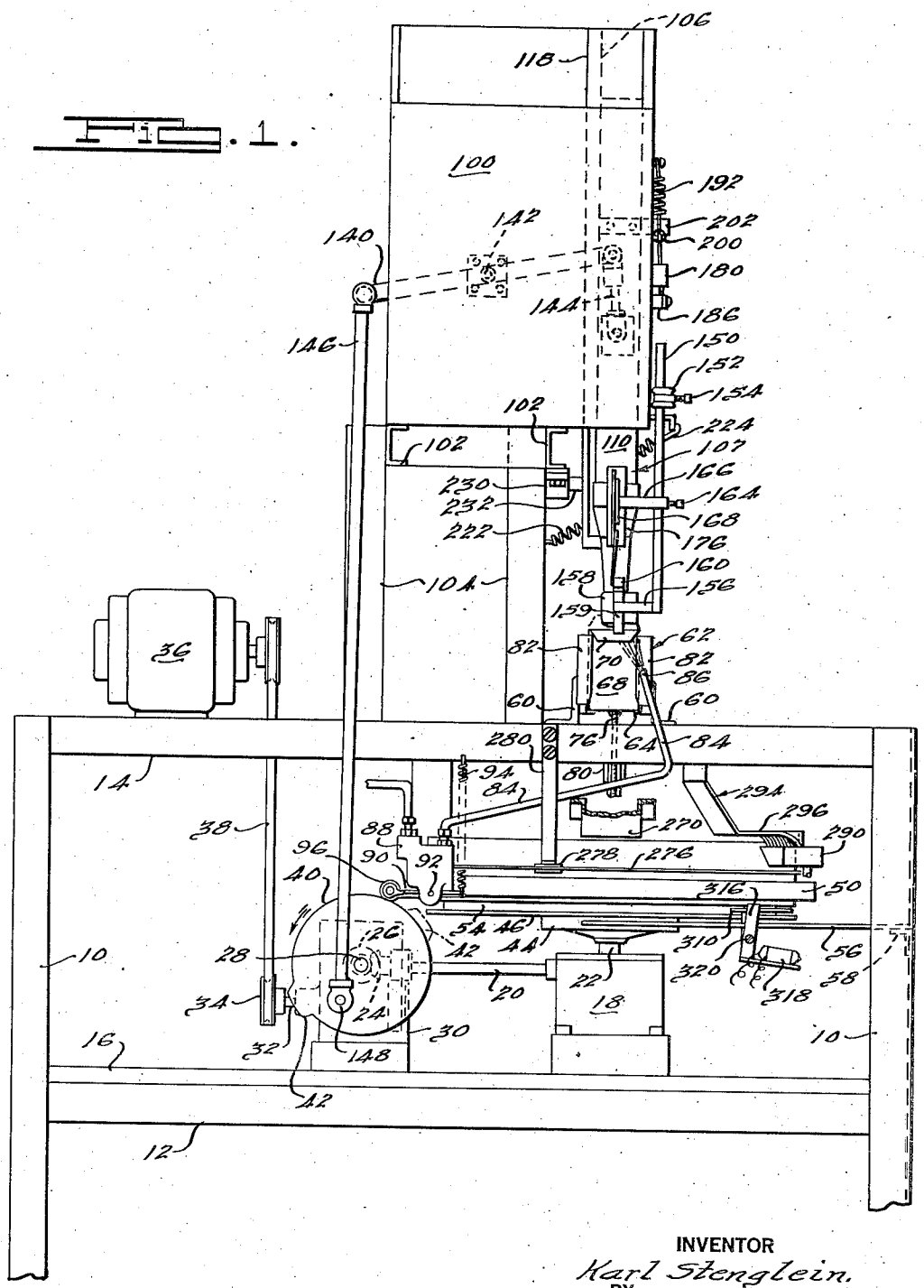
May 15, 1945. K. STENGLEIN 2,376,289

PACKAGING APPARATUS

Filed Feb. 4, 1942 4 Sheets-Sheet 1

Fig. 1.



INVENTOR
Karl Stenglein.
BY
Harness, Dickey & Pierce
ATTORNEYS.

May 15, 1945. K. STENGLEIN 2,376,289

PACKAGING APPARATUS

Filed Feb. 4, 1942 4 Sheets-Sheet 2

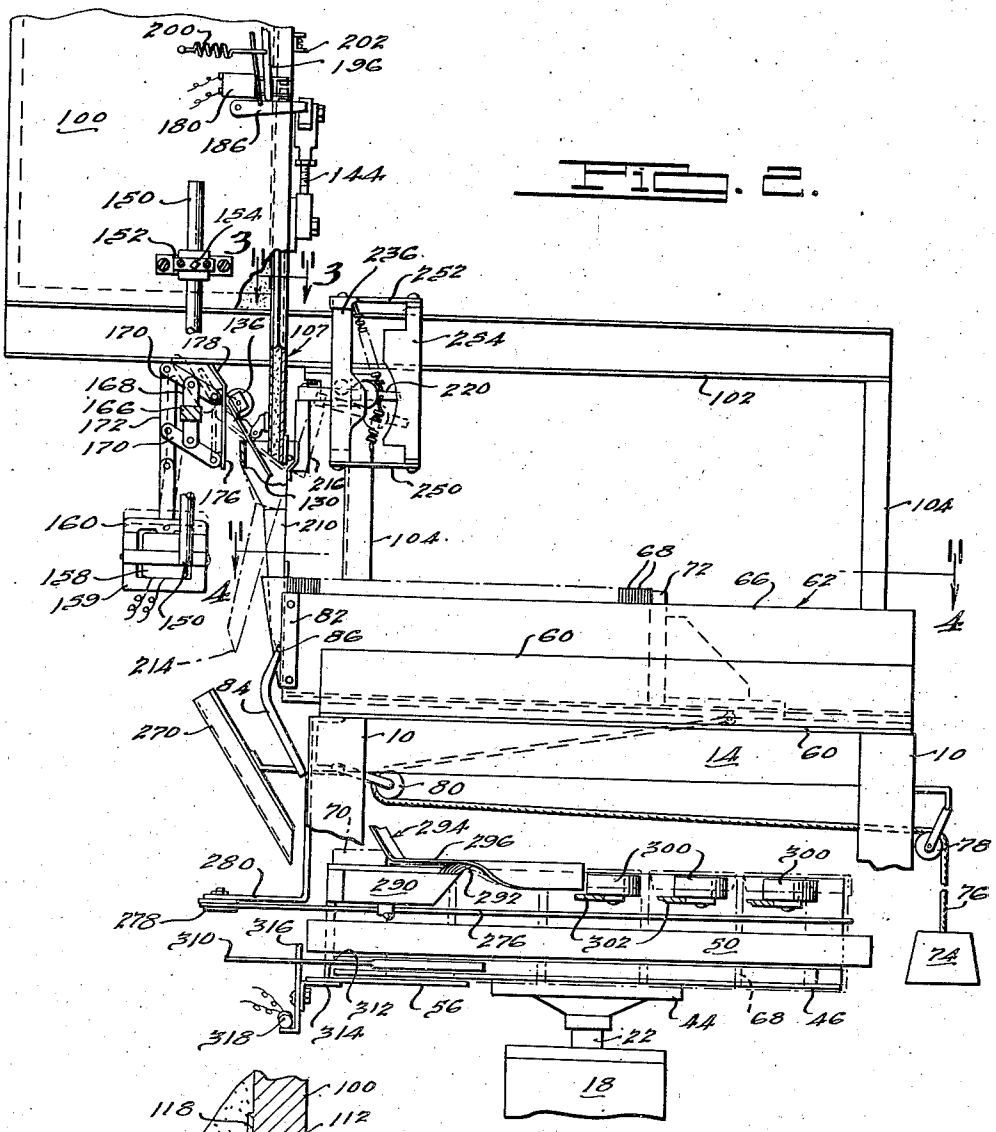


FIG. 2.

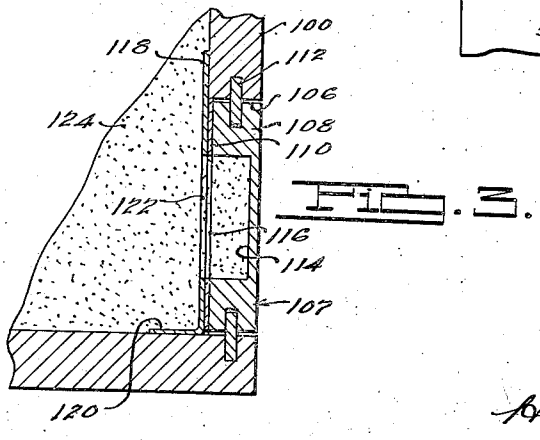


FIG. 3.

