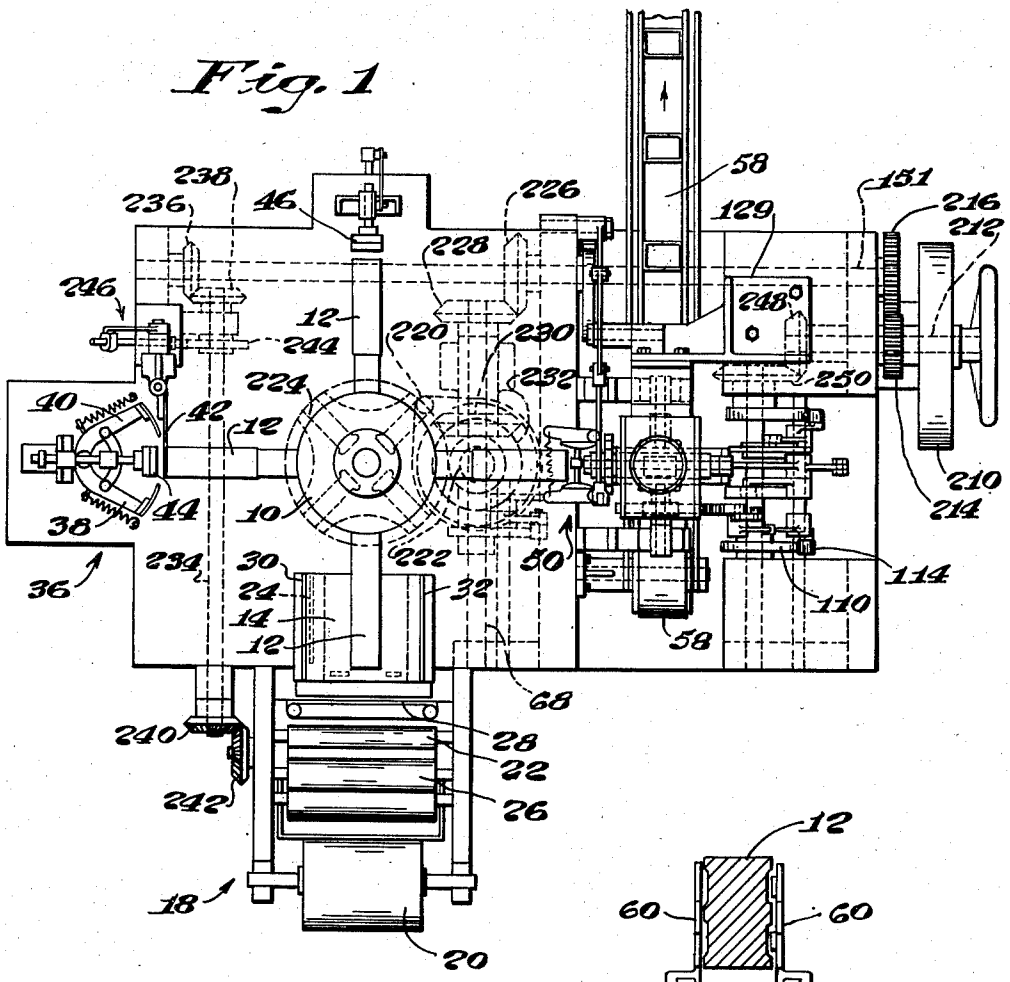
June 5, 1945. S. R. HOWARD 2,377,687

PACKAGING MACHINE

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Fig. 1



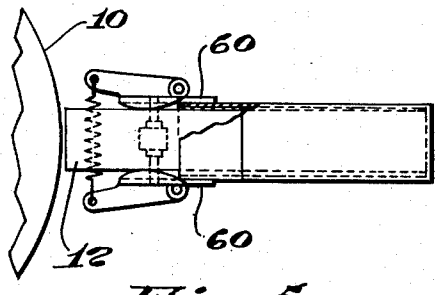


