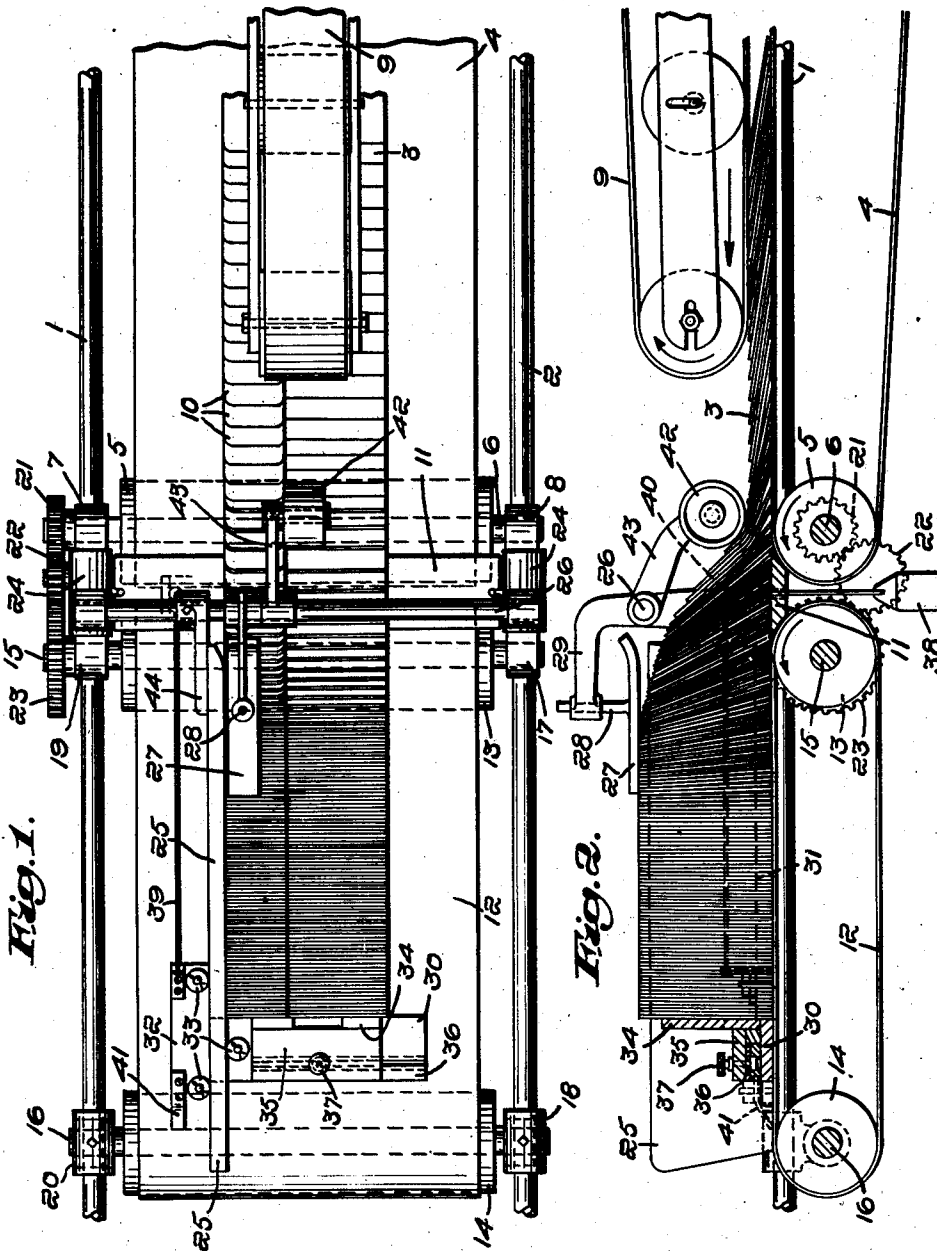


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CARTON STACKING MECHANISM

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CARTON STACKING MECHANISM

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This invention relates to mechanism for continuously stacking and condensing in an upright pile collapsed cartons as they are delivered in inclined overlapping series from a prior operation, such, for example, as an accumulator stacker in which folded and moist glued cartons are carried in said overlapped relation by a traveling endless belt and subjected to pressure during the setting of the glue.

Mechanism for progressively stacking a series of narrow overlapping cartons from horizontal to vertical position by successively tilting them as they are advanced is disclosed in my prior Patent No. 1,960,311 granted May 29, 1934.

