June 26, 1962 H. E. ENGLESON ET AL 3,040,635

CARTON TRANSFER APPARATUS

Filed June 10, 1959

2 Sheets-Sheet 1

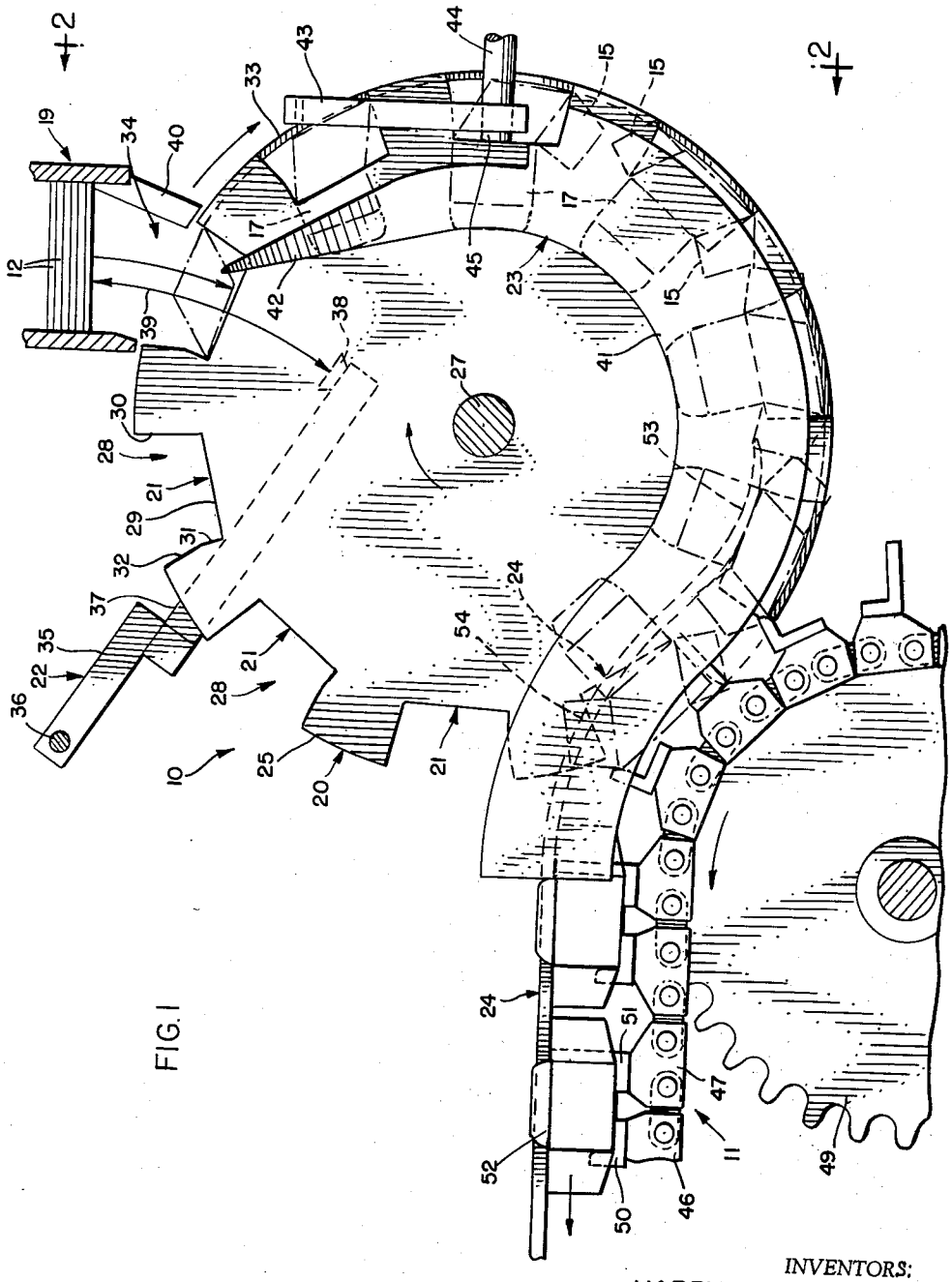


FIG. 1

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2 Sheets-Sheet 2

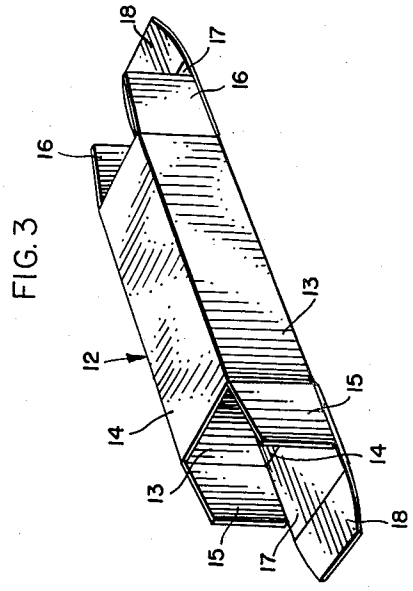


FIG. 3

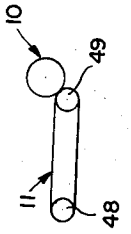


FIG. 4

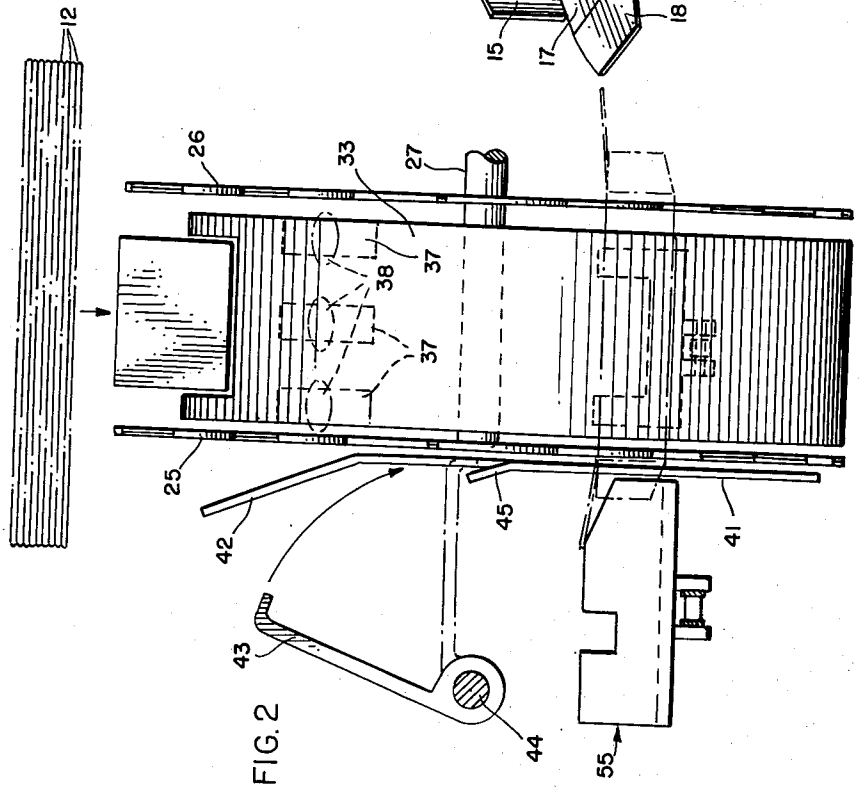


FIG. 2

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CARTON TRANSFER APPARATUS

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6 Claims. (Cl. 93—53)

This invention relates in general to a carton transfer apparatus, and more particularly to a carton transfer apparatus for transferring an expanded carton from an expanding station into a bucket on a carton conveyor, wherein the flaps at one end of the carton are prefolded to a plane substantially perpendicular to the longitudinal axis of the carton.

In the industry of packaging machinery, and especially machinery for filling cartons, the present day competitive market has necessitated reduction in cost of carton filling operations which has been accomplished by the present invention by increasing the speed of a portion of a packaging machine thereby permitting overall increase in speed of a packaging machine.

A packaging machine of the type generally used for filling of cartons generally includes a magazine for storage of a plurality of collapsed cartons, mechanism for erecting the cartons and for prefolding some of the flaps, and mechanism for transferring the erect cartons to a carton conveyor. The cartons are filled on the carton conveyor by filling from an article conveyor.

The present invention comprises apparatus for speeding up the prefolding of a carton and transfer thereof to a carton conveyor. The present invention includes a pocketed rotary wheel for receiving expanded cartons and for prefolding the flaps on one end thereof, wherein the wheel coacts with the carton conveyor and means for directly transferring the expanded cartons to buckets on the carton conveyor.

Accordingly, it is an object of this invention to provide apparatus for a packaging machine which will permit the overall increase of speed for the packaging machine thereby increasing the ultimate production.

Another object of this invention resides in the provision of an apparatus for transferring expanded cartons from an expanding station to buckets on a carton conveyor and for prefolding the flaps at one end of the cartons, whereby the apparatus is capable of operating at high rates of speed.

