W. H. PERRY.

Manufacture of Bar Iron.

No. 33,006. Patented Aug. 6, 1861.

Fig: 1.

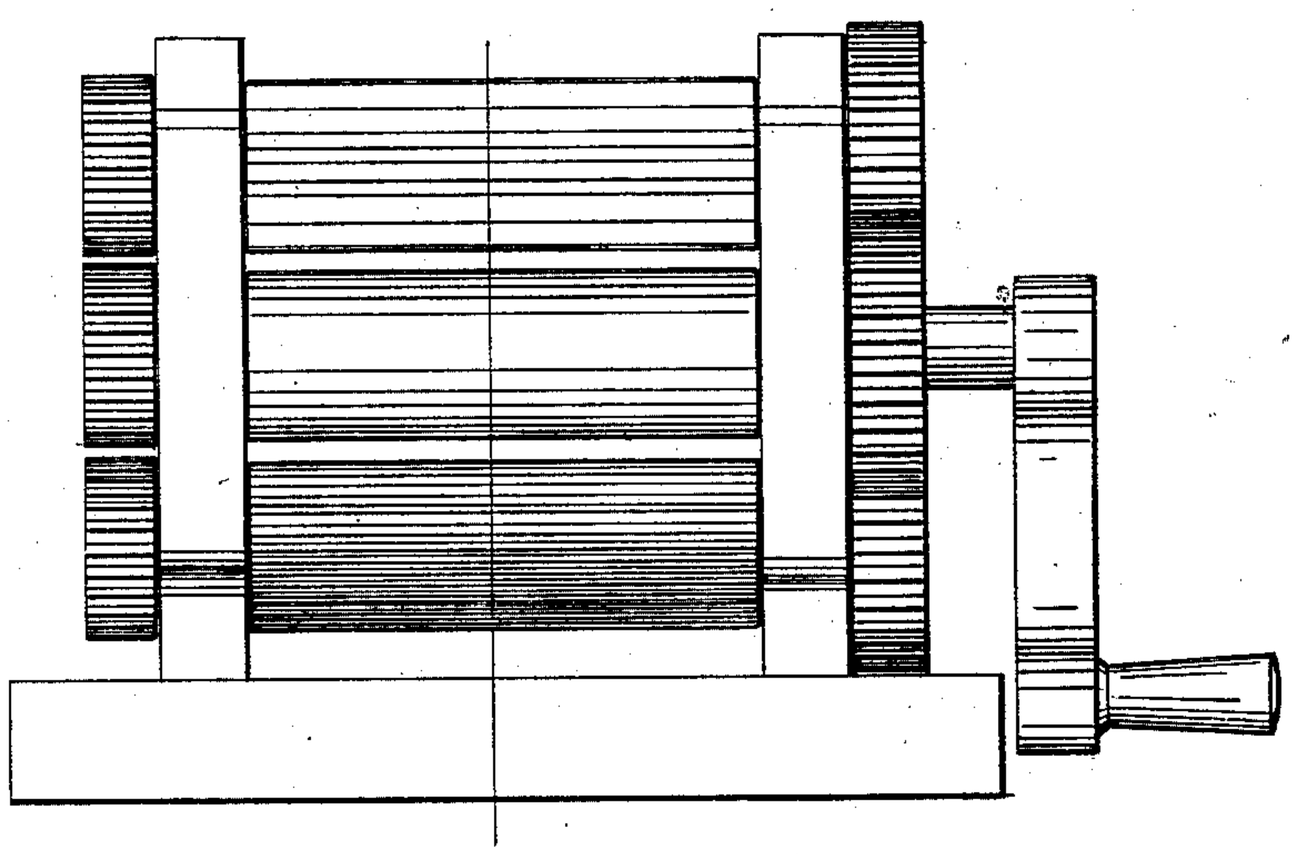


Fig: 2.

