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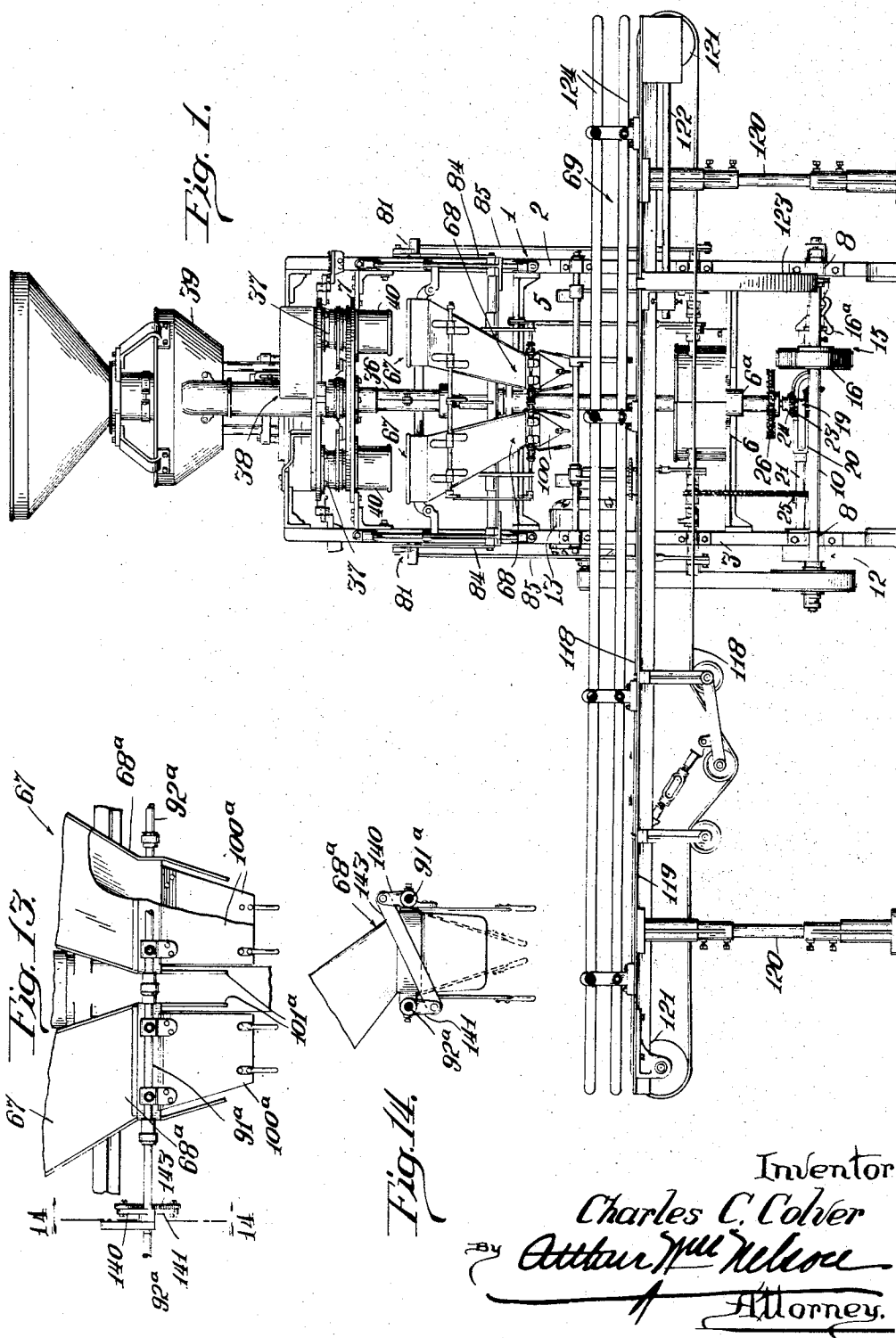
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CARTON FILLING MACHINE

Filed April 23, 1930

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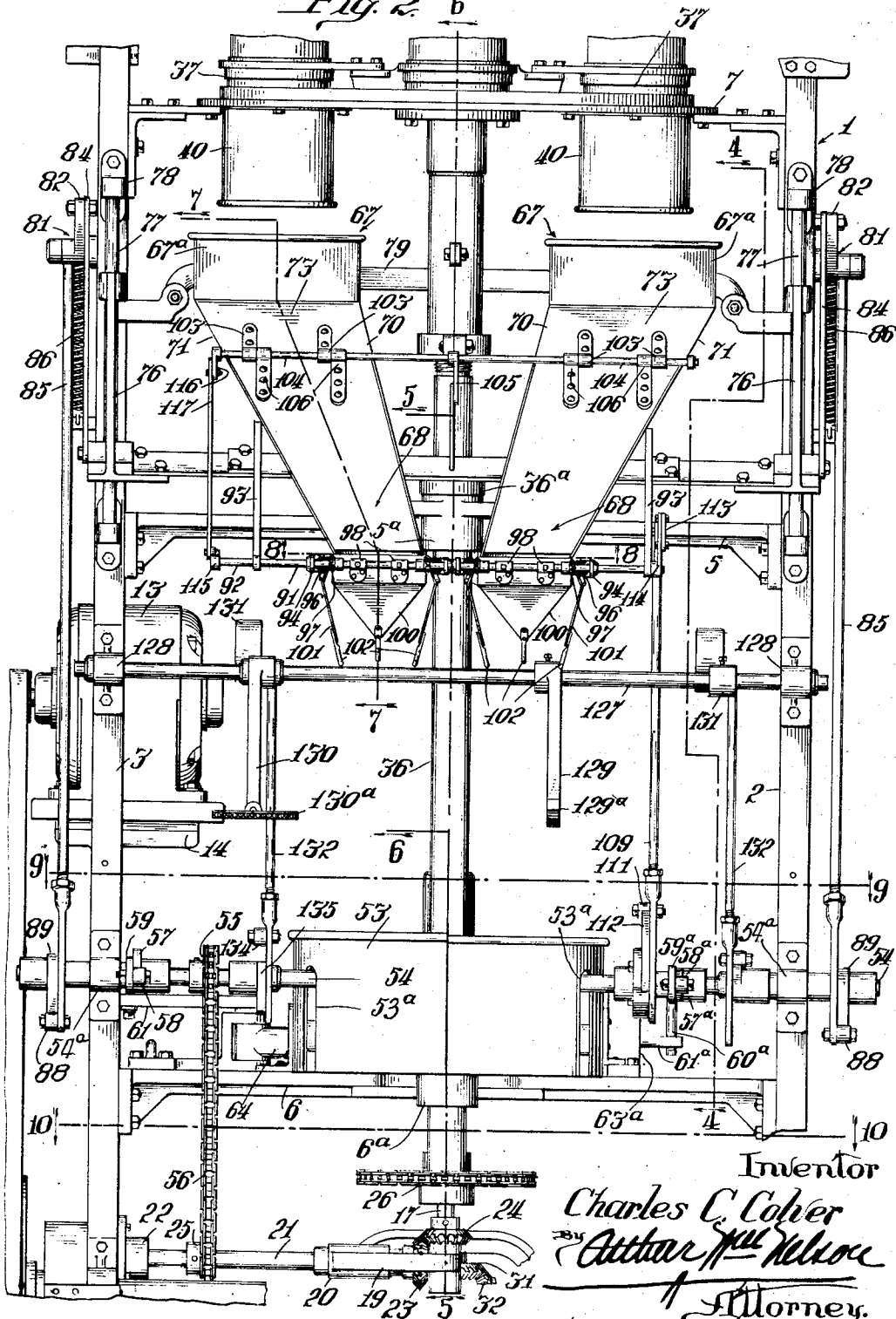
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CARTON FILLING MACHINE