Still another object of this invention is in the provision of a carton transfer apparatus capable of coacting with a carton conveyor and stationary means for quickly and efficiently transferring cartons to the conveyor.

A further object of this invention is to provide apparatus for transferring expanded cartons from an expanding station to a carton conveyor including a pocketed rotary wheel and bar means arranged at the juncture of the rotary wheel and the carton conveyor for directly stripping the cartons from the pockets on the wheel and transferring them into buckets on the carton conveyor.

Other objects, features, and advantages of the invention will be apparent from the following detailed disclosure, taken in conjunction with the accompanying sheets of drawings, wherein like reference numerals refer to like parts, in which:

FIG. 1 is a side elevational view of an apparatus for transferring expanded cartons from an expanding station to buckets on a carton conveyor, and for prefolding the flaps on one end of the cartons according to the invention;

FIG. 2 is an end elevational view of the embodiment of FIG. 1, taken substantially along line 2—2 of FIG. 1;

FIG. 3 is a perspective view of an expanded carton of

the type that may be employed by the present invention; and

FIG. 4 is a diagrammatic view on a reduced scale of the present invention in association with a complete carton conveyor.

Referring now to the drawings, particularly FIG. 4, the apparatus of the present invention for transferring a carton from a magazine to a carton conveyor is generally designated by the numeral 10, while the carton conveyor is generally designated by the numeral 11. The transfer apparatus 10 also functions to prefold the flaps at one end of the cartons.

The type of carton that may be employed with the present invention may be of the straight tuck type as shown in FIG. 3 and generally designated by the numeral 12, or of the reverse tuck type, depending upon the desires of the user. The carton 12 includes opposing side walls 13, 13 and opposing side walls 14, 14, end flaps 15, 15 and 16, 16 hingedly extending from the opposite ends of the opposed side walls 13, 13, and cover flaps 17, 17 extending from the opposite ends of one of the side walls 14 and having tuck flaps 18, 18 secured to the cover flaps. The cartons 12 are initially in collapsed form and stacked in a carton magazine 19, FIG. 1. The cartons are removed from th magazine and expanded into the transfer apparatus 10 and then carried to the carton conveyor 11. During the transfer operation, the flaps at one end of the cartons are folded to open position.

The transfer apparatus 10 generally includes a rotary pocketed wheel 20 having a plurality of circumferentially spaced peripheral pockets 21, means for removing the collapsed cartons 12 one at a time from the magazine 19 and expanding the collapsed cartons and inserting the expanded cartons into the pockets 21 on the rotary wheel 20, generally designated by the numeral 22, means for prefolding the flaps of each carton at one end thereof and generally designated by the numeral 23, and means for stripping the cartons from the pockets 21 on the rotary wheel 20 and inserting the cartons into buckets on the carton conveyor 11 and generally designated by the numeral 24.

The rotary pocket wheel 20 includes front and back disk-shaped plates 25 and 26 mounted on a driven shaft 27. Aligned notches 28 are formed in the periphery of the disk-shaped plates to define the pockets 21. Each notch is constructed to define for the pockets 21 a flat bottom 29, a leading wall 30 extending upwardly from the forward end of the bottom wall 29 and inclined slightly toward the next succeeding pocket, and a trailing wall including a lower section 31 extending substantially perpendicular from the bottom 29, and an upper section 32 inclined from the lower section 31 outwardly away from the forward wall 30 slightly in order to provide a relief portion for clearance purposes. After the expanded cartons have been received in the pockets 21 of the wheel, they are held therein by an arcuately-shaped retaining plate 33 extending between the expanding station 34 and the point at which the expanded cartons have been inserted completely into the pockets to the point where the cartons are actually transferred to the buckets on the carton conveyor.

The mechanism for removing the cartons one at a time from the magazine 19 and for expanding the cartons and inserting the cartons into the pockets 21 on the rotary wheel 20 includes a bracket 35 carried by a rock shaft 36 and having extending from the free end thereof a plurality of arms 37 carrying thereon suction heads 38. The suction heads 38 are operable along a path defined by the arrow 39, FIG. 1, to engage the lowermost collapsed carton in the magazine 19, remove the carton from the magazine and expand it against an expander

block 40, and insert the expanded carton into the pocket 21 aligned with the expansion station 34.

