ABSTRACT: Article transfer apparatus including a tiltable elevator for transferring an article from one elevation to transport mechanism at a lower elevation. The elevator is mounted for vertical movement on a pair of spaced upright posts that straddle a portion of the transport mechanism. Gravity acting on the elevator tends to hold it in an attitude with its support deck substantially horizontal. Pivot structure causes the elevator to tilt to another attitude with its support deck inclined upon lowering of the elevator toward the lower elevation mentioned. The elevator's support deck is at least partially defined by power-driven rolls.
Fig. 3.

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ELEVATOR WITH A PIVOTED SUPPORT DECK

This invention relates to article transfer apparatus, and more particularly to such apparatus that includes a tiltable elevator adapted to receive an article at one elevation and discharge it onto transport means at a lower elevation. For purposes of illustration, a preferred embodiment of the invention is described in conjunction with equipment which stacks and palletizes packages that are to be delivered to power-driven carts for transport away from the equipment.

In certain types of article-handling operations it is necessary to transfer an article from one elevation onto transport means at a lower elevation. Frequently, this must be done on a selective basis, i.e. when an article is ready to be transferred, and when the transport means is ready to accept this article. Further, it is often desirable to orient the apparatus employed to transfer an article in a position where it is directly over the transport means. Such an orientation can save space and simplify construction.

A general object of the invention is to provide novel article-handling apparatus, including an elevator, for transferring articles from one elevation onto article transport means at a lower elevation, and operable to accomplish the above-noted tasks.

Another object of the invention is to provide such novel apparatus wherein the transport means includes a power-driven discharge conveyor for moving articles off the elevator and onto the transport means at a lower elevation, thus permitting economy of space. This construction also allows the transport means to travel under the elevator and move in a direction parallel to the direction ofarticles discharged from the elevator.

Yet another object is to provide such novel apparatus wherein the elevator means includes a power-driven discharge conveyor for moving articles off the elevator and onto the transport means at a lower elevation, thus permitting economy of space. This construction also allows the transport means to travel under the elevator and move in a direction parallel to the direction of articles discharged from the elevator.

A further object is to provide apparatus including a novel tiltable elevator which is mounted on an upright support frame by a pair of vertically spaced rollers at each side of the elevator, which rollers engage upright guide rails on the support frame. The rollers in a pair engage opposite sides of a guide rail to provide rolling contact during vertical shifting of the elevator and to permit tilting of the elevator in one direction only. Generally, such tilting would be to incline the elevator toward its discharge end so that gravity may assist in the discharge of articles therefrom.

Still another object is to provide such apparatus wherein the elevator is raised and lowered by overhead power-driven tensioning means fastened to opposite sides of the elevator. With the elevator being supported adjacent its opposite sides, a stable support deck is provided. Further, with the means for raising and lowering the elevator being overhead free passage is provided for subjacent transport means and the apparatus may be mounted fully above floor level.

These and other objects and advantages will become more fully apparent from the following description read in conjunction with the drawings, wherein:

FIG. 1 is a schematic plan-view of article-handling equipment adapted for stacking and palletizing cartons, and incorporating transfer apparatus constructed according to the invention;

FIG. 2 is an enlarged side elevation taken generally along the line 2-2 in FIG. 1, of transfer apparatus contemplated herein, with portions broken away;

FIG. 3 is a view taken generally along the line 3-3 in FIG. 2, with portions broken away;

FIG. 4 is a view taken generally along the line 4-4 in FIG. 2, somewhat enlarged in scale and with a portion broken away;

FIG. 5 is a cross-sectional view taken generally along the line 5-5 in FIG. 4;

FIG. 6 is a view taken generally along the line 6-6 in FIG. 5, with portions broken away;

FIG. 7 is a view, somewhat enlarged, taken generally along the line 7-7 in FIG. 4; and

FIG. 8 is a fragmentary detail view illustrating an elevator in the transfer apparatus in an inclined attitude over a cart and pallet which are positioned to receive a load from the elevator.

