

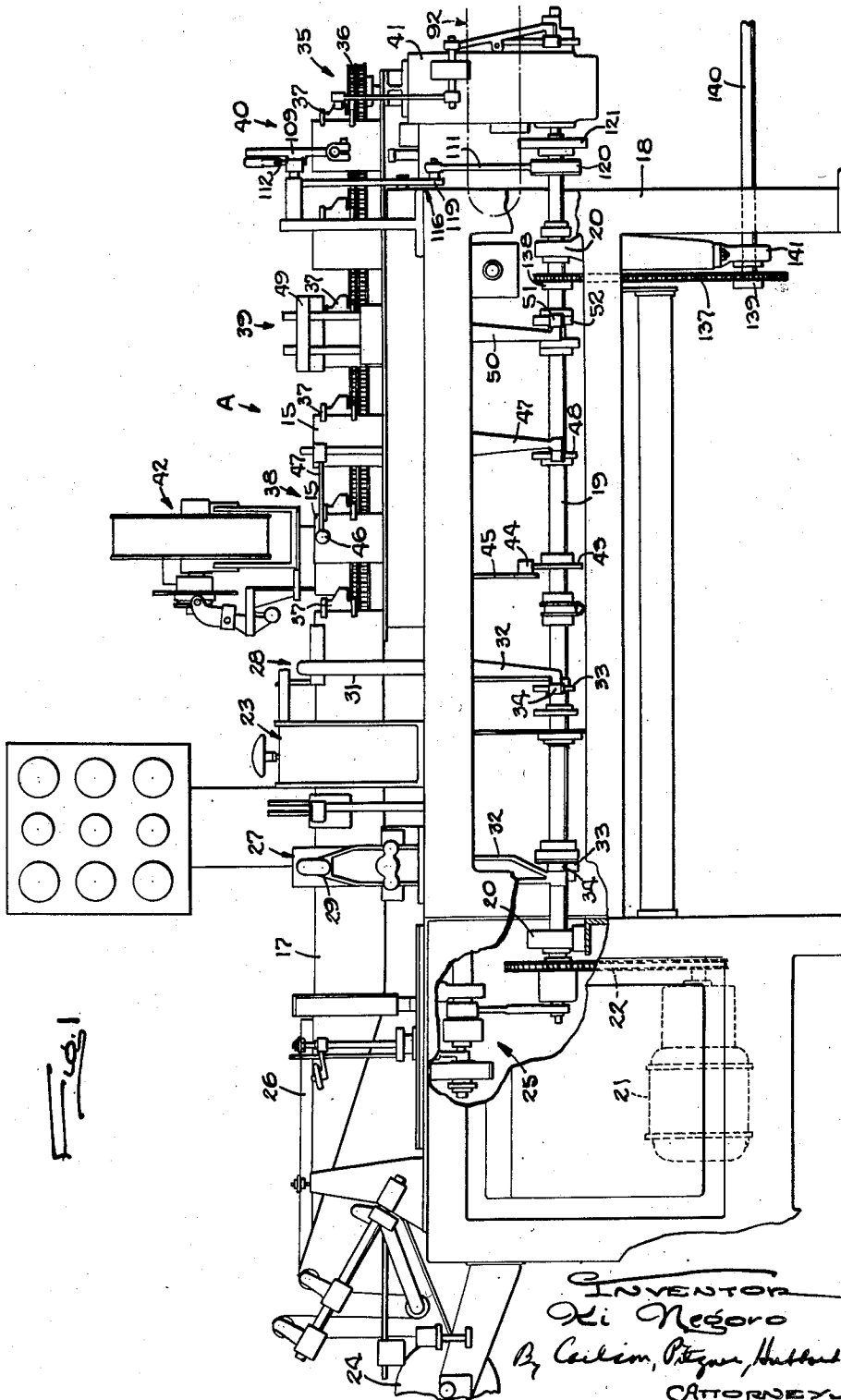
March 18, 1958

KI NEGORO
PACKAGING MACHINE

2,826,881

Filed July 15, 1954

9 Sheets-Sheet 1



March 18, 1958

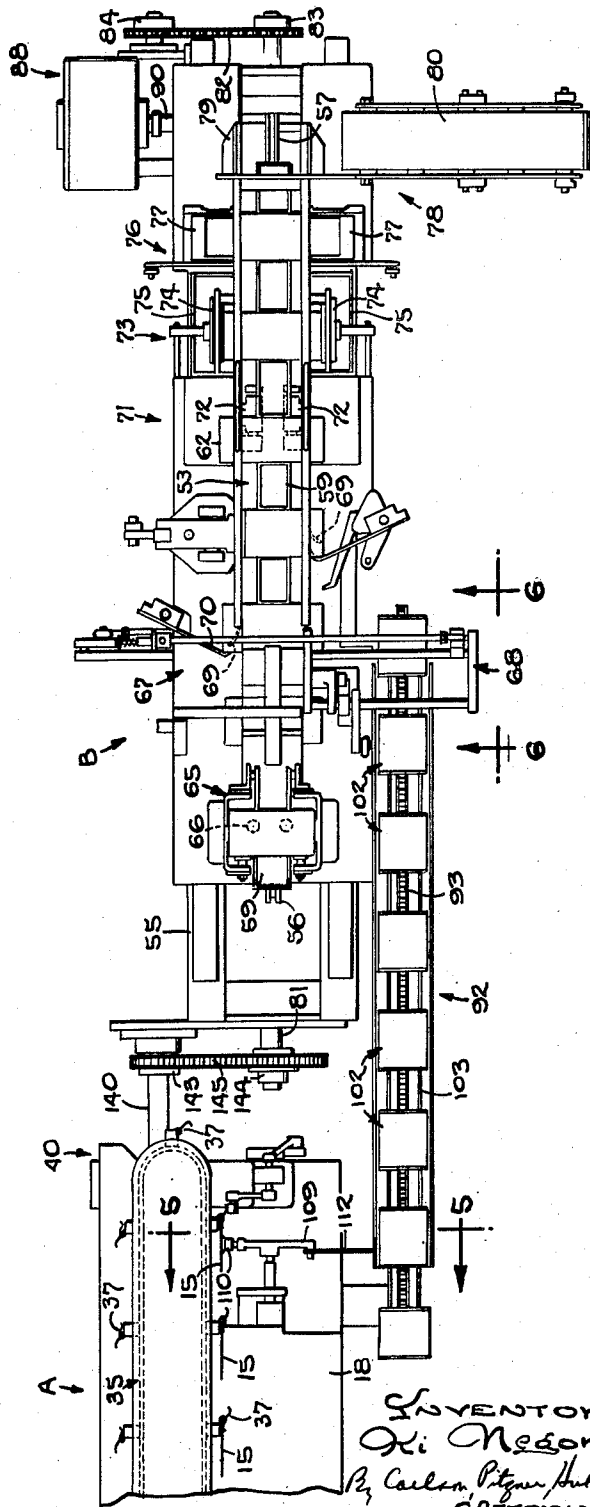
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9 Sheets-Sheet 2