Referring now to FIGS. 1 and 2, after the end flaps 15 and cover flap 17 at one end of the carton 12 have been folded to open position, they are maintained in open position by a retaining plate 41. A stationary cover flap folder 42 cams the cover flap 17 to open position as the cartons are advanced by the rotary wheel 20. The leading end flap 15 is folded to open position by a movable arm 43 oscillated by a shaft 44 supporting the arm. As seen particularly in FIG. 2, the arm 43 folds the leading end flap 15 to position where it then is cammed to the full open position by a stationary folder 45 and subsequently held in open position by the retaining plate 41. The trailing end flap 15 is folded back to open position by the stationary folder 45.

The carton conveyor 11 includes an endless chain having sets of bucket supporting brackets including brackets 46 and 47 trained around horizontally spaced sprockets 48 and 49. Power may be supplied to one of the sprockets. The brackets 46 and 47 have mounted thereon transversely extending L-shaped members 50 and 51 defining the buckets 52 on the carton conveyor 11. The leading L-shaped member 50 is much shorter than the trailing L-shaped member 51, for obvious reasons when viewing the transfer operation. During the time the buckets 52 traverse the arcuate path around the sprockets, they open up by virtue of the construction of the brackets 46 and 47 relative to the links connecting them together and their engagement with the sprocket. Thus, at the point adjacent the sprocket 49 where the rotary wheel 20 is positioned, the buckets 52 will be open to receive transfer of the cartons from the rotary wheel. It may also be noted in FIG. 2 that the disk-shaped plates 25 and 26 of the rotary wheel 20 straddle the buckets 52 at the point of juncture.

The stripping and transferring means 24, FIG. 1, includes a first arcuate portion 53 arranged between the disk-shaped plates 25 and 26 and being substantially concentric to the axis of the rotary wheel 20, and a second arcuate portion 54 bent in the reverse direction and extending substantially concentric to the axis of the sprocket 49 and partially between the disk-shaped plates 25 and 26 of the rotary wheel and over a portion of the bucket conveyor 11. The stripping and transferring bar 24 may take the form of a solid bar or of transversely spaced sections, depending upon the desires of the user. The first arcuate portion 53 initiates the stripping of the cartons from the rotary wheel 20 and the transferring of the cartons into the buckets 52 on the carton conveyor, while the second arcuate portion 24 completes the camming of the cartons from the rotary wheel and into the buckets on the carton conveyor. The stripping and transferring bar 24 is stationary, and serves to perform the transfer operation from an aligned pocket of the rotary wheel to an aligned bucket on the carton conveyor. The driving of the rotary wheel 20 is synchronized with the driving of the carton conveyor 11 in order to properly align the pockets of the rotary wheel with the buckets of the carton conveyor and to effect proper transfer of the cartons.

It will also be appreciated that the operation of the suction heads 38 is synchronized with the movements of the rotary wheel 20 in order to properly expand a carton into each of the pockets, and the movable folder 43 is driven in timed relationship with the rotary wheel 20 in order to properly prefold the leading end flap of each carton during its movement thereby.

At the terminal end of the retaining plate 41, at the carton conveyor 11, the prefolded flaps of the cartons are released to envelope the ends of the article buckets 55 on the article conveyor, FIG. 2. The buckets 55 of the article conveyor run abreast of the carton conveyor buckets and are in alignment therewith.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention, but it is understood that this application is to be limited only by the scope of the appended claims.

The invention is hereby claimed as follows:

1. In combination with a magazine having a stack of collapsed cartons and a carton conveyor having a plurality of carton receiving buckets, a carton transfer apparatus for transferring each carton in collapsed form from the magazine to expanded form in said conveyor including a rotary wheel having a plurality of circumferentially spaced carton pockets, means for removing collapsed cartons one at a time from the magazine, expanding each collapsed carton and delivering each expanded carton into a pocket of said rotary wheel, and a stationary transfer and stripping means for stripping each expanded carton from its pockets of said wheel and transferring the carton into a bucket of said conveyor, said stationary transfer and stripping means comprising a bar arranged at the juncture of said wheel and conveyor having an arcuate portion substantially concentric to said wheel.

2. In combination with a magazine having a stack of collapsed cartons and a carton conveyor having a plurality of carton receiving buckets, said buckets on said carton conveyor being mounted on endless chains trained around horizontally spaced sprockets whereby said buckets open while moving through the arcuate path defined by the sprockets and close while moving through the rectilinear path defined between said sprockets, a carton transfer apparatus for transferring each carton in collapsed form from the magazine to expanded form in said conveyor including a rotary wheel positioned adjacent a conveyor sprocket where the buckets are open having a plurality of circumferentially spaced pockets, means for removing collapsed cartons one at a time from the magazine, expanding each collapsed carton and delivering each expanded carton into a pocket of said rotary wheel, and a stationary transfer and stripping means for stripping each expanded carton from its pocket of said wheel and transferring the carton into an open bucket of said conveyor, said stationary transfer means comprising a bar arranged at the juncture of said wheel and conveyor having an arcuate portion substantially concentric to said wheel axis and an arcuate portion substantially concentric to said sprocket axis.