Some types of collapsed cartons have projecting panels or flaps which together with the springiness of the overlapped collapsed cartons make it extremely difficult to accumulate in upright on-edge position as they tend to twist and lock so that periodically the attendant has to remove them from the stacker and regather them one by one by hand.

The construction disclosed in my prior patent is not adapted to stack cartons of this character in upright position and the present invention has for its object to overcome these difficulties in stacking and condensing such cartons and to insure the continuous stacking and condensing of these and other types of cartons in upright position. This is accomplished in the present invention by providing an upright back stop located at the delivery end of the conveyer for the overlapping cartons so positioned in proximity thereto as to cause the resultant of the force applied to the cartons as they are advanced by the conveyer and the resistance offered by the back stop gradually to erect the successive cartons to, and condense them in, substantially upright on-edge position.

A further object of the invention is to provide means for exerting yielding pressure upon the upper surface of the advancing overlapped cartons adjacent the point where they are discharged from the conveyer, such as to insure uniform successive delivery of the cartons to the upright stacking mechanism.

Another object of the invention is to provide a movable back stop and means for controlling the movement and position thereof as the cartons are stacked up thereagainst.

A further object of the invention is to provide a top guide bar for the upper edges of the cartons as they are stacked up so that they will be jogged into properly stacked position.

A further object of the invention is to provide

a mechanism for rapidly stacking cartons in upright position and so condensing them as to insure complete setting of the glue and which will enable a large number of cartons to be accumulated and condensed and from which they can be removed by the attendant in predetermined preferably counted batches adjacent the back stop, with means for automatically moving the back stop forwardly to retain the cartons remaining in the stacker in upright position during the progressive stacking of the cartons and without interruption of the operation of the machine.

These and other objects and features of the invention will more fully appear from the following description and the accompanying drawing and will be particularly pointed out in the claims.

A preferred form of apparatus embodying the present invention is illustrated in the accompanying drawing, in which,

Fig. 1 is a top plan view of the apparatus; and, Fig. 2 is a view, chiefly in vertical section and partially in side elevation, of the construction shown in Fig. 1.

The series of inclined overlapping moist glued and collapsed cartons to be stacked in accordance with the present invention is formed and continuously delivered by any suitable apparatus. An apparatus for such purpose is disclosed in my application Serial Number 455,434 filed August 20, 1942, for Stacker accumulators. This apparatus comprises a stacker accumulator in which a series of folded and freshly glued cartons are carried by an endless conveyer in overlapped relation beneath compressor means which serves forcibly to hold down the glued portions during the drying and setting of the glue, the cartons being delivered from the conveyer to the mechanism for erecting the cartons to vertical stacked position by the mechanism forming the subject matter of the present invention.

The apparatus illustrated in the drawing comprises a suitable supporting frame of which is here illustrated only the longitudinally extending horizontal side bars 1 and 2 upon which the mechanism is mounted.

The moist glued collapsed cartons 3 are carried in rearwardly inclined overlapping position on a traveling endless conveyer shown as a belt or apron 4. This conveyer at its delivery end surrounds a roller 5 the shaft 6 of which is mounted in bearings 7 and 8 adjustable along the bars 1 and 2. The cartons which have been folded with freshly glued panels or flaps are firmly pressed together in, and are maintained in, compressed relation nearly to their delivery end to the stack-

ing apparatus by the endless belt 9 pressing against them as in my aforesaid application. The speed of the belts 4 and 9 is regulated so that the overlapping of the cartons as delivered to them is less than the width of the flaps, such as 10, 5 which might interlock.

The lower edge portions of the overlapped cartons are engaged by the endless conveyer 4 and are discharged therefrom at the delivery end of the conveyer on a support for their lower edges as they are continuously advanced by the conveyer and are erected to upright position by a co-operating upright, preferably vertical, back stop, as will hereinafter be described.

In the particular construction illustrated the first part of the support is fixed and the latter part moves at a relatively slow speed. The fixed part of the support is shown as a platform 11 and the movable portion as an endless traveling conveyer 12. The conveyer 12, which is in the form of a belt, extends over the rollers 13 and 14, the shafts 15 and 16 of which are mounted respectively in bearings 17 and 18, 19 and 20, which are adjustable along the frame bars 2 and 1. This second conveyer 12 is driven by any suitable means at the required speed and is here shown as driven by the shaft 6 of the conveyer 4 by means of a gear 21 on the shaft 6 engaging an intermediate pinion 22 which engages a gear 23 on the shaft 15.