INVENTOR
Karl Stenglein.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

May 15, 1945. K. STENGLEIN 2,376,289

PACKAGING APPARATUS

Filed Feb. 4, 1942 4 Sheets-Sheet 3

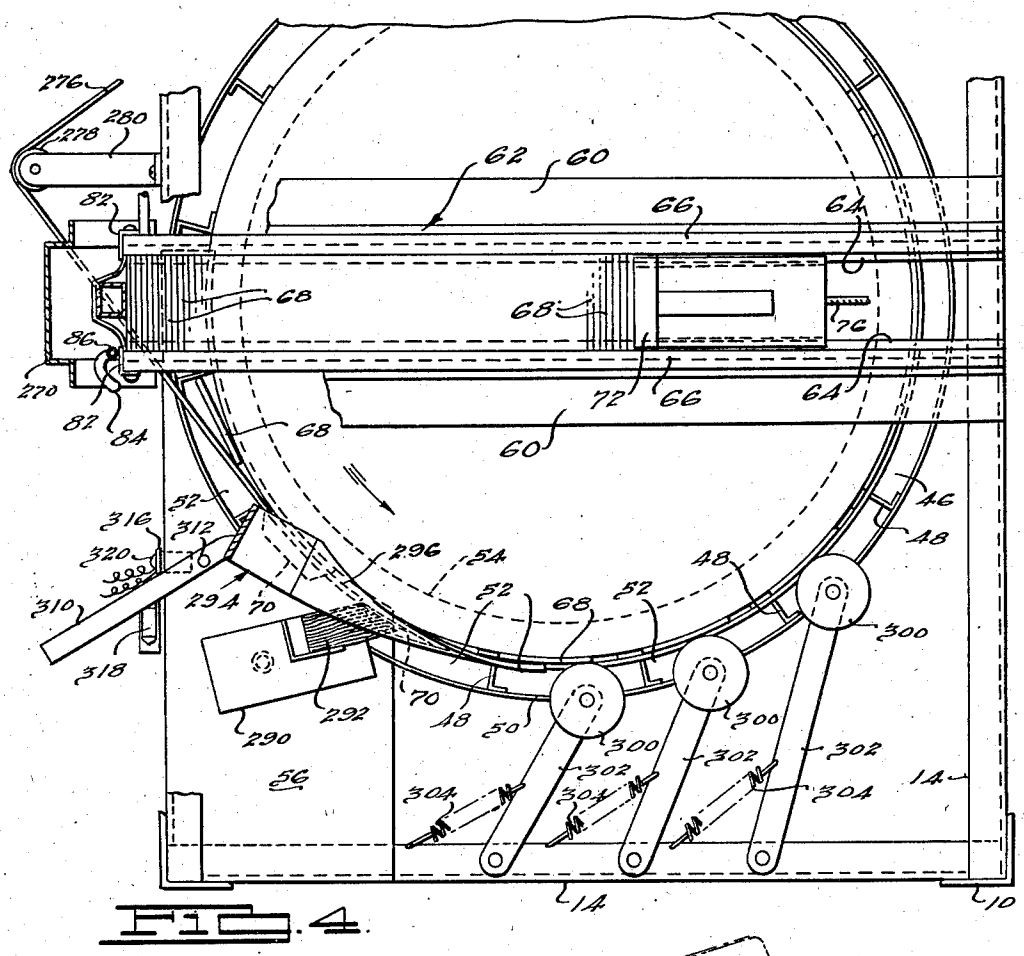
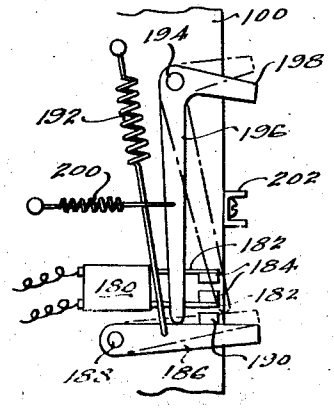


FIG. 4.

FIG. 5.



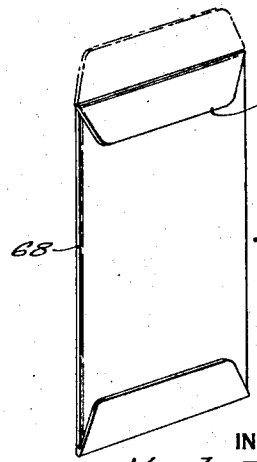


FIG. 6.

INVENTOR
Karl Stenglein.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

May 15, 1945. K. STENGLEIN 2,376,289

PACKAGING APPARATUS

Filed Feb. 4, 1942 4 Sheets-Sheet 4

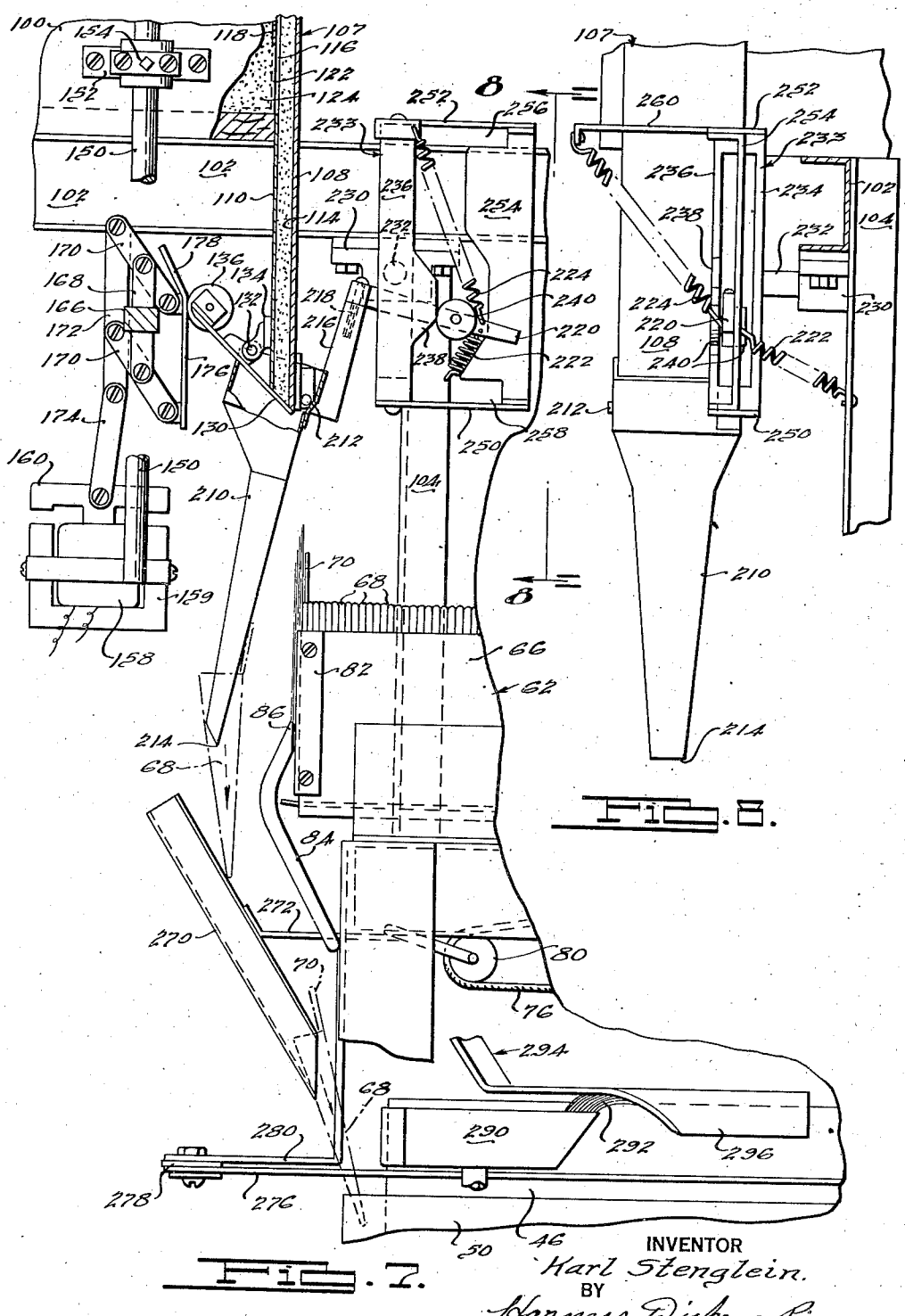


FIG. 7.

FIG. 8.

INVENTOR
Karl Stenglein.
BY
Harness, Dickey & Pierce
ATTORNEYS.

Patented May 15, 1945 2,376,289

UNITED STATES PATENT OFFICE

2,376,289

PACKAGING APPARATUS

Karl Stenglein, Saginaw, Mich.

Application February 4, 1942, Serial No. 429,441

13 Claims. (Cl. 226—49)

This invention relates to packaging apparatus and particularly to apparatus which is adapted to package material consisting of relatively small loose particles or material which is comminuted and in a substantially dry state, particularly in containers of the envelope type, the principal object being the provision of apparatus of this type that is substantially automatic in operation, simple in construction and relatively economical to build.

Objects of the invention include the provision of means progressively presenting envelope-like containers in a position to be filled, opening the flap of the container and then filling the container; and the provision of means for feeding a pack of envelope-like containers one after the other to a position to be filled, filling each of said containers in turn and then disengaging it from the pack.

Further objects of the invention include the provision of a package filling machine including a hollow material dispensing slide having an automatically actuated valve on the discharge end thereof; the provision of a construction as above described in which the material discharged from the slide is delivered to a spout reciprocable with the slide; the provision of apparatus as above described in which the spout is pivotally mounted upon the slide; the provision of apparatus as above described in which means are provided for pivoting the spout on the slide during each reciprocation of the slide; the provision of apparatus as above described including means for rendering the valve inoperative to discharge material from the slide whenever the machine is stopped; the provision of apparatus as above described in which means are provided for adjustably controlling the point in the reciprocable movement of the slide at which the valve is opened; and the provision in apparatus of the type described of means for adjustably controlling the length of time the valve remains open and, therefore, the amount of material discharged from the spout during each reciprocation of the slide.

Further objects of the invention include the provision of a novel form of means in apparatus of the type described for effecting pivotal movement of the spout on the slide during reciprocation of the slide in one direction only; the provision of a novel form of switch mechanism actuated by movement of the slide for controlling the opening and closing positions of the material discharge valve; and the provision in apparatus of the type described of means for stopping the apparatus when the supply of containers fed to the spout is exhausted.

The above being among the objects of the present invention the same consists in certain novel features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed, having the above and other objects in view.

