

W. SWINDELL.
STEEL HEATING FURNACE.

No. 177,437.

Patented May 16, 1876.

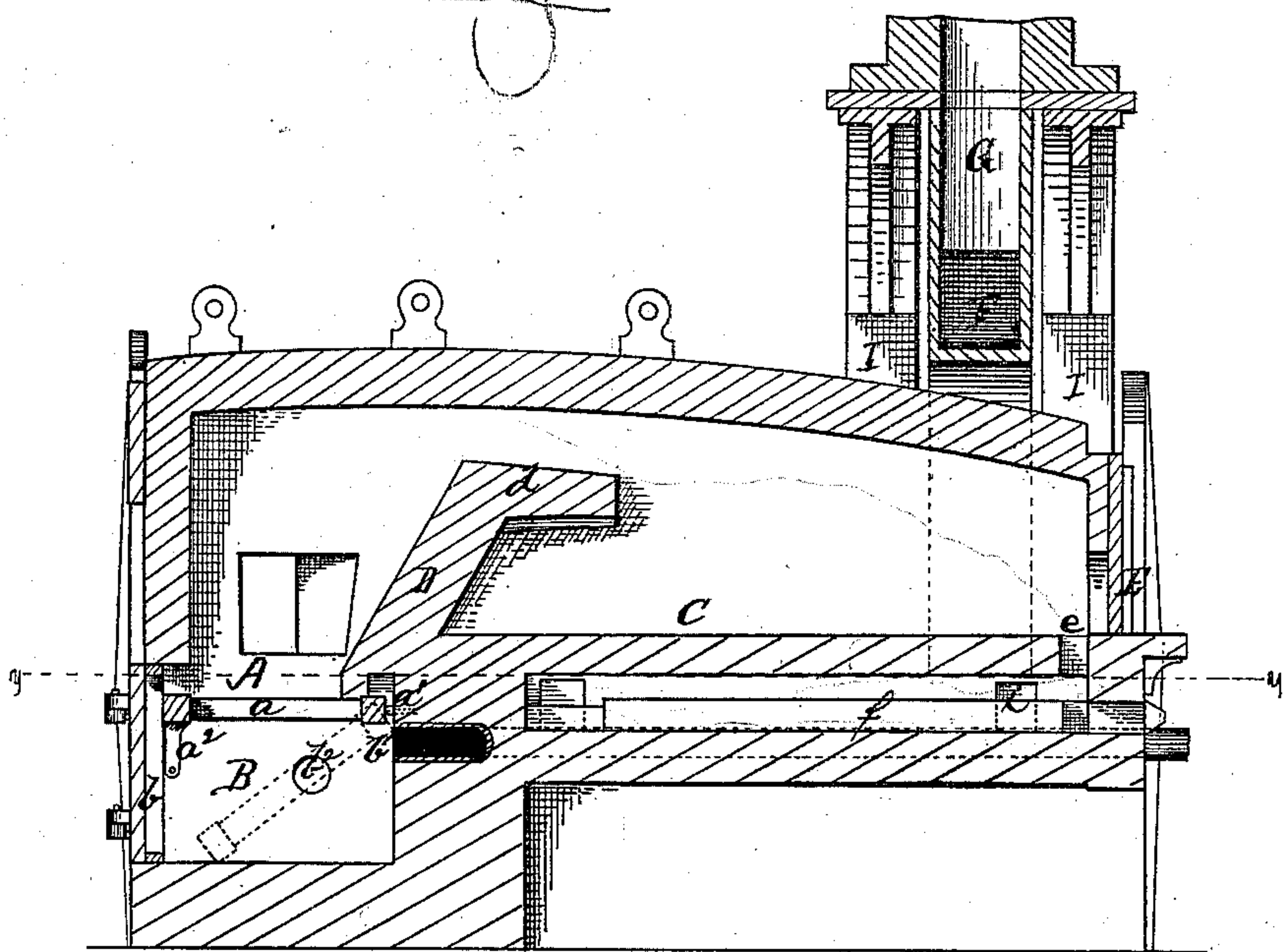


Fig. 1.

