April 22, 1958 E. H. PATRICK 2,831,585

MATERIAL HANDLING APPARATUS

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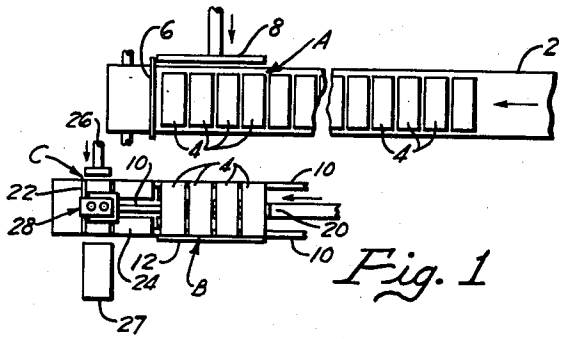


Fig. 1

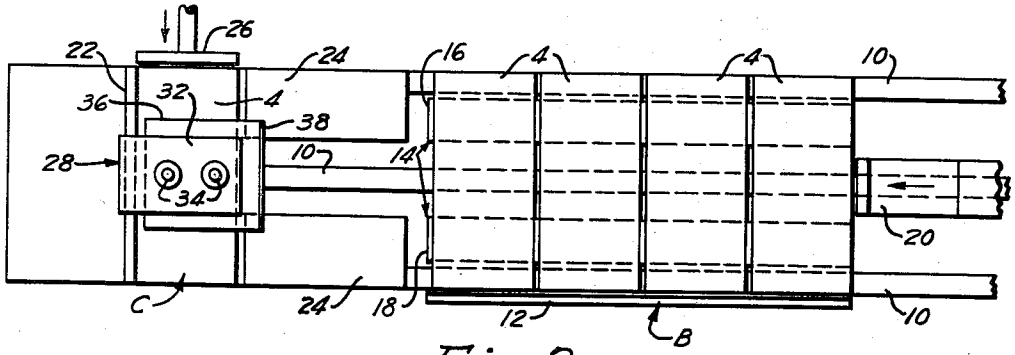


Fig. 2

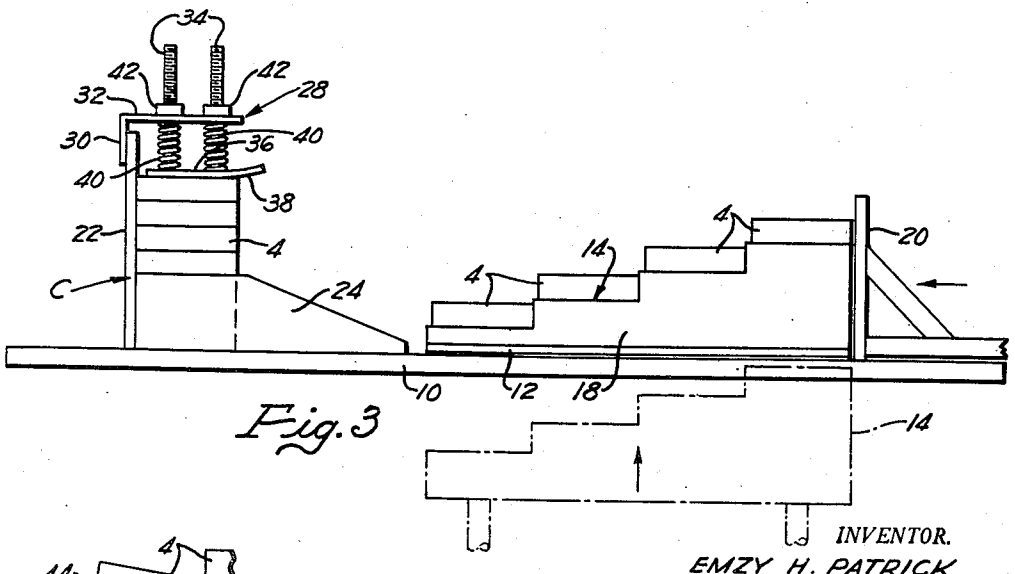


Fig. 3

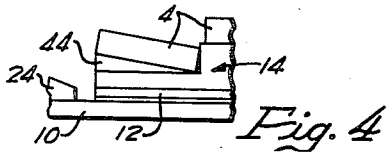


Fig. 4

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MATERIAL HANDLING APPARATUS

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3 Claims. (Cl. 214—6)

This invention relates to apparatus for handling material and particularly to apparatus for handling slab material to facilitate packaging thereof.

