July 4, 1933. S. R. HOWARD 1,916,425

PACKAGING MACHINE

Filed May 17, 1928 4 Sheets-Sheet 1

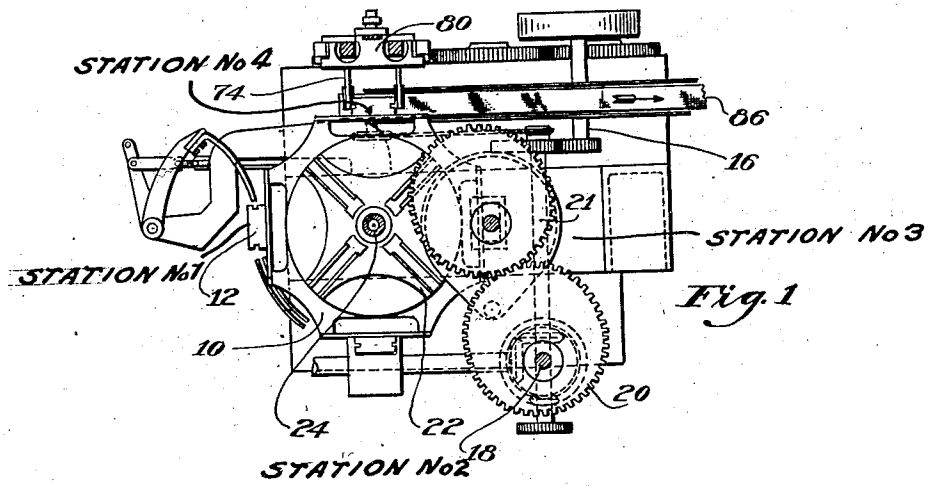


Fig. 1