Referring now to the drawings, and first more specifically to FIG. 1, at 10 is indicated generally a portion of article-handling equipment adapted to receive multiple cartons and to form them into multiple-tiered unitized loads. The apparatus includes a pair of stacking conveyors generally at 12, 14 and a main line conveyor, indicated generally at 16. The stacking conveyors include apparatus, to be described in greater detail below, which is adapted to receive multiple cartons at infed ends 12a, 14a, of the stacking conveyors, stack these cartons in multiple-tiered unitized loads, and discharge them at offbearing ends 12b, 14b, respectively, onto the main line conveyor 16. The main line conveyor, as will be described in greater detail below, is adapted to receive such unitized loads, place them on pallets and transfer them to transport means, which underlies the main line conveyor adjacent the left-hand portion of conveyor 16 in FIG. 1. The transport means then moves the loads away from the main line conveyor.

While stacking conveyors 12, 14 are substantially similar, only a single carton feedline 18 is indicated being fed onto the infed end of conveyor 12 while two carton feedlines 19, 20 are indicated feeding onto the infed end of conveyor 14. Due to the substantial similarity between the two, only stacking conveyor 14 will be described in detail.

Cartons, to be stacked in a unitized load are fed to the infed end 14a of the conveyor by feedlines 19 and 20. Selectable stop means 21 at infed end 14a is operable to regulate the flow of cartons onto the stacking conveyor.

A converging and conveying section 22 is operable to receive cartons from lines 19, 20, channel them into single file, and transport them to a turning section 24. The turning section is operable selectively to turn individual cartons 90° in a horizontal plane from the position in which they enter the turning section. A second turning section 26 downstream from section 24 is adapted to receive cartons from turning section 24 and selectively to collect and turn pairs of cartons 90° from the position they have on entering this second turning section.

A lateral transfer section 28 is positioned downstream in the stacking conveyor from turning section 26. Section 28 is adapted to collect and form a presellected number of cartons into a compact group, which is rectangular when viewed in plan.

The elevator deck 30 adjacent section 28 is adapted to receive such a rectangular group of cartons from section 28 and transport the group to a stacking section 32. The elevator deck is of conventional design, being adapted to lift previously received groups of cartons and deposit a newly received group thereunder to form a stack, and should be known to those skilled in the art.

Explaining briefly the operation of such a stacking conveyor, cartons to be stacked in a multiple-tiered unitized load are fed from feedlines 19, 20 onto section 22 with the flow of such cartons onto section 22 being controlled by the selectable stop means 21. Section 22 conveys the cartons toward turning section 24 and during conveying aligns them as required for entry into the turning section. A carton conveyed to turning station 24 is either allowed to pass through as it is presently aligned or is turned by the turning section 90° in a horizontal plane. Whether or not the carton is turned at section 24 is determined by the actions of suitable control and sensing means which determine the needed orientation for a carton as it progresses in a downstream direction in the stacking conveyor. Cartons are then conveyed from section 24 to the turning section 26 wherein, through the operation of suitable sensing and control means, selected pairs of cartons are collected and turned 90° from the position in which they entered the second turning section. The turning of selected ones and selected pairs of cartons in the turning sections is accomplished to place the cartons in proper orientation,
whereby a preselected number of cartons may be formed into a compact, rectangular group as they are conveyed onto lateral transfer section 28.

Lateral transfer section 28 not only collects and forms a preselected number of cartons into a rectangular group, but it also aligns such a group with elevator deck 30, on which the group is then transferred. As has been previously described, elevator deck 30 receives successive rectangular groups from transfer section 28, lifting previously received groups and depositing newly received groups thereunder, to form a stack on stacking section 32. Successive groups of cartons are stacked one upon another on section 32 until the desired stack height of cartons is obtained. A formed stack, also referred to herein as a multiple-tiered unitized load, is then fed from the offbearing end 140 onto main line section 16. Suitable sensors and control mechanism are provided adjacent the offbearing end of each stacking conveyor, whereby loads transferred from a stacking conveyor onto the main line conveyor do not interfere with loads from other stacking conveyors.

Main line conveyor 16 is adapted to support loads received from the stacking conveyors above floor elevation and transports the loads to the left, in a downstream direction, in FIG. 1. The main line conveyor includes a squaring-up section 36 adapted to shift a load laterally on the conveyor and against a vertical, elongated backing plate 38 to assure that various layers of cartons in the load are properly aligned, one above the other. A palletizing section 40, positioned downstream in the conveyor 16 from squaring-up section 36, is adapted to place a load on and glue it to a suitable underlying sheet-type pallet.

