Feb. 16, 1932. E. W. MIKAELSON 1,845,926

COOLING BED

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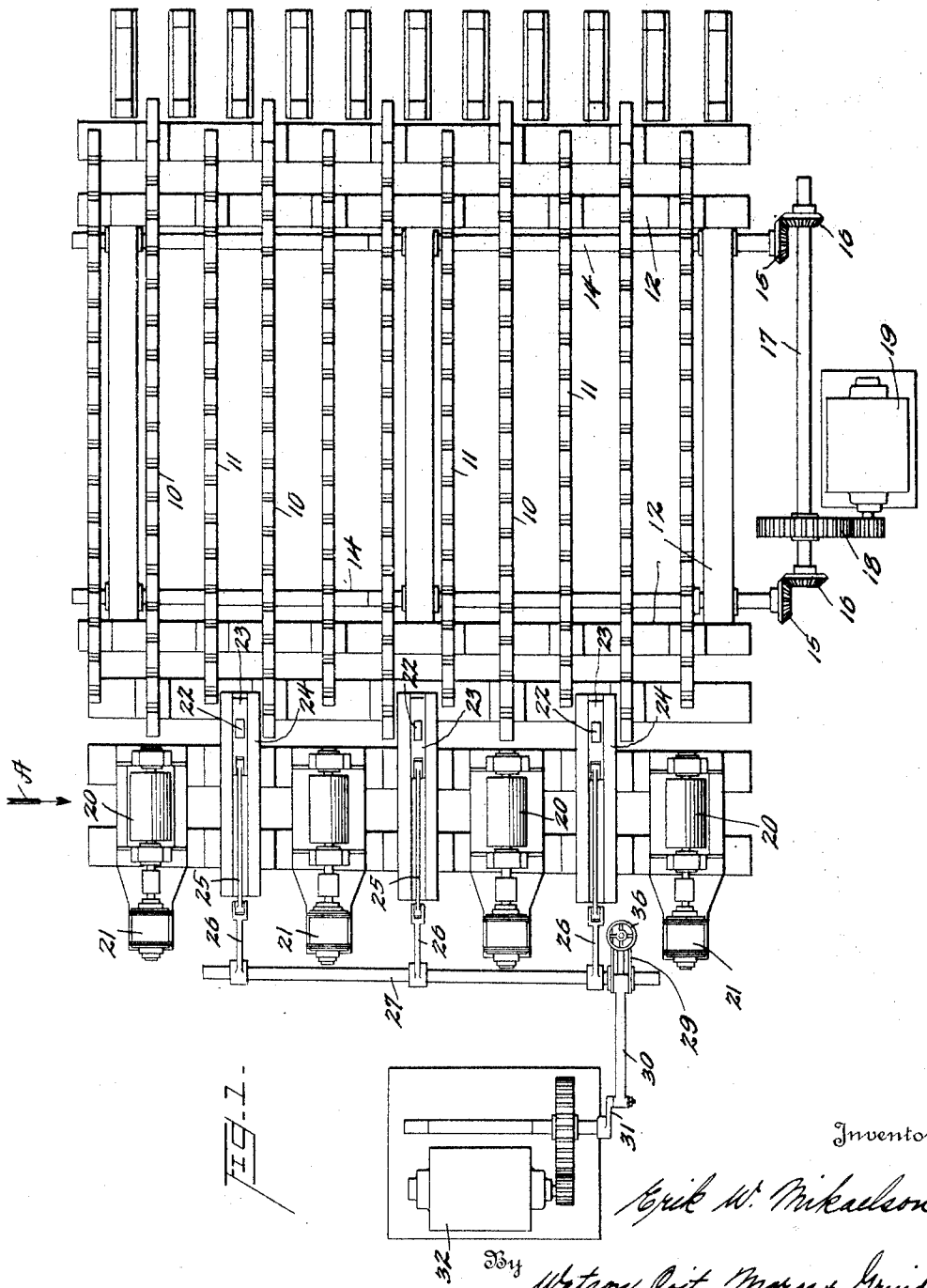


FIG. 1.

