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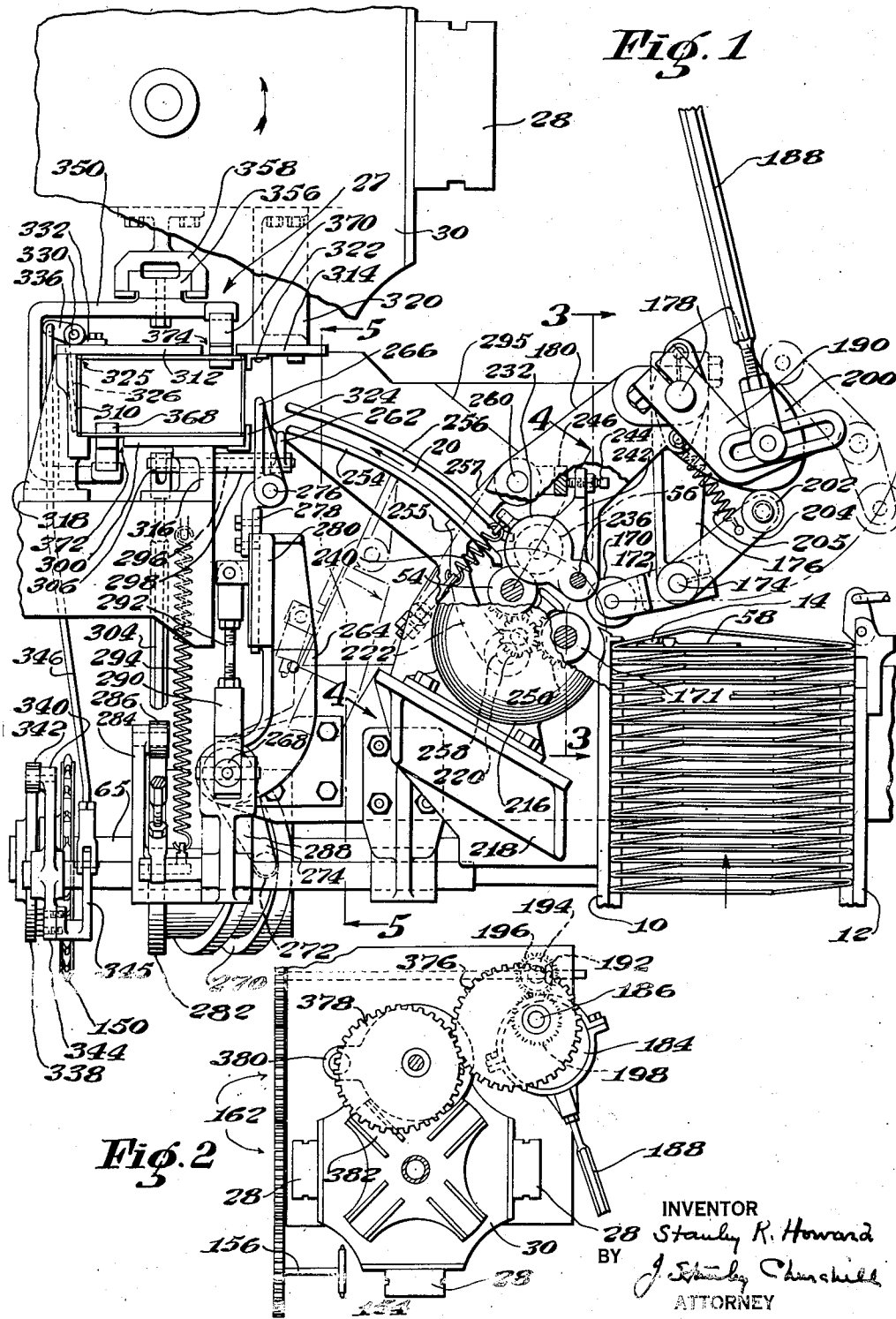
S. R. HOWARD

