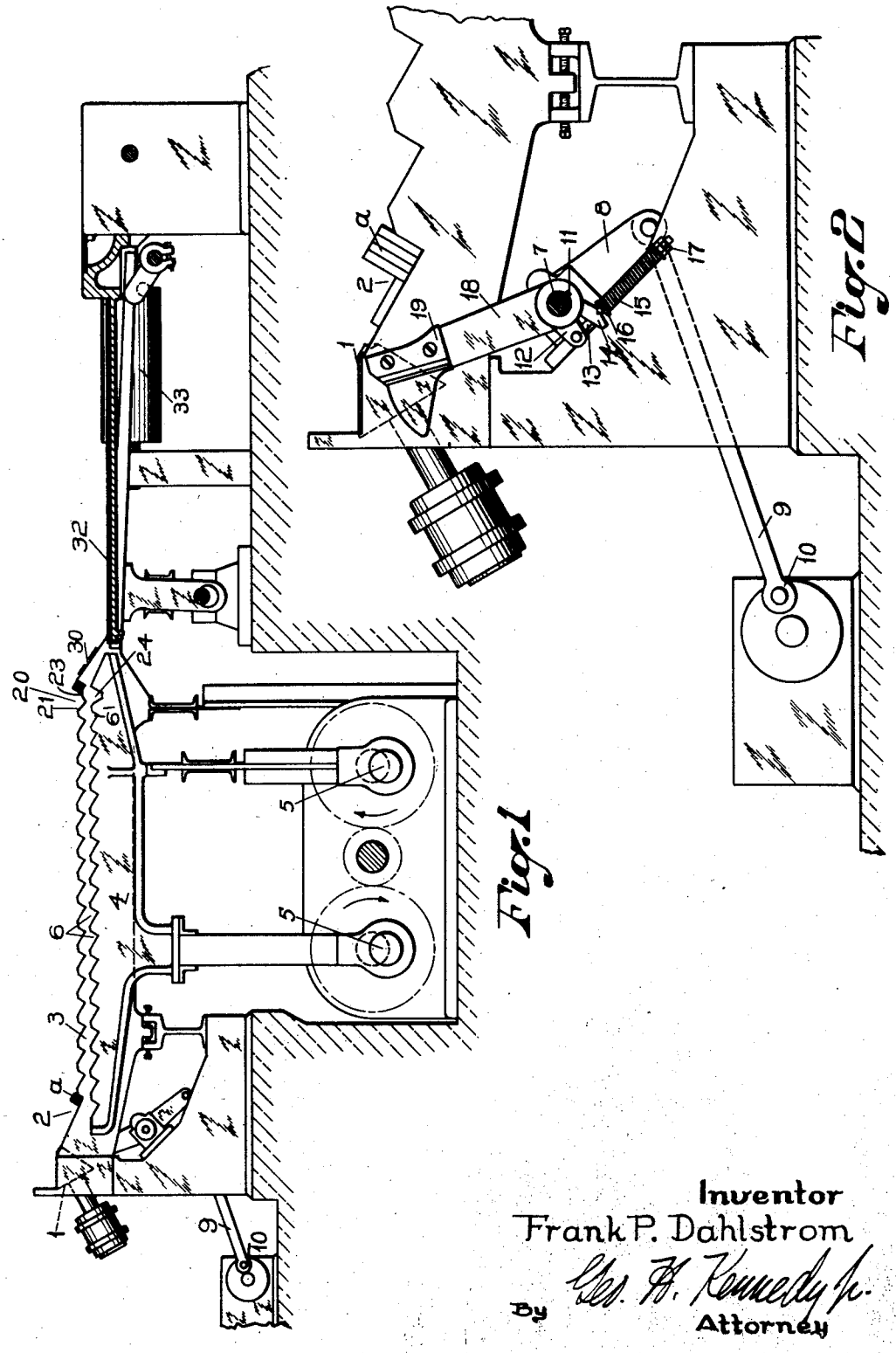
Oct. 17, 1933. F. P. DAHLSTROM 1,931,405