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Fig. 2 6



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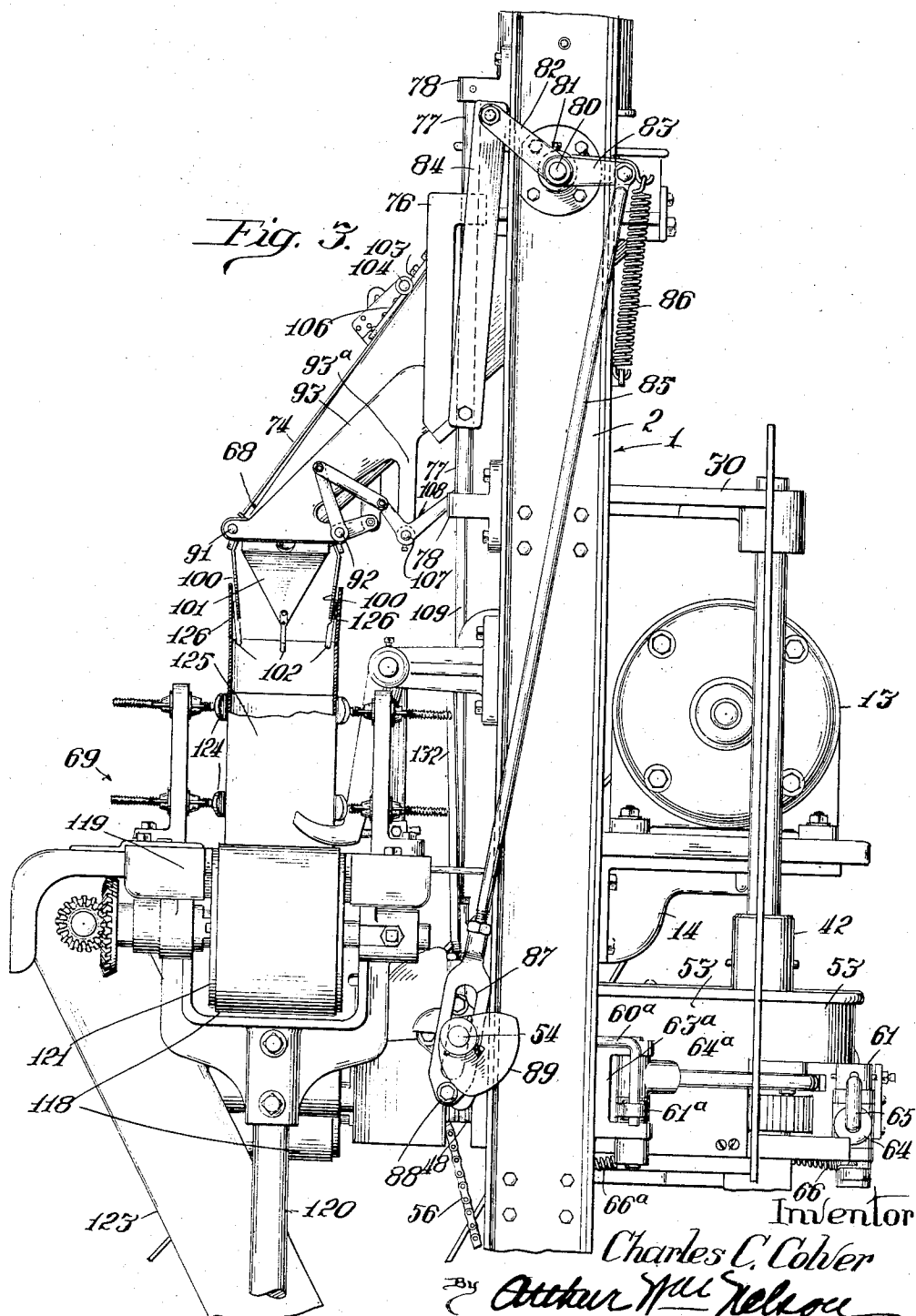
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CARTON FILLING MACHINE

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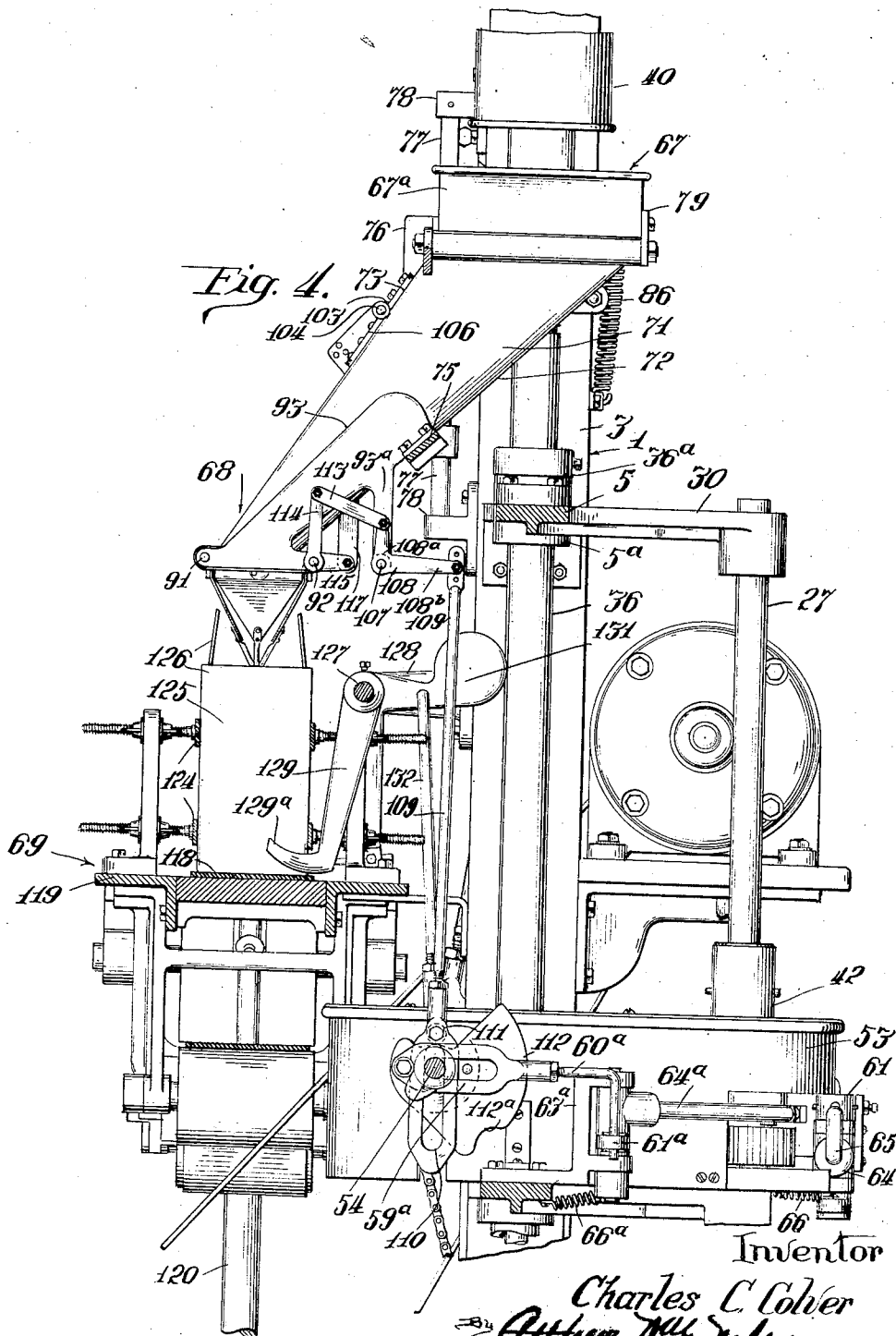
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CARTON FILLING MACHINE