2,241,817

PACKAGING MACHINE

Filed May 13, 1939

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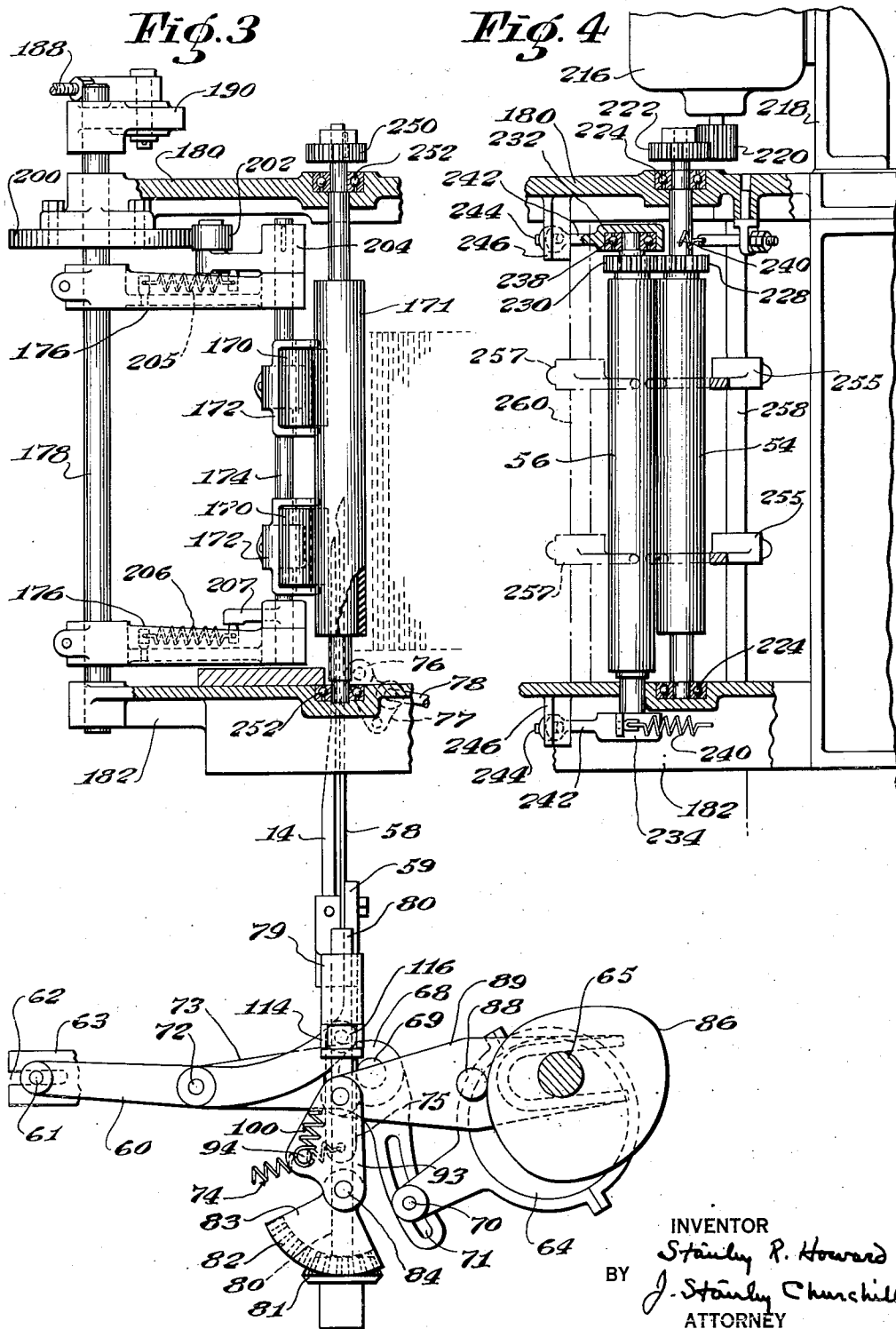
S. R. HOWARD

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4 Sheets-Sheet 2



INVENTOR
Stanley P. Howard
BY J. Stanley Churchill
ATTORNEY

May 13, 1941.

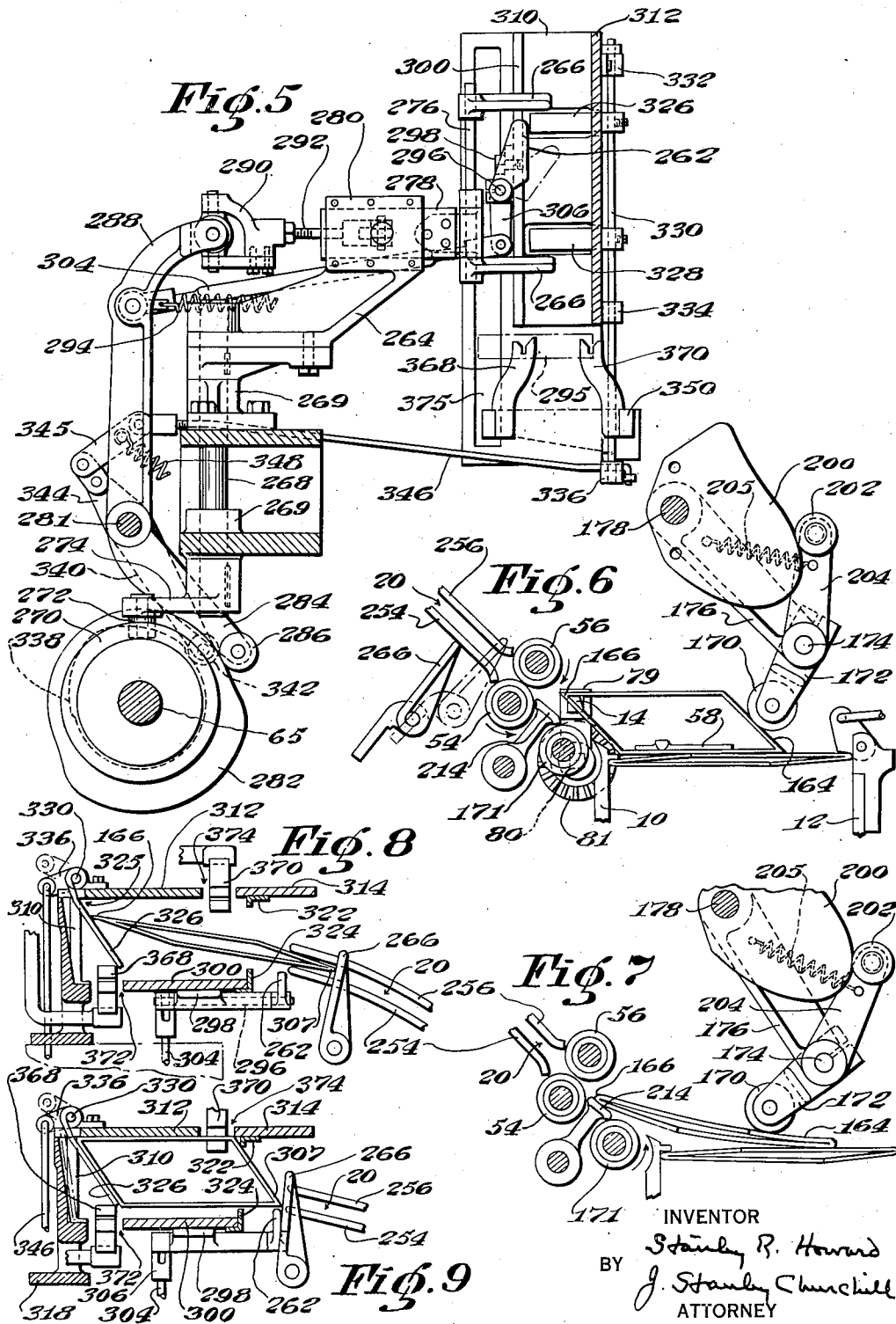
S. R. HOWARD

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PACKAGING MACHINE

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4 Sheets-Sheet 3



INVENTOR
Stanley R. Howard
BY
J. Stanley Churchill
ATTORNEY

May 13, 1941.