APPARATUS FOR HANDLING PACKED METAL STOCK

Filed Dec. 17, 1932 3 Sheets-Sheet 1



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APPARATUS FOR HANDLING PACKED METAL STOCK

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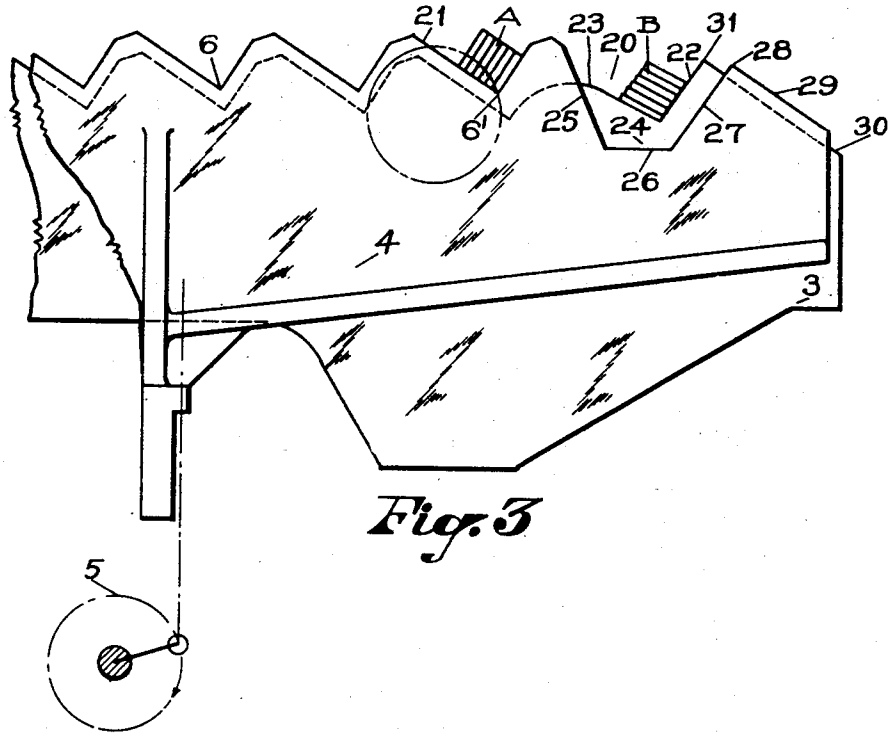