In handling and packaging slab material, such as wax cakes, it is customary to collect a number of such slabs, stack the same on top of the each other and thereafter place the stack of slabs in a carton or package. Apparatus generally employed in such operations have not always proved satisfactory, however, because movement of the stack of slabs during handling thereof is often accompanied by movement out of position of one or more of the slabs forming a part of such stack. The apparatus of the present invention overcomes the defects found in material handling apparatus of the prior art by maintaining slab material stacked on top of each other in a fixed position during handling thereof.

The present invention can be better understood with reference to the accompanying drawing which is hereby incorporated in and made a part of the present specification. It is understood that the construction and combination of parts which are herein described and which are illustrated in the drawing comprise preferred embodiments only and there is no intention to be limited thereby. Figure 1 is a plan view of the apparatus together with the collecting and stacking means associated therewith. Figure 2 is an enlarged plan view similar to Figure 1 but showing only a portion thereof. Figure 3 is a side view of the apparatus shown in Figure 2. Figure 4 is a view of the step elevator shown in Figure 3 provided with a wedge on the last step thereof.

Referring to the drawing, specifically Figure 1, reference numeral 2 defines a conventional endless conveyor, such as a belt conveyor or the like, for moving wax blocks 4 in the direction of the arrow toward station A. In order to halt the movement of wax cakes 4 when they have reached station A a vertically disposed stop plate 6 is mounted above conveyor 2 in the path of movement of the wax blocks. Periodically, a reciprocating transfer pusher 8 transfers a series of wax cakes from station A to station B. Transfer pusher 8 can be adapted to move any selected number of wax cakes from station A to station B, but in the present discussion it will be assumed that four such wax cakes are moved from one station to the other.

While station B can be located in a plane below station A it is preferably substantially in the same plane as station A. As shown in Figures 1 and 2, station B comprises in essence a plurality of spaced, longitudinally disposed bars 10 arranged so as to receive the wax cakes as they are transferred from station A. In order to halt the forward movement of the wax cakes during the transfer, a stop 12 mounted in the path of movement of the wax blocks is provided.

Normally disposed below the framework comprising station B is a step elevator 14. When the wax cakes have been moved into position at station B, step elevator 14 is moved upwardly as shown in Figure 3 by any suitable means. The arrangement is such that upon movement of the step elevator the wax cakes are moved upwardly and a wax cake is disposed on each of the steps forming a part of the step elevator. For reasons which will be noted shortly, step elevator 14 is preferably made in two sections 16 and 18 as shown in Figure 2. If desired, the two sections 16 and 18 can be joined at their lower portion.

As soon as the step elevator 14 has moved upwardly into position and a wax cake has been disposed on each of the steps thereof, accumulator pusher 20 is moved, by any suitable means, in the direction of the arrow, as shown in Figure 2, between sections 16 and 18 of step elevator 14. Initially accumulator pusher 20 contacts the wax block on the top step of the step elevator, pushing such wax block on top of the wax block on the next lower step. Further movement of the accumulator pusher moves the two wax blocks on top of the wax block on the next lower step, and this is continued until the four wax blocks are stacked on top of each other.

