W. Ennis,

Refining Iron.

No. 106,347. Patented Aug. 16. 1870.

FIG. 1.

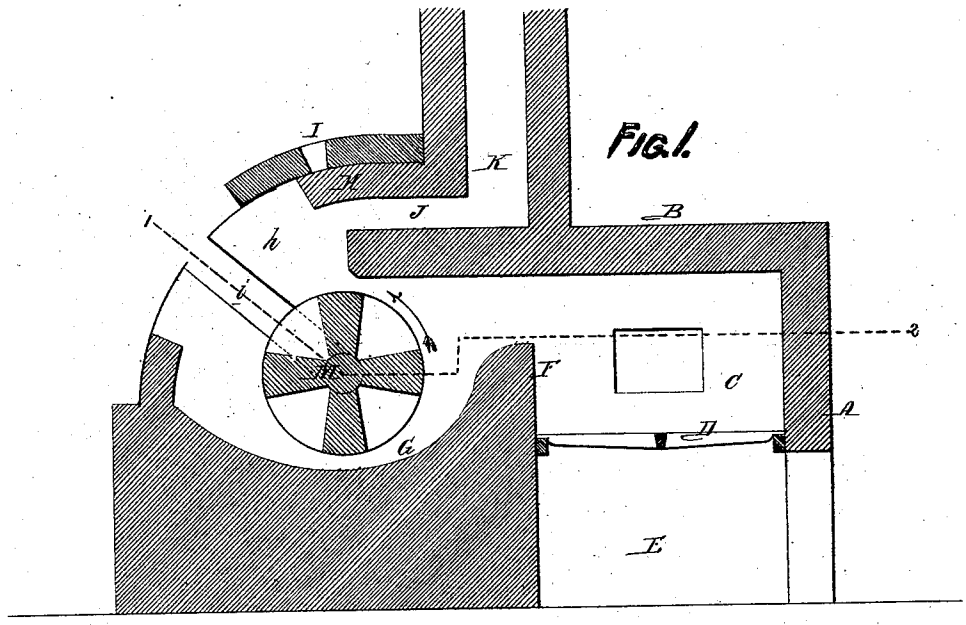
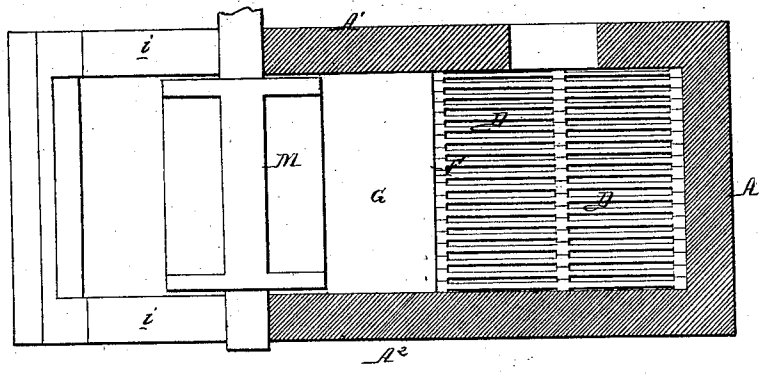


FIG. 2.



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WILLIAM ENNIS, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 106,347, *dated August* 16, 1870.

IMPROVEMENT IN THE MANUFACTURE OF WROUGHT AND PUDDLED IRON.

The Schedule referred to in these Letters Patent and making part of the same.

I, WILLIAM ENNIS, of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented an Improvement in the Manufacture of Wrought Iron, of which the following is a specification.

Nature and Object of the Invention.

My invention consists in producing wrought iron of a desired character from iron of different qualities by melting in a furnace the iron of one quality and agitating it with a mechanical puddler composed of iron of another quality, which, melting, will unite with the molten mass in the furnace, and will be puddled therewith, the puddler thus performing its mechanical functions, while it aids, by its admixture with the contents of the furnace, in producing the wrought iron of the desired character.

Description of the Accompanying Drawing.

Figure 1 is a vertical section of a furnace wherewith my invention may be carried into effect, and

Figure 2, a sectional plan on the line 1 2, fig. 1.

General Description.

In the process of puddling, it is a common practice to melt iron of one quality in the furnace and then to add iron of another quality, with the view of producing wrought iron of a desired character. Sometimes wrought iron is added with different fluxes to the metal in the furnace, with the view of obtaining a desired product, the usual plan of stirring and agitating the metal being pursued.

Various mechanical appliances have been devised with the view of saving the severe and costly labor required in manipulating the usual puddling tools, but the use of machinery in place of labor has, hitherto, been very limited in the practice of this tedious process, owing to the destructive action of the heat on the mechanism employed.

In carrying out my invention, I employ a mechanical puddler, but I avail myself of the gradual melting of the same as a means of mixing together different qualities of iron for the purpose of obtaining wrought iron of a desired quality.

I have selected, for illustration, a furnace of peculiar character wherewith to carry my invention into effect, but it should be understood that furnaces of different styles may be used, and different machinery employed, without departing from the main features of my invention.

In the drawing—

A represents the front wall of the furnace;

A^1 and A^2, the opposite side walls;

B, the roof;

C, the fire-place, having the usual grate, D, and ash-pit, E;

F, the bridge-wall; and

G, the concave bed of the furnace, wherein the metal is melted and puddled.

The furnace has an arched rear, H, in which is an opening, *h*, a sliding cover, I, being arranged to close or expose this opening.

A return flue, J, forms a communication between the interior of the furnace and the chimney, K.

In the opposite side walls A^1 and A^2 of the furnace are inclined openings *i i*, for receiving the journals of a vaned wheel, M, the latter being composed of iron of the quality which has to be mixed with that in the furnace.

When the furnace is in operation the opening *h* is closed by the sliding cover I, the inclined openings *i i* are so blocked up with refractory material that the journals of the wheel M only can pass through them, and the said wheel M is caused to revolve, in the direction of the arrow, by any suitable mechanism, in the molten metal in the bed of the furnace, while the products of combustion are directed through the space between the roof B and the bridge-wall F onto the wheel and onto the molten metal, and after circulating through the chamber of the furnace, pass off through the flue J to the chimney K.

As the molten mass of metal is agitated and carried upward by the vanes of the wheel M, and as it falls from the said vanes in streams, it is met by the products of combustion, so that a thorough puddling is effected, while, at the same time, the wheel itself must be gradually melted, and the melted portion must unite and be puddled with that in the furnace, and wrought iron of the desired quality must thus be produced.

As the puddler is consumed and reduced in diameter, its journals can be adjusted to a lower position in the openings *i i*, so as to be near the bed of the furnace.

I prefer the furnace illustrated and described for carrying my invention into effect, but, as before remarked, different styles of furnaces may be applied and different mechanical puddlers substituted for that explained. A vibrating puddler may, for instance, be employed in place of the rotating wheel, or a vertical shaft may pass through the roof of the furnace, and within the same may be furnished with a suitable agitator.

Claim.

The process described, of mixing and puddling iron of different qualities together, by melting iron of one quality in a furnace and agitating it with iron of a different quality, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ENNIS.

Witnesses:

WM. A. STEEL,

LOUIS BOSWELL.