S. R. HOWARD

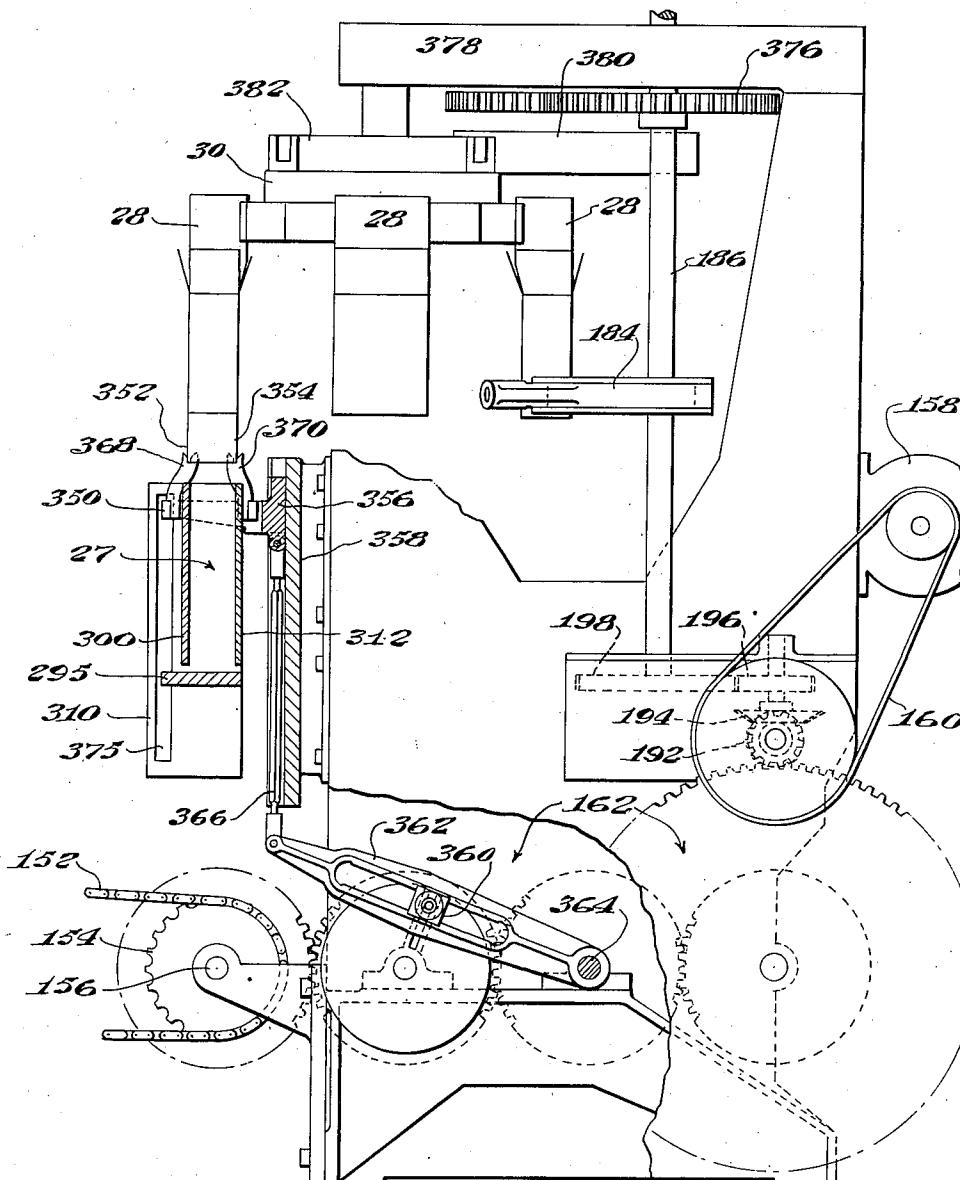
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Fig. 10



INVENTOR

BY Stanley R. Howard
J. Stanley Churchill
ATTORNEY

J. Stanley Churchill
ATTORNEY

ATTORNEY

UNITED STATES PATENT OFFICE

2,241,817

PACKAGING MACHINE

Stanley R. Howard, Milton, Mass., assignor to
Pneumatic Scale Corporation, Limited, Quincy,
Mass., a corporation of Massachusetts

Application May 13, 1939, Serial No. 273,497

8 Claims. (Cl. 93—53)

This invention relates to a packaging machine, and more particularly to a carton feeding and sealing machine.

The invention has for an object to provide a novel and improved construction of carton feeding and sealing machine in which provision is made for transferring cartons from a supply thereof to a carton supporting member by novel and improved mechanism and which is capable of operation at higher speeds than prior machines of this character.

A further object of the invention is to provide a novel carton feeding and sealing machine in which provision is made for automatically placing the cartons upon the carton supporting member by novel and improved mechanism whereby the machine is enabled to operate efficiently and at relatively high speed.

With these general objects in view, the invention consists in the carton feeding and sealing machine and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a plan view of the carton transfer mechanism embodied in the present carton feeding and sealing machine; Fig. 2 is a plan view illustrating a portion of the driving mechanism; to be referred to; Figs. 3 and 4 are elevational views of a portion of the carton transfer mechanism in cross-section on the lines 3—3 and 4—4 of Fig. 1, respectively; Fig. 5 is an elevational view in cross-section on the line 5—5 of Fig. 1 showing the carton receiving pocket and associated mechanism; Figs. 6 and 7 are plan views of a portion of the mechanism illustrated in Fig. 1 shown in different positions of operation; Figs. 8 and 9 are plan views, partly in cross-section, of the carton receiving and forming pocket, showing the carton in different positions, and Fig. 10 is a side elevation of a sufficient portion of the carton feeding and sealing machine to enable the present invention to be understood, some of the parts being broken away and in cross-section.