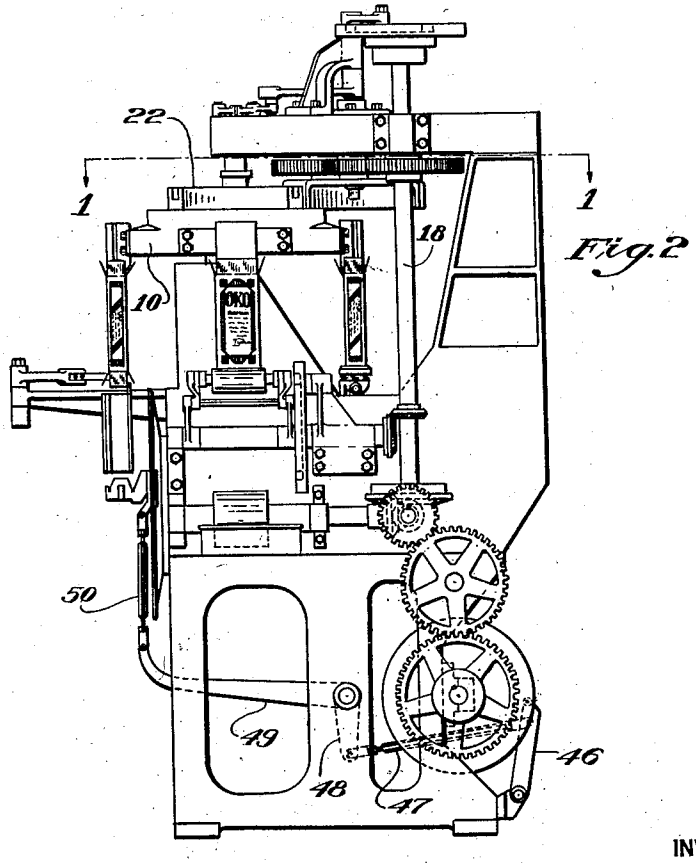


Fig. 2

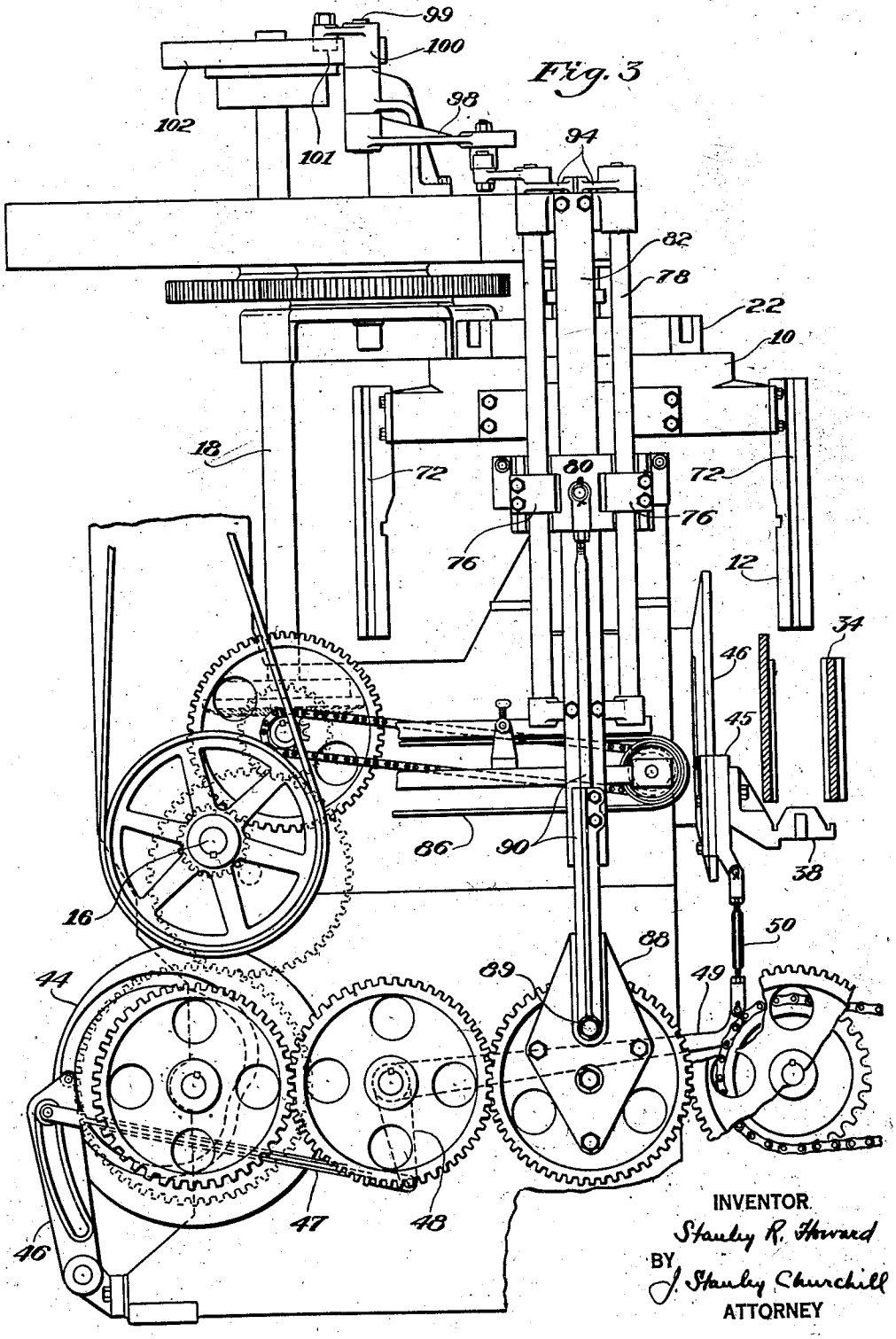
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Fig. 3



