Aug. 14, 1951 E. J. RAPP 2,564,079

PRODUCT STACKER

Filed March 4. 1950 3 Sheets-Sheet 1

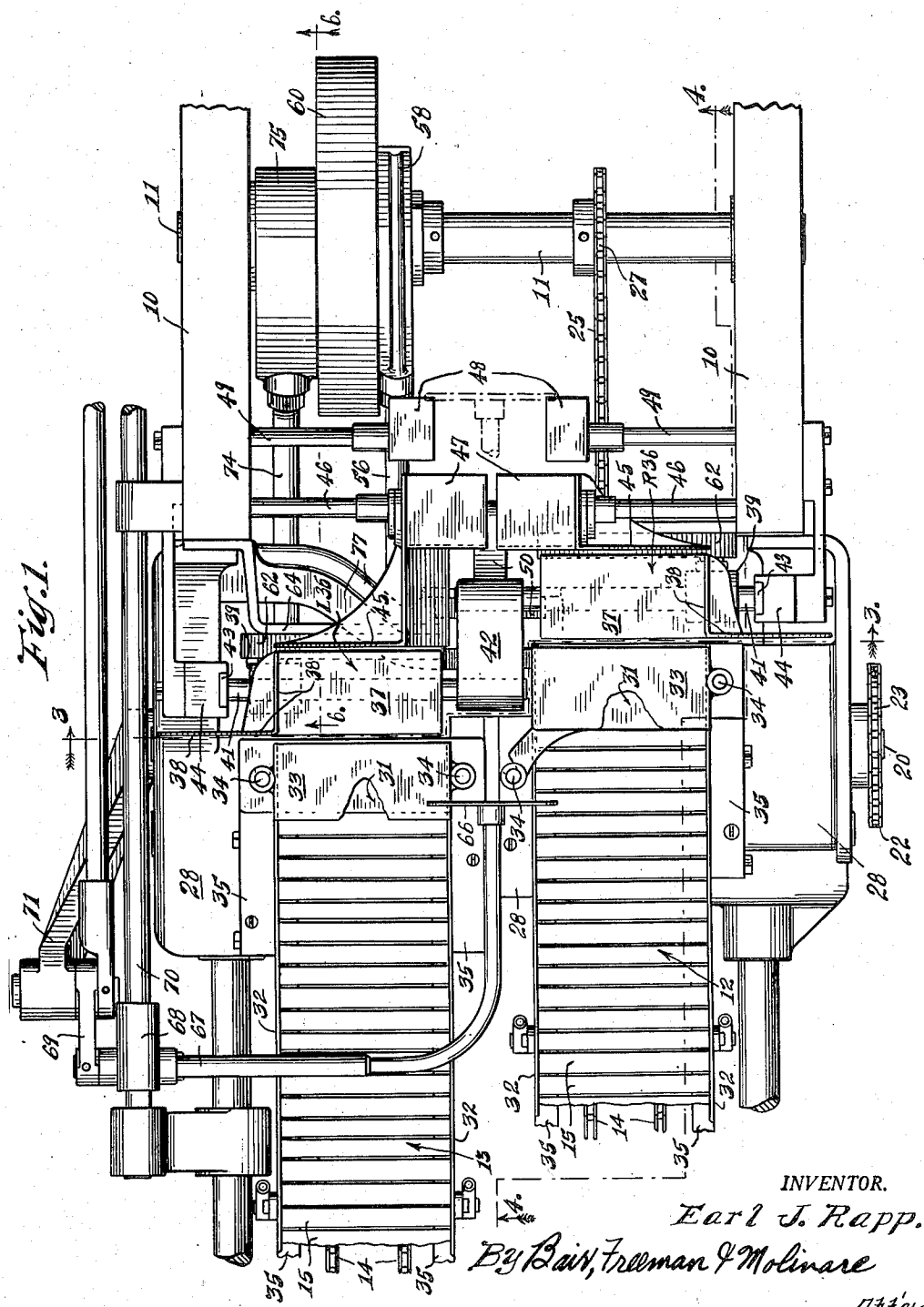

Fig. 1.

