This invention relates to pack-annealing cooling beds and, in particular, to a device for turning over bars at a point between the runout conveyor and the annealing portion of the bed, to bring a predetermined edge uppermost so the bars will form a tight pack.

Pack-annealing cooling beds are generally well known. They usually include sloping skids between the runout conveyor and the annealing portion of the bed, and re治ting stops movable across the latter effective to cause bars discharged sidewise from the runout conveyor and sliding down the skids to form a pack at the lower end thereof for slow cooling. After cooling, the bars are advanced singly across the cooling bed proper to a shear approach table. In rolling certain types of bars which are unsymmetrical in section, e.g., plow-share blanks which have a tapering edge, it is sometimes desirable to reverse the bars edge for edge to insure the formation of a tight pack on the annealing portion of the bed. It is accordingly the object of the invention to provide means for automatically turning bars over between the runout conveyor and the annealing portion of the bed.

In a preferred embodiment, I employ oscillating linkages spaced along the length of the runout conveyor and provide means for actuating them in synchronism with the sidewise discharge of a bar from the runout conveyor onto the downwardly sloping skids. A step on the skids temporarily arrests the bars as discharged and hook means on the linkages engage the upper edge of each bar while resting on said step, exerting a pull thereon and thereby turning the bar over to continue its slide downwardly to the annealing portion of the bed.

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the preferred embodiment. In the drawings:

Figure 1 is a partial schematic cross-section through a conventional pack-annealing cooling bed;

Figure 2 is a section showing a portion of Figure 1 to enlarged scale incorporating my invention therewith; and

Figure 3 is a partial side elevation of the structure of Figure 2 with parts in section along the plane of line III—III of Figure 2.

Referring in detail to the drawings and, for the present, to Figure 1, a pack-annealing cooling bed 10 comprises a runout conveyor 11, a sloping-skid portion 12, annealing portion 13 and a cooling bed proper 14. Usually these elements are duplicated on both sides of the center line 15. Pusher bars 16 are reciprocated periodically to stand on edge against retracting stops 16a bars which have been kicked sidewise off of the conveyor 11 and permitted to slide down the sloping-skid portion 12 to the annealing portion 13. The construction as shown in detail in Figures 2 and 3 includes beams 17 spaced apart along the length of the bed, with inner beams 18 and outer beams 19 carried thereby. Posts 20 spaced along beams 18 support a walkway 21 and kick-off shafts 22 having arms 22a spaced therealong. Conveyor 11 includes driven rollers 23 spaced along the length thereof mounted on beams 18. Apron plates 24 extend between adjacent rollers and are mounted on beams 25 which may be raised and lowered so as to pick up a bar from the rollers for sidewise discharge by kick-off cranks on shafts 22. Between liftable apron plates 24 and the sloping skid portion 12 are fixed apron plates 26, each having a step 27 thereon to arrest temporarily a bar sliding sidewise downwardly. The step 27 is known and forms no part of my invention.

My novel bar turnover comprises a plurality of oscillatable linkages 28 spaced along the length of the conveyor, carried by pairs of transverse beams 29 secured to walkway 21. Each linkage includes spaced hanger bars 30 and 31 pivoted at their upper ends to the transverse beams and connected at their lower ends by a link 32. An actuating link 33 is pivoted to a crank 34 on shaft 22 and to bars 30. A turnover bar 36 is pivoted to bars 30 at one end and has a hook at the other end adapted to engage the upper edge of a rolled bar resting on step 27 as indicated at 37 (Figure 1). A screw 38 threaded through link 32 engages the lower edge of bar 36 for pivotal adjustment thereof to bring the hook end to proper level for effective engagement with bar 37.

When a rolled bar delivered from the mill has been run out on rollers 23 and picked up by lifting apron plates 24, shaft 23 is oscillated to cause arms 22a to kick the bar off of the latter whereupon they slide down plates 26 and come to rest against stops 27. Shaft 22 is then reversed to restore the kick-off arms to their original position. Simultaneously the hook ends of bars 36 thereupon ride over the upper edge of bar 37 and engage behind it. Thus, on the next kick-off operation, bars 36 pull the upper of bar 37 laterally causing it to pivot about its lower edge and eventually to fall over onto sloping-skid portion 12 with its thick end lowermost whereupon it slides downwardly to the pack-annealing portion 13 and is there arrested against the next preceding bar by pusher bars 16, forming a tight pack therewith for slow cooling. Stops 16a retreat as the pack is built up and disappear when it reaches full size so that a cooled bar at the exit side of the pack may fall down on the cooling bed proper 14 and be moved thereby to the shear approach table.

It will be evident that the invention provides a simple adjunct to a conventional cooling bed, permitting pack-annealing of bars of unsymmetrical section when they are discharged with their thinner edge downwardly. The operation is automatically timed with that of the conventional kick-off arms so no special operating means is required. Motion of the parts is limited and wear and maintenance are practically nil.

Although I have disclosed herein the preferred embodiment of my invention I intend to cover as well any change or modification therein which may be made without departing from the spirit and scope of the invention.

I claim:

1. In a runout conveyor including spaced rollers for receiving a rolled bar longitudinally, kick-off means for discharging the bar laterally and a sloping bed adjacent said rollers having a step for arresting a bar sliding downwardly thereupon, the combination therewith of a plurality of pivoted links spaced along the conveyor and depending above said bed, each link having a hook member pivotally thereto adapted to engage the upper edge of a rolled bar resting against said step, and a link pivoted to said first-mentioned link and said kick-off means oscillating the first-mentioned link to cause said hook member to turn said bar over about its lower edge for continued sliding down said bed.

2. Apparatus as described in claim 1, characterized
by an auxiliary link disposed side-by-side relative to each first-mentioned link and a cross-connecting link connecting each first-mentioned link with its associated auxiliary link.

3. Apparatus as described in claim 1, characterized by said hook member extending generally horizontally from said linkage.

4. Apparatus as described in claim 3, characterized by means for adjusting said hook member angularly relative to said linkage.

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