Fig. 3

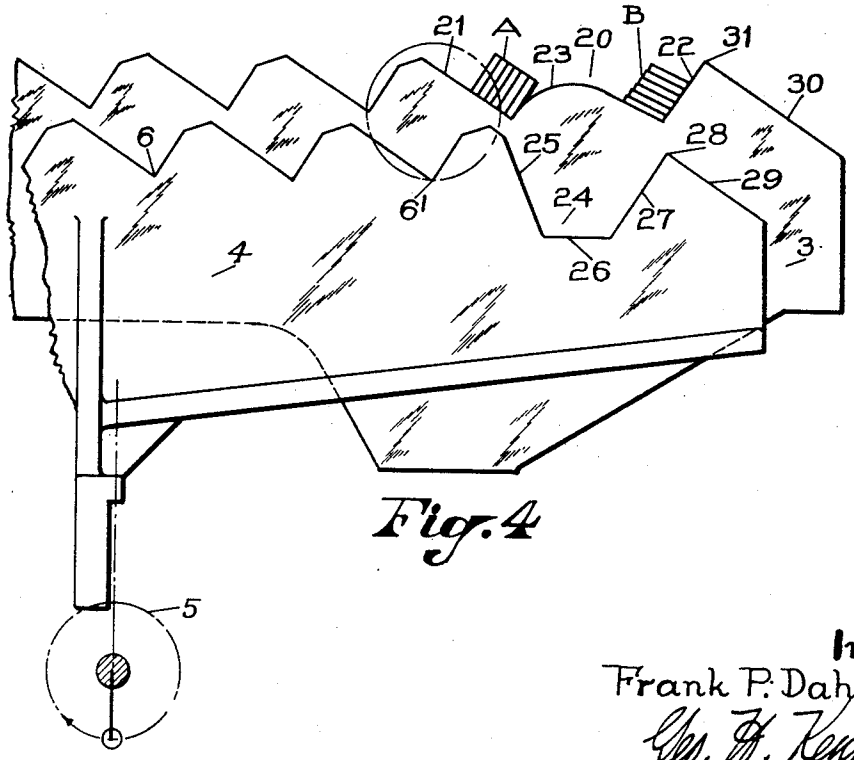


Fig. 4

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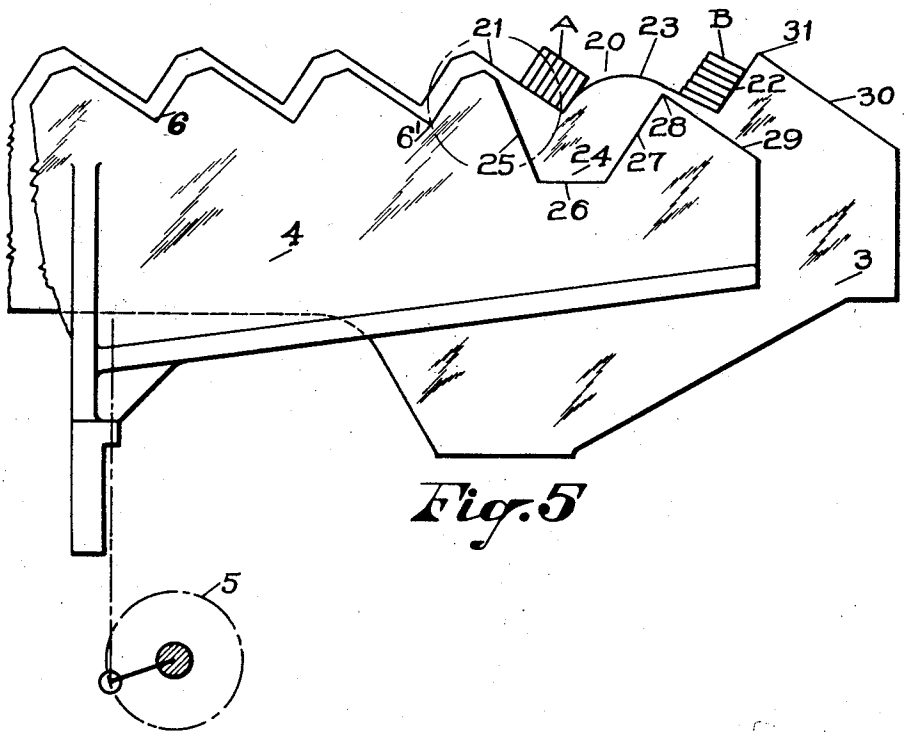