INVENTOR.
Earl J. Rapp.
By Bair, Freeman & Molinare
Atty's.

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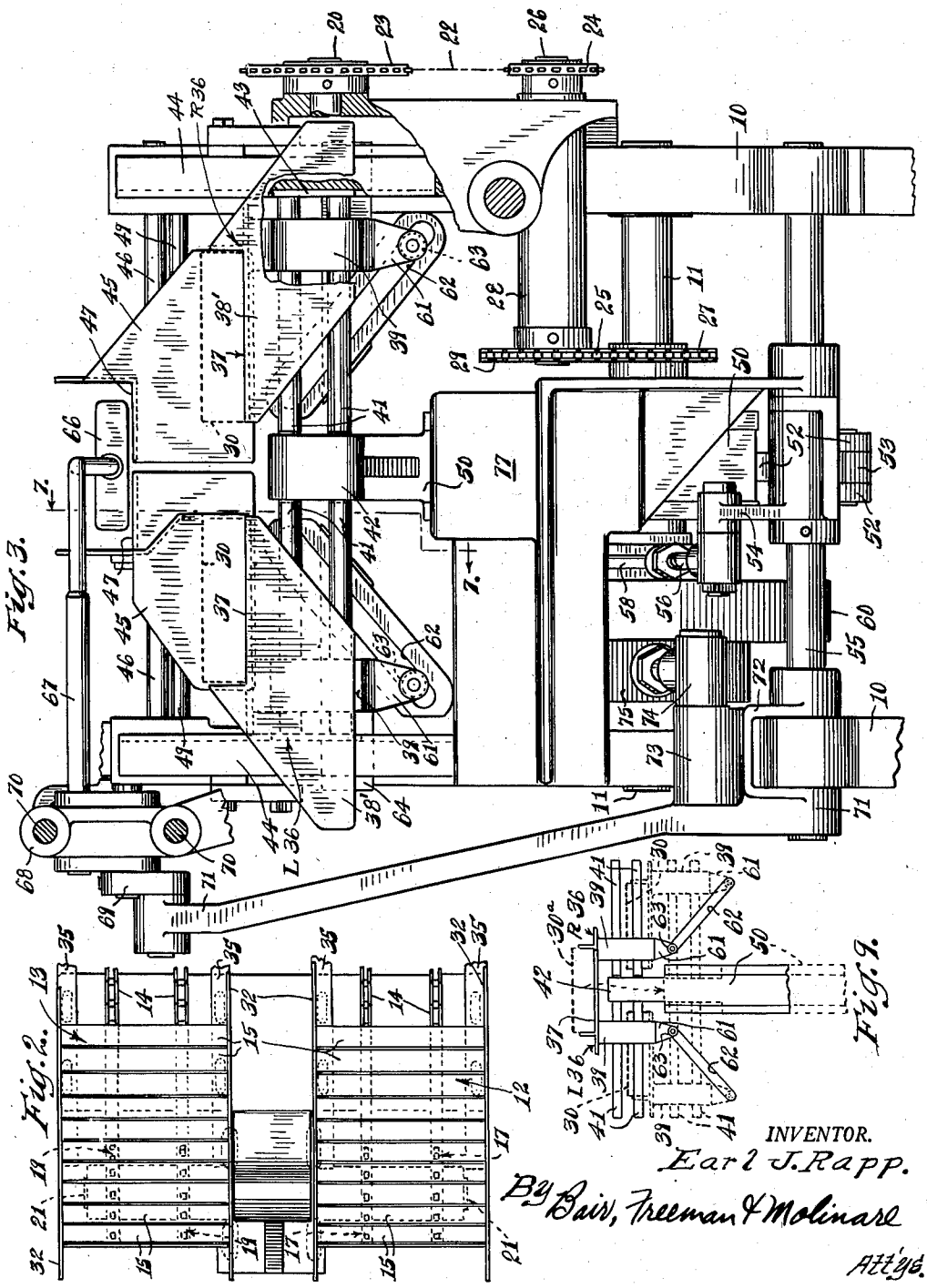

Fig. 3.