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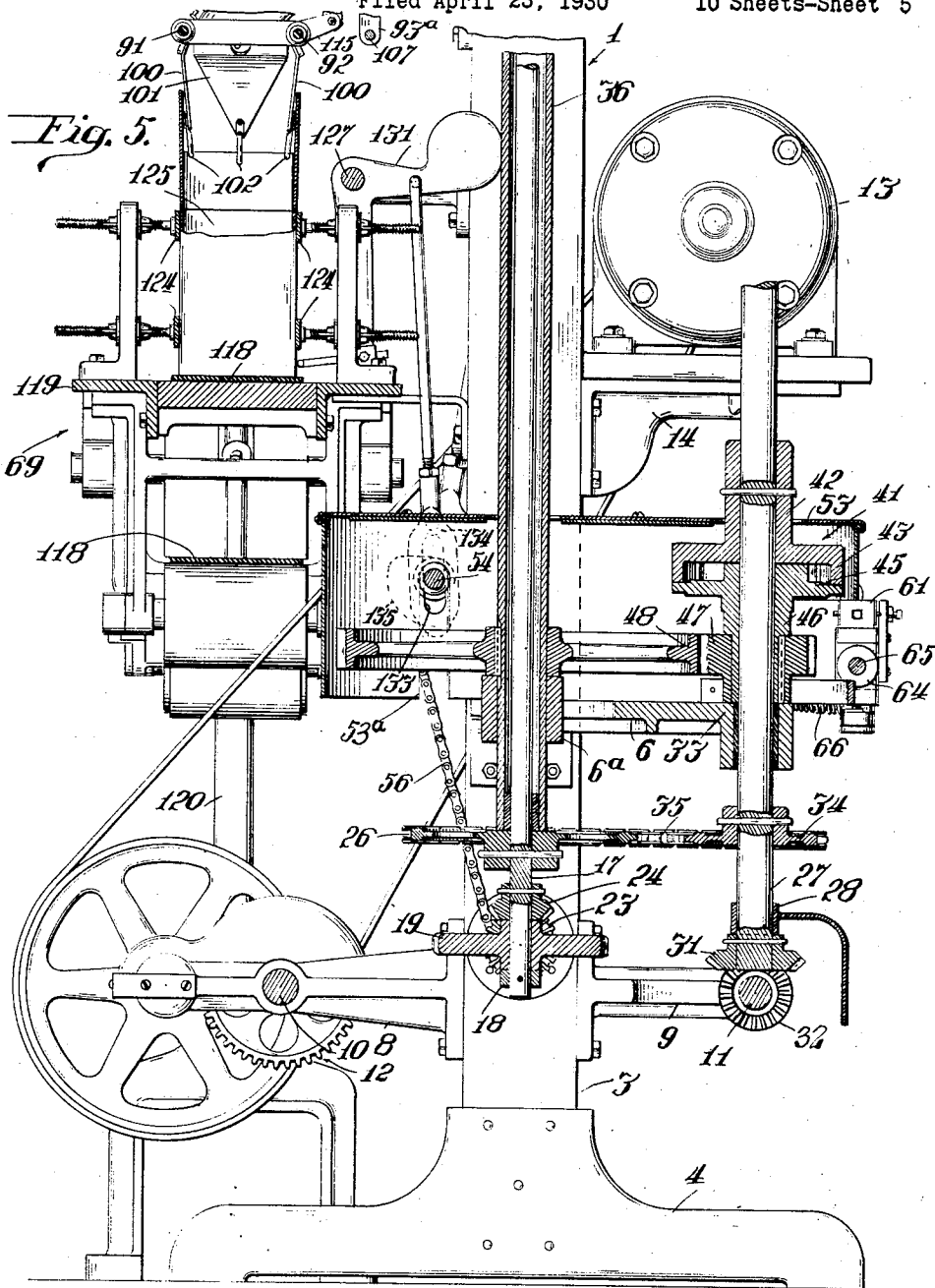
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CARTON FILLING MACHINE

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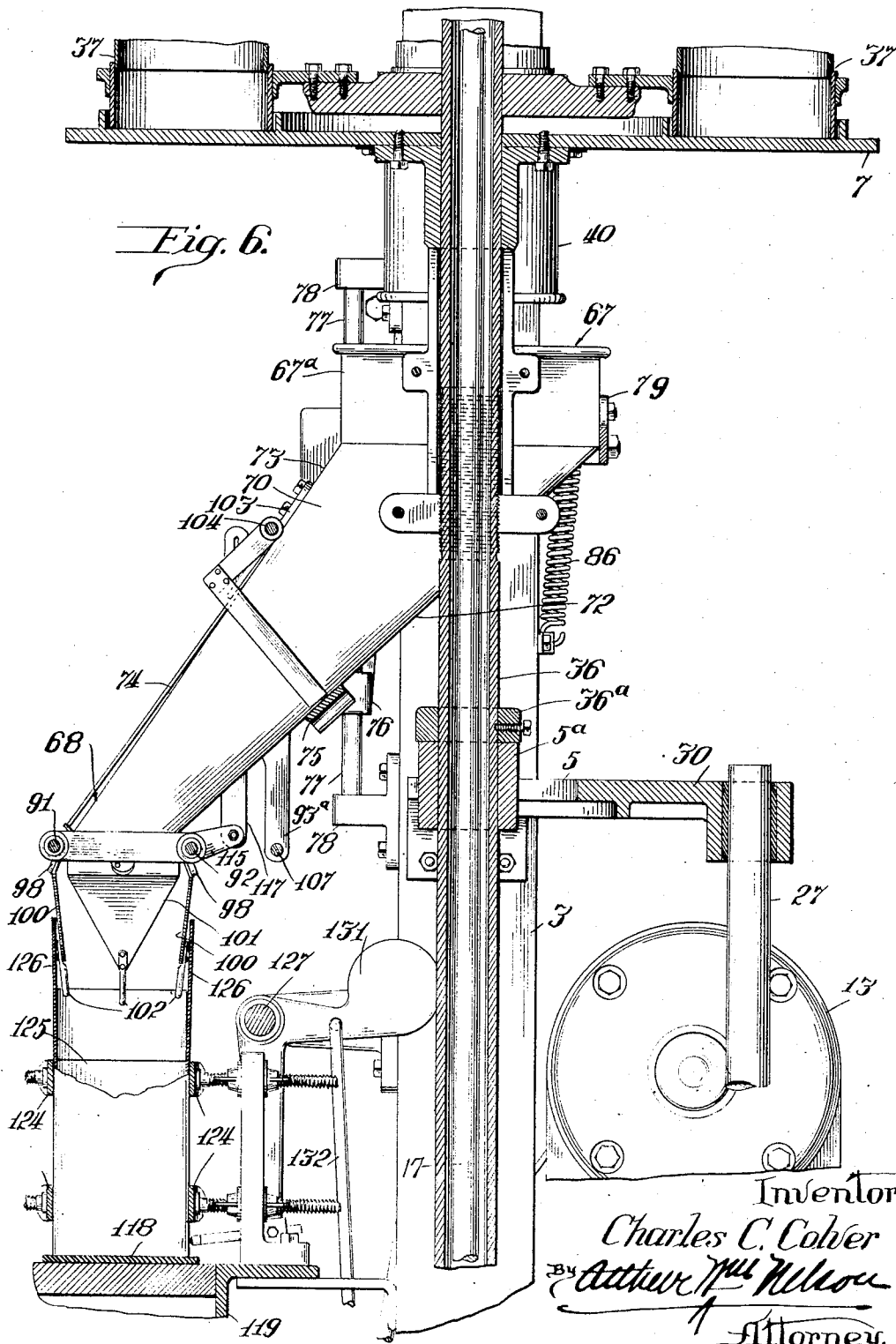
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CARTON FILLING MACHINE

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CARTON FILLING MACHINE

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Fig. 8.