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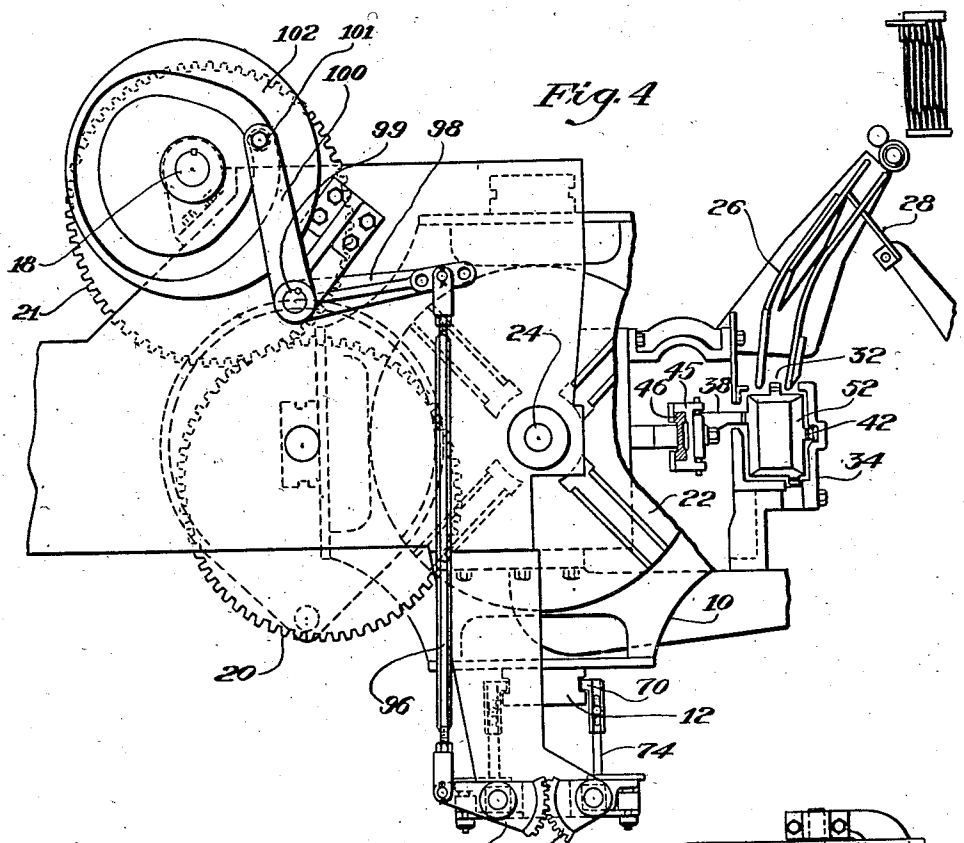


Fig. 4

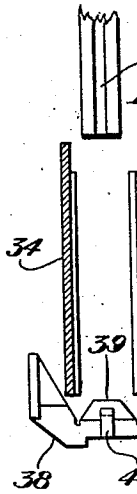


Fig. 5

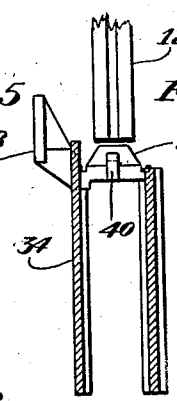


Fig. 6

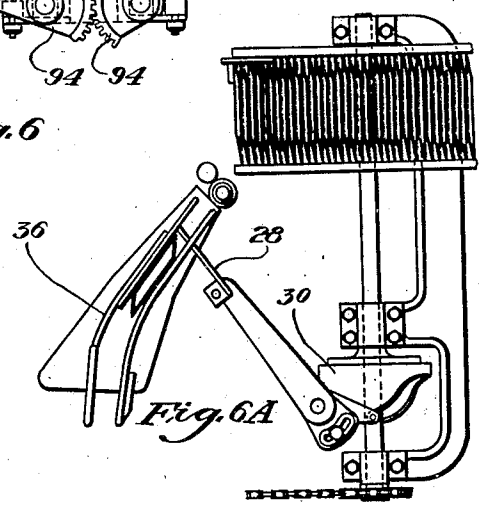


Fig. 6A

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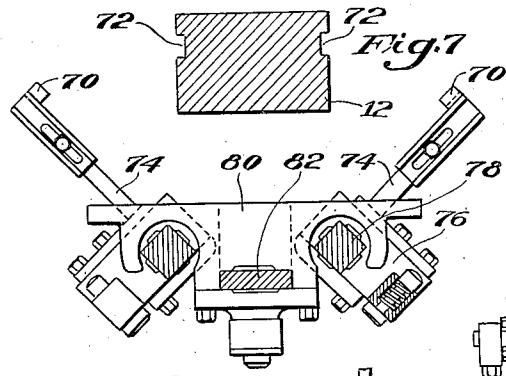


