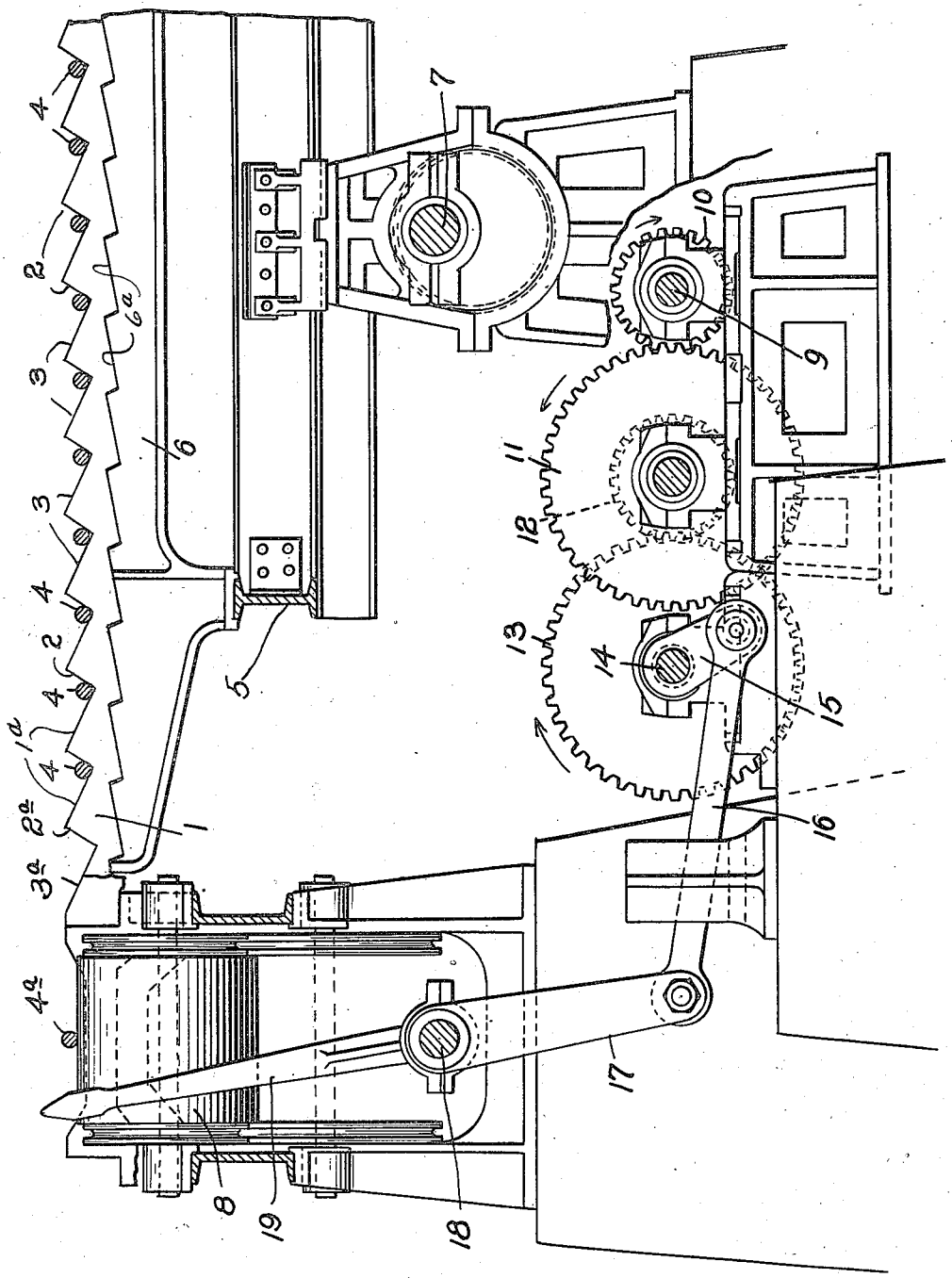
Mar. 13, 1923. 1,448,425

W. WORTHINGTON

COOLING BED

Filed Aug. 12, 1918



WITNESSES

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UNITED STATES PATENT OFFICE.

WARREN WORTHINGTON, OF BUFFALO, NEW YORK, ASSIGNOR TO DONNER STEEL COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

COOLING BED.

Application filed August 12, 1918. Serial No. 249,596.

To all whom it may concern:

Be it known that I, WARREN WORTHINGTON, a resident of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Cooling Beds, of which the following is a specification.

This invention relates to cooling beds for rolling mills, and more particularly to means for delivering the finished bars from the roll table onto the cooling bed. The object is to move the finished bar, while in a hot semi-plastic condition, laterally onto the cooling bed and in a manner to secure an initial impact and thereby straighten the bar.

The drawing shows an end elevation and partial cross section of a portion of a cooling bed showing the improvements applied thereto.

In the rolling mill art it is customary to provide cooling beds to which the hot finished bars from the finishing pass of the mill are delivered and on which they are supported in a manner to be surrounded by air for a sufficient time to cool them sufficiently for subsequent shearing or other treatment. The cooling beds employed usually comprise means to hold the bars spaced apart and to transport them slowly, frequently step by step, from the roll table to the shear table or other delivery means.

It is well known that hot bars of considerable length when still in the semi-plastic condition as received from the finishing rolls of the mill, will conform to any surface upon which they are laid. Consequently it has been the practice to hold such hot bars in straight position until sufficiently cool to prevent deformation by gravity. This property of the hot bars to conform to the surfaces upon which they are supported has been utilized in cooling beds by providing aligning notches extending the full length of the cooling bed in which the hot bar is supported.

