Nov. 13, 1956 F. B. ROBERTS 2,770,392

METHOD FOR FEEDING ARTICLES IN PREDETERMINED QUANTITIES

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Fig. 1.

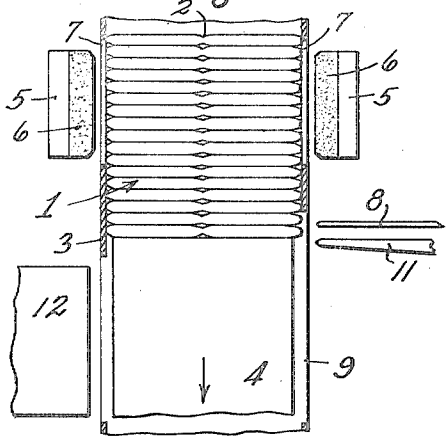


Fig. 2.

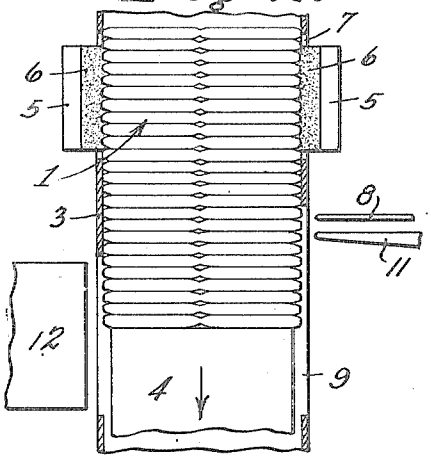


Fig. 3.

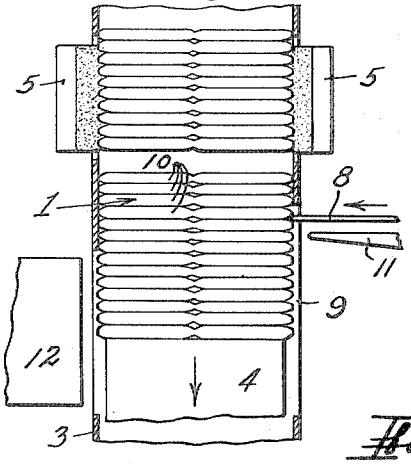


Fig. 4.

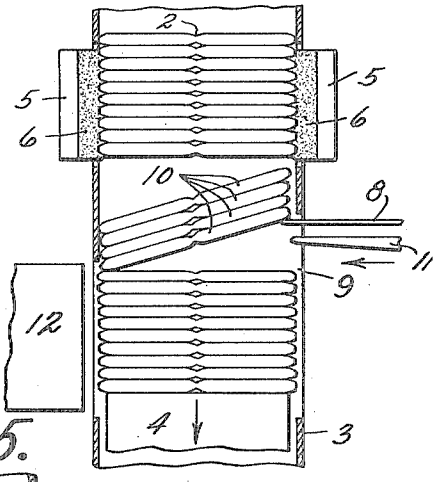
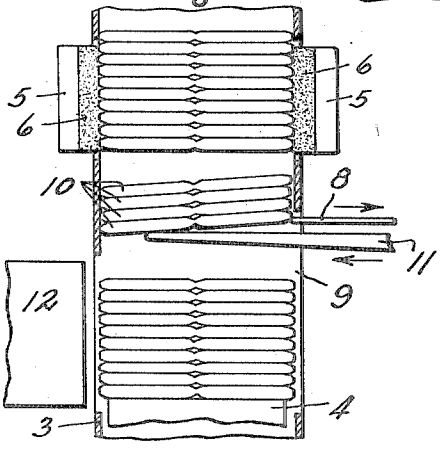


Fig. 5.



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Fig. 6.

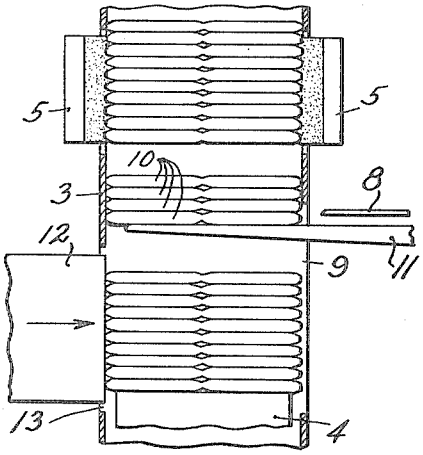


Fig. 7.