A lateral positioning section 42 is disposed downstream from palletizing section 40 and is adapted to move a palletized stack laterally on the main line conveyor and against a backing plate 44 to insure that the load is properly positioned on the conveyor for subsequent operation. A generally apparatus for receiving a load from the downstream end of lateral positioning section 42 and for delivering such a load onto transport mechanism 48 is adapted, in turn, to move a load away from the downstream end of main line conveyor 16.

A conveying line 16, a unitized load received therefrom of one from the stacking conveyors is first moved in a downstream direction to section 36, where it is moved laterally against backing plate 38 to align layers of cartons in the load. The load is then moved on to palatezing section 40 at which its underside is glued to a sheet-type pallet, and then it is passed on to lateral positioning section 42, where it is moved laterally against backing plate 44. The load is then conveyed onto apparatus 46 which transfers it onto transport mechanism 48 for moving the load away from the main line conveyor. Suitable sensors and controls are provided along main line conveyor 16 whereby loads are maintained in a spaced relationship along the conveyor, so that each section in conveyor 16 is operating on a load without interference from other loads on the conveyor.

Referring now to FIG. 2, the downstream end of lateral positioning section 42 includes a series of parallel, laterally spaced load support rollers 52, (shown in dotted outline) all of which have their upper surfaces lying within a substantially common plane. These rollers are supported in a frame above floor level which is indicated at 54.

The transport mechanism 48, as is seen in FIGS. 1 and 2 includes a pair of tracks 60 secured to floor 54 and a series of cars 64 which run on the tracks. The tracks enter the region underlying main line conveyor 16 between palletizing section 40 and lateral positioning section 42 and extend parallel to conveyor 16 to a region some distance downstream from apparatus 46. A horizontal power-driven roller chain 62 runs between tracks 60, as is seen in end view in FIG. 3 and as is indicated by the dashed line and arrowheads in FIG. 1. Each cart 64 (as seen in FIG. 2) has a substantially horizontal platform 68 on which is supported a raised, removable pallet 70. Adjacent the forward end, or at the right of each cart in FIG. 2, is a bumper 72 which extends upwardly from platform 68 to a region above the top of a pallet 70. Chain-engage means indicated generally at 76 secured to the cart adjacent its front end is operable to hook onto roller chain 62, whereby a cart is moved by the chain along tracks 60. Suitable control mechanism is provided for selectively connecting and disconnecting the chain-engaging means from the roller chain, whereby each cart is moved or halted as required in operation of the apparatus. Each cart is adapted to receive a unitized load thereon and to transport it along a path, defined by the path of movement of the top of a pallet 70, at a lower elevation than that at which it is moved along conveyor 16.

It should be understood that the cart system described is only one type of transport mechanism which could be used. Roller- or belt-type conveyors, or other transport means, may be used also to transport unitized loads from such stacking and palletizing apparatus.

Referring now to FIGS. 2 and 3 it will be seen that the apparatus 46 for transferring loads from conveyor 16 onto a cart 64 includes, in broad terms, an upright frame 86 on which is mounted a vertically shiftable elevator 90. Frame 86 is supported on the floor and includes a pair of laterally spaced, upright, hollow posts 92, 94 and a crossbeam 96, which is secured to posts 92, 94 at their upper ends (see FIG. 3). The posts 92, 94 straddle tracks 60 and the path for carts 64.

A pair of spaced-apart, upright elongated guide rails 100 are secured to opposite lower sides of posts 92, 94, respectively. Opposed vertical surfaces of each guide rail occupy spaced upright planes, with one surface on a rail facing the upstream end of the elevator and the other surface facing its downstream end.