Fig. 5

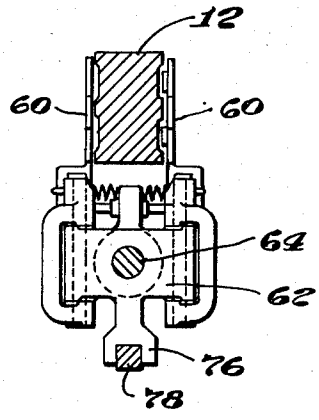


Fig. 6

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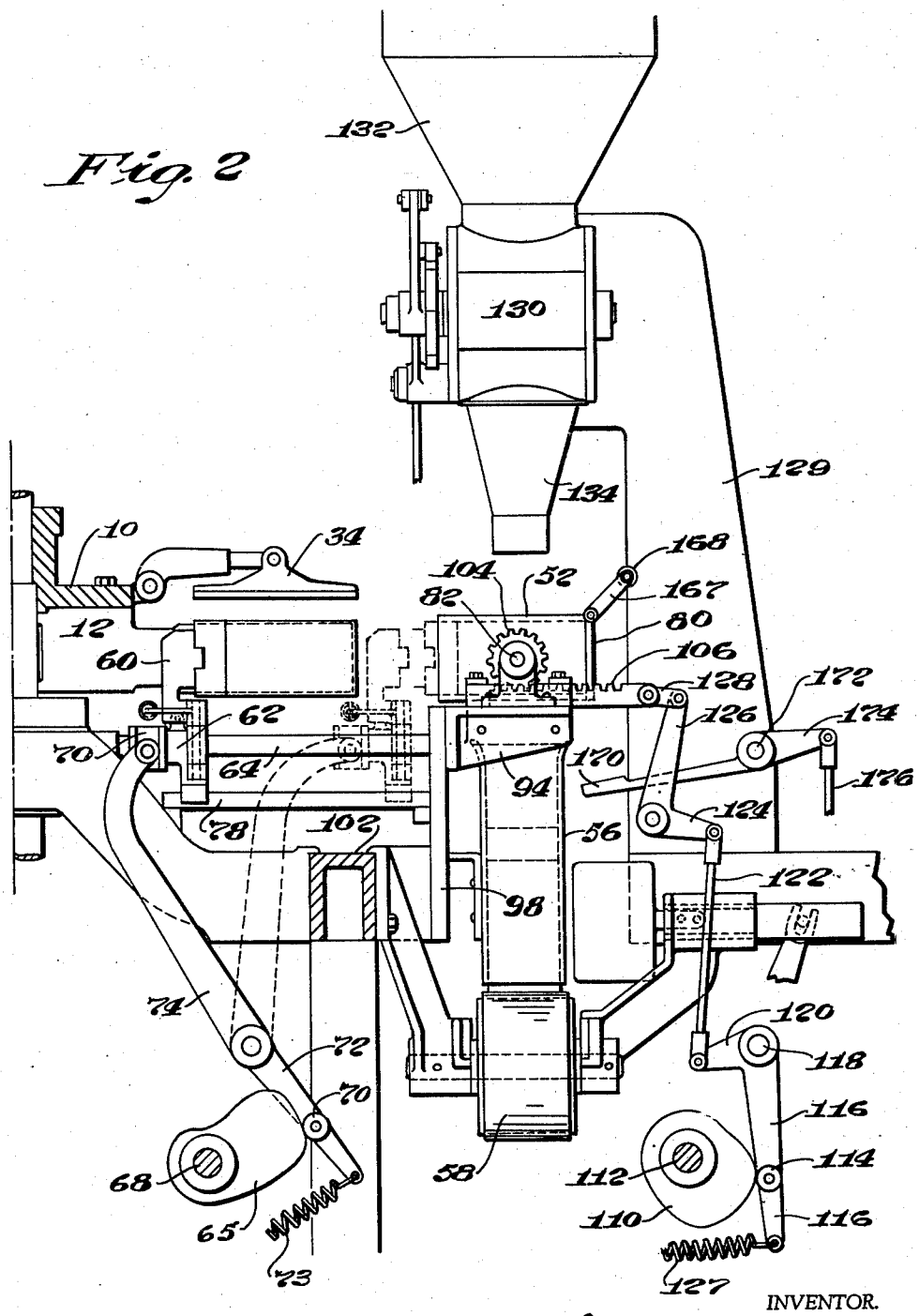
BY J. Stanley Churchill.