The fixed portion 11 of the support is undercut at its front and rear edges so as to fit over the conveyers 4 and 12 where they pass around the rollers 5 and 13. This platform is mounted at its ends upon brackets 24 which are adjustable along the frame bars 1 and 2 with the bearings of the roll shafts 6 and 15.

A side guide plate 25 for the stack of cartons extends longitudinally above the conveyer 12 and is conveniently supported at its forward end upon a transverse shaft 26 carried by the brackets 24. A horizontally disposed top guide bar 27 is mounted in position to engage and jog the upper edges of the cartons as they are moved to vertical condensed position and to insure uniformity of the level of said upper ends of the stacked cartons. The top guide bar 27 is provided midway of its length with a vertical stud 28 which is adjustably mounted in an arm 29 having at its opposite end a cylindrical boss which is mounted upon and secured to the transverse shaft 26.

The back stop, which in cooperation with the force applied to the cartons by frictional engagement with the traveling conveyer 1, erects the cartons progressively to upright position, may be so positioned relatively to the delivery end of the conveyer 1 that the resultant force applied by the conveyer to the under edge portions of the overlapped cartons and the resistance of the back stop to the advancing movement of the cartons will gradually deflect the cartons from horizontal to vertical position, it being understood that if necessary the first carton of the series delivered from the conveyer may be raised manually so that it and the succeeding cartons will be successively forced rearwardly and upwardly and condensed into closely assembled upright position. Preferably, however, the back stop is mounted for movement forwardly and rearwardly in the line of the travel of the cartons so that it may be positioned as required in accordance with the length of the stack of cartons.

As the cartons are progressively stacked in vertical position batches of predetermined number next adjacent the back stop, which may be counted by usual mechanism, may be removed by the

operator and the back stop moved forward by hand, or automatically, so that under all conditions the cartons will be maintained in upright position.

Preferably, as shown, the back stop is mounted so as to be moved rearwardly as the advancing stack of cartons presses against it. For this purpose means are provided acting yieldingly to retard the rearward movement of the back stop due to the pressure of the advancing stack of cartons.

When as preferred the stacked cartons are slowly advanced rearwardly by the second conveyer 12, the invention provides a ratchet means associated with the back stop and the conveyer which, while it acts to permit forward movement of the back stop so as to keep it in contact with the advancing end of the stack, also prevents rearward movement of the back stop with respect to the conveyer so that the back stop cannot advance faster than the conveyer.

By reason of this construction the pressure of the advancing series of cartons not only erects the cartons to upright position but also produces such compression of the upright cartons as to insure complete setting of the glue.

In the preferred construction illustrated the base for the back stop comprises a flat plate 30 which extends transversely directly over the conveyer 12 and passes through a longitudinal slot 31 in the side guide plate 25. On the opposite face of the side guide plate the base is provided with an extension 32. Antifriction rollers 33, two engaging the outer face and one engaging the inner face of the side guide plate 25, are mounted on the base and serve to guide it in its forward and backward movement.

The back stop 34 is mounted for adjustment laterally on the base 30 properly to support cartons of different width. For this purpose the back stop is secured to a plate 35 which is mounted to slide laterally on a slotted plate 36 secured to and spaced from the base 30, and a set screw 37 in the plate 35 extends through the slot in the plate 36 with the head therebeneath. Thus by loosening and tightening the set screw 37 the back stop 34 may be adjusted to any desired lateral position.

The back stop 34 thus carried on the base 30 is yieldingly pressed forwardly by suitable means such as a counterweight 38 suspended on a cord 39 running over a pulley 40 and extending horizontally and connected to the base extension 32. The base 30 has secured to it a spring finger 41 which engages the conveyer 12 and acts like a ratchet to prevent rearward movement of the back stop relatively to the conveyer thereby to insure uniform compression of the stacked cartons.

In the present invention means are provided which act to press yieldingly upon the upper surface of the advancing cartons just above the discharging end of the conveyer so as to provide such frictional engagement of the lower edges of the cartons with the conveyer as to insure proper delivery of successive cartons to the support upon which they are discharged. Such means is shown as a suitable roller 42 journaled on an arm 43 which is pivotally mounted upon the transverse shaft 26 and pressed upon the upper surfaces of the overlapped cartons slightly in advance of and in proximity to the delivery end of the conveyer 4.