Fig. 2.

Fig. 4.

INVENTOR.
Earl J. Rapp.
By Bair, Freeman & Molinare
Atty's.

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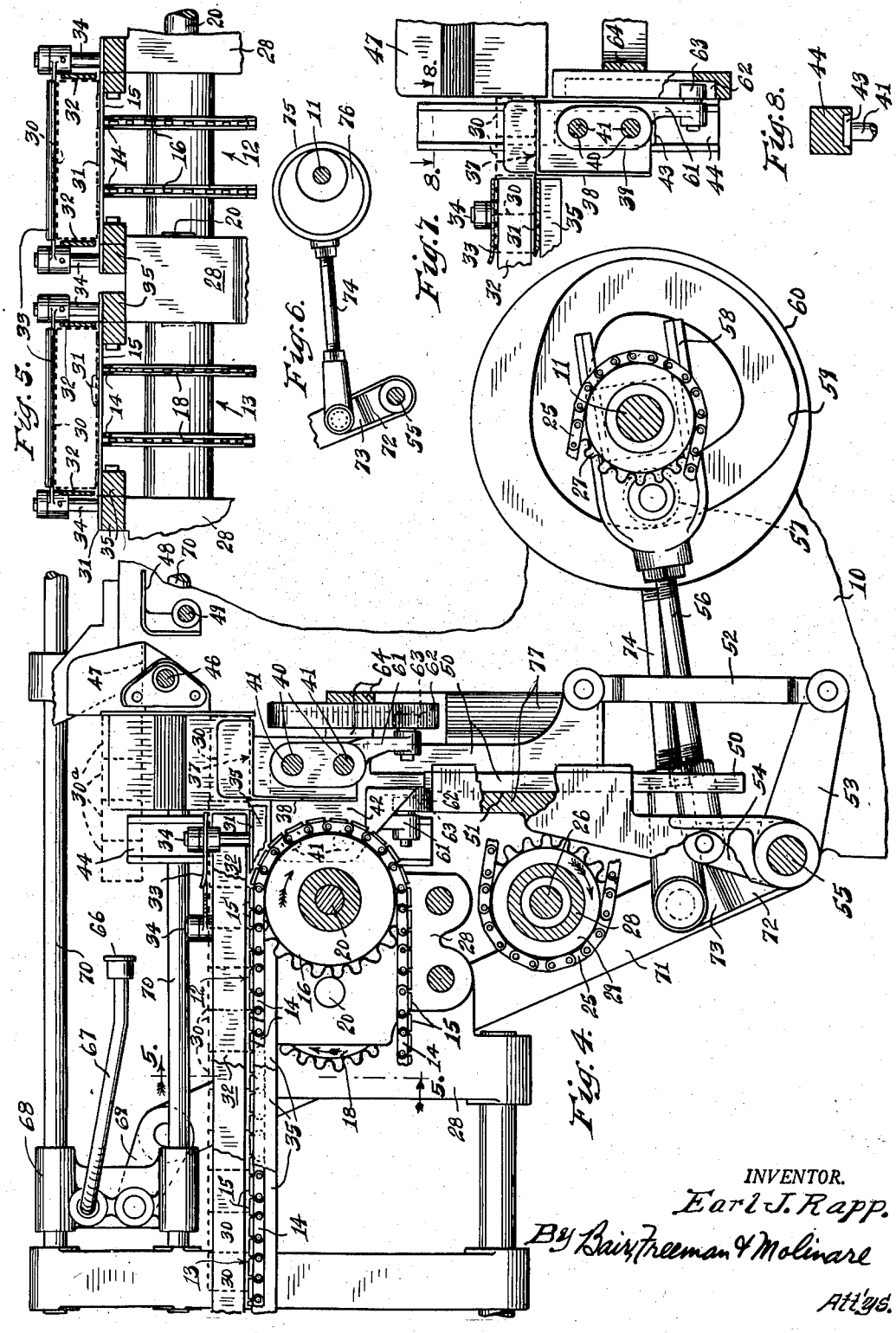

Fig. 1.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 8.