Each side post also has secured thereto one of a pair of substantially horizontal support beams 102. Each beam 102 is spaced above the floor and parallels tracks 60. A pair of opposed, flange-connected, elongated channels 104, seen only in end view in FIG. 2, form a crossmember which extends between, is secured to and interconnects the upstream, or left, ends of spaced support beams 102. A pair of legs, such as the one illustrated at 108 in FIG. 2, is secured to the lower one of the channels 104, and extends downwardly therefrom to support the upstream end of the frame above the floor. A pair of legs, such a that illustrated at 110, is secured to and extends downwardly from the downstream, or right, ends of support beams 102 to support them above the floor.

Referring now to FIGS. 4 and 5, elevator 90 includes a pair of parallel, spaced-apart, elongated sideplates 114 which extend the full length of the elevator. These sideplates are interconnected and held in their spaced relation by connecting beams 116, which are seen only in cross section in FIG. 5.

A series of elongated, parallel, laterally spaced-apart rolls 120 extend between sideplates 114. The rolls are journaled adjacent their ends on the sideplates for rotation about substantially horizontal axes extending normal to sideplates 114. Rolls 120 all have equal outer diameters.

Most of rolls 120 have a sprocket 122 secured thereto adjacent one side of the elevator. As is seen in a broken away portion of FIG. 4, sprockets on adjacent rollers are offset from each other to avoid interference therebetween.

A motor 126 is connected by a drive chain 128 to roll 120 which is nearest the receiving, or left, end of the elevator. A side-by-side double drive chain 130 drivingly connects the sprockets on this roll to the sprockets on the remainder of the rolls, whereby operation of motor 126 the majority of rolls 120 are rotated under power.

Another series of elongated, parallel, spaced rolls 134 are journaled on and extend between plates 114 to the right of rolls 120 in FIGS. 4 and 5. Rolls 134 have equal outer diameters which are less than those of rolls 120. Double sprockets 136 are secured to each of rolls 134. Double sprocket 138, of greater diameter than sprockets 136, is secured to the roll 120 which is farthest to the right in FIG. 4. A double drive chain 140 trained over sprockets 138 and 136 drives roller 134 in
the same direction as rolls 120 on operation of motor 126. The relative size of sprockets 136, 138 are such that rolls 134 rotate with the same tangential speed as do rolls 120 (see FIG. 7).

To the right of rolls 134 in FIGS. 4 and 5 are two idler rolls 135, 137 which are journaled on plates 114.

As is seen in FIG. 5, the upper surfaces of rolls 120, 134, 135, 137 lie in a substantially common plane P1, and define a support deck herein for the elevator. The rolls defining the support deck are adapted to receive a unitized load at the receiving, or left, end of the elevator in FIGS. 4 and 5 and, upon operation of motor 126, to convey the load toward the discharge, or right, end of the elevator.

Positioned beneath rolls 134, 135, 137 are a series of non-powered, substantially parallel, laterally spaced-apart, elongated rolls 144 which extend between sidesplates 114 and are journaled on the sidesplates. The lower surfaces of rolls 144 lie within a substantially common plane P2 which, with the elevator in the position shown in FIG. 5, is at an angle to the horizontal. The plane occupied by these lower surfaces of rolls 144 converges toward the plane occupied by the upper surfaces of rolls 120, 134 and intersects the plane along a substantially horizontal line L adjacent the discharge end of the elevator.

The ends of sidesplates 114 adjacent the discharge end of the elevator are interconnected by a multiple-plate apron 146 including stacked plates 146a, 146b, 146c which extend between and are secured to plate 114. As seen in FIG. 5, the upper surface of plate 146a lies in plane P1. The right-hand edges of the bottom faces of plates 146a, 146c in FIG. 5 lie in plane L.

The elevator is mounted for vertical movement on frame 86 by a pair of carriages 150, 152 at opposite sides of the elevator. The carriages are similar in construction and, thus, only that indicated at 152 will be described in detail. Referring to FIGS. 4, 5, and 6, a carriage includes a vertical plate 160 which is secured to and extends both above and below a sidesplate 114 of the elevator. A pair of inclined members 166 are secured to sidesplate 114 and project upwardly therefrom along plate 160, converging progressing upwardly. Members 166 are secured, as by welding, to member 160 and are connected to each other by a lug 168 which extends between their upper ends.