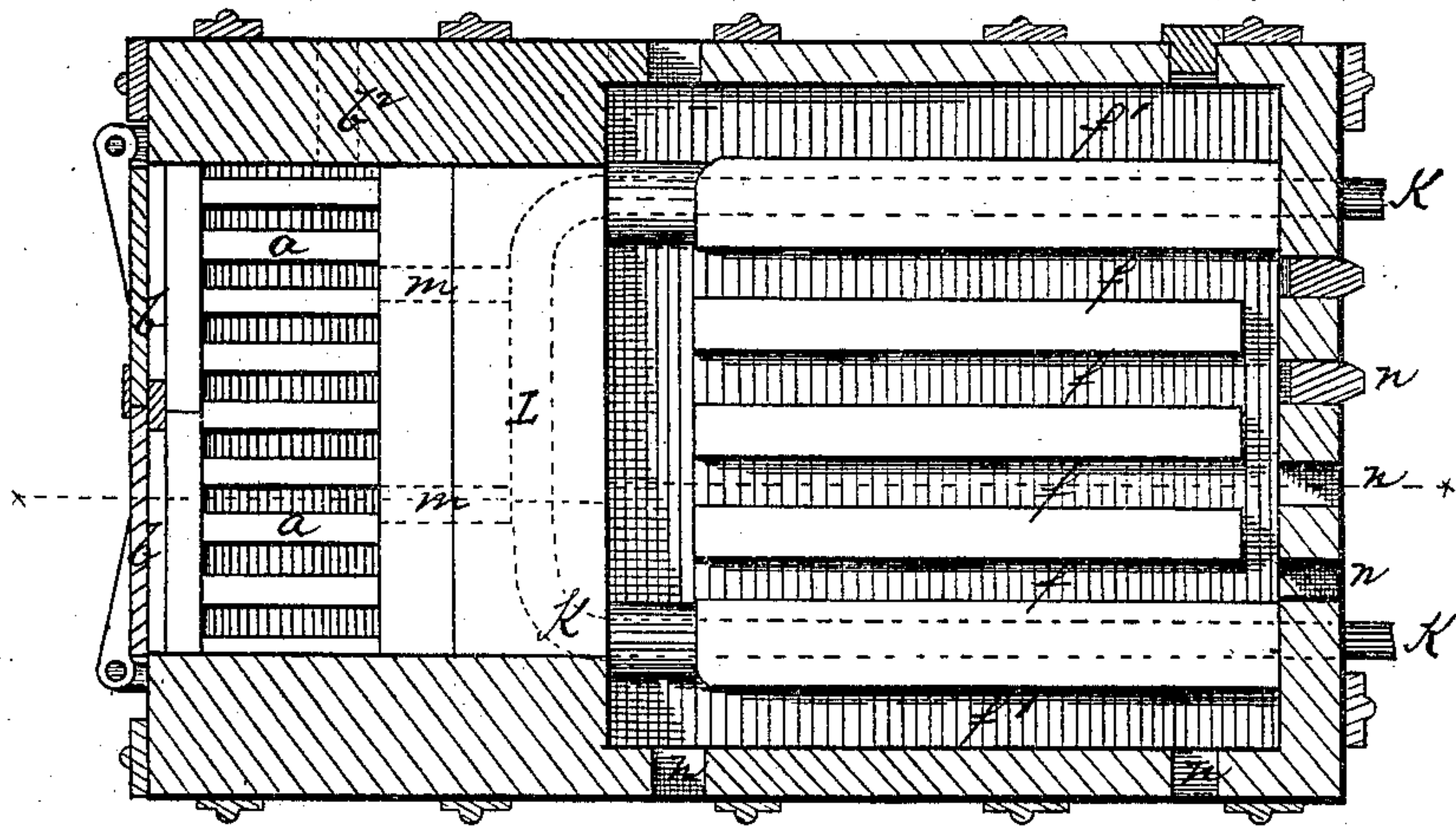


Fig. 2.

WITNESSES.

James S. Ray
R. W. Hunsdale

INVENTOR.

William Swindell
By Bakewell & Kerr
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM SWINDELL, OF ALLEGHENY, PENNSYLVANIA.

