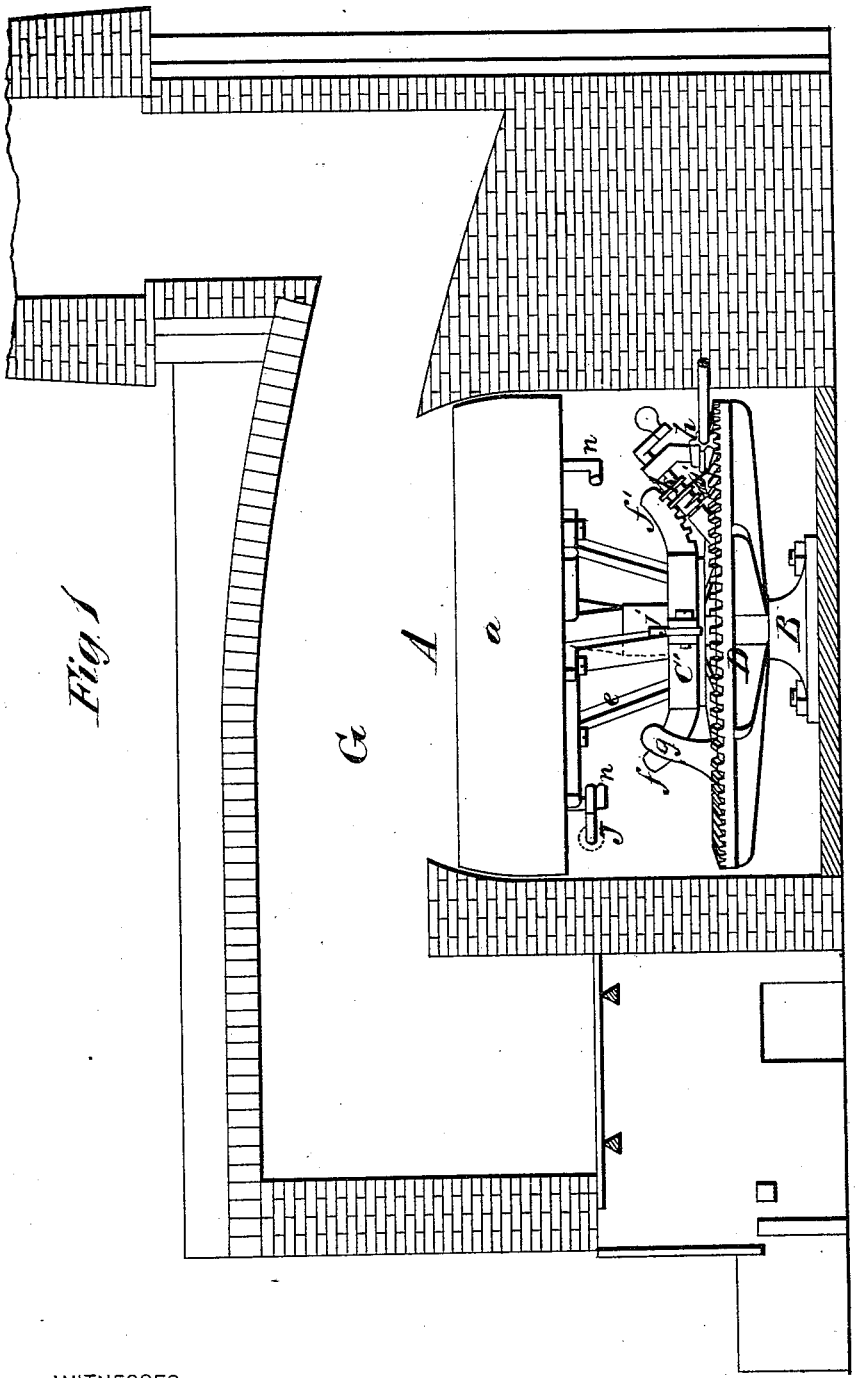
3 Sheets--Sheet 1.

G. W. HALL.

Tilting and Revolving Puddling Furnace.