In general the different features of the present invention are herein shown as embodied in an automatic packaging machine comprising a carton feeding and sealing machine which functions to close and seal the bottom flaps of the carton. In the commercial package forming machine, upon which the present invention is an improvement and which is known in the trade as a bottom sealer, the cartons are supplied to

the machine in a partially completed form, that is in a tubular form which is knocked down or collapsed having the top and bottom flaps projecting from opposite ends of the tubular body portion of the carton. The carton in this condition will be referred to as a collapsed carton. Such collapsed cartons are automatically fed from a magazine holding a bulk supply thereof and are automatically opened into tubular form and placed upon the forming block or similar supporting member of the bottom sealing mechanism with the bottom flaps extending below the bottom of the carton supporting member. In practice, the bottom sealing mechanism and the carton feeding mechanism are operatively connected together to comprise in effect a unitary carton feeding and sealing machine in which the carton feeding operations are performed in definite timed relation to the sealing and folding operations of the bottom sealing mechanism.

Commercial prior carton feeding and sealing machines, as typified by the machines illustrated and described in the United States patents to Howard, No. 1,342,047, dated June 1, 1920, and No. 1,593,827, dated July 27, 1926, were limited to a productive speed of from 30 to 60 cartons a minute. It is the aim of the present invention to generally improve the structure of the cooperating mechanisms for removing successive cartons from the magazine, opening them up into tubular form and placing them upon the carton supporting members of the bottom sealing mechanism to the end that the machine may operate at a greatly increased speed and to be capable of attaining a productive capacity of the order of 100 cartons a minute.

Referring to the drawings, the carton feeding and sealing machine illustrated therein and in which the different features of the present invention are embodied comprises an improvement in the carton forming machine shown in the Howard patents above referred to and includes a carton feeding unit comprising guide rails 10, 12 which constitute a magazine for supporting a stack of the collapsed cartons, the latter being arranged vertically in the magazine with the bottom forming flaps lowermost. The collapsed cartons are withdrawn from the stack between the guide rails 10, 12 by mechanism including a reciprocal and revoluble knife 14, as will be described and conveyed by said mechanism through a guideway 20 and thereafter the carton is pushed into a pocket indicated generally at 27. The collapsed carton is squared up in the pocket and then lifted by an elevator onto a forming

block 28 with the bottom flaps projecting below the bottom of the block. A plurality of forming blocks are mounted upon a spider 30 which is intermittently rotated to present the cartons to different stations. Provision is made for folding and sealing the bottom flaps of the cartons as the latter are rotated into successive stations and for this purpose the folding and sealing instrumentalities illustrated in the United States patent to Everett, No. 1,765,716, dated June 24, 1930, may be employed. Inasmuch as the construction of the bottom sealing mechanism of itself constitutes no part of the present invention, the details thereof have been omitted from the drawings to facilitate understanding of the invention, and for further detailed description of the construction and operation of these parts, reference is made to the above mentioned Howard and Everett patents. After the bottom flaps have been folded and sealed to constitute a closure for the bottom of the carton, the latter may be ejected from the forming block 28 by the usual ejector mechanism, when the block has arrived at the final station, and the carton in this form may be deposited upon a discharge conveyor to be carried away from the machine.

Referring now to Fig. 1, the mechanism herein illustrated for withdrawing successive collapsed cartons from the stack or magazine comprises the knife 14 having a relatively narrow blade which is adapted to be raised from a position beneath the stack to cause it to enter the carton and which is thereafter swung through an arc sufficient to open the carton and to dispose one corner thereof in a position to be projected into the bite of a pair of advancing rolls 54, 56 between which the carton is subsequently passed, as will be described. In the operation of the mechanism, the knife 14 cooperates with a relatively flat knife blade 58, see Figs. 1, 3 and 6, the latter being secured by a bracket 59 upon one end of a lever 60 pivoted at 61 in an open slot 62 in a bracket 63 projecting from the frame of the machine, and the knife blade 58 is actuated to be raised from a position beneath the stack upwardly to a position within the foremost carton by an eccentric 64 on the main cam shaft 65, the movements of the eccentric being transmitted through a bell crank 68, pivoted upon a stud 69 supported upon the machine frame. The lever 60 is pivoted midway of its length to a stud 72 carried by the arm 73 of the bell crank 68 thereby providing a substantially straight line motion for the knife members. A pin and slot connection 70, 71 is provided for adjusting the movements of the knife to cause the latter to withdraw from the carton during the early part of the movements of the revoluble knife 14. The function of the relatively flat knife 58 is to engage the interior of the rear side of the carton to hold it firmly against the stack while the revoluble knife operates to open the carton, as illustrated in Fig. 6. As herein shown, the bracket 59 is pivotally mounted in the end of the lever 60, the upper end of the knife 58 being yieldingly held against the end of the stack by a spring 74 attached to an extended portion 75 of the bracket 59. The flat knife 58 is also adapted to be rocked forwardly to permit the foremost carton in the stack to be removed from the magazine as illustrated in Fig. 6 and as herein shown, this operation may be accomplished by a roller 76 carried by a pivotally mounted lever 77 which may be actuated through connections including a link 78 connected to an operating cam, not shown, see Fig. 3.