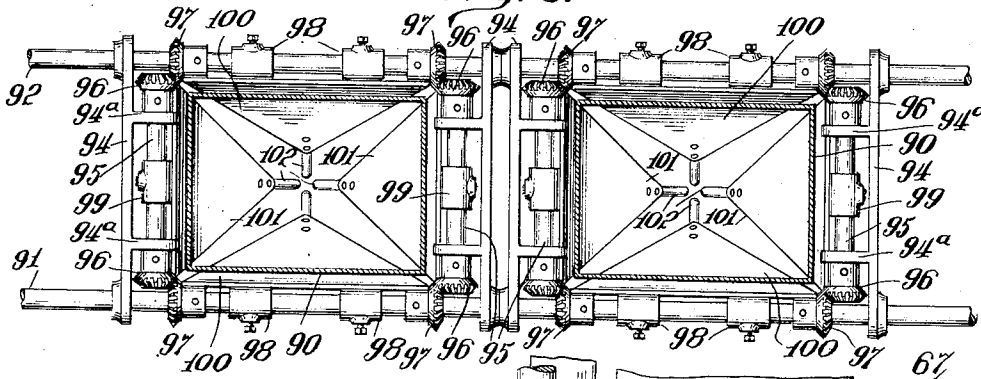
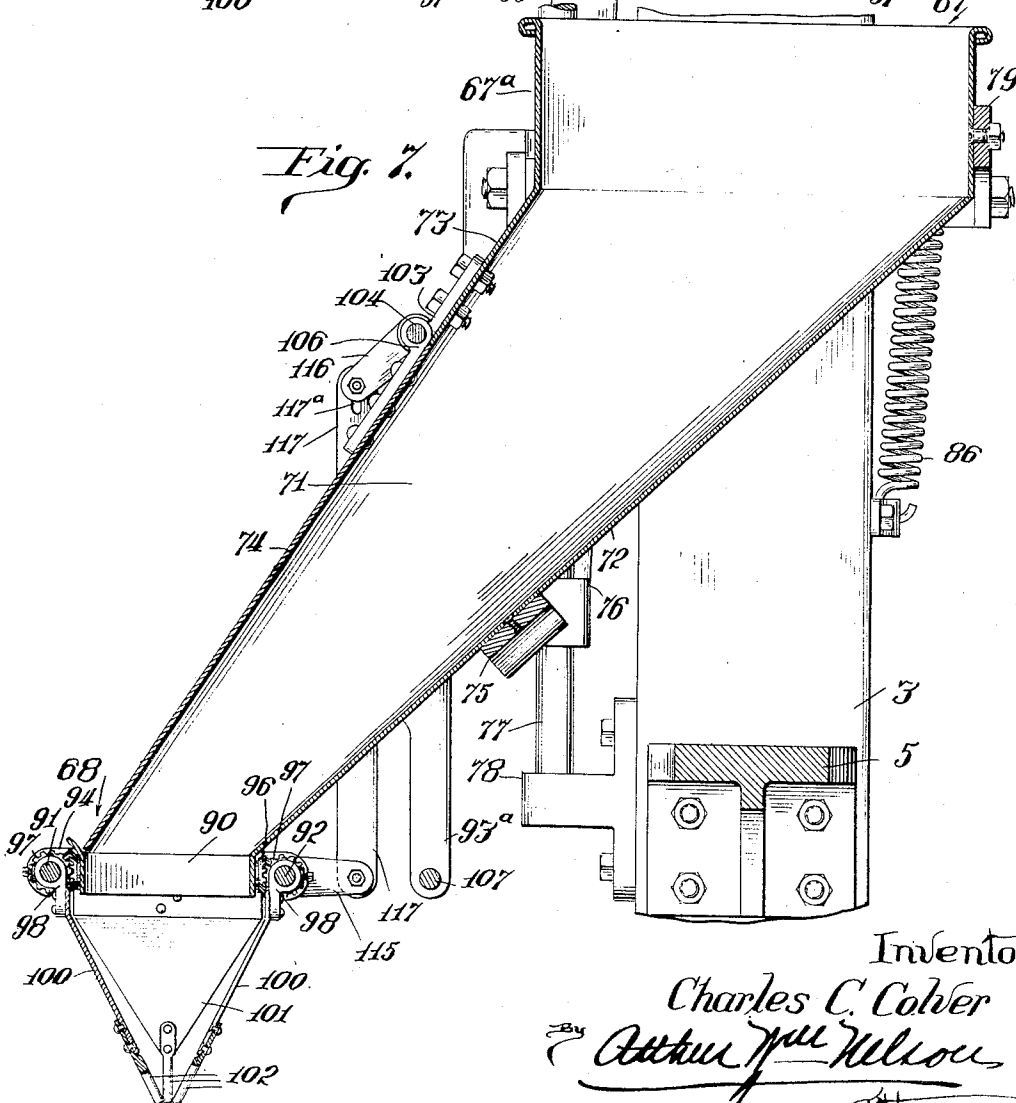


Fig. 7.



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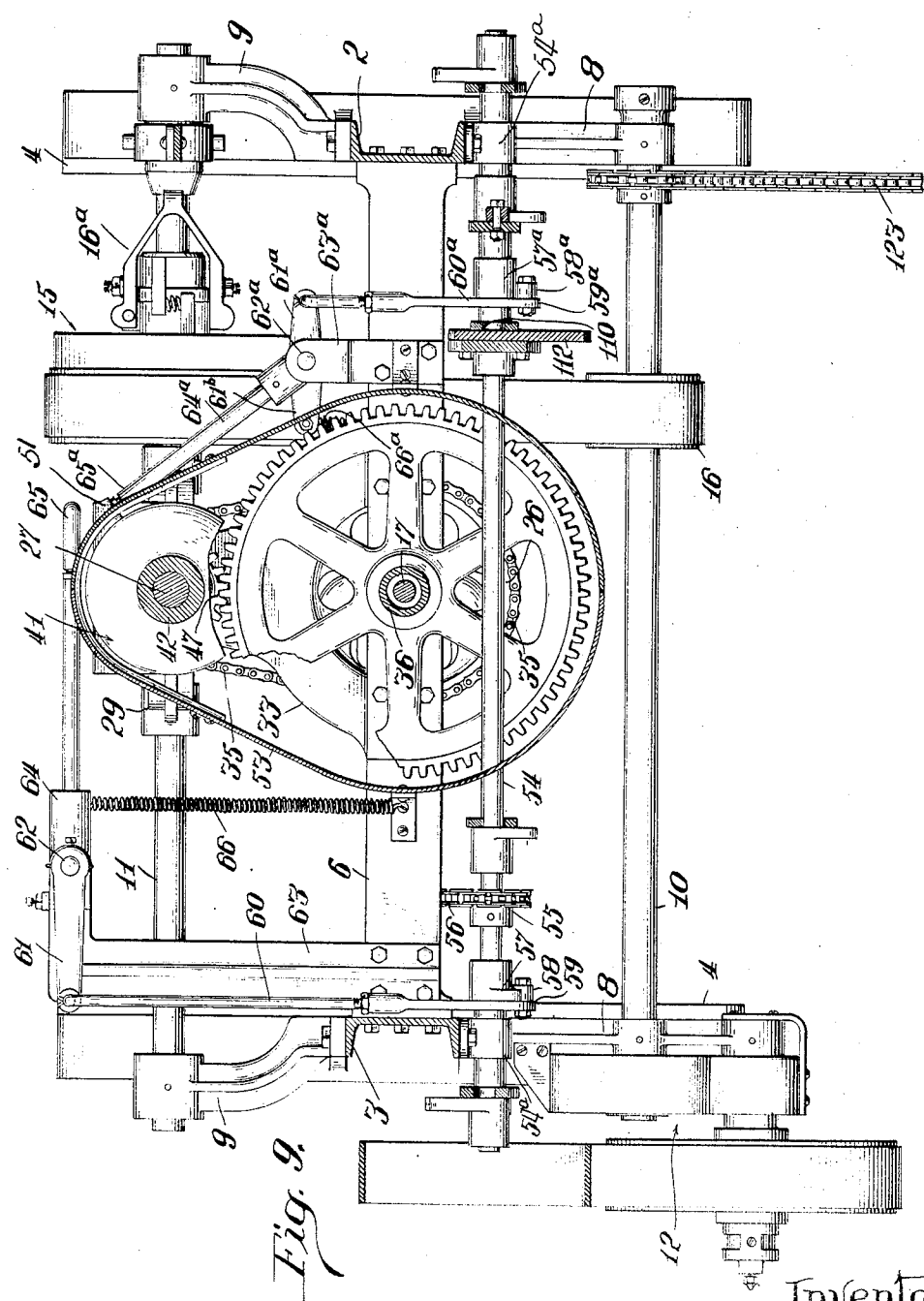


Fig. 9.