Fig. 7

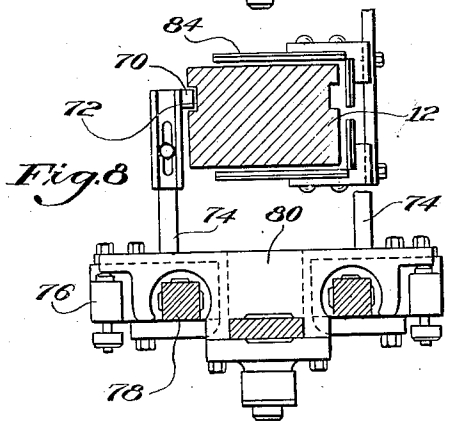


Fig. 8

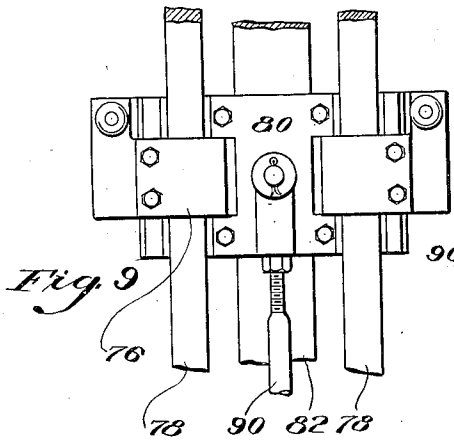


Fig. 9

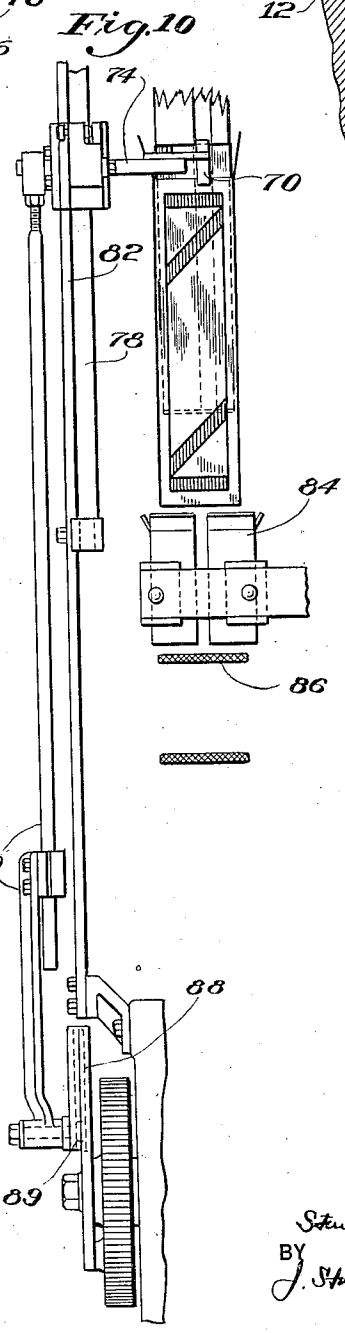


Fig. 10

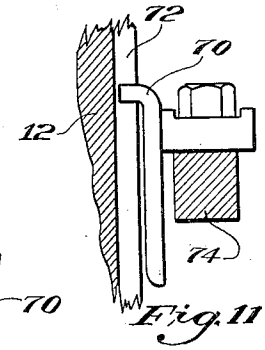


Fig. 11

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UNITED STATES PATENT OFFICE

STANLEY R. HOWARD, OF EAST MILTON, MASSACHUSETTS, ASSIGNOR TO PNEUMATIC SCALE CORPORATION, LIMITED, OF QUINCY, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

PACKAGING MACHINE

Application filed May 17, 1928. Serial No. 278,564.