An opening 172 extends through plate member 160. A mounting bracket 174 is welded to one of inclined members 166 and is positioned on the inner side of plate member 160 between the two inclined members. Bracket 174 supports a roller 176 which is rotatable on an axis parallel to sidesplate 114 of the elevator, with a portion of roller 176 protruding through opening 172 to rest against guide rail 100 (see FIG. 6). This roller and a similar one on the opposite carriage support the elevator against lateral movement.

A roller 180 is journaled on the outer side of plate member 160 adjacent the upper margin of the plate member for rotation about an axis parallel to the axis of rolls 120 on the elevator. Roller 180 engages the upright side of guide rail 100 which faces the discharge end of the elevator. Another roller 182 is journaled on the outer side of plate member 160 adjacent its lower margin for rotation about an axis parallel to the axis for roller 180. Roller 182 is positioned to engage the opposite side of guide rail 100. With rollers 180, 182 properly positioned and resting against their respective sides of guide rail 100, the support deck of the elevator is substantially horizontal.

Vertical dot-dash line 184 in FIGS. 2 and 5 extends through the center of gravity (C.G.) of elevator 90. With the center of gravity positioned upstream from rolls 180, 182 the elevator is urged to rotate in a counterclockwise direction, as viewed in these two figures, which is resisted by rollers 180, 182 engaging opposite sides of guide rail 100.

A pair of chains 186, 188 (see FIG. 3), also referred to herein as elongated trainable tensioning means, have spaced-apart ends 186a, 188a which are connected to lugs 168 on carriages 150, 152, respectively, through shackles 190. With the elevator positioned as shown in FIGS. 2, 4, and 5, the ends 186a, 188a lies between the upright planes occupied by the opposed surfaces of guide rail 100. As is seen in FIGS. 2, and 3, these chains extend upwardly from their associated carriages, are trained over spaced-apart sprockets 192 mounted atop frame 86, and then extend downwardly into the hollow interior of side post 92. Within side post 92 the chains are trained over a pair of ganged sprockets 194 and thence extend upwardly to attach at their other set of ends 186b, 188b to frame 86 through a pair of slack takeup means 198. Each slack takeup means 198 may be adjusted either to take up or let out slack in chains 186, 188 whereby the elevator support deck may be leveled in a side to side orientation.

As is seen in FIGS. 2 and 3, ganged sprockets 194 are mounted on a common bracket 200. Bracket 200, in turn, is secured to the downwardly projecting rod end of a vertical, power-actuated ram, or motor, 204 which has its cylinder end secured to frame 86. Extension of ram 204 tensions chains 186, 188 to raise elevator 90 while retraction of the ram lowers the elevator.

In FIG. 2, elevator 90 is illustrated in solid outline in its raised position, with the rolls defining the support deck for the elevator positioned substantially horizontal and aligned with rolls 52 in transfer conveyor section 42. An intermediate powered conveyor section 206 is supported on channel members 104 to provide a bridge across which unitized loads may pass from transfer conveyor 42 onto the elevator.

With frame 86 straddling the path for the carts and the elevator being raised and lowered from an overhead support the carts are permitted from movement under the elevator. Further, the double chain lift mechanism produces even lifting of both sides of the elevator and inhibits binding in the apparatus.

As is seen in FIGS. 2, 4 and 5, a horizontal pin 210 substantially paralleling rolls 120, is secured to the elevator adjacent its receiving end and projects laterally outwardly beyond sidesplates 114. Vertically adjustable stop brackets 212, shown in FIG. 2, are secured to legs 108 adjacent the receiving end of the elevator and define upwardly facing sockets adapted to receive the end ports of pin 210. On lowering of the elevator the end portions of pin 210 are received in the upwardly facing sockets to prevent further downward movement of the receiving end of the elevator. A substantially horizontal rock axis 213 which extends transversely of the elevator is provided for the elevator by pin 210 and brackets 212. Further lowering of the elevator, below the point at which pin 210 engages bracket 212, causes the elevator to rock about such axis toward the attitude shown in dot-dash outline in FIG. 2 where its discharge end is lower than its receiving end. Such rocking is permitted by the novel mounting of the elevator on guide rail 100 through rollers 180, 182. Explaining further, as the elevator is lowered and inclines toward its discharge end either one, or both, of rollers 180, 182 on both sides of the elevator are permitted to disengage from rail 100, while pin 210 remains seated in bracket 212.