No. 167,241. Patented Aug. 31, 1875.



WITNESSES

Robert Everett

George B. Upham.

INVENTOR

Gordon W. Hall,

Chipman & Brown & Co

ATTORNEYS

3 Sheets--Sheet 2.

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Fig. 2

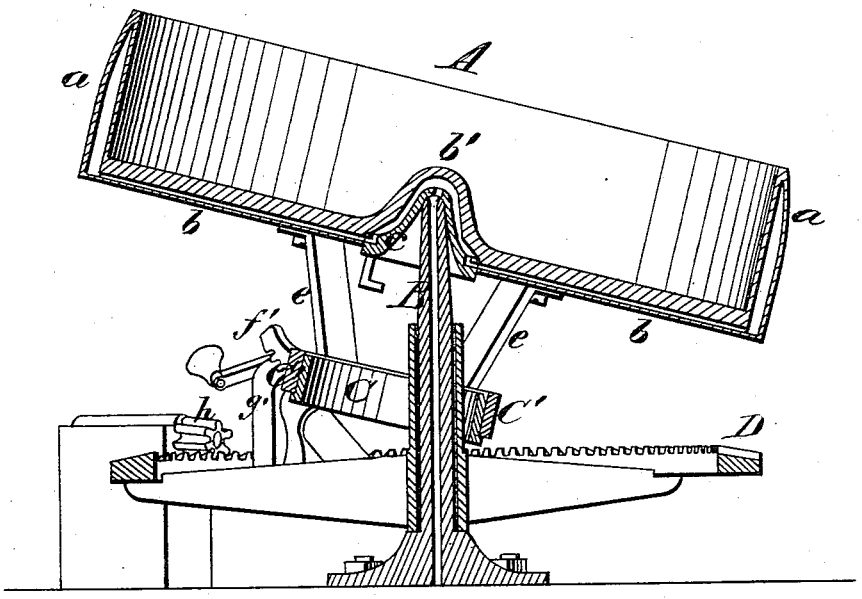
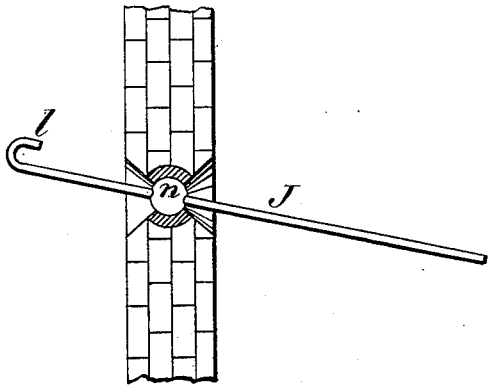


Fig. 3



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Robert Everett

George E. Upham.