INVENTOR.
Earl J. Rapp.
By Bair, Freeman & Molinare
Att'ys.

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UNITED STATES PATENT OFFICE

2,564,079

PRODUCT STACKER

Earl Joseph Rapp, Toledo, Ohio, assignor, by mesne assignments, to Lynch Corporation, Anderson, Ind., a corporation of Indiana

Application March 4, 1950, Serial No. 147,715

11 Claims. (Cl. 214—7)

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This invention relates to a product stacker and particularly to one for stacking four quarter-pound prints of butter or oleomargarine to be wrapped in a flat package with the four quarters side by side in a single layer.

One object of the invention is to provide a simple and novel mechanism for stacking units of a product issuing from a pair of intake conveyors in a side-by-side stack so that, for instance, two units from each conveyor can be stacked horizontally and the four units moved as one unit into a cartoning or wrapping mechanism.

Another object is to provide carrier elements for the units of product issuing from the discharge ends of two intake conveyors, such carrier elements carrying the units to a position where those from one conveyor are stacked ahead of the units from the other conveyor so that the units thus stacked may all be moved together as one unit for cartoning and/or wrapping operations.

Still another object is to provide carrier elements which are laterally movable from spaced apart positions to positions where they are in alignment with each other, whereupon the units of product from both carriers may be moved therefrom by a pusher element, the carriers being mounted for lateral movement and also for vertical movement, and an inclined guideway mechanism cooperating with projections of the carriers to impart to them the lateral movement as vertical movement is imparted thereto whereby articles from two side-by-side intake conveyors may be brought into alignment at an elevated position for feeding into the cartoning or wrapping mechanism.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my product stacker, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of a product stacker embodying my present invention.

Figure 2 is a continuation of the left hand end thereof.

Figure 3 is a vertical rear end view with the intake conveyors removed and taken substantially on the section line 3—3 of Figure 1.

Figure 4 is a vertical sectional view on the line 4—4 of Figure 1.

Figure 5 is a vertical sectional view on the line 5—5 of Figure 4.

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Figure 6 is a vertical sectional view taken at the line 6—6 of Figure 1 and showing the parts on a reduced scale.

Figure 7 is a sectional view on the line 7—7 of Figure 3.

Figure 8 is a sectional view on the line 8—8 of Figure 7; and

Figure 9 is a diagrammatic rear view to show the essential elements of the product stacker, and their operation and positions relative to each other during such operation.

On the accompanying drawings I have used the reference numeral 10 to indicate a main frame of a wrapping or cartoning machine and 11 a drive shaft journalled therein. The shaft 11 is driven in any suitable manner, usually from an electric motor (not shown) and at a suitable speed for the wrapping or cartoning mechanism with which the present invention is not concerned.

On the other hand, the present invention is embodied in the mechanism which will now be described. There are two intake conveyors 12 and 13 each of which comprises chains 14 to which bars 15 of wood or the like are secured. There are two of the chains 14 for each conveyor 12 and 13.

The chains 14 for the conveyor 12 are trained around sprockets 16 and 17 and for the conveyor 13 around sprockets 18 and 19. The shaft for the sprocket 16 is indicated at 20 and for the sprockets 17 and 19 is indicated at 21. The sprocket 16 is secured to the shaft 20 and this shaft constitutes a drive for both intake conveyors 12 and 13.

The shaft 20 is driven by a chain 22 meshing with a sprocket 23 on the shaft 20 and with a sprocket 24 on a counter shaft 26. The counter shaft 26 is journalled in a bearing 28 of the frame 10 and carries a sprocket 29 around which a chain 25 extends. This chain also extends around a sprocket 27 which is mounted on the main drive shaft 11. Thus the shaft 20 and the conveyor chains 14 for the right hand intake conveyor 12 are driven.

