Dec. 15, 1964 J. E. ASHWORTH 3,161,284

RECIPROCATING SHUFFLE-BAR CONVEYOR WITH BELL-CRANK LIFT

Filed Dec. 11, 1962 2 Sheets-Sheet 1

FIG. 1.

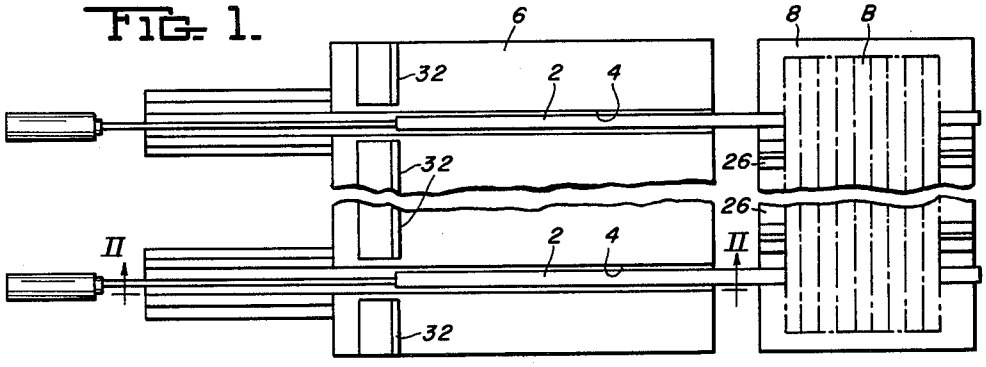


FIG. 5.

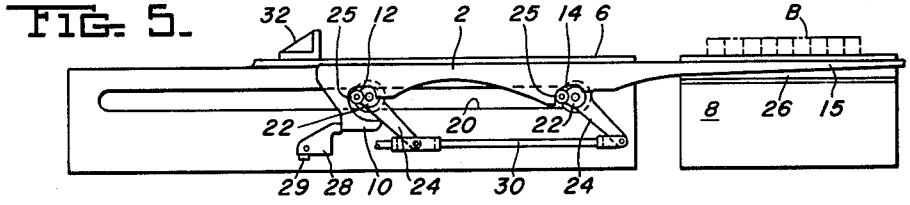


FIG. 6.

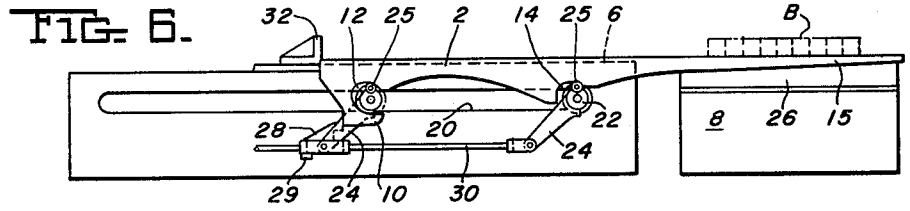


FIG. 7.

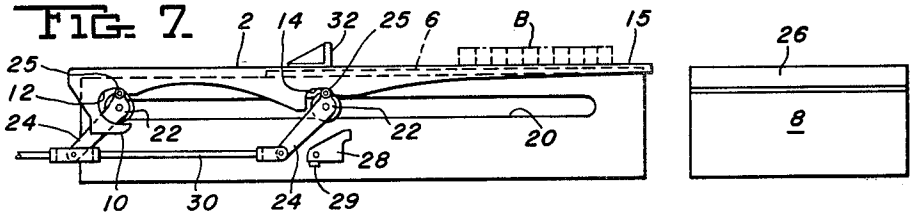
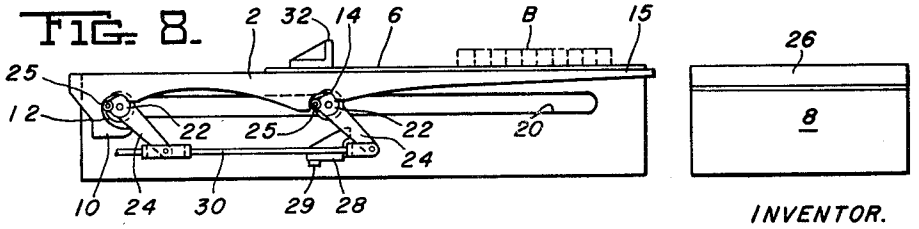


FIG. 8.



INVENTOR.
JAMES E. ASHWORTH
By Donald G. Dalton
Attorney

Dec. 15, 1964 J. E. ASHWORTH 3,161,284

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Filed Dec. 11, 1962 2 Sheets-Sheet 2

FIG. 2.