In the operation of the apparatus thus described the overlapping cartons are progressively

delivered from the discharge end of the conveyer 4 and are held down upon the delivery end thereof by the roller 42 with sufficient force to insure the progressive forwarding of the cartons upon the support 11. The back stop 34 is initially set at a distance from the delivery end of the conveyer 4 sufficiently less than the length of the cartons to cause the cartons progressively to be deflected upwardly to upright position by the resultant of the longitudinal force applied by the conveyer 4 and the resistance of the back stop 34. During such upright stacking movement the free end of each carton slides upwardly upon the upwardly inclined carton next beneath it and the pressure exerted upon the lower edges of the cartons forces them along the plate 11 thereby gradually erecting them toward vertical position. Upon continued movement the lower edges of the cartons are forced into engagement with the slower traveling endless belt or apron 12 and the continued pressure upon said lower edges gradually reduces the spacing between said lower edges to zero when the cartons are erected to upright position.

As the operation continues the back stop is yieldingly forced rearwardly by the stack formed as the cartons move to upright position. The top guide bar 27 acts to engage the upper edges of the carton as they reach upright position and jogs any tilted carton into vertical position, thus positioning the upper edges of all of the cartons at the same level.

The pressure upon the progressively stacked cartons serves to condense them in upright stacked position and as the back stop is forced rearwardly to or toward the limit of its rearward movement a batch of cartons, the number of which is usually determined by a counting device, is removed by the operator and the back stop when thus relieved is automatically moved forwardly by the counterweight 38.

Inasmuch as the back stop is held against the end of the advancing stack by the counterweight and cannot be moved rearwardly faster than the conveyer, by reason of the ratchet-like engagement of the spring finger 41, the cartons are compressed in upright position in such manner that uniform counted batches of the compressed cartons can be readily removed by the operator.

It will be understood that the particular mechanism shown and described herein is of an illustrative character and that various changes in construction and arrangement of parts may be made within the spirit and scope of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. Carton-stacking and condensing mechanism comprising means for engaging the under surfaces of a series of overlapping moist glued collapsed cartons and progressively advancing them, an upright back stop in the path of the cartons movable by the pressure applied by the conveyer to the cartons in the same direction at such relatively slower rate than that of said carton-advancing means as to cause the movement of the carton-advancing means progressively to erect the cartons to substantially upright on-edge position and then progressively condense them in said upright position.

2. Carton-stacking and condensing mechanism comprising means for accumulating and compressing a series of traveling moist glued collapsed cartons in overlapped position including

a horizontal traveling endless conveyer for supporting the overlapping cartons, and means for progressively compressing them to insure proper adhesion and setting of the glue, an upright back stop in the path of the cartons acting progressively to erect the advancing cartons to upright position, and a plate yieldably engaging the upper edges of the erected cartons and extending over the overlapped cartons as they approach erected position to produce such frictional engagement of the lower edge portions of the cartons with the conveyer as will insure proper propulsion of the cartons successively to erect them to upright position.

3. Carton-stacking and condensing mechanism comprising a traveling endless conveyer for supporting a series of overlapping moist glued collapsed cartons, a stationary stack support positioned at the discharge end of the conveyer to receive the lower edges of the cartons as the said lower edges are continuously advanced by the conveyer on to the support, a suitable roller pressing upon the upper surface of the advancing overlapped cartons above the discharging end of the conveyer acting to insure frictional engagement of the lower edges of the cartons with the conveyer, and an upright back stop in the path of the cartons movable in the direction of movement of the conveyer at a slower speed acting progressively to erect the advancing cartons to upright position and then to compress the erected cartons.

4. Carton-stacking and condensing mechanism comprising a traveling endless conveyer for supporting a series of overlapping moist glued collapsed cartons, a stationary stack support positioned at the discharge end of the conveyer to receive the lower edges of the cartons as the said lower edges are continuously advanced by the conveyer on to the support, an upright back stop in the path of the cartons movable in the direction of movement of the conveyer at a slower speed acting progressively to erect the advancing cartons to, and condense them in, substantially upright position, and means for adjustably mounting the back stop forwardly or backwardly in the line of travel of the cartons, whereby the back stop may be positioned as required by a selected length of the stack of upright cartons.