The chains 14 just referred to drive the sprockets 17 and they in turn rotate the shaft 21. The sprockets 19 being secured to the shaft 21 are thus rotated so as to drive the left hand intake conveyor 13 from the conveyor 12. The sprockets 18 at the forward end of the conveyor 13 act as idlers.

The conveyor bars 15 of both intake conveyors 12 and 13 are adapted to support quarter pounds or "prints" of butter or similar product indicated

at 39 and the conveyors feed the product to the wrapping or cartoning machine. The prints 30 are first fed on to plates 31 shown in Figures 4 and 5. The prints 30 are guided at the sides by side plates 32 and a hold-down plate 33 is mounted above each plate 31 as shown in these two figures. The plates 33 are supported by posts 34 extending upwardly from conveyor supporting frame members 35.

Referring to Figure 1, it will be noted that the plates 33 and 31 for the right hand intake conveyor 12 are staggered with relation to similar plates 33 and 31 for the left hand intake conveyor 13, those for the right hand conveyor being ahead (to the right in Figure 1) of those for the left hand conveyor as the direction of print travel is toward the right in Figure 1. Just ahead of the plates 31 are carrier elements indicated generally at R36 and L36, R indicating right and L indicating left. Each carrier comprises a plate-like platform 37 approximately the size of two quarter-pound prints 30 and an upstanding flange 38 at the outer end of each (right end for R36 and left end for L36).

Either one of the carriers will now be described as to details and the description applies also to the other. At the rear end of the platform 37, an apron 38' depends. From the bottom of the platform ahead of the apron a bracket 39 depends. The bracket 39 is provided with a pair of bores 40 (see Figure 4) which slide on rods 41. The rods 41 are carried by a head 42 and their outer ends have a connector 43 traveling in a channel shaped guide 44 as shown in Figure 8.

Referring to Figure 1, it will be noted that the rods 41 for the carrier R36 are staggered ahead of the rods for the carrier L36, the head 42 being of sufficient fore-and-aft length to accommodate both pairs of rods and of course the channel guides 44 are offset from each other. These channel guides are stationary with relation to the frame 10.

Ahead of the carriers R36 and L36 are stationary aprons 45 and they are supported by rods 46 from the side members of the frame 10. Supporting platforms 47 are also supported by the rods 46 to receive the prints 30 as will hereinafter appear and additional platforms 48 are supported by rods 49 to suitably receive the prints of butter during the wrapping and/or cartoning thereof.

For vertically reciprocating the head 42, I provide a slide bar 50 guided in vertical slideways 51 carried by a bracket 77 extending from one of the frame members 10 and connected by a link 52 with an arm 53. The arm 53 is part of a bell crank, the other arm of which is indicated at 54, the bell crank being rockably mounted on a shaft 55. The arm 54 is pivotally connected to the rear end of a link 56 which carries a fork 58 at its front end. The fork is slidable with respect to the drive shaft 11 and carries a roller 57 coacting with a cam groove 59 of a cam 60 secured to the drive shaft. Thus rotation of the drive shaft effects vertical reciprocation of the rods 41 and thereby of the carriers R36 and L36.

At the same time the carriers are vertically reciprocated they are also moved inwardly toward each other and this is accomplished by extensions 61 on the brackets 39 carrying rollers 63 which travel in inclined stationary cams 62. The cams 62 are supported by a cross piece 64 of the frame 10 as shown in Figures 1, 4 and 7.

The carriers R36 and L36 are adapted to elevate the prints 30 to the dotted position illustrated as 30*a* in Figure 4 where they can be pushed off the carriers on to the platform plates 47 and 48. The pusher for this purpose is indicated at 66 and it is carried by a rod 67 supported by a slide 68 slidable on stationary rods 70. The slide 68 is connected by a link 69 with the upper end of the lever 71 which lever at its lower end is forked at 72 as shown in Figure 3 to straddle one of the frame members 10 and rock on the shaft 55. The lever 71 carries a boss 73 with which one end of a link 74 is pivotally connected. The other end of the link as shown in Figure 6 terminates in an eccentric strap 75 surrounding an eccentric 76 on the shaft 11.