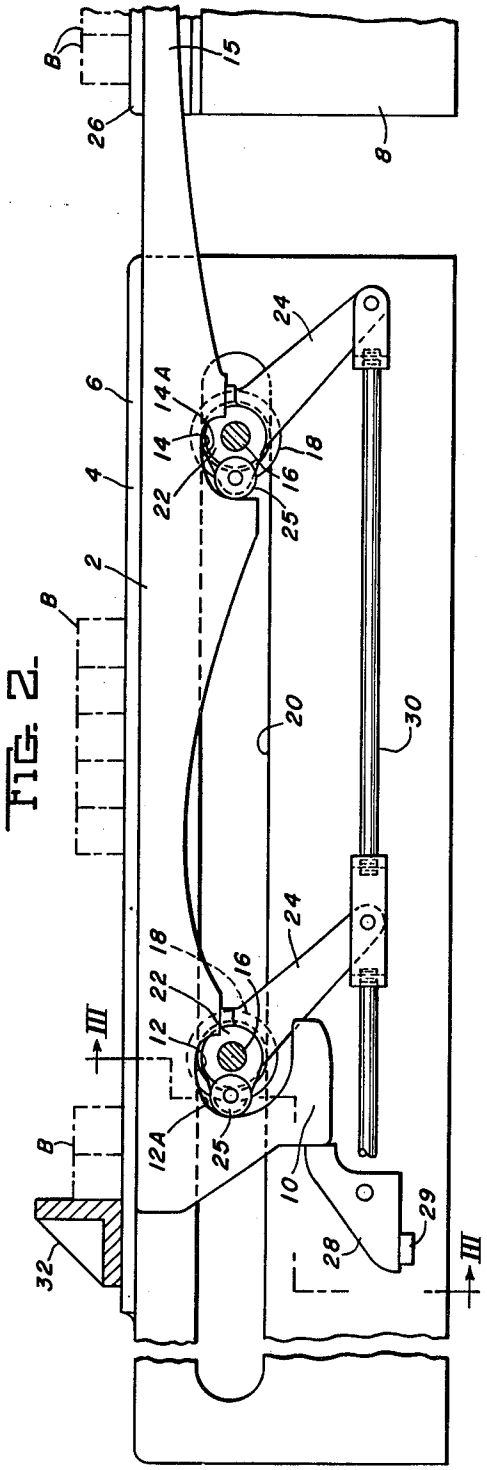


FIG. 3.

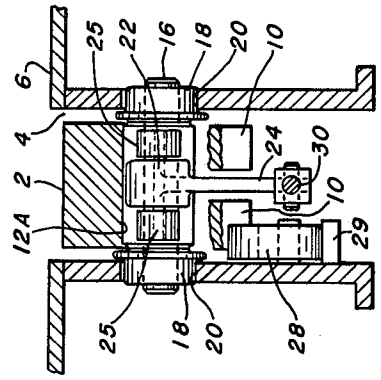
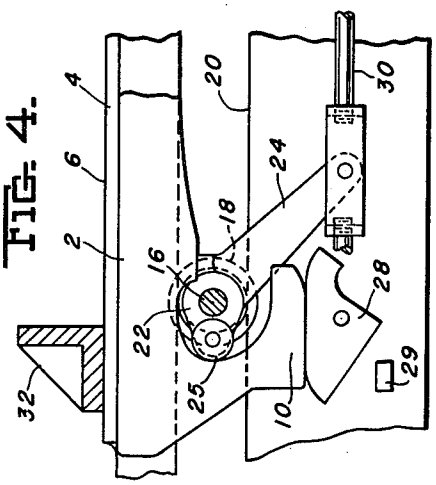


FIG. 4.



INVENTOR.
JAMES E. ASHWORTH
By Donald G. Dalton
Attorney

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RECIPROCATING SHUFFLE-BAR CONVEYOR WITH BELL-CRANK LIFT

James E. Ashworth, Palo Alto, Calif., assignor to United States Steel Corporation, a corporation of New Jersey

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3 Claims. (Cl. 198—219)

The present invention relates generally to material-handling apparatus and more particularly has as its primary object the provision of a reciprocating shuffle-bar conveyor with bell-crank lift for transferring articles especially elongated articles such as metal billets, blooms, slabs and the like from a supply platform to a gathering table.

The above and other objects will become more apparent after referring to the following specification and attached drawings, in which:

FIGURE 1 is a plan view of the apparatus of the invention;

FIGURE 2 is a longitudinal sectional view taken along the line II—II of FIGURE 1;

FIGURE 3 is a cross-sectional view taken along the line III—III of FIGURE 2;

FIGURE 4 is a partial elevational view showing the tiltable dog of the apparatus of the invention in an alternate position; and

FIGURES 5, 6, 7 and 8 are generally schematic elevational views showing the sequence of operation of the apparatus of the invention.

Referring more particularly to the drawings, reference numeral 2 designates the lift bar of the apparatus of the invention which is mounted in a channel 4 formed in a gathering table 6 for reciprocal longitudinal movement toward and from a supply platform 8 positioned adjacent the gathering table.