3. In combination with a magazine having a stack of collapsed cartons and a carton conveyor having a plurality of carton receiving buckets, said buckets on said carton conveyor being mounted on endless chains trained around horizontally spaced sprockets whereby said buckets open while moving through the arcuate path defined by the sprockets and close while moving through the rectilinear path defined between said sprockets, a carton transfer apparatus for transferring each carton in collapsed form from the magazine to expanded form in said conveyor including a rotary wheel positioned adjacent a conveyor sprocket where the buckets are open having a pair of axially spaced disks, aligned peripheral notches in said disks defining carton receiving pockets, means for removing collapsed cartons one at a time from the magazine, expanding each collapsed carton and delivering each expanded carton into a pocket of said rotary wheel, and a stationary transfer and stripping means arranged between said disks for stripping each expanded carton from its pocket of said wheel and transferring the carton into an open bucket of said conveyor.

4. In combination with a magazine having a stack of collapsed cartons and a carton conveyor having a plurality of carton receiving buckets, said buckets on said carton conveyor being mounted on endless chains trained around horizontally spaced sprockets whereby said buckets open while moving through the arcuate path defined by the sprockets and close while moving through the rectilinear path defined between said sprockets, a carton transfer

apparatus for transferring each carton in collapsed form from the magazine to expanded form in said conveyor including a rotary wheel positioned adjacent a conveyor sprocket where the buckets are open having a pair of axially spaced disks straddling the conveyor buckets adjacent the conveyor sprocket, aligned peripheral notches in said disks defining carton receiving pockets, means for removing collapsed cartons one at a time from the magazine, expanding each collapsed carton and delivering each expanded carton into a pocket of said rotary wheel, and a stationary transfer and stripping means arranged between said disks for stripping each expanded carton from its pocket of said wheel and transferring the carton into an open bucket of said conveyor.

5. In combination with a magazine having a stack of collapsed cartons and a carton conveyor having a plurality of carton receiving buckets, said buckets on said carton conveyor being mounted on endless chains trained around horizontally spaced sprockets whereby said buckets open while moving through the arcuate path defined by the sprockets and close while moving through the rectilinear path defined between said sprockets, a carton transfer apparatus for transferring each carton in collapsed form from the magazine to expanded form in said conveyor including a rotary wheel positioned adjacent a conveyor sprocket where the buckets are open having a pair of axially spaced disks straddling the conveyor buckets adjacent the conveyor sprocket, aligned peripheral notches in said disks defining carton receiving pockets, means for removing collapsed cartons one at a time from the magazine, expanding each collapsed carton and delivering each expanded carton into a pocket of said rotary wheel, and a stationary transfer and stripping means arranged between said disks for stripping each expanded carton from its pocket of said wheel and transferring the carton into an

open bucket of said conveyor, said stationary transfer means comprising a bar arranged at the juncture of said wheel and conveyor having an arcuate portion substantially concentric to said wheel axis and an arcuate portion substantially concentric to said sprocket axis.

6. In combination with a magazine having a stack of collapsed cartons and a carton conveyor having a plurality of carton receiving buckets, said buckets on said carton conveyor being mounted on endless chains trained around horizontally spaced sprockets whereby said buckets open while moving through the arcuate path defined by the sprockets and close while moving through the rectilinear path defined between said sprockets, apparatus for transferring each carton in collapsed form from the magazine to expanded form in said conveyor and for prefolding the flaps at one end of each carton to open position substantially perpendicular to the longitudinal axis of each carton including a rotary wheel positioned adjacent a conveyor sprocket where the buckets are open having a plurality of circumferentially spaced pockets, means for removing collapsed cartons one at a time from the magazine, expanding each collapsed carton and delivering each expanded carton into a pocket of said rotary wheel, stationary and movable flap folders at one side of said wheel, and a stationary transfer and stripping means for stripping each expanded carton from its pocket of said wheel and transferring the carton into an open bucket of said conveyor.

References Cited in the file of this patent

UNITED STATES PATENTS

2,318,208	First et al.	May 4, 1943
2,803,932	Nigrelli et al.	Aug. 27, 1957
2,881,682	Engleson et al.	Apr. 14, 1959