

UNITED STATES PATENT OFFICE.

MAURICE HERNSHEIM AND CHARLES E. BONWELL, OF MANNINGTON, WEST VIRGINIA.

PICKLING PROCESS.

No. 865,700.

Specification of Letters Patent.

Patented Sept. 10, 1907.

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To all whom it may concern:

Be it known that we, MAURICE HERNSHEIM and CHARLES E. BONWELL, both of Mannington, in the county of Marion and State of West Virginia, have invented certain new and useful Improvements in Pickling Processes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

10 The object of this invention is to effect economies in the pickling of iron and steel products, preparatory to coating, both with respect to the time involved and the quantity of material wasted in the removal of scale.

Heretofore pickling has usually been accomplished 15 by subjecting the metal to successive acid baths. The loss consequent upon the acids eating into the metal, to remove the scale, has, according to the processes heretofore in use, averaged about sixty pounds to the ton.

20 According to our invention, the iron or steel products are subjected to a bath of a solution of citric acid and caustic soda. We have found that best results are obtained by the use of one (1) ounce of caustic soda to fifty (50) gallons of water, the quantity of water being 25 dependent upon the capacity of the pickling tank. When the caustic soda is thoroughly dissolved, the citric acid is added in proportion of about three-fourths ($\frac{3}{4}$) of a pound to a ton of metal to be pickled. The solution is subjected to a temperature of from one hundred and eighty (180) upwards, but not beyond two hundred and twelve (212), degrees, Fahrenheit.

30 We have found in actual practice that in a tank of one thousand (1,000) gallons capacity, with twenty (20) ounces of caustic soda, and from five hundred (500) to

seven hundred and fifty (750) pounds of citric acid, 35 about nine hundred (900) tons of metal may be pickled before the bath needs to be replenished. Best results are obtained by leaving the metal immersed in the bath from fifteen to twenty-five minutes during which time all scale will be removed. For very fine wire thirty to 40 sixty seconds is necessary, but if the bath is very hot fifteen seconds will be sufficient. The alkali limits the eating action of the acid, and to this is due the saving in respect to the quantity of material lost. The solution has no deleterious effect upon the pure metal but 45 only removes the scale therefrom, thus enabling a perfect coating to be applied.

We claim as our invention:—

1. The method of pickling iron and steel products consisting of subjecting such products to a bath of a solution having citric acid as its base. 50

2. The method of pickling iron and steel products consisting of subjecting such products to a bath of a solution composed of citric acid and an alkali, the latter present in such proportion as to limit the action of the acid. 55

3. The method of pickling iron and steel products consisting of subjecting such products to a bath of a solution of citric acid and caustic soda.

4. The method of pickling iron and steel products consisting of subjecting such products to a bath of a solution heated to a temperature not exceeding the boiling point of water, and composed of citric acid and an alkali, the latter present in such proportion as to limit the action of the acid. 60

In testimony whereof, we have signed this specification in the presence of two subscribing witnesses. 65

MAURICE HERNSHEIM.
CHARLES E. BONWELL.

Witnesses:

FRANCIS S. MAGUIRE,
VERNON E. WEST.