The revoluble knife 14 is mounted upon a bracket 79 slidably mounted upon a square shaft 80 journaled in suitable bearings in the machine frame and capable of being rotated through a bevel gear 81 mounted upon the lower end thereof in cooperation with a beveled segment 82 formed on an arm 83 mounted upon a stud 84 supported in a part of the machine frame. The stud 84 has fast thereon a second arm 93 which is rocked by a cam 86 mounted upon the cam shaft 65 in cooperation with a cam roll 88 upon a forked cam arm 89. The cam 86 operates to cause the revoluble knife 14 to swing through an arc of substantially 90 degrees from its carton entering position to its carton opening position. The knife is returned to its original position during the operation of the machine by a spring 100 attached to a pin 94 carried in the arm 93 and having the other end thereof attached to a part of the machine frame. Provision is made for raising the revoluble knife 14 to introduce it into the collapsed carton at the same time that the flat knife 58 is raised for this purpose, and to this end the lever 60 is provided with a forked extension 114 which is received within a yoke 116 formed on the hub of the bracket 79 which carries the knife 14, so that both knives are raised by the eccentric 64 through the linkage previously described.

The carton feeding and transferring mechanism is driven through connections from and in timed relation to the bottom sealing mechanism and as herein shown, the carton feeder cam shaft 65 is provided with a sprocket 150 which is connected by a chain 152 to a sprocket 154 mounted on a shaft 156 on the bottom sealer, see Figs. 1, 2 and 10. The shaft 156 is driven from a motor 158 through a belt connection 160 and through the cooperating train of gears indicated generally at 162 in Figs. 2 and 10 forming a portion of the bottom sealer driving mechanism.

In general, in the operation of the improved carton transfer mechanism, see Figs. 1, 6 and 7, after a collapsed carton has been withdrawn from the magazine and opened up with one corner thereof disposed in the general direction of the advancing rollers 54, 56 for applying pressure thereto in order to bend the carton blank in the opposite direction from that which it assumed in its original condition in the stack. As herein shown, the carton engaging and bending mechanism includes a pair of movable rollers 170 which, after operating to flatten out the carton blank, are adapted to be moved into cooperative engagement with a vertical driven roller 171 by which the flattened out carton blank is projected into the bite of the advancing rollers 54, 56. During this latter operation, the knife blade 58 and the revoluble knife 14, are being withdrawn so that when the forward edge 166 of the carton is received between the rollers 54, 56, the carton removing and opening members will be fully withdrawn to permit the carton to be advanced into the guideway 20 and towards the pocket 27.

The provision of the carton advancing rollers 54, 56, which are arranged to pick up and continue the advance of the carton into the guideway 20, after the cooperating rollers 170 and 171 have started the movement thereof in this direction, enables the machine to operate at a relatively high speed as compared with prior mechanisms employed for this purpose. Thus, after the movable rollers 170 have remained in cooperative engagement with the vertical driven roller 171 for a relatively short time, that is until

the forward edge 166 of the carton is projected into the bite of the rollers 54, 56, the movable rollers 170 are permitted to return to their original or starting position in readiness for cooperation with the next carton to be fed, instead of remaining in engagement with the carton blank and the cooperating roller 171 until the carton has entirely passed therebetween. In this manner, a saving of time is effected which aids materially in enabling the machine to operate at a relatively high rate of speed.

In the preferred embodiment of the invention, and as herein illustrated, see Figs. 1, 2 and 3, the rollers 170 are carried by arms 172 fast upon a vertical rocker shaft 174. The shaft 174 is pivotally mounted in suitable bearings in rocker arms 176 which are fast upon a second vertical rocker shaft 178. The shaft 178 is mounted in stationary upper and lower brackets 180, 182 respectively which form a part of the machine frame. Provision is made for rocking the shaft 178 through connections from the bottom sealing mechanism and as shown in Figs. 1 and 2, the connections include an eccentric connection 184, mounted on a vertical shaft 186 connected by a link 188 to a lever 190 fast upon the upper end of the vertical rocker shaft 178. As illustrated in Figs. 2 and 10, the vertical shaft 186 on the bottom sealing mechanism is rotated through driving mechanism from the motor 158, including bevel gears 192, 194, and spur gears 196, 198, the latter being mounted on the vertical shaft 186. In the operation of the machine, after the carton has been bent flat by the pressure of the rollers 170, as illustrated in Fig. 7, the latter are moved into cooperative engagement with the driven vertical roller 171 and retained in this position until the forward edge 166 of the flattened carton disposed therebetween is projected into the bite of the rollers 54, 56.

In order to guide the pivotally mounted carton engaging rollers 170 through the most effective path for bending the carton over upon itself and for cooperation with the roller 171 to project the carton blank into the bite of the rollers 54, 56, the rollers 170 are given a combination arcuate and straight line motion, and, to this end, the vertical rocker shaft 174 is arranged to be rocked by a stationary cam 200 affixed to the underside of the upper bracket 180. The stationary cam 200 cooperates with a roller 202 carried by an arm 204 which is fast upon the upper end of the vertical shaft 174. The cam roll 202 is retained in engagement with its cam 200 by a spring 205 which is connected between the upper rocker arm 176 and the cam roller arm 204, and a spring 206 which is connected between the lower arm 176 and an arm 207 fast on the shaft 174 as clearly shown in Fig. 3. The stationary cam 200 is designed so that, in operation, when the arms 176 are rocked through a circular path by the eccentric 184, the pivotally mounted carton engaging rollers 170 will be caused to follow a circular path at the beginning of their stroke and until they engage the end wall 164 of the carton and to thereafter follow a path substantially parallel to the stack of cartons in the magazine as illustrated in Fig. 1. This latter movement operates to flatten out the carton blank, as hereinbefore described, and, thereafter the continued movement of the rollers 170 carries the latter into cooperative engagement with the driven vertical roller 171 to project the carton into the bite of the rollers 54, 56 and into the guideway 20. As herein shown, the feed rollers

are preferably provided with a rubber covering to obtain a firm grasp upon the carton blank, and the springs 205, 206 provide a yielding engagement between the rollers 170, 171. During the transfer of the blank from one set of feed rollers to the next, the blank is guided over a stationary bridge member 214, disposed between the rollers 54 and 171.