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PACKAGING MACHINE

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Fig. 2



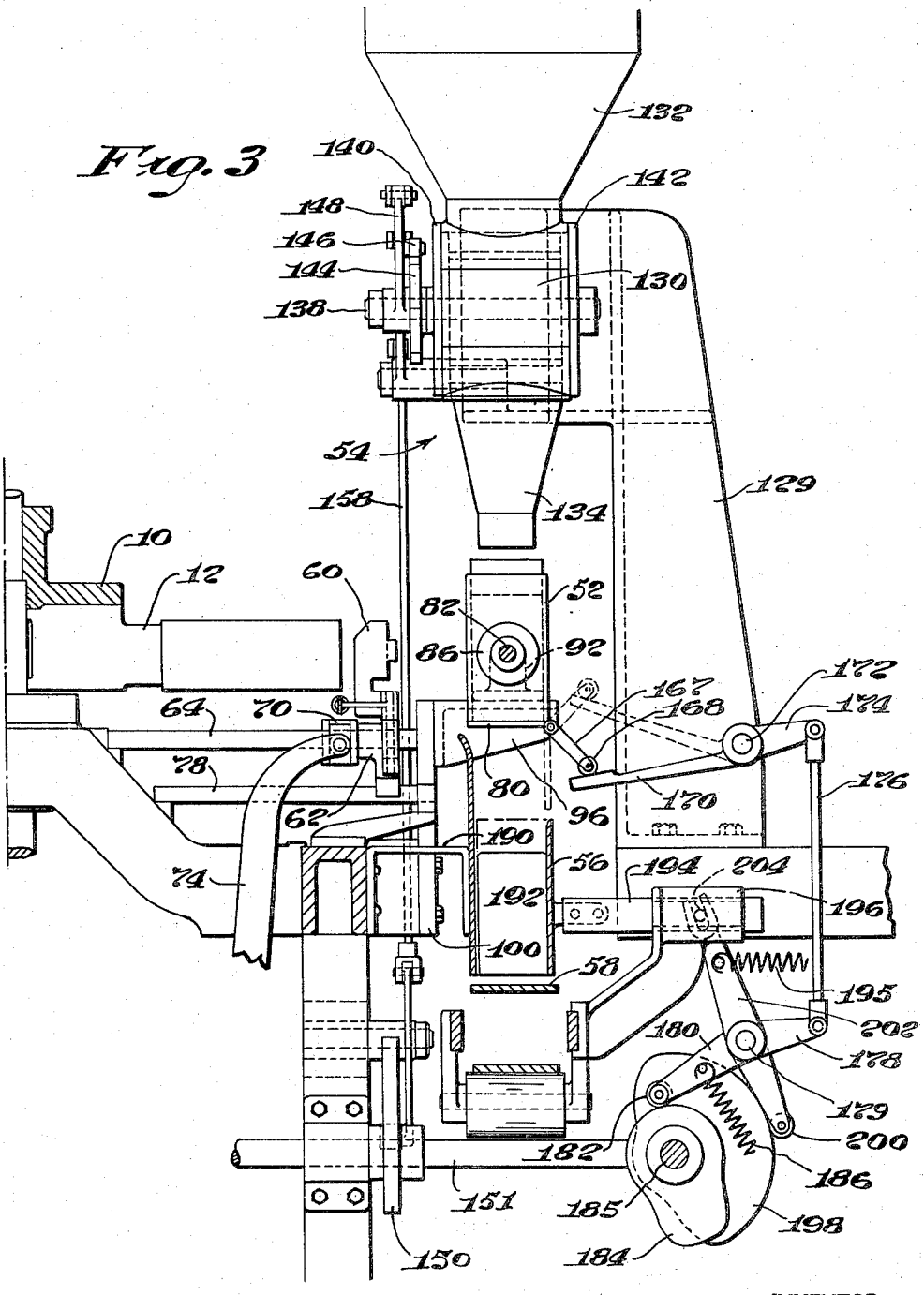
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PACKAGING MACHINE