In the accompanying drawings which illustrate a suitable embodiment of the present invention and in which like numerals refer to like parts throughout the several different views,

Fig. 1 is a front elevational view of a packaging machine constructed in accordance with the present invention;

Fig. 2 is an enlarged fragmentary, partially broken and partially sectioned side elevational view of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged fragmentary transverse sectional view taken on the line 3—3 of Fig. 2 and illustrating the construction of the reciprocable slide in greater detail;

Fig. 4 is an enlarged fragmentary horizontal sectional view taken on the line 4—4 of Fig. 2 and illustrating the envelope closing and sealing mechanism for the packages;

Fig. 5 is an enlarged fragmentary side elevational view of the switch mechanism actuated by reciprocation of the slide and employed for controlling the opening and closing of the material discharge valve;

Fig. 6 is a perspective view of one of the containers employed in the apparatus shown in the preceding views;

Fig. 7 is an enlarged fragmentary partially broken, partially sectioned side elevational view of the material feeding and package opening and discharging portion of the apparatus with the control mechanism therefor, showing the same in greater detail; and,

Fig. 8 is a fragmentary rear elevational view taken on the line 8—8 of Fig. 7 and illustrating the nozzle pivoting mechanism.

The present invention particularly relates to apparatus for filling envelopes with predetermined amounts of material which consists of relatively small, loose particles or material which is comminuted and in a substantially dry state, although it will be appreciated from the following description and explanation that the material measuring and feeding portion of the apparatus is applicable for filling containers of substantially any conventional form, as for instance set up boxes or cartons, and the apparatus may be adapted to fill such other types of containers by

a relatively simple modification thereof. Accordingly, as far as such features of the apparatus of the present invention are concerned it will be understood that they are not limited solely to the filling of envelopes.

Envelopes are employed to package a great variety of materials for a number of different purposes. Some materials such as dyes in powdered form, garden seeds, and the like are conventionally sold as complete packages in envelope-type containers. Dry comminuted materials, such for instance as powdered soap or like cleaning materials, conventionally sold in boxes are conventionally distributed as samples in envelope-type packages. Envelopes as received by the one who is to effect the packaging normally have their flaps closed which thus requires such flaps to be opened before the material can be introduced thereinto. In the past it has been conventional practice by those who desire to package material in envelope-like containers to fill such containers by hand, the result being that the filling of the containers is a relatively slow and expensive operation and the contents of various envelopes are liable to vary to a greater or lesser extent.

In accordance with the present invention envelopes received with the closed flaps are simply stacked in the apparatus, the hopper of the apparatus is filled with the material which is to be packaged, and upon setting the apparatus in operation the envelopes are successively opened, filled with a predetermined amount of material and the flaps are closed and sealed, all of this being accomplished without human aid except that required to start and stop the apparatus and to maintain the envelope and material hoppers filled. It will, of course, be appreciated that the mechanism for closing and sealing the envelope containers is not limited in its application to the particular material feeding mechanism disclosed herein but is a separate invention which forms the subject matter of my copending application for Letters Patent of the United States on the same subject as the present application, filed March 19, 1945 and serially numbered 583,442, the same being a division of the present application.

Referring now to the drawings and particularly to Fig. 1, it will be noted that the apparatus or machine includes a frame or base of generally rectangular conformation including vertically extending corner legs 10 interconnected by lower cross-members 12 and upper cross-members 14. A floor-like support 16 is extended over and secured between the lower cross-members 12. Upon the floor 16 is supported and secured a gear reduction mechanism indicated generally at 18 having a horizontally directed in-put or drive shaft 20 and a vertically directed output or driven shaft 22 projecting upwardly through the top thereof. The in-put shaft 20 is driven by means of a pair of bevelled gears 24 and 26 from the output shaft 28 of a second gear reduction mechanism 30 also mounted on the floor 16. The gear reduction mechanism 30 is provided with a drive or in-put shaft 32 carrying a pulley 34 which is driven from an electric motor 36 supported on the upper cross-members 14, by means of a belt 38. The output shaft 28 of this second gear reduction mechanism 30 has fixed thereto a cam 40 provided with a single peripheral lobe 42. The function of the cam 40 will be described later.

Output shaft 22 of the gear reducing unit 18 has fixed to its upper end a supporting flange 44 which in turn supports thereon in concentric relation with respect to the shaft 22 a circular head 46 shown for the purpose of convenience in the form of a solid disc. As best brought out in Fig. 4 the head 46 has secured to the periphery thereof in equally angularly spaced relation about its axis a plurality of radially outwardly projecting spacer members 48. These spacer members 48 are preferably formed from sheet metal and arranged in their planes of thickness parallel to the axis of rotation of the head 46. The outer end of each spacer element 48 is bent into parallelism with the corresponding portion of the periphery of the head 46 and surrounding and supported on such bent ends of the spacer members 48 is a ring element 50 preferably formed from sheet metal and of a material depth as indicated. The spacer members 48 and ring 50 are of equal depth and materially less than the thickness of the head 46 and are located above the lower edge of the head 46 and a material distance below the upper face thereof. Thus a pocket 52 is formed between each adjacent pair of spacers 48 between the periphery of the head 46 and the ring 50 and such pockets are open both at the top and bottom thereof. As perhaps best brought out in Fig. 1 the head 46 is provided with a peripheral groove 54 therein immediately above its lower edge and below the lower edge of the ring 50, the purpose of which will hereafter be more fully described.

As brought out in Figs. 1, 2, and 4 and particularly in the latter figure a plate member 56 is arranged with its plane of thickness horizontal and supported from the frame by means of suitable angle brackets 58. This plate member 56 is positioned immediately below but preferably out of contact with the lower face of the head 46 and projects under the head 46 from an angular position, as best brought out in Fig. 4, slightly above the center of the head 46, as viewed in such figure, to a point angularly about the axis of the disc in a counterclockwise direction of rotation as viewed in Fig. 4 approximately 45 degrees therefrom, the inner edge portion of the plate 56 being cut away along a curve struck from the axis of rotation of the head 46. The plate 56 thus underlies those pockets 52 located directly thereabout and serves as a means for preventing the envelopes from falling directly through the pockets when positioned over the plate 56 as will hereinafter be more apparent.

Supported between a pair of angle members 60, extending between the front and rear upper cross-members 14 and directly above the axis of the head 46 is an envelope hopper indicated generally at 62. This hopper has sectioned ledges 64 projecting inwardly at the bottom of the spaced side walls 66 thereof whereby to provide a bottom support for the envelopes which are received therein. The side walls are spaced from one another by a width corresponding with the width of the envelopes to be filled and one of which envelopes is shown in perspective at 68 in Fig. 6, in the condition in which it is received for filling, that is with its flap 70 in closed but unsealed condition. The envelopes 68 are placed in the trough or hopper 62 with their long dimensions vertical and with the flaps 70 at the upper ends thereof and facing towards the front of the machine. The height of the sides 66 of the trough 62 is less than the height or length of the envelopes 68 so that the flaps 70 are arranged above or substantially above the upper edges of the sides 66. The stack of envelopes 68 is constantly urged towards that end of the hopper 62 disposed at the front end of the machine by means of a follower block 72 slidably received in the hopper 62 and constantly

urged forwardly by means of a weight 74 connected to the follower block 72 by means of a cable 76 passing over suitably supported sheaves 78 and 80 as brought out in Fig. 2.

Each side 66 of the envelope hopper 62 has fixed to its forward end an angle member 82 one flange of which lies in flat contacting relation with respect to the outer side face of such side member 66 and the remaining flange of which extends across the forward end of such side member 66 and projects inwardly a slight distance beyond the inner face thereof as best brought out in Figs. 1 and 4. These members 82 thus project into the path of movement of the outer edges of the envelopes 68 in their passage through the hopper 62 and prevent the envelopes from being ejected from the hopper under the influence of the weight 74 acting through the follower block 72. It will thus be appreciated that each envelope 68 in turn is presented in flatwise relation at the forward end of the envelope hopper 62 with the flap 70 of each envelope at the upper end thereof and facing towards the front of the machine.

The flap 70 of each envelope 68 must, of course, be opened before material can be discharged into the envelope, and to effect opening of the flap 70 of each envelope as it is advanced in turn to the outer end of the hopper 62 the following mechanism is provided. As best illustrated in Figs. 1, 2 and 7 a tube 84 is provided with a flattened end forming a nozzle 86 and the nozzle end of the tube 84 lies immediately in advance of the righthand member 82 of the hopper 62, as viewed in Fig. 1, with the nozzle 86 thereof positioned approximately midway the height of such member 82 and not only directed inwardly towards the center of the flap 70 of the foremost envelope 68 as indicated in Fig. 1 but angularly against the face of such envelope as brought out in Figs. 2 and 7.

The tube 84 is connected to a suitable source of air under pressure and interposed in the length of the tube 84 is a valve 88, shown in Fig. 1. As there indicated the valve 88 is provided with a control arm 90 pivoted between its ends to the valve at 92 and the pivotal position of which controls the opening and closing of the valve 88. A coil spring 94 tensioned between one end of the arm 90 and one of the frame side members 14, as illustrated in Fig. 1, constantly urges the arm 90 towards a closed valve position. The opposite end of the arm 90 is provided with a roller 96 mounted thereon which rides on the periphery of the cam 40. When the roller 96 rides on that portion of the periphery of the cam 40 angularly beyond the lobe 42 thereof the spring 94 serves to hold the valve 88 in closed position. When the lobe 42 rotates to a position in which it engages the roller 96 it acts therethrough to pivot the arm 90 to a position in which the valve 88 is opened and, therefore, permits the flow of air therethrough to the nozzle 86. The lobe 42 being of a relatively small angular extent thus serves to momentarily open the valve 88 during each rotation of the cam 40. When the valve 88 is thus opened by the lobe 42 of the cam 40, the air rushes through the tube 84 and is discharged from the nozzle 86 against the forward face of the foremost envelope 68 in the hopper 62 and, flowing inwardly and upwardly over the face of such envelope, strikes the flap 70 thereof and forcefully blows it to the open position illustrated in Fig. 7. This opening of the flap 70 of the leading envelope 68 is, of course, timed with other operations of the machine which will hereinafter be brought out.