The end of the lift bar 2 remote from the supply platform 8 is shaped with an integral, depending and inwardly curved projection 10. A substantially semi-circular recess 12, providing a camming surface 12A, is formed on the undersurface of the lift bar adjacent the projection 10 with the camming surface 12A continuous with the inner surface of the projection 10. Another substantially semi-circular recess 14, which provides a camming surface 14A, is formed on the undersurface of the lift bar spaced from recess 12. A longitudinally extending lift finger 15 is formed on the end of the bar 2 projecting toward the supply platform 8. Each of the recesses 12 and 14 accommodates a transversely disposed shaft 16 having a wheel 18 rotatably mounted on each end thereof. The wheels are mounted for movement in ways 20 which are formed in opposite walls of channel 4 below the upper surface of the gathering table 6 and extend normal to the platform 8. A bell crank 22 having a lever 24 depending therefrom and a pair of spaced rollers 25 rotatably mounted thereon is pivotally mounted on each of the shafts 16 between the wheels 18. The projection 10 is formed with a slot in its bottom portion for accommodating the lever 24 of the bell crank disposed in recess 12.

In operation, to transfer a group of billets B laterally from upright supports 26 on the supply platform 8 to the gathering table 6, the lift bar 2 is moved longitudinally to the right as viewed in FIGURE 5 to position the lift finger 15 under the group of billets B. Then the bell cranks 22 are pivoted by moving levers 24 to the left, as shown in FIGURE 6, to cause the cam rollers 25 to engage camming surfaces 12A and 14A and raise the lift bar. As the bar 2 is thus raised the group of billets is lifted clear of the supports 26 by the lift finger 15. The lift bar 2 is then moved longitudinally to the left in raised position to transfer the billets

laterally to a position above the gathering table, as shown in FIGURE 7. The bell cranks 22 are then pivoted by moving levers 24 to the right to lower the lift bar and lift finger and deposit the group of billets on the gathering table, as shown in FIGURE 8, from which the billets can then be moved axially for further processing as, for example, into a pre-heating furnace. After the billets have been thus deposited on the gathering table, the lift bar is moved to the right in lowered position toward the supply platform preparatory to beginning another billet transferring cycle.

As the lift bar is moved longitudinally in either direction, the wheels 18 travel in the ways 20.

As best shown in FIGURES 2, 3 and 4, a tiltable dog 28 is provided on one side of the channel 4 below the ways 20 for preventing longitudinal movement of the lift bar 2 to the left when the levers 24 are moved to the left to pivot the bell cranks 22 to raise the lift finger into lifting engagement with the underside of the group of billets B. A stop 29 is provided adjacent the underside of the dog to prevent pivotal movement of the dog in counterclockwise direction, as viewed in FIGURE 2. When the lift bar is moved to the right in lowered position the dog is pivoted in clockwise direction, as best shown in FIGURE 4, to permit passage of the projection 10. The pivot point of the dog is offset from its center of gravity so that the dog automatically returns to initial position, as shown in FIGURE 2, after the lift bar has been moved fully to the right. When the levers 24 are moved to the right to lower the group of billets onto the gathering table, the bell cranks will tend to pivot before longitudinal movement of the lift bar actually occurs. The weight of the billets on the lift bar will aid in preventing longitudinal movement of the lift bar when the bell cranks are pivoted so that no dog or other stop member is required for this phase of the transferring cycle.

A common link 30 is preferably pivotally connected with the lower ends of the levers 24 so that the levers can be moved simultaneously. Power means may be connected with the link 30 for effecting longitudinal movement of the lift bar and finger and pivoting of the bell cranks. Such power means may be a pressure cylinder, bell crank, rack and pinion, etc.

A stationary stop 32 may be provided on the gathering table 6 for limiting the lateral movement of the group of billets B.

It will be understood that, as best shown in FIGURE 1, gathering table 6 is formed with two or more channels 4 extending in spaced, parallel relation and each having a lift bar 2 and associated shafts 16, wheels 18, and bell cranks 22 disposed therein. The lift bars are operated simultaneously during the transfer operation.

While one embodiment of my invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for lifting and transferring articles comprising parallel horizontal lift bars, each of said bars having a pair of arcuate camming surfaces formed on its underside one adjacent each end thereof, a way adjacent opposite sides of each of said bars extending parallel with each other substantially in the horizontal plane containing the bottoms of said bars, supports for each bar spaced therealong, each support including a shaft extending transversely between the ways adjacent each bar and having a wheel disposed at each end adapted to travel along said ways, and a bell crank pivoted on each of said shafts intermediate said wheels, a cam roller on each of said bell cranks adapted to engage said camming surfaces on the underside of said bars

upon angular movement of said bell cranks about said shafts whereby to raise and lower said bars, and pivoted dogs positioned in the path of horizontal movement of said bars effective to restrain horizontal movement of said bars until after a predetermined vertical movement of the bars by said cranks.

2. Apparatus as defined by claim 1 including common means for actuating the bell cranks of the supports of each of said bars.

3. Apparatus as defined by claim 1 characterized by each bar having a lift finger projecting from one end thereof.

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