Practical operation

In the operation of my product stacker, the prints 30 are delivered to the plates 31 under the plates 33 and pushed across the plates 31 on to the platforms 37 of the carriers R36 and L36. The front print on each conveyor engages its respective apron 45 which limits the movement of the prints, the intake conveyors operating continuously and thus slipping under the prints to keep them tight against the aprons 45.

As soon as two prints are completely delivered to the two platforms 37, the platforms are raised by the cam 60 operating through the links 56 and 52 and the bell crank 53—54 to elevate the slide bar 50. The elevation of this bar elevates all four rods 41 for carrying the brackets 39 upwardly and since their rollers 63 are coacting with the inclined slots of the cam 62, the carriers R36 and L36 also move inwardly.

Referring to Figure 9, this is shown diagrammatically, the original position being the dotted position and the raised position the full line position. It will be noted that the carriers R36 and L36 in the full line position have moved together as well as being elevated and the four prints 30 then assume the dotted position indicated at 30*a* in Figure 4.

As the carriers are elevated, their aprons 38 hold back the prints 30 except the first two in each case and said first two on each carrier slide upwardly along the stationary aprons 45, the third print on each conveyor being held down against undesirable upward movement by the plates 33.

When the prints are at the position 30*a*, the pusher 66 engages all four of them and pushes them across the platforms 47 and 48 where part of the wrapping or cartoning operation takes place and further into the machine for completing the wrapping or cartoning operations upon the next stroke of the pusher 66. Such next stroke delivers four more of the prints to the position indicated as 30*a* and the cycle is repeated in a well known manner.

It will be obvious from the foregoing specification that I have provided a product stacker in which desired lateral movement of carriers is accomplished by their vertical movement in conjunction with inclined stationary cams so that units of product from two intake conveyors spaced from each other may be aligned for the units of product from both conveyors to be pushed as a unit into the wrapping or cartoning mechanism. The necessary motion for the carriers is had with a simple arrangement of vertical slide bar carrying lateral guides for the carriers and the carriers being provided with rollers that roll in the inclined stationary slots. Thus with a minimum of mechanical parts, the desired horizontal stacking result is secured.

Some changes may be made in the construc-

tion and arrangement of the parts of my product stacker without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. In a product stacker of the character disclosed, a pair of intake conveyors having discharge ends staggered with relation to each other, said conveyors being arranged side by side, a carrier element at the forward end of each of said conveyors and adapted to receive units of product from the conveyors, said carrier elements being provided with aprons to hold back additional units, hold-down plates above the first of such additional units, means for laterally moving said carrier elements to positions aligned with each other whereby the units from both carrier elements may be discharged on the same level therefrom, and a pusher for effecting such discharge.

2. In a product stacker, a pair of intake conveyors arranged side by side, a carrier element at the forward end of each of said conveyors and adapted to receive units of product from the conveyors, said carrier elements being staggered, and means for laterally moving said carrier elements to a position where one is aligned behind the other whereby the units from both may be discharged on the same level therefrom.

3. In a product stacker of the character disclosed, a pair of side-by-side intake conveyors having discharge ends staggered with relation to each other, a product carrier at the forward end of each of said conveyors and adapted to receive units of product therefrom, said carriers being provided with aprons to hold back additional units, and means for laterally moving said carriers to positions of longitudinal alignment whereby the units from both carriers may be discharged therefrom at the same elevation.

4. In a product stacker of the character disclosed, a pair of intake conveyors having discharge ends staggered with relation to each other, said conveyors being arranged side by side, a product carrier at the forward end of each of said conveyors and adapted to receive units of product therefrom, said carriers being provided with aprons to hold back additional units, means for laterally moving said carrier elements to positions aligned whereby the units from both may be discharged on the same level therefrom, said means moving said carrier elements vertically, and inclined stationary cams for moving them laterally as a result of such vertical movement.