For supplying material to the envelopes 68 a box-like hopper 100 having an open top is supported in spaced relation above the upper frame members 14 and forwardly thereof by means of a spaced pair of channels 102 which, in turn, are supported from the front and rear cross-members 14 by means of vertically extending legs 104 as best brought out in Figs. 1 and 2. The hopper 100 is positioned with the plane of its rear face, as viewed in Fig. 1, approximately in the plane of the forward end of the envelope hopper 62 as best brought out in Fig. 7. Further the hopper 100 as best brought out in Fig. 1 is positioned with its righthand marginal portion directly over the envelope hopper 62. Also as best brought out in Fig. 1 the front wall of the hopper 100 stops short of the top of the hopper 100 so as to facilitate the loading of the hopper with material from the front thereof.

The hopper 100 is provided with a vertical slot 106 in its rear wall extending from the top to the bottom thereof in vertical alignment with the envelope hopper 62 as viewed in Fig. 1, and a slide indicated generally at 107 is reciprocably arranged within such slot. In the particular construction of the hopper 100 shown it is assumed to be made of wood and of substantial wall thickness. As best brought out in Fig. 3 the slide 107 which is of substantially the same width as the slot 106 and is slidably received therein comprises a wooden member 108 having a metal forward face plate 110, the combined thicknesses of which substantially equal the thickness of the rear wall of the hopper 100. In order to guide the slide 107 for vertical sliding movement in the slot 106, keys 112 are inserted centrally in the opposite side walls of the slot 106 and project into such slot, the member 108 being provided with cooperating grooves for slidably receiving such keys 112 therein.

The slide member 108 is provided with a relatively large groove 114 in its forward face and over the length thereof and the groove 114 is closed over its length by the plate 110 except at that position thereof adjacent to the bottom of the hopper 100 where it is cut out over the width of the groove 114 as indicated at 116 in Figs. 3 and 7. An additional plate member 118 is secured to the inner face of the rear wall of the hopper 100 over the height of the slot 106 and is provided with a flange 120 secured to the adjacent side wall of the hopper 100. The plate 118 thus serves as a means for rigidifying that corner of the hopper 100 in which the slot 106 is formed. Also as indicated in Figs. 3 and 7 the plate 118 is provided with an opening 122 therein extending upwardly a short distance from the bottom of the hopper 100 and of a width corresponding with the width of the groove 114 in the slide. The material with which the hopper 100 is loaded and which comprises small particles of or comminuted dry material 124 is thus free to flow through the opening 122 in the plate 118 and through the opening 116 in the slide 107 into the hollow interior of the slide formed by the groove 114 and through which it may flow downwardly to the lower end of the slide. The slide 107, of course, reciprocates during operation of the machine and this movement of the slide aids in jarring the material 124 down over the opening 122 in the plate 118 and into the groove 114 of the slide, the opening 116 in the slide being in overlapping relation with respect to the

opening 122 in the plate 118 at all times so as to permit the free flow of material into the hollow interior of the slide.

As best brought out in Fig. 7, the lower end of the slide 107 is cut off at an angle and the discharge of material therefrom is controlled by a valve 130. The valve 130 comprises a flat plate-like member pivoted at 132 between its ends to a bracket 134 fixed to the plate member 110 adjacent the bottom end thereof. That end of the valve member 130 outwardly of the slide 107 from the pivot 132 thereof is provided with a roller 136 which serves aas a weight to constantly urge the valve member 130 into flat contacting relationship with respect to the lower end of the slide 107 so as to close the slide to the discharge of material through it. The means for actuating the valve 130 will hereafter be explained.

In order to effect reciprocation of the slide 107 a double armed lever 140, as best brought out in Fig. 1, is pivotally mounted between its ends on a pin 142 suitably fixed to the rear wall of the hopper 100, so as to swing in a plane parallel to such rear wall. A link 144 pivotally connected at its opposite ends to the righthand end of the lever 140 as viewed in Fig. 1 and to the slide 107 serves to interconnect these two parts for simultaneous movement. The lefthand end of the lever 140, as viewed in Fig. 1, is connected by means of a link 146 with a pin 148 projecting outwardly from a side face of the cam 40 in offset relation with respect to the axis of rotation thereof. Consequently rotation of the cam 40 effects reciprocation of the link 146 which in turn effects oscillation of the lever 140 and reciprocation of the slide 107. The link 144 is preferably adjustable in length so as to enable the limits of reciprocable movement of the slide 107 to be adjusted up or down through adjustment of the length thereof. It may be noted at this point that inasmuch as the slide 107 and the air valve 88 are both controlled through operation of the cam 40, they are, therefore, controlled in timed relation with respect to each other.

In order to control the material control valve 130 the following mechanism is provided. A vertically extending rod 150 is supported in a bracket 152 secured to the right-hand face of the hopper 100 as viewed in Fig. 1. It is vertically adjustable in the bracket 152 and may be locked in vertically adjusted position by means of a set screw 154. At its lower end the rod 150 has fixed thereto a laterally extending arm 156 which supports thereon a magnet 158 having a U-shape field element or structure 159 fixed thereto and an armature 160 movably associated therewith. As best brought out in Fig. 1 the rod 150 has adjustably secured thereto by means of the set screw 164 a second laterally projecting arm 166 the free end of which, as best brought out in Fig. 7, has fixed thereto a vertically directed cross-bar 168 extending both above and below the same. A link 170 is pivotally mounted between its ends to each of the opposite ends of the cross-bar 168 for movement in a vertical plane. The links 170 are normally inclined downwardly and to the right as viewed in Figs. 2 and 7. The lefthand ends of the links 170, as viewed in Fig. 7, are pivotally connected together by a connecting link 172 which in turn is pivotally connected by means of a link 174 with the armature 160 of the magnet 158. The opposite ends of the links 170 are pivotally connected together through a plate-like track member 176 arranged with its plane of thickness perpendicular to the plane of thickness of the aforementioned links. That portion of the plate member 176 extending between the connected free ends of the links 170 is straight and vertically disposed in parallelism with the link 172 so as to provide for parallel motion but its upper end above the point of its pivotal connection with the upper link 170 is bent to the left as indicated at 178 and as viewed in Figs. 2 and 7.

It will be appreciated from the foregoing description that when the magnet 158 is energized and the armature 160 thereof drawn downwardly with respect to the field structure 159 of the magnet, the armature 160 acting through the links 174 and 172 will turn the links 170 in a direction which will move the plate or track member 176 outwardly away from the pivotal points between the links 170 and the cross-bar 168, and that when the magnet 158 is de-energized a small amount of pressure only will be needed to return these parts to the position indicated in Fig. 7.

As best brought out in Fig. 7 the plate or track 176 is arranged in cooperative relationship with respect to the roller 136 on the valve member 130 controlling the flow of material 124 from the slide 107. Its relationship is such that when the magnet 158 is not energized, and which condition of the magnet 158 is illustrated in Fig. 7, the roller 138 in pressing against the track member 176 will press the track member 176 inwardly to cause clockwise rotational movement of the links 170 as viewed in Fig. 7 as the slide 107 moves downwardly and carries the roller 136 over the track member 176. If the weight of the roller 136 is not sufficient to effect the above described function, then suitable spring means (not shown) may be connected between the valve 130 and the slide 107 to assist the weight of the roller 136 in this respect. On the other hand, if the magnet 158 is energized, then the track 176 will be shifted to the right from the position illustrated in Fig. 7 to the position illustrated in Fig. 2 under which conditions as the slide 107 moves downwardly from the upper limit of its reciprocable position the roller 136 will strike the angularly directed end 178 of the track 176, and the magnet 158 being of sufficient strength to withstand the force of the roller 136 on the track 176, the roller 136 will be forced to ride over the face of the plate or track 176 and in so doing will cause the valve 130 to pivot about its pivot point 132 in a clockwise direction of rotation as viewed in Fig. 7 and thus uncover the lower end of the slide 107 so as to permit the discharge of material 124 through such lower end of the slide. This is the relation of parts illustrated in Fig. 2. It will be appreciated, however, that the point in the reciprocable movement of the slide 107 at which the roller 136 engages the track member 176 and, therefore, opens the valve 130 under such conditions, may be varied by varying the vertical position of the rod 150 and consequently the vertical position of the track member 176. Thus the point in the reciprocable movement of the slide 107 at which the material valve 130 opens may be readily adjusted to correspond with any particular desired amount of material 124 which is to be discharged from the slide during each reciprocable movement thereof.

With the construction thus far described it will be appreciated that if the magnet 158 was energized at all times when the machine was operating, then the material valve 130 would be opened while the slide 107 was approaching the lower limit of its movable position and also while it was

moving away from such position. It is preferred to close the valve 130 as it reaches approximately its bottom limit of reciprocable movement in order to obtain more accurate control of the volume of material discharged from the slide.

The closing of the valve 130 at the bottom limit of reciprocable movement of the slide 107 is accomplished by de-energizing the magnet 158 at or about the time the slide 107 reaches the lowermost limit of its reciprocable position. For accomplishing this result a switch, indicated generally at 180 in Figs. 2 and 5, is located at the rear corner of the hopper 100 adjacent the slide 107. As best brought out in Fig. 5 the switch 180 is provided with a pair of parallel spring arms 182 each of which carries a contact point 184 in cooperative and opposed relation with respect to the other. The spring arms 182 and contacts 184 are so positioned and arranged that when free of external influences the contacts 184 are arranged in spaced relation with respect to each other as illustrated in Fig. 5. The arms 182 are connected in series with the magnet 158 previously described.

