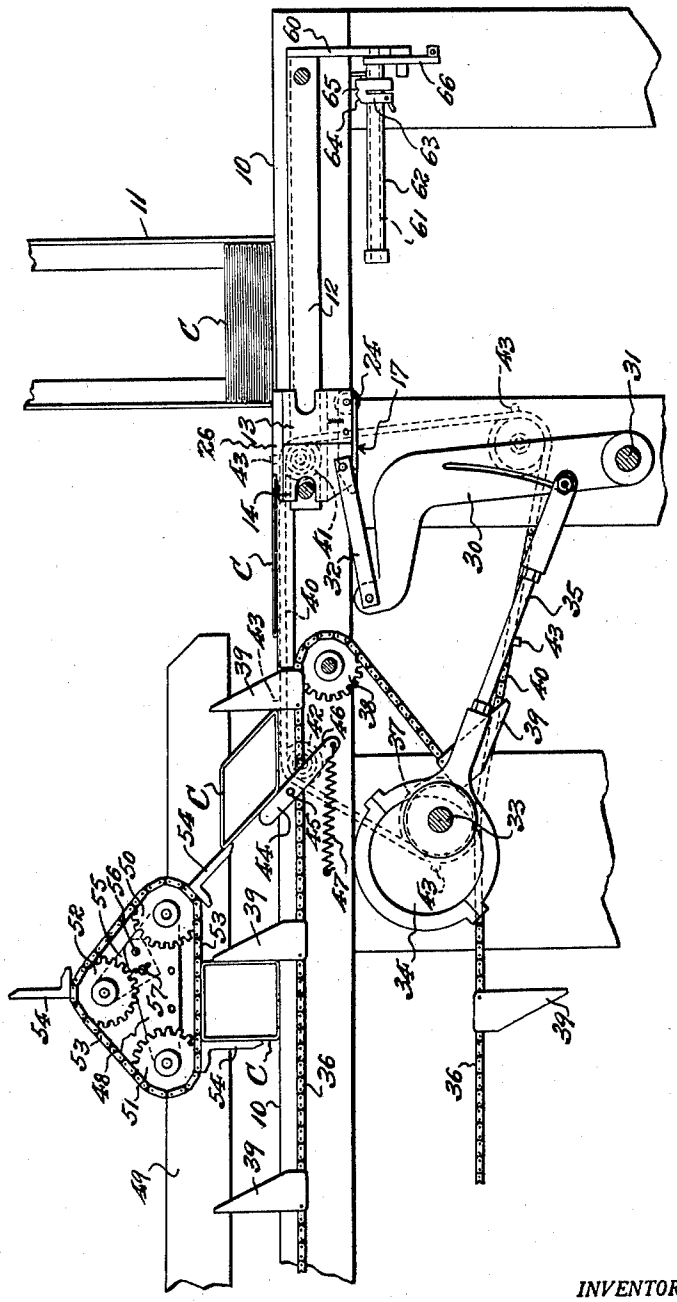
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MECHANISM FOR FEEDING AND SETTING UP COLLAPSED CARTONS

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MECHANISM FOR FEEDING AND SETTING UP COLLAPSED CARTONS

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3 Claims. (Cl. 93—53)

This invention relates to packaging machinery, and has reference, more particularly, to improvements in machines for filling and closing paper cartons, the cartons being initially collapsed or flat folded, and being automatically delivered from a stack thereof to means for setting up the same to an expanded open condition preparatory to filling and closing thereof; this application being a division of our co-pending application Serial No. 528,266, filed August 15th, 1955, now Patent 2,832,592.

It is an object of this invention to provide a carton filling and closing machine with improved means operative to expand or square flat folded or collapsed carton bodies as delivered from a stack thereof, and thus set up the same in open condition ready for reception of material or objects desired to be inserted thereinto for enclosure thereby.