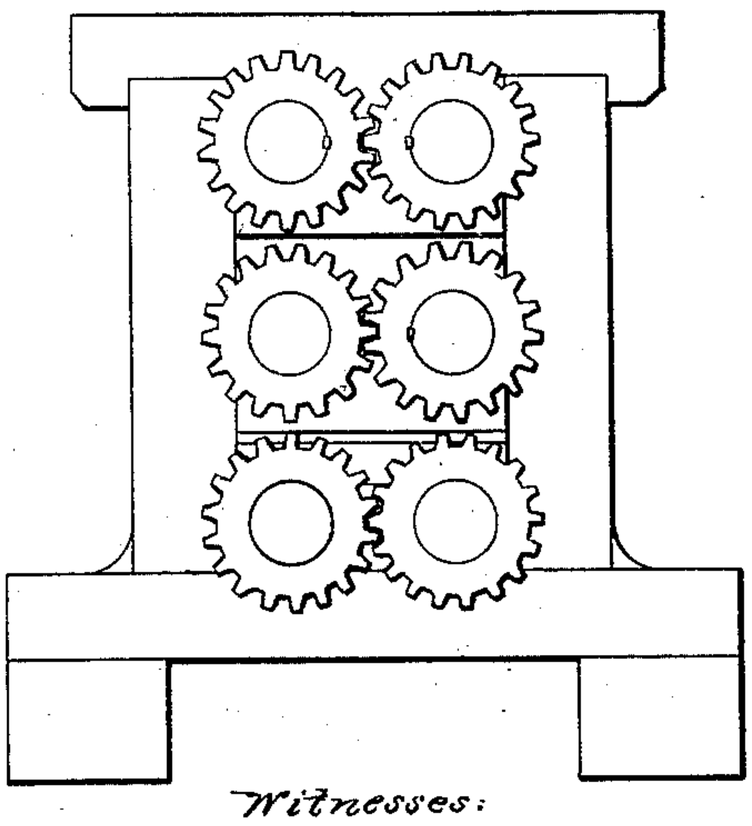
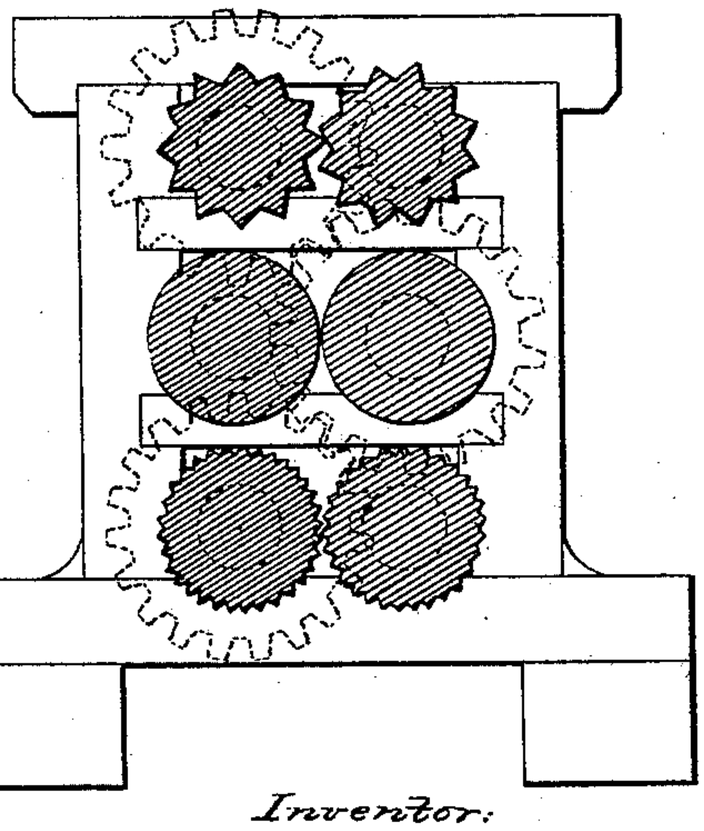


Fig: 3.



Witnesses:

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Augustus Pohlers.

Inventor:

William H Perry.

UNITED STATES PATENT OFFICE.

WM. H. PERRY, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN THE MANUFACTURE OF IRON.

Specification forming part of Letters Patent No. **33,006,** dated August 6, 1861.

To all whom it may concern:

Be it known that I, WILLIAM H. PERRY, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Improvement in the Manufacture of Iron; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a side elevation of the machine used in practicing my improvement. Fig. 2 is side elevation of the said machine, and Fig. 3 is a transverse section taken on the line A′ A′.

My invention consists of an improvement in the process of manufacturing iron, and the machine illustrated by the annexed drawings constitutes an essential element in the said process.

