J. W. Ells,

Annealing and Polishing Sheet Iron,

No. 48,918. Patented July 25, 1865.

Fig. 1.

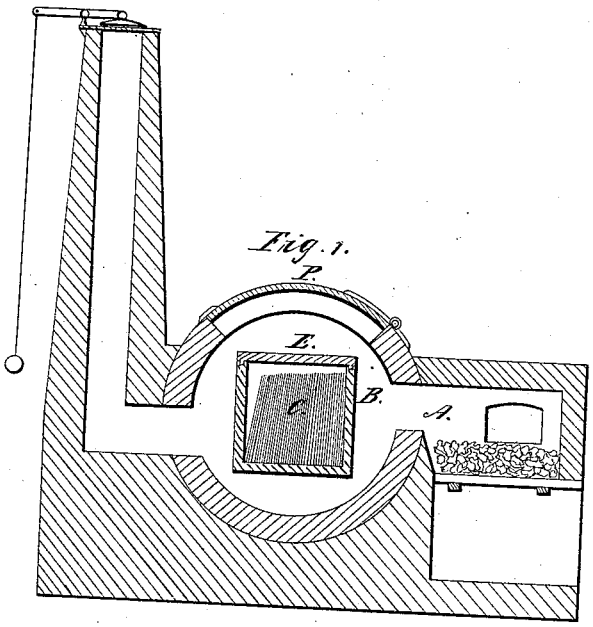
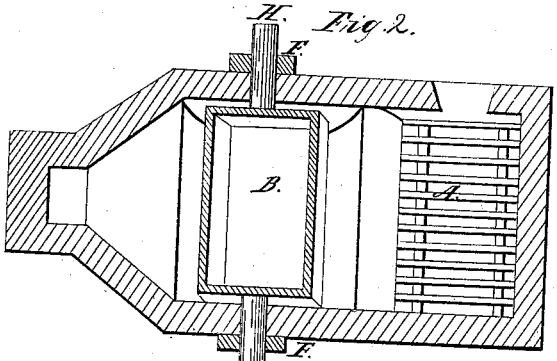
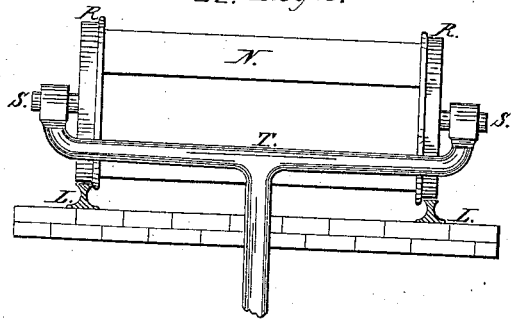


Fig. 2.



H. Fig. 3.



Witnesses
Eb. Williams Jr.
John McKenna.

Inventors:
Josiah W. Ells

UNITED STATES PATENT OFFICE.

JOSIAH W. ELLS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN ANNEALING AND POLISHING SHEET-IRON.

Specification forming part of Letters Patent No. **48,918**, dated July 25, 1865; antedated July 12, 1865.

To all whom it may concern:

Be it known that I, JOSIAH W. ELLS, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Method or Process of Annealing and Polishing Sheet-Iron; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, and to the letters of reference marked thereon.

The nature of my invention consists in annealing and polishing sheets of iron by placing them loosely in a tight cast-iron box or muffle with scales or oxide of iron, animal-charcoal, coke, lime, or other decarbonizing and cutting agents, and imparting sufficient motion to the box or muffle while in the furnace to agitate the sheets of iron to such an extent as will polish them by the attrition of the annealing and cutting agencies during the operation of heating and cooling, whereby they are given the peculiar mottled and polished appearance of Russia sheet-iron.

To enable others to understand my improved method or process, I will proceed to describe the mode of operation by reference to the accompanying drawings. For this purpose I construct a reverberatory furnace of brick, and of which—

Figure 1 represents a longitudinal vertical section. Fig. 2 represents a transverse longitudinal section.

This furnace resembles in shape and construction those of a similar character already in use; but in order to accomplish the purpose for which it is intended, in addition to the damper, grate, and other appendages incident to such furnaces, I construct a large door, P, Fig. 1, at the top, capable of being opened or closed, as the operation may require. Just beneath this door, immediately in the body of the furnace A, and transverse thereto, I have suspended on trunnions H H, Fig. 2, a large cast-iron box, B, resting in appropriate bearings F F, Fig. 2, and on which it can easily be turned. This box, during the working of the furnace, is closed by a tight-fitting lid, E, Fig. 1, held in place by any mechanical contrivance that will answer the end.

The operation is as follows: Sheets of iron of a good quality are cut somewhat smaller than the inside of the box, so as to allow of a little play; but before placing them in the box the bottom is to be covered to the depth of one inch or more with a composition formed by mixing one part of pulverized iron-ore with eight parts of lime and one part of animal-charcoal, preference being given to that iron ore which has once been used for annealing cast-iron. One sheet is then laid flat on this mixture. Some of the mixture is then dusted over the upper face of the sheet to the depth of one-fourth of an inch, and a second sheet laid in, and so on alternately until the box is nearly full, when a coat of the mixture, entirely filling up the box, is placed over all. The lid E, Fig. 1, is then to be fastened on. After this is done the door P, Fig. 1, at the top of the furnace A, is closed, a fire introduced and kept up until the sheets are heated to about 800°, or until the scale begins to loosen. A rotary or oscillating motion is then imparted to the box by requisite machinery attached to one of the trunnions outside of the furnace. This motion causes the sheets C, Fig. 1, to slide one on the other, and loosen as well as rub off the heavy external scale, polishing at the same time the fine scale that lies closest to the body of the iron, while the continual tumbling and thumping of one sheet on the other as they turn over in the box produces those slight inequalities on the surface of the iron so much admired in the Russia sheet. This motion of the box is to be kept up for several hours, and at the same degree of heat, until the sheets are thoroughly polished, when the furnace is to be closed perfectly tight to exclude the air, the fire withdrawn, and the furnace allowed to gradually cool. The motion of the box, however, is carried on until the heat has diminished at least one-half. The box is then stopped, and all allowed to cool down together, which being ascertained, the box is opened, the sheets taken out, cleaned, and straightened, ready for use.

Fig. 3 represents a mere modification of the plan for operating the box. Instead of supporting the weight by the trunnions, the box N in this case is provided at each end with a flanged wheel, R, which enables the box to roll

back and forth on a track or couple of rails, L L, resting on the bottom of the furnace, motion being communicated by a forked pitman, T, clasping the journals S S.

Having thus briefly described my invention, I wish it understood that I do not limit myself to any of the mechanical arrangements for carrying out my process, as these may be varied, while the spirit of my invention remains the same; but

I claim—

Annealing and polishing sheets of iron by placing them in a tight cast-iron box or muffle, with scales or oxide of iron, animal-charcoal, coke, lime, or other decarbonizing and cutting agents, and imparting sufficient motion to the box or muffle while in the furnace to agitate the sheets of iron to such an extent as will polish them by the attrition of the annealing and cutting agencies during the operation of heating and cooling, whereby they are given the peculiar mottled and polished appearance of Russia sheet-iron.

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