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Fig. 3



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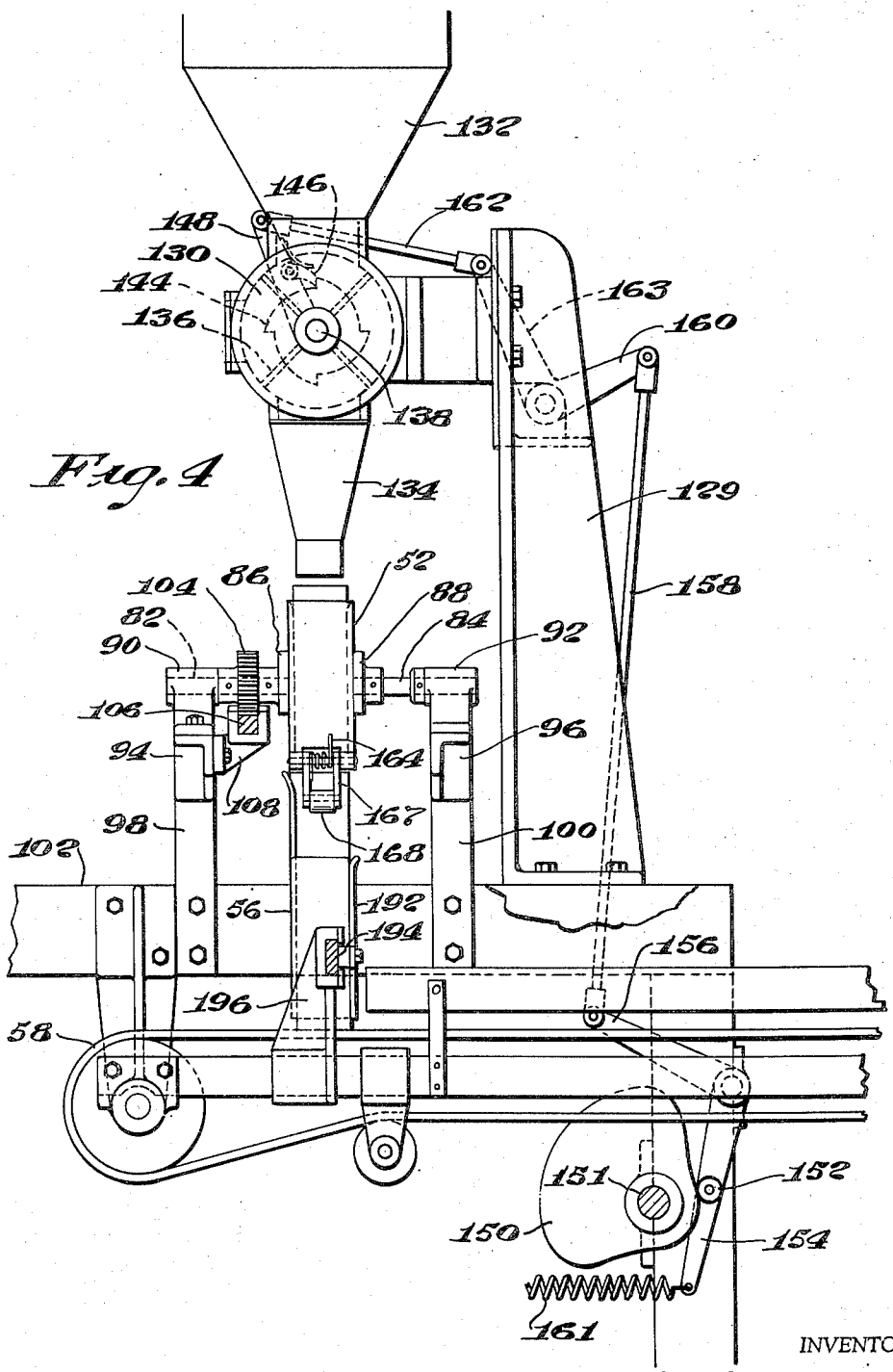


Fig. 4

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UNITED STATES PATENT OFFICE

2,377,687

PACKAGING MACHINE

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Application April 15, 1941, Serial No. 388,585

3 Claims. (Cl. 226—58)

This invention relates to a packaging machine.

The invention has for one of its objects to provide novel, simple and efficient apparatus for making containers such as paper bags and for handling and conveying the same to enable succeeding operations to be performed thereon, such as filling and closing the same in separate machines.

