(No Model.) 2 Sheets—Sheet 1.

W. SWINDELL.

Shield for Furnace Doors.

No. 238,182. **Patented Feb. 22, 1881.**

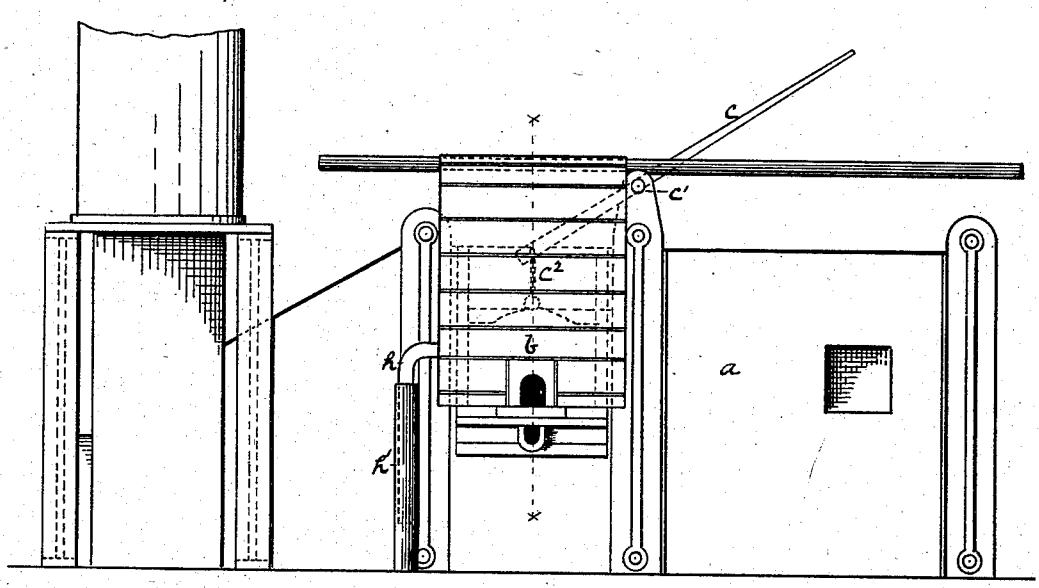


Fig. 1.

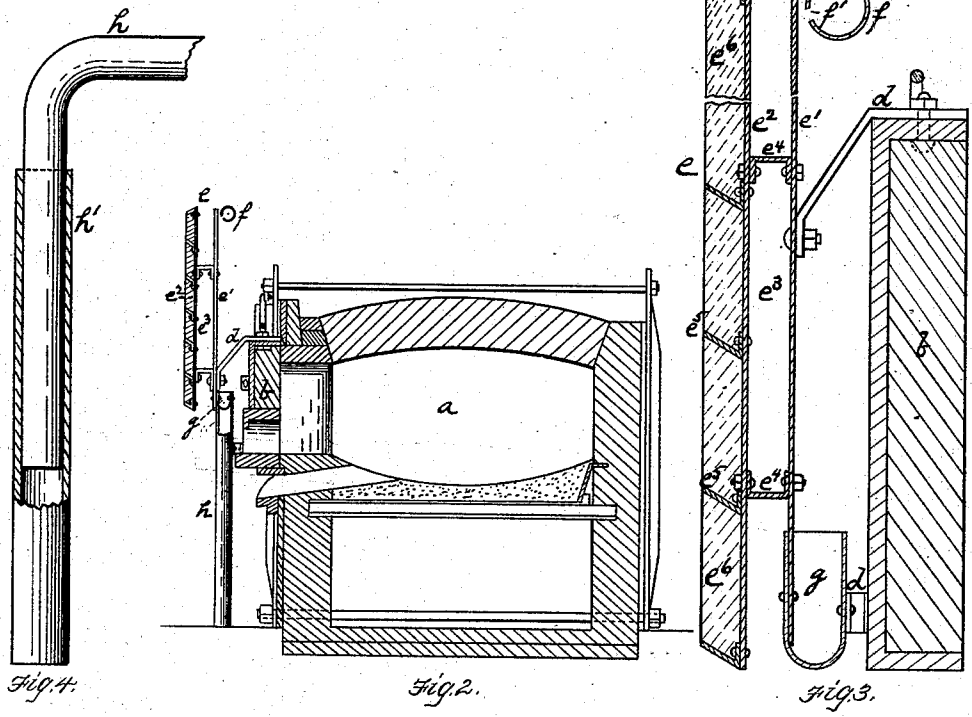


Fig. 4. Fig. 2. Fig. 3.