Fig. 2



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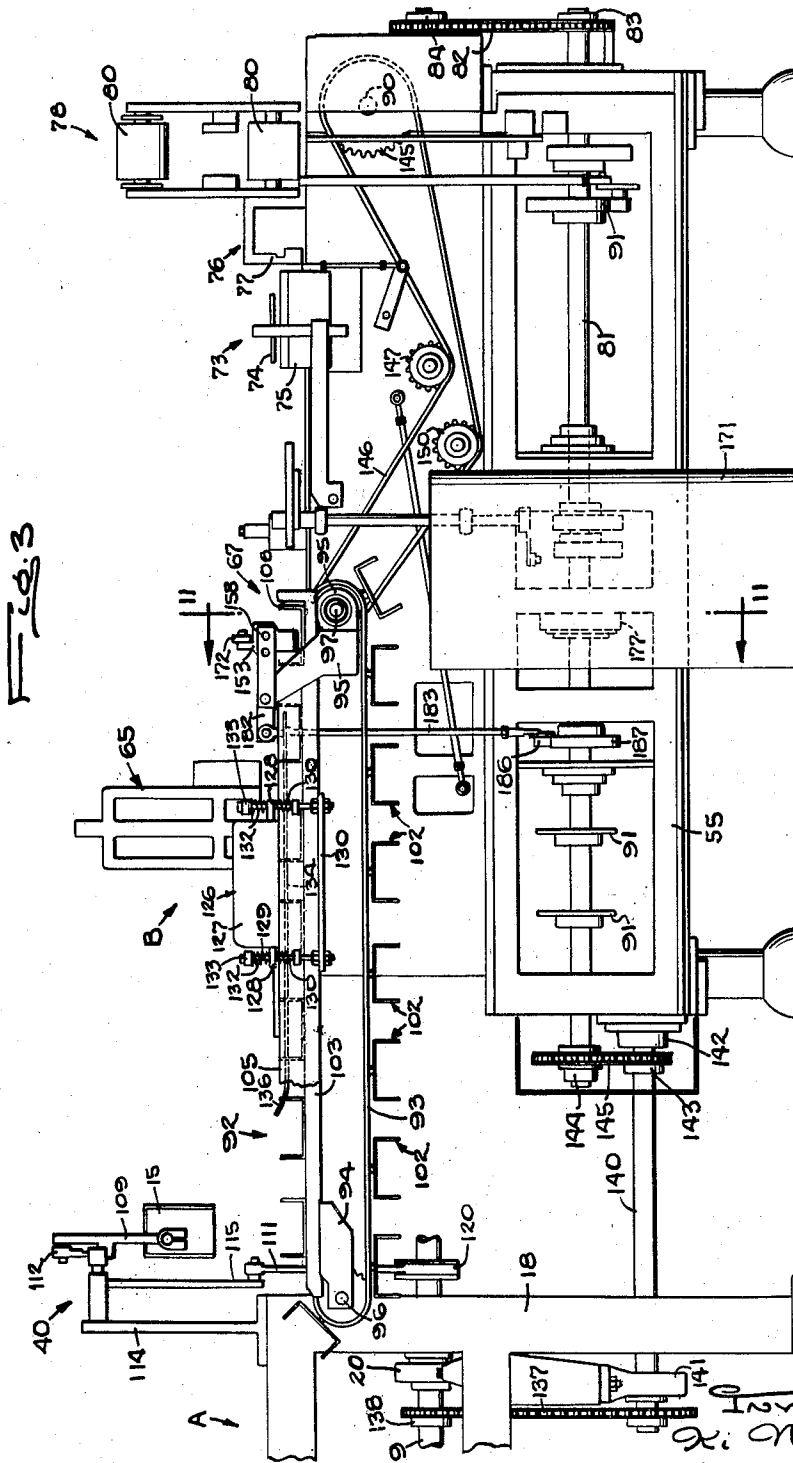
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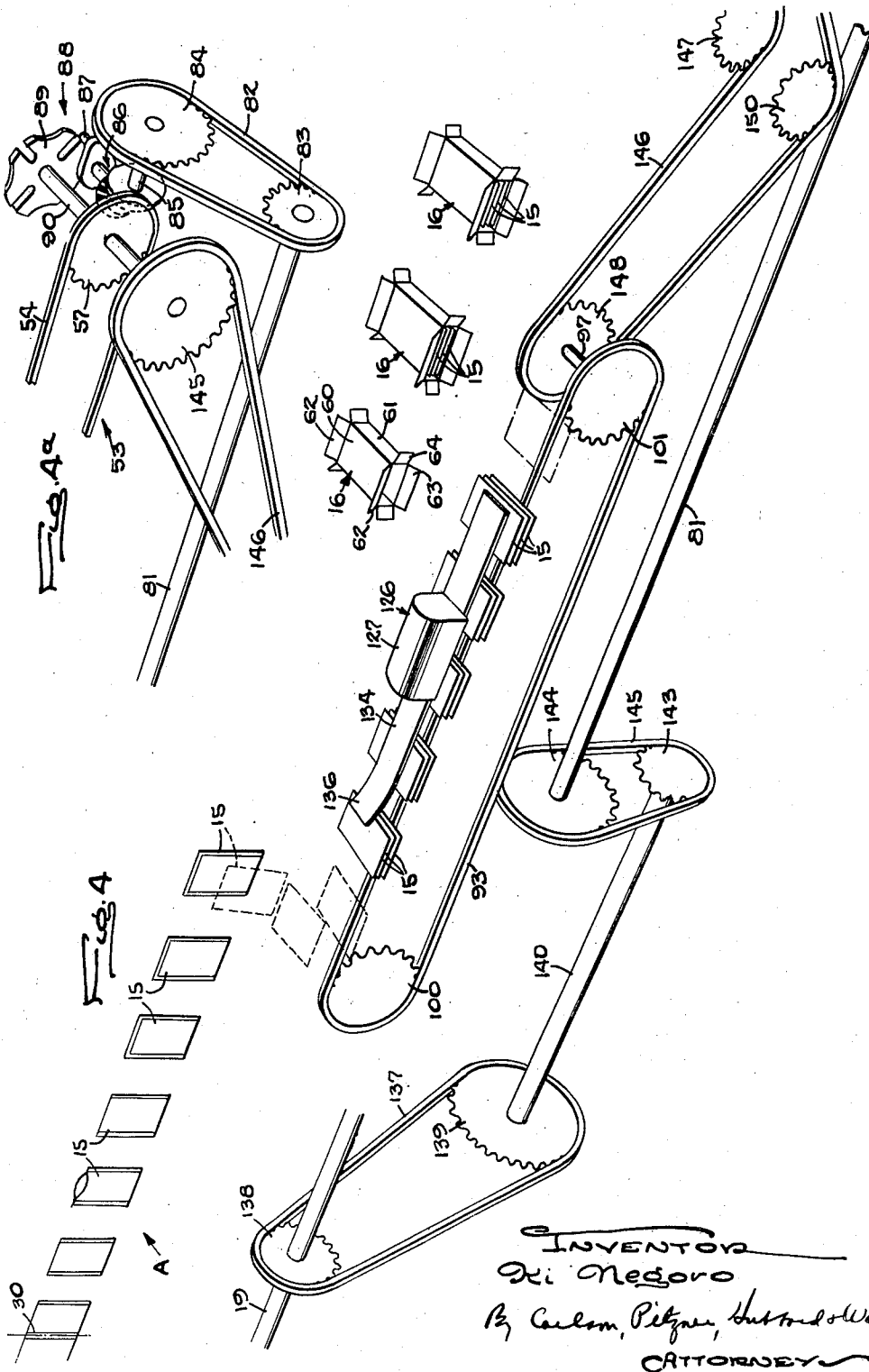
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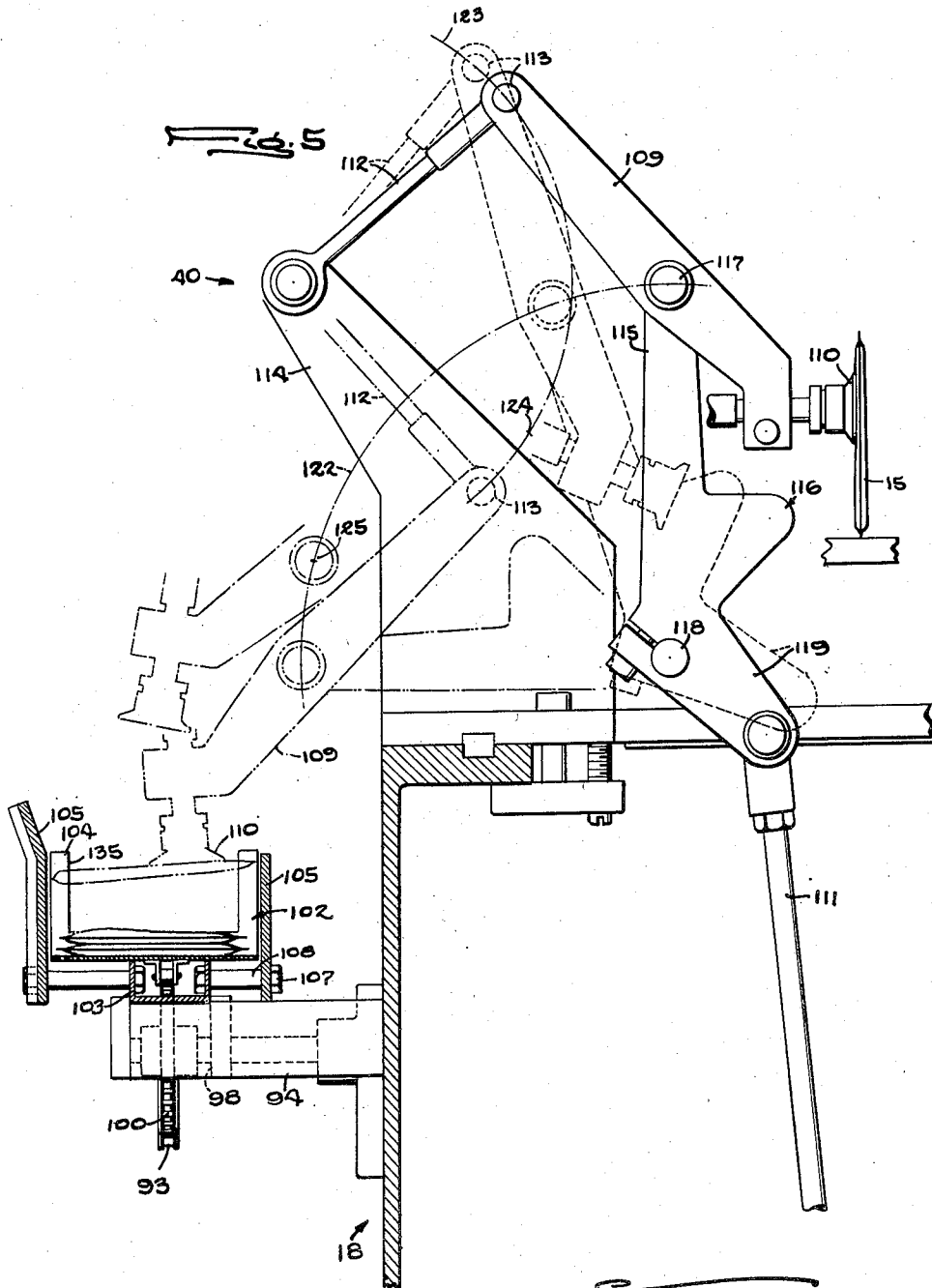
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9 Sheets-Sheet 5