A further object of the invention is to provide a novel and improved packaging machine and particularly a bag forming machine, for producing relatively light weight bags or cartons and in which provision is made for facilitating the handling of such bags at the discharge station of the machine and upon a discharge conveyer.

A still further object of the invention is to provide a novel and improved packaging machine in which provision is made for providing the formed bag with at least a partial load of the material being packaged immediately after the formation thereof and prior to its discharge from the machine whereby the bag is rendered sufficiently weighted to enable the bag to maintain its shape and to be more accurately controlled and handled during its discharge from the machine and in the subsequent transference thereof to other machines.

With these general objects in view and such others as may hereinafter appear, the invention consists in the packaging machine and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings which illustrate the preferred embodiment of the invention, Fig. 1 is a plan view of a packaging machine embodying the present invention; Fig. 2 is an enlarged side elevation, partly in cross section, of the discharge station of the machine; Fig. 3 is a view similar to Fig. 2 showing the parts in a different position of operation; Fig. 4 is a front view of the mechanism shown in Fig. 2; Fig. 5 is a plan view detail of the mechanism for stripping the carton from its forming block; and Fig. 6 is an end view detail, partly in cross section, of the mechanism shown in Fig. 5.

In general, the present invention seeks to provide a novel, simple and practical packaging machine for forming containers of light weight material, such as paper, and for depositing at least a partial load of the material to be packaged therein immediately after formation so that successive containers may be discharged upon a discharge conveyer in a form capable of being conveyed to a succeeding and independently operating machine, such as a weighing machine or a top closure machine. The light weight containers, such as paper bags, thus loaded possess sufficient definiteness of shape, rigidity and stability to enable them to be handled by the conveyer in a practical manner analogous to that in which relatively stiff cartons may be handled, so that they may be successfully and economically fed to a succeeding machine in the packaging line with minimum interruption in the operation thereof.

Referring now to the drawings, the illustrated and preferred embodiment of the present packaging machine, as shown in Fig. 1, includes container forming mechanism comprising an intermittently rotated spider 10 provided with a plurality of horizontally disposed forming blocks 12 about which the blanks 14 of container forming material are wrapped to form a bag or carton. Except as to details hereinafter described, such bag forming mechanism may and preferably will comprise bag forming mechanism now upon the market, such as is illustrated in the United States Patent to Hesser, No. 1,020,821, dated March 19, 1912. As herein shown, such mechanism may include an operating station indicated generally at 18 in which provision is made for cutting off a predetermined length of bag forming material drawn from a supply roll 20 thereof by feed rolls 22 and for feeding the blank into operative position beneath the forming block 12. Provision is also made for applying strips of adhesive 24 to the web of material as it passes the adhesive applying rollers 26 prior to being cut to length by the reciprocatory knife 28 and advanced into the position shown in Fig. 1. The cut-off blank is positioned between guides 30, 32 which form part of a folding mechanism adapted to cooperate with the forming block 12 to wrap the blank 14 about the block, as clearly shown and described in the patent to Hesser, above referred to. A top presser member 34, see Fig. 2 is then arranged to descend to firmly press the seam formed by the overlapping and adhesively secured edges of the blank.

The spider 10 is thereafter rotated to present the forming block 14 to an operating station indicated generally at 36 where the extended ends of the blank are folded upon the block to form the bottom of the bag, and as herein shown, this operation is performed by two pairs of folder plates, one pair 38, 40 being arranged to rock in a horizontal plane and the second pair 42 being arranged to rock in a vertical plane. An end presser 44 is then operated to firmly press the folded bottom of the bag against the block to set

the glue. An additional presser 46 is provided at the next operating station whereupon the spider is rotated to present the forming block to the discharge station indicated generally at 50 where the bag is removed from the forming block.