Provision is made in the improved carton transferring mechanism for advancing the carton into the guideway 20 and to the pocket 27, more rapidly than has heretofore been possible, and, as herein shown, see Figs. 1, 3 and 4, the advancing rollers 54, 56 are preferably driven from a separate motor 216 and independently of any connections from the bottom sealing mechanism. The motor 216 is mounted vertically in a bracket 218 attached to the machine frame and is provided with a pinion 220 at its lower end which meshes with a pinion 222 secured to the upper end of the roller 54. The roller 54 is mounted to run in ball bearings 224 fixed in the upper and lower brackets 180, 182 as shown. The roller 56 is arranged to be driven from the roller 54 through cooperating spur gears 228, 230 and, as herein shown, the roller 56 is carried between upper and lower arms 232, 234 respectively which are secured to a pivotally mounted rod 236 journaled in the brackets 180, 182. Ball bearings 238 are also provided in the arms 232, 234 for mounting the roller 56.

In the preferred embodiment of the invention, provision is made for adjusting the roller 56 with relation to the roller 54 to accommodate different thicknesses of cartons and provision is also made for permitting the roller 56 to yieldingly cooperate with the roller 54. To this end, each roll carrying arm 232, 234 is further provided with an extension 242 which carries a set screw 244 adapted to engage a stop member 246. The stop members 246 may comprise lugs depending from the brackets 180, 182 as shown in Fig. 4. In addition to advancing the carton into the guideway 20, the function of the rollers 54, 56 is to press the carton flat in the opposite direction from that which it originally assumed in order to counteract the inherent tendency of the carton to return to its original position and to prepare the latter to assume a rectangular position in the carton pocket 27, as will be described.

The vertical roller 171, as herein shown, is also driven from the motor 216 through the cooperation of the motor pinion 220, with a pinion 250 secured to the upper end of the roller 171 which latter is journaled in ball bearings 252 mounted in the brackets 180, 182.

From the description of the operation of the machine thus far, it will be observed that the carton has been removed from its stack formation, opened up, again flattened out in the opposite direction and projected between the advancing rollers 54, 56 and into the guideway 20 toward the pocket 27. As herein shown, the guideway 20 comprises two sets of rails 254, 256, an upper and a lower set mounted upon brackets 255, 257 supported by vertical rods 258, 260 respectively, which latter extend between the brackets 180, 182. The upper set of rails are spaced from the lower set to provide an opening therebetween, for a purpose to be described. After the carton has entered the guideway 20, it comes to rest against a movable stop 262 immediately in front of the pocket 27 and in a position to be moved into the pocket 27 by a transfer mechanism which will now be described.

In the preferred embodiment of the machine provision is made for transferring the carton from the guideway 20 and into the pocket 27 in timed relation to the operation of the carton forming machine and to this end a swinging arm 264 carrying carton engaging fingers 266 is provided. As herein shown, see Figs. 1 and 5, the swinging arm 264 is fast upon the upper end of a vertical shaft 268 journaled in suitable bearings 269 in the machine frame. The arm 264 is arranged to be rocked to present the fingers 266 from a position behind the carton blank, as shown in dotted lines in Fig. 6, to a position immediately adjacent the carton pocket as illustrated in full lines in Fig. 1. The vertical shaft 268 carrying the arm 264 is arranged to be rocked by a barrel cam 270 in cooperation with a cam roller 272 carried by a lever 274 fast on the lower end of the vertical shaft. The barrel cam is mounted upon the cam shaft 65 of the machine.

In accordance with another feature of the improved carton transfer mechanism provision is made for operating the device in a manner such that a succeeding carton blank may be fed into the guideway 20 shortly after the previous blank has been pushed out of the guideway and into the pocket, and before the transfer arm 264 has returned to its original or starting position. This arrangement, as will be described, enables the machine to operate at a relatively greater speed than prior mechanisms of this character by eliminating the delay formerly occasioned by waiting for the transfer arm 264 to substantially complete its return stroke before a succeeding carton was permitted to enter. As illustrated herein, in order to permit a succeeding carton blank to be fed into the guideway 20 before the arm 264 has returned to its starting position, provision is made for retracting the fingers 266 before they start on their return stroke and for again extending the fingers at the end of the return stroke. As herein shown, the carton engaging fingers 266 are mounted upon a vertical stud 276 carried by a slide member 278 reciprocatingly mounted in the head 280 of the arm 264. The fingers 266 are arranged to be retracted through connections 65, and, as herein shown, one arm 284 of a two-armed lever pivoted at 281, carries a cam roll 286 which cooperates with the cam 282. The second arm 288 of the two armed lever is provided with a universal fitting 290 which is connected to the slide member 278 by a link 292. The cam roll 286 is held against its cam 282 by an elongated spring 294 extended between the arm 288 and the machine frame. During the transfer of the carton blank by the arm 264 and fingers 266, the carton is supported on its lower edge by a supporting plate 295.

Referring now to Figs. 1 and 5, provision is made for operating the movable stop member 262 so as to permit the carton blank to enter the pocket 27 during the forward stroke of the transfer arm 264 and to prevent entrance of the carton blank during the return stroke of the arm. To this end, the stop finger 262 is mounted on a rocker shaft 296 journaled in a bracket 298, mounted upon a plate 300 forming one side of the pocket 27. The stop member 262 is arranged to be rocked through connections from the arm 288 including a link 304 and an arm 306 fast on the rocker shaft 296. With this arrangement in the operation of the machine, when the fingers 266 are retracted at the end

of their forward or carton pushing stroke, the stop arm 262 will be rocked forward into the path of the succeeding carton blank, as indicated by dotted lines in Fig. 5. Thus the succeeding carton is prevented from entering the pocket 27 until the previous carton has been removed from the pocket and subsequent operations performed, as will now be described.

