

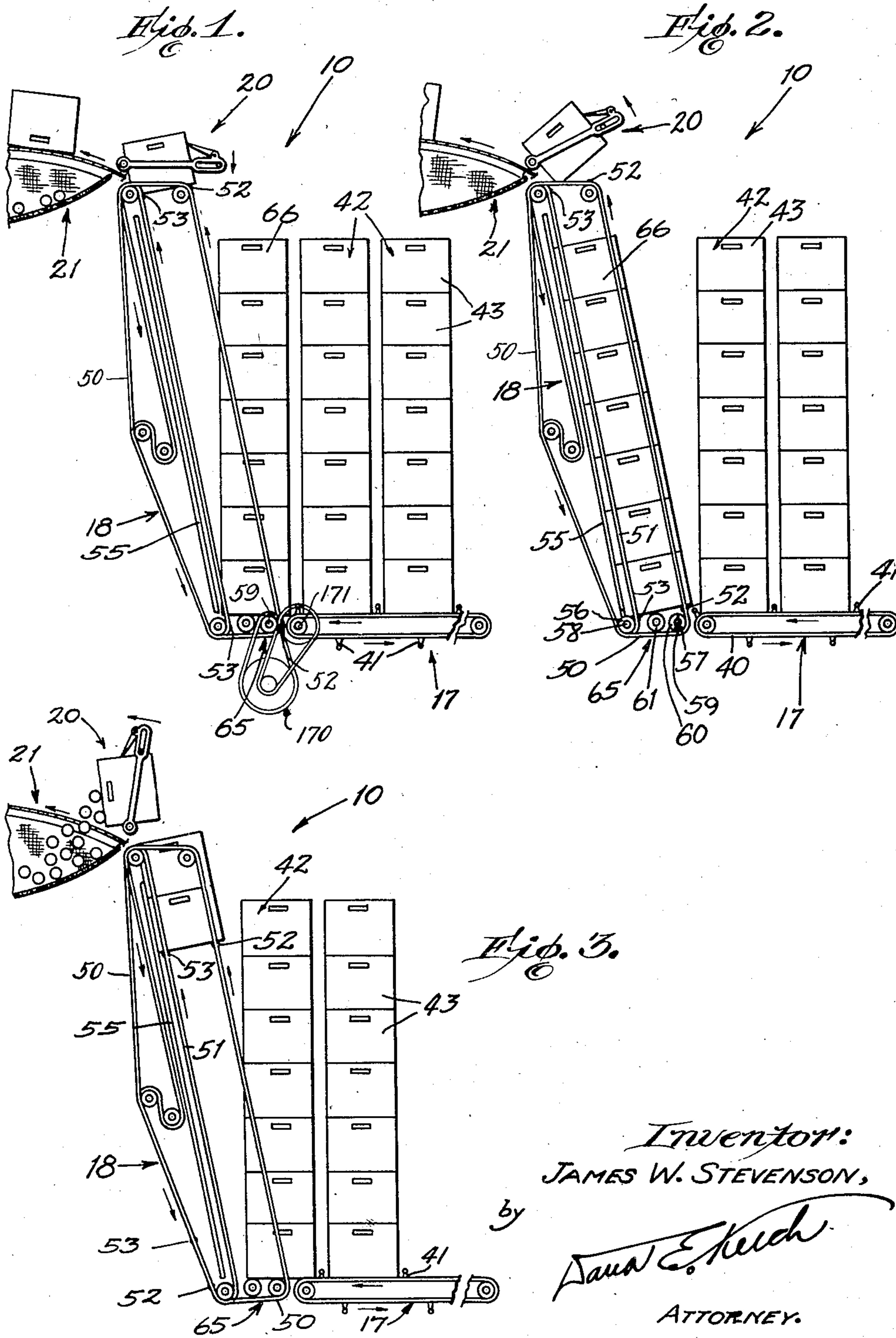
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AUTOMATIC BOX STACK DUMPER

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AUTOMATIC BOX STACK DUMPER

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My invention relates to receptacle dumping devices and more particularly to automatic box stack dumpers.

This invention is an improvement in the automatic stack dumper disclosed in my co-pending application, Serial No. 453,839, filed May 19th, 1930.

Most stack dumpers, until recently, have been manually fed with one stack of boxes at a time. In my previously disclosed automatic box stack dumper, noted above, means were provided for automatically feeding stacks of boxes to the dumper. This is an extremely difficult thing to accomplish mechanically on account of the delicate balance of the stacks, which such a machine should handle up to seven boxes high.