Witnesses,
T. W. Bakewell.
L. C. Fitler

Inventor,
William Swindell,
by his Attys
Bakewell & Kerr

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. SWINDELL.

Shield for Furnace Doors.

No. 238,182. **Patented Feb. 22, 1881.**

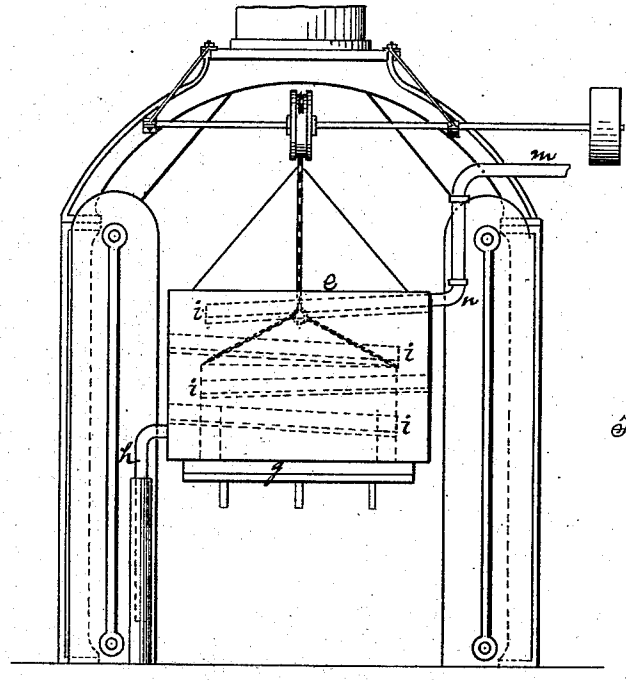


Fig 5.

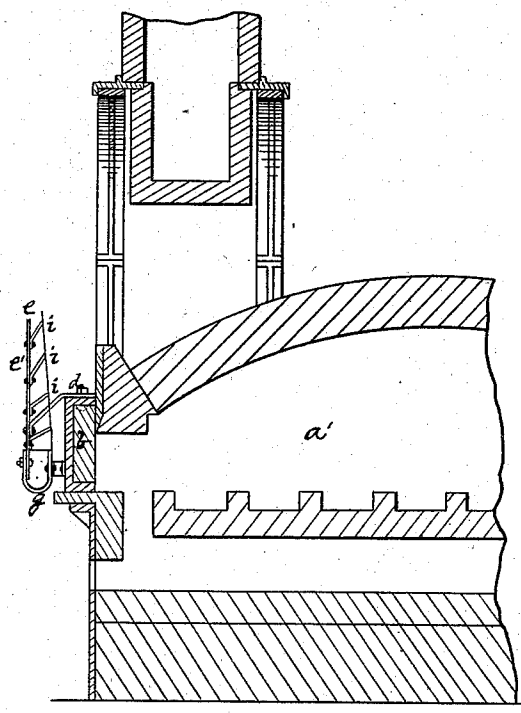


Fig 6.

Witnesses
T. W. Bakewell.
L. C. Fitler.

Inventor,
William Swindell
by his attys
Bakewell & Kerr

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM SWINDELL, OF ALLEGHENY, PENNSYLVANIA.

SHIELD FOR FURNACE-DOORS.

SPECIFICATION forming part of Letters Patent No. 238,182, dated February 22, 1881.

Application filed September 10, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SWINDELL, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Shields for Furnace-Doors; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to water-cooled shields for iron, steel, and other furnaces. The doors of such furnaces rise in opening, being operated either by a lever or by a windlass or crank and pulley.

My invention consists of an improved shield fastened to and operating with the door. The door usually remains closed during the working of the furnace, except at the time of charging or discharging. While these operations are going on the shield cannot remain in front of the door, so that for all practical purposes when attached to the door it is always in position.