To control the switch 180 the following mechanism is provided. Below the switch 180 an arm 186 is pivotally secured to the side wall of the hopper 100 as at 188. On its upper surface the arm 186 carries a button 190 of insulation material in vertical alignment with the contacts 184 and in a position to contact the lower face of the lower arm 182. A tension spring 192 cooperates between the arm 186 and the hopper 100 to constantly urge the arm 186 in a counterclockwise direction of movement as viewed in Fig. 5 and, therefore, towards a position in which the arm 186 will act through the button 190 to spring the lower arm 182 upwardly and to bring the contacts 184 into engagement with each other whereby to close the circuit through the magnet 158 and, therefore, place the track member 176 in its operative position.

Pivotally mounted on the hopper 100 at 194 above the switch 180 and arm 186 is a bellcrank lever having a downwardly directed arm 196 and a rearwardly extending arm 198. The lower or free end of the arm 196 extends downwardly to a position in which it is engageable with the upper surface of the arm 186. A coil spring 200 tensioned between the arm 196 and the hopper 100 constantly urges the above described bellcrank in a direction of clockwise movement about its pivot point 194 as viewed in Fig. 5 and when moved to the limit of its movement in such direction the engagement of the free end of the arm 196 of the bellcrank with the arm or lever 186 serves to maintain the button 190 out of contact with the lower switch arm 182. When, however, this bellcrank is rotated in a counterclockwise direction of rotation against the force of the spring 200 and away from such limit of its clockwise movement, as to the position illustrated by dotted lines in Fig. 5, then the point of contact between the arm 196 and the arm or lever 186 in shifting outwardly of the arm 186 moves upwardly and then permits the spring 192 to move the arm 186 to bring the contacts 184 into engagement with each other.

Both the arm or lever 186 and the rearwardly extending arm 198 of the bellcrank project rearwardly beyond the rear face of the hopper 100 as illustrated in Fig. 5. A channel sectioned member 202 is fixed to the rear face of the slide member 108 and extends laterally to a position between the rearwardly extending ends of the bellcrank arm 198 and of the arm or lever 186. It is thus in a position where it may engage such rearwardly extending ends as it approaches the opposite limits of its reciprocable positions.

The operation of the above described mechanism is as follows. The position of the mechanism as illustrated in Fig. 5 is the position it assumes when the slide 107 is moving upwardly. As will be appreciated under such conditions the switch 180 is in open circuit position and, accordingly, the magnet 158 is de-energized and consequently the material valve 130 is closed. As the slide 107 moves upwardly the member 202 will engage the free end of the bellcrank arm 198 and as the slide continues its upward movement this engagement will forcefully cause the bellcrank 196—198 to pivot towards the position illustrated in dotted lines in Fig. 5, so that just before the slide 107 reaches the upper limit of its reciprocable position the spring 192 will have been enabled to swing the arm 186 to a position in which the contacts 184 are brought into contact with each other, thus closing the circuit to the magnet 158 and positioning the track member 176 in a position to engage the roller 136 and to open the valve 130 during the ensuing down stroke of the slide 107. The force of the spring 192 is greater than that of the spring 200 so that during the ensuing down stroke of the slide 107 and because of the friction between the lower end of the arm 196 of the bellcrank and the arm or lever 186, the bellcrank will retain its rotatable position indicated by dotted lines in Fig. 5. Thus the magnet 158 will remain energized during the downward movement of the slide 107 and until such time as the member 202 fixed to the slide approaches the bottom limit of its reciprocable position upon which the member 202 will contact the rearwardly extending end of the arm 186 and will press it downwardly against the force of the spring 192. This action of the member 102 has two effects, the first of which is to separate the contacts 184 thus to break the circuit to the magnet 158 and permit the material valve 130 to close, and, second, to permit the spring 200 to swing the bellcrank to the position indicated in full lines in Fig. 5 thereby to lock the arm 186 against upward movement during the ensuing upward stroke of the slide.

Thus the mechanism provided as above described is such as to close the circuit to the magnet 158 during substantially the entire down stroke of the slide 107 and to break the circuit to such magnet during substantially the entire up-stroke thereof. Thus, the valve 130 is closed during the entire up-stroke of the slide and is opened only during that portion of the down stroke thereof that the roller 136 is in contact with the track member 176. As previously mentioned inasmuch as the track member 176 may be adjusted vertically to vary its point of engagement with the roller 136 during the down stroke of the slide, it will be appreciated that the time element during which the control valve 130 is opened during each complete cycle of operation of the device may be varied to obtain any predetermined volume of discharge upon each stroke of the slide that is desired.

In order to introduce the material 124 discharged from the slide 107 under the control of the valve 130 into the envelopes 68 the following mechanism is provided. A spout or nozzle member 210 is pivotally mounted adjacent its upper end by means of a pin 212 to the rear face of the slide member 108 adjacent the bottom end

thereof. The spout 210 is provided with an enlarged funnel-like upper end which surrounds the lower end of the slide 107, as well as the cooperating end of the valve 130 when the slide is at the upper limit of its reciprocable movement. The lower end of the spout 210 is cut off on an angle to impart a downwardly and inwardly pointed end to the same. As best brought out in Fig. 7 the pivot pin 212 is so arranged that the lower end of the spout 210 is movable towards and from the front end of the envelope hopper 62. The stroke of the slide 107 and consequently the spout 210 is such that when at the upper end of its reciprocatory movement the point 214 of the spout 210 is above the upper edges of the envelope 68 in the hopper 62 when the flaps 70 thereof are closed, but is below the upper edge of the upturned flap 70 of the foremost envelope 68 which is the envelope which is to be filled upon the next downward stroke of the nozzle. When the spout 210 is at the bottom limit of its vertically reciprocable movement the point 214 approaches but is short of the bottom edges of the envelopes 68 in the hopper 62.

The point 214 of the spout 210 is intended, on its downward stroke, to enter the open upper end of the leading envelope 68 after which the valve 130 is opened to discharge the material 124 through the spout 210 into such envelope 68, all of such material thus fed to the spout 210 either being discharged into the leading envelope 68 either during such downward stroke or additionally during the ensuing up-stroke. In order to insure the point 214 of the spout 210 thus entering the open upper end of the leading envelope 68, the spout 210 is constantly urged by spring means in a counterclockwise direction of movement as viewed in Figs. 2 and 7. This is accomplished by means of an upwardly extending arm 216 fixed to and projecting upwardly from the rear face of the spout 210. At its upper end the arm 216 has pivotally secured thereto by means of a pin 218 a rearwardly extending arm 220. A pair of springs 222 and 224 which will hereafter be more fully described constantly urges the arm 220 bodily forwardly, or to the left as viewed in Figs. 2 and 7, thereby to urge the spout 210 to pivot about its pivot point 212 in a counterclockwise direction of rotation as viewed in Figs. 2 and 7. A further function of the springs 222 and 224 will hereafter be described and means which will also hereinafter be described are provided for limiting the counterclockwise movement of the spout 210 so that when the spout 210 is at such limit of its pivotal movement the point 214 thereof will be lightly but relatively firmly pressed in the forward face of the outermost envelope 68 in the envelope hopper 62. One thing that is important to note is that the pivot pin 218 for the arm 220 is arranged in perpendicular relationship to the axis of the pin 212 for pivotally supporting the spout 210 so that the arm 220 is pivotal in a plane parallel to the axis of the pivot pin 212 for the nozzle 210.

There are two features which are relied upon for discharging the filled envelopes from the hopper 62. In the first place it will be recalled that the envelopes 68 are held against inadvertent discharge from the hopper 62 by means of the members 82 which project inwardly from each side 66 of the envelope hopper 62 and engage the outer marginal edge portions of the leading envelope 68. The spout 210 being relatively thick in a direction perpendicular to the plane of the envelopes 68 in the hopper 62, it will be appreciated that when the spout 210 is projected downwardly into the open upper end of the leading envelope 68 in the hopper 62 it will serve to separate the front and back walls of the envelope and thus decrease its lateral dimensions, particularly above the lower end thereof, sufficiently to allow the sides of the envelopes to move freely forwardly between the opposed edges of the members 82. Thus the upper portion of the envelope is readily released from the hopper 62. The lower end of the envelope is, however, not so readily decreased in lateral dimensions and in order to release this end of the envelope and to positively eject the entire envelope from the hopper 62 the spout 210 is caused to pivot forwardly about its pivot pin 212 to thus forcefully withdraw the leading envelope from the hopper 62 upon which the envelope is free to drop off the spout 210 under the influence of gravity.

In the broader aspects of the invention it makes no difference whether the spout 210 is thus caused to pivot to eject the leading envelope 68 from the hopper 62 when the spout 210 nears the bottom of its downward stroke or after it has started upwardly on its upward stroke. The latter arrangement is preferred in that it allows more time for the material discharged into the spout 210 to be discharged therefrom into the envelope 68 and also because of the fact that it has been found that the material flows more freely from the spout 210 during its upward movement in the envelope, the end of the spout in such case thus automatically providing a space in the envelope for the material to flow from the point 214 of the spout 210. Accordingly, this arrangement of the mechanism is illustrated in the drawings.

In order to effect this pivotal movement of the spout 210 the following mechanism is provided. A bracket 230, best shown in Figs. 7 and 8, is fixed to the underside of the righthand channel member 102, as viewed from the front of the machine, and slightly rearwardly of the slide 107. A laterally adjustable arm 232 is rigidly clamped in the bracket 230 and projects to the left thereof as viewed in Fig. 8. On its outer end the arm 232 has fixedly secured thereto a rigid rectangular frame 233 having a pair of laterally spaced plate-like side members 234 and 236 and connecting thickened end members. The side members 234 and 236 are located laterally of the machine equally on opposite sides of the pivot pin 218 securing the arm 220 to the arm 216 of the nozzle 210.