Referring now to Figs. 2, 3 and 4, as therein shown, the discharge station 50 includes a rotatable pocket 52 arranged to receive the formed bag as it is removed from its forming block and to be moved from a horizontal position in alignment with the forming block 12, as shown in Fig. 2, to a vertical position, as shown in Fig. 3, to present the formed bag in alignment with filling mechanism, indicated generally at 54. Thereupon the filling mechanism is operated to deposit at least a partial load of material in the bag, and thereafter the bottom of the pocket is opened to permit the bag to fall by gravity to a discharge conveyor 58 to be conveyed away from the machine and to be delivered to a succeeding machine in the packaging line such as a weighing or filling machine where the remainder of the load may be introduced into the bag. Although, as herein described, a partial load is introduced into the bag prior to its discharge from the machine, it will be apparent that for some purposes the bag may be provided with its entire load at the discharge station whereupon the filled bag may be delivered by the conveyor directly to a top closing machine.

In the illustrated machine, as shown in Fig. 2, provision is made for stripping the bag from its horizontally disposed forming block and depositing the bag into the rotatable pocket 52 disposed in alignment therewith. The stripping fingers 60 are carried by a slide member 62 arranged to be reciprocated upon a slide bar 64 supported upon the machine frame. The stripping fingers 60 are rockingly mounted upon the slide member 62 and are arranged to yieldingly engage the edges of the open end of the bag while the latter is disposed upon the block and to slide the bag off the block into the pocket 52. As herein shown, the slide member may be reciprocated through connections from a cam 65 mounted upon a cam shaft 68 forming part of the driving mechanism of the machine as will be hereinafter described. A cam roller 70 carried by one arm 72 of a two-armed lever, cooperates with the cam 65 and a second arm 74 is connected to the slide member 62 by a swivelled block 71. A spring 73 is arranged to urge the roller 70 against its cam. The slide member 62 is provided with a depending yoked portion 76 arranged to engage a rectangular slide bar 78 in order to maintain the slide member 62 in an upright position. In the operation of the machine, the stripping fingers 60 are disposed in a neutral position, as shown in dotted lines in Fig. 2, out of the path of the forming blocks 12 during the intermittent movement of the spider 10. When a forming block has come to rest at the discharge station, the stripping unit is moved over the block to present the stripping fingers in operative relation to the edges of the bag whereupon the stripping unit is advanced to remove the bag from the block and to deposit it in the pocket 52. Thereafter, the stripping unit is again retracted to its neutral position to permit the spider to make another intermittent movement, and to provide clearance for the horizontally disposed pocket 52 to be rotated to its vertical position, as will now be described.

Referring now to Figs. 2 and 4, the rotatably mounted pocket 52 comprises a box shaped holder open at one end and having a hinged bottom plate 80 at its other end. The pocket is supported upon shafts 82, 84 secured to opposite sides of the pocket in flanges 86, 88, and the shafts are journaled in bearings 90, 92 carried by brackets 94, 96 respectively. The latter are mounted upon upright bars 98, 100 attached to the frame 102 of the machine, as shown in Figs. 2 and 4. Provision is made for rotating the pocket through an arc of 90 degrees from a horizontal to a vertical position and return, and as herein shown, the shaft 82 is provided with a gear 104 arranged to cooperate with a rack 106 slidably mounted in a member 108, secured to the bracket 94. The rack 106 is arranged to be reciprocated to effect rotation of the pocket as above described, through connections from a cam 110 mounted fast upon a cam shaft 112. A cooperating cam roll 114 is carried by one arm 116 of a bell crank pivotally mounted upon a rocket shaft 118. The second arm 120 of the bell crank is connected by a link 122 to one arm 124 of a second bell crank, the second arm 126 of which is connected by a link 128 to the end of the rack 106. A spring 127 connected to the arm 116 serves to hold the roller 114 against its cam.