This invention relates to an automatic packaging machine and more particularly to an automatic machine for sealing the bottom flaps of cartons.

In general the object of the invention is to provide a novel and improved construction of automatic bottom sealing machine capable of operation at higher speeds than prior machines of this character, and in which provision is made for automatically placing the cartons upon the carton supporting members by novel and improved mechanism.

A further and more specific object of the invention is to provide a novel automatic bottom sealing machine in which provision is made for automatically placing the cartons upon and removing the same from their supporting members by novel and improved mechanism, whose operation contributes to the efficiency of the machine and facilitates the operation of the same at relatively high speed.

With these objects in view the invention consists in the machine and in the 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, Figure 1 is a plan and Fig. 2 a side elevation of a bottom sealing machine embodying the present invention; Fig. 3 is a side elevation of the machine illustrating the mechanism for stripping the cartons; Fig. 4 is a plan view of a portion of the machine shown in Figs. 1 and 2 with parts broken away to illustrate the mechanism for placing the cartons upon the forming blocks; Figs. 5, 6 and 6A are diagrammatic details in sectional elevation and plan respectively, illustrating the operation of the mechanism for automatically placing the cartons upon the forming blocks; Figs. 7 and 8 are sectional details of the mechanism for stripping the carton from the forming block; Fig. 9 is a detail in side elevation of the mechanism illustrated in Fig. 8; Fig. 10 is a side elevation of the stripping mechanism and its operating parts; and Fig. 11 is a detail to be referred to.

Referring now to the drawings for purposes of illustration the different features of the invention are therein shown as embodied in a machine for bottom sealing cartons, and except as to such details as are hereinafter pointed out the illustrated machine may and preferably will comprise a standard bottom sealing machine such as is now upon the market.

Reference is made to the patent to W. S. Scales No. 767,445 dated August 16, 1904, as disclosing the general details of construction and mode of operation of such prior art bottom sealing machine.

Briefly and in general the prior art bottom sealing machine includes four forming blocks upon each of which a carton is placed to be supported with the bottom flaps of the cartons projecting below the bottom of the block. The forming blocks are arranged to be intermittently moved, and provision is made for positioning successive cartons upon successive blocks as each block is moved into a definite station, and thereafter a particular block with its carton is intermittently revolved through successive steps of 90° each to permit the different operations of folding and sealing bottom flaps of the carton to be performed.

In the machine illustrated in the above mentioned Scales Patent No. 767,445, the operation of the machine contemplated the manual placing of successive cartons upon the carton supporting member each time that the supporting member was tipped. In the commercial automatic bottom sealing machines now upon the market, provision is made for automatically feeding the cartons from a bulk supply by a carton feeding machine and for opening the cartons and inserting them in succession in a vertically movable pocket on the bottom sealing machine, by which each carton is moved upwardly and slipped upon the forming block. In such commercial machines, before the forming block and its carton could be moved following the deposition thereon of the carton by the vertically movable pocket, sufficient time had to elapse for the pocket to complete its descent. This represented a substantial in-

terval during which the machine was at rest, and one feature of the present invention resides in the provision of a construction of mechanism for depositing the cartons automatically upon the forming block in such manner that rotation of the forming block may be initiated immediately following the placing of the carton thereon.

A further feature of the invention resides in the provision of novel and improved mechanism for removing the carton from the forming block after the bottom sealing operations have been performed and both features are directed to securing a maximum speed in the operation of the machine.