The rear faces of the members 234 and 236 are straight and vertically disposed except that the member 236 only is provided between its ends and over the lowermost portion thereof with a rearwardly extending cam portion 238. The arm 220 has pivotally mounted thereon a pair of rollers 240, one on each side thereof, which are adapted to engage the rear edges of the members 234 and 236. The righthand roller 240, as viewed in Fig. 8, is adapted to engage the rear edge of the righthand member 234 during the downward movement of the slide 107 and spout 210 and the lefthand roller 240 to engage the rear edge of the lefthand member 236 during upward movement thereof, the other roller in each case being free of engagement with its corresponding side member 234 or 236 as the case may be. The straight portions of the rear edges of the members 234 and 236 are preferably so located that the springs 222 and 224 in urging the spout 210 in a counterclockwise direction of rotation as viewed in Fig. 7 limit such movement

of the spout 210 through engagement with the rollers 240 to such a position that the point 214 of the spout 210 is pressed lightly but firmly against the forward face of the leading envelope 68 in the hopper 62 as previously mentioned, this being the means, therefore, previously referred to for effecting this result.

It will be appreciated that as the slide 107 and spout 210 move downwardly at which time the righthand roller 240 is in contact with the straight rear edge of the side member 234 the point 214 of the spout 210 will enter the open upper end of the leading envelope 68 in the hopper 62 and be projected almost to the bottom thereof. When the spout 210 reaches the bottom end of its stroke as above described the arm 220 is then pivoted to slide the rollers 240 across the bottom member of the frame 233 and to bring the lefthand roller 240 into alignment with the side member 236 and into contact with the rear edge thereof so that during the ensuing upward stroke such roller 240 will ride up over the rear edge of the member 236 and will maintain the spout 210 in a position as controlled thereby. When the arm 220 is thus shifted at the bottom end of the stroke of the slide 107 the lefthand roller 240, in engaging the rear edge of the member 236, will first engage the straight lower portion thereof. As the slide 107 moves upwardly carrying the arm 220 and rollers 240 therewith the lefthand roller 240 will engage the cam 238 which will pull the arm 220 bodily to the right as viewed in Fig. 7 and consequently the upper end of the arm 218 to the right and cause the spout 210 to pivot in a clockwise direction of rotation as viewed in Fig. 7 from its normal vertical position. At the time such pivotal movement of the spout 210 occurs its point 214 is still well within the interior of the leading envelope 68 and, therefore, acts to forcefully disengage such leading envelope from the hopper 62 and move it outwardly from the front end thereof. When this occurs the envelope which, of course, is weighted with the material 124 is free to drop off of the spout 210 under the influence of gravity. The slide 107 needs to move only a short distance upwardly to move the lefthand roller 240 as viewed in Fig. 8 over the cam 238 and as it passes over the cam the springs 222 and 224 immediately draw such roller into contact with the straight upper portion of the member 236 thus returning the spout 210 to its vertical position and in which it will maintain the flap 70 of the then leading envelope 68 in the hopper 62 in its opened position. Consequently it will be appreciated that the spout 210 is kicked outwardly during each up-stroke thereof in order to discharge the envelope just filled but the spout 210 is returned to its vertical position before its upstroke is completed.

The means for shifting the roller from the side member 234 to the side member 236 when the spout reaches the lower limit of its reciprocable position and from the side member 236 to the side member 234 when it reaches the upper limit of its reciprocable position will now be described. A pair of rearwardly extending arms 250 and 252 are fixed at their forward ends to the bottom and top, respectively, of the frame 233. At their rear ends the arms 250 and 252 are fixed to the bottom and top, respectively, of a plate member 254 arranged with its plane of thickness parallel to the planes of thickness of the sides 234 and 236 of the frame 233 and midway therebetween. The plate member 254 is in such a position that its forward edge projects forwardly of the rear end of the arm 220 except at its top and bottom where it is cut away as at 256 and 258, respectively, to permit the rear end of the arm 220 to swing transversely therethrough from one side of the member 254 to the opposite side thereof. The forward edge of the member 254 is so shaped and spaced from the rear edges of the walls 234 and 236 as to provide ample clearance for the rollers 240.

Referring now to Fig. 8 it will be noted that the spring 224 is anchored at its upper end on an arm 260 forming a lateral extension of the arm 252 and projecting to the left as viewed in Fig. 8, while the lower end of the spring 222 extends in the opposite direction and is fixed to one of the legs 104. Thus the anchor point for the upper end of the spring 224 is approximately on the level with the upper end of the frame 233 and to the left thereof while the anchor point for the lower end of the spring 222 is approximately on the level of the lower end of the frame 233 and to the right thereof. It will thus be appreciated that when the spout 210 and consequently the arm 220 are adjacent the lower limit of their reciprocable positions the spring 222 will be extended a minimum amount and the spring 224 will be extended a maximum amount and, conversely, when the spout 210 is at the upper limit of its reciprocable position and consequently the arm 220 is at the upper end of the frame 233 the spring 222 will be extended a maximum amount and the spring 224 a minimum amount. The springs 222 and 224 are so arranged that when the arm 220 and particularly the rollers 240 are in a mid position between their opposite limits of vertical travel they exert an equal force on the arm 220. Consequently when the arm 220 and rollers 240 are at their bottom limit of movement the spring 224 will exert a greater force tending to swing the arm 220 about the pivot pin 218 than the spring 222 and when at the upper limit of their vertically movable positions the spring 222 will exert a greater force than the spring 224 tending to pivot the arm 220 about its pin 218.

As a result of the foregoing construction it will be appreciated that when the arm 220 and rollers 240 move upwardly and downwardly with the spout 210 the force of the springs 222 and 224 vary, but inasmuch as the rear end of the arm 220 is engaged on either one or the other side of the plate member 254 it cannot shift laterally under the influence of the springs 222 and 224 except when it reaches the limits of its vertically movable position at which time it may shift from one side of the plate 254 to the other side thereof through the cut-out portions 256 or 258 of the plate 254. Inasmuch as the tension of the spring 222 is greatest when the spout 210 is at the upper limit of its reciprocable position the force of the spring 222 will overcome the force of the spring 224 and cause the arm 220 to be shifted to the right as viewed in Fig. 8 so as to bring it through the cut-out portion 256 of the plate member 254 and, therefore, to the right side thereof as viewed in Fig. 8 in which position of the arm 220 the righthand roller 240 will engage the rear edge of the frame side member 234 and the lefthand roller 240 will be free of engagement with the frame side member 236. As the spout 210 then starts its ensuing down stroke the rear end of the arm 220 will be located to the right of the righthand face of the plate member 254 as viewed in Fig. 8 so that in spite of the fact that the strength of the spring 222 decreases during such downward

movement and the force of the spring 224 increases, the arm 220 cannot swing in response thereto and the right-hand roller 240 will be maintained in engagement with the rear edge of the frame side member 234.

Similarly, as shown as the spout 210 reaches the downward limit of its reciprocable position, the force of the spring 224 being greater than the corresponding force of the spring 222 at such time, it will cause the arm 220 to be pivoted to the left as viewed in Fig. 8 so as to move the rear end thereof through the cut-out portion 258 of the plate member 254 thus to bring the lefthand roller 240 into engagement with the rear edge of the frame side member 236 and disengage the righthand roller 240 as viewed in Fig. 8 from the rear edge of the righthand frame side member 234. Similarly during the ensuing up-stroke of the spout 210 the rear end of the arm 220 will now be blocked off by the lefthand face of the plate 254 as viewed in Fig. 8 which will maintain the lefthand roller 240 in engagement with the lefthand frame member 236, as viewed in Fig. 8, until the spout 210 again reaches the upper limit of its reciprocable position at which time the spring 222 will again cause the rear end of the arm 220 to be shifted through the cut-out portion 256 and to return the parts to the position first above described. The lefthand roller 240 in travelling upwardly in contact with the rear face of the side member 236 will first pass upwardly along the straight lower portion thereof and will then encounter the cam 238 and ride upwardly over it and then engage the straight upper portion. In riding over the cam 238 the roller 240 in contact therewith will act through the arms 220 and 216 and will cause the spout 210 to pivot in a clockwise direction of rotation as viewed in Fig. 7 about the pin 212 and thus forcefully withdraw the leading envelope 68 from the hopper 62. It will be appreciated that at the time the spout 210 is thus pivoted an appreciable length of the spout is still inserted within the leading envelope 68 so that it has ample purchase on the leading envelope 68 to withdraw it from the envelope hopper. Any material remaining in the spout 210 at the time it starts its upward movement is, of course, fed out of the spout into the envelope and when the spout pivots forwardly to release the envelope, the envelope is free to drop under the influence of gravity from the spout and any material remaining in the spout will be discharged into the envelope at such time. The cam 238 being relatively short, it will be appreciated that the spout 210 will return to its normal vertical position before the lower end of the spout reaches the upper edges of the envelopes in the hopper 62 and will serve to maintain the flap 70 of the next leading envelope in open position. It will thus be appreciated that the above described mechanism operates automatically to normally maintain the spout 210 in a vertical relation but such as to cause the lower end or point of the spout 210 to be kicked forwardly during its upward movement and during a predetermined phase of such upward movement and be maintained in its vertical relation during its entire downward movement.