To enable others skilled in the art to make and use my invention, I will now describe its construction and operation by specific reference to the accompanying drawings, in which—

Figure 1, Sheet 1, is a side elevation of a puddling or boiling furnace of the usual construction provided with my improvement. Fig. 2 is a vertical cross-section on the line *x x* of Fig. 1. Fig. 3 is a vertical cross-section of the furnace-door and shield. Fig. 4 is a view of the teloscopic joint of the water-pipes. Fig. 5, Sheet 2, is a front elevation of a steel-furnace provided with my improvement; and Fig. 6 is a vertical cross-section of the same.

Like letters of reference indicate like parts in each.

In the puddling-furnace *a*, Sheet 1, the door *b* is raised and lowered by a lever, *c*, pivoted at *c'*, and connected to the door by a chain, c^2.

Attached to the door *b*, by suitable metallic braces *d*, bolted thereto, is the shield *e*, which is made of two iron plates, *e'* and e^2 united, with an air-space, e^3, between them, by short angle or flanged iron braces e^4, bolted to them.

Extending along above the side of the furnace, over the door, is a water-pipe, *f*, slotted or perforated, as at *f'*, on the side next to the shield, so as to discharge a film or spray of water against the side of the plate *e'* next to the furnace.

Fastened to the lower edge of the plate *e'*, and extending the full length of the shield, is a metallic trough, *g*, which receives the water that flows down over the surface of the plate *e'*, and conducts it to a discharge-pipe, *h*, extending laterally, and then, by a bend, downward from one end. To provide for the movement of this pipe with the door, I have run it into a larger pipe, *h'*, of sufficient length to permit its movement without disconnection therefrom. This pipe may, if desired, lead to and discharge into the trough or box in which the operator cools his working-tools, and thus save the necessity of supplying it with water from any other source. The application of the water to the shield on the side next to the furnace guards more effectually against the warping of the shield, and causes any steam that may be generated to rise between the shield and the furnace, and not outside, in the face of the workman.

On the outer side of the plate e^2, I bolt a series of ribs or flanges, e^5, of even depth, and then fill the surface flush with cement e^6, brick, or other refractory material. This serves for greater protection against heat, and prevents warping, which is also the function of the air-space e^3.

If desired, the air-space may be omitted and the flanges e^5 and cement e^6 placed on the outer face of plate *e*; or the flanges and filling may be omitted.

The shield is provided with a work-hole corresponding to that of the door *b*.

In connection with the steel-furnace on Sheet 2 I have shown a modified form of shield. In this there is but one plate, *e'*, and bolted to the inside are a series of troughs, *i*, running from end to end and inclined zigzag to each other. The upper trough is fed with water from a pipe, *n*, fastened to the door, and connected with a supply-pipe, *m*, by a teloscopic joint similar to that shown in Fig. 4. The water flows from pipe *n* down through the zig-zag trough *i* into trough *g*, and thence by discharge-pipe *h*, as described.

It is apparent that the shields, with their

troughs and flanges, may be cast in one or more pieces, or that they may be made of wrought-iron.

The advantages of my improved shield consist in its cheapness and simplicity of construction; in the fact that it requires no labor to move it or attention to keep it in order; that when the fire is put out in cold weather the water will drain out and will not freeze in it, or if any should remain and freeze that it can do no damage, as the troughs are all open; and, lastly, in its durable construction.

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

1. A shield for furnaces attached to and moving with the door, and having a water-trough on its inner face at or near the bottom and communicating with a discharge pipe or conduit, substantially as and for the purposes described.

2. A shield for furnaces combined with a water-supply pipe so as to have a stream or jet of water flowing on or over the side next the furnace, and having a water-trough at or near the lower edge leading to a discharge, substantially as and for the purposes described.

3. A shield for furnaces having a series of zigzag troughs on one side, substantially as and for the purposes described.

4. A shield for furnaces having a vertical movement connected to supply and discharge water-pipes, or either, by a sliding telescopic joint, substantially as and for the purposes described.

5. A shield for furnaces having a trough on its inner side at or near the bottom, and an outer side faced with brick or other refractory material, either with or without an air-space extending vertically through it, in combination with a water-pipe capable of discharging a jet or stream of water on its inner side next to the furnace, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand.

WILLIAM SWINDELL.

Witnesses:
THOS. B. KERR,
FRANK W. SMITH.