Referring to FIGS. 4 and 5, it will be seen that a pair of plates 214 project laterally outwardly from opposite sides of sidesplates 114 adjacent the discharge end of the elevator. Vertically adjustable stop brackets 216 are secured to legs 110 of frame 86 beneath plate 214 on the elevator and engage stop plates 214 to prevent the discharge end of the elevator from lowering beyond a predetermined elevation.

With the elevator in its lowered and inclined position (dot-dash outline in FIG. 2, and solid outline in FIG. 8), the undersides of rollers 144 and the edges of plates 146b, 146c mentioned, lie in a substantially horizontal plane, preferably at an elevation slightly above the elevation of the top of a pallet 70. This orientation results from the fact that working of the elevator between its raised and lowered positions takes place through an angle which is substantially the same as the angle between planes P1, P2. Thus, with the elevator inclined and lowered, its support deck (lying in plane P2) occupies an angle
relative to the horizontal which is substantially the same as the angle between the planes.

Explaining the operation of the load transfer apparatus, and referring to FIG. 2, a load such as that indicated at 220a is connected from section 42 onto the support deck of elevator 90 with the elevator in its raised position. A cart carrying a pallet, is moved into a position as shown under the elevator with its forward bumper slightly downstream from the discharge end of the elevator. Thereupon, the elevator disengages from roller chain 62. Elevator 90 is then lowered until it assumes the position shown in dot-dash outlines and the load is in the position shown in dot-dash outline generally at 220b. In this lowered position, the discharge end of the elevator rests closely adjacent the upper surface of pallet 70. Rolls 120, 134 are then rotated by motor 126 to shift the load off onto the pallet. As the load is moved off the elevator under power the downstream edge of the load contacts bumper 72 and forces the cart to move downstream at a speed corresponding to the speed of the load coming from the elevator. Should the pallet be too tall to pass freely beneath roller 144, these rollers will engage the top of the pallet and provide rolling contact to accommodate movement of the cart and pallet under the elevator.

Once the load has been fully discharged onto the pallet, suitable control means reconnects the cart with roller chain 62 to move the cart and its load away from the elevator. Elevator 90 is then raised by extending ram 204, whereby the elevator is made ready to receive another load. Since the center of gravity of the elevator is spaced toward the infeed end from rollers 180, 182, as the elevator is raised gravity causes it to rotate from its inclined attitude to the substantially horizontal attitude illustrated in solid outline in FIG. 2. Another cart then may be moved into position under the elevator ready to receive a load.

Suitable load sensors and control means are provided for the load transfer apparatus, and the transport mechanism, whereby they operate in proper sequence.

While an embodiment of the invention has been described, obviously changes and variations are possible without departing from the invention.

I claim and desire to secure by Letters Patent:

1. For use with article transport means defining at one elevation a path of travel for an article, apparatus for receiving an article at another elevation which is above said elevation and for delivering the same to said transport means at said other elevation, the apparatus comprising
   a frame including a pair of spaced upright posts straddling said path,
   elevator means having a support deck disposed between said posts and means mounting said elevator means for vertical movement on said posts above said path, said mounting means accommodating rocking of said elevator means about a substantially horizontal rock axis extending transversely of said path, such rocking being effective to adjust said elevator means between one attitude with its deck substantially horizontal and another attitude with its deck inclined, said elevator means above a certain elevation which is above said one elevation being maintained under the influence of gravity acting thereon in said one attitude,
   power-operated means operatively connected to said elevator means adjustable to raise and lower the same, and
   pivot means effective with said power-operated means adjusted to lower said elevator means below said certain elevation to produce rocking of the elevator toward its said other attitude.

2. The apparatus of claim 1, wherein said mounting means comprises a pair of elongated guide means, with one on each post, and a pair of carriages joined to opposite sides of said elevator means with each supported for movement along a different one of said guide means.

3. The apparatus of claim 2, wherein, considering each guide means and its associated carriage, the guide means comprises an upright rail, and the carriage comprises a pair of rollers at different elevations disposed on opposite sides of said rail.

