

UNITED STATES PATENT OFFICE.

ANTHONY L. FLEURY, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN THE MANUFACTURE OF STEEL.

Specification forming part of Letters Patent No. 56,026, dated July 3, 1866.

To all whom it may concern:

Be it known that I, ANTHONY L. FLEURY, of the city of Pittsburg, county of Allegheny, State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Steel for Rails, &c.; and I do hereby declare that the following is a clear and exact description of the same.

As the machinery used in my process is well known, I do not consider it necessary to illustrate it by drawings and models.

The nature of my invention consists in immersing the spongy wrought-iron balls, when taken from the puddling-furnace, for a few minutes into a bath of cast-iron, prepared as below more fully specified, then compressing the semi-solid mass under the hammer, rolls, or a hydraulic press, in order to free the steel from the superfluous cast-iron and adhering impurities, and bringing it to the shape and form necessary for the manufacture of rails or other objects.

This process is based on the well-known fact that wrought-iron, especially when highly heated and porous, when brought in contact with melted cast-iron which contains about five per cent. of carbon, will eagerly absorb some of this carbon and chemically combine with the iron and form a soft quality of steel. This is found more readily to be the case in presence of some nitrogenous substance. The imbibed liquid metal is, of course, pressed out before it is rolled into shape.

In order to enable others skilled in the manufacture of iron and steel to make use of my invention, I will proceed to give a more full description of the process.

After a ball has been shaped in the puddling-furnace and taken from the hearth, it is immediately, or after it comes from the squeezer or hammer, immersed for a short time—say from two to twenty minutes, according to the hard-

ness of the metal required—into a bath of cast-iron. This bath is prepared by melting white cast-iron and throwing onto the same, in order to keep it from coming in contact with the atmosphere, a salt of soda or potassa, baryta, or fluor-spar, to which a small portion of cyanide of potassium or chloride of ammonia has been added. In order to keep the liquid bath saturated with carbon I add from time to time some more cast-iron or plumbago. When this semi-solid pasty mass is kept floating in the liquid iron and fully saturated it is taken out and compressed in order to deprive it of its superfluous cast-iron. The obtained ingot is then put into the desired shape for rails, plow-shares, or other purposes.

The process can be varied and modified in many ways without altering its principle. For instance, the hot wrought-iron ball can be placed into a hopper-shaped reservoir, the cast-iron poured onto it, so as to thoroughly saturate the balls, then compress it and squeeze out the superfluous cast-iron, and then roll the ingot into shape for rail-steel; or the puddling-furnace can have a second hearth, into which the balls are thrown and the melted cast-iron poured over them or immersed in the cast-iron, kept hot by the same fire in the puddling-furnace.

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

The processes herein described for the manufacture of bars, rails, or ingots or steel-like iron by treating wrought-iron with melted cast-iron and subjecting the product to the varied treatment of squeezing, compressing, rolling, or hammering, substantially as set forth.

ANTHONY L. FLEURY.

Witnesses:

P. H. VANDER WEYDE, M. D.,
B. S. HEDRICK.