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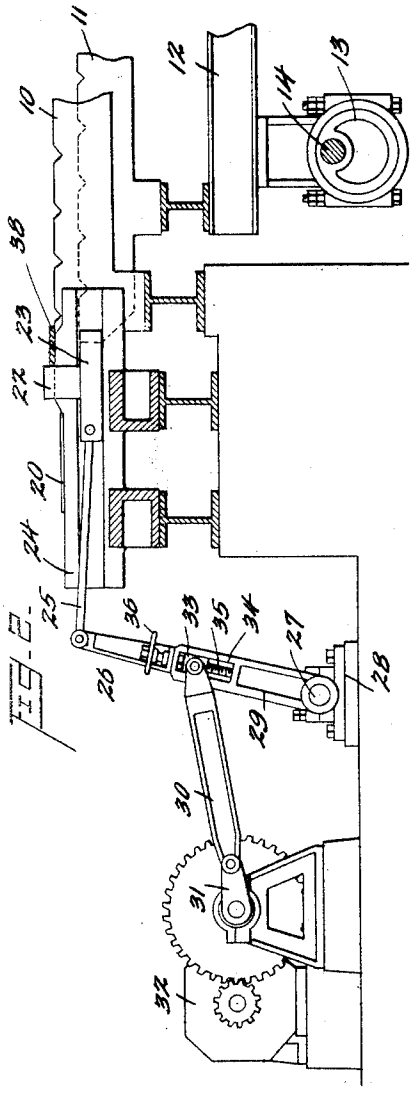


FIG. 2.

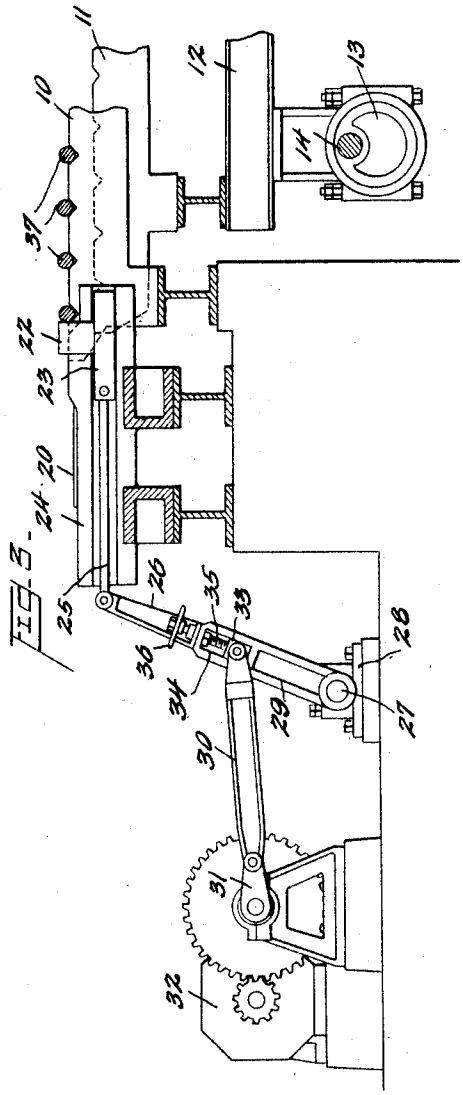


FIG. 3.

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Patented Feb. 16, 1932 1,845,926

UNITED STATES PATENT OFFICE

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COOLING BED

Application filed April 12, 1929. Serial No. 354,602.

This invention relates to cooling beds for rolling mills, and particularly to mechanism for pushing the hot bars from the delivery table of the mill on to the cooling bed.

The cooling bed in connection with which the present invention is designed for use is of the well known type which comprises a set of stationary bars, notched at regular intervals, arranged parallel to each other at one side of the delivery table and a similar set of notched bars adapted to be intermittently oscillated, working in the spaces between the stationary bars and adapted to shift the hot bars deposited on the stationary bars progressively from notch to notch along the latter and finally to deliver the cooled bars to a suitable receptacle. The cooling bed is usually provided with transfer, or pusher, mechanism adapted to push the hot bars, coming from the finishing pass of the mill, from the delivery table on to the cooling bed. However, in the present case, the adjacent notches in the stationary and oscillating bars are not so closely disposed as in the ordinary bed of this type but are spaced from each other so as to provide a series of horizontal work receiving surfaces alternating with said notches.