Fig. 5

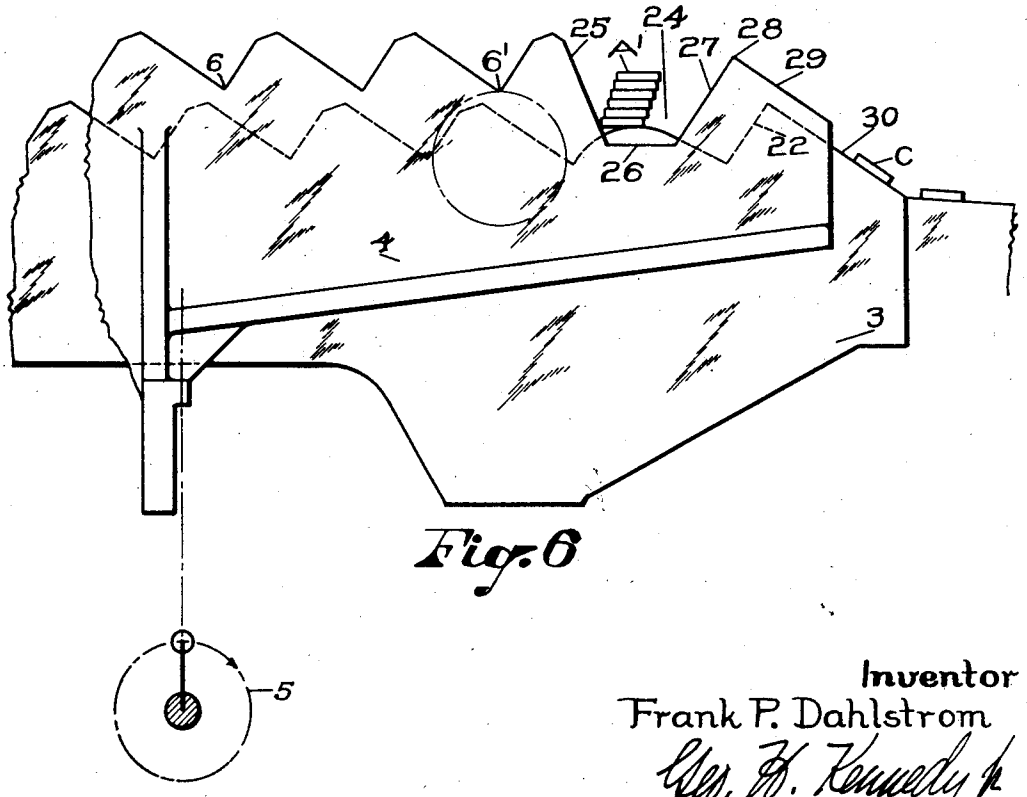


Fig. 6

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1,931,405

APPARATUS FOR HANDLING PACKED METAL STOCK

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Application December 17, 1932
Serial No. 647,717

12 Claims. (Cl. 80—42)

The present invention relates in general to the mechanical handling of metal stock and the like. More particularly, the invention relates to the separation or unpacking of flat metal bars (such as spring flats or the like) which have been subjected, in pack formation, to slow cooling or annealing on a cooling bed,—of the type, for example, shown in George Patent No. 1,536,205, dated May 5, 1925.

In the aforesaid George patent, disclosing a notched shuffle bar cooling bed, the flat bars are so packed as to rest edgewise against the forward sides of the notches, whereby the pack on its discharge from the bed is disintegrated and spread out by gravity on the run-off table, or other receiving device, provided for the support and subsequent conveyance of the individual pieces of stock. However, it is oftentimes desirable, on beds of this type, to so pack the bars that they rest edgewise against the rear sides of the notches, and under these conditions, the final discharge of the pack onto the run-off table or other receiving device does not procure the desired spreading out of the individual pieces of the pack,—the latter instead being deposited in shingle formation, with the pieces overlapping each other.

The present invention overcomes this difficulty by so constructing the notched shuffle bars of the cooling bed at or near their discharge ends that each pack in its transfer to the last cooling bed notch is shifted in such a manner that the pieces thereof rest edgewise against the forward or far side of said notch,—thus obtaining on its discharge movement from the bed the same gravity disintegration and spreading out of the pack on the receiving table as is obtained in the aforesaid George patent. Other and further objects and advantages of the invention will appear from the following detailed description thereof, reference being had to the accompanying drawings, in which—

Fig. 1 is a view in side elevation, partly in section, of apparatus embodying the invention.

Fig. 2 is a larger scale view in side elevation of the pack-forming mechanism.

Fig. 3 is a fragmentary large scale diagrammatic view partly in section, of the pack-shifting construction.

Figs. 4, 5 and 6 are views, similar to Fig. 3, showing the parts in different positions.

Like reference characters refer to like parts in the different figures.