The above and other objects will be understood from a reading of the following detailed description of an illustrative embodiment of this invention in connection with the accompanying drawing which shows a fragmentary longitudinal sectional view of a carton filling and closing machine having feeding mechanism for successively advancing flat collapsed cartons for a supply stack thereof, and means for expanding and squaring the cartons to open condition ready for reception of material or objects desired to be enclosed therein.

Referring to the drawing, the reference character **10** indicates a longitudinally extending trackway by which cartons to be set up, filled and closed are supported as they are moved through the machine.

Mounted across the rear end portion of the trackway **10** is an upstanding, endwise open hopper structure **11**, which serves to support a stack of initially flat folded or collapsed cartons C.

A stationary slideway bar **12** is suitably supported to extend longitudinally beneath the hopper structure and below the top level of the trackway **10**. Slidably supported by said slideway bar **12**, for movement back and forth thereon, so as to traverse the open bottom of the hopper structure **11**, is a reciprocable carton feed device. This carton feed device, in an illustrative form thereof as shown, comprises a rearward slide member **13** and a forward slide member **14**, which normally abut one another in end to end relation, and are detachably coupled together, so as to move as a unit back and forth upon the slideway bar **12**, when the carton feeder device formed thereby is conditioned for carton feeding operation. The means for detachably coupling together the rearward and forward slide members comprises a latching lever **17**, which is pivotally supported in connection with the rearward slide member **13**. The latching lever **17** is provided at its rear end with an antifriction roller **24**. Affixed to the top of the rearward slide member **13**, to project forwardly over the top of the forward slide member **14** is a push-plate **26**, which underlies the stack of cartons lodged in the hopper **11**, so as to be movable back and forth relative to said stack of cartons by the reciprocation

of the carton feeder device, whereby to successively advance collapsed cartons from the stack thereof for movement through the machine.

Fastened to the rear end of the slideway bar **12** of the carton feed device, to depend therefrom, is a bracket plate **60**. Affixed to this bracket plate, to extend forwardly therefrom in parallel relation to the slideway bar **12**, and so as to be disposed adjacently beneath the path of reciprocable movement of the slide members **13** and **14** and the latching lever **17** thereof, is a bearing stud **61**. Journaled on said bearing stud, for rocking movement thereon, is a hollow oscillatable shaft **62**. Mounted on said oscillatable shaft, to upstand therefrom, is a latching lever release cam block **63**, which is formed to provide an upwardly and rearwardly inclined cam section **64** on its free end portion, that leads to a transverse seating groove or channel **65** formed in the free end surface of said cam block **63**. Also mounted on said oscillatable shaft **62**, to depend therefrom, is a lever arm **66** that is opeartive to rock the oscillatable shaft, whereby to selectively move the latching lever release cam block **63** into and out of the path of the roller **24** of the latching lever **17**, whereby to condition the slide members **13** and **14** in latching lever connected or in latching lever released disconnected relation, as may be desired. Operator manipulatable means (not shown) is provided for actuating the lever arm **66**.

The above described carton feed device is merely illustrative of one type thereof (being the type shown in the parent application of which this application is a division) which may be employed. It will therefore be understood that any other suitable known type of carton feed means may be employed, and consequently no limitation to the illustrative form described is intended, so far as the invention of this application is concerned.

Means is provided for effecting suitably timed reciprocation of the carton feeder device. An illustrative form of such means, as shown, comprises an oscillatable lever **30**, which is pivotally mounted on a transverse shaft **31** that is supported by and across the machine frame work. The free end of this lever **30** is connected by link **32** to the forward slide member **14** of the carton feeder device. Operated by a power shaft **33**, which is journaled in and across the machine framework, is an eccentric **34** that is connected by its connecting rod **35** to the oscillatable lever **30**, and which thus functions to produce oscillation of the latter whereby to reciprocate the carton feeder device.

