July 19, 1955 E. A. VERRINDER 2,713,430

STACK CONTROLLING OVERHEAD BELT BOX DUMPERS

Filed July 28, 1950 5 Sheets-Sheet 1

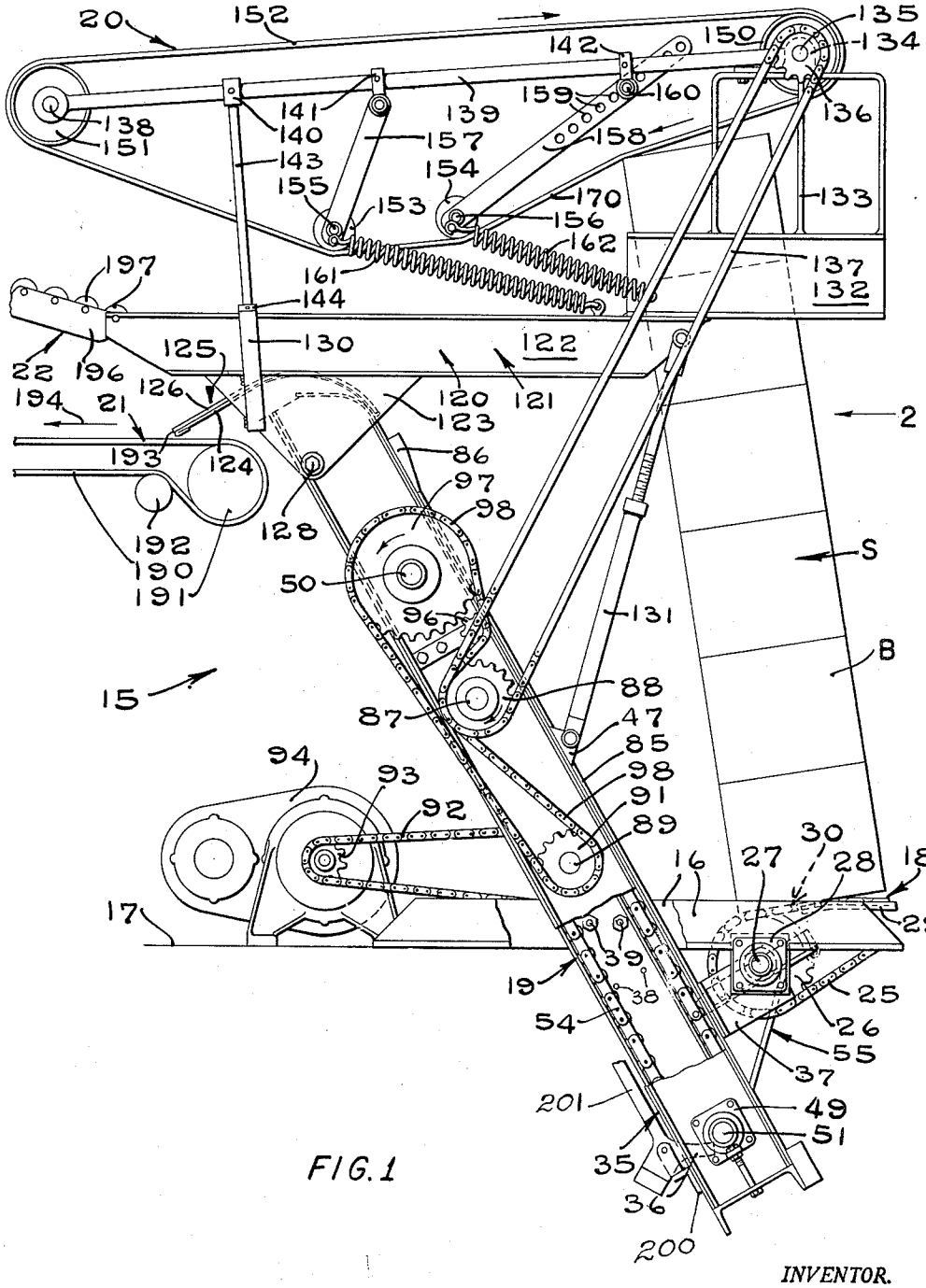


FIG. 1

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STACK CONTROLLING OVERHEAD BELT BOX DUMPERS

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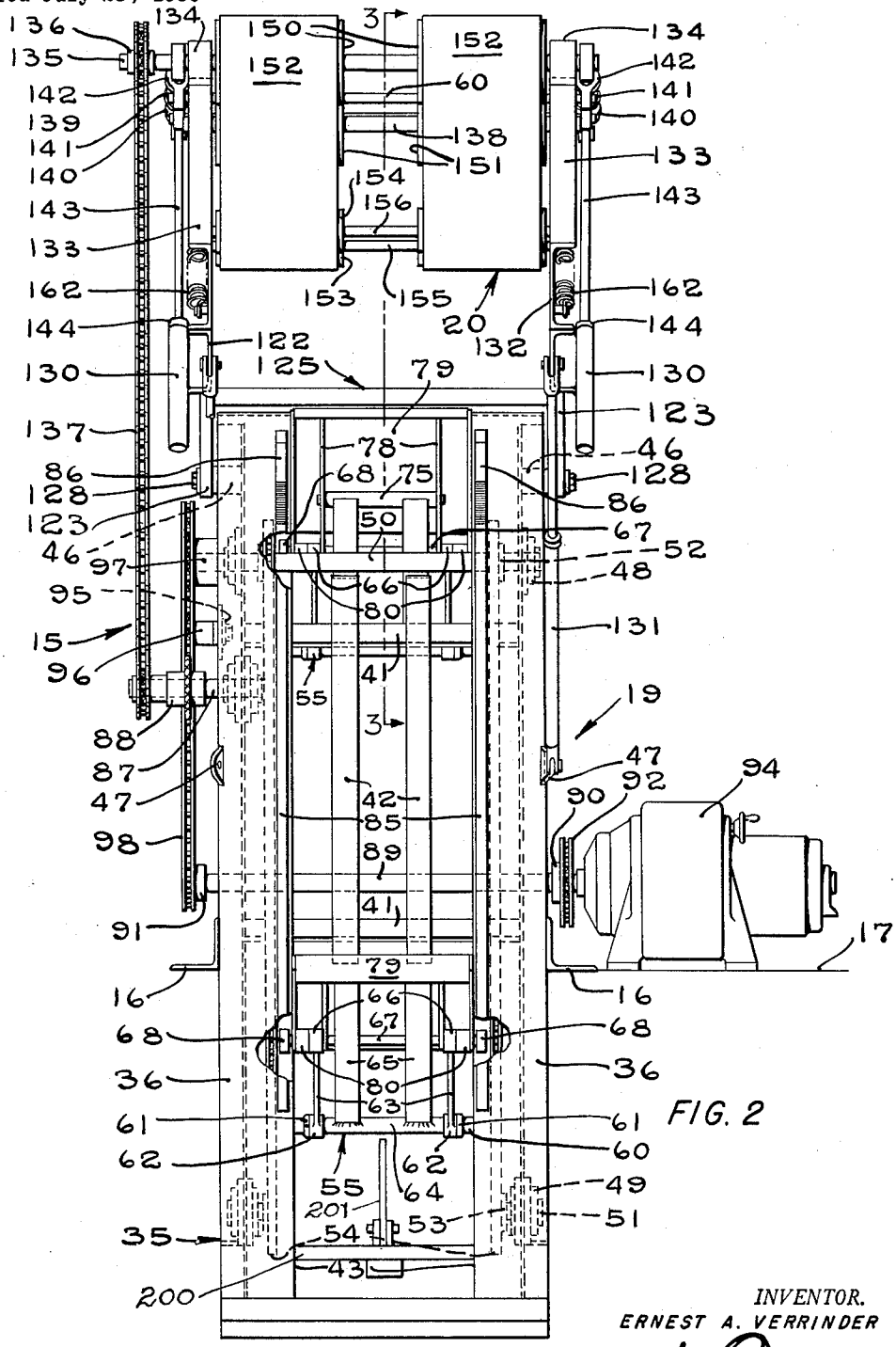