The principal object of the present invention is to provide a pusher mechanism for this purpose which can be readily adjusted to position bars of different cross sections at different relative positions on the cooling bed. For example, if the mill is delivering bars of round cross section, the pusher mechanism is adjusted to have a long stroke so as to push these bars laterally sufficiently far onto the stationary bars of the cooling bed to cause them to enter the first series of notches, whereas if the mill is delivering rectangular or flat bars the pusher mechanism is given a shorter stroke so that these bars will be positioned on the horizontal surfaces of the stationary bars, in rear of the first series of notches. The action of the transfer bars is such that the round bars are intermittently advanced from one series of notches to another, across the bed to the point of discharge, and the flat bars are advanced intermittently from one row of flat surfaces (intermediate two rows of notches on the stationary bars) to the next succeeding row of aligned flat surfaces.

Referring to the accompanying drawings, in which one embodiment of the invention is illustrated, by way of example:

Fig. 1 is a plan view of the cooling bed;

Fig. 2 is a sectional view showing the improved pusher mechanism adjusted to properly position flat bars on the cooling bed, and

Fig. 3 is a view similar to Fig. 2, but showing the pusher mechanism adjusted for operation on round bars.

The cooling bed shown by the drawings comprises a set of stationary parallel notched bars 10 and a similar set of movable transfer bars 11 working in the spaces between and at the sides of the stationary bars. The transfer bars 11 are rigidly connected by frame members 12 carrying eccentric straps which are mounted on eccentrics 13 fixed to shafts 14. Shafts 14 carry bevel gears 15 meshing with gears 16 on a shaft 17 which is driven through spur gears 18 by an electric motor 19. The throw of the eccentrics is equal to the distance between adjacent notches of both the stationary and movable bars, so that a bar positioned in the first notches of the cooling bed will be carried in the notches of the movable bars from one aligned series of stationary bar notches to the next series progressively, until the bar is finally delivered in cooled condition to the receptacle at the delivery side of the bed. This general type of cooling bed is well known in the art.

The hot bars coming from the finishing pass of the mill are delivered to rollers 20 in the direction of the arrow A, each of these rollers being rotated by an electric motor 21, the rollers 20 constituting the delivery table of the mill. The present invention is particularly concerned with mechanism for pushing the bars laterally from rollers 20 on to the cooling bed. The particular mechanism illustrated for this purpose comprises pushers 22 mounted to reciprocate between the rollers in paths parallel to the axes thereof, these pushers projecting above a horizontal plane tangential to the upper surfaces of the rollers and being thereby adapted to push the bars laterally from the rollers on to the

cooling bed. Pushers 22 are fixed to slides 23 which are mounted in fixed guides 24.

Each slide is connected by a link 25 to the upper end of an arm 26 which is fixed on a rock shaft 27 journaled in bearings 28 located below and at one side of the delivery roll table. To one end of rock shaft 27 is fixed an arm 29, and to this arm is pivotally connected one end of a link 30, the other end of said link being pivoted to a crank 31 driven through suitable reduction gearing by an electric motor 32. The pivotal connection between link 30 and arm 29 may be adjusted vertically by any suitable means. The mechanism illustrated includes a block 33, to which link 30 is pivotally connected, which block is slidably mounted in ways 34 formed in arm 29, and a threaded shaft 35 rotatably mounted in arm 29 and engaging a threaded bore in block 33, which shaft carries on its upper end a hand wheel 36. By rotating hand wheel 36 in one direction or the other, block 33 can be moved towards or from the axis of rock shaft 27, to vary the lengths of the arcs through which the upper ends of arms 26 oscillate, and consequently to vary the throw of the pusher 22.