Forwardly beyond the hopper **11**, the machine is provided with continuously driven carton propelling conveyer means, which comprises at least one conveyer chain **36** which is supported by sprockets including a drive sprocket **37** that is mounted on the power shaft **33**, and an idler sprocket **38** over which runs the advancing course thereof in parallel relation to the trackway **10** of the machine. Mounted on the conveyer chain **36**, at suitably spaced longitudinal intervals therealong, are carton propelling members **39**, which are adapted to upstand from the advancing course of said conveyer chain, so as to engage rear sides of cartons C that are supported by and for advancing travel upon said trackway **10**.

Intermediate the hopper **11** and the receiving end portions of the carton propelling conveyor chain **36** is a continuously driven carton transfer conveyer means, which comprises at least one conveyer chain **40**, and preferably two thereof arranged to straddle the conveyer chain or chains of the carbon propelling conveyer means. Said transfer conveyer chain **40** (or each thereof) is supported by sprockets including a drive sprocket that is mounted on the power shaft **33**, and a rearward idler sprocket **41** and a forward idler sprocket **42** over which runs the advancing course thereof in parallel relation

to the trackway 10 of the machine. Carried by the transfer conveyer chainn 40, at suitably spaced intervals therealong, are carton advancing lugs 43. The receiving end portion of the advancing course of the transfer conveyer chain 40 is disposed rearwardly of the terminal point of the forward feed stroke travel of the carton feeder device. The forward discharge end portion of said advancing course of the transfer conveyer chain 40 laps the receiving end portion of the advancing course of the carton propelling conveyer chain 36, so that a carton advanced by said transfer conveyer chain is positioned in advance of an approaching propelling member 39 of the propelling conveyer chain, so that the rearward edge and side of said carton can be engaged by latter for advance thereby.

Suitably positioned forwardly of the receiving end of the advancing course of the propelling conveyor chain 36, and within the trackway 10, so as to lie in the path of advance of a carton C propelled along the latter, is a yieldable carton lifter device comprising an upwardly projecting lifter lever 44, pivotally supported at 45 relative to the trackway, and having a downwardly extending tail portion 46 to which a pull spring 47 is connected. Initially, i.e., before it is engaged by an advancing carton, the lifter lever 44 is swung by the pull spring 47 to a rearwardly inclined position, in which position it awaits engagement by an advancing carton.

Mounted above the trackway 10 adjacent to the carton lifted lever 44, for cooperation with the latter and with the propelling members 39 of the carton propelling conveyer means, is a carton squaring and holding device. This device comprises a stationary bracket 48, which is suitably supported from a stationary part of the machine, such e.g. as a side rail 49. Rotatably mounted respectively on rearward and forward ends of the stationary bracket 48 are longitudinally aligned rearward and forward idler sprockets 50 and 51. Supported intermediate and in upwardly offset relation to the idler sprockets 50 and 51 is a tensioning idler sprocket 52. Supported by said idler sprockets 50, 51 and 52 is an endless chain 53, the forwardly moving course of which extends between the idler sprockets 50 and 51 so as to run parallel to the trackway 10 at a level spaced above the latter substantially equal to the height of a carton, when said carton is set up in its squared and open condition. Carried by the chain 53, at suitably spaced intervals therealong, to project perpendicularly outward therefrom, are rigid carton holding fingers or dogs 54.

The chain 53, with its carton holding fingers or dogs 54, is free to move under the thrust of a carton which is propelled forwardly along the trackway 10 by the carton propelling conveyer means. It is desirable by reason of this that the tension of the chain 53 be so adjusted as to yield to the thrust of carton advancing movement, and yet offer sufficient resistance to such movement as will maintain the holding engagement of carton contacting fingers or dogs 54 thereof with cartons which are propelled against the latter. To attain desired tensional adjustment of the chain 53, the tensioning idler sprocket 52 is mounted on a movable bracket extension 55 which is pivotally connected at 56 with the stationary bracket 48, and which can be moved to lift or lower said tensioning idler sprocket with chain tension adjusting effect. A cooperative lock screw and slot means 57, or other suitable means, is provided for securing said bracket extension 55 and the idler tensioning sprocket carried thereby in selected chain tensioning position.