The feed device used in my former automatic box stack dumper was intermittent in operation, the stopping and starting of the feed being necessary to time the stacks with the dumper. This involved the use of delicate control mechanisms which it is best to avoid in packing houses where skilled mechanics capable of running these are not usually to be found.

It is accordingly an object of my invention to provide an automatic box stack dumper which is relatively simple and will not get out of order easily.

It is another object of my invention to provide an automatic box stack dumper in which stacks are fed to the dumping mechanism by a continuous movement whereby the danger of stacks toppling over is minimized.

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

Fig. 1 is a diagrammatical side elevational view of a preferred embodiment of my invention with a stack of boxes which is just being delivered onto the receiving table of the dump.

Fig. 2 is a view similar to Fig. 1 and illustrating the dump after the stack of boxes on the receiving table has been tilted against the inclined guide means of the elevator.

Fig. 3 is a view similar to Figs. 1 and 2

showing a stack partially elevated and dumped, and another stack partly fed onto the receiving table.

Referring specifically to the drawing, the illustrated embodiment of my invention comprises an automatic box stack dumper 10 which includes a stack feeding mechanism 17, a stack elevating mechanism 18, an individual box dumping mechanism 20 and a fruit and empty box receiving mechanism 21. These mechanisms are all identically the same as the correspondingly named and numbered mechanisms in the above noted co-pending application, excepting as hereinafter pointed out.

The feeding mechanism 17 has a pair of chains 40 mounted as before so that the upper flights travel over suitable supports in the direction of the elevator 18. The manner and speed with which this is driven will be described later. Secured upon the chains 40 at opposite points thereon are pairs of lugs 41 which are uniformly spaced throughout the length of these chains so that a stack 42 of boxes 43 may be set down on the chains 40 between any adjacent pair of lugs 41 and this stack will then be carried upon the chains 40 towards the elevator 18.

The elevator 18 includes two pairs of endless chains 50 and 51 each of which has a pair of cross bars 52 and 53; each of the cross bars 52 co-operating with one of the cross bars 53 in a manner to be described later.

The elevator 18 has a pair of guide bars 55 which are rigidly supported back of the rising flights of chains 51. The chains 50 and 51 and guide bars 55 are inclined away from the feed mechanism 17, a slightly greater distance than the width of one of the boxes 43. Suitable guide means (not shown) are provided for the rising flights of the chains 50 and 51.

At their lower ends chains 50 pass around sprockets 56 and 57 mounted on shafts 58 and 59 respectively. Freely rotatable on the shaft 59 between the chains 50 is a roller 60. Also rotatably mounted adjacent to the roller 60 is a roller 61 the uppermost elements of these rollers lying in the horizontal plane of the bottoms of the lowermost boxes in

stacks conveyed on the feeding mechanism 17.

The feeding mechanism 17 is continuously driven at such a speed that it will travel a distance between adjacent pairs of lugs 41 each time the chains 50 and 51 of the elevator 18 make half a complete circuit of their paths of travel. Any conventional drive may be provided for the feeding mechanism 17, one example of such a drive being a chain transmission 170, of the general type disclosed in the patents to Johnson No. 307,771 Nov. 11, 1884 and Barter No. 1,173,917 Feb. 29, 1916. In the example shown, the shaft 171 of the feeding mechanism 17 is driven from the shaft 59 through the chain transmission 170.

The operation of my invention is as follows: As may be noted from the drawing, the stack dumper of my invention may be built to handle stacks of boxes of any practical height, the illustrated embodiment being designed to handle stacks of a maximum height of seven boxes. The objects of the invention are largely attained by the inclining of the elevator 18 which permits a stack of boxes to be fed onto the rollers 60 and 61, which form a receiving table 65 at the bottom of the elevator 18, while a previously delivered stack is being elevated and dumped one box at a time by the elevator 18 and the individual box dumping mechanism 20. Conflict of the incoming stack of boxes with that being dumped is prevented by the ratio between the speeds of the elevator 18 and the feed mechanism 17. Thus the lower box of a stack of boxes is elevated at such a speed and at such an angle that it is traveling leftward at a speed approximately equal to the speed of the incoming stack.