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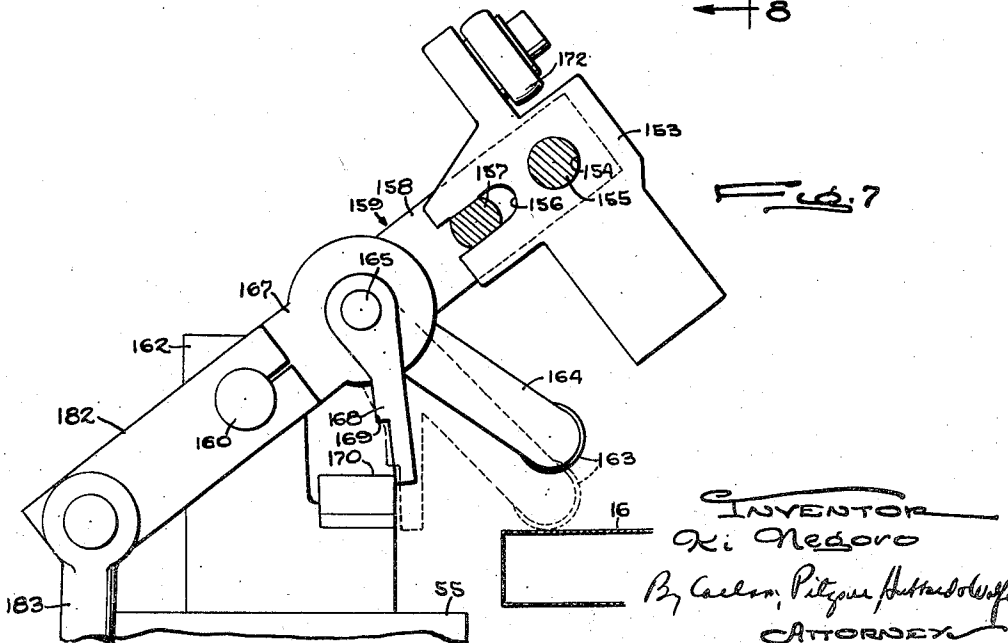
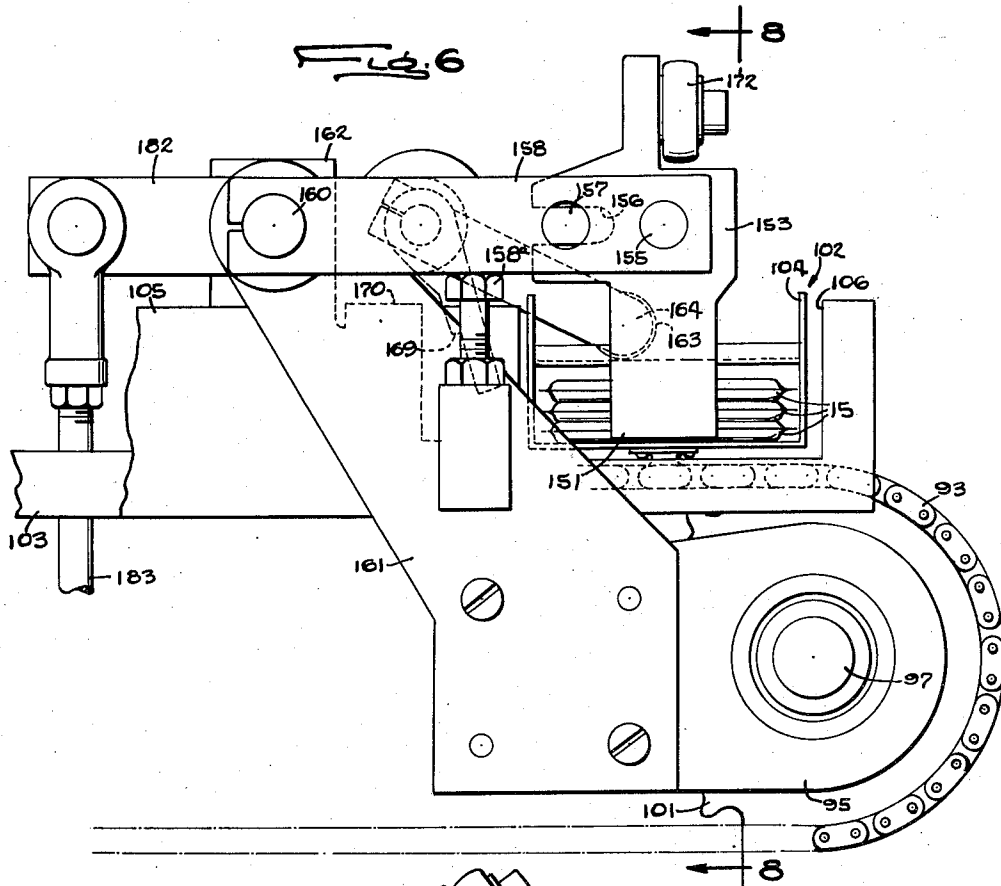
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9 Sheets—Sheet 6



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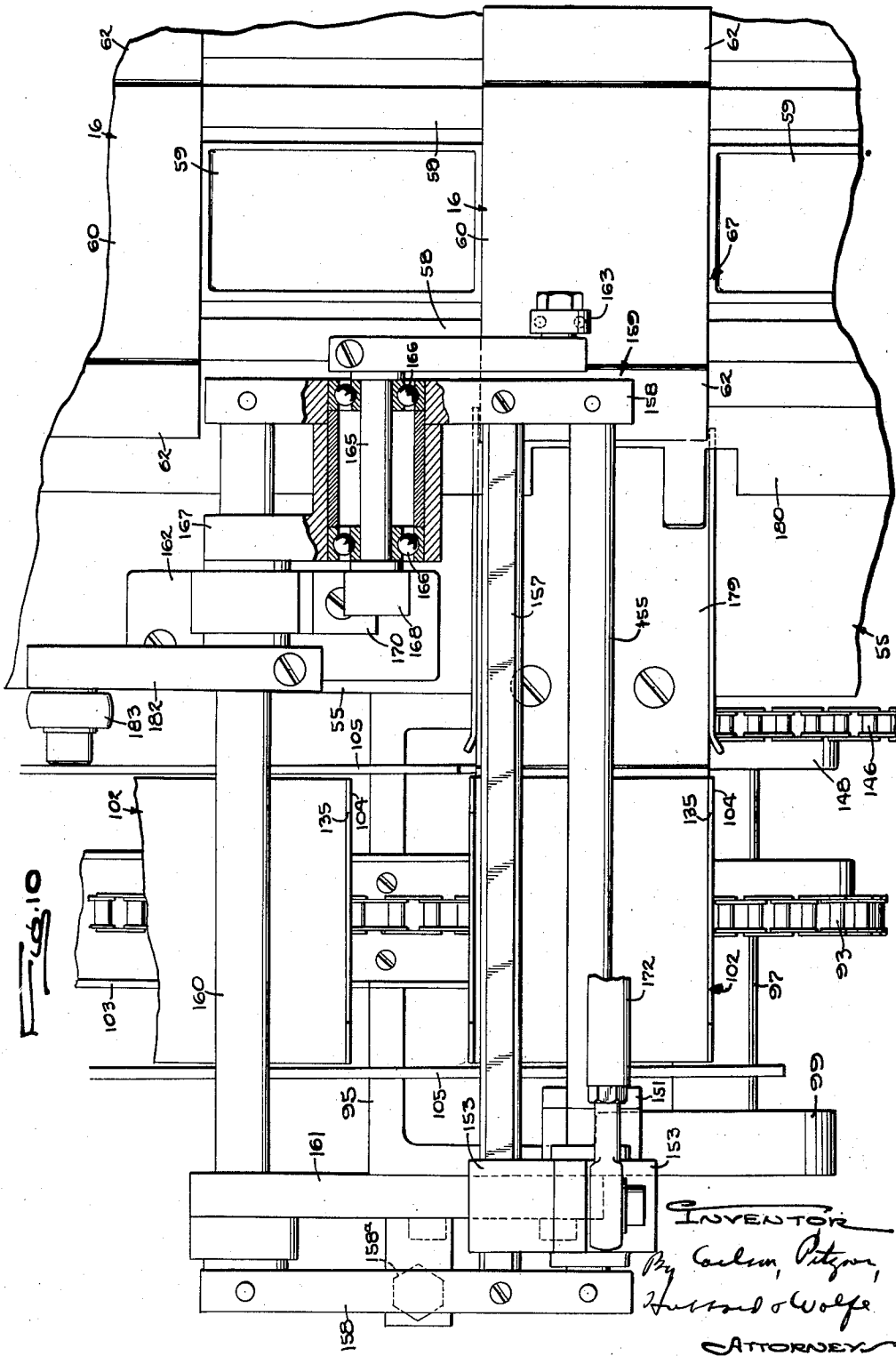
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PACKAGING MACHINE

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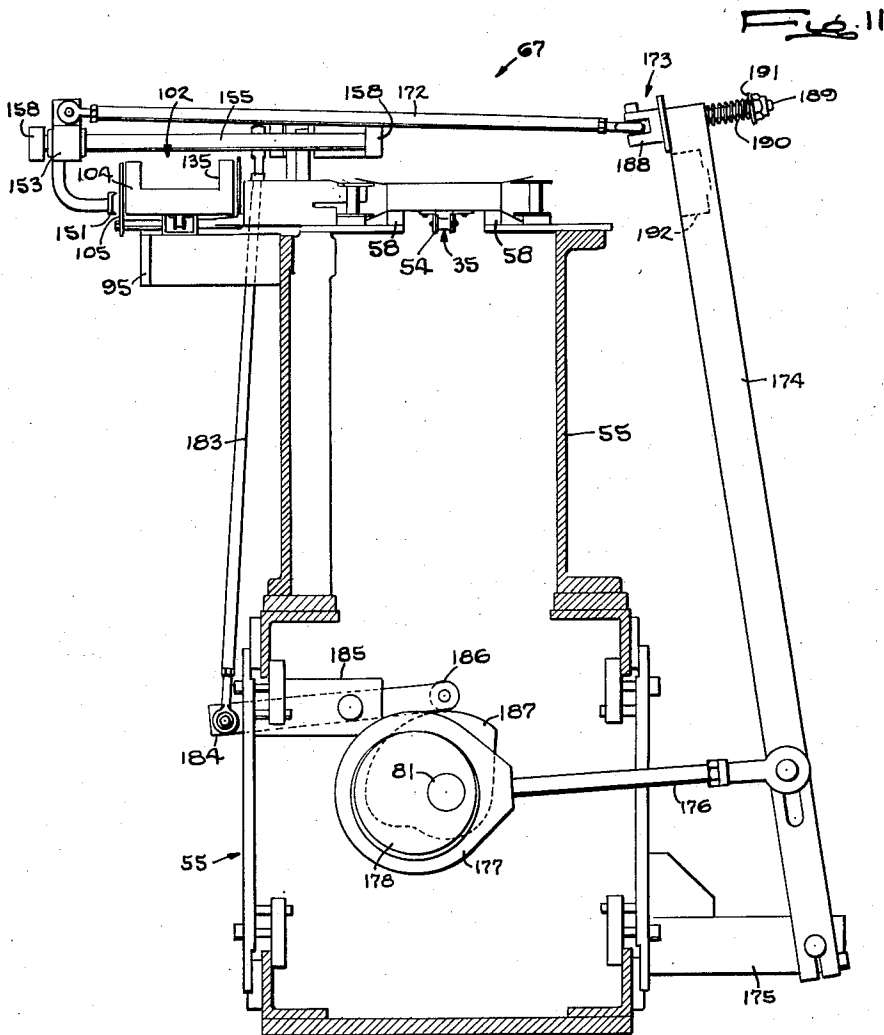
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KI NEGORO
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9 Sheets-Sheet 9



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1

2,826,881

PACKAGING MACHINE

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Application July 15, 1954, Serial No. 443,603

23 Claims. (Cl. 53—63)

This invention relates to automatic packaging machines for filling and closing bags and to machines for depositing one or more of the closed bags in a carton or box. In some of its more particular aspects, the invention has reference to the bagging and cartoning of a loose or powdered material which is delivered into the bag while the latter is supported in an upright position.