One type of such cooling bed is illustrated in the drawing, where 1 represents one of a series of stationary supporting members whose upper surfaces are provided with notches formed with inclined faces 2 and 3 arranged at an angle of approximately 90° to each other. It will be understood that there are a large number of these supporting members 1, spaced a short distance apart, side by side, with their upper surfaces at the same level and the notches in the members in alignment. The hot semi-plastic bars as received from the rolling mill, when placed in aligning notches of the supporting members, tend to settle down by gravity into the bottoms of the aligning notches, and will therefore (particularly in the first aligning notches of the cooling bed) tend to straighten by gravity.

Between the stationary members 1 are a series of shifting members which consist of bars 6 having their upper edges serrated to form the notches 6^a at intervals spaced apart the same distances as the notches in the stationary members 1. These shifting members are mounted on a frame or frames 5, supported on eccentrics on a shaft 7 which is intermittently driven, thereby imparting to the shifting members a movement in a circular path, which, as is apparent, causes the bars 6 to lift the metal bars 4 on the cooling bed out of one series of aligning notches and deposit the same into the next forward series of aligning notches, in a well understood manner.

8 indicates a series of idle rollers which constitutes the delivery roll table of the rolling mill and upon which the hot finished bar 4^a is delivered. This rolling table extends along the receiving side of the cooling bed, and as soon as the completed bar 4^a is delivered thereonto, mechanism is set into operation to transfer said bar from the rolls 8 to the first notch 2^a, 3^a of the cooling bed, and in a manner to cause it to enter said first notch with an impact, and at substantially the same time move all of the bars of the cooling bed one step forward thereon. For this purpose a shaft 9, arranged to be intermittently connected to a source of power, through the gears 10, 11, 12 and 13 drives a shaft 14 to which is secured a crank 15 whose free end is connected through link bar 16 to a crank or arm 17 on a rock shaft 18, extending underneath the rolls 8 and at intervals carrying arms 19, which are longer than the arm 17, and which extend upwardly between adjacent idle rolls, as shown.

At each revolution of the crank 15 the series of arms 19 are caused to travel across and back between the rolls 8, and since said arms 19 are longer than the arm 17, their free ends have a rapid movement and thereby throw the newly finished bar 4^a off the rolls

8 and into the first notch of the cooling bed, and against the edge 2^a thereof, with considerable force. Since the bar at this stage is still at a high heat and quite plastic this forcible delivery of the same into the first notch of the cooling bed assists in removing any crooks or bends which may exist in said bar. In its further travel across the cooling bed the bar may be further straightened by being held in the aligning notches, but as it cools quite rapidly very little straightening effect occurs after the initial notch, but the succeeding notches hold the bar in straight condition until cooled.

I claim:

1. In a cooling bed comprising a longitudinal runout and a series of fixed transverse supporting bars adjacent to the runout, mechanism for transferring stock from the runout to the supporting bars comprising a series of levers pivotally mounted on a laterally immovable member situated beneath the runout with free ends extending upward from said mounting above the level of the runout, and means to move the said free ends back and forth across the runout.

2. In a cooling bed comprising a runout having carrying rollers with intervening spaces and adjacent transverse fixed supporting members, mechanism for transferring hot stock from the runout to the supporting members comprising a rotatable shaft parallel to and mounted underneath the path of the runout, a series of aligned uprights fixed on said shaft and extending above the path of the runout, and means to drive the shaft intermittently in opposite directions whereby to cause the said uprights to move back and forth across the path of the runout.

3. Mechanism for transferring hot stock from the runout of a cooling bed, comprising a rotatable shaft situated beneath the runout, a series of aligned radial projections from said shaft extending through spaces in the runout, and means to drive the shaft to cause said uprights to travel across the path of the runout, whereby to transfer hot stock laterally therefrom.

4. The combination with a cooling bed comprising a longitudinal runout having supporting and carrying rollers spaced apart, lateral supporting members having inclined ends leading up to the sides of the runout and aligned stops at the bottoms of said inclined portions, and means to transfer hot stock from the runout to the lateral supporting members comprising a shaft situated beneath and parallel to the path of the runout, an aligned series of radial arms carried by said shaft extending between said rollers of the runout, and means to rotate the shaft to cause the upper ends of the arms to pass across the path of the runout.

5. In a cooling bed comprising a runout and laterally positioned supports for receiving hot stock from the runout, the combination of a series of upright shifting arms extending above the bearing surface of the runout and mounted on a common rockable shaft situated beneath and parallel to the runout, a crank fixed on said shaft, said crank being substantially shorter than that portion of the arms between the shaft and the bearing surface of the runout, and means to intermittently actuate the crank in opposite directions, whereby to shift hot stock laterally from the runout without lifting it from the surface thereof.

6. The combination with a cooling bed comprising notched supporting members adapted to retain finished bars, and a runout comprising a series of idle rolls situated beside the notched supporting members and adapted to receive finished bars from the rolls, of members pivotally mounted beneath the idle rolls and extending above the upper surface thereof and adapted to move across the path of the idle rolls between said rolls, and an intermittently driven crank mechanism adapted to move said pivotally mounted members back and forth across the path of the idle rolls, whereby to throw the finished bars from the idle rolls onto the supporting members of the cooling bed with an initial lateral impact.

In testimony whereof, I have hereunto set my hand.

WARREN WORTHINGTON.