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CARTON FILLING MACHINE

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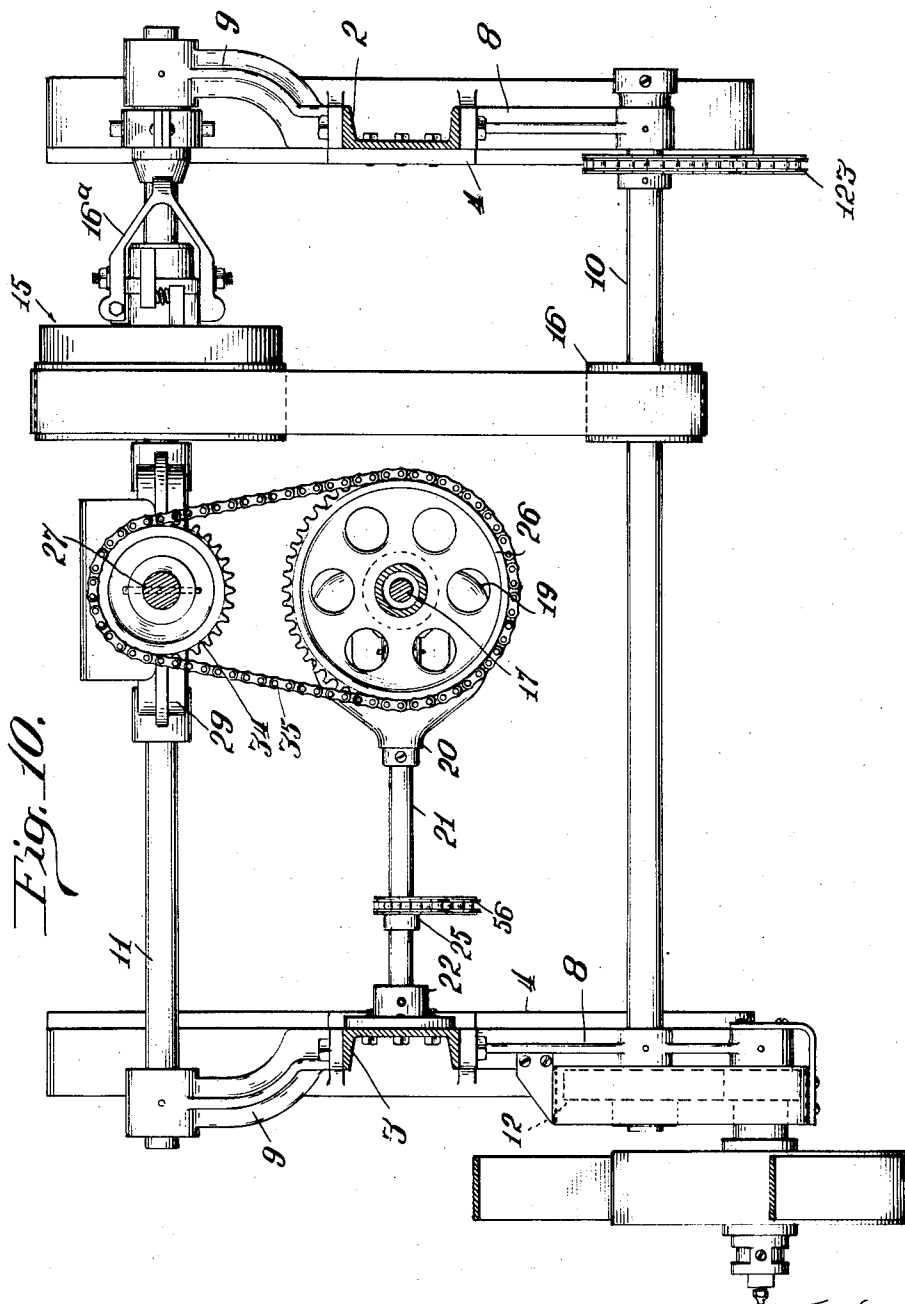


Fig. 10.

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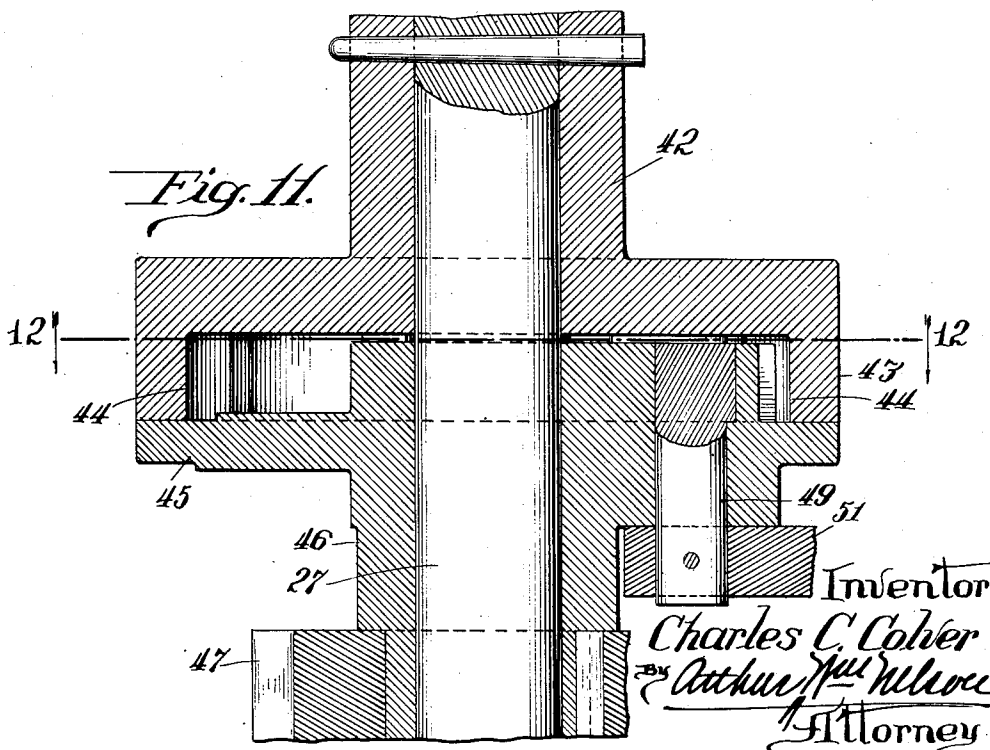
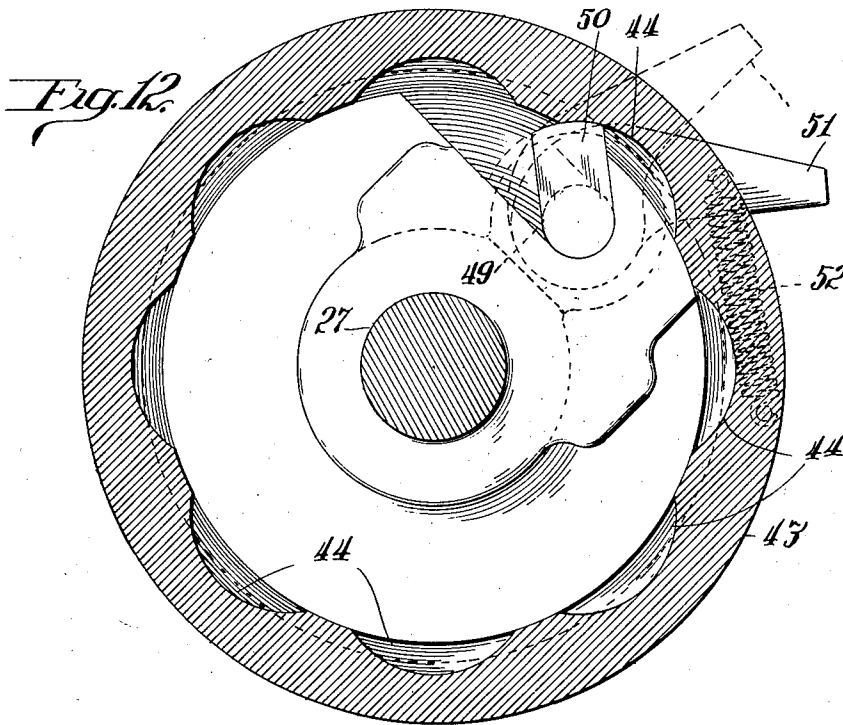
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CARTON FILLING MACHINE

Application filed April 23, 1930. Serial No. 446,441.

This invention relates to improvements in carton filling machines and it consists of the matters hereinafter described and more particularly pointed out in the appended 5 claims.

The primary object of the invention is to provide a machine which will deliver measured quantities of more or less bulky or breakable articles such as crackers, cookies and the 10 like, from a source of supply into the cartons or boxes in which they are to be shipped and sold and this in a manner which is not only fast and accurate but which reduces breakage of the articles to a minimum.

Another object of the invention is to provide a machine for this purpose that includes a reciprocating discharge spout, the bottom end of which is adapted to enter and spread the flaps and associated liner ends of the carton to be filled as well as to guide a measured 20 quantity of articles into said carton, discharged into the top end of the spout by a suitable mechanism provided therefor, the spout being withdrawn from the carton after 25 the same has been filled.

Still a further object of the invention is to provide in a machine of this kind a spout, the discharge end of which comprises coacting members adapted when in one position to 30 enter the end of the carton being filled and then swing laterally to open the flaps of said carton to permit a free unrestricted discharge of articles into said carton.

These objects of the invention as well as others, together with the many advantages thereof will more fully appear as I proceed with my specification.

In the drawings:—

Fig. 1 is a view in front elevation of my improved carton filling machine as when employed in connection with a carton supporting means in the form of a conveyor.

