products back from the main fire. From the combustion producers  $f^2$ , the products pass to the flues or tubes of the boiler with absolutely no smoke and no waste of fuel.

Fig. 4 illustrates my invention applied to a furnace adapted especially for use in hospitals in burning puss-rags etc. In this figure, G is the combustion-chamber, H the hearth, and I the grate, the hearth and the grate being exactly the same as disclosed in the other figures of the drawings. K is the ash-pit. After passing through the spaces between the grate-bars, the products of combustion pass directly up the smoke-stack L. For the reasons stated in connection with

the device of the other figures, there is, with the device of Fig. 4, absolutely no smoke and no smell.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

In a furnace, the combination with a combustion chamber, of a solid wall at the front end thereof and constituting the front wall of the furnace, a solid hearth integral with said wall and extending downwardly therefrom to a point approximately at the center of the combustion chamber, a wall projecting from the top of the furnace and constituting the rear wall of the combustion chamber, a grate adjacent the hearth and inclined upwardly for a distance, whence it extends horizontally to said last mentioned wall, a chamber or space in the rear of the combustion chamber, a second wall in said chamber or space extending from the top to the bottom of the furnace and provided with a plurality of restricted passages, and an additional wall intermediate the aforementioned walls and projecting upwardly from the bottom of the furnace to a point about midway of the beforementioned rear wall of the combustion chamber, substantially as described.

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

CHARLES SCHWEIZER.

Witnesses:

E. T. BRANDENBURG,  
J. F. BRANDENBURG.