FIG. 2

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STACK CONTROLLING OVERHEAD BELT BOX DUMPERS

Filed July 28, 1950 5 Sheets-Sheet 3

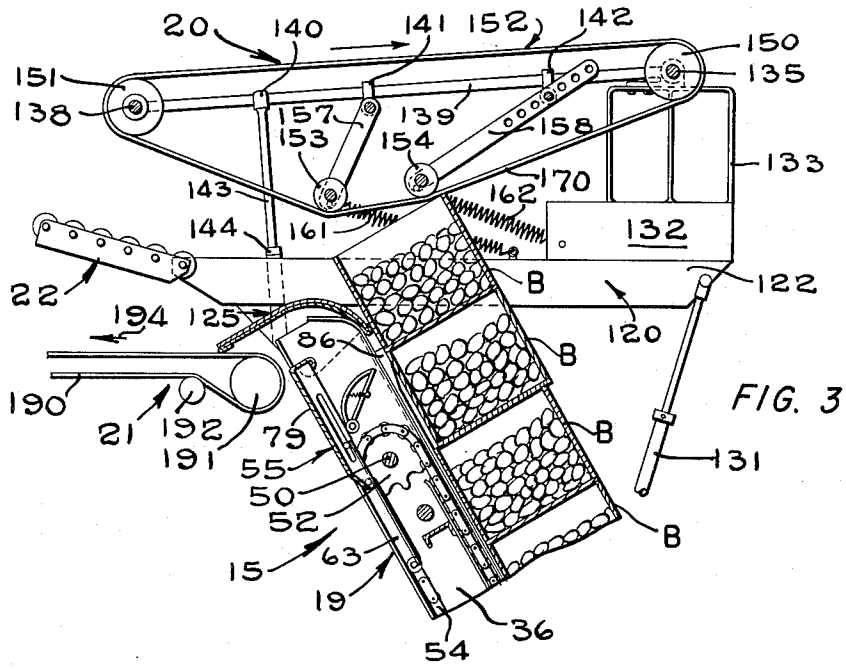


FIG. 3

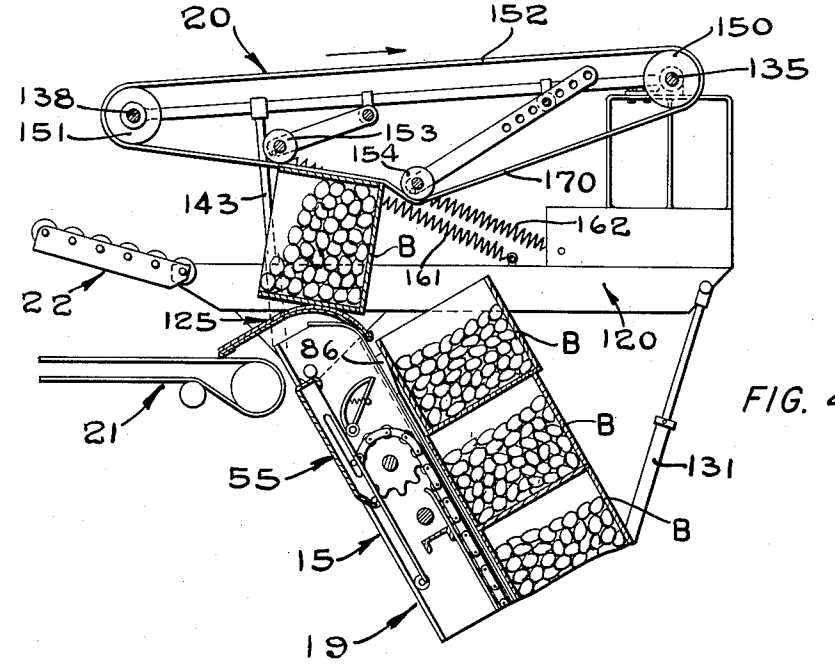


FIG. 4

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STACK