Fig. 2 is a view in front elevation on an enlarged scale of that portion of the machine with which the invention is more particularly 45 concerned and with the carton conveyor shown in Fig. 1, omitted.

Fig. 3 is a view in side elevation of those parts thereof shown in Fig. 2 as when viewed 50 from the right hand side thereof.

Fig. 4 is a vertical sectional view through one side portion of the machine as taken on the line 4—4 of Fig. 2.

Fig. 5 is another vertical sectional view through the bottom central portion of the machine as taken on the line 5—5 of Fig. 2.

Fig. 6 is a vertical sectional view through the top central portion of the machine as taken on the line 6—6 of Fig. 2.

Fig. 7 is a detail vertical sectional view on an enlarged scale through one of the discharge spouts as taken on the line 7—7 of Fig. 2.

Fig. 8 is a detail horizontal sectional view as taken on the line 8—8 of Fig. 2.

Fig. 9 is a horizontal sectional view through the machine as taken on the line 9—9 of Fig. 2.

Fig. 10 is another horizontal sectional view through the machine as taken on the line 10—10 of Fig. 2.

Fig. 11 is a vertical sectional view on an enlarged scale of a certain two step clutch embodied in the mechanism of the improved machine and will be more fully referred to later.

Fig. 12 is a horizontal sectional view through the clutch of Fig. 11 as taken on the line 12—12 of said Fig. 11.

Fig. 13 is a detail view in front elevation of a modified form of discharge end of the spout mechanism.

Fig. 14 is a detail vertical sectional view as taken on the line 14—14 of Fig. 13.

My improved machine which is especially adapted for use in connection with a carton support, such as a conveyor, includes a hopper at the top thereof adapted to hold a supply of the articles with which the cartons are to be filled, the hopper itself being replenished in any suitable manner as the supply diminishes. This hopper which is funnel shaped, discharges at its bottom into a secondary and distributing hopper having one or more tubes that deliver the articles into certain coacting measuring cups in a rotative plate, when said cups come into line therewith, said cups measuring out each load or quantity of articles to be delivered into a carton when brought into a predetermined 100

position on the conveyor before mentioned. The measuring cups are open at their top and bottom ends and in the rotation of said plate the bottom ends of said cups sweep over a non-rotative plate.

This non-rotative plate carries discharge tubes or necks and when said cups come into alignment therewith, in the rotation of the first mentioned plate the cups discharge their contents into said necks. Below said non-rotative plate are provided spouts which are normally closed at their bottom ends by carton flap entering and spreading members or plates. Said spouts have a vertical reciprocatory movement in timed relation with respect to the cartons on the conveyor to be filled.

As they ascend or move upwardly out of the cartons after loading or filling them as will later appear, the flap entering and spreading members of each spout close together. When the empty cartons on the conveyor reach a position in line with said spouts, said cartons are momentarily arrested and while thus arrested, said spouts descend and as the closed and rather pointed end of the spouts (as formed by said plates or members) enter the open top end of the associated cartons, said plates or members swing laterally to engage the flaps of the carton and open them outwardly.

As said plates or members swing laterally to open said flaps, the spouts are still in descent and at that time, the measuring cups register with the discharge tubes so that a measured quantity of articles passes from said cups to said necks and into the top end of the associated spouts to be guided thereby into the respective cartons. The spouts now withdraw from the cartons which become filled and so soon as the spouts clear the cartons, the plates or members again close the associated ends of the spouts, the filled cartons move on and other empty ones take their place for filling as before.

Referring now in detail to that embodiment of the invention, illustrated in Figs. 1 to 11 inclusive of the accompanying drawings, 1 indicates as a whole the frame of the machine which includes, laterally spaced, perpendicular right and left hand posts 2 and 3 respectively, each of a channel bar cross section. Each post is secured at its bottom end to the mid portion of an associated forwardly and rearwardly extending foot piece 4 of angle bar cross section and said posts are connected together by top and bottom, vertically spaced cross bars 5 and 6 respectively as well as by a circular plate 7 disposed in a plane above that of the top cross bar 5 and which plate will be more specifically referred to later.

Secured to the posts 2 and 3 respectively, near the foot pieces are pairs of forwardly and rearwardly extending brackets 8 and 9

respectively and journaled in said brackets are transversely extending, horizontal shafts 10 and 11 respectively. The shaft 10 is the continuously rotating drive shaft of the machine and is driven through suitable speed reducing mechanism 12 (see Fig. 9) from a motor 13 mounted on a bracket 14 on the rear side of the left hand post 3. On the right hand end of the shaft 11 is a clutch mechanism 15 driven by pulley and belt 16 from the shaft 10. A shifter mechanism 16^a is associated with the clutch whereby the shaft 11 may be operatively connected to and disconnected from the shaft 10 so far as driving relation is concerned in a manner well known.

17 indicates an upright shaft disposed midway between and in the plane of the posts 2 and 3. Fixed to the bottom end of said shaft is a collar 18 and loose on said shaft above the collar is a horizontally disposed yoke 19 having a boss 20 extending toward the left hand post 3 as best shown in Fig. 10. A horizontal shaft 21 is journaled at one end in the boss of said yoke and is journaled at its other end in a bearing 22 on the inner face of the post 3. On the shaft 21 within the yoke is a bevelled pinion 23 which meshes with a similar pinion 24 fixed to the upright shaft 17 so as to have a thrust bearing on the hub of the yoke 19 as best shown in Fig. 5. On the shaft 21 adjacent the bearing 22 is fixed a sprocket 25 and on the shaft 17 a short distance above the pinion 24 is fixed a sprocket 26.

In line with but spaced rearwardly of the upright shaft 17 is a second upright shaft 27 arranged in the plane of the shaft 11. The shaft 27 is journaled near its bottom end in the sleeve 28 of an inverted U-shaped yoke 29 engaged on the shaft 11 and is journaled at its top end in a rearwardly extending bracket 30 made integral with the top cross bar 5 before mentioned. Fixed to the bottom extremity of the shaft 27 within the yoke 29 is a bevelled pinion 31 which meshes with a similar pinion 32 on the shaft 11 also within said yoke. The shaft 27 is also journaled at a point above the pinion 31 in a rearwardly extending bracket 33 made integral with the bottom cross bar 6 before mentioned. Fixed to said shaft 27 between the pinion 31 and bracket 33 is a sprocket 34 which is operative through a chain 35 to drive the sprocket 26 on the shaft 17. Thus when the clutch 15 is "in", both upright shafts 17 and 27 are being continuously driven in the same direction.

Surrounding the shaft 17 is an intermittently rotated tube 36 having rotating bearing in central hubs 5^a and 6^a respectively formed integral with the top and bottom cross bars 5 and 6 before mentioned. A collar 36^a fixed to said tube and engaging on the hub 5^a provides a part of the thrust bear-

ing for said tube. Said tube extends up through the nonrotative plate 7 and has there secured to it certain diametrically opposite disposed measuring cups 37—37 associated with a suitable feed mechanism tubes 38 employed in connection with a supply hopper 39. The feed mechanism tube 38 and hopper 39 just mentioned are referred to only generally herein because they are more fully illustrated and described in my copending application filed April 23, 1930, and bearing Serial Number 446,440. However, it is mentioned in passing, that in the intermittent rotative movement of the tube an amount of the material operated upon, is delivered into said cups which measure the quantity of material to be delivered into each carton. Each cup is open at its top and bottom and the open bottom wipes over the top surface of the fixed plates 7 until said cups register with certain diametrically opposite depending feed tubes 40 depending from said plate 7 in the plane of the posts 2 and 3. When the measuring cups come into partial register with the feed tubes, the tube 36 is momentarily retarded so that an initial dumping or discharge from the measuring cups into the tubes takes place and thereafter said tube is again rotated to bring the measuring cups into full register with the feed tubes to permit the final discharge thereinto. From the feed tubes the material is discharged into certain spouts as will hereinafter appear.

Intermittent movement is imparted to the tube 36 by the following means:—On the shaft 27 just above the bracket 33 is located a suitable clutch mechanism 41 see Fig. 5. Said clutch includes a collar 42 having a depending annular flange 43 in the interior surface of which are formed recesses 44. Associated with and below said collar and loose on the shaft 27 is an annular pawl carrying plate 45 having a hub 46 to which is keyed a spur pinion 47 that has a thrust bearing upon the bracket 33. This pinion meshes with a spur gear 48 keyed to the tube 36 and engaging on the hub 46 of cross bar 6 to form another part of the thrust bearing for said tube.