Accumulator pusher 20 continues its forward movement until the stack of wax cakes are positioned at station C. In order to halt the forward movement of the stack of wax cakes at station C, a stop 22 mounted in the path of movement of the stack is provided. Preferably, movement of the stack of wax cakes to station C is over ramp or incline 24, which, as shown in Figure 2, is preferably made in two sections to permit the required forward movement of accumulator pusher 20. After accumulator pusher 20 has moved the stack of wax blocks into position at station C, it is moved back to its original position and step elevator 14 is lowered into position below station B. After the stack of wax cakes has come to rest at station C, a loading pusher 26, as shown in Figures 1 and 2, is moved, by any suitable means, in the direction of the arrow, pushing the stack of wax cakes into a container such as a carton or package 27. The carton or package 27 is thereafter moved to other stations for further handling.

In order to handle the stack of wax cakes and prevent the wax cakes from being shaken or moved out of position during the handling thereof, I have provided a spring holder 28. As shown in Figure 3, the spring holder 28 comprises an angle member 30 provided with a horizontal portion 32 overlying station C. The angle member is preferably fixedly attached to stop 22 or it can be made integral therewith. The horizontal portion 32 of the angle member is provided with a number of openings through which fit bolts 34, which are preferably threaded. It is understood that while only two bolts are shown, more can be provided if desired. Fixedly attached by any suitable means to the lower portion of bolts 34 is a plate 36 provided with a curved portion 38 to facilitate entry of the stack of wax cakes thereunder. Circumferentially disposed about bolts 34, between plate 36 and the horizontal portion 32 of angle member 30, are compression springs 40 for normally maintaining plate 36 downwardly. Threaded on the free ends of bolts 34 are nuts 42 which serve to limit the forward movement of plate 36.

Plate 36 is normally extended into position so that the distance between it and the ramp beneath it is a little less than the height of the stack of wax cakes which it is to receive. It can be seen that when the stack of wax cakes are moved up the ramp 24 into position at station C, the spring holder 28 will receive the same and hold it securely, with the result that the individual wax cakes will not be shaken out of their proper position upon subsequent handling.

In order to prevent the bottom cake of the stack of wax cakes from hitting the adjacent edge of the ramp 24, thus eliminating jostling of the stack as it is moved up

the ramp, a wedge type lift 44 fixedly mounted on the lower step of step elevator 14 is provided as shown in Figure 4. The wedge type lift permits the bottom cake of wax in the stack of wax cakes to hit the ramp 24 at a smaller angle than it otherwise would without disturbing the position of such stack.

While the description herein has been with reference to wax cakes, it is understood that such description is for the purpose of illustration only and that any material requiring similar treatment can also be handled with the apparatus of this invention. Although the specific means for moving the conveyor, the various pushers and the step elevator have not been shown, any suitable means, be it manual, mechanical, etc., can be employed to provide such movement.

Obviously, many modifications and variations of the invention as hereinabove set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated by the appended claims.

I claim:

1. Apparatus for facilitating the handling and packaging of slab material which comprises a step elevator for positioning a number of slab material in step-wise arrangement, a ramp longitudinally disposed with respect to said step elevator, a spring-biased plate overlying said ramp, means for accumulating such slab material on top of each other to form a stack thereof and moving such stack up said ramp into fixed engagement with said spring-biased plate, and means for moving said stack from said fixed engagement into a container.

2. Apparatus for facilitating the handling and packaging of slab material which comprises a step elevator for positioning a number of slab material in step-wise arrangement, a wedge positioned on the lowest step of said elevator adapted to lift the free edge of a slab material mounted thereon, a ramp longitudinally disposed with respect to said step elevator, a spring-biased plate overlying said ramp, means for accumulating such slab material on top of each other to form a stack thereof and moving such stack up said ramp into fixed engagement with said spring-biased plate, and means for moving said stack from said fixed engagement into a container.

3. Apparatus for facilitating the handling and packaging of slab material which comprises a step elevator for positioning a number of slab material in stepwise arrangement, a loading station longitudinally disposed with respect to said step elevator, a spring-biased plate overlying said loading station, means for accumulating such slab material on top of each other to form a stack thereof, means for moving such stack to said loading station into fixed engagement with said spring-biased plate, and means for moving said stack from said fixed engagement into a container.

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