The general object of the invention is to synchronize the operations of the bagging and cartoning machines so that the material is deposited in bags and the bags are loaded in cartons in one continuous and automatic operation without employing intervening hand operations.

A more detailed object is to synchronize the two machines through the use of an intermediate conveyor which is associated in a novel manner with the machines and operates in timed relation with both the bagging machine and the cartoning machine.

Another object is to distribute the contents and flatten the bag as an incident to transferring the bag from the bagging machine to the conveyor so as to permit the automatic loading of the bags into cartons of minimum thickness.

A further object is to achieve the foregoing object by supporting the bags horizontally on the conveyor so that they are turned through a right angle when being transferred and, as a result of this turning, the contents are distributed from one end of the bag to the other.

The invention also resides in the novel construction and arrangement of the means for turning the bags through a right angle.

Another object is to utilize the time the bags are on the conveyor to condition the bags for insertion into the cartons such as by vibrating the bags to compact the contents and flatten the bags further.

It also is an object of the invention to provide a novel mechanism for loading the bags in the cartons which mechanism is automatically rendered inoperative in the absence of a carton properly positioned to receive the bags.

Another object is to arrange the parts of the loading mechanism to yield in the event the bags or cartons jam and to utilize this yielding not only to prevent damage to the machine but also to stop the operation of the machine.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is a front elevation of the bag making machine incorporated in the packaging machine of the present invention.

Fig. 2 is a fragmentary plan view of the packaging machine showing the end of the bag machine, the cartoning machine, and the intermediate conveyor.

Fig. 3 is a front elevation of the parts shown in Fig. 2.

Figs. 4 and 4a are schematic perspective views illustrating the successive operations of the packaging machine.

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Fig. 5 is an enlarged fragmentary sectional view taken along the line 5—5 in Fig. 2.

Fig. 6 is an enlarged front view taken along the line 6—6 in Fig. 2.

Fig. 7 is a view similar to Fig. 6 but showing the parts in a moved position.

Fig. 8 is a fragmentary sectional view taken along the line 8—8 in Fig. 6.

Fig. 9 is a fragmentary perspective view of a part of the cartoning machine.

Fig. 10 is an enlarged plan view of the mechanism for inserting the bags in cartons.

Fig. 11 is an enlarged sectional view taken along the line 11—11 in Fig. 3.

As shown in the drawings for purposes of illustration, the invention is embodied in a machine for packaging material in a flat envelope type bag 15 which, in turn, is enclosed in a box or carton 16 (Fig. 4). The bags 15 may be filled with a loose material such as powdered gelatin and a plurality of bags, in this case, three, are inserted in each carton. Preferably, the bags are made and filled, the cartons are opened, the bags inserted in the carton and the carton ends closed through the correlated use of a machine A (Fig. 1) for making and filling the bags and a machine B (Fig. 3) for forming, filling and closing the cartons.

The machine for making and filling the bags 15 may be similar to the one disclosed in Bartelt Patent 2,649,674 to which reference may be had for details of construction. Generally, a machine of this type forms the bags by folding longitudinally a sheet 17 (Fig. 1) of bag material, cross-sealing the two halves of the folded strip to form a succession of bags joined at their edges and cutting the resulting seal intermediate its edges to separate the bags. The individual bags then are filled with the material to be packaged and finally are closed by sealing the front and back panels together across the top of the bag.

All the various mechanisms for folding, sealing and cutting the sheet 17 and for filling and closing the bags 15 are supported by an elongated horizontal frame 18 and are operated by a horizontal camshaft 19 journaled on the frame in spaced bearings 20 and driven continuously by a motor 21 through a belt 22. Upright feed rollers 23 journaled on the frame frictionally engage opposite sides of the folded sheet and are turned to unwind the sheet from a supply roll 24 on the frame and advance the sheet horizontally along the top of the frame. The feed rollers are turned by the motor 21 through an indexing mechanism 25, which may be the type disclosed in the copending application of Kenneth R. Johnson, Serial No. 261,226, filed December 12, 1951, now Patent No. 2,738,187, so that the sheet is advanced step by step across a former or plow 26 which folds the sheet and then through the cross-sealing station 27 and the cut-off station 28. At the station 27, heated shoes 29 disposed on opposite sides of the sheet 17 engage the latter, which is formed of or coated with a heat sealable material, to form a narrow seal 30 (Fig. 4) joining the two halves of the sheet together. Knives 31 similarly disposed at the station 28 cut the seal intermediate its edges to separate the end bag 15 on the sheet. The shoes 29 and the knives 31 are supported on the upper ends of upright levers 32 fulcrumed between their ends on the frame 18 and the levers are rocked to swing these elements into engagement with the sheet during a period of dwell by cams 33 fast on the shaft 19 and engaging follower rollers 34 on the lower ends of the levers.

Each bag as it is severed from the sheet 17 is picked up by a carrier 35 which herein is in the form of an endless chain 36 supporting at spaced intervals a plu-

reality of rearwardly opening grippers 37. As the bag sheet 17 is advanced, the carrier 35 dwells with the gripper at the forward end opened to receive the leading edge of the end bag on the sheet. The gripper then is closed and, after the bag is separated by the knives 31, the carrier chain 36 is advanced step by step to present the bag to successive stations 38, 39 and 40. Such advance in timed relation to the movement of the bag sheet is obtained by operating the chain 36 from the camshaft 19 through a Geneva mechanism 41.

During the advance by the carrier 35, the bags 15 are supported vertically open end up and, at the station 38, this end is presented below the spout of a dispenser 42. The latter may be of any construction well known in the art and suitable for discharging measured quantities of a powdered material. The dispenser is operated while the bag is dwelling at the station 38 by a cam 43 on the shaft 19 engaging a follower roll 44 which actuates the dispenser through the medium of a link 45. Preparatory to filling, the bag panels may be separated by suction cups 46 which are supported on vertical levers 47 and are moved apart to open the bag when the levers are rocked by a cam 48 on the shaft 19.

After being filled, the bag mouth is closed at the station 39, this being effected by opposed horizontal sealing shoes 49 which are heated and are swung against the upper margin of the bag to heat seal the bag panels together across the top of the bag. Such swinging of the shoes is achieved by supporting the latter on upright levers 50 and by rocking the levers during dwelling of the bags through the action of cams 51 which are secured to the shaft 19 and engage follower rolls 52 on the lower ends of the levers. From the station 39, each bag 15 is advanced by the carrier 35 to the station 40 where the gripper 37 is opened and the bag is removed for insertion in a carton 16.

The machine for forming, filling and closing the cartons 16 may be similar to the one disclosed in the co-pending application of Charles B. Harker, Serial No. 345,339, filed March 30, 1953, and, in general, comprises a second carrier 53 (Fig. 2) which supports the cartons horizontally on their sides and advances the cartons edgewise step by step along the horizontal path through a succession of spaced stations. As in the case of the carrier 35 in the bag making machine, the carrier 53 is in the form of an endless chain 54 which in this case is supported on an elongated horizontal frame 55 by means of spaced sprocket wheels 56 and 57 and is disposed in a vertical plane with a horizontal run extending along the top of the frame. The cartons 16 are supported on spaced parallel guide rails 58 (Figs. 8, 10 and 11) extending along opposite sides of the chain 54 and are slid edgewise along these rails by blocks 59 which are secured to the chain and are spaced apart in accordance with the width of the cartons.

As illustrated in Fig. 4, each carton is composed of two wide rectangular side walls 60 and two narrow edge walls 61 with top, bottom and edge flaps 62, 63 and 64 projecting from the ends of these walls. The cartons are stored in a flattened condition in an open ended magazine 65 (Figs. 2 and 3) disposed above the forward end of the carrier 53. The bottom carton in the magazine is engaged by a transfer member 66 which, as disclosed in the aforesaid Harker application, draws the carton out through the open lower end of the magazine and is placed down on the rails 58 between two adjacent blocks 59, the carton being opened to the squared shape shown in Fig. 4 as an incident to the transfer from the magazine to the guide rails. The carton then is advanced to a station 67 where three bags 15 are inserted in the carton through one end by a loading mechanism 68.

As the carton is advanced along the guide rails 58, the leading edge flaps 64 are folded in by stationary plows 69 mounted on the frame 55 and the trailing edge flaps are bent in by fingers 70 which swing into engage-

ment with these flaps during dwelling of the carton. At a subsequent station 71, upwardly swinging arms 72 fold up the bottom flap 63 and, at the next station 73, fingers 74 which normally are submerged in glue-filled receptacles 75 are raised against the upper flaps 62 to apply the adhesive to the undersides of these flaps. From the station 73, the carton is advanced to the station 76 where downwardly swinging arms 77 fold the upper flaps 62 down gluing these flaps to the flaps 63 and completing the closing of the carton. The closed carton then is indexed to the next station 78 where a transfer arm 79 picks the carton up, turns it through a right angle and places it in an upright position between vertically spaced horizontal belts 80. The latter hold the flaps in until the glue sets, the cartons being pushed along between the belts by succeeding cartons until they are removed at the outer end of the belts.