4. The apparatus of claim 3, wherein said opposite sides of a rail occupy upright planes that extend transversely of said path, the upper roller in the pair of rollers on one carriage and the upper roller in the pair on the other carriage are disposed adjacent one set of corresponding sides of said upright rails, and the lower rollers are disposed adjacent the other set of corresponding sides, and said elevator means is constructed with its center of gravity spaced on the opposite side of said lower rollers from said guide means.

5. The apparatus of claim 4, wherein said rollers engage said opposite sides of said rails with the elevator means occupying its said one attitude.

6. The apparatus of claim 1, wherein said power-operated means comprises elongated trainable tensioning means operatively connected to and extending upwardly from said elevator means, and motor means drivenly connected to said tensioning means.

7. The apparatus of claim 6, wherein said tensioning means comprises a pair of elongated chains having one set of spaced-apart ends fastened adjacent opposite sides of said elevator means.

8. The apparatus of claim 7, wherein said chains have another set of ends fastened to said frame, and said chains extend from said other set of ends toward a common drive member which is driven by said motor means.

9. The apparatus of claim 4, wherein said power-operated means comprises a pair of elongated motor-driven chains having one set of spaced-apart ends fastened adjacent opposite sides of said elevator means at points intermediate said upright planes with the elevator means in its said one attitude, and with the chains extending upwardly from said one set of ends.

10. The apparatus of claim 1, wherein said pivot means comprises an elongated substantially horizontal pin mounted on said elevator means, and means anchored to said frame defines an upwardly facing socket for freely receiving said pin.

11. The apparatus of claim 10, wherein said pin received within said socket the longitudinal axis of the pin coincides with said rock axis.

12. The apparatus of claim 4, wherein said pivot means comprises an elongated substantially horizontal pin mounted on said elevator means at a location spaced on the opposite side of said center of gravity from said rollers, and means anchored to said frame defines an upwardly facing socket for freely receiving said pin.

13. The apparatus of claim 10, wherein said elevator means has receiving and discharge ends and in its said other attitude is oriented with its said support deck sloping downwardly toward said discharge end, said pin is located adjacent said receiving end, and stop means is mounted on said frame adjacent said discharge end and is positioned to provide vertical support for said discharge end with said elevator means in its said other attitude.

14. The apparatus of claim 1, wherein said elevator means has receiving and discharge ends, and comprises a pair of elongated laterally spaced sideplates extending between such ends and power-driven conveyor means mounted on and disposed between said sideplates operable to transport an article in a direction from said receiving end toward said discharge end.

15. The apparatus of claim 14, wherein said conveyor means comprises a first set of elongated, spaced, substantially parallel rolls whose top sides occupy a common plane and define said support deck.

16. The apparatus of claim 15, which further comprises a set of elongated, spaced, substantially parallel nonpowered rolls mounted on and extending between said sideplates at an elevation which is below the rolls in said first set of rolls with the bottom sides of said nonpowered rolls occupying another common plane that intersects said first-mentioned common plane, along a substantially horizontal line adjacent the discharge end of said elevator means.
17. The apparatus of claim 16, wherein, viewing said elevator means in side elevation, the angle between said common planes is substantially the same as the angle between said support deck and the horizontal with said elevator means in its said other attitude.

18. The apparatus of claim 16, wherein the rolls in said first set have substantially the same outer diameters, said non-powered rolls are located toward the discharge end of said elevator means from the rolls in said first set, and said conveyor means further comprises a second set of elongated, spaced, substantially parallel rolls mounted on and extending between said sideplates at a location directly over said non-powered rolls, the rolls in said second set being substantially parallel to the rolls in said first set and being positioned with their top sides occupying said first-mentioned common plane, and having outer diameters which are smaller than those of the rolls in said first set.

19. The apparatus of claim 18, wherein there is a motor drivingly connected to the rolls in the first set and connecting means drivingly connecting the rolls in said second set to those in said first set, said connecting means being constructed to drive the rolls in said second set with substantially the same tangential velocity as that of the rolls in said first set.

20. The apparatus of claim 1, which is for use in conjunction with package stacking and palletizing equipment having a discharge end at said other elevation, and with said apparatus being positioned whereby its said elevator means is adapted to receive an article from such discharge end.