Referring now to the drawings, as above stated the essential construction and mode of operation of the machine illustrated therein, except as to details to be hereinafter pointed out, may and preferably will comprise those of the commercial bottom sealing machines now upon the market and which are in general illustrated in the aforesaid Scales patent. The machine is provided with a rotatable spider 10 having four forming blocks 12 depending therefrom. Provision is made for intermittently rotating the spider 10 and forming blocks 12 through successive steps of 90° each, and as illustrated herein this intermittent motion is produced from the main driving shaft 16 driven from a suitable source of power, through gearing connections including a vertical drive shaft 18 and cooperating elliptical gears 20, 21, and through a Geneva motion indicated generally at 22 connected to the supporting shaft 24 upon which the spider 10 is mounted. The details of this driving mechanism are now well known and of themselves constitute no part of the present invention.

In the operation of the machine, as each forming block 12 is rotated into the position illustrated as Station 1 in Figs. 1 and 2, provision is made for automatically placing thereon a carton with the bottom flaps of the carton projecting beyond the bottom of the forming block. As illustrated in Fig. 4, successive cartons are fed from a standard form of carton feeding machine through a guideway 26, being actuated by a pusher member 28 driven from a suitable cam 30 through connections illustrated in detail in Fig. 6A and the carton is inserted by the pusher 28 through an opening 32 in a stationary pocket 34 secured to the machine frame and through which a vertically movable lifting device 38 is arranged to be moved to lift the carton onto the forming block 12. As herein shown, the lifting device 38 is provided with a central portion 39 adapted to enter between the bottom flaps of the carton and with lugs 40 forming grooves 42, for engaging and receiving the lower ends of the bottom flaps of the cartons. The lifting device is bolted to a slide 45 arranged to slide vertically in a suitable guide 46 secured to the machine frame, and vertical motion is imparted to the lifting device by an actuating cam 44 through a cam arm 46, connecting link 47, lever arms 48, 49, and link 50, as illustrated in Figs. 2 and 3. With this arrangement, after a carton is moved into the stationary pocket 34 through the open side thereof by the pusher member 28, the carton rests upon the lifting device 38 with the lower end of each bottom flap engaged by one of the lugs 40. Thereafter as the lifting device is raised the carton is lifted and slipped directly onto the forming block, and at the limit of the upward movement of the lifting device the carton is positioned in the correct position with the bottom flaps projecting beyond the bottom of the carton. After the carton has been moved into such position, immediate revolution of the spider 10 is caused to take place through the timing of such operation with respect to the operation of the lifting device 38. This rotation of the spider may take place immediately after the carton has been properly positioned on the block, because of the fact that the lifting device is positioned at all times entirely below the bottom of the forming block, and during the rotation of the spider, the bottom flaps snap over the bevelled sides 52 of the central portion 39 of the lifting device during the early part of the downward movement of the device.

From the description thus far it will be observed that in accordance with the present invention an automatic bottom sealing machine is provided in which maximum speed may be obtained in the automatic positioning of successive cartons upon successive blocks and wherein a minimum delay occurs between the positioning of the carton on the block and the start of revolution of the spider to move such block and carton into the next station and to bring a new block into position to receive its carton.

After a carton has been positioned upon the forming block at Station 1, the remaining operations of applying adhesive to the bottom flaps, and of folding the flaps to seal the bottom of the carton, may and preferably will be performed during the revolution of the block and carton through stations Nos. 2 and 3, and while the block and carton remain at such stations, and inasmuch as the details of suitable mechanism for performing these operations are known, their illustration has been omitted and it is not deemed necessary for understanding the present invention to further describe them, although reference may be had to the aforesaid Scales patent for a more complete description thereof.

Another feature of the present invention resides in the provision of novel and improved mechanism for removing or stripping the

carton from the forming block after the bottom sealing operations have been performed. It is highly desirable in a high speed bottom sealing machine, that the length of time during which the carton and block remain at the ejecting station be reduced to a minimum. As herein shown, provision is made for pushing or stripping the carton from its block immediately after the block arrives at Station No. 4 (see Fig. 1) and for permitting the block, and consequently the spider 10, to be immediately revolved after the carton has been removed, to the end that a minimum amount of time may be lost by the block remaining stationary in the ejecting station.