The annular plate 45 of the clutch 41 closes the bottom end of the collar 42 and journalled in said plate within the collar is a pin 49 carrying a pawl 50 at its top end to engage in any one of the notches or recesses in the flange of the collar. On the bottom end of said pin 49 is a dog 51 adapted to be engaged with trip fingers hereinafter mentioned to disengage the pawl 50 from the recess 44 in which it is engaged and thus disconnect the plate 45 from the collar 42. A spring 52 connecting the dog and plate, normally swings the pawl into engagement with the recesses. The clutch mechanism 41 to-

gether with directly associated parts is enclosed by a cover 53, best shown in Fig. 5.

To the front of the posts 2 and 3 in substantially the horizontal plane of the clutch collar 43 is a transversely extending horizontal shaft 54 hereinafter referred to as the "cam shaft" and which is journalled in forwardly extending brackets 54^a on said posts 2 and 3. Fixed to said cam shaft is a sprocket 55 driven by a chain 56 from the sprocket 25 on the shaft 21. The cover 53 is provided with cutaway openings 53^a to accommodate the cam shaft 54 as best shown in Fig. 2.

On the cam shaft 54 near the left hand post 3 is fixed a cam 57 adapted to engage a roller 58 on the slotted front end 59 of a rearwardly extending rod 60. The rear end of said rod is connected to the free end of an arm or lever 61, fixed at its other end to the top end of an upright rock shaft 62. Said shaft is journalled in an L-shaped arm 63 fixed to and extending rearwardly from the cross bar 6 near the post 3. On the bottom end of this rock shaft is an arm 64 diametrically opposed to the lever and the free end of this arm is bent back upon itself as at 65 to form an abutment adapted when swung into one limit of its movement to form a stop which is engaged by the pawl 51 of the clutch 41. When this pawl so engages the abutment, the dog 50 is released from that recess 44 in which it was engaged to momentarily break the driving connection between the collar 42 and plate 45. So soon as the arm 64 swings in the other direction, it releases the pawl 51 to free the dog 50 which again enters one of the recesses 44 under the action of the spring 52 to again operatively connect the collar 42 and plate 45. A spring 66 fixed at its ends to the arm 64 and to the cross bar 6 respectively, acts to normally throw said bent over end 65 thereof into that position wherein it will stand in the path of the pawl 51.

Near the other post 2 there is fixed to the shaft 54 a cam 57^a adapted to engage a roller 58^a on the slotted front end 59^a of a rearwardly extending rod 60^a. The rear end of said rod is connected to the short arm 61^a of a bell crank lever fixed to an upright rock shaft 62^a. This rock shaft is journalled in a bracket 63^a fixed to and extending rearwardly from the cross bar 6 near the cover 53. The long arm 64^a of said bell crank lever has its free end 65^a normally disposed in the path of the pawl 51 at a point spaced about 60° in a clock-wise direction from the abutment as provided by the bent over end 65 of the arm 64. A spring 66^a connected at one end to an arm 61^b and at its other end to the cross bar 6 respectively, normally acts to throw the lever arm 64^a into a position wherein the end 65^a thereof will stand in the path of the pawl 51.

In each instance a spring acts to throw the

stop levers in one direction and a cam acts to throw said levers in the opposite direction. Thus for each rotation of the shaft 27 the pinion 47 is twice arrested and of course the tube 36 will likewise be arrested.

Between the posts 2 and 3 below the feed tubes 40 is a pair of spouts 67 hereinafter referred to as the "right" and "left" hand spouts respectively. Each spout includes an open top inlet end 67^a of substantially large cross sectional area, axially disposed with respect to the associated feed tube 40, and a discharge end 68 of a smaller cross sectional area which is offset inwardly and forwardly with respect to the axis of feed tubes to be disposed in the plane of a carton support of any suitable kind so as to overhang the same. As shown herein said support is in the form of an endless conveyor indicated as a whole by the numeral 69 to be more fully referred to later.

Each spout includes inner and outer tapering side walls 70 and 71 respectively, an inclined and tapered bottom wall 72 and a front wall 73 having its bottom end part 74 arranged as a hinged door or lid as will soon appear. The bottom wall 72 of both spouts are fixed to a cross bar 75 having its end portions secured to upright runners 76. Said runners have top and bottom sleeves arranged for a sliding guided bearing upon upright guide rods 77 each fixed at their ends by brackets 78 secured to the front portion of the posts 2 and 3. The open top inlet ends of both spouts are connected together by a cross bar 79 which together with the cross bar 75 securely holds said spouts so that they may move as a unitary structure.

Extending laterally from each post 2 and 3 is a stud 80 on which is pivoted a bell crank lever 81, comprising a pair of arms 82 and 83 respectively. The arm 82 of each lever is connected by a link 84 with the bottom end of an associated runner 76 while the arm 83 of each lever is operatively connected to the top end of a rod 85. A spring 86 also connects each arm 83 with the associated post 2 and 3 respectively. The bottom end of the rod is flattened and has a longitudinal slot 87 therein through which the cam shaft 54 extends. On the bottom extremity of said flattened end of the rod is a roller 88 adapted to be engaged by a cam 89 on said shaft 54. Thus as the cams 89 engage the rollers 88, an upward guided ascending movement is imparted to the spouts 67 through the rod 85, bell crank levers 81 and links 84, and so soon as the cam sweeps past said roller, a downward guided or descending movement is imparted to said spouts by the action of gravity, the springs 86 operating to cushion this last mentioned movement.

The discharge end 68 of each spout is defined by a rectangular, horizontally disposed collar 90 (see Fig. 7) whereby the axis

of said end is arranged perpendicularly. To the front and rear of the collar 90 of both spouts are transversely extending, horizontal shafts 91 and 92 respectively, which are journaled at their ends in bracket plates 93 fixed to and extending downwardly and forwardly from the cross bar 75. Supported by said shafts 91—92 are connecting brackets 94—94 including bearing ears 94^a in which forwardly and rearwardly extending shafts 95 are journaled in the plane of the shafts 91—92. As is apparent from Fig. 8 of the drawings, the shafts 91—92 are disposed adjacent and are common to the front and rear walls of both spout collars 90, while there is a pair of shafts 95 for the side walls of each of said collars. On the ends of said shafts 95 are fixed pinions 96 that mesh with pairs of like pinions 97 on the shafts 91—92.

On the shafts 91—92 which are rock shafts, between each pair of pinions 97 are secured sleeves 98 and centrally on each shaft 95 which is also a rock shaft is secured a similar sleeve 99. Fixed to the sleeve 98 are substantially triangular front and rear closure or spreading plates 100—100 and fixed to the sleeves 99 are substantially triangular side plates 101 and the apex or pointed end of each plate 100—101 is provided with an extension finger 102. When the closure or spreader plates are in that position wherein all the fingers 102 are grouped together as shown in Fig. 7, the associated plates provide a substantially inverted pyramid shaped closure or pointed end for the spout. When the shafts 91—92 and 95 are rocked by means soon to appear, the said plates are caused to swing outward into the position shown in Fig. 8. As is shown in Figs. 7 and 8, the said plates do not close absolutely tight at their corners, but they do close tight enough to form the pointed end for the associated spout whereby said ends of both spouts readily enter the associated carton ends.

On the bottom edge of the front wall 73 of each spout is fixed a pair of bearing sleeves 103 and in the sleeves of both pairs of ears is journaled a horizontally disposed shaft 104. The central portion of said shaft, at a point between the spouts, is supported by a bracket 105 from the cross bar 75. Fixed to the shaft 104 adjacent the sleeves 103 are similar sleeves 106 which are fixed to the top marginal portion of the associated end part 74 of the front wall 73.

The bracket plates 93 each includes a depending arm 93^a in which is journaled a horizontally disposed rock shaft 107. Secured to one end (the right hand end) of said shaft is a bell crank lever 108 having a normally upright short arm 108^a and a normally horizontal long, rearwardly extending arm 108^b. The arm 108^b is operatively connected to the top end of a rod 109 the bottom end of which is flattened and has a longitudinal slot

110 therein through which the shaft 54 extends. On said flattened end above the top end of the slot 110 is a roller 111 adapted to be engaged by a cam 112 fixed to the shaft 54 and in the periphery of said cam is a recess 112^a as best shown in Fig. 4. In the rotation of the cam shaft (which rotates counter-clockwise as viewed in Fig. 4) the cam 112 lifts the rod 109 and through the bell crank 108 rocks the shaft 107. When the recess 112^a of said cam reaches the roller 111 on said rod, a short "kick", jerk or jiggle is imparted to the rock shaft as is apparent and the purpose of this will appear later.