It is to be noted that the flap 70 of the leading envelope 68 in the hopper 62 is blown open and to the upright position illustrated in Fig. 7 at the time the spout 210 is pivoted outwardly in envelope ejecting position as illustrated in Fig. 7, the lobe 42 of the cam 40 being so located on the periphery of the cam 40 and with respect to the point of connection of the link 146 therewith that the valve 88 is opened only during the interval that the spout 210 is in its outward pivoted position. The air from the nozzle 86 is, of course, fed against the flap 70 of the leading envelope until the spout 210 returns sufficiently to its upright position to maintain such flap 70 in its upright position without the aid of the blast of air.

The drive for reciprocating the slide 107 and the spout 210 and the circular head 46 are so timed that an envelope 68 is discharged from the hopper 62 each time one of the pockets 52 becomes aligned with the forward end of the envelope hopper 62. In order to guide the envelope thus filled by and discharged from the spout 210 into such aligned pocket a chute 270 is provided. The chute 270 as best illustrated in Figs. 4 and 7 is formed from sheet metal into generally channel section and is arranged to receive the filled envelopes 68 as they fall from the lower end of the spout 210 and to slidably direct them rearwardly or towards the center of the head 46 and into the particular pocket 52 aligned therewith at the front of the machine as indicated in Fig. 7. The chute 270 is suitably supported by means of a pair of arms 272 fixed thereto and to one of the frame cross-members 14.

Each envelope 68 as it is thus discharged from the spout 210 into the chute 270 and from the chute 270 to a pocket 52 formed between the periphery of the circular head 46 and the ring 50, drops through such pocket until its lower edge strikes the plate 56 therebelow which, therefore, limits further downward movement of the envelope. The upper edges of the envelopes so resting on the plate 56 extend a material distance above the upper edge of the ring 50 and, of course, as received on the plate 56 the flaps 70 thereof are opened. Means are provided for binding the envelopes 68 to the periphery of the head 46, that is to the inner wall of the corresponding pockets 52, moistening the adhesive on, closing and sealing the flaps 70, and then eventually discharging the envelopes from the pockets 52 and head 46.

In order to thus bind the envelopes to the periphery of the head 46 an endless belt 276, preferably in the form of a stretchable rubber element is arranged in encircircling relation with respect to the head 46 above the ring 50 and this belt 276 at the front of the machine is trained over a pulley 278 supported in forwardly spaced relation to the forward portion of the head 46 by means of a bracket 280. The pulley 278 thus spaces the belt 276 from the forward portion of the head 46 and particularly over that portion thereof where the envelopes 68 are delivered by the hopper 270 to the pockets 52 so that an envelope 68 in thus being discharged from the chute 270 to the pockets 52 drops into the pockets between the belt 276 and the periphery of the head 46. However, it will be appreciated that as the head 46 rotates and carries the envelopes 68 around therewith in the pockets 52, as soon as the envelopes reach that point at which the belt 276 normally contacts with the periphery of the head 46 they will be clamped by the belt to the periphery of the head 46, in other words against the inner walls of the corresponding pockets 52. The tension of the belt 276 is sufficient to maintain the envelopes 68 in firm engagement with the periphery of the head 46 so that after the envelopes pass beyond the edge of the plate 56 and are, therefore, unsupported at their bottoms, they will not fall through the pockets 52 but will be maintained in position therein until they travel around with the head 46 to the

position in which the belt 276 leaves contact with the periphery of the head 46, almost a full turn of the head 46, at which time they will fall by gravity out of their corresponding pockets 52 and into a suitable receptacle which may be provided below the head 46 for receiving them. The belt 276 which is preferably driven with the head 46 simply through frictional engagement therewith, thus serves to automatically bind the envelopes 68 to the head for the closing and sealing operation and then discharge them from the machine.

In order to close and seal the flaps 70 of the envelopes 68 a water tank 290 is supported on the plate 56 at a point in the rotational movement of the head 46 shortly after the belt 276 clamps each succeeding envelope to the head 46 during rotation of the latter. The tank 290 is provided with a wick or brush 292 immersed in the water therein and which projects therefrom into engagement with the periphery of the head 46 at a height thereon at which the flaps 70 of the envelopes are positioned in travelling around with the head 46. In other words, the free end of the wick or brush is positioned to contact and moisten the adhesive on the flaps 70 of the envelopes as the latter are carried around by the head 46. The wick or brush 292 is of a character which absorbs and picks up the water in the tank 290 by a capillary attraction so that as each flap 70 of the envelope 68 passes between it and the periphery of the head 46 the adhesive thereon is moistened by the water in the element 292. The flap is then ready to be closed and sealed.

The closing of the flaps 70 is accomplished by means of a metal strip indicated generally at 294 which, as illustrated in Fig. 1, is fixed at its forward end to the forward cross-member 14 and extends angularly downwardly and rearwardly therefrom and then horizontally as at 296. The lower end of the downwardly extending portion of the strip 294 and the forward portion of the horizontally extending portion 296 of the strip 294 extends partially over the upper face of the head 46, as best brought out in Fig. 4, and in a position in which these portions engage the flap 70 of each envelope 68 in turn as it passes therebefore and bends such flap outwardly. The horizontally extending portion 296 is twisted in a direction to bring its outer edge downwardly gradually and is curved into conformance with the periphery of the head 46 so that after the flap 70 of each envelope is initially bent and moistened it is caused to be folded over into closed position against the corresponding face of the envelope, in other words into closed position. The rear end of the strip 294 preferably resiliently presses such flaps inwardly toward the periphery of the head 46 and this is readily accomplished as will be appreciated because of the length of the strip 294 and the fact that it is supported at its forward end only.

As the envelopes 68 in rotating with the head 46 pass beyond the rear end of the strip 294 their flap ends successively engage a plurality of rollers 300 which firmly press the flaps 70 against the envelopes in order to insure the effective sealing of the same. The rollers 300 are rotatably mounted upon arms 302 the opposite ends of which are suitably pivotally secured to the adjacent frame cross-member 14, and a coil spring 304 is tensioned between each arm 302 and the frame member 14 to constantly and resiliently urge the corresponding roller 300 towards engagement with the periphery of the head 46. As many of these rollers 300 may be employed as desired but the number shown in the drawings has been found ample in most cases.

After the envelopes have passed beyond the rollers 300 it will be appreciated that they are maintained in position against the periphery of the heads 46 for an appreciable length of time before they are released therefrom by the belt 276 and dropped into a suitable receptacle. It has been found that this time element is ample to insure sufficient setting of the adhesive before the envelopes are dropped into the receptacle to prevent inadvertent opening of the flaps thereof.

It will be appreciated that with the apparatus thus far described that inasmuch as the material valve 130 is actuated during each reciprocation of the slide 107 material will be discharged from the spout 210 during each reciprocation of the slide regardless of whether an envelope 68 is or is not positioned to receive the material. Consequently and inasmuch as the machine is intended for continuous operation without the constant presence of an attendant, it is desirable to provide some means to shut off the machine when the supply of envelopes 68 in the hopper 62 inadvertently becomes exhausted or for any other reason an envelope should fail to be presented in a filling position at the front end of the envelope hopper. The means provided for shutting off the machine in such event is as follows.

As best illustrated in Fig. 2 a relatively long and angularly bent strip-like arm 310 is pivotally mounted between its ends on a vertical pivot 312 on the upper surface of the plate 56. The inner end of the arm 310 is aligned with and is adapted for projection into the peripheral groove 54 in the lower part of the head 46, but when the envelopes 68 are being successively fed to the pockets 52 as they rotate below the chute 270 the lower edges of these envelopes, in bridging the groove 54, hold the rear end of the arm 310 out of the groove 54. The forward end of the arm 310, as illustrated in Fig. 4, projects forwardly of the front edge of the plate 56. To such forward edge of the plate 56 and as best brought out in Fig. 2 an angle bracket 314 is secured and to the vertically directed outer face thereof an arm 316 is pivotally mounted between its ends for pivotal movement about a horizontal axis. The lower end of the arm 316 carries a mercury switch 318 which is connected in series with the driving motor 36. As best illustrated in Fig. 1 the mercury switch 318 is offset to the right from the pivotal axis 320 of the arm 316 so as to exert a constant force tending to rotate the arm 316 in a clockwise direction of movement as viewed in Fig. 1. This movement of the arm 316 is limited by contact thereof with the outer end of the arm 310 as best brought out in Fig. 4. The relationship of these parts is such that when the rear end of the arm 310 is maintained out of the peripheral groove 54 of the head 46 through engagement with the lower portions of the envelopes 68, the switch 318 is maintained in closed position and consequently the motor 36 may operate without interruption. However, should an envelope 68 be missing from one of the pockets 52, then as such pocket comes into alignment with the inner end of the arm 310 such inner end of the arm will drop into the bottom of the groove 54 of the head 46 causing the arm 310 to pivot in a counterclockwise direction of movement as viewed in Fig. 4 and permit the arm 316 to swing under the weight of the switch 318 to move the switch 318 to open position, thereby stopping operation of the motor 36 and consequently the en-

tire machine. The switch 318 is illustrated in open position in Fig. 1 as in such figure it is assumed that no envelopes are present on the periphery of the head 46. The magnet 158 for controlling the material valve 130 is connected into the electrical circuit for the motor 36 behind the switch 318 so that in event the switch 318 is opened at a time when the material valve 130 is opened the magnet 158 will be de-energized and permit the valve 130 to close thereby to prevent continued discharge of material from the slide 107.