CONTROLLING OVERHEAD BELT BOX DUMPERS

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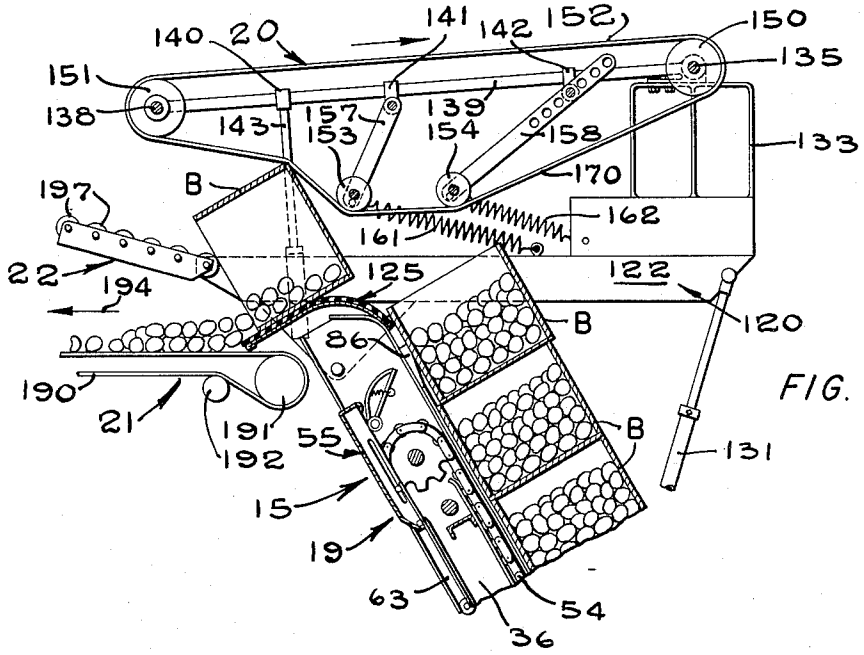


FIG. 5

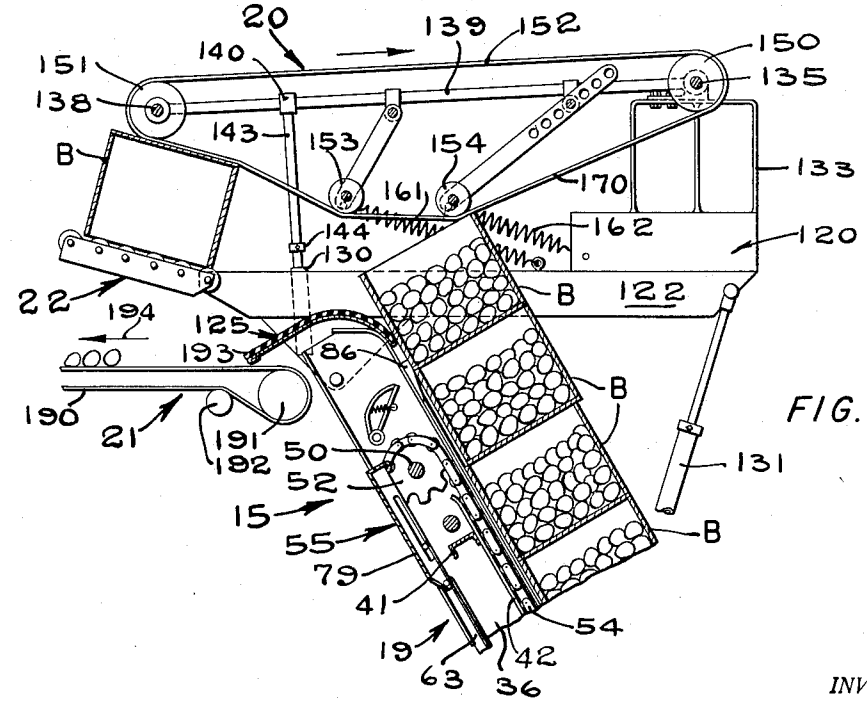


FIG. 6

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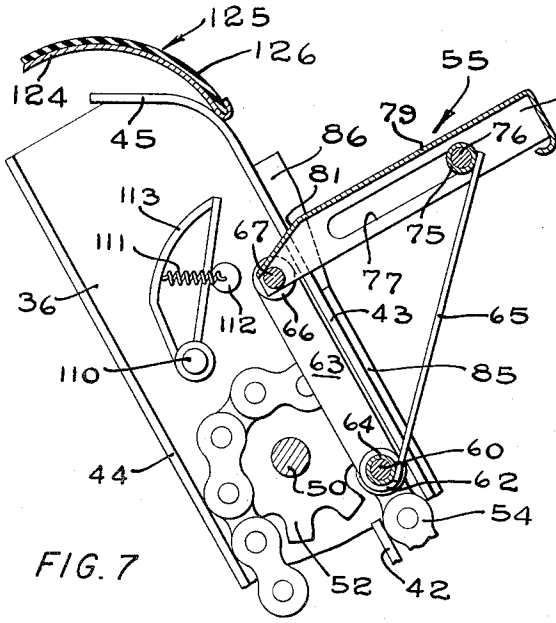