In the illustrated machine after the carton has arrived at Station No. 4 a pair of stripping fingers 70 are arranged to be swung by mechanism to be described into a position such as is illustrated in Figs. 8, 10 and 11, in which the fingers 70 are extended into grooves 72 in the forming block at the ejecting station. The fingers 70 are mounted upon arms 74, the latter being carried by blocks 76 positioned upon squared shafts 78 and themselves rotatably carried by a supporting member 80 to be capable of being lifted with the supporting member and thereby slid along the shafts 78 and at the same time to be capable of movement with the shaft to cause the fingers 70 to be swung into and from the positions illustrated in Figs. 7 and 8. As above stated in the operation of the machine after the carton and block have arrived at the ejecting station No. 4, see Fig. 1, the supporting piece 80 will have been raised and the fingers 70 swung in until they extend into the grooves 72 so as to position the fingers 70 above the top flaps of the carton, as illustrated in Fig. 10. From this position the supporting piece 80 carrying with it the block 76 and fingers 70 is caused to slide downwardly upon its supporting guide 82, and during its descent the fingers 70 strip the carton from the block and deposit it in a receiving pocket 84 positioned immediately above an outgoing conveyor belt 86 whereby after the carton drops onto the belt it is then conveyed from the machine by the belt. The supporting piece 80 is arranged to be moved vertically by a cam 88, cam roll 89, and connecting rod 90, the vertical reciprocations of the piece 80 operating in timed relation to the other elements of the machine.

Immediately after the carton has been removed from the block by the fingers 70 at the lower portion of the movement of the supporting piece 80, provision is made for swinging the fingers 70 together with their supporting arms 74 outwardly from the sides of the block into a position such that the block may then move without engaging the fingers 70 or arms 74, such a position being illustrated in Fig. 7. As herein shown the mechanism for performing this operation includes the square shafts 78 each of which is provided at its upper end with a segmental gear 94. The gears are arranged to mesh to cause the shafts 78 to be oscillated in unison, and one of the gears 94 is connected by a link 96 to a lever arm 98, and the latter is connected through the shaft 99, cam arm 100, and cam roll 101 to a control cam 102 driven in timed relation to the remaining elements of the machine. The design of the cam 102 is such as to cause the arms 74 and fingers 70 to be swung outwardly immediately after the carton has been removed from the block, thereby permitting the block to be immediately moved and thus insuring a minimum loss of time at the ejecting station. The cam is also designed so that the fingers 70 remain in their extended position such as is illustrated in Fig. 7 until they are raised with the supporting piece 80 to a position above the top flaps of the carton upon the next block arriving at the ejecting station, after which the fingers 70 are swung inwardly with the arms 74 and the foregoing operations repeated.

From the description thus far it will be observed that in the present construction of bottom sealing machine minimum loss of time is insured at the receiving and ejecting stations of the bottom sealing machine. This saving in time contributes materially to the maximum production of sealed cartons by the machine and constitutes one of the important features in enabling machines of this character to produce upwards of sixty sealed cartons a minute.

While the preferred embodiment of the invention has been illustrated and described, it will be understood that the same 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 bottom sealing machine, in combination, a plurality of intermittently rotatable vertically arranged carton supporting members, means for intermittently rotating the carton supporting members, and automatically operating means for positioning the cartons upon the supporting members, including a vertically arranged stationary pocket, a pusher member for inserting successive cartons in the pocket, said pusher member and pocket cooperating to effect the opening of the carton into a rectangular condition in the pocket, and vertically movable means engaging the ends of the bottom flaps for moving the carton from said pocket onto a carton supporting member, said means having provision for permitting the initiation of the rotation of said supporting members immediately after a carton has reached an operative position upon the supporting member.

2. In a bottom sealing machine, in com-

bination, an intermittently movable forming block, a stationary pocket provided with an open side and positioned below said forming block, and a vertically movable member for engaging the bottom flaps of the carton to lift it from said pocket and move it onto the block and means for introducing a carton laterally into said pocket through said open side, said pocket and carton moving member being located below the bottom of the forming block whereby initiation of movement of the forming block may take place immediately after the positioning of the carton upon the block.