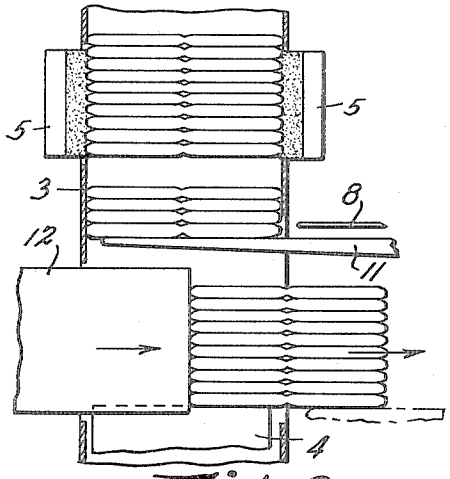


Fig. 8.

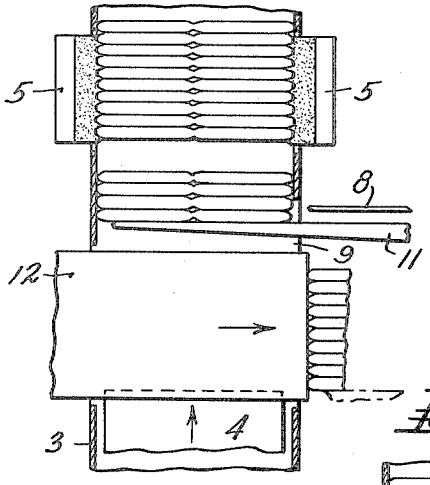


Fig. 9.

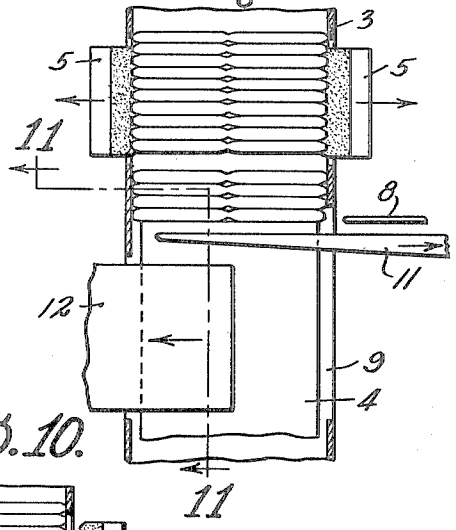


Fig. 10.

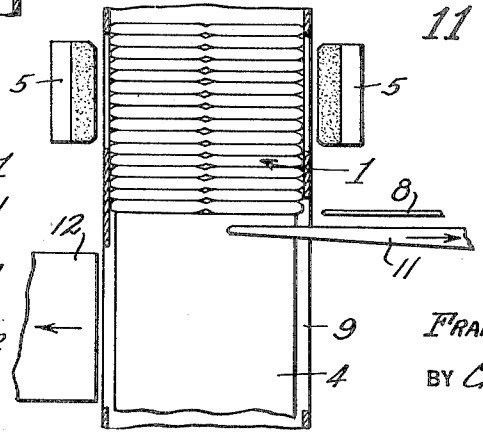
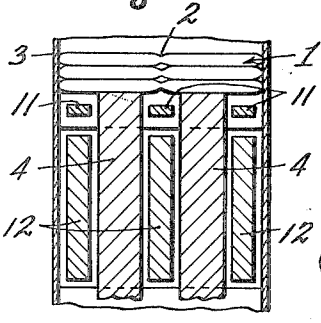


Fig. 11.



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METHOD FOR FEEDING ARTICLES IN PREDETERMINED QUANTITIES

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Application February 16, 1950, Serial No. 144,563

1 Claim. (Cl. 221—1)

This invention relates to a method for separating a variably predetermined quantity of fragile articles such as wafers, crackers or the like from a stack of such articles for delivering the separated articles to a wrapping station for wrapping as a unit.