To advance the cartons, the carrier chain 53 is driven by a power rotated shaft 81 (Figs. 3 and 4) journaled in and extending longitudinally of the frame 55. Through a drive chain 82 extending around a sprocket wheel 83 on the shaft 81 and around a sprocket wheel 84 fast on a short shaft 85 and through bevel gears 86, the shaft 81 drives the rotating pin 87 of a Geneva mechanism 88. The latter includes a four point wheel 89 and is operable to turn intermittently a shaft 90 extending transversely of the frame 55 and supporting the sprocket wheel 57. Thus the step by step motion is imparted to the carrier chain 54 and hence to the cartons 16. A plurality of cams 91 fast on the shaft 81 actuated the transfer member 66, the folding elements 70, 72 and 77, the glue fingers 74 and the transfer arm 79 so that these mechanisms operate at the proper time during dwelling of the cartons.

The present invention contemplates synchronizing the operations of the bag making machine A and the cartoning machine B through the use of a conveyor 92 which is constructed and arranged relative to the two machines in a novel manner so as to form in effect, a unitary machine which makes and fills the bags 15, opens the cartons 16, loads the bags into cartons and closes the carton ends. The conveyor of the present invention permits all of these operations to be performed automatically and in rapid succession without intermediate handling operations. To the foregoing ends, the conveyor receives the completed bags from the carrier 35 of the bag making machine and presents them to a position opposite the loading station 67 of the cartoner. During this advance, the movement of the conveyor is so timed with the movements of the carriers 35 and 53 that a predetermined number of bags are delivered opposite the loading station each time an empty carton arrives at this station. In this way, the bag making and the cartoning machines operate in exact synchronism.

In the present instance, the conveyor 92 comprises an endless chain 93 disposed in a vertical plane and having a horizontal run extending from a point alongside the discharge station 40 of the bag making machine to a point alongside the loading station 67 of the cartoning machine. To conserve space and obtain compactness, the conveyor 92 is disposed on the same side of both the bag making and the cartoning machines and the latter are longitudinally spaced and in general alinement so that the overall assembly presents a substantially straight line operation.

Supporting the conveyor 92 in overlapping relation with the bag and carton carriers 35 and 53 are two generally U-shaped brackets 94 and 95 (Figs. 5 and 8) bolted to and projecting laterally from the sides of the bag maker and cartoner frames 18 and 55 respectively. Horizontal shafts 96 and 97 projecting outwardly from the frames are journaled in bearings 98 and 99 bolted to the brackets 94 and 95 and sprocket wheels 100 and 101 around which the conveyor chain 93 extends are fast on the respective shafts. Secured to the chain in

spaced relation are a plurality of pockets or bag holders 102 which, as they are advanced along the upper run of the chain, are supported by and slide along an upwardly opening channel bar or rail 103 (Fig. 5). The latter spans the brackets 94 and 95 and is screwed thereto.

In accordance with another aspect of the invention, the bags 15 as they are removed from the carrier 35 and placed on the conveyor 92 are turned through a right angle and are supported horizontally on the conveyor. Not only does this facilitate filling the cartons 16 while the latter are on their sides, but equally important, turning and supporting the bags in this manner distributes the material in the bags thus flattening the bags from end to end and permitting the bags to be inserted in a carton of minimum thickness. To these ends, each pocket 102 is in the form of a U-shaped casting which opens upwardly when on the upper run of the chain 93. The pockets are somewhat wider than the bags are long to receive the cartons transversely between the side walls 104 of the pocket as viewed in Figs. 6 and 8. For purposes of loading the bags in the carton, as will be described later, the ends of the pockets are open. The bags are prevented from slipping out of the pockets through the open ends by vertical plates 105 which extend alongside the upper run of the conveyor from one end to the other, the plates being cut away at the loading station 67 as indicated at 106 in Fig. 6. The plates 105 are stationary and are supported by the rail 103 through the medium of bolts 107 and spacers 108 (see Fig. 8).

Means is provided for transferring the bag 15 at the discharge station 40 from the carrier 35 to the conveyor 92 and for turning the bag through a right angle from the vertical position to the horizontal as an incident to such transferring. Herein, this means comprises a bodily movable lever 109 (Fig. 5) which carries a gripper 110 for engaging the bag and which, upon a single stroke of an actuator 111, first moves the bag horizontally away from the carrier 35, then turns the bag through a right angle and finally lowers the bag into the holder 102 which is disposed in a position opposite the discharge station. Upon the return stroke of the actuator 111, the lever and its gripper are moved back to their original positions preparatory to the removal of the next bag.

As illustrated in Fig. 5, the lever 109 in its starting position is inclined upwardly and away from the plane of the bags 15 on the carrier 35 and the upper end of the lever is connected to a link 112 by a pivot 113. The latter, in the position of the parts shown in full lines, extends downwardly at generally a right angle to the lever and the lower end of the link is pivotally joined to a stationary bracket 114 upstanding from the bag making machine frame 18. An upright arm 115 of a bell crank lever 116 is coupled to the intermediate portion of the lever 109 by a pivot 117 while the bell crank lever turns about a stationary pivot 118. The free end of the other arm 119 of the bell crank lever is pivotally connected to the upper end of a vertical link which constitutes the actuator 111 and whose lower end is coupled to an eccentric 120 (Fig. 1) fast on the camshaft 19. The gripper 110, which is mounted on the lower end of the lever 109, may be a suction cup connected to a suitable vacuum source through a valve (not shown) which is actuated in timed relation with the movement of the cup by a cam 121 on the shaft 19.

With the foregoing construction, the parts are in the starting position illustrated in full lines in Fig. 5 and the cam 121 connects the cup 110 to the vacuum source so that the cup grips the bag. The latter is released by the clamp 37 on the carrier 35 and the actuating link 111 starts to rise under the action of the eccentric 120. This turns the bell crank 116 counterclockwise swinging the pivot 117 to the left. This movement of the pivot 117 turns the link 112 counterclockwise and raises the pivot 113 until the three pivots 113, 117 and 118 are aligned as shown in dotted lines (Fig. 5). The initial movement

of the parts as thus far described shifts the suction cup 110 in a substantially horizontal direction so that the bag 15 is removed from the carrier 35 without engaging any part of the bag making machine.

After the pivots 113, 117 and 118 have reached alignment, continued turning of the bell crank 116 swings the pivot 117 counterclockwise through substantially a quarter circle as indicated by the arc 122 in Fig. 5. At the same time, the link 112 swings the pivot 113 in the opposite direction through an arc 123 which also is approximately a quarter circle. From a comparison of the arcs 122 and 123, it will be seen that initially the pivot 117 moves primarily in the horizontal direction while the principal direction of movement of the pivot 113 is vertical. This difference causes the lever 109 to turn clockwise through a right angle while it is shifted bodily to a position over the conveyor 92 as shown in dot dash lines. Such turning and shifting is effected as the pivots 113 and 117 move to the points 124 and 125 respectively.

As the pivots 113 and 117 continue to move along the arcs 122 and 123 beyond the points 124 and 125, both move primarily in a vertical direction. Accordingly, the lever 109 is lowered bodily to the position shown in dash dot lines so that the bag 15 enters the holder 102. At this time, the eccentric 120 has raised the actuating link 111 to its highest point and the cam 121 disconnects the suction cup 110 from the vacuum source to drop the bag into the holder. The link 111 then turns the bell crank 116 in the opposite direction and the lever 109 and the pivots 113 and 117 retrace their respective paths as described above.

It will be observed that, as the bags 15 are held by the clamps 37 on the carrier 35, they are upright. Due to the flowable nature of the powdered material, all of the material is disposed near the bottom of the bag which thus bulges at its lower end. By turning the bag through a right angle to a horizontal position, the transfer lever 109 distributes the material more uniformly from one end of the bag to the other. This eliminates the bulge and flattens the bags thus reducing the size of the carton 16 required to receive the bags. Such flattening occurs automatically as an incident to the same turning which prepares the bags for entry into cartons lying horizontally, this being a convenient position in which to handle the cartons. The single transferring operation, therefore, produces two advantages.

The conveyor 92 advances the bags from alongside the discharge station 40 of the bag making machine to a position opposite the loading station 67 of the cartoning machine. Advantage is taken of the advance of the bags between the two machines to perform an intermediate operation which conditions the bags for insertion into the cartons 16. While this conditioning operation may be used for various purposes, herein it is used to compact the material in the bag and thereby further flatten the latter. Such compacting may be performed by a vibrator 126 (Figs. 3, 4 and 8) disposed along the path of the conveyor 92.

In the present instance, the vibrator 126 comprises an oscillating motor 127 of any conventional electromagnetic construction with flanges 128 (Fig. 8) projecting outwardly from the motor housing and sliding on upright rods 129. The latter are bolted at their lower ends to bars 130 which are welded to the undersides of the plates 105. Encircling each rod 129 below the flange 128 is a helical compression spring 130^a which acts between the flange and a stationary abutment 131 on the rod. A similar compression spring 132 is disposed above the flange and acts between the latter and an abutment 133 which is in the form of a bar spanning the tops of two adjacent rods.

With the foregoing arrangement, the motor housing vibrates at an amplitude depending, as is well known in the art, upon the mass of the motor 127 and the natural frequency of the suspension springs 130 and 132. This

vibration is transmitted to the bags on the conveyor 92 by an elongated horizontal bar 134 secured to the underside of the motor housing and extending along the conveyor above the bags. In order that the bar 134 engages the top bag in each holder 102, the side walls 134 of the holders are cut away as indicated at 135 (Fig. 8) to permit the bar to project down into the holders. The forward end 136 of the bar is bent up to guide the bags in under the bar for compacting.

To synchronize the operation of the bag making machine and the cartoning machine, the conveyor 92 is operated in timed relation with the bag carrier 35 and the carton carrier 53, in turn, is operated in timed relation to the conveyor in such a way that the bags are arranged on the conveyor in groups of the desired number and each group is inserted in a carton. More particularly, the cycle of the carrier 35 is timed to be an increment of the cycle of the conveyor so that a predetermined number of bags are deposited in the holder 102 which is in the receiving position before the conveyor is indexed. The cycles of the conveyor and the carrier 53, however, are of equal duration so that a holder 102 arrives opposite the loading station 67 each time an empty carton is presented to this station.