3. In a bottom sealing machine, in combination, an intermittently revoluble carton supporting member, means for automatically positioning a carton upon said member at one station and for removing the carton from the block at another station, and means for moving the carton supporting member immediately after the positioning of the carton upon the carton supporting member or the removal of the same therefrom.

4. In a bottom sealing machine, in combination, an intermittently revoluble carton supporting member, means for positioning a carton thereon at one station, and means for automatically removing the carton therefrom at another station, and means for causing the initiation of movement of the carton supporting member immediately after the removal of the carton from its supporting member at the ejecting station.

5. In a bottom sealing machine, in combination, a movable carton supporting member, means for positioning a carton thereon, and means for removing a carton therefrom including a stripper member movable longitudinally and laterally of the carton supporting member to perform the stripping operation, and means for moving the stripper member laterally for withdrawing said stripper member from the path of movement of said carton supporting member at the completion of the stripping operation.

6. In a bottom sealing machine, in combination, a movable carton supporting member, means for positioning a carton thereon, and means for removing a carton therefrom including a pair of stripping members mounted to be capable of vertical movement to perform the stripping operation and of outward lateral movement to be moved out of the path of the carton supporting member, and actuating means for the stripping members for moving the stripping members laterally out of the path of the carton supporting member.

7. In a bottom sealing machine, in combination, a movable carton supporting member, means for positioning a carton thereon, and means for removing a carton therefrom including a pair of stripping members, a vertically reciprocating supporting member upon which said stripping members are mounted to be capable of pivotal motion with relation thereto, and means for reciprocating said supporting member and for swinging the stripping members outwardly at the end of the stripping operation.

8. In a bottom sealing machine, in combination, an intermittently movable spider provided with a plurality of depending carton supporting blocks, means for positioning successive cartons on the blocks at one station, and means for removing the cartons from the blocks at another station, said means including a pair of stripping members mounted to be capable of vertical and outward pivotal motion with relation to the block, means for imparting vertical motion to the stripping members to perform the stripping operation and for immediately moving the members outwardly at the end of the stripping operation, and actuating means for the spider timed to initiate the movement of the spider immediately after the stripping operation has been completed.

9. In a packaging machine, in combination, a block for supporting a carton, means for moving the block in a definite path, a carton engaging device, means for moving the carton engaging device laterally into operative position, reciprocatory means for then moving the same longitudinally of the block to move the carton relative to the block, and means for then moving the same laterally into a position out of the path of movement of the block, and before longitudinal movement of the carton engaging device in the opposite direction commences.

10. In a packaging machine, in combination, a block for supporting a carton, means for moving the block in a definite path, a carton engaging device comprising a pair of swinging fingers, cam operated means for operating the fingers to move them laterally into operative position, reciprocatory means for then moving the same longitudinally of the block to move the carton relative to the block, and means for then moving the same laterally into a position out of the path of the movement of the block.

11. In a packaging machine, in combination, a plurality of carton supporting blocks, means for moving the carton supporting blocks in succession and in a definite path, a carton engaging member operatively supported to be capable of lateral movement into operative position and of movement longitudinally of the blocks to effect movement of the carton relative to the block while a block is within the carton, and reciprocatory operating means for causing the carton engaging member to be first moved laterally, then longitudinally of a block, and then moved laterally into a position out of the path of movement of the carton supporting block.

12. In a packaging machine, in combination, a block for supporting a carton and provided with a recess therein, means for moving the block in a definite path, a carton engaging device insertable into said recess to engage the end of a carton supported on the block, means for moving the carton engaging device laterally into operative position, then longitudinally of the block to move the block relative to the carton while inserted in said recess, and then laterally into a position out of the path of movement of the block and before longitudinal movement of the carton engaging device in the opposite direction commences.

In testimony whereof I have signed my name to this specification.

STANLEY R. HOWARD.