In the operation of the machine, when the carton blank passes out of the guideway 20, it is pushed by the fingers 266 into the pocket 27, and by reason of the pressure of the fingers on the rear folded edge 307 of the blank, and the opposite folded edge 166 bearing against the opposite side of the pocket, the continued pressure of the transfer fingers 266 will open the carton blank to its fully squared out form, in which shape it will be retained by the walls of the pocket. As herein illustrated, see Figs. 1, 8 and 9, the pocket 27 comprises the vertical side plates 300, 310, 312 and 314 which are supported by brackets 316, 318 and 320 mounted upon the machine frame. Angle bars 322, 324 disposed at the entrance to the pocket, define the corners at this end of the pocket.

In order to positively guide the forward edge 166 of the carton blank into the opposite corner 325 of the pocket, one side 310 of the pocket is provided with a swinging portion comprising the gates 326, 328, see Fig. 5, which are mounted upon a vertical rod 330, journaled in brackets 332, 334, secured to the plate member 312. Provision is made for rocking the gates from a position illustrated in Fig. 8 to the position shown in Fig. 1 in timed relation to the movement of the transfer fingers 266, and as herein shown, the lower end of the vertical rod 330 is provided with an arm 336 which is arranged to be rocked by a cam 338, mounted on the cam shaft 65, through connections including a two armed lever pivotally mounted on the rocker shaft 281, one arm 340 of the two armed lever carrying a cam roll 342 cooperating with the cam 338. The other arm 344 of the two armed lever is provided with an extension 345 which is connected by a link 346 to the arm 336. A spring 348 connected to the extension 345 is provided to hold the roller 342 against its cam. In operation, the gates 326 are disposed in the position illustrated in Fig. 8, until the carton is squared out into the position illustrated in Fig. 9, whereupon the gates swing back at the same rate as the forward movement of the fingers 266 until the carton is entirely squared up as shown in Fig. 1. Although, when operating at moderate speeds, such as from 30 to 60 packages per minute, the blank will open in the pocket without the aid of the gates 326, yet, when operating at a relatively high speed, the cooperation of the gates 326 with the fingers 266 provide a positive means for assuring the proper alignment of the carton in the pocket so that it will open up and prevent jamming or crushing of the carton blank up against the opposite side of the pocket. The carton, in its entirely squared up position, as shown in Fig. 1, is now ready to be elevated onto the forming block 28 of the bottom sealing mechanism, as will now be described.

Referring now to Figs. 1, 5 and 10, the elevating mechanism comprises, in general, an elevating member 350 which, in the operation of the machine, is arranged to engage the lower edges 352, 354 of the carton blank positioned in the pocket 27 and to raise the blank onto the forming block 28 positioned in alignment therewith, whereupon the elevating member is returned to

its lowered position in readiness for the next succeeding carton. The elevating member 350 is carried in a slide 356 mounted in a vertical guide 358 which is attached to the frame of the machine. The slide 356 is arranged to be raised and lowered through connections from the sealing mechanism including a crank member 360 in cooperation with a crank lever 362 which is pivoted at 364. The crank lever 362 is connected at its outer end by a link 366 to the vertical slide member 356. Thus the elevating member is vertically reciprocated during the operation of the machine.

In accordance with another feature of the present invention the elevating mechanism is constructed and arranged in a manner such that a succeeding carton blank may enter the pocket 27 before the elevating member has returned to its completely lowered position during its return stroke. In view of the relatively long stroke of the elevating member, this feature is of particular importance since a considerable amount of time is gained in that it is unnecessary to wait until the elevating member has completed its descent before introducing the next carton into the pocket.

As illustrated herein, the elevating member 350 comprises a skeletonized frame extending around the outside of the pocket 27 as shown in Fig. 1 and is provided with two inwardly and upwardly extending fingers 368, 370 which are arranged to extend through vertical openings 372, 374 respectively in the pocket. The side plate 310 is also provided with a vertical slot 375 through which one arm of the member 350 extends. As herein shown, the fingers are formed with V-grooves in their upper ends which are arranged to engage the lower edges of the carton flaps as illustrated in Fig. 1. In the operation of the machine, after the carton has been elevated onto its forming block 28, the elevating member 350 starts its return stroke, and, during this time, before the member 350 has completely returned to its lowermost position, the next succeeding carton blank is pushed into the pocket by the fingers 266 as shown in Fig. 8. By the time the carton blank has been opened up to the position shown in Fig. 9, the elevating member will have arrived near the end of its stroke so that when the latter reaches its lowermost position, the carton will be entirely squared up in position to be elevated onto the next forming block 28, the latter having in the meantime been brought around into alignment with the pocket 27. The fingers 368, 370 are so disposed as not to interfere with the introduction of the carton blank into the pocket, as will be apparent from an inspection of Fig. 8. It will be observed that the carton is guided in its upward movement by the sides of the pocket 27. With this construction, it will be apparent that a succeeding carton blank is permitted to enter the pocket while the elevating member is still moving downwardly and before it has completed its return stroke thus effecting a saving of time in the operation of the device and materially increasing the speed of the machine.

As herein shown, the spider 30, upon which the forming blocks 28 are mounted, is arranged to be intermittently operated through connections from the vertical shaft 186 including the elliptical gears 376, 378 and the Geneva drive mechanism comprising the driver 380 and geneva 382. The intermittent movement of the spider is arranged to bring one of the forming blocks

28 in direct vertical alignment with the pocket 27 at each period of rest, and in timed relation to the mechanism for feeding and squaring up of the carton in the pocket.

From the above description it will be observed that the improved construction of the carton feeding and forming mechanism of the present invention enables the machine to operate at a relatively high rate of speed as compared with other machines of this character and, in practice, a speed of 100 cartons per minute has been attained.

The operation of the machine may be briefly summarized as follows: After the foremost carton blank has been removed from the stack by the knife members 14, 58, and disposed in the position shown in Fig. 6, the pivotally mounted rollers 170 engage the carton, flatten it out, and, in cooperation with the driven roller 171, the rollers 170 project the flattened out carton into the bite of the feed rollers 54, 56. The feed rollers advance the carton into the guideway 20 and up against a movable stop member 262. The carton is now engaged by the fingers 266 which operate to push the carton into the pocket 27, the stop member 262 being moved out of the way at this time. The carton, square up in the pocket 27 is now elevated onto the forming block 28 by the elevating member 350, whereupon the forming block is intermittently moved to the different stations of the carton sealing machine to close and seal the bottom flaps of the carton.