In the present instance, the bag carrier 35 cycles three times for each cycle of the conveyor 92, that is, the conveyor dwells while three successive bags are delivered to the discharge station 40 and are removed from the carrier and deposited in a holder 102. During the subsequent advance of the carrier 35, the conveyor is indexed one step to bring an empty holder beneath the discharge station and to present a filled holder to the loading station 67. The carton carrier is advanced in unison with the conveyor so that a filled carton leaves the station 67 and an empty carton arrives at this station each time the conveyor presents a new group of bags to the loading mechanism 68.

Preferably, the timed advance of the carriers 35 and 53 and the conveyor 92 is achieved by driving the conveyor and the carton carrier from the same member which drives the bag carrier, that is, from the camshaft 19. For this purpose, a chain 137 (Figs. 3 and 4) extends around a sprocket wheel 138 on the shaft 19 and around a sprocket wheel 139 on a shaft 140 which spans the adjacent ends of the bag and carton machines and is journaled in bearings 141 and 142 mounted respectively to the frames 18 and 55 of these machines. A second pair of sprocket wheels 143 and 144 are secured to the shaft 140 and the camshaft 81 of the cartoner respectively and are connected by a chain 145.

Both the conveyor 92 and the carton carrier 53 are driven from the camshaft 81. Thus, as described previously, the chain 54 of the carton carrier is driven through the sprocket wheel 83, the belt 82, the wheel 84, the gears 86 and the Geneva mechanism 88. The latter also is effective to impart the intermittent motion to the conveyor chain 93 and, to this end, the drive sprocket wheel 101 of the conveyor is driven from the same shaft 90 which supports the drive sprocket sheet 57 of the carton carrier. Thus, a sprocket wheel 145 is secured to the shaft 90 and a chain 146 extends around this wheel, under an idler wheel 147 journaled on the frame 55, around a wheel 148 fast on the shaft 97 supporting the drive sprocket wheel 101 under a second and similar idler wheel 150 and back to the wheel 145. With the foregoing arrangement, the Geneva mechanism 41 indexes the bag carrier 35 once for each revolution of the shaft 19 while the Geneva mechanism 88 indexes both the conveyor 92 and the carton carrier 53 once for every three revolutions of the same shaft.

The bags 15 in the holder 102 opposite the loading station 67 are inserted into the carton 16 at this station by the loading mechanism 68. The invention contemplates constructing this mechanism in a novel manner so as to transfer the bags if a carton is properly posi-

tioned at the station 68 but to be inactive if there is no carton there. This is achieved by employing a pusher 151 (Figs. 8 and 11) which engages and pushes the bags forward into the carton on one stroke and then is shifted away from the path it originally took for the return stroke. After being returned, the pusher again is moved back into alignment with the bags but this movement is conditioned upon the presence of a carton at the station 67. In the absence of a carton, the pusher remains displaced from its normal path and, therefore, is ineffective on the next forward stroke to push the next group of bags.

Herein, the pusher 151 is a block having small fingers 152 on the forward side to project above and below the bags 15 in the holder 102. The block 151 depends from a slide 153 which is formed with a hole 154 (Fig. 7) receiving a horizontal rod 155 (see Fig. 10) which extends transversely of the chain 93 toward the loading station 67. At one side, the block is formed with a notch 156 engaging the flattened sides of a second and parallel rod 157. The rods 155 and 157 serve as guides for the slide 153 in the latter's movement forward toward the carton carrier 53 to push the bags into the waiting carton.

Supporting the two rods 155 and 157 are end bars 158 (Fig. 10) extending across and secured to the opposite ends of the rods to form with the latter a framework 159. This framework, in this instance, constitutes the means for shifting the pusher block 151 laterally away from its normal path for the return stroke of the slide 153. To this end, the forward ends of the plates 158 are secured to a shaft 160 which is spaced from and parallels the rods 155 and 157 and which is journaled in a stationary plate 161 bolted to the outside of the bracket 95 and in a bracket 162 (Fig. 10) bolted to the top of the carton machine frame 55. With the framework 159 thus supported, it may be swung up about the axis of the shaft 160 to raise the guide rods 155 and 157 and hence the pusher 151 above the conveyor holders 102 as the slide 153 is returned to its starting position shown in full lines in Fig. 8. The framework swings between an upper inactive position (Fig. 7) and an active position (Fig. 6) as determined by an adjustable stop 158^a.

To prevent the framework 159 from being lowered to its operative position unless a carton is properly disposed at the loading station 67, a feeler 163 detects the presence or absence of such a carton and selectively permits the framework to be lowered or holds the framework in its raised inactive position. As shown in the drawings (see Figs. 6, 7 and 10), the feeler 163 may be a roller carried on one end of an arm 164 whose other end is secured to a horizontal shaft 165 which supports the arm for swinging about the axis of the shaft. The latter is journaled on the framework 159 by means of ball bearings 166 fastened to one end bar 158 and to a bracket 167 rigid with this bar. Fast on the other end of the shaft 165 is a latch member 168 which is formed with a shoulder 169 (Fig. 7) cooperating with a stationary abutment or ledge 170 on the bracket 162. The arm 164 and the latch 168 are fixed to the shaft 165 at the angle illustrated in Fig. 7 so that the two turn together with the shaft.

When the framework 159 is in its uppermost position shown in Fig. 7, a point on the latch 168 below the shoulder 169 rests on the side of the ledge 170 as illustrated in full lines and the roller 163 is spaced above the carton 16 at the station 67. As the framework starts to swing down and before the shoulder engages the ledge, the roller 163 engages the carton (see the broken lines in Fig. 7) and then the roller moves along the top of the carton (Fig. 6). This swings the arm 164 out swinging the latch out so that the shoulder passes clear of the ledge permitting the completion of the lowering of the framework. In the absence of a carton, however,

the roller 163 moves straight down as does the latch 168. As a result, the shoulder engages and rests on the ledge holding the framework up. With the framework thus held, the slide 153 is disposed above the holder 102 and the pusher 151 passes over the bags in the holder on its next forward stroke. On this stroke, therefore, the pusher is inactive.

The conveyor 92 cooperates with the loading mechanism 68 in that it disposes of any bags which may have been by-passed by the pusher 151. This is achieved by taking advantage of the fact that the chain 93 of the conveyor is disposed in a vertical plane so that the holders 102 as they leave the upper run of the conveyor are turned over. As a result, any bags remaining in a holder after passing through the loading mechanism are dumped. A receptacle 171 (Fig. 3) disposed beneath the end of the conveyor may be provided to receive these bags.

In order to advance the pusher 151 toward the carton 16 as the latter dwells at the station 67, the slide 153 is moved forward on the guide by the camshaft 81. For this purpose, a link 172 (Fig. 11) pivotally connected at one end to the slide extends horizontally across the conveyor 92 and the carrier 53 and its opposite end is joined by means of a pivotal connection 173 to the upper end of an upright lever 174. The latter is fulcrumed at its lower end to a stationary plate 175 on the frame 55 and a generally horizontal rod 176 is pivotally joined to the lever above the fulcrum. At the opposite end, the rod supports a collar 177 encircling an eccentric 178 on the camshaft 81. The eccentric 178, through the rod 176, rocks the lever 174 about its fulcrum and, since the lever is connected to the slide 153 by the link 172, the slide moves forward and back.

On the forward stroke of the slide 153, the pusher 151 engages the ends of the bags in the holder 102, the upper finger 152 projecting over the top bag and the lower finger extending in under the bottom bag. The pusher slides the bags out of the holder, across a stationary plate 179 (Fig. 10) secured to the frame 55 and extending between the holder and the carton, and into the carton. During this time, the flaps 62 and 63 of the carton are held open by stationary guide fingers 180 (Fig. 8). To prevent the bags from jamming as they are inserted in the carton, the latter is supported so that one wall will, if necessary, bow outwardly to facilitate entry of the bags. This is achieved by dishing out the guide rail 58 nearest the loading mechanism 68 as shown at 181 in Fig. 9. Such dishing permits the lower side wall 60 of the carton to be bowed downwardly by the bags as shown in Fig. 8 rather than buckling and preventing insertion of the bags.

Upon the completion of the forward stroke of the slide 153, the framework 159 is tilted up preparatory to the return stroke. For this purpose, an arm 182 (Figs. 6 and 10) is fixed to and projects forwardly from the pivot shaft 160 and pivotally connected to the outer end of a lever 184 (Fig. 11). The latter is fulcrumed intermediate its ends on a block 185 rigid with the frame 55 and carries at its other end a roller 186 riding on a cam 187 on the shaft 81. A rise on the cam rocks the lever counterclockwise as viewed in Fig. 11 and this pulls the end of the arm 182 down thus swinging the framework 159 up. With the framework in the raised position, the eccentric 178 acting through the rod 176, the lever 174 and the link 172 returns the slide 153 back to outer ends of the guide rods 155 and 157. A fall on the cam 187 then permits the framework to drop under its own weight to lower the slide to its original position providing the feeler 163 detects the presence of the next empty carton at the station 67. If there is no carton at this station, the latch 168 holds the framework in the raised position and the surface of the cam 187 drops out of contact with the follower roller 186 until the next cycle of the camshaft 81.

Means is provided to permit the cartoning machine to

continue its cycle in the event that the pusher 151 is blocked from further movement due to jamming of the bags or carton. This means includes parts which yield relative to each other upon such jamming and, preferably, the yielding of the parts operates to stop the machine. Herein, the yieldable parts constitute the parts of pivotal connection 173 (Fig. 11) between lever 174 and the link 172. Thus, the link is pivoted to a block 188 which is fast on the end of a bolt 189. The bolt projects through and slides in the lever 174 and a compression spring 190 encircling the bolt acts between the lever and a washer 191 on the bolt. In this way, the bolt and the lever normally move together to slide the pusher 151 upon rocking of the lever but, should the pusher jam, the lever may continue to rock against the action of the spring while the link 172 remains stationary.

In order to stop the machine when the pusher 151 jams, relative movement of the bolt 189 and the lever 174 operates a switch 192. The latter is secured to the lever and is actuated upon movement of a plate 193 which is fastened to the block 188. Thus, when the lever moves relative to the block, the switch is actuated. Preferably, the switch operates to stop the entire apparatus, that is, the bag making and cartoning machines A and B and the conveyor 92, and, to this end, the switch 192 de-energizes the motor 21 through a suitable control circuit (not shown). If desired, the switch may also energize a brake (not shown) which holds the camshaft 19 against turning.

