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MATERIAL HANDLING APPARATUS

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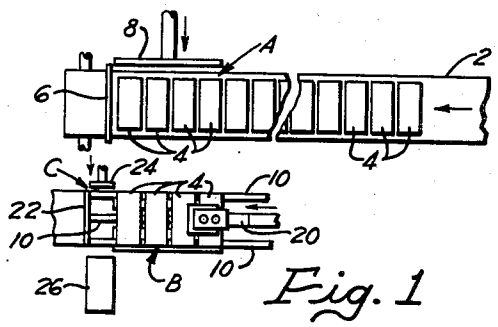


Fig. 1

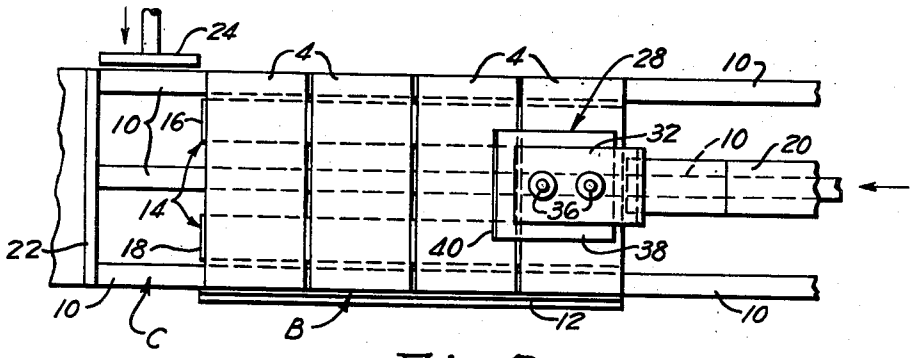


Fig. 2

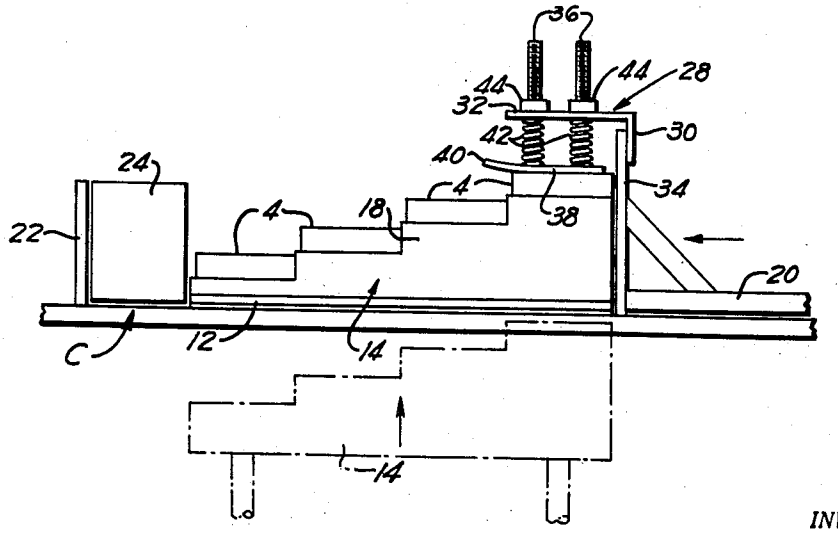


Fig. 3

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MATERIAL HANDLING APPARATUS

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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 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 facilitating the stacking of the slab material and 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.

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 Figure 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 together at their lower position.

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. After the stack of wax cakes has come to rest at station C, a loading pusher **24** is moved, by any suitable means, in the direction of the arrow, as shown in Figures 1 and 2, pushing the stack of wax cakes into a container such as a carton or package **26**. The carton or package **26** is thereafter moved to other stations for further handling.

In order to facilitate the accumulation of the wax cakes to form a stack thereof and prevent the individual cakes from being shaken out of position during such accumulation and subsequent packaging, 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 the adjacent portion of step elevator **14**. The angle member is preferably fixedly attached to the vertical portion **34** of accumulator pusher **20** 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 **36**, 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 **36** is a plate **38** provided with a curved portion **40**. Circumferentially disposed about bolts **36** between plate **38** and the horizontal portion **32** of angle member **30** are compression springs **42** for normally maintaining plate **38** downwardly. Threaded on the free ends of bolts **36** are nuts **44** which serve to limit the forward movement of plate **38**.

Plate **38** is normally extended into position so that when the step elevator **14** is moved upwardly, with a wax cake on each of the steps thereof, plate **38** is in contact with the wax cake on the top step of the step elevator and holds the same securely in place. It can be seen that as accumulator pusher **20** is moved in the direction of the arrow as shown in Figure 3, accumulating the wax blocks to form a stack as previously described, springs **42** will force plate **38** to remain in contact with the wax cake on top of the stack, and this contact is maintained until loading pusher **24** moves the stack of wax cakes into the carton or package **26**. In this way, the wax cakes are maintained securely in place during the accumulation stage and the loading stage and are not forced out of their desired position at any time.

While the description herein has been with reference to wax cakes, it is understood that such description is for purposes 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, pusher means for accumulating said slab material on top of each other to form a stack thereof and moving said stack to a loading station, means for moving said stack at said loading station into a container, and means fixed to said pusher means for engaging the slab material on the top step of said step elevator and maintaining such engagement during the handling and packaging of such slab material.

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, pusher means for accumulating said slab material on top of each other to form a stack thereof and moving said stack to a loading station, means for moving said stack at said loading station into a container, and spring means fixed to said pusher means for engaging the slab material on the top step of said step elevator and maintaining such engagement during the handling and packaging of such slab material.

3. 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, pusher means for accumulating said slab material on top of each other to form a stack thereof and moving said stack to a loading station, means for moving said stack at said loading station into a container, and a spring-biased plate fixed to said pusher means for engaging the slab material on the top step of said step elevator and maintaining such engagement during the handling and packaging of such slab material.

4. 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, pusher means for accumulating said slab material on top of each other to form a stack thereof and moving said stack to a loading station, means for moving said stack at said loading station into a container, and means fixed to said pusher means for engaging the slab material on the top step of said step elevator and maintaining such engagement during the handling and packaging of such slab material, said means fixed to said pusher means comprising a plate, springs in contact with said plate for urging said engagement and means adjusting the tension of said springs and limiting movement of said plate.

5. Apparatus for facilitating the handling and packaging of slab material which comprises means for supporting a number of slab material in a horizontal plane, means for positioning said slab material in step-wise arrangement, means for accumulating said slab material on top of each other to form a stack thereof and moving said stack to a loading station, means for moving said stack at said loading station into a container, and means fixed to said accumulating means for engaging the top-most slab material positioned in step-wise arrangement and maintaining such engagement during the handling and packaging of such slab material.

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