From the description thus far, it will be observed that a formed bag is stripped from its forming block at the discharge station and deposited in the rotary pocket while the latter is in its horizontally disposed position whereupon the pocket is rotated 90 degrees to present the pocket in alignment with the filling mechanism 54. As herein shown, the filling mechanism is supported upon an upright bracket 129 and may comprise a feed hopper 130 having an inlet at its upper end in communication with a supply hopper 132 and an outlet at its lower end in communication with a discharge funnel 134. The feed hopper is provided with a plurality of radially arranged blades 136 rotatably mounted upon a central shaft 138, journaled in removable side plates 140, 142 of the hopper. The blades 136 separate the hopper interior into equal compartments and provision is made for intermittently rotating the feeding blades to empty the material from one of the measuring compartments during each cycle of operation of the machine in order to provide each bag with a partial load of the material being packaged prior to discharging the formed bag from the machine. As herein shown, a ratchet 144 mounted fast upon the shaft 138 is arranged to be operatively engaged by a pawl 146 carried by a lever 148 loosely mounted adjacent the ratchet upon the shaft 138. Provision is made for rocking the lever 148 to effect intermittent rotation of the blades 136 through connections including a cam 150 mounted fast upon a cam shaft 151, and a cooperating roller 152 carried by one arm 154 of a two-armed lever. The second arm 156 of the two-armed lever is connected by a link 158 to one arm 160 of a bell crank pivotally mounted in the supporting bracket 129, the second arm 163 of the bell crank being connected by a link 162 to the lever 148. A spring 161 connected to the arm 154 operates to hold the roller 152 against its cam.

After the bag has been provided with a partial load of the material being packaged, as above described, provision is made for opening the hinged bottom gate 80 to permit the bag to fall by gravity onto the discharge conveyer belt 58. As herein shown, the hinged gate 80 is normally retained in its closed position by a coil spring 164, see Fig. 4, and in order to open the gate an arm 167 extending from the gate and provided with a roller 168 is arranged to be engaged by

one arm 170 of a two-armed lever pivotally mounted on a rocker shaft 172 journaled in the bracket 129. The second arm 174 of the two-armed lever is connected by a link 176 to one arm 178 of a cam lever pivotally mounted on a rocker shaft 179. The second arm 180 of the cam lever is provided with a roller 182 which cooperates with a cam 184 mounted fast on a cam shaft 185. A spring 186 connected to the arm 180 is arranged to urge the cam roll 182 against its cam. Thus, in the operation of the machine, the arm 170 engages the roller 168 on the extended arm 167 and operates to rock the gate 80 from its closed position, as shown full lines in Fig. 3 to its open position as shown in dotted lines. Upon the release of the bag from the pocket, the arm 170 is returned to its lowered position whereupon the pocket is rotated to again present the pocket in its horizontal position in alignment with a succeeding forming block.

As hereinbefore stated, upon release of the bag from its pocket, the bag is guided through a chute 56 to fall upright upon the continuously moving conveyer belt 58. The chute 56 is supported beneath the pocket and in alignment therewith by a member 190 extended from the frame of the machine, as illustrated in Fig. 3, and the chute is preferably closed on three sides, the fourth side being open to permit the bag to be conveyed therethrough upon the conveyer belt. In order to guide the bag on the fourth or open side during its fall from the pocket 52, a movable guide member 192 is provided to form the fourth side of the chute during the discharge of the bag from the pocket and which is arranged to be retracted in timed relation to the operation of the machine to release the bag from the chute. As herein shown, the movable guide member 192 is attached to a slide member 194 which is slidably mounted in a bracket 196 extending from the conveyer side frame. The slide member is arranged to be reciprocated through connections including a cam 198 fast on the cam shaft 185, a cooperating cam roller 200 carried by one arm of a two-armed lever pivotally mounted on the rocker shaft 179, and a second arm 202 of the two-armed lever provided with a bifurcated end arranged to embrace a pin 204 extending from the slide member 194 as clearly shown in Fig. 3. A spring 195 operates to hold the roller 200 against its cam.

Referring now to Fig. 1, the driving mechanism, as herein shown, comprises a clutch pulley 210 loosely mounted upon a short shaft 212 and which may be driven from an electric motor, not shown. The pulley 210 is detachably engageable with a pinion 214 fast upon the shaft 212 which is arranged to mesh with a gear 216 fast upon the end of the elongated drive and cam shaft 151. The bag forming spider 10 has intermittent motion imparted to it through a Geneva mechanism of usual construction comprising a driver 220 fast upon a shaft 222, and a four-point drive shaft 151 through cooperating bevel gears 226, 228, a cross-shaft comprising the cam 65 and cooperating bevel gears 230, 232. The paper feed and cut-off mechanism 18 is driven from the shaft 151 through a cross-shaft 234, bevel gears 236, 238 and bevel gears 240, 242, as illustrated in Fig. 1. The bottom folding mechanism 36 is operated from the cross-shaft 234 through a cam 244 and the usual connections indicated generally at 246, reference being had to the Hesser Patent No. 1,020,821, hereinbefore referred to, for a more detailed description of such mechanism. The cam shaft 185, as herein shown, is driven through cooperating bevel gears 248, 250. The discharge conveyer 58 may be independently driven through any usual or preferred mechanism, not shown.

