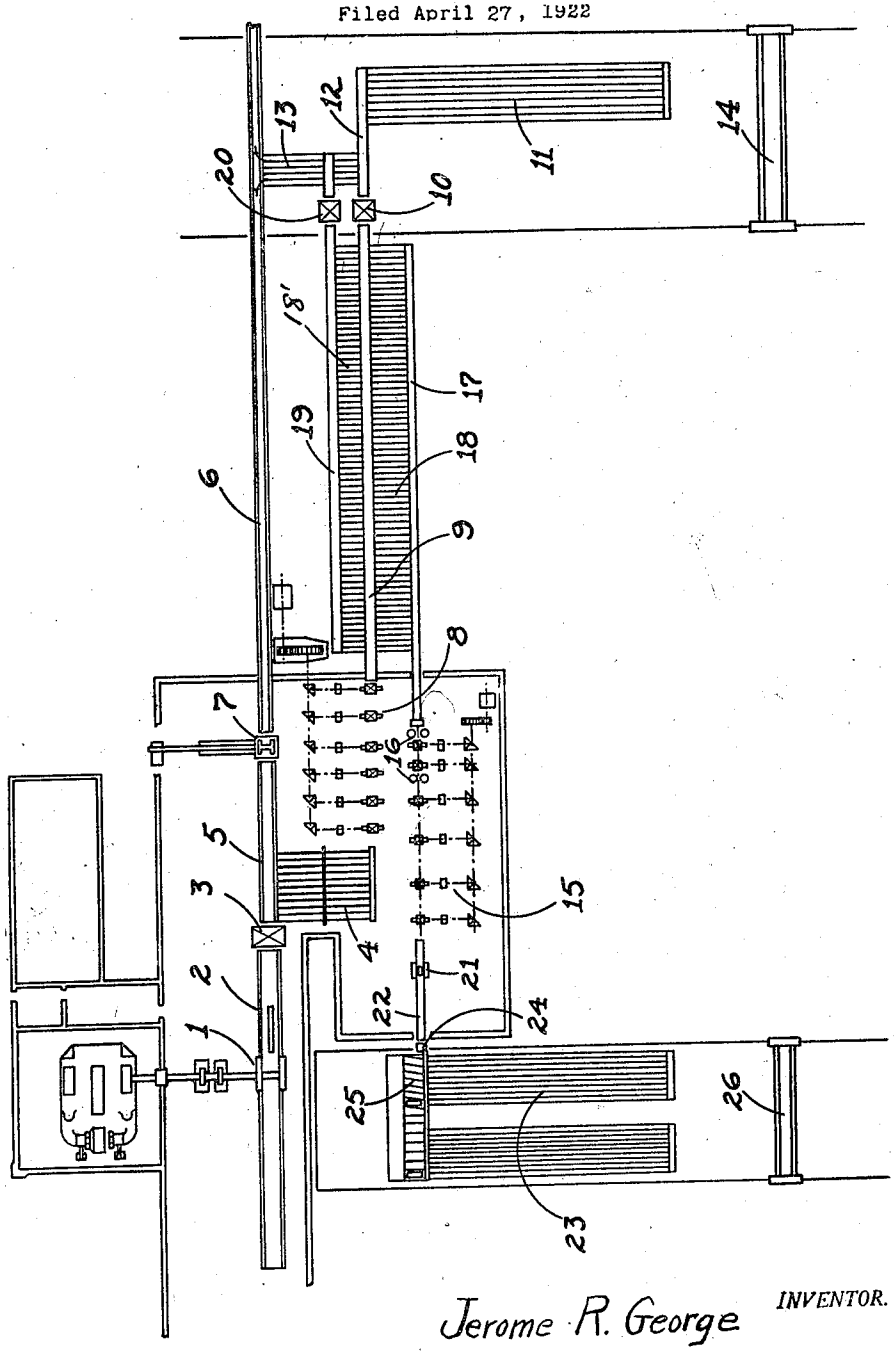
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J. R. GEORGE

ROLLING MILL

Filed April 27, 1922




Jerome R. George INVENTOR.

BY

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# UNITED STATES PATENT OFFICE.

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## ROLLING MILL.

Application filed April 27, 1922. Serial No. 556,884.

*To all whom it may concern:*

Be it known that I, JEROME R. GEORGE, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in a Rolling Mill, of which the following, together with the accompanying drawing, is a specification.

The present invention relates generally to rolling mills. The invention resides in a novel combination and arrangement of roll trains and auxiliary mill equipment, which adapts itself to the rapid and convenient rolling, handling and disposal of a diversified product of blooms, billets, sheet bar and the like. The various features and advantages of the invention are fully set forth in the following description, reference being had to the accompanying drawings, wherein the single figure is a diagrammatic plan view of rolling mill apparatus combined and arranged in accordance with the invention.

Referring to said drawing, 1 represents a blooming or cogging mill of ordinary construction, the same serving for the initial reduction of large size ingots as they are delivered from soaking pits, not shown. Beyond the receiving table 2 of the blooming or cogging mill 1 is disposed a shear 3, by the action of which such of the product of mill 1 as is desired may be cut up into convenient lengths for handling by a broadside transfer mechanism 4, the latter adapted to receive said material from a shear table 5. Other product of the mill 1 not destined for reduction in the roll train served by transfer mechanism 4 is adapted to be carried forward longitudinally upon conveying mechanism 6, in connection with which is provided a shear 7.