FIG. 7

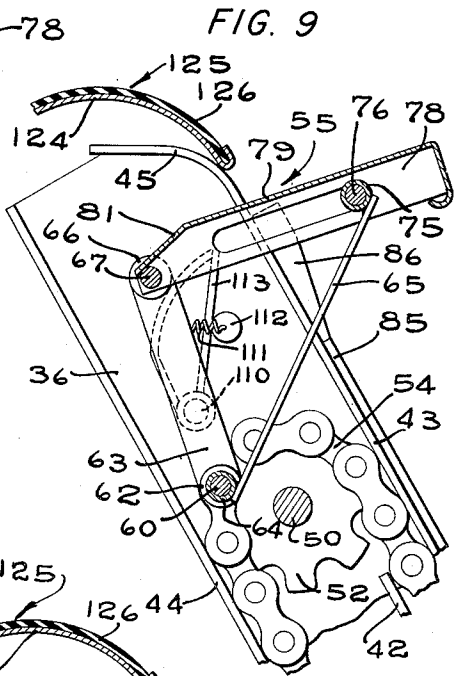


FIG. 9

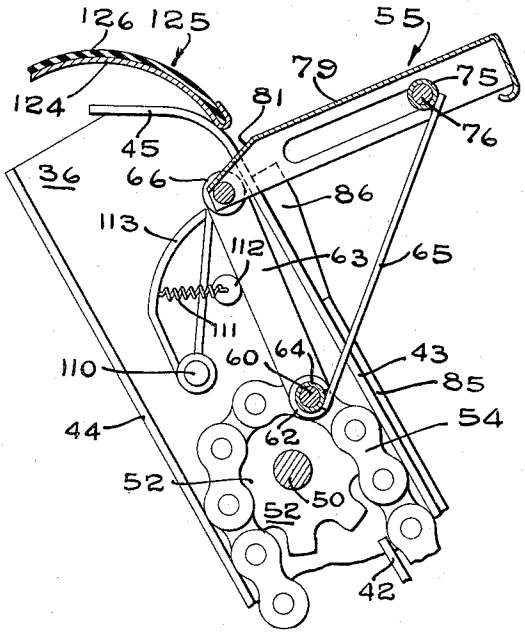


FIG. 8

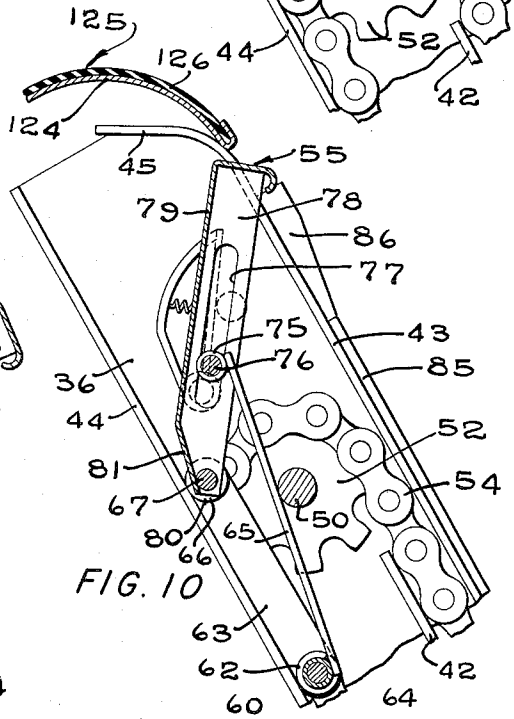


FIG. 10

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United States Patent Office 2,713,430 Patented July 19, 1955

2,713,430

STACK CONTROLLING OVERHEAD BELT BOX DUMPERS

Ernest A. Verrinder, Riverside, Calif., assignor to Food Machinery and Chemical Corporation, San Jose, Calif., a corporation of Delaware

Application July 28, 1950, Serial No. 182,924

10 Claims. (Cl. 214—306)

This invention relates to the art of handling a product in bulk in open top boxes and is particularly useful in dumping the contents from such boxes.

This application covers an improvement in the box dumper shown in my co-pending application for U. S. Letters Patent Serial No. 168,789 filed June 17, 1950. In that application I disclosed an overhead belt box dumper for dumping stacks of boxes in which a stack was lifted at a fairly steep angle to a device for dumping each box in the stack at a relatively high level above the floor along which the stacks were fed into the machine.

A distinguishing feature of the invention disclosed in said co-pending case was the employment of an overhead belt which the boxes of the rising stack successively engaged. This belt rolled each box engaged thereby over an arched fulcrum plate to dump the contents from the box and to deliver the box, thus emptied, onto an empty box conveyor.

In packing houses, canneries and the like, it is often an advantage to be able to dump the loose product from the boxes of stacks delivered in upright position to the machine at a somewhat lower point than heretofore found practical for stacks so delivered.

It is accordingly an object of the present invention to provide an overhead-belt box dumper which is adapted to receive vertical stacks of boxes brought thereto on a horizontal floor track and dump the contents from the boxes so that said contents leave the box at a substantially lower level than has hitherto been possible with stack dumpers to which stacks are fed in this manner.

A further object is to provide such an overhead-belt stack dumper which is readily adjustable to vary the level at which the contents of the individual boxes are dumped therefrom.

It is another object of this invention to provide an overhead-belt stack dumper in which the overhead belt frictionally engages the uppermost box of a stack being fed into the machine and maintains such engagement so as to control the tilting of said stack towards a reclining position against the stack elevator of the machine, thereby permitting said elevator to be inclined at a substantially greater angle from vertical than previously possible, and at the same time accomplish the dumping of each box at the upper end of the elevator by engagement of said belt therewith.