In the operation of the machine as thus far described, the rearward and forward slide members 13 and 14 of the carton feeder device being coupled together by the latching means for normal operation, the carton feeder device is reciprocated by its above described actuating means. The rearward stroke of the carton feeder device carries the push-plate 26 behind the carton supply stack, so that, on its ensuing forward stroke, the same will engage the rearward edge of the bottommost flat folded or collapsed carton of said supply stack, and thereupon will push the latter forwardly out of said stack, and over the receiving end portion of the transfer conveyer means. By the timed operation of the chain or chains 40 of said transfer conveyer means, carton advancing lugs 43 thereof are moved behind the delivered collapsed carton so as to engage the rear edge of the latter, and thereupon advance the same so as to engage its forward edge with the lifter lever 44, and into position for engagement of its rear edge by the approaching carton propelling member or members 39 advanced by the chain or chains 36 of the carton propelling conveyer means.

As the forward edge of the advancing collapsed carton is brought by the operating conveyor means into engagement with the spring tensioned lifter lever 44, the latter yieldably thrusts upwardly against the forward side panel of said collapsed carton, whereby to up turn said panel about its juncture with the bottom panel thereof, thus initiating the squaring movement of said collapsed carton. As this occurs, one of the fingers or dogs 54 of the carton squaring and holding means, which is carried by that portion of the chain 53 that is passing around the rear idler sprocket 50 thereof, has reached a position at which it will be engaged by the upper marginal portion of the upswinging forward side panel of the advancing carton. As the partially squared carton thereafter continues to advance under the propulsion of the propelling member or members 39 which exert forward thrust against the rear edge of its bottom panel, the aforesaid finger or dog 54 will move in company with the advancing carton to a perpendicular position, so as to back up the carton against the forward thrusting pressure of the propelling member 39, thus completing the squaring erection of the carton, whereby its front and rear side panels are disposed perpendicular to its top and bottom side panels. As the carton thus operated upon passes into engagement with the carton squaring and holding device, the lifter lever 44 will yield to the forward movement of the carton, so as to be depressed by the carton passing over the same. Said lifter lever will be returned by its pull spring 47 to normal position ready for engagement by a following collapsed carton. From the above it will now be apparent that the carton is subjected to erecting pressure between a propelling member 39 and a finger or dog 54 of the carton squaring and holding device. It will also be understood that collapsed cartons will be successively delivered from the supply stack thereof, and successively erected to squared open condition by the means and in the manner above described.

A feature of the carton squaring device is its adaptability to set up cartons of different sizes without adjustment to permit changing from one size carton to another. The characteristic of the machine is a consequence of the relative spacing between the carton propelling members 39 of the conveyer chain 36 and between the dogs 54 on the endless chain 53. Since the spacing between the dogs 54 is less than the spacing between the propelling members 39, and since the endless chain 53 to which the dogs 54 are attached is driven by the advancing cartons, the endless chain 53 operates intermittently. Upon a change of size of the cartons fed to the carton squaring device, the time interval during which the chain 53 is inoperative will change so as to accommodate the change in carton size. After the change of carton size (i.e. after the first carton of the new size has been set up by the machine), the device will be indexed to the new size and will operate just as it did prior to the change in carton size. Thus, the operation of the endless chain 53 corresponding to the continuous operation of the conveyer chain 36 is intermittent so that

different size cartons can be set up without adjustment of the endless chain 53.