Distributors have found it commercially desirable to display and distribute wafers, for example saltine crackers, in separately wrapped packages each comprising a stack of, say, ten wafers. The method disclosed in this application provides a means for separating out, from a larger mass of wafers, stacks of wafers of a size desired to be packaged as a unit.

A principal object of the invention is to provide such a method which operates without fracturing any of the wafers.

The objects and advantages of the new method and the manner in which they are attained will be more apparent from the following description and accompanying drawings.

In the drawings:

Figs. 1–10 show, diagrammatically, successive stages in the operation of parts of a simple device cooperating to process a stack of superimposed wafers according to the new method; and

Fig. 11 is a sectional view of the principal operative parts of such a device taken on line 11—11 of Fig. 9.

The wafers to be processed according to the invention are designated in the drawings by the numeral 1. They are thin and flat and are indented along a center line as at 2. It will be readily understood that extreme care is required in handling the wafers to prevent wastage from breaking or crumbling. In packaging the wafers, however, speed in handling is desirable, for economy of operation. The method here disclosed embodies a practical combination of speed and care for commercial utility. According to the example of the method described in this application, a stack of ten wafers is separated from a larger stack and presented for wrapping as a unit.

In Fig. 1 a stack of wafers 1 is shown held in the walls 3 of a vertical casing which serves as a wafer magazine. The wafers are supported in the magazine as by two spaced plungers 4 (see Fig. 11) which form in the present example a vertically reciprocable elevator or carrier. The plungers provide careful support for the wafers, being spaced to bear on the two side halves of the wafers outside the central indentation line 2.

As the first step in separating a ten-wafer stack for wrapping, the elevator plungers 4 are lowered in the magazine from the position of Fig. 1 to the position of Fig. 2. It will be understood that the elevator plungers move continuously through the downward and upward strokes, being preferably at rest only at the lowest point of elevator travel. For purposes of clear exposition, however, the movement of the parts will be considered as "stopped" from time to time, specifically at the stages of operation represented by the several drawings.

Two complementary oppositely disposed lugs or clamps 5 are provided at the sides of the magazine walls 3.

Each clamp is faced adjacent the magazine with a pad 6 of soft resilient material such as sponge rubber, and the magazine walls 3 have openings 7 therein to receive the clamp pads. When the descending elevator plungers reach the position illustrated by Fig. 2, the clamps are moved inwardly through the openings 7 to grasp between them a number of wafers 1. The edges of the wafers are pressed into the soft pads 6 and are held against further downward movement in the magazine. Obviously, all the wafers above those immediately between the pads 6 are also supported against downward movement. The padded clamps 5 provide a strong and effective support for the wafers and at the same time provide a support which does not tend to fracture or crumble the wafers. The force of the clamps is exerted laterally against the wafers' greatest compressive strength. Further, inclusion of a plurality of wafers between the clamps prevents the wafers' buckling.

Fig. 3 shows the relation of the parts after the elevator has fallen away from the position of Fig. 2. The padded clamps 5 retain the main body of stacked wafers upwardly in the magazine. It will be noted that a stack of wafers larger than the stack desired to be ultimately separated for wrapping is carried downwardly in the magazine by the descending elevator. A wafer separator, such as one or more horizontally disposed pins, indicated in Fig. 3 by the pin 8, is inserted through an opening 9 in the wall of the magazine, between the edges of two adjacent wafers 1 in the stack which is carried on the elevator. The separator pin or pins are inserted at a point to leave, between the elevator plungers and the pins, the general number of wafers to be separated for wrapping as a unit.

The separator pins are yieldingly mounted in any suitable manner, or otherwise so arranged, that in the event that, as the separator advances, the pins engage the edge of a wafer the pins yield to let the so-engaged wafer move downwardly with the elevator, after which the pin advances beneath the following wafer.

The wafers so separated by the pins 8 and retained against further downward movement with the elevator plungers 4 will be referred to as surplus wafers and are designated in the drawings by the numeral 10.

As the elevator shifts downwardly to the position of Fig. 4, the rear edge of the surplus wafers 10 remote from and not supported by the pins 8 follows the underlying wafer stack and causes the surplus stack to be tipped to an inclined position as is shown by Fig. 4.