It will be observed that the arrangement described above synchronizes the operations of the packaging machine and the cartoning machine so that the two operate together to deposit the material to be packaged in the bags and to insert a predetermined number of bags into each carton. From start to finish, the operations are performed automatically without intervening hand operations. The conveyor 92, operating in timed relation to the advance of both the bag carrier 35 and the carton carrier 53, insures that the proper number of bags are deposited in each holder 102 and that a group of bags is presented to each carton arriving at the loading station 67. By turning the bags through a right angle as they are transferred from the bag carrier to the conveyor, the material is distributed throughout the bag even though the material is powdered in form and originally collected at the bottom of the bag. The conveyor also provides an opportunity to condition the completed bag for entry into the carton as by vibrating the bag to distribute the material further. The end result is that the bags are flattened and may be received in cartons of minimum size.

Turning the bags on their sides has the additional advantage of preparing the bags for insertion into cartons which are similarly disposed on their sides. With the bags and the cartons arranged in this way, the bags may simply be pushed into the cartons. The novel arrangement of the loading mechanism 68 for effecting such pushing results in disabling the pusher 151 in the event there is no carton at the loading station 67. Further, the pusher is yieldably operated and thus, in addition to preventing damage, is effective to operate control mechanism for stopping the machine.

I claim as my invention:

1. In a packaging machine, the combination of, a first carrier for vertically supporting a plurality of bags filled with loose material and for advancing said bags along a first horizontal path to present the bags successively to a transfer station, a second carrier for supporting a plurality of cartons and advancing the cartons edgewise along a second horizontal path with the carton ends facing laterally of said second path and being presented successively by said second carrier to a loading station, a conveyor having a horizontal run extending between said paths and overlapping said transfer station and said loading station, a plurality of pockets carried by said conveyor and constructed to hold a predetermined

number of bags lying horizontally in the pocket, said pockets having an open end facing laterally toward said second carrier, a device operable to transfer the bag at said transfer station to an empty pocket on said conveyor and simultaneously turn the bag through a right angle, mechanism for advancing said conveyor intermittently and in timed relation with the advance of said first carrier to dwell the conveyor while said predetermined number of bags are deposited in said empty pocket and then to advance the pocket and present the next empty pocket opposite said station, mechanism for advancing said second carrier in synchronism with said conveyor to present an empty carton to said loading station each time a pocket filled with bags is presented to a position opposite the station and to dwell the carton while the pocket is dwelling, and a pusher operable while both said conveyor and said second carrier are dwelling to push the bags in the pocket at said position into the carton at said loading station.

2. In a packaging machine, the combination of, a first carrier for supporting a plurality of bags filled with loose material and for advancing said bags along a predetermined horizontal path to present the bags successively to a transfer station, a second carrier for supporting a plurality of cartons and advancing the cartons edgewise along a second horizontal path with the carton ends facing laterally of said second path and being presented successively by said second carrier to a loading station, a conveyor having a horizontal run extending between said paths and overlapping said transfer station and said loading station, a plurality of pockets carried by said conveyor and constructed to hold a predetermined number of bags lying horizontally in the pocket, said pockets having an open end facing laterally toward said second carrier, mechanism for advancing said conveyor intermittently and in timed relation with the advance of said first carrier to dwell each pocket opposite said transfer station while said predetermined number of bags are transferred from the first carrier to the pocket and then to advance the pocket and present an empty pocket opposite said station, mechanism for advancing said second carrier in synchronism with said conveyor to present an empty carton to said loading station each time a pocket filled with bags is presented to a position opposite the station and to dwell the carton while the pocket is dwelling, and a pusher operable while both said conveyor and said second carrier are dwelling to push the bags in the pocket at said position into the carton at said loading station.

3. The combination of, a carrier for supporting a succession of open top envelope bags in a vertical plane and advancing the same edgewise along a predetermined path to a discharge position, means operable in one position of each bag along said path to deposit a quantity of loose material therein, means operable at a subsequent position of each bag to close and seal the upper end of the bag, a horizontally movable conveyor disposed alongside said carrier and having upwardly opening pockets spaced therealong and each adapted to receive a plurality of said bags in horizontal position with one bag resting on top of the other, mechanism operable intermittently to engage a closed bag in said discharge position, turn the same through a right angle, and deposit the bag in one of said pockets, means for presenting open end cartons one by one to a position to receive the bags from one of said pockets by endwise shifting of the same horizontally out of the pocket, and mechanism for starting and stopping said conveyor to advance the same intermittently and in synchronism with said carrier, said transfer mechanism and said carton presenting means to dwell one of said pockets for receiving a plurality of said bags, and then advance the pocket in a plurality of intermittent stops to a position opposite a carton in said bag receiving position.

4. In a packaging machine, the combination of, a package carrier operable to support a plurality of verti-

cally disposed bags in spaced relation and to advance the bags along a predetermined linear path, a carton carrier operable to support a plurality of horizontally disposed cartons in spaced relation and to advance the cartons along a second linear path aligned with and longitudinally spaced from said first path, a conveyor having a linear run paralleling both of said paths and disposed on the same side of the two paths with one end portion of the run overlapping said first path and the other end portion overlapping said second path, a member operable intermittently to transfer a bag from said package carrier to said one end portion of said conveyor and to turn the bag through a right angle thereby to place the bag horizontally on the conveyor, mechanism for advancing said conveyor and said carriers in timed relation with each other to present the bags on said conveyor successively to a position opposite the cartons on said carton carrier, and a transfer element operable to move the bags horizontally and insert the bags thus presented into the opposed cartons.

5. In a packaging machine, the combination of, a package carrier operable to support a plurality of bags in spaced relation and to advance the bags along a predetermined linear path, a carton carrier operable to support a plurality of cartons in spaced relation and to advance the cartons along a second linear path generally aligned with and longitudinally spaced from said first path, a conveyor having a linear run paralleling both of said paths and disposed on the same side of the two paths with one end portion of the run overlapping said first path and the other end portion overlapping said second path, a member operable intermittently to transfer a bag from said package carrier to said one end portion of said conveyor, mechanism for advancing said conveyor and said carriers in timed relation with each other to present the bags on said conveyor successively to a position opposite the cartons on said carton carrier, and a transfer element operable to insert the bags thus presented into the opposed cartons.

6. In a packaging machine, the combination of, a bag carrier for supporting a plurality of bags in spaced relation and advancing the bags along a first predetermined path to a discharge station, a carton carrier for supporting a plurality of cartons and advancing the cartons along a second path to a loading station, a conveyor extending between said paths and overlapping said discharge station and said loading station, a member operable to transfer the bag at said discharge station to said conveyor, a device operable to transfer the bags in a position opposite said loading station from said conveyor to the carton at the loading station, mechanism operable to drive said bag carrier intermittently and advance the bags step by step to said discharge station, a drive element responsive to the advance of said bag carrier and operable to dwell the conveyor during a predetermined number of advances of the carrier and then advance the conveyor whereby the bags are deposited on the conveyor in stacks of said predetermined number, and means for dwelling and advancing said carton carrier in unison with said conveyor to present a carton to said loading station each time a stack of bags are presented to said position.

7. In a packaging machine, the combination of, first and second carriers operable to advance along individual spaced paths, means on said first carrier for holding a plurality of bags to advance the same successively to a transfer position along the path of the first carrier, means on said second carrier for holding a plurality of cartons to present empty cartons successively to a loading position along the path of the second carrier, a conveyor extending from said transfer position to said loading position, a device for transferring bags at said transfer position to said conveyor, a device operable to insert the bags on said conveyor opposite said loading position into the carton at the loading position, mechanism for advancing said conveyor intermittently in a cycle timed with

respect to the advance of said first carrier to dwell the conveyor while a predetermined number of bags are transferred to the conveyor, said means operable to advance said second carrier intermittently through a cycle of the same duration as the cycle of said conveyor with the dwell periods of the two cycles overlapping whereby said predetermined number of bags are presented to said loading station each time an empty carton arrives at the station and are loaded into the carton while both the bags and the carton are dwelling.

8. A machine for packaging and cartoning material having, in combination, a carrier for supporting a plurality of bags in spaced relation and operable to advance each bag along a predetermined path through a succession of stations, mechanisms disposed at said stations and operable to fill and close said bags when the latter are disposed at the stations, a conveyor having a portion disposed alongside a terminal one of said stations and extending beyond said path, a device operable to transfer the bag at said terminal station to said conveyor, mechanism for driving said conveyor intermittently and in timed relation to said carrier to dwell the conveyor while a predetermined number of bags are transferred from said carrier and thereafter to advance the conveyor and move the bags through a step of predetermined length, a second carrier supporting a plurality of spaced cartons and presenting empty cartons successively to a position alongside the path of the conveyor, said second carrier being advanced intermittently in synchronism with said conveyor to present cartons at said positions in timed relation to the arrival of cartons opposite the position, and a transfer element operable to transfer bags on said conveyor opposite said position into the carton dwelling at said position, and mechanism disposed beyond said position for closing the carton.

9. In a packaging machine, the combination of, a carrier for supporting a succession of envelope bags in a vertical plane and advancing the same edgewise along a predetermined path to a discharge position, a horizontally movable conveyor disposed alongside said carrier and having a plurality of upwardly opening pockets spaced therealong and each adapted to receive a plurality of said bags in horizontal position with one bag resting on top of the other, a member operable periodically to engage a bag in said discharge position and deposit the bag in one of said pockets, mechanism operable to advance said conveyor to present said pocket successively to a loading position, an elongated element extending along said conveyor over said pockets and engaging the top bags in the pockets, a vibrator connected to said element to vibrate the same and thereby distribute the material within the bags in said conveyor and flatten the bags, and means for presenting an empty open ended carton opposite said loading station and a transfer device operable to shift the bags horizontally out of the pocket and into the carton.