The manner of accomplishing the foregoing objects, as well as further objects and advantages, will be made manifest in the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevational view of a preferred embodiment of the stack controlling overhead belt box dumper of this invention showing the overhead belt controlling the tilting of a stack.

Fig. 2 is a front elevational view of Fig. 1 taken in the direction of the arrow 2.

Fig. 3 is a fragmentary diagrammatic sectional view, of reduced scale, taken on the line 3—3 of Fig. 2 and

illustrating a step in the operation of the invention closely following the step illustrated in Fig. 1.

Fig. 4 is a view similar to Fig. 3 showing a step in the operation of the invention just in advance of that shown in Fig. 3, and in which the uppermost box of the stack is being readied over the dumping fulcrum to dump the contents therefrom.

Fig. 5 is a view similar to Fig. 4 and illustrating a further advance step in the box dumping operation wherein the box has been rolled and the engagement with the empty box conveyor.

Fig. 6 is a view similar to Fig. 5 and illustrates a still further advance step in the dumping operation in which the completely empty box has been delivered onto the empty box conveyor and showing the overhead belt rig strung upwardly to accommodate the discharge of the empty box onto the empty box conveyor.

Fig. 7 is an enlarged fragmentary operational view taken on the line 3—3 of Fig. 2 of a stack lifting cradle preferably employed in the stack elevator of the invention, this view showing the cradle as it approaches its uppermost position.

Fig. 8 is a view similar to Fig. 7 and illustrates said cradle as it bypasses roller traps just before it reaches its uppermost position.

Fig. 9 is a view similar to Fig. 8 illustrating a still further advanced stage in the progress of the elevator cradle as it turns about the elevator drive shaft at the upper end thereof.

Fig. 10 is a view similar to Fig. 9 and illustrates said cradle being cammed into its fully retracted position by engagement with said drive shaft.

Referring specifically to the drawings, the invention is therein shown as embodied in a stack conveying and elevating, and box dumping apparatus **15**, which is mounted on a main frame comprising a pair of heavy angle iron members **16**, supported on a floor **17**. The apparatus **15** includes a stack conveyor **18**, a stack elevator **19**, a stack controlling and box dumping conveyor **20**, a loose product conveyor **21** and an empty box conveyor **22**.

The stack conveyor **18** includes a pair of endless chains **25** which turn around suitable sprockets **26** which are carried on stub shafts **27**, the latter being journaled in bearings **28** mounted on the angle iron member **16**. The chains **25** travel in channel-iron floor tracks **29** which are supported on floor **17** and are, therefore, horizontal. At the delivery end of the chains **25**, the tracks **29** are inclined downwardly towards the pitch line of the sprockets **26** so as to produce a short downwardly inclined section **30**. This is to cause each stack S of boxes B travelling on the stack conveyor **18** to rock towards the stack elevator **19** as this stack is about to be delivered to said elevator, the purpose of this being made clear hereinafter.

The stack conveyor **18** is driven by power applied to the chains **25** thereof under controls which regulate the delivery of stacks S to the elevator **19** so as to deliver each of said stacks in a timed relation with the operation of said elevator in a manner well known in the art and which is not, therefore, described herein in detail.

The elevator **19** comprises a rigid structure or stack elevator frame **35**, including side standards **36** on which are formed bearings **37** which pivot on the shafts **27**, said standards also having bolt holes **38** and being secured to the angle irons **16** by bolts **39** passing through a selected group of the holes **38** so that said angle irons form a base for the structure **35** resting on the floor **17** and supporting the elevator **19**. The selection of that group of the holes **38** through which bolts **39** pass determines the angle between the elevator **19** and the floor **17**. The standards **36** are united in spaced relation

by cross members 41 on which are mounted chain guides 42. The standards 36 also have front and rear inturned guide flanges 43 and 44. Upper ends 45 of the guide flanges 43 turn inwardly as shown in Figs. 3 to 10 inclusive.

Standards 36 are also provided with bearings 46 and lugs 47 the purposes of which will be made clear hereinafter.

Fixed on the standards 36 are upper and lower main bearings 48 and 49, respectively, carrying a drive shaft 50 and stub shafts 51. Fixed on the drive shaft 50 are sprockets 52 while the stub shafts 51 carry sprockets 53. Trained about the sprockets 52 and 53 are endless elevator chains 54 on which are mounted a pair of stack lifting cradles 55.

Each of the cradles 55 includes a shaft 60, opposite ends of which are secured to corresponding fitting links provided in chains 54. Fixed on each shaft 60 are collars 61 which confine on said shaft bearings 62 formed on the lower ends of arms 63 and a sleeve 64 fixed to the lower ends of arms 65, so that said bearings and sleeve are freely rotatable on the shaft 60. The upper ends of arms 63 have bearings 66 which rotatably receive a shaft 67, on the outer ends of which are mounted rollers 68 which travel between and are guided by the guides 42 and flanges 43, which also guide the rising flights of chains 54. The upper ends of arms 65 are welded to a sleeve 75 carrying a shaft 76, the opposite ends of which extend into slots 77 in side walls 78 of a stack platform 79. The walls 78 carry bearings 80 at their rear ends which pivotally receive the shaft 67. The inner face of platform 79 is shaped to form a cam face 81 the purpose of which will be made clear hereinafter.

Applied to the outer faces of the flanges 43 are guide tracks 85 which terminate at their upper ends in cams 86, the purpose of which will be made clear hereinafter.

Also mounted on suitable bearings provided on the standards 36 is a stub shaft 87, carrying a double sprocket 88, and a jack shaft 89 carrying a sprocket 90 on one end and a sprocket 91 on the other. The sprocket 90 is connected by a chain 92 to the drive sprocket 93 of a geared motor unit 94.