5. In a product stacker, a pair of intake conveyors having side-by-side discharge ends staggered with relation to each other, a carrier at the forward end of each of said conveyors and adapted to receive units of product issuing from the conveyors, said carriers being provided with aprons to hold back additional units, stationary hold-back aprons at the front of each carrier, hold-down plates above the first of such additional units, means for laterally moving said carriers to positions aligned whereby the units from both may be discharged on the same level therefrom, a pusher for effecting such discharge, said means moving said carrier elements vertically, and inclined stationary cams for moving them laterally as a result of such vertical movement.

6. In a product stacker of the character disclosed, a pair of intake conveyors having discharge ends staggered with relation to each other and arranged side by side, a carrier element at the forward end of each of said conveyors and adapted to receive units of product therefrom, said carrier elements being laterally movable to positions of alignment whereby the units from both may be discharged on the same level therefrom, a pusher for effecting such discharge, means for moving said carrier elements vertically, and inclined stationary cams coacting with projections from said carrier elements for moving them laterally as a result of such vertical movement.

7. In a product stacker, a pair of intake conveyors having discharge ends staggered with relation to each other, and arranged side by side, carriers at the forward end of each of said conveyors adapted to receive units of product from the conveyors, said carriers being laterally movable to positions aligned with each other whereby the units from one may be discharged behind the units from the other, a pusher for effecting such discharge, means for vertically reciprocating said carriers, oppositely inclined tracks mounted on the frame of said stacker, and projections from said carriers movable in said tracks for moving the carrier elements inwardly to alignment with each other as they are reciprocated in one direction and for spreading them apart to align them with said intake conveyors when they are reciprocated in the opposite direction.

8. A product stacker comprising a pair of side-by-side intake conveyors having discharge ends staggered with relation to each other, a carrier element at the forward end of each of said conveyors and adapted to receive units of product from the conveyors, means comprising a vertically reciprocable element on which said carrier elements are laterally slidable to aligned positions whereby the units from both may be discharged on the same level therefrom, oppositely inclined stationary tracks, and projections from said carrier elements movable in said tracks for moving the carrier elements inwardly to alignment with each other as they are reciprocated in one direction and for spreading them apart to align them with said intake conveyors when they are reciprocated in the opposite direction.

9. In a product stacker of the character disclosed, a pair of intake conveyors arranged side by side and having staggered delivery ends, staggered carrier elements adapted to receive units of product therefrom, a reciprocable slide, lateral guide elements carried thereby along which said carrier elements are slidable, projections from said carrier elements, oppositely inclined cam means coacting therewith for effecting lateral movement of said carrier elements in opposite directions along said guides as said reciprocable member is reciprocated vertically, the final position of said carrier elements at one end of the reciprocating motion being in alignment with each other, a pusher element for pushing the units from both carrier elements into a wrapping or cartoning machine, said carrier elements spreading apart as said reciprocable member is reciprocated in the opposite direction and aligning with said intake conveyors at the end of such reciprocating motion in said opposite direction.

10. In a product stacker, a pair of side-by-side intake conveyors having staggered delivery ends, a carrier element for each conveyor adapted to receive units of product therefrom, a recip-

rocable slide having guide elements along which said carrier elements are laterally slidable, projections from said carrier elements, and oppositely inclined cam means coacting therewith for effecting lateral movement of said carrier elements in opposite directions along said guides as said reciprocable member is reciprocated.

11. In a product stacker, a pair of intake conveyors arranged side by side and having staggered delivery ends, carrier elements adapted to receive units of product therefrom, a vertically reciprocable slide carrying lateral guide elements

along which said carrier elements are slidable, coacting projection and oppositely inclined cam means for effecting lateral movement of said carrier elements in opposite directions along said guides as said vertically reciprocable member is moved, the limits of position of said carrier elements at the ends of the reciprocating motion being in alignment with each other and with said intake conveyors respectively.

EARL JOSEPH RAPP.

No references cited.