From the foregoing it will be appreciated that in operating the mechanism described the hopper 62 is loaded with envelopes and the hopper 100 is loaded with the material to be inserted therein, the main switch to the motor 36 is closed and the operator simply holds the switch 318 in closed position until the machine has progressed far enough in operation so that the filled envelopes, if fed without interruption, maintain the switch 318 in closed position. Upon setting the machine in operation the cam 40 in rotating effects reciprocation of the slide 107 and spout 210. It will be appreciated that when the machine is first loaded it may be necessary to manually raise the flap 70 on the first envelope 68 if such envelope is to be filled, depending upon the initial position of the spout 210, and thereafter as the spout 210 reciprocates its point 214 will be inserted in the upper end of the leading envelope in the hopper 62, will move downwardly therein and discharge material thereinto and at the same time withdraw the upper edge of such leading envelope from between the stop members 82, and as its travel is reversed and it moves upwardly the spout will be kicked forwardly to forcefully release the filled envelope from the hopper 62 which envelope will then drop off the spout 210 into the chute 270. As the spout 210 pivots forwardly to thus release the leading envelope 68 from the hopper 62 the cam 40 will actuate the air valve 88 to direct a blast of air through the nozzle 86 against the flap 70 of the next envelope in the hopper 62 thus to move such flap to opened position in which it will be held when the spout 210 resumes its vertical position after the previously filled envelope has dropped off of the end thereof. The spout 210 in moving upwardly will maintain the flap of the first envelope in opened position so that during the ensuing down stroke its point 214 will enter the open upper end thereof to repeat the above described operations. The amount of material 124 which is discharged each time through the spout 210 into an envelope 68 as above described will, of course, be controlled by the valve 130 which in turn is controlled through the plate member 176 and the latter of which is in turn controlled by the switch structure illustrated in Fig. 5, and by the vertically adjusted position of the magnet 158, so that any desired amount of material may be discharged into an envelope during each reciprocation of the nozzle 210. It may be mentioned that this form of material discharge control has been found to be extremely accurate, enabling the volume of each charge to be controlled to a fraction of one per cent of the desired charge. The envelopes which are thus filled and discharged from the hopper 62 are fed into the pockets 52 of the head 46 where the flaps are moistened, closed and sealed and then delivered into a suitable receptacle after a sufficient time element to insure the maintenance of the sealed relation of the flap. All that is necessary to insure continued operation of the machine is to keep the hoppers 62 and 100 filled with envelopes and material, respectively, and in the event the supply of envelopes in the hopper 62 becomes exhausted before it is noticed by an attendant and re-filled, the machine is stopped so that the material in the hopper 100 will not be uselessly discharged upon the floor.

Having thus described my invention, what I claim by Letters Patent is:

1. In a packaging machine, in combination, a material hopper, a hollow reciprocable slide operatively connected thereto, the hollow interior of said slide communicating with the interior of said hopper whereby to receive material therefrom, a valve normally closing the lower end of said slide, electrically actuated means cooperable with said valve to open the same at a predetermined point in the reciprocable movement of said slide, and means operable to deenergize the first mentioned means and thereby render the same ineffective to maintain said valve in open position at a different point in the reciprocable movement of said slide.

2. In a packaging machine, in combination, a material hopper, a hollow reciprocable slide operatively connected thereto, the hollow interior of said slide communicating with the interior of said hopper whereby to receive material therefrom, a valve normally closing the lower end of said slide, movably mounted track means adjacent said slide and adapted for engagement with said valve, electrically actuated means for positioning said track means to open said valve by engagement therewith at a predetermined point in the reciprocable movement of said slide, and means for deenergizing said electrically actuated means inoperative at a different point in the reciprocable movement of said slide whereby to render said track means ineffective to maintain said valve in open position.

3. In a packaging machine, in combination, a material hopper, a hollow reciprocable slide operatively connected thereto, the hollow interior of said slide communicating with the interior of said hopper whereby to receive material therefrom, a valve normally closing the lower end of said slide, a track member mounted adjacent said slide for movement towards and from said slide and normally positioned for engagement with said valve during each reciprocation of said slide, said track member being normally moved away from said valve upon engagement therewith without effecting opening of said valve, and electrically energized means cooperable with said track member to maintain said track member in a position to effect opening of said valve when in engagement therewith.

4. In a packaging machine, in combination, a material hopper, a hollow reciprocable slide operatively connected thereto, the hollow interior of said slide communicating with the interior of said hopper whereby to receive material therefrom, a valve normally closing the lower end of said slide, a track member mounted for movement toward and from the path of movement of said slide and in a position to engage said valve member during reciprocation of said slide, said track member being normally movable away from said slide by engagement with said valve without effecting opening of said valve, electrical means operatively connected with said track member operable when energized to maintain said track member in position against the force of said valve whereby to effect opening

of said valve upon engagement therewith, said track member being adjustable in the direction of the movement of said slide whereby to vary the point in the reciprocatory movement of said slide that said valve may be caused to open, and switch means in circuit with said electrical means for de-energizing said electrical means at a different point in the reciprocable movement of said slide.

5. In a packaging machine, in combination, a material hopper, a hollow reciprocable slide operatively connected thereto, the hollow interior of said slide communicating with the interior of said hopper whereby to receive material therefrom, a valve normally closing the lower end of said slide, a track member mounted adjacent said slide for movement towards and from said slide and normally positioned for engagement with said valve during each reciprocation of said slide, said track member being normally moved away from said valve upon engagement therewith without effecting opening of said valve, electrically energized means cooperable with said track member to maintain said track member in a position to effect opening of said valve when in engagement therewith, and switch means in series with said electrically energized means moved between open circuit and closed circuit positions by movement of said slide.

6. In a packaging machine, in combination, a reciprocable material carrying slide, means for releasing predetermined amounts of said material from said slide during reciprocation of said slide, and a spout pivotally mounted on and reciprocable with said slide for receiving said materials discharged from said slide.

7. In a packaging machine, in combination, a reciprocable material slide, means for releasing predetermined amounts of material from said slide during reciprocation thereof, a spout pivotally connected to said slide for receiving material discharged therefrom, and means for effecting pivotal movement of said spout with respect to said slide during predetermined portions of the reciprocable movement of said slide.

8. In a material packaging machine, in combination, a reciprocable material slide, means operable to discharge a predetermined amount of material from said slide during each reciprocation thereof in one direction, a spout pivotally mounted on said slide in a position to receive material discharged therefrom, and cam means operatively connected to said spout operable to cause said spout to pivot relative to said slide during reciprocation of said slide in one direction and to maintain said spout against pivotal movement during reciprocation of said slide in the opposite direction.

9. In a material packaging machine, in combination, a reciprocable material slide, a spout member pivotally mounted on said slide for reception of material discharged therefrom, an arm carried by said spout member for pivotal movement about an axis at right angles to the axis of pivotal movement of said spout member on said slide, cam engaging means mounted on said arm, a pair of cam members cooperable with said engaging means, and means for causing said engaging means to engage one of said cam members during reciprocation of said slide in one direction and the other of said cam members during reciprocation of said slide in the opposite direction, one of said cam members being formed to effect pivotal movement of said spout member when said engaging means passes over the same, and both of said cam members being operable to maintain said spout member in a predetermined position of pivotal movement at all other times.

10. In a packaging machine, in combination, a reciprocable slide, a spout pivotally mounted on said slide for reciprocable movement therewith, means operative to control the discharge of material from said spout in timed relation to reciprocatory movements of said slide, a container hopper, means for feeding containers in said hopper in a direction perpendicular to the direction of reciprocation of said spout and for presenting said containers in succession in a position to receive said spout therein during reciprocation thereof in one direction, and means for effecting pivotal movement of said spout with respect to said slide while said spout is received in a cooperating container whereby to eject said container from said hopper.

11. In a packaging machine, in combination, a reciprocable slide, a spout member pivotally mounted on said slide for reciprocation therewith, means for discharging material into said spout member during each reciprocatory movement of said slide in one direction, a container hopper, means operatively connected with said hopper for feeding a container below said spout member during each reciprocatory movement thereof in one direction, means normally preventing ejection of said containers from said hopper under the influence of the first mentioned means, and means for effecting pivotal movement of said spout member with respect to said slide when said spout member is received within a container whereby to forcefully eject said container from said hopper in opposition to said third mentioned means.

12. In a packaging machine, in combination, a reciprocable slide, a spout pivotally mounted on said slide for reciprocation therewith and having a normal position with respect thereto, means for intermittently delivering material to be packaged to said spout, an envelope hopper adapted to contain a stack of envelopes with the flaps thereof in closed position, means for feeding said envelopes in said hopper in a direction at right angles to the path of movement of said slide to present the leading of said envelopes in a position approximately in the plane of normal movement of the discharge end of said spout whereby to position it for reception of the end of said spout when said spout is in said normal position and when the flap of said leading envelope is in open position, means for effecting pivotal movement of said spout relative to said slide and away from said hopper when said spout is positioned within the leading one of said envelopes in said hopper, and means for opening the flap on the next succeeding envelope while said spout is pivoted away from said hopper, said spout holding said flap in opened position when returned to its said normal position with respect to said slide.

13. In a packaging machine of the class wherein there is a reciprocable slide, a material discharge spout is reciprocable with said slide, means are provided for operatively controlling the discharge of material from said spout in timed relation to reciprocatory movements of said slide, a stack of envelopes with the flaps thereof in folded condition are constantly urged to a position to bring the advanced one thereof in position to be acted upon by said spout, and means are provided for directing a stream of air against the flap of said advanced envelope to open it to permit entrance of said spout into said advanced envelope,

the combination with said spout and slide, of means mounting said spout on said slide for pivotal movement with respect thereto in a direction toward and from said stack of envelopes, means for causing pivotal movement of said spout after it has entered an envelope, whereby to withdraw said envelope from said stack, and means for returning said spout to a pivoted position in which it bears against the opened flap of the next envelope in said stack prior to the time said slide reaches that limit of its reciprocable position away from said stack, whereby to hold said flap in open position and condition said next envelope to receive said spout upon the next reciprocable movement of said slide toward said stack.

KARL STENGLEIN.