INVENTOR

Gordon W. Hall

Chipman Frame & Co,

ATTORNEYS

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Fig. 4

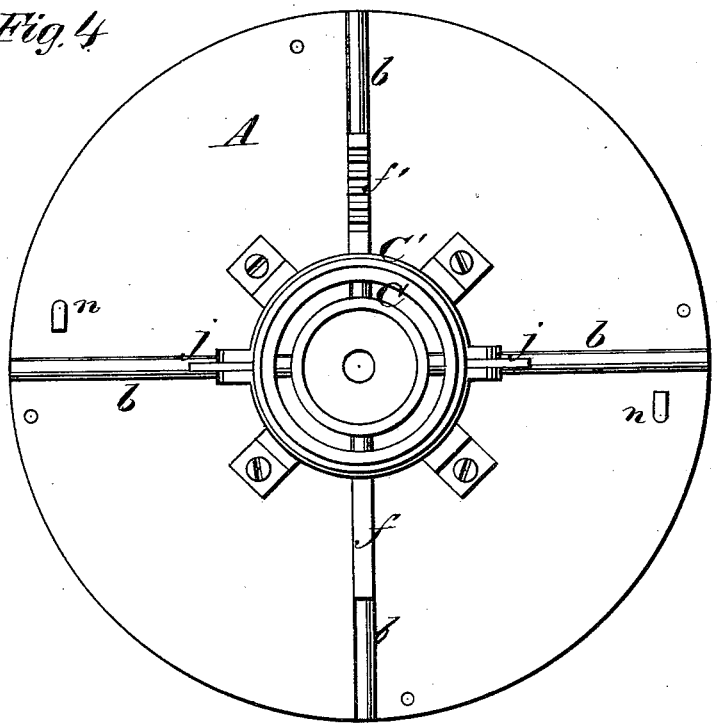
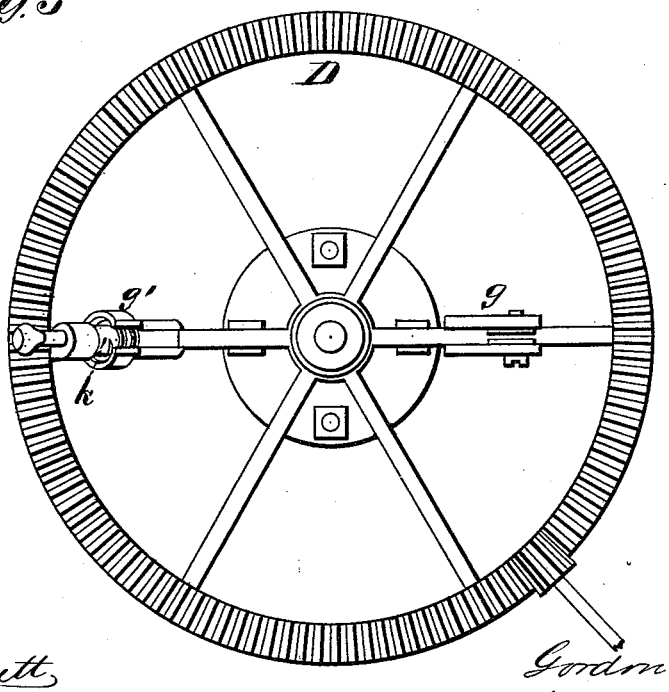


Fig. 5



WITNESSES

Robert Everett

George E. Upham.

INVENTOR

Gordon W. Hall,

Chipman & Fenner & Co,

ATTORNEYS

UNITED STATES PATENT OFFICE.

GORDON W. HALL, OF HAVANA, ASSIGNOR OF ONE-HALF HIS RIGHT TO R. NELSON GERE, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN TILTING AND REVOLVING PUDDLING-FURNACES.

Specification forming part of Letters Patent No. **167,241**, dated August 31, 1875; application filed June 26, 1875.

To all whom it may concern:

Be it known that I, GORDON W. HALL, of Havana, in the county of Schuyler and State of New York, have invented a new and valuable improvement in Tilting Puddling-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side view, part sectional, of my tilting puddling-furnace, and Fig. 2 is a longitudinal vertical sectional view of the same. Fig. 3 is a detail view, and Figs. 4 and 5 are plan views.

This invention has relation to puddling-furnaces wherein the process of puddling is conducted in hearths or basins which are moved by mechanical power for the purpose of agitating the melted metal, and facilitating the puddling operation.

The nature of my invention consists mainly in a boiling and puddling hearth or basin, which is mounted in such manner that a continuous circular tilting or wabbling motion is imparted to it during the operation of puddling, whereby the contained metal is more thoroughly agitated and exposed to the heat of the furnace, as will be hereinafter explained. The invention also consists in a puddling hearth or basin, which is free to be tilted and wabbled, in combination with means for adjusting the same at any desired angle from a horizontal plane, as will be hereinafter explained. My invention also consists in a hearth or basin which can be tilted, and which is centrally supported upon a hollow pedestal, in combination with water-conduits and annular boshes, as will be hereinafter explained. The invention finally consists in certain novel means, hereinafter explained, whereby the hearth or basin can be rotated, adjusted in a horizontal plane, or held by means of a swivel-hook, and caused to recive a variable tilting or wabbling motion without rotation, as will be fully explained hereinafter.