From the above description it will be seen that in the operation of the machine, the formed bag is stripped from its forming block 12 at the discharge station and deposited into the rotatably mounted pocket 52 while the latter is in its horizontal position. Thereafter, the rotary pocket is turned upright and the bag disposed therein is provided with a partial load of the material being packaged. The bottom of the pocket is then opened to permit the weighted bag to fall by gravity through the discharge chute 56 and onto the continuously operated conveyer 58 to be discharged from the machine. During this time the spider 10 is rotated to present a succeeding forming block with a formed bag thereon to the discharge station, and upon the discharge of the partially filled bag from the rotatably mounted pocket 52, the latter is again rocked to its horizontal position to receive the succeeding bag from the forming block 12, as described.

From the description thus far, it will be observed that in the present machine light weight containers which heretofore have presented exceedingly difficult problems in handling, are provided with at least partial loads of the material to be packaged and by which the material of the bag is caused to assume a definite and predetermined rectangular shape and to possess sufficient weight and rigidity to enable the successive partially filled bags, as they are deposited upon the conveyer, to be moved in a line, and thus successfully fed into a succeeding machine in the packaging line, such for example, as to a weighing machine, and in the event that the load which has been introduced into the bag of the present machine comprises the full measured load, then the bags may be fed upon the conveyer directly to a top closing machine. This enables the present machine to comprise a simple machine and to avoid the necessity of timing and operatively connecting together the various bag making, bag filling and top closing machines in a single machine. This is conducive to simplification in the design and operation of the machine and facilitates the packaging of material in bags in an economical and practical manner.

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

Having thus described the invention, what is claimed is:

1. A packaging machine having in combination, a horizontally disposed bag supporting block rectangular in section and having its sectional dimensions substantially equal to the internal sectional dimensions of an opened and squared up bag so that the latter can be supported thereover, bag stripping means for stripping the opened and squared up bag from the block, bag holding means engaging an opened and squared up bag as it is stripped from the block operative to move the bag from a horizontal to an upright position and to support the bag in such upright position under a bag filling means, said bag holding means including mov-

ably mounted bag supporting means, and means operative to move the bag supporting means to effect the release of the bag from the bag holder after the bag has been at least partially filled to permit it to drop upon a conveyor.

2. A packaging machine having in combination, a horizontally disposed bag supporting block rectangular in section and having its sectional dimensions substantially equal to the internal sectional dimensions of an opened and squared up bag so that the latter can be supported thereover, a bag holding pocket member rotatable from a horizontal position to a vertical position below a bag filling means, said bag holding pocket member having an openable bottom wall, means for stripping the opened and squared up bag from the block and depositing it in said pocket member while the latter is in its horizontal position, operating means for rotating said pocket member from the horizontal position into the vertical position below the bag filling means, and means for thereafter opening the bottom wall of the pocket member to effect the release of the bag from the pocket member after the bag has been at least partially filled to permit it to drop upon a conveyor.

3. A packaging machine having in combination, a horizontally disposed bag supporting block rectangular in section and having its sectional dimensions substantially equal to the internal sectional dimensions of an opened and squared up bag so that the latter can be supported thereover, a bag holding pocket member rotatable from a horizontal position to a vertical position below a bag filling means, said bag holding pocket member having an openable bottom wall, means for stripping the opened and squared up bag from the block and depositing it in said pocket member while the latter is in its horizontal position, operating means for rotating said pocket member from the horizontal position into the vertical position below the bag filling means, means for thereafter opening the bottom wall of the pocket member to effect the release of the bag from the pocket member after the bag has been at least partially filled to permit it to drop upon a conveyor and a three-sided guide chute for guiding the bag during its descent from the bag holding pocket member.

STANLEY R. HOWARD.