

UNITED STATES PATENT OFFICE.

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MANUFACTURE OF SHEETS AND PLATES OF MANGANESE STEEL.

1,017,903.

Specification of Letters Patent.

Patented Feb. 20, 1912.

No Drawing.

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To all whom it may concern:

Be it known that I, WINFIELD S. POTTER, a citizen of the United States, residing at New York city, county of New York, State of New York, have invented certain new and useful Improvements in the Manufacture of Sheets and Plates of Manganese Steel; and I 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.

My invention relates to the rolling of sheets or plates from manganese steel billets or blanks, (having a percentage of manganese above 5½% and usually containing about 12%) and has for its object to produce a final product of a substantially uniform fine-grained condition throughout, and having the desired stiffness or ductility appropriate to the use for which it is intended.

In carrying out my invention, I first heat the manganese steel billet or sheet bar until it is brought into a uniform and ductile condition throughout, appropriate to the rolling operation. To this end, the necessary plasticity is imparted to the billet or sheet bar by raising it to a temperature which, for the production of the best results, will usually be above the melting point of the eutectic alloy, *i. e.*, above 1125° C. but which, in some instances, may be as low as say 1060° C. provided the subsequent reduction from the billet to the sheet or plate in a single heat is not considerable. The rolling operation is continued until the blank has been reduced to almost its final dimensions. The rolling is then interrupted and the resulting blank which, at this time, is found to present inequalities of condition, is placed in a heating furnace and is therein brought to a temperature, which is equalized throughout and which is sufficient to permit continuation of the rolling operation with the delivery of the product from the ultimate finishing pass of the rolls at a temperature usually between 800° C. and 1075° C. the higher temperature being preferred when greater ductility and softness are desired in the final sheet or plate, and a lower temperature, as for example a temperature between 800° C. and 900° C. when greater stiffness and a higher elastic limit in the finished product are required. At the termination of

the rolling operation and preferably as soon as possible after it has issued from the last forming pass of the rolls, the finished sheet or plate is cooled or quenched, so as to preserve the qualities due to the rolling operation as determined by the finishing temperature. After the quenching operation, the sheet may be cold rolled which has the effect of further stiffening it and of affording smooth surfaces. Where the minimum stiffness is required, the finished sheet should be reheated throughout to about 1000° C. for a short time (as for example, five minutes) prior to quenching.

What I claim is: -

1. The method of making sheets or plates of manganese steel which consists in heating a billet or blank of manganese steel until in a uniform and ductile condition throughout, rolling until the blank is of nearly the desired finished dimensions, equalizing the temperature in the blank so as to obtain a finishing temperature appropriate to the desired quality or condition of the product as it issues from the finishing pass of the rolls, rolling to finished gage, and then cooling rapidly; substantially as described.

2. The method of making sheets or plates of manganese steel which consists in heating a billet or blank of manganese steel until in a uniform and ductile condition throughout, rolling until the blank is of nearly the desired finished dimensions, equalizing the temperature in the blank so as to obtain a finishing temperature appropriate to the desired quality or condition of the product as it issues from the finishing pass of the rolls, rolling to finished gage, cooling rapidly, and cold rolling the product to further stiffen it; substantially as described.

3. The method of making sheets or plates of manganese steel which consists in heating a billet or blank of manganese steel to a temperature above 1125° C., rolling until the blank is of nearly the desired finished dimensions, equalizing the temperature in the blank, rolling to finished gage at a finishing temperature between 800° C. and 1075° C. and cooling rapidly; substantially as described.

4. The method of making sheets or plates of manganese steel which consists in heating a billet or blank of manganese steel to a temperature above 1125° C., rolling until

the blank is of nearly the desired finished dimensions, equalizing the temperature in the blank, rolling to finished gage at a finishing temperature below 1000° C. but above
5 800° C., reheating to about 1000° C. for a short time, and cooling rapidly; substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

WINFIELD S. POTTER.

Witnesses:

LEON W. ROSENTHAL,
WILLIAM H. DAVIS.