IMPROVEMENT IN STEEL-HEATING FURNACES.

Specification forming part of Letters Patent No. 177,437, dated May 16, 1876; application filed March 7, 1876.

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 Steel-Heating Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a vertical section on the line x , Fig. 2, and Fig. 2 is a horizontal section on the line $y y$, Fig. 1, of a furnace embodying my invention.

Like letters refer to like parts in the several figures.

My invention relates to that class of metallurgic furnaces termed heating-furnaces, and is especially adapted for heating articles of steel, such as plowshares, mold-boards, springs, or like articles preparatory to bending or tempering, but the construction will be found generally applicable in heating-furnaces for other purposes than those specified.

I will now proceed to describe my invention so that others skilled in the art to which it appertains may apply the same.

In the drawing, A indicates the fire-chamber of a heating-furnace, provided with grates $a a$, hinged as at a^1 , and supported in front by latches a^2 , which can be withdrawn to let down the grate at will. The ash-pit B is closed by doors $b b$, and perforated at b^1 and b^2 for blast-pipes. Above the grate the chamber A is closed in front, but provided at the side with a door or chute for introducing the fuel. C is the hearth, which is separated from the fire-chamber by a bridge-wall, D, inclined away or sloping from the fire-chamber and toward the hearth, and capped by a horizontal projecting portion or shelf, d , which overhangs that portion of the hearth next to the fire-chamber, so that the portion of the hearth specified is heated by radiation rather than by the direct rays of heat. By these devices the equable temperature of all parts of the hearth is insured. E indicates the charging-door, preferably placed in the end of the furnace, and parallel to the downtake or combustion-flue e , by means of which the hearth communicates with the flues $f f' f''$, the former of which conduct the pro-

ducts of combustion beneath the hearth toward the fire-chamber, and the latter or return flues reconduct the products of combustion or waste gases, which have given up their heat to the hearth and blast, to the uptake F. F is the uptake, composed of an arch-flue, which connects on both sides of the furnace (as shown at i , Fig. 1) with the flues f' , and a vertical flue or stack, G, the whole supported upon the rear of the furnace, and by suitable plates I. K are pipes for the hot-blast, and are arranged within the walls which separate the flues f and f' , so as to be acted on by the waste gases from the time the same leave the hearth until they reach the uptake. These pipes K K may be connected by a cross-pipe, L, provided with a series of branch pipes, $m m$, which discharge the heated blast into the ash-pit B at any desired points. A series of ports, $n n$, are formed in the furnace-walls at suitable points, to facilitate the cleaning of the several flues, and may be opened to admit air to the waste gases or to cool the hearth, or may be closed by plugs or caps at will.

The operation of the furnace is as follows: The fire having been started in fire-chamber A the products of combustion are directed by the inclined bridge-wall against the crown, and, passing above the hearth, dip at the rear end of the furnace, and escape from the hearth through e into flues $f f'$, along which they pass forward, returning by $f' f''$, thus heating the blast and bottom of the hearth before they finally reach the uptake. As soon as the hearth is sufficiently heated for the purpose intended, the door E is raised and the charge introduced, any air which enters the door being drawn into the flues $e f f'$ with the products of combustion, which cross that end of the furnace.

The advantages of my invention are, first, that any kind of fuel may be employed without regard to its impurities; second, the articles placed on that portion of the hearth next the fire-chamber are not unduly heated; and, thirdly, that no air is admitted to cool the hearth or affect the articles heated thereon when inspecting or charging the furnace.

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

1. In combination with the hearth of a heating-furnace, the overhanging bridge-wall, inclined or forming an acute angle therewith, substantially as and for the purpose set forth.

2. In combination with the hearth of a heating-furnace the door E, located as specified, and the flues *ef*, substantially as specified.

3. In combination with the hearth and fire-chamber of a heating-furnace the flues *eff'*,

and the blast-pipes K, arranged beneath the hearth, and in relation thereto, substantially as and for the purpose set forth.

In testimony whereof I, the said WILLIAM SWINDELL, have hereunto set my hand.

WILLIAM SWINDELL.

Witnesses:

F. W. RITTER, Jr.,

JAMES I. KAY.