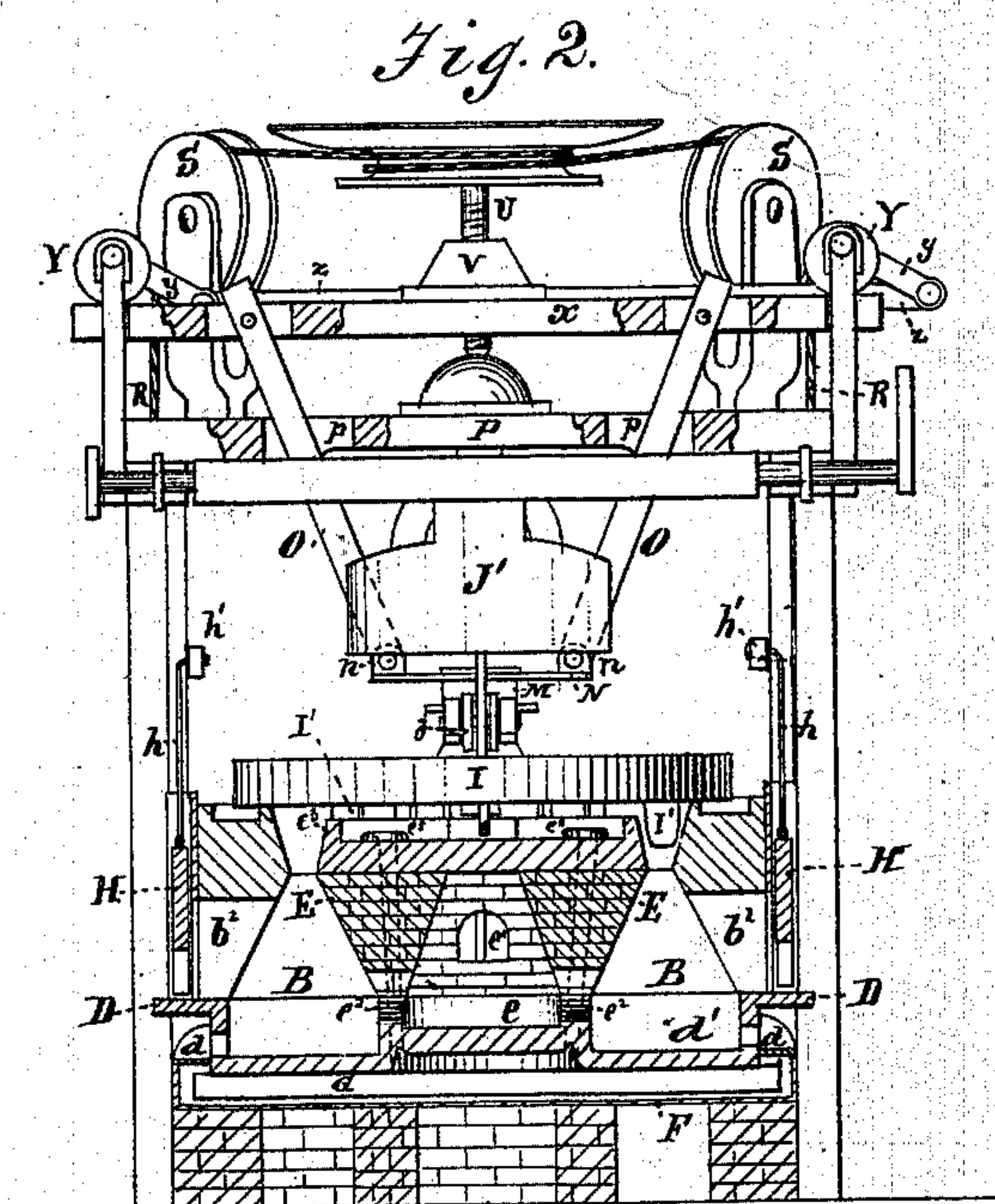
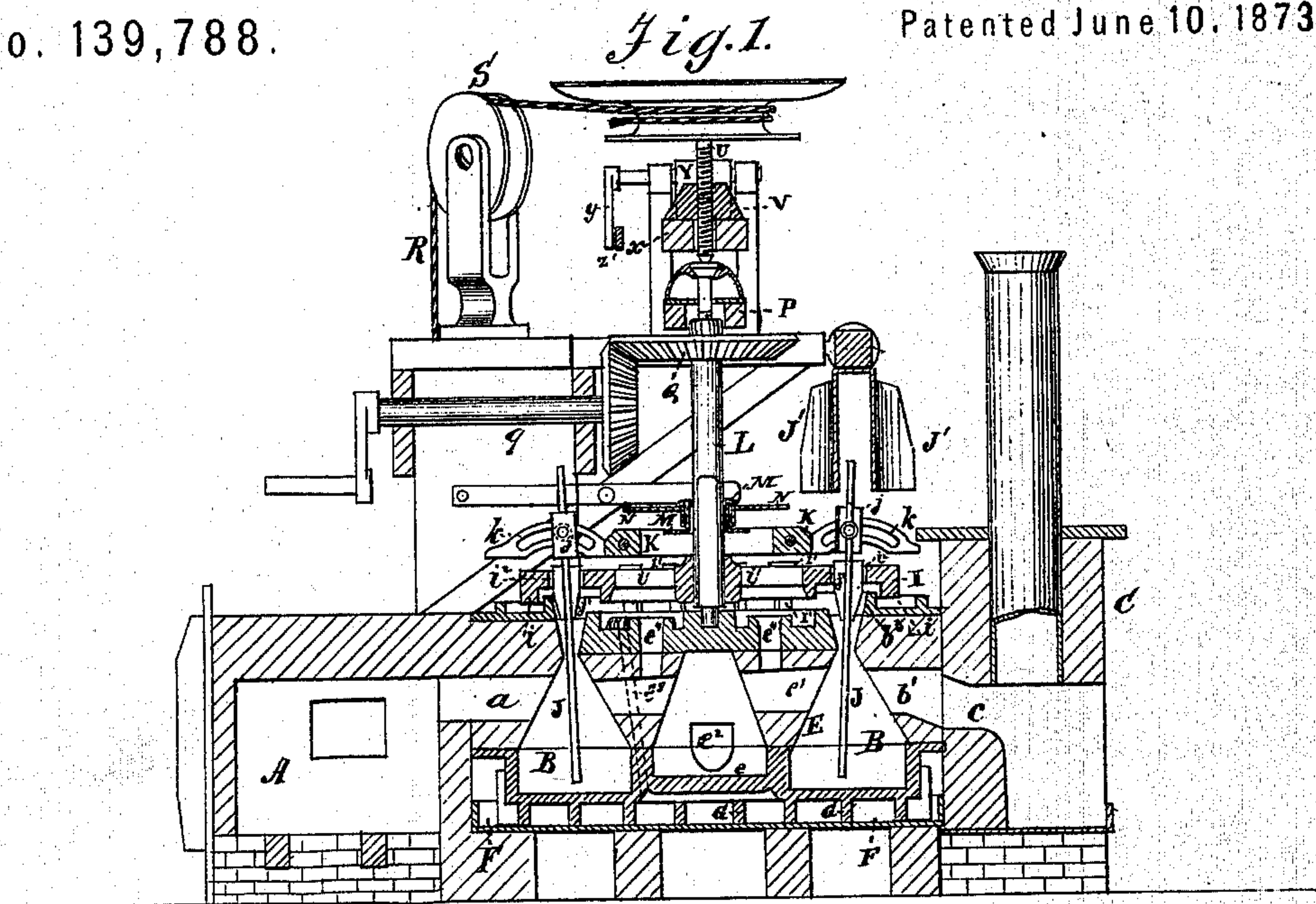