Referring first to Fig. 1, each hot bar, as carried out longitudinally from the mill on a series of conveyor rollers 1, (only one of such rollers being shown), is transferred broadside, by the usual kick-off devices, not shown, to the first notch 2 provided by the stationary racks 3 of the cooling bed. The latter consists, as is well known, of a set of such stationary notched racks 3, 3, alternating with a similar set of movable notched racks 4, 4. The movable racks 4, 4 are connected at each end to eccentrics 5, 5, so as to be movable bodily in a circular path, all the time maintaining their parallelism with the stationary racks, and performing substantially half of their movement above and the other half below the plane of said stationary racks. The throw of the eccentrics 5, 5 is such that each notch 6 of the movable racks, after coming into registry with a notch 2 of the stationary racks, is carried upwardly and forwardly and then downwardly into registry with the next notch of the stationary racks, so that the stock, at each operation of the movable racks, is lifted out of a stationary notch and carried forward and deposited in the next stationary notch, being thus movable step-by-step across the cooling bed.

Referring now to Fig. 2, each piece of flat stock, as kicked off sidewise from the rollers 1, 1, slides down in the first stationary notch 2 until its advancing edge strikes the forward side of said notch; thereupon, according to usual practice, said piece is tipped or turned upwardly until its upper surface rests against said forward side of the notch,—the mechanism for doing this, as shown in Fig. 2, comprising a suitably journalled shaft 7, whose operating arm 8 is connected by a link 9 to an actuating crank or eccentric 10. The shaft 7 also has secured thereto, as by a key 11, a short arm 12, the latter carrying a pivoted rod 13 which extends through an aperture in the arm 14 journalled on shaft 7. A spring 15 on the rod 13 is confined between a washer 16, abutting the under side of arm 14, and the retaining nuts 17 at the outer end of said rod,—said spring thus serving to transmit yieldably to the arm 14 the rocking movements imparted to the shaft 7 and arm 12. Said arm 14, journalled on the shaft 7, has an upward extension 18, terminating in a shoe 19 that normally lies just below the rear side of the first stationary notch 2; following the delivery, as above described, of a piece of stock to said notch, the clockwise rocking of shaft 7, produced by a revolution of crank 10, causes the shoe 19 to swing upwardly, thereby tipping the piece against the forward side of the notch into a position of edgewise support upon the rear side of the notch, following which the shoe 19 resumes

its normal position so as to be out of the way of the next piece delivered to said notch from the rollers 1. Such next piece and those successively following it are operated upon in the same manner by the shoe 19, in consequence of which there is accumulated in said first stationary notch 2, as shown at *a* in Figs. 1 and 2, a pack of pieces lying face to face, with their bottom edges contacting the rear side of the notch,—it being understood that the resilient connection provided by the spring 15 permits such progressive shortening of the swing of shoe 19 as is required by the gradual thickening of the pack as pieces are successively added thereto.

The formation, as above described, of each pack in the first stationary notch 2 takes place, of course, in periods of inaction of the movable racks 4, 4. When said racks 4, 4 are in action, their several notches 6, 6, having clockwise circular motions that register them successively with two adjacent notches of the stationary racks 3, 3, produce the step-by-step travel of the formed pack or packs across the cooling bed, substantially in the manner set forth in the aforesaid George patent. Ultimately, by the action of the last one 6′ of the series of moving notches 6, 6, each pack so formed and handled is deposited in a final stationary notch 20,—the diagram of Fig. 3 illustrating such a pack (marked A) in the act of being so deposited, following which the racks 4, 4 descend to their lowest position, as shown in Fig. 4. The pack A is thus initially deposited in the final stationary notch 20 in the same relative position that it occupied in each of the preceding stationary notches,—that is, with its base in advance of its top, and with the several pieces resting edgewise against the rear side 21 of the notch. The latter, as best shown in Figs. 3, 4, 5 and 6, has a spread or elongation corresponding substantially to two of the preceding stationary notches, the rear side 21 being spaced from the front side 22 by a prolonged convex bottom surface 23; stated another way, this final stationary notch 20 is the equivalent, in effect, of two notches merged into one, and with the relatively low crown of surface 23, instead of a sharp high peak, dividing them. As shown in Fig. 4, the pack A is deposited in the crotch or angle between the rear side 21 and the convex bottom 23 of final stationary notch 20, and in this position is acted upon by a final movable notch 24 of special construction, as hereinafter described.