In the annexed drawings, A designates a circular hearth or basin, which is composed of cast-iron cast entire or in sections, and constructed with an annular hollow rim, *a*, radial water-conduits *b*, and a central elevation, *b'*. The conduits *b* communicate with and supply water to the rim or boshes *a*, and the central elevation *b'* receives in it a teat, *c*, which has a perforation through its apex, and between which and the lower side of the elevation *b'* is a space which communicates with the radial conduits *b*. The teat *c* forms a socket to receive the upper rounded end of a stationary standard, B, shown clearly in Figs. 1 and 2. The hearth A is by these means allowed to tilt freely, and as the standard B is hollow, water may be forced through it and conveyed to the interior of the rim *a* during the operation of puddling. C designates a base-ring on the lower ends of standards *e*, which are rigidly secured to the bottom of the basin A, which ring is embraced by a band, C', having segments *f f'* cast on it, and arranged diametrically opposite each other. The axis of the ring C is coincident with the axis of the basin A, and the diameter of this ring is such as will allow the basin to be tilted at any desired angle. The segment *f* is held between guides *g*, and the segment *f'*, which has teeth on its lower edge, is held between guides *g'*. The guides *g g'* are rigidly secured to the spokes of a large horizontal bevel spur-wheel, D, which turns freely around the standard B and receives its rotation from a pinion, *h*, on a shaft which extends through the furnace-wall, and is driven by means of a belt or spurred gearing. The guides *g'* receive between them a worm-screw, *k*, on the shaft of which a crank-handle is keyed for allowing it to be turned. The screw *k* engages with the teeth on segment *f'*, so that by turning this screw the basin A can be adjusted in a horizontal plane, or set at any desired angle to such plane. The ring C, which is rigidly secured to the basin A by means of arms, as above stated, is free to turn inside of the band C', when not arrested by pivoted fingers *j*, which are applied to the band C'. When fingers *j* are turned inward and locked with the arms of ring C, then the basin A will rotate with the wheel D. G designates a reverberatory puddling-furnace, in which my im-

proved basin is arranged, and J designates a rod having a hook, *l*, on one end. This rod passes through the wall of the furnace, and has a ball-and-socket bearing therein, which allows it to receive a universal play. The hook *l* is on the inner end of the rod J, and is designed to engage with one or the other of two hooks, *n*, on the bottom of the basin A, and prevent this basin from rotating, but allows it to receive a circular tilting motion from the wheel D. For the purpose of having the external surface of the rim of the wheel as close as possible to the wall surrounding it, said surface is curved, and the adjacent surface of the furnace-wall is also curved, as shown in Fig. 1. The furnace G may be constructed in the usual well-known manner, and in the ordinary sliding door I shall construct another slide for the balling-tool. I shall also make an opening, suitably closed through the rim of the basin, for the purpose of tapping off cinders.

In practice the interior of the basin will be lined with a suitable refractory material, (fix,) and for this purpose I prefer to use magnetic ore, or common ground ore (fix.) By my invention I cause the melted mass in the basin to change position from the bottom to the surface continually, thus thoroughly mixing the metal with the cinder and chemicals, and subjecting the same to the reverberatory heat of the furnace and eliminating all obnoxious gases, and thoroughly decarbonizing the entire charge in the basin.

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

1. A central recessed boiling and puddling hearth or basin, mounted upon the stationary standard B, rounded at its upper end, forming a pivot, in combination with a suitable operating mechanism, whereby the basin has a continuous circular tilting or wabbling motion, substantially as and for the purpose set forth.

2. The adjustment-screw K, combined with the segment *f'*, and a basin, A, mounted substantially as described.

3. The ring C, secured as described, to the basin A, in combination with the band C', segment *f f'*, guides *g g'*, and wheel D, substantially as described.

4. The hooked rod J, pivoted into the wall of the furnace G, in combination with one or more hooks, *n*, on the basin A, substantially as described.

5. The teat *c*, having a perforation through its apex, combined with the basin A, hollow standard B, conduits *b*, and hollow rim *a*, substantially as described.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

GORDON W. HALL.

Witnesses:
A. H. CONKLIN,
WM. CRANK.