

UNITED STATES PATENT OFFICE.

JOHN N. LAUTH, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN REWORKING STEEL.

Specification forming part of Letters Patent No. **160,209**, dated February 23, 1875; application filed December 24, 1874.

To all whom it may concern:

Be it known that I, JOHN N. LAUTH, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Reworking Steel; and I do hereby declare the following to be a full, clear, concise, and exact description thereof.

In the working of steel it has been heretofore found impracticable (in the business sense of that term) to pile or fagot the steel, and heat and roll or hammer it into blooms, partly because of the readiness with which the oxygen of the air unites with the carbon of the steel as soon as or before a welding-heat is obtained.

Efforts have also been made to inclose the steel in an iron case, so as to protect it from the action of the air; but when such case is hermetically sealed the operation is too costly; and, if the case or covering be other than tight or close, the air is apt to attack the steel with such avidity, when at or near the degree of temperature required for successful working, that its peculiar or valuable qualities are wholly destroyed or seriously impaired before the iron case or covering can, by rolling, hammering, or otherwise, be closed down on the steel so as to form, practically, a tight case.

My improvement relates to this branch of the art of steel manufacture; and, while applicable to the working of steel of all kinds and all shapes, it is especially useful in and designed for the reworking of scrap-steel generally.

In carrying out this improvement I pile, fagot, or bundle the steel in any known way, using in connection with it a case, shell, covering, or exterior layer or layers of iron in any convenient or desired form. The ends or pieces of bar-iron may be used for this purpose in the usual way, or plate-iron, or scrap-iron of any kind of suitable form. The thickness of the iron covering thus made should be such as will, in the process of working, form a covering or coating to the steel, even (by preference) when rolled or otherwise reduced down into the article desired. These pieces or plates of iron are arranged in such juxtaposition that they will give a coating for the steel on all sides, and to this end they may be arranged on all sides, or on only two or more

sides, and the ends or edges allowed to project over or beyond the steel part of the pile or fagot sufficiently far to be afterward, and in the first application of a compressing-power, closed down over the steel, which would be otherwise exposed.

Up to this point nothing new is claimed herein.

These piles or fagots thus made are charged into any suitable heating-furnace; but instead of bringing them at once up to the usual heat, at which they can be worked into a solid bloom, as usual heretofore, I raise them to a heat a little short of that at which the steel employed would be destroyed, as to its peculiar and characteristic qualities, or materially injured by the action of the air or other gases thereon, then remove them from the furnace, and roll, hammer, or otherwise compress them. This point will vary with different kinds or qualities of steel; but the skilled workman, knowing the kind of steel he is dealing with, and knowing or learning (as he easily may, at least approximately) the temperature at which this point is reached with that quality or kind of steel, will readily know when the heat above indicated is attained. This will, however, in most cases, be a red heat, and at this temperature both the iron and the steel will have such degree of plasticity or pliability, or both, that by the action of rolls, hammer, or press thereon, in any of the ways known to the art, the fagot or pile may be reduced to form, the air expelled from its interstices to such extent that the presence of the remainder is not dangerous, and the iron coating worked down onto and around over the fagot, so as to close up the joints perfectly, or to such an extent that external air in dangerous quantities will be excluded. After this is done the steel part of the fagot will be so completely protected against the destructive action of air or other gases from without, that it may be at once or subsequently recharged into the furnace, raised to the degree of heat usual in the working of such masses and kinds of material, and then rolled into bars or other merchantable or usable form.

In this way I also produce an iron-coated steel from scrap equal in most or all respects to the like article as heretofore produced by

more difficult and costly methods, and at the same time utilize material, much of which has heretofore gone to waste, or possessed but little value.

Scrap-steel of every kind, including ends and pieces of Bessemer steel rails, may be advantageously and economically reworked in in this manner, and it is also a superior process for the manufacture of iron-coated steel as used with either scrap or merchantable steel.

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

In the reworking of steel when piled or fag-

oted exteriorly with iron, the step set forth, which step consists in arresting the heat at a point a little short of that at which the steel employed would be destroyed or materially injured by the action of air or other gases thereon, and then subjecting the pile or fagot to compression before bringing it to the usual working-heat, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN N. LAUTH.

Witnesses:

JAMES M. CHRISTY,
GEORGE H. CHRISTY.