An adjustable mounting 95 is provided on one of the standards 36 for an idler sprocket 96. Fixed on the shaft 50 in the same radial plane with the sprockets 91 and 96 and with the inner sprocket of double sprocket 88 is a sprocket 97. Trained about this sprocket and the other sprockets aligned therewith (Fig. 1) to effect rotation of shafts 50 and 87 in opposite directions is an endless chain 98.

Pivoted on pins 110 provided on inner faces of standards 36 near their upper ends and yieldably held by springs 111 against pins 112 on said standards are roller traps 113 (Figs. 7 to 10).

The stack controlling and box dumping conveyor 20 is mounted on a head frame 120 comprising side elements 121 which include channel beams 122, to the lower edges of which are welded triangular plates 123, the latter being united by a transverse arcuate plate 124 of a dumping fulcrum member 125, opposite ends of which plate are welded to plates 123. The plate 124 is preferably covered by a sheet of sponge rubber 126, which is cemented thereto.

The lower corners of plates 123 are pivotally secured by bolts 128 to the bearings 46 formed outwardly from upper ends of the elevator standards 36. Each of the elements 121 also includes tubular sockets 130, the purpose of which will be made clear hereinafter.

Pivotally connected at its opposite ends to the lugs 47 and to the front ends of beams 122 are turnbuckles 131 by the adjustment of which the angular relation between the conveyor 20 and the elevator 19 may be determined. Welded upon the forward ends of beams 122 are beam sections 132 carrying bearing supports 133 on which are mounted bearings 134 in which a shaft 135 is journaled. The near end of shaft 135 as seen in Fig. 1 carries the sprocket 136, which is radially aligned with the outer sprocket of double sprocekt 88 and is connected thereto by an endless chain 137 which is trained about these two sprockets.

Pivotally mounted at their opposite ends on the shaft 135 and a shaft 138 spaced horizontally therefrom are spacer members 139. These carry adjustable collars 140, 141 and 142. Depending from collars 140 are supporting posts 143, the lower ends of which extend into the sockets 130 and carry adjustable collars 144, which may be fixed on these posts in various positions to determine the height to which these posts support the members 139, and the shaft 138 carried thereby, above the upper end of the elevator 19.

Fixed on the shafts 135 and 138 are pairs of spaced pulleys 150 and 151 about which are trained a pair of spaced endless belts 152. Disposed within these belts are a pair of belt tensioning rollers 153 and 154, carried by shafts 155 and 156. Shaft 155 is supported at its opposite ends between lower ends of arms 158 having a series of holes 159 which may be used optionally to receive opposite ends of a shaft 160 which pivotally connects said arms 158 to collars 142. Opposite ends of coiled contractile springs 161 and 162 are attached to the head frame elements 121 and to lower ends of the arms 157 and 158 so as to yieldably press the rollers 153 and 154 downwardly against the lower flights 170 of the endless belts 152.

The loose product conveyor 21 is diagrammatically shown in the drawings in order that adjacent portions of the structure of the invention would not be obscured. This conveyor includes an endless belt 190, which is trained about pulleys 191 and 192, the receiving end of this conveyor extending beneath a discharge edge 193 of the fulcrum 125 and travelling in the direction of the arrow 194 so as to rapidly convey away loose product delivered thereto.

It is to be understood, of course, that the conveyor 21 is provided with side walls (not shown) to keep the loose product on the belt 190 while this product is being conveyed away.

The empty box conveyor 22 comprises a pair of roller conveyor sections 196 which are welded to the channel members 122 and extend inwardly therefrom, these conveyor sections carrying rollers 197 upon which boxes B, emptied of their contents, are adapted to travel open top down.

Provided on rear edges of standards 36 is a cross member 200 having a rocker finger 201 which extends into the path of each descending cradle 55 so as to be swung by the shaft 60 of said cradle and thus engage the cam face 81 thereof and swing the cradle to its forward position in readiness to lift a stack S when it starts upward with the rising flights of chains 54.

Operation

The apparatus 15 is adapted to receive stacks S of boxes B, which stacks are placed in a row upon the stack conveyor 18 and are thereby delivered successively to the elevator 19 as shown in Fig. 1. As the foremost of these stacks enters the sloping end section 30 of the conveyor 18 it rocks forward slightly, with the result that the uppermost box of the stack engages the lower flights 170 of the endless belts 152. As the motor unit 94 is energized at this time, the belts 152 are driven through the chain 137 in the direction indicated by the arrows in Fig. 1. The lower flights 170 of belts 152 are pressed against the upper box B of the stack S by the springs 161 and 162 with sufficient pressure to cause these belts to control the further tilting of the stack S so that this tilting progresses with the uppermost box of the stack remaining in nonslipping engagement with belts 152 until this stack has reached a position in parallelism with and

reclining against the rigid structure 35 of the elevator 19.

The relation of the boxes B of stack S to the elevator 19, at the moment the stack is thus delivered into a position of rest on the elevator structure, is shown in Fig. 3. Here it is seen that the upper two boxes of the stack have engaged the cams 86 provided on the standards 36 so as to effect a shift between these two boxes and the remainder of the stack. The delivery of stack S to the elevator 19 in this manner was timed by the controls heretofore mentioned but which are not shown herein so that one of the cradles 55 is just approaching this stack beneath and rising upwardly to engage the same as shown in Fig. 1, whereas the other of these cradles is just being withdrawn rearwardly out of the way of the incoming stack as is shown in Fig. 10. If the withdrawal of the upper cradle 55 has not been completed by the time the new stack S is delivered to the elevator 19, the engagement of the upper boxes of this stack with the platform 79 of the upper cradle propels the latter rearwardly into alignment with the balance of the upper cradle as shown in Fig. 3.