10. In a packaging machine, the combination of, a carrier for supporting a succession of envelope bags in a vertical plane and advancing the same edgewise along a predetermined path to a discharge position, a horizontally movable conveyor disposed alongside said carrier and having a plurality of pockets spaced therealong and each adapted to receive a plurality of said bags in horizontal position with one bag resting on top of the other, a member operable periodically to engage a bag in said discharge position and deposit the bag in one of said pockets, mechanism operable to advance said conveyor to present said pocket successively to a loading position, a vibrator acting on the bags on said conveyor at a point in advance of said loading position and operable to distribute the material within each bag and thereby flatten the bag, and means for presenting an empty open ended carton opposite said loading station, and a transfer de-

vice operable to shift the bags horizontally out of the pocket and into the carton.

11. In a packaging machine, the combination of, a first carrier adapted to support a plurality of bags filled with a loose material in spaced relation and operable to advance the bags along a predetermined path to present the bags successively to a transfer station, a second carrier for supporting a plurality of empty cartons in spaced relation and for advancing said cartons along a second predetermined path to present the cartons successively to a loading station, a conveyor extending from said transfer station to said loading station, a member operable in timed relation with advance of said carrier to transfer the bag at said transfer station to said conveyor for delivery by said conveyor to a position opposite said loading station, a device disposed along the path of said conveyor and operating on the exterior of the bags supported by the conveyor to distribute the material in each bag and flatten the bag preparatory to insertion in a carton thereby to minimize the size of the carton required to receive the bag, and a transfer element disposed at said position and operable to move a flattened bag from said conveyor into the carton at said loading station.

12. The combination of, a carrier for supporting a succession of open top envelope bags in a vertical plane and advancing the same edgewise along a predetermined path to a discharge position, means operable in one position of each bag along said path to deposit a quantity of loose material therein, means operable at a subsequent position of each bag to close and seal the upper end of the bag, a horizontally movable conveyor disposed alongside said carrier and having upwardly opening pockets spaced therealong and each adapted to receive a plurality of said bags in horizontal position with one bag resting on top of the other, mechanism operable intermittently to engage a closed bag in said discharge position, turn the same through a right angle, and deposit the bag in one of said pockets, means for presenting open end cartons one by one to a position to receive the bags from one of said pockets by endwise shifting of the same horizontally out of the pocket, mechanism for starting and stopping said conveyor to advance the same intermittently and in synchronism with said carrier, said transfer mechanism and said carton presenting means to dwell one of said pockets for receiving a plurality of said bags, and then advance the pocket in a plurality of intermittent steps to a position opposite a carton in said bag receiving position, and means for applying downward pressure to the stacks of bags in each successive pocket during dwelling of the latter in a position beyond said discharge position.

13. In a packaging machine, the combination of, a first carrier adapted to support a plurality of bags in spaced relation and operable to advance the bags along a predetermined path to present the bags successively to a transfer station, a second carrier for supporting a plurality of empty cartons in spaced relation and for advancing said cartons along a second predetermined path to present the cartons successively to a loading station, a conveyor extending from said transfer station to said loading station, a member operable in timed relation with advance of said carrier to transfer the bag at said transfer station to said conveyor for delivery by said conveyor to a position opposite said loading station, a conditioning device disposed along the path of said conveyor and operating on the bags supported by the conveyor to condition each bag for insertion into a carton, and a transfer element disposed at said position and operable to move a conditioned bag from said conveyor into the carton at said loading station.

14. In a packaging machine, the combination of, a carrier for supporting a plurality of envelope bags filled with a loose material in an upright position and for advancing the bags along a predetermined path to a discharge station, a conveyor having a part disposed along-

side said station and extending beyond said path to a loading position, means for supporting a carton to receive the bags at said loading position, a transfer mechanism disposed at said station, said mechanism comprising two arms each pivotally supported to swing about a fixed axis, a lever pivotally connected at one end to one arm and at an intermediate point to the other arm, a gripper mounted on the other end of said lever to engage and hold the bag at said station, and means to turn said two arms in opposite directions about their respective pivots first to move the bag away from said station, then to turn the bag through a right angle and finally to lower the bag onto said conveyor.

15. In a packaging machine, the combination of, a carrier for supporting a plurality of envelope bags filled with a loose material in an upright position and for advancing the bags along a predetermined path to a discharge position, a conveyor having a part disposed alongside said position and extending beyond said path to a loading station, means for supporting a carton to receive the bags at said station, a lever fulcrumed adjacent said position and having a gripper on one end thereof, means actuating said gripper to engage and hold the bag at said position, and mechanism operable to turn said lever and hence said bag through a right angle and simultaneously shift said lever bodily to a position over said conveyor thereby to deposit the bag horizontally on the conveyor.

16. In a packaging machine, the combination of, two parallel rails horizontally disposed and spaced apart in accordance with the length of a carton to support the opposite ends of the latter, means for advancing cartons edgewise along said rails to present the cartons successively to a dwell station, a conveyor operable to present successively a plurality of stacks of bags to a dwell position opposite said station and alined with the open end of the carton, and a pusher disposed outwardly of said rails beyond the stack of bags at said position and movable toward and transversely of the rails to push the stack into the carton at said station, the upper edge of the rail nearest said pusher being dished out at said station to permit the bottom wall of the carton to bow outwardly during the insertion of the bags.

17. In a packaging machine, the combination of, a carrier for supporting a plurality of empty cartons on their sides and presenting the cartons successively to a dwell station, a conveyor for supporting a plurality of bags horizontally and disposed in a generally vertical plane with a horizontal run extending alongside said carrier to present the bags on said run to a position opposite said station and in alinement with the open end of the carton at the station, a transfer member disposed alongside said station and movable to insert the bag at said position into the carton at said station, and a feeler responsive to the presence of a carton at said station and operable in the absence of such a carton to cause an idle motion of the transfer member thereby to by-pass the bag at said position, the by-passed bag being dumped automatically as an incident to the continued advance of said conveyor as the bag leaves the end of said run.

18. In a packaging machine, the combination of, a conveyor for supporting a plurality of bags and operable to present the bags to a dwell position, a carrier for supporting a plurality of cartons and presenting the cartons successively to a dwell station opposite said position with the open end of the carton alined with the bag at said position, a supporting member disposed alongside said station and mounted to swing from an active position to an inactive position, a pusher movably mounted on said member and operable on the forward stroke and when the member is in said inactive position to push the bag at said dwell position into the carton at said station, mechanism operable after the com-

pletion of the forward stroke to swing said member to said inactive position for the return stroke of said pusher and then to swing said member back to said inactive position, a stationary abutment, a latch connected to said member and engageable with said abutment to prevent the return of said member to said active position, and a feeler responsive to the presence of a carton at said station and operable to cause said latch to pass clear of said abutment thereby to permit return of the member to said active position.

19. In a packaging machine, the combination of, a conveyor for supporting a plurality of bags and operable to present the bags to a dwell position, a carrier for supporting a plurality of cartons and presenting the cartons successively to a dwell station opposite said position with the open end of the carton alined with the bag at said position, a pusher disposed alongside said station and movable along a predetermined path toward the carton at said station to insert the bag at said position into the carton, mechanism operable after the forward stroke of said pusher to move the pusher laterally of said bag upon the return stroke of the pusher and then to return the pusher to said path, a stationary abutment, a latch connected to said pusher and engageable with said abutment to prevent the return of the pusher to said path, and a feeler responsive to the presence of a carton at said station and operable to cause said latch to pass clear of said abutment and permit the pusher to return to said path.

20. In a packaging machine, the combination of, a conveyor for supporting a plurality of bags and operable to present the bags to a dwell position, a carrier for supporting a plurality of cartons and presenting the cartons successively to a dwell station opposite said position with the open end of the carton alined with the bag at said position, a supporting member disposed alongside said station and mounted to swing from an active position to an inactive position, a pusher movably mounted on said member and operable on the forward stroke and when the member is in said active position to push the bag at said dwell position into the carton at said station, mechanism operable after the completion of the forward stroke to swing said member to said inactive position for the return stroke of said pusher and then to swing said member back to said active position, and a feeler responsive to the presence of a carton at said station and operable in the absence of such a carton to prevent the return of said member to said active position.

21. In a packaging machine, the combination of, a carrier for supporting a plurality of empty cartons on their sides and presenting the cartons successively to a dwell station, a conveyor for supporting a plurality of bags horizontally and extending alongside said carrier to present the bags to a position opposite said station and in alinement with the open end of the carton at the station, a pusher normally disposed behind the bag at said position and movable along a predetermined path toward the carton at said station, mechanism operable to move said pusher forward to insert the bag in the carton and then to return the pusher to its original position, means supporting said pusher for movement laterally of said path and operable to shift the pusher to one side of the path upon the return movement of the pusher, and means responsive to the presence of a carton at said position and operable to return said pusher to said path behind the bag at said position.

22. In a packaging machine, the combination of, a carrier for supporting a plurality of empty cartons on their sides and presenting the cartons successively to a dwell station, a conveyor for supporting a plurality of bags horizontally and extending alongside said carrier to present the bags to a position opposite said station and in alinement with the open end of the carton at the station, a pusher normally disposed behind the bag at said

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position and movable along a predetermined path toward the carton at said station, mechanism operable to move said pusher forward to insert the bag in the carton and then to return the pusher to its original position, and means supporting said pusher for movement laterally of said path and operable to shift the pusher to one side of the path upon the return movement of the pusher.

23. In a packaging machine, the combination of, a carrier for supporting a plurality of empty cartons on their sides and presenting the cartons successively to a dwell station, a conveyor for supporting a plurality of bags horizontally and extending alongside said carrier to present the bags to a position opposite said station and in alinement with the open end of the carton at the station, a pusher normally disposed behind the bags at said position and movable along a predetermined path toward the carton at said station, mechanism operable to move said pusher forward to insert the bag in the carton and

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then to return the pusher to its original position, means supporting said pusher for movement laterally of said path and operable to shift the pusher to one side of the path upon the return movement of the pusher, and an element responsive to the relative positions of the bags and the cartons and operable to hold said pusher laterally of said path if the relative positions are incorrect and thereby cause the pusher to make an idle stroke.

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