This final movable notch 24, unlike the preceding movable notches 6 and 6′, has its rear side 25 at a relatively steep angle and with much deeper penetration below the tops of racks 4, 4; a bottom flat surface 26 lies between the steep rear side 25 and the opposite or forward side 27 of this notch, said side 27 terminating in a peak 28 somewhat lower than the peaks between the several preceding movable notches 6 and 6′. From its peak 28, each movable rack is formed with a downwardly sloping end surface 29, which substantially parallels a similarly downwardly sloping end surface 30 of each stationary rack 3, 3, lying beyond the final stationary notch 20.

With a pack received in said final stationary notch 20 in the position marked A in Fig. 4, the next operation of the movable racks 4, 4, as shown in Fig. 5, initially carries the final movable notch 24 rearwardly, thereby to dispose the steep side 25 of said notch in operative relation to said pack at position A. Further movement of racks 4, 4, upwardly and forwardly, engages said steep side 25 with the pack at position A, and pushes it up and along the convex surface 23, as indicated in Fig. 6, by the intermediate pack position A′. Moving still further forward, and at the same time downwardly, this steep side 25 pushes the pack over the crest of the convex surface 23, whereupon it may slip forward by gravity into edgewise contact with the forward side 27 of movable notch 24, so that as said side 27 is carried past the forward side 22 of stationary notch 20, as indicated in Fig. 3, the pack is left in the position B in the crotch or angle between side 22 and convex surface 23 of the last stationary notch 20,—having been turned in this process through approximately 90°. Said pack remains in this position B while the racks 4, 4 are completing their downward movement, as shown in Fig. 4, and then on the next ensuing motion of said racks, as depicted in Fig. 5, the inclined end surface 29, initially moving rearwardly and upwardly, engages the pack in position B from beneath, and pushes it bodily up the side of surface 22 of stationary notch 20. In consequence, the pack at B has its several pieces, beginning with the topmost piece, successively elevated past the peak 31 of inclined end surface 30, thus permitting each piece as it reaches said elevation to slide down by gravity, separately, on said inclined end surface 30, as shown at C in Fig. 6. In this way, the pieces arrive singly and separately on the run-off table or other receiving device indicated at 32; the latter may comprise a flat-surfaced conveyor of the well known shuffle bar type, arranged to secure the broadside delivery of individual pieces thereon to a set of conveyor rollers 33,—or, if desired, said rollers 33 may receive the individual pieces directly from the end inclines 30 of the stationary racks 3, 3 of the cooling bed.

I claim:

1. In apparatus of the class described, the combination with a carry-over cooling bed, having notches for the support and movement of pieces in pack formation, said notches each having forward and rear sides, the former being in advance of the latter in the direction of movement of the packs, of means for forming each pack with its pieces resting edgewise against the rear side of a notch, and means operative on each pack, before its discharge from the bed, to turn it bodily, so that its pieces rest edgewise against the forward side of a notch, thereby to obtain the disintegration of said pack by gravity.

2. A cooling bed of the class described, having stationary members and movable members each equipped with notches, for the support and movement of packs of pieces, each of said notches having forward and rear sides, the former being in advance of the latter in the direction of movement of the packs, with each piece resting edgewise against the rear surface of the notch occupied by its pack, and other notches in said members adjacent their delivery ends, said last-named notches cooperating to turn each pack forwardly substantially as a unit into edgewise engagement of its pieces with the forward surface of a notch, thereby to obtain on the discharge of said pack from said bed the separation of its pieces by gravity.