Fig. 1 shows the last box of a stack being gripped by the individual dumping mechanism 20 and lifted off of an upper pair of cross bars 52 and 53. At this time an incoming stack of boxes 66 has been delivered in position on the receiving table 65 so that the lower pair of cross bars 52 and 53 may engage this stack and, tilting it against the inclined guide bars 55, elevate it to the individual dumping mechanism 20 which will dump the boxes of the stack one at a time.

In the embodiment illustrated the chains 50 and 51 extend upwardly to a point approximately the height of a box above the upper end of the stack 66 when this is first tilted to an inclined position onto the elevator 18. This permits the upper cross bar 52 time in which to travel out of the path of the rising stack 65 before this comes opposite the upper extremity of the chains 50 which carry the bars 52.

It is thus seen that I have produced a box stack dumper which is extremely simple in construction and operation and in which all intermittent feed control mechanisms are

eliminated and a practical continuous feed mechanism is provided.

While I have shown and described but a single embodiment of my invention it is to be understood that various changes and modifications may be made in this without departing from the spirit of the invention or the scope of the appending claims.

What I claim is:

1. In a box dumping mechanism the combination of: movable means for receiving and continuously advancing a stack of boxes poised in upright position; an inclined rest adjacent thereto; and elevating means operating substantially parallel to said rest and tilting a stack against said rest when lifting same from said movable receiving means said rest being at such an inclination and said elevating means and movable means being operated in such timed relation that the boxes of a stack being elevated will clear the boxes of an immediately following stack as it is advanced by said movable means.

2. In a box dumping mechanism the combination of: means for receiving a stack of boxes poised in upright position; an inclined rest adjacent thereto; elevating means operating substantially parallel to said rest and tilting a stack against said rest when lifting same from said receiving means; and means for continuously feeding a series of stacks of boxes, poised in upright position, to said receiving means said rest being at such an inclination and said elevating means and feeding means being operated in such timed relation that the boxes of a stack being elevated will clear the boxes of an immediately following stack as it is fed to said receiving means.

3. In a box dumping mechanism the combination of: an inclined box-stack elevator; means for conveying a series of stacks of loaded boxes, each of which stacks is balanced in upright position, into the path of said elevator, each stack in its turn being engaged in upright position, tilted to an inclined position and lifted by said elevator; and means for removing said boxes from said elevator.

4. In a box handling mechanism the combination of: means for elevating a stack of boxes from a receiving position along a path inclined from vertical; means for feeding a stack of boxes, balanced in upright position, to said receiving position as a preceding stack is being elevated along said inclined path away from said receiving position; and means for removing said boxes from said elevating means.

5. In a box dumping mechanism the combination of: means for elevating a stack of boxes for dumping, said means including an endless chain mechanism and a plurality of cradles spaced therealong, each cradle being adapted to engage and lift a stack of

boxes from a receiving point, said means being inclined at a sufficient angle to permit an incoming stack to be moved practically to said stack receiving point before the lowest box of an immediately preceding stack has been elevated above the uppermost box of the incoming stack; and means for continuously moving said incoming stack to said receiving point, said means being operated in timed relation with said elevator.

6. In a box dumping mechanism, the combination of: a continuously driven horizontal conveyer for conveying stacks of loaded boxes; means on said conveyer for dividing the upper surface thereof into spaces each of which is adapted for containing a single stack, said conveyer delivering said stacks to a receiving point; an endless chain elevator; a plurality of cradles spaced at intervals therealong, said elevator, at a height practically equal to one of said intervals being inclined away from said conveyer a distance practically equal to one of said conveyer stack spaces; means for driving said conveyer and said elevator in the same ratio as said conveyer stack space bears to said elevator cradle interval; and means for removing said boxes from said elevator.

7. A combination as in claim 6 in which the length of each of said elevator cradle intervals is approximately equal to the height of a stack plus one box; and means operating in timed relation to said elevator for dumping the boxes in each stack as it is elevated.

8. The method of loading stacks of boxes onto an elevator which consists in lifting a preceding stack in a given direction and feeding the lower end of a following stack into position in the path of said elevator before said preceding stack has cleared said following stack, and tilting said following stack into alignment with said elevator when said preceding stack has cleared.

9. The method of loading stacks of boxes onto an elevator which consists in lifting a preceding stack in a given direction and feeding with a continuous movement the lower end of a following stack into position in the path of said elevator before said preceding stack has cleared said following stack and tilting said following stack into alignment with said elevator with a lifting movement when said preceding stack has cleared.

In testimony whereof, I have hereunto set my hand at Riverside, California, this 23rd day of September, 1930.

JAMES W. STEVENSON.