In Fig. 3 block 33 is shown adjusted to the lower limit of its travel in ways 34. Obviously with the block in this position the pusher 22 will be given a maximum throw, and it will be observed that this throw is sufficient to push the round bars 37 far enough on to the cooling bed so that they will drop into the first transverse set of notches in the stationary bars 10. In Fig. 2, on the other hand, block 33 is shown adjusted to the upper limit of its travel in ways 34, causing the pushers to have a minimum throw. With such an adjustment flat bars such as 38 will be positioned on the horizontal surfaces of stationary bars 10 at the rear side of the first set of notches. It is desirable of course that the round bars be initially in the first set of notches of the stationary bars and that they should rest in notches of the transfer bars when being moved to prevent them from rolling out of position on the bed, and that the flat bars be at all times positioned horizontally on the flat surfaces between the notches of both transfer and stationary bars. The present invention provides a simple mechanism to effect these results. The throw of the eccentrics which drive the transfer bars does not vary and it is apparent that if the pusher mechanism is adjusted so that a round bar is properly delivered to the first series of aligned notches it can not fail to be transferred from one series of notches to another until it passes from the cooling bed. The same holds true with respect to the flat bars, that is if a flat bar is correctly positioned initially it will be certain to be transferred from one series of aligned flat surfaces to another in its passage across the bed.

It will be understood of course that flat and round bars are not ordinarily delivered by the mill alternately, but flat bars may be delivered for several hours or a day or more and round bars may be delivered for similar lengths of time. It is necessary of course to change the adjustment of the pusher mechanism only when the change is made from rounds to flats or vice versa.

It will be obvious to those skilled in the art that various changes can be made in the described details of construction without altering the essential mode of operation.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In combination with the delivery table and cooling bed of a rolling mill, said delivery table comprising spaced rollers and said cooling bed comprising a set of stationary bars having alternating series of differently formed rest portions to accommodate rolled bars of differing cross-sections and a set of similarly constructed oscillating bars working in the spaces between said stationary bars to transfer a rolled bar from one rest portion to the next one of like form; a series of horizontal guides disposed between the rollers of said delivery table, pushers mounted to reciprocate in said guides in paths substantially parallel to the axes of said rollers, a link pivotally connected at one end to each of said pushers, a rock shaft having arms respectively pivotally connected to the other ends of said links, another arm rigid with said rock shaft, a block slidably mounted on said last named arm, means for adjusting the position of said block along said arm, a link pivoted at one end to said block, and means for reciprocating said link whereby the throw of said pushers may be adjusted to position bars of different cross-section upon the initial correspondingly formed rest portion of the bars of said bed.

2. A cooling bed and delivery table installation, for use in connection with a rolling mill or the like, comprising, in combination, a delivery table, a plurality of relatively movable sets of work transferring bars disposed adjacent said table, means for oscillating certain of said bars in a fixed orbit for effecting the transfer of said work, all of said bars being provided with alternating series of differently shaped work receiving portions, those of one of said series being shaped for the reception of work of generally round cross-section and those of the other of said series being shaped for the reception of flat work, push-off mechanism for transferring the work from said table to said bars, and means for varying the operation of said mechanism at will to deposit work of such differing shapes upon the initial work re-

ceiving portions of the proper type to receive the same.

3. A cooling bed and delivery table installation, for use in connection with a rolling mill or the like, comprising, in combination, a delivery table, two relatively movable sets of work receiving bars disposed adjacent said table, means for oscillating certain of said bars in a fixed orbit regardless of the kind of work being handled, all of said bars being provided with alternating series of notches, for the reception of work of generally round cross-section, and flat surfaces for the reception of flat work, push-off mechanism for transferring the work from said table to said bars, and means for varying the operation of said mechanism at will to deposit work of the first mentioned type in the initial notches of the bars of one of said sets and to deposit work of the last mentioned type upon the initial flat surfaces of said bars.

4. A cooling bed and delivery table mechanism, for use in connection with a rolling mill or the like, comprising, in combination, a delivery table, a set of stationary bars disposed adjacent said table having alternating series of differently formed work receiving portions to accommodate rolled articles of differing cross-sections, and a set of similarly constructed oscillating bars adapted to work in the spaces between said stationary bars to transfer a rolled article from one work receiving portion to the next succeeding one of like configuration, mechanism operatively associated with said table and said bars adapted to push said articles laterally from said delivery table onto said bars, and means for adjusting the extent of movement of said pushing mechanism, whereby articles of different cross-sections may be positioned upon the initial work receiving portions of the series of the proper type to receive them.

In testimony whereof I hereunto affix my signature.

ERIK W. MIKAELSON.