From the description thus far it will be observed that in the operation of the present machine, provision has been made for feeding the collapsed carton blanks into a position with relation to the squaring out pocket so that the next succeeding carton blank will have been moved into a position ready to be introduced into the pocket during the interval in the operation of the machine that the preceding carton blank is being squared out in the pocket and further that the succeeding carton blank in its collapsed form is introduced into the pocket while the preceding carton blank is being transferred onto the forming block and prior to the time that the return stroke of the elevating members has been completed. These features of the invention contribute to the speed of the machine and to the economical production of sealed cartons.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a machine of the character described, in combination, carton opening and feeding means including a pocket for squaring up successive cartons, an elongated guideway through which the cartons are delivered into the pocket, a pusher member for engaging the rear corner of the carton to move it into the pocket, an inclined gate disposed in the path of the advancing corner of the carton to guide the same into the corresponding corner of the pocket, and means for moving said gate in timed relation to the movement of said pusher member into and from operative guiding position.

2. In a machine of the character described, in combination, a carton supporting member for supporting a carton during the bottom flap sealing operation, a squaring pocket into which successive cartons are fed to be squared up prior to

their transfer to said carton supporting member, and means for effecting said transfer including a pair of fingers adapted to project into the pocket to engage the bottom flaps of the carton during said transfer, said fingers being disposed with relation to the path of movement of cartons being introduced into the pocket so as to permit a succeeding carton to be introduced into the pocket while said fingers are returning to operative position after having transferred the preceding carton onto the carton supporting member.

3. In a machine of the character described, in combination, a magazine for supporting a stack of collapsed carton blanks, means for withdrawing successive blanks from the magazine and for opening the same, means for recollapsing the opened blank in the opposite direction including a movable roller, carton blank feeding means for advancing the recollapsed carton blank including a feed roller adapted to cooperate with said movable roller, a second pair of feed rollers between which the blank is fed by said first feed roller and said movable roller, a guideway into which the blank is fed by said second pair of feed rollers, and means for bodily moving said movable roller to return the latter to a starting position in readiness for operation upon a succeeding carton blank while the second pair of feed rollers are continuing the advance of a carton blank into said guideway.

4. In a machine of the character described, in combination, a magazine for supporting a stack of collapsed carton blanks, means for withdrawing successive blanks from the magazine and for opening the same, means for recollapsing the opened blank in the opposite direction including a movable roller, carton blank feeding means for advancing the recollapsed carton blank including a feed roller adapted to cooperate with said movable roller, a second pair of feed rollers, independently operating means for driving said second pair of feed rollers at relatively high speed between which the blank is fed by said first feed roller and said movable roller, a guideway into which the blank is fed by said second pair of feed rollers, and means for bodily moving said movable roller to return the latter to a starting position in readiness for operation upon a succeeding carton blank while the second pair of feed rollers are continuing the advance of a carton blank into said guideway.

5. In a machine of the character described, in combination, a pocket for squaring a collapsed carton blank, a guideway for guiding collapsed carton blanks into said pocket, means for feeding a collapsed carton blank into the guideway, and means for transferring a collapsed carton blank from the guideway into the pocket comprising a movable arm, a retractable finger carried by the arm and adapted to engage the rear edge of the collapsed carton blank to advance it into the pocket, and means for retracting the finger at the end of the forward stroke of the arm and for again extending the finger at the

end of the return stroke of the arm, and means for permitting a succeeding collapsed carton blank to enter the guideway during the return stroke of the arm.

6. In a machine of the character described, in combination, a pocket for squaring a collapsed carton blank, a guideway for guiding collapsed carton blanks into said pocket, means for feeding a collapsed carton blank into the guideway, and means for transferring a collapsed carton blank from the guideway into the pocket comprising a movable arm, a retractable finger carried by the arm and adapted to engage the rear edge of the collapsed carton blank to advance it into the pocket, and means for retracting the finger at the end of the forward stroke of the arm and for again extending the finger at the end of the return stroke of the arm, and means for permitting a succeeding collapsed carton blank to enter the guideway during the return stroke of the arm, and a stop member adapted to prevent the entrance of the collapsed carton blank into the pocket until engaged by said finger, and means for operating the stop member in timed relation to the operation of said finger.

7. In a machine of the character described of the type embodying a single stationary squaring pocket in which successive cartons are squared preparatory to being removed therefrom in succession to be delivered to successive carton supporting members, in combination, a single squaring pocket, a magazine for supporting a stack of collapsed cartons, a guideway leading from the magazine to the pocket, means for withdrawing successive cartons from the magazine and delivering them into the guideway, a carton moving member, and means for moving the same in a manner such as to engage successive cartons delivered into the guideway and to effect movement of one carton therethrough while the preceding carton is being squared up in the pocket and before the latter has been moved therefrom to be presented to the carton supporting means.

8. In a machine of the character described of the type embodying a single stationary squaring pocket in which successive cartons are squared preparatory to being removed therefrom in succession to be delivered to successive carton supporting members, in combination, a single squaring pocket, a magazine for supporting a stack of collapsed cartons, a guideway leading from the magazine to the pocket, means for withdrawing successive cartons from the magazine and delivering them into the guideway, a reciprocable carton engaging member, means for moving the same through a path such as to cause it to engage and feed a carton through the guideway upon the forward stroke thereof and to be withdrawn from carton engaging relation upon its rearward stroke, whereby to permit the carton moving member to effect the movement of one carton through the guideway while the preceding carton is in the pocket before it has been completely delivered to said carton supporting means.

STANLEY R. HOWARD.