When the parts are in the relation shown by Fig. 4, a secondary supporting member such as a plurality of horizontally aligned arms 11 is shifted into and across the magazine through the wall opening 9. The function of the supporting arms 11 is best illustrated by Fig. 5, where it is seen that the support engages the stack of surplus wafers 10 rearwardly of the center of the bottom wafer of the surplus stack, or, as seen in Fig. 5, to the left of the center of the bottom wafer, and pushes that wafer upwardly to restore the surplus stack 10 to a horizontal position. As the support arms in this condition (Fig. 5) are in a position to support the surplus wafers, the pins 8 are no longer needed and may be withdrawn from the magazine.

The elevator in the position of Fig. 5 is at its lowest point, and will remain at rest for the remainder of the operation dealing with the stack of ten wafers now shown to be separated from the upper supply stack and resting at the lower portion of the magazine.

It will be understood that the separator and support may be adjusted upwardly or downwardly relative to the magazine to provide a greater or lesser number of wafers in the package stack. The pins and elevator arms are not, however, necessarily adjustable relative to each other.

Fig. 6 shows the separator pins completely withdrawn from the magazine with the surplus wafer stack **10** resting on the arms **11** of the support. A pusher such as three parallel legs **12** (see Fig. 11) is shown entering the magazine wall **3** through a side opening **13**. The legs **12** of the pusher and the wall opening **13**, together with the lower portion of the opening **9** in the opposite wall, are in alignment with the stack of wafers supported on the lowered elevator. Thus, as shown by Fig. 7, the advancing pusher legs move the stack of wafers on the elevator out of the magazine. Here the wafers may be disposed of for wrapping by any desired or suitable means.

When the wafers are completely removed from the elevator (Fig. 8), the elevator leaves its lowest position of rest and begins to rise. Fig. 9 shows the relative position of the parts when the elevator has reached its highest point, carrying the surplus wafers upwardly off the supporting arms **11**. In Fig. 9, the pusher legs have been retracted substantially half way across the magazine, the supporting arms have started to withdraw from the magazine in an opposite direction, and the padded wafer clamps **5** are beginning to release the wafers from their hold.

It will be clearly understood from a consideration of the sectional view of the parts shown by Fig. 11 that the support arms **11** and the pusher legs **12** on the one hand, and the two elevator plungers **4** on the other hand, are so spaced relative to one another that their being in horizontal alignment (see Fig. 9) does not interfere with their continued operation.

In the condition shown by Fig. 10, the padded clamps **5** have been completely released, permitting the wafers at the top of the magazine to fall onto the short stack of surplus wafers held by the elevator. The support arms **11** are being retracted from the magazine, the elevator is at its highest point for support of the wafers **1**, and the pusher legs **12** are nearly withdrawn to their position of Fig. 1.

Beginning again with the parts in the position shown by Fig. 1, the cycle is repeated. It will be understood that the timing of the various elements by which the method is carried out may be varied to meet the needs of the wrapping instrumentalities to which the successively separated stacks are presented.

What is claimed is:

A method of feeding a predetermined quantity of relatively thin, fragile articles from a stack which comprises, supporting the stack on a vertically reciprocable support, lowering the support and the stack of articles thereon a predetermined distance, clamping the stack of articles above the support at a point sufficiently above the topmost article of the quantity to be fed to leave a surplus of articles on the support, lowering the support a further distance, inserting a separator between the edge of the topmost article of said quantity and the edge of the article immediately above said topmost article, lowering the support a further distance while holding the separator stationary to lower the rear edges of the surplus articles above the separator and position said surplus articles in an inclined position, advancing a secondary support beneath the surplus articles at an elevation to engage the articles rearwardly of their center to thereby raise the surplus articles to substantially the level of the separator, withdrawing the separator to permit the surplus articles to rest on the secondary support, moving the group of articles transversely from the first support, raising the latter into engagement with the surplus supported on the secondary support, raising the first support a further distance to raise the surplus from the secondary support and into proximity with the bottom of the clamped stack and unclamping the stack to permit the latter to descend onto the surplus to be again supported by the first support.

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