J. HEATLEY.
Puddling Furnaces.

No. 139,788.

Patented June 10, 1873.



Witnesses:
W. Mathys.
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UNITED STATES PATENT OFFICE.

JOHN HEATLEY, OF HARRISBURG, PENNSYLVANIA.

IMPROVEMENT IN PUDDLING-FURNACES.

Specification forming part of Letters Patent No. **139,788**, dated June 10, 1873; application filed April 17, 1873.

To all whom it may concern:

Be it known that I, JOHN HEATLEY, of Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a new and Improved Puddling-Furnance; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 is a longitudinal vertical central section. Fig. 2 is an end view with parts broken off.

The invention relates to puddling-furnaces; and consists in certain improvements which will be first, fully described, in connection with all that is necessary to a full understanding thereof, and then clearly pointed out in the claims.

In the drawing, A represents an ordinary furnace, and B a melting-chamber, having respectively the oblong openings *a* through which pass the hot-air and products of combustion from the one into the other. Opposite to these openings *a* is the opening *b*¹, which registers with an opening, *c*, of the smoke-stack C. In the melting-chamber B are the opposite holes *b*² *b*² through which the cast metal is charged thereinto. D is the bottom of the melting-chamber, having outlet hole *d*, and the annular concavity *d'* surrounding a raised hearth *e* of the melting-stove E, which has the charge-holes *e*¹ and outflow-holes *e*². On top of the melting-stove E is an outer flange *e*³ within which is thus formed a water receptacle. *e*⁴ *e*⁴ are peep-holes, and *e*⁵ *e*⁵ are water-conduits, whose mouths are raised, and the latter of which lead through the stove into a water-pan F below the melting-chamber. Around the bottom and convex side of bottom D are passed, fastened, or on it cast, the metallic bars G, which are always sunk more or less in the water of said pan, and caused to raise the bottom above the water. By this means the chill upon the metal is not communicated directly or suddenly to the melted metal in bottom D, but the heat is absorbed from the metal gradually and carried by conduction through the bars G to the water, which may be changed at intervals or caused to circulate therethrough continually. H H