To enable any one skilled in the arts to which my invention appertains to understood its nature and importance, it will first be necessary to describe the process of manufacture now in use—that is, so much of it as relates to this invention. Take, for example, a single furnace, worked day and night, which is operated by two men—the furnace-man and his helper. The helper commences his work by preparing the bottom of the furnace for his "turn." This is done by throwing into the hot furnace one hundred pounds of scrap-iron. The door is then shut and a good fire made in the furnace, the scrap remaining in until about one-fourth of it is reduced to liquid cinder. The remaining scrap is then taken out, and the door left open until the cinder becomes hard. This hard smooth cinder makes a good bottom to work the turn on. When the bottom is sufficiently hard, the helper commences the first "heat" by throwing into the furnace six shovelfuls of cinders with four hundred and seventy-five pounds of "pig" metal. He then closes the door and makes a good fire, and leaves it about ten minutes, at the end of which time he takes a bar and turns over the pig metal to quicken the melting. He then leaves it ten minutes more, when the metal begins to melt. The man then puts down the damper and stirs the metal constantly, to keep it from sticking on the sides and bottom of the furnace for about twenty-five minutes, when it becomes a liquid. At this stage the man puts up the damper and stirs up the fire without putting on much coal, that there may be a clear heat without smoke. The liquid mass of metal and cinders then commences to boil. It rises up from two or three inches deep to eight or nine inches, and continues to boil and bubble for twenty minutes, requiring a good deal of stirring during the whole of this time to keep it from sticking to the sides and bottom of the furnace. This working is continued until it begins to stick together and "come to nature," as it is termed, at which stage it drops in a large cake on the bottom of the furnace, (the iron being under the cinder,) after which it has to be constantly stirred up and turned over, that the iron may be cleared. After being worked in this way for some time, it becomes spongy, at which point the "puddler" works it into four balls, which are taken, one after another, as they are balled, up to the squeezers, and from the squeezers to the rolls, where they are rolled into "muck-bars." It takes from one hour and a quarter to one hour and a half to make a "heat," and six heats are one day's work, and five heats are made in the night turn. When the last charge of each turn is taken out, the furnace has to be "fixed" and put in good order again for the next turn. This is done by throwing in four shovelfuls of pulverized ore, three shovelfuls of scale, with one hundred pounds of scrap. This is left in about half an hour until it is all melted, and about twenty-five per cent. of the scrap is reduced to cinder. A small ball is then rolled up and taken out. What remains is daubed on the sides of the furnace wherever it has been burned out. The furnace yields about twenty-seven hundred and fifty pounds the day turn and about twenty-three hundred the night turn. Thus much for the old method.

My plan is as follows: I first take the metal as it comes from the blast-furnace and spread it over a level floor prepared for the purpose. Now, while the metal is red hot it is extremely crummy or friable, and in that condition only is it fit for my purpose. While it is in this condition, then—viz., red hot—I throw it in the machine illustrated by the drawings. This machine consists of six rollers, A A, B B, and C C, fixed in a frame (shown by D.) Four of these rollers are corrugated and two are plain. They are made and arranged in the frame and in relation to each other in the manner shown by the drawings, and they are made to rotate in the direction indicated by the arrows by

means of cog-wheels applied to their respective ends. By passing the iron through the machine while it is in this condition—viz., red hot—and just after it has been drawn from the blast-furnace, and before it has had time to cool, it is crumbled up like sawdust. This crumbled metal I introduce in the hot furnace (through a hopper placed on the top of each furnace for that purpose) in quantities of about two hundred and twenty-five pounds, and spread it over the bottom of the furnace as evenly as possible. I then close the furnace-door, and in less than five minutes the iron comes to nature, after which it is worked together in a large ball, which is passed through the squeezers, and then through the rolls, in the ordinary manner. While the first ball is in the squeezers the furnace-man is scraping the second one together, and has it ready to follow the first one through the squeezers. Two balls are made at each heat. When the last ball is removed, the furnace-man pulls a little catch in the bottom of the hopper, which allows the next charge to drop into the furnace, and so on, the whole day. By the process now in use a furnace worked both turns—that is, night and day, or about nineteen hours and a half—yields fifty hundred and fifty pounds of muck-bar, whereas by my process a furnace-man and helper, with a furnace of equal capacity, makes over eight thousand pounds of muck-bar in twenty hours, equal, if not better, in quality to that made by the old process. The time, scrap, coal, and ore that are now wasted at the end of each turn fixing up the furnace are all saved by my process, as the furnace is not injured in the practice of it. The success of this invention depends upon passing the metal through the machine before it has cooled after coming from the blast-furnace and while it is yet red hot, whereby it is made to crumble in small particles.

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

Preparing the iron for the puddling-furnace by passing it through the machine described soon after it has come from the blast-furnace, before it has had time to cool, and while it is yet red-hot, so as to reduce it to a crumbled mass.

W. H. PERRY.

Witnesses:

AMOS BROADNAX,

WILLIAM JACOBUS.