The manner in which the upper cradle 55 is retracted into the position in which it is shown in Fig. 10 is illustrated in Figs. 7, 8, and 9.

Fig. 8 illustrates the upper cradle 55 as it is just arriving at the uppermost point in its travels where the lowermost box of a stack just elevated thereby is being delivered to the stack controlling the box dumping conveyor 20 for dumping the contents therefrom as will be described hereinafter. In this view the rollers 68 are shown swinging the roller traps 113 away from the pins 112, following which, the springs 111 return these traps beneath said rollers so that, as the shaft 60 of this cradle passes on over the shaft 50 as seen in Fig. 9, the rollers 68 ride on top of the roller traps 113 and ultimately come to rest against the flanges 44 as shown in Fig. 10. The engagement of the arm 65 with the shaft 50 as shown in this view swings these arms rearwardly whereby the platform 79 is overbalanced and falls back to a position where the arms contact the shaft 76 which retains the parts of this cradle 55 in alignment while it descends as shown in Fig. 3.

As the stack S is lowered or tilted by the belts 152 into a reclining position on the tracks 85 and cams 86 provided on the standards 36, the cradle 55 rising therebeneath engages the lowermost box on this stack and starts to elevate the stack. This upward movement continues while each of the boxes B of the stack is, in turn, pressed against the belts 152 and rolled by these over the dumping fulcrum member 125 so as to discharge the contents of the box over this fulcrum member and onto the loose product conveyor 21, and discharge the empty box onto the empty box conveyor 22. The topmost box of a new stack being delivered into the machine 15 is tightly engaged by the belts 152 as shown in Fig. 1 to control the tilting of the stack into parallelism with the elevator 19 and reclining thereagainst, and the rolling of this uppermost box over the fulcrum member 125 commences immediately upon the stack reaching this position of rest against the elevator which also approximately coincides with the engagement of the lower cradle 55 with the bottom of the stack and the start of the continuous upward movement of the latter riding upon this cradle.

From the point in the operation of dumping the boxes of the stack shown in Fig. 3, the topmost box is rolled between the belts 152 and the fulcrum member 125 through the position in which this box is shown in Fig. 4 until most of the loose product in the box is dumped therefrom as shown in Fig. 5 and the box has been brought into contact with the initial pair of rollers 197 of the empty box conveyor 22. The belts 152 at this point contact one of the bottom corners of the box and as they progress press it against the empty box conveyor 22 and further invert the box, discharging the balance of the loose product therefrom onto the downward sloping discharge portion of the fulcrum member 125 as the box is lifted upwardly almost entirely inverted on the empty box conveyor 22 (Fig. 6).

It is necessary to lift the free end of the stack controlling and box dumping conveyor 20 to permit the empty box to pass between this and the empty box conveyor 22. When this occurs, the posts 143 are withdrawn slightly from their fixed sockets 130, the amount of this withdrawal being indicated by the height of the collars 144 in Fig. 6 above the upper ends of the sockets.

Fig. 6 also shows the next upper most box in the stack engaging the lower flights of belts 152 while the empty first uppermost box is still holding the free end of the conveyor 20 upwardly. As soon as the pressure between the lower flights 170 of the belts 152 against the upper near corner of the now uppermost box in the stack is sufficient, these belts will start to rock this box over the fulcrum member 125 so as to dump the contents therefrom in the same manner as occurred in the dumping of the first uppermost box above described. In this way, each of the boxes of the stack is in succession rolled between the conveyor 20 and the fulcrum member 125, the contents dumped therefrom and the empty box then discharged onto the empty conveyor 22.

As may readily be seen from the side elevational view of Fig. 1 of the apparatus 15 and from the above description of the operation thereof, this invention permits the delivery of fruit dumped from the boxes at a substantially lower elevation above the floor 17 than would be possible without the control of the tilting of the stacks S into parallelism with the stack elevator 19 which is effected by the engagement of the topmost box of the stack with the lower flights 170 of the belts 152 of the stack controlling and box dumping conveyor 20.

While I prefer to employ a pair of spaced belts 152 in the conveyor 20 for controlling delivery of stacks S to the elevator 19 and for then rolling boxes of the stack successively to dump the same, these functions can be performed with a single belt of a width greater than the length of a box B. In claiming the conveyor 20 broadly therefore the term "belt" may be used in a generic sense to refer to either a pair of belts 152 or to a single belt as noted substituted therefor and having the same general mode of operation and functions as the two belts 152.

The stack dumper 15 is adjustable to vary the level at which the contents of the boxes B are dumped by changing the angle between the elevator 19 and the floor 17, and changing the angle between the elevator 19 and the box dumping conveyor 20. These changes are effected by removing bolts 39 (Fig. 1) and replacing them in a different selected group of the holes 38, and by altering the length of turnbuckles 131.

Briefly summarizing the specific structure of the illustrated embodiment of the invention: floor mounted angle members 16 support and are adjustably secured to frame 35 of stack elevator 19 by bolts 39 in a rearwardly inclined position which can be modified by repositioning said bolts. Stack conveyor 18, operating in timed relation with elevator 19, delivers thereto upright stacks of loaded open top boxes upwardly disposed. The rearward inclination of the elevator requires each stack to be gently tilted and lowered into a position of rest thereagainst before being elevated. Head frame 120 includes vertical side members 121 comprising beams 122, triangular plates 123, beam sections 132, and bearing supports 133. Bolts 128 pivotally mount head frame 120 on the upper end of elevator 19. Turnbuckles 131 also connect elevator 19 to head frame 120 and permit ready adjustment of their angular relation to match a corresponding adjustment by bolts 39 of the inclination of elevator 19 relative to horizontal. Mounted on head frame 120 at the upper end of elevator 19 and rearward of the stack elevating path is a box dumping fulcrum 124