are doors which are caused to slide up and down over the holes *b*² *b*² of the melting-chamber by means of the straps *h* *h*, and the levers *h*¹ *h*¹, which have their fulcrums on the frame. I is the detachable top of melting-chamber, having the downward flange *i* that fits and rotates around a corresponding upward and inner flange *b*³ of the melting-chamber B, and a series of pendent fan-blades I that create an equable diffusion of the gases and hot-air as they come from the furnace. *i*¹ is a series of holes arranged over the melting-stove, and intended to allow the plugs to be inserted and taken from peep-holes *e*⁴ *e*⁴; and *i*² *i*² are slots in which are worked the stirrers JJ to enable them to be changed in position across the melting-chamber. J' J' are vibratory regulators placed on a hand-crank shaft, and within convenient reach, for the purpose of causing the stirrers to be moved with facility across from one side to the other of the melting-chamber B. These stirrers are pivoted in the recess of a block, *j*, which is journaled in two parallel arc-slots, *k* *k*, at opposite ends of the bar K. The latter slides up and down over the top I that is made fast to the vertical shaft L, and turns therewith. The bar K is formed in two parts, attached together over the shaft, and the journals of stirrer-blocks by screws or other easily detachable fastenings, and may have cross-pins between the arc-slotted ends. They may also be made in two side-pieces with intermediate spacing-blocks. By this construction this bar can be easily removed and returned to its position. *j'* *j'* are metallic facings applied to the inside of slots *i*² *i*² for the purpose of lessening wear and of being easily removed and replaced after they are worn by friction out of the proper shape. To the top of this bar K is made fast the collar M that surrounds the shaft, and in which is swiveled the disk N. This disk has ears *n* *n* in which are pivoted the lift-levers O O that pass up through slots of the cross-bar P. Q is a bevel spur-wheel driven by a corresponding bevel-pinion on the hand-crank shaft *q*. R is a cord attached at its ends to weights and passing over pulleys S S so as to rotate the screw U, which works in the nut V, to raise or lower the bar *x*. Y Y are two cams journaled in bear-

ings on the frame and having arms $y y$ which are vibrated by a rod z so as to hold the bar x always in a horizontal position.

The operation is as follows: The iron being charged through holes $b^2 b^2$ and $e^1 e^1$ into the stove E, which is protected by its internal and central position from all drafts of air, and around which all the hot products of combustion continually circulate, is soon disintegrated and passed out of hole d , while the the iron is melted and allowed to pass through holes $e^2 e^2$ into the concavity of melting-chamber. Here it is continually stirred by the laterally as well as up and down adjustable stirrers J J while it is gradually chilled by the abstraction of its heat through the bars G into the water of pan. The iron is then removed in the usual or in any suitable manner. The stirrers J, being adjustable rapidly to any change of position, keep all the fused metal in motion and thereby tend to produce a simultaneous cooling of all parts of the metal while the indirect absorption of heat through the bars G tends to the same end. Certain kinds of metal will not properly fuse unless their particles are put in motion at a certain temperature. These are therefore melted, stirred, and cooled in the chamber B.

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

1. The stove E placed in the center of melting-chamber B and provided with inlet and outlet openings thereinto and thereforom, as and for the purpose described.

2. The cover I of a melting-chamber, B, ar-

ranged to rotate thereover, and thus to carry around therewith the stirrers, as a new and convenient means of applying said stirrers.

3. The bar K vertically movable on shaft and provided with arc-slots at each end, in which the stirrers are moved as described, so as to give the double adjustment intended.

4. The combination, with the stirrer-bar K, of the collar M that surrounds shaft, the swiveled disk N, lift-levers O O, and slotted cross-bar P, as and for the purpose set forth.

5. The combination, with screw U, of cords, pulleys, and counter-balance weights, arranged as and for the purpose specified.

6. The bar K, made in two or more pieces, clamped together on shafts and journals of stirrer-blocks, as and for the purpose described.

7. The metallic facings $j j'$ applied to the slots $i^2 i^2$ of the top I of melting-chamber, as and for the purpose described.

8. The combination, with rod z , of cams Y Y having the arms $y y$, and operated as and for the purpose described.

9. The revolving cover I having the series of pendent fan-blades I', as and for the purpose specified.

10. The vibratory regulators J' J' applied to the stirrers, as and for the purpose specified.

The above specification of my invention I have signed this 11th day of April, A. D. 1873.

JOHN HEATLEY.

Witnesses:

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