3. In apparatus of the class described, a set of stationary supporting members and a set of movable transferring members, both sets having matching notches wherein the pieces are received in pack formation, each of said notches having forward and rear surfaces, the former being in advance of the latter in the direction of movement of the packs, with the pieces of each pack resting edgewise against the rear surfaces of said notches, and other notches in said members cooperating

to turn each pack bodily forwardly, before its discharge from said members, to position the pieces of the pack in edgewise engagement with the forward surface of a notch, thereby to procure, on the discharge movement, the disintegration by gravity of said pack.

4. The combination with a cooling bed, and means for advancing packs of bars on said bed with the base of each pack in advance of the top thereof, of means for turning each of said packs substantially as a unit to position the top of said packs in advance of the base thereof, and means for thereafter procuring disintegration of the packs and delivery of the bars one by one.

5. The combination with a cooling bed, and means for advancing packs of bars on said bed with the base of each pack in advance of the top thereof, of means for turning each of said packs substantially as a unit to position the top of said packs in advance of the base thereof, and means forming part of said advancing means for procuring disintegration of said packs and delivery of the bars one by one.

6. The combination with a cooling bed, means for forming individual packs of bars with the base of each pack in advance of the top thereof, and means for advancing said packs of bars on said bed, of means for turning each of said packs substantially as a unit to position the tops of said packs in advance of the bases thereof, and means for thereafter procuring disintegration of the packs and delivery of the bars one by one.

7. In a cooling bed, a set of notched stationary members in which packs of bars are supported, and a set of notched movable members for procuring advance of said packs of bars on said stationary members, one set of members having arcuate surfaces, and the other set of members having steep-sided notches cooperating with said arcuate surfaces for turning each of said packs of bars as a unit.

8. In a cooling bed, a set of notched stationary members in which packs of bars are supported, and a set of notched movable members for procuring advance of said packs of bars on said stationary members, one set of said members having arcuate surfaces, and the other set having steep-sided notches cooperating with said arcuate surfaces for turning each of said packs of bars substantially as a unit, in response to the relative movement of said stationary and movable members.

9. A carry-over cooling bed, having stationary and movable members, said members having matching notches for the support and movement of pieces in packed formation, each of said notches having forward and rear sides, the former being in advance of the latter in the direction of movement of the packs, means for forming each pack with the pieces thereof in edgewise engagement with the rear sides of said matching notches, said members having other notches cooperating, in response to the carry-over movements of said movable members, to turn each pack bodily through substantially 90° before its discharge from the bed, with the pieces of each pack resting edgewise against the forward side of the notches.

10. A carry-over cooling bed, having stationary and movable members, said members having matching notches for the support and movement of pieces in packed formation, each of said notches having forward and rear sides, the former being in advance of the latter in the direction of movement of the packs, means for forming each pack with the pieces thereof in edgewise engagement with the rear sides of said matching notches, said members having other notches for shifting each pack bodily so that the pieces thereof bear edgewise against the forward sides of said notches before the discharge of the pack from the bed.

11. A carry-over cooling bed, having stationary and movable members, said members having matching notches for the support and movement of pieces in packed formation, each of said notches having forward and rear sides, the former being in advance of the latter in the direction of movement of the packs, means for forming each pack with the pieces thereof in edgewise engagement with the rear sides of said matching notches, said members having other notches including an elongated stationary notch having a convex bottom surface, whereon each pack, before its discharge from the bed and in response to the movements of the movable members, is turned through substantially 90°, to establish edgewise contact of its pieces with the forward side of said elongated notch.

12. A carry-over cooling bed, having stationary and movable members, said members having matching notches for the support and movement of pieces in packed formation, each of said notches having forward and rear sides, the former being in advance of the latter in the direction of movement of the packs, means for forming each pack with the pieces thereof in edgewise engagement with the rear sides of said matching notches, said members having other notches including a steep-sided movable notch cooperating with an elongated stationary notch having a convex bottom surface, whereon each pack, before its discharge from the bed and in response to the movements of the movable members, is turned through substantially 90°, to establish edgewise contact of its pieces with the forward side of said elongated notch.

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