The broadside transfer mechanism 4 serves for the movement of stock across the space intervening between the center line of mill 1 and the center line of a billet and slab mill 8, the rolls of which, preferably, provide a plurality of differently shaped rows of passes, to give such variety as may be desired in the cross section of the reduced material emerging therefrom. Such material is run out from the mill 8 onto suitable longitudinal conveying mechanism 9; any portion thereof, for which no further reduction is contemplated or desired, may, after being cut to proper lengths in shear 10, be disposed of on the cooling bed 11, the latter receiving said material from the longitudinal conveying mechanism 12 disposed in alinement with the mechanism 9. A broadside transfer mechanism 13 connects the above described apparatus with the longitudinal conveying mechanism 6 for the product of mill 1, and as indicated in the drawing, all this handling and cooling apparatus common to the mills 1 and 8 is so disposed and assembled as to render the material, or any part thereof, susceptible to removal and transfer, as for instance by a traveling crane 14.

The invention further provides a reducing roll train 15, the latter as shown being disposed in the same room or inclosure as the mill 8, and serving for the production, for instance, of small and medium size billets and sheet bar. The several stands of rolls of this mill 15 provide, preferably, a plurality of differently shaped rows of passes, to give such variety as may be desired in cross section of the reduced material emerging therefrom. As part of the equipment of mill 15, one or more stands of edge rolls 16, 16 may also be provided, by the use of which sheet bar of variable thickness may be rolled. The direction of travel of the material through mill 15 is opposite to that of mill 8, and to this end is provided a suitable longitudinal conveying mechanism 17 for delivering the material to said mill 15, the conveying mechanism 17 being offset from and parallel to the conveying mechanism 9, and oppositely actuated. Such of the product of mill 8 as is destined for further reduction is transferred from the mechanism 9 to the mechanism 17 by a broadside transfer mechanism 18, by the operation of which the stock may be moved, as rapidly or as slowly as desired, across the intervening space; the transfer mechanism 18 thus constitutes, in effect, a delay table, the function of which is to permit as much or as little time to elapse, as may be desired, for the cooling of such of the products of mill 8 as may need a lower temperature for their further reduction by rolling.

On the opposite side of the center line of mill 8, a transfer mechanism 18′ connects the conveying mechanism 9 with another longitudinal mechanism 19, the latter, as

shown, being operatively associated with and delivering to the assembled cooling and handling apparatus heretofore described, and having, in connection therewith, a shear 20 adapted to serve in duplicate with the shear 10. This arrangement gives added capacity to the apparatus for the handling and disposal of the product of mill 8; such of said product as is not destined for subsequent reduction in mill 15 may come under the action alternately of the duplicate shears 10 and 20, and thereafter be disposed of either on the cooling bed 11 or by movement across the transfer device 13, to conveying mechanism 6, the latter delivering in either direction to suitable storage or other apparatus, not shown.

The reduced product emerging from the smaller mill 15 may be operated upon in any manner desired, as for instance by being cut up in a flying shear 21 suitably located in the run-out 22 of said mill, preliminary to movement onto a cooling bed 23 of any well known type. Or, if the product of mill 15 emerges in the form of sheet bar, the same may be operated upon by rolls 24 adapted to assemble the sheets one upon the other in a stack or pile, preparatory to their delivery to the cooling bed 23. The latter, for the proper handling of this diversified product, is here shown as equipped with suitably skewed rolls 25 for assembling the material, and in connection therewith may be provided, the same as at the opposite end of the apparatus, an overhead crane 26.

I claim,

1. In apparatus of the class described, the combination, with longitudinal conveying means for the product of a blooming mill, of a pair of independent reducing roll trains for the further reduction of said product, said roll trains being offset from said conveying means and from each other, and delivering the material in opposite directions.

2. In apparatus of the class described, the combination, with longitudinal conveying means for the product of a blooming mill, of a pair of independent reducing roll trains for the further reduction of said product, said roll trains being offset from said conveying means and from each other, and delivering the material in opposite directions, and separate means for shearing, assembling and cooling the products of the respective roll trains.

3. In apparatus of the class described, the combination, with longitudinal conveying means for the product of a blooming mill, of a pair of independent reducing roll trains for the further reduction of said product, one of said roll trains delivering the material in the same direction as said blooming mill, and the other delivering in the opposite direction.

4. In apparatus of the class described, the combination, with longitudinal conveying means for the product of a blooming mill, of a pair of independent reducing roll trains for the further reduction of said product, one of said roll trains delivering the material in the same direction as said blooming mill, and the other delivering in the opposite direction, and means operable to procure the delivery of material from the first roll train to the second roll train.

5. In apparatus of the class described, the combination, with longitudinal conveying means for the product of a blooming mill, of a pair of independent reducing roll trains for the further reduction of said product, shearing, assembling and cooling means for the product of one of said roll trains, as delivered in the direction of delivery of said blooming mill, and shearing, assembling and cooling means for the product of the other roll train, as delivered in a direction opposite to that of said blooming mill.

6. In apparatus of the class described, the combination, with longitudinal conveying means for the product of a blooming mill, of a pair of independent reducing roll trains for the further reduction of said product, a delay table interposed between said conveying mechanism and one of said roll trains, and duplicate delivery and shearing mechanism for such product of said roll train as is not destined for further reduction in said other roll train.

Dated April 20, 1922.

JEROME R. GEORGE.