Having now described our invention, we claim:

1. In a machine having a trackway over which collapsed cartons are moved subject to squaring erection to open the same for reception of content to be enclosed therein, means for successively feeding collapsed cartons from a supply stack thereof, conveyer means to receive and advance said cartons along the trackway, said conveyer means having propelling members to engage trailing edges of said collapsed cartons, a lifter device against which the leading edge of an advanced collapsed carton is thrust by a propelling member of the conveyer means, said lifter device being adapted to exert upswinging pressure upon the leading side panel of the advanced carton, whereby to initiate squaring movement of said carton, said lifter device comprising a pivoted lever having an upper arm to normally project above the plane of the trackway in the path of collapsed cartons advanced thereupon, said lever having a tail portion, and a pull spring connected with said tail portion, whereby to yieldably disposed the lever so as to position the upper arm thereof in its aforesaid normal position, and a carton squaring means comprising a supporting bracket structure, an endless chain supported by sprockets, certain of said sprockets being longitudinally spaced to dispose the advancing course of said chain above and parallel to the plane of the trackway, another of said sprockets to engage the return course of said chain, means to adjust the latter sprocket relative to the other sprockets, whereby to predetermine the running tension of said chain, said chain having angularly projecting dogs spaced therealong to be engaged by the partially squared advancing cartons and by exerting back pressure thereupon to thereby complete the carton squaring operation.

2. In a machine having a trackway over which flat collapsed cartons are successively moved subject to squaring erection to open the same for reception of content to be enclosed therein, conveyer means adapted for continuous operation to advance said cartons along the trackway, said conveyer means having propelling members to engage trailing edges of the collapsed cartons and disposed at spaced intervals therealong, a spring tensioned yieldable carton lifter device against which the leading edge of an advanced collapsed carton is thrust by a propelling member of the conveyer means, said lifter device being adapted to exert up swinging pressure upon the leading side panel of an advanced collapsed carton, whereby to initiate squaring movement of said carton, said carton squaring means comprising an endless chain mounted over the conveyer and having angularly projecting dogs disposed at spaced intervals therealong and adapted to be engaged by the partially squared advancing cartons and by exerting back pressure thereupon

to thereby complete the carton squaring operation, said endless chain being mounted for idling response to the engagement thereof by the partially squared advancing cartons, means for regulating the running tension of said endless chain, the spacing between said propelling members exceeding the spacing between said dogs, whereby the operation of the endless chain corresponding to the continuous operation of the conveyer means is intermittent so that different size cartons can be set up with the machine without adjustment of said endless chain.

3. In a machine having a trackway over which flat collapsed cartons are successively moved subject to squaring erection to open the same for reception of content to be enclosed therein conveyer means to advance said cartons along the trackway, said conveyer means having propelling members to engage trailing edges of the collapsed cartons, a lifter device against which the leading edge of an advanced collapsed carton is thrust by a prop;elling member of the conveyer means, said lifter device being adapted to exert upswinging pressure upon the leading side panel of the advanced carton, whereby to initiate squaring movement of said carton, said lifter device comprising a pivoted lever having an upper arm to normally project above the plane of the trackway in the path of collapsed cartons, advanced thereupon, said lever having a tail portion, and a pull spring connected with said tail portion, whereby to yieldably dispose the lever so as to position the upper arm thereof in its aforesaid normal position, and carton squaring means comprising a main supporting bracket structure, a pair of idler sprockets mounted on said bracket structure, an endless chain supported by said sprockets, said pair of sprockets being longitudinally spaced to dispose the lower advancing course of said chain above and parallel to the plane of said trackway, a third idler sprocket disposed intermediate said pair of idler sprockets to engage the upper return course of said chain, a movable bracket extension connected with said main bracket structure to carry said third idler sprocket, said bracket extension being adjustable to raise or lower said third idler sprocket to regulate the running tension of said endless chain, means to releasably secure said bracket extension and third idler sprocket in desired chain tension adjusting position, and said chain having angularly projecting dogs spaced therealong adapted to be engaged by the partially squared edvancing cartons and by exerting back pressure thereupon to thereby complete the carton squaring operation.

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