opposite ends of which are welded to plates 123. Empty box conveyor 22 is welded to rear ends of head frame beams 122. Bearings 134 on supports 133 journal shaft 135 by which overhead belt conveyor 20 is pivotally mounted on head frame 120 and by which it is also driven. Spacer members 139 pivot at their opposite ends on shafts 135 and 138 which carry drive and driven pulleys 150 and 151 of conveyor 20. Considering endless belts 152 trained about these pulleys as a single belt, this may be said to have a lower flight 170 which is yieldably depressed independently at longitudinally spaced points by rollers 153 and 154 mounted on arms 157 and 158 depending from spacers 139, and swung downward by springs 161 and 162 lower ends of which are attached to head frame 120. The downward swinging of overhead belt conveyor 20 about shaft 135 is adjustably limited by collars 144 fixed on supporting posts 143 upper ends of which attach at 149 to pulley spacer members 139 and the lower ends of which are guided in sockets 130 welded to head frame beams 122. Thus it is seen that the angle of inclination between the floor and the stack elevator 19 is adjustable by moving bolts 39. The angular relation between stack elevator 19 and head frame 120 about bolts 128 is adjustable by turnbuckles 131. The minimum spacing of the overhead belt conveyor 20 from the dumping fulcrum 124 and from empty box conveyor 22 is adjustable by shifting collars 144 on support rods 143 thereby swinging conveyor 20 about shaft 135 relative to head frame 120.

The claims are:

1. A box dumping device, comprising: a stack conveyor for moving upright stacks of loaded open-top boxes in a horizontal direction; a stack elevator inclined toward the rear of said device and disposed to receive and elevate said stacks in sequence; a fulcrum member mounted to the rear of and at the upper end of said stack elevator; a stack-tilting and box-dumping conveyor including horizontally spaced pulleys and an endless belt trained thereabout, said belt conveyor being disposed above said stack elevator in alignment with the direction in which the stacks are delivered thereto, said belt conveyor having a front portion the lower flight of which partially overlies said stack conveyor and is upwardly inclined forwardly to initially be engaged by the nearest upper corner of the uppermost box of the stack being delivered to said stack elevator; means driving said belt conveyor with said lower flight traveling in the same direction as and at a faster rate than said stack conveyor; and means yieldably pressing said traveling lower flight downwardly into frictional engagement with said upermost box to tilt said stack rearwardly into position against said stack elevator, said yieldable means then continuing to press said lower flight downwardly against said uppermost box of the tilted stack whereby said lower flight in traveling, rolls said box over said fulcrum member to dump its contents, said stack elevator raising the remainder of the boxes of said tilted stack successively into frictional contact with said moving lower flight, thereby causing each box to be dumped by rolling it over said fulcrum member as aforesaid.

2. A combination as in claim 1 having elevator mounting means for adjustably varying the angular inclination from horizontal of said stack elevator; a head frame pivotally mounted on the upper end of said stack elevator, said head frame having mounted thereon said fulcrum member, said belt conveyor and said means for yieldably pressing said lower belt flight downwardly; and means for adjustably varying the angular relation between said stack elevator and said head frame, in order to maintain the latter in approximately the same angular relation to horizontal for different angular inclinations therefrom in said stack elevator.

3. A combination as in claim 2 in which said belt conveyor is pivotally mounted near its front end on said head frame to permit said belt conveyor to swing upward about the axis of said mounting in response to upward pressure of said boxes thereagainst.

4. A combination as in claim 3 in which said yieldable pressing means comprises roller means applied to the conveyor belt lower flight and spring means connecting said roller means with said head frame so that said yieldable means not only presses said lower flight downwardly but resists upward swinging of said belt conveyor about its mounting axis.

5. A combination as in claim 4 having means to adjustably limit the downward swinging of said belt conveyor about the axis of its mounting on said head frame to vary the minimum spacing between said lower belt flight and said fulcrum member.

6. A combination as in claim 1 in which means is provided for pivotally mounting said belt conveyor about a fixed axis near its front end to permit said belt conveyor to swing upward about said axis in response to upward pressure of said boxes thereagainst.

7. A combination as in claim 6 having means to adjustably limit the downward swinging of the belt conveyor about the axis of its mounting to vary the minimum spacing between said lower flight and said fulcrum member.

8. A combination as in claim 1 in which said means for yieldably pressing the belt conveyor belt lower flight downward is applied to said lower flight principally in the area thereof intersecting the inclined stack elevating path, and in which combination said lower flight inclines upwardly between said path and the rear end of said belt conveyor; and an empty box conveyor mounted under and in closely spaced relation with said rearward upwardly inclining portion of said lower flight whereby a box just emptied by being rolled over said fulcrum member by said lower flight is propelled by said flight against and upwardly onto said empty box conveyor.

9. A combination as in claim 8 in which means is provided for pivotally mounting said belt conveyor about a fixed axis near its front end to permit said belt conveyor to swing upward about said axis in response to upward pressure of said boxes thereagainst; and means to adjustably limit the downward swinging of said belt conveyor about the axis of its mounting to vary the minimum spacing between said lower flight, on the one hand, and said fulcrum member and empty box conveyor on the other.

10. A combination as in claim 9 having elevator mounting means for adjustably varying the angular inclination from horizontal of said stack elevator; a head frame pivotally mounted on the upper end of said stack elevator, said head frame having mounted thereon said dumping fulcrum, said empty box conveyor, said belt conveyor and said means for yieldably pressing said lower flight downwardly; and means for adjustably varying the angular relation between said stack elevator and said head frame in order to maintain the latter in approximately the same angular relation to horizontal for different angular inclinations therefrom in said stack elevator.

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