5. Carton-stacking and condensing mechanism comprising a traveling endless conveyer for supporting a series of overlapping moist glued collapsed cartons, a stationary stack support positioned at the discharge end of the conveyer to receive the lower edges of the cartons as the said lower edges are continuously advanced by the conveyer on to the support, a movable upright back stop in the path of the cartons acting progressively to erect the advancing cartons to, and condense them in, substantially upright position, means for adjustably mounting the back stop forwardly or backwardly in the line of travel of the cartons, and means acting to retard rearward movement of the back stop, due to the pressure of the advancing stack of cartons, thus to maintain the cartons upright as the length of the stack increases and to condense the upright stacked cartons.

6. Carton-stacking and condensing mechanism comprising means for accumulating a traveling series of moist glued collapsed cartons in overlapped position, and means for progressively compressing them to insure proper adhesion and setting of the glue, a movable upright back stop in the path of the cartons delivered from said

compressing means acting progressively to erect the cartons to, and condense them in, substantially upright position, and a horizontally disposed rigid top guide bar extending over and adapted to be engaged by the upper edges of the cartons as they stack up acting to jog the cartons into uniform upright stacked position.

7. Carton-stacking and condensing mechanism comprising a traveling endless conveyor for supporting a series of overlapping moist glued collapsed cartons, a stack support positioned at the discharge end of the conveyor to receive the lower edges of the cartons as the said lower edges are continuously advanced by the conveyor on to the support, an upright back stop in the path of the cartons movable by the pressure applied to the cartons by the conveyor acting progressively to erect the advancing cartons to, and condense them in, substantially upright position, means for mounting the back stop for movement forward and backward in the line of travel of the cartons, a support beneath the path of movement of the back stop comprising a second endless traveling conveyor, means for driving the same at a speed slower than that of the first conveyor, and means on said back stop engaging said second conveyor for preventing the back stop from being advanced by the advancing stack faster than the travel of the second conveyor.

8. Carton-stacking and condensing mechanism comprising a traveling endless conveyor for supporting a series of overlapping moist glued collapsed cartons, a stack support positioned at the discharge end of the conveyor to receive the lower edges of the cartons as the said lower edges are continuously advanced by the conveyor on to the support, a movable upright back stop in the path of the cartons acting in opposition to the pressure produced by the conveyor upon the cartons progressively to erect the advancing cartons to, and condense them in, substantially upright position, means for mounting the back stop for movement forward and backward in the line of travel of the cartons, a support beneath the path of movement of the back stop comprising a second endless traveling conveyor, means for driving the same at a speed slower than that of the first conveyor, means acting yieldingly to press the back stop against the advancing stack, and ratchet means associated with the back stop and the second conveyor acting to permit forward movement and to prevent rearward movement of the back stop with respect to the second conveyor.

9. Carton-stacking mechanism comprising an endless traveling conveyor for advancing at a retarded rate a continuously advancing stack of substantially vertically erected collapsed glued cartons, a back stop for the rearward end of the stack formed of sections adjustable transversely of the conveyor to engage cartons of different width, means for mounting and guiding the back stop for movement forward and backward above the conveyor, means acting yieldingly to press the back stop against the advancing stack, and ratchet means associated with the back stop and the conveyor acting to permit forward movement and to prevent rearward movement of the back stop with respect to the conveyor, thereby continuously to compress together the upright cartons.

10. Carton-stacking mechanism comprising an endless traveling conveyor for advancing at a retarded rate a continuously moving stack of substantially vertically erected collapsed glued cartons, a back stop for the rearward end of the stack, a stack side guide plate above the conveyor having a longitudinal slot, a base for the back stop extending through the slot, the base and slot acting to guide the back stop forward and backward above the conveyor, a spring finger on the base engaging the conveyor and acting to prevent rearward movement of the back stop relatively to the conveyor, and means acting yieldingly to press the back stop forwardly against the stack and automatically to retain the erected cartons in upright compressed position upon removal of cartons from the stack.

11. Carton-stacking mechanism comprising an endless traveling conveyor for advancing at a retarded rate a continuously advancing stack of substantially vertically erected collapsed glued cartons, a back stop for the rearward end of the stack, a stack side guide plate above the conveyor having a longitudinal slot, a base for the back stop extending through the slot, antifriction rolls mounted on the base at each side of and in engagement with the sides of the guide plate, the base and slot acting to guide the back stop forward and backward above the conveyor, a spring finger on the base engaging the conveyor and acting to prevent rearward movement of the back stop relatively to the conveyor, and means acting yieldingly to press the back stop forwardly against the stack and automatically to retain the erected cartons in upright compressed position upon removal of cartons from the stack.

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