The short arm 108^a of the bell crank lever 108 is connected by a link 113 to the top end of an arm 114 fixed to the associated (right hand) end of the rock shaft 92 so that the kick before mentioned is transmitted to said shaft 92. On the other (left hand) end of the shaft 92 is secured a rearwardly extending arm 115 and on the associated end of the shaft 104 is fixed an arm 116. A link 117 connects the arms 115 and 116 and in the top end of said link is a longitudinal slot 117^a (see Fig. 7) whereby a limited lost motion is provided between said arms as the arm 115 starts swinging upwardly. It is pointed out at this time that in the upward or ascending movement of the spouts 67 the linkage, arms and levers described for operating the closure and spreading members of the spouts are in no manner affected because the cam 112 is so positioned, that the rod 109 may be carried with said spouts, the slot 110 in said rod providing that amount of lost motion necessary.

As before mentioned, an endless conveyor 69 is exemplified as the support for the cartons being filled. Such a support may be readily correlated with respect to the structure before described, and parts of said structure are employed in connection with others to stop the cartons while on said conveyor, in a position in line with the discharge ends 68 of the spouts 67.

Such a conveyor which is located in front of the filling machine includes an endless belt 118 the top lap of which is supported upon a relatively long platform 119 mounted on standards 120. The belt passes about pulleys 121 at the ends of the platform and one of said pulleys is driven by shafting 122 and sprocket mechanism 123 from the shaft 10 before mentioned.

On the platform 119 on each side of the top lap of the belt 118 are guide bars 124 to guide the cartons 125 to be filled, in their movement with said belt. The cartons as best shown in Figs. 3 and 4 are of a kind having top flaps 126 and such cartons may or may not have liners therein. The empty cartons are placed upon the left hand end of the belt 118 between the guides 124 and have their bottom ends closed and the top flaps normally stand upright. As a pair of open

top cartons approach the planes of the discharge ends 68 of the spouts they are momentarily arrested. The carton arresting mechanism is preferably made as a part of the filling machine as its operations may thus be more readily timed with respect to the operations of the other parts of the machine.

The carton arresting mechanism includes a transversely extending, horizontal rock shaft 127 journaled in brackets 128 extending forwardly from the posts 2 and 3 respectively. Fixed on this shaft is a pair of depending arms 129 and 130 respectively and a rearwardly extending, weighted arm 131. The arm 129 includes a forward extension 129^a adapted in one limit of movement of the arm to extend into the path of movement of the carton 125 on the belt 118 to stop a pair of cartons in a position in line with the discharge ends of the filling spouts. On the arm 130 is provided a carton engaging member 130^a adapted to hold the next carton in line after the pair to be filled, in spaced relation therefrom during the filling operation.

A link or rod 132 is connected at its top end to the weighted arm 131 while its bottom end is flattened and is provided with a longitudinal slot 133 through which the cam shaft 54 extends. On this end of the link or rod above the slot is a roller 134 to be engaged by a cam 135 on said shaft. Thus in the rotation of the cam shaft, the cam 135 imparts an upward movement to the link or rod 132 to rock the shaft 127 counter-clockwise. This movement occurs just after the cartons have been filled and the spouts 67 are moving upwardly so that the filled cartons are released to move along with the belt 118. So soon as the cam sweeps past the roller, the weighted arm 131 acts to swing the shaft 127 clockwise to bring the arms 129 and 130 into carton stopping and engaging positions as before mentioned.

In general the operation of the mechanism above described is as follows:—When the spouts are in their uppermost position their bottom ends are each closed as shown in Fig. 7 by means of the plates 100 and 101 respectively and the filled cartons have moved on and two empty ones have now taken their place. At about this time the measuring cups 37 have been filled from the feed mechanism tubes 38 and said cups are swinging toward the feed tubes 40. During this movement of the measuring cups, the spouts are descending and approaching the empty cartons. As they enter the empty cartons the plates 100 and 101 swing outwardly to open out the carton flaps as will later appear. As the measuring cups approach the feed tubes 40 and register therewith there is a complete discharge of the contents of said cups, down through the tubes and spouts into the cartons.

Returning now to said discharge spouts, as the discharge ends approach the open top end of the associated cartons, the plates 100 and 101 enter the same. At this time, the cam 112 moves into engagement with the roller 111 on the rod 109 and this engagement of the roller imparts a rocking movement to the shaft 107. In the rocking movement of said shaft 107 the plates 100 and 101 swing outwardly away from each other and swing the carton flaps 126 into a further open position and the articles passing through the spouts fall into the cartons. As the said plates 100 and 101 thus swing outwardly the wall 74 of spout 67 swings upwardly so as to provide more room for the articles as they pass into the collar 90 of the spout and thus they cannot pack up or jam and become entangled in the collar. In this manner a free discharge is assured.

As the recess 112^a of the cam 112 engages the roller 111 on the actuating rod 109, a short reverse movement of the plates 100—101 and wall 74 is provided after which they again open as the remainder of the cam 112 engages the roller. Thus a gentle "kick" or jerk is imparted thereto so that a loosening of the articles takes place which prevents their packing and jamming.

The spouts now move upwardly, thus withdrawing the plates or spreaders from the cartons to permit a complete discharge of articles into the cartons and so soon as said plates have cleared the carton flaps, they close together. Thereafter the arms 129 and 130 swing rearwardly thus releasing the just filled cartons when two other empty cartons move forwardly to take the place of those just filled and the operation is repeated as before. The filled cartons pass to the discharge end of the conveyor where they are disposed of in any suitable manner as by transfer to a flap sealing mechanism (not shown) which fastens the open flaps in carton closing position.

In Figs. 13 and 14 I have shown a slightly modified form of closure plate and flap spreading mechanism now to be described. In said figures 68^a indicates the discharge ends of the spouts 67 and 91^a and 92^a indicates the front and rear rock shafts similar to the rock shafts 91 and 92 before mentioned. 101^a indicates the side plates which in this instance are fixed or stationary ones and the front and rear plates 100^a are secured to the shafts 91^a and 92^a which are provided with upwardly and downwardly extending arms 140 and 141 respectively, connected by a link 143 so that when the shaft 92^a is rocked in one direction, the shaft 91^a is rocked in the other direction and thus the plates 100^a are caused to swing toward and away from each other into positions to coact with the fixed plates 101^a to open and close the bottom discharge end 68^a of each spout.

The machine described, rapidly feeds measured quantities of material such as cookies, crackers and the like from a source of supply directly into the cartons and this in so gentle a manner that breakage of the cookies and crackers is reduced to such a minimum as to be practically eliminated. Such a machine may be readily coordinated with a carton conveyor mechanism as described or may be used in connection with hand fed cartons should it be so desired.

While in describing the invention I have referred in detail to the form, arrangement and construction of the various parts thereof, the same is to be considered merely as illustrative of one embodiment of the invention only so that I do not wish to be limited thereto except as may be specifically set forth in the appended claims.

I claim as my invention:—

1. A carton filling machine embodying therein a spout, including a part removable to relieve pressure on the articles therein, means for feeding quantities of said articles with which the cartons are to be filled to said spout, means providing a support for said cartons, means providing a normally closed discharge end for the spout, means providing a relative movement between said support and spout end to bring them into operative relation for the passage of articles through said spout into said carton when said discharge end is opened and means for simultaneously opening said discharge end and said spout part to relieve the pressure on the articles in said spout as said articles are discharged through said open end.

2. A carton filling machine embodying therein a spout, including a part movable to relieve pressure on the articles therein, means for feeding quantities of said articles with which the cartons are to be filled to said spout, means providing a support for said cartons, means providing a normally closed discharge end for the spout, means providing a relative movement between said support and spout end whereby said discharge end enters the open end of the carton and means for simultaneously opening said spout end when in said carton and for moving said part of said spout to relieve the pressure on the articles in the spout as said articles are discharged through said open end.

3. A carton filling machine embodying therein a spout, including a normally closed, swingable pressure relief plate, means for feeding quantities of articles with which the cartons are to be filled to said spout, means providing a support for said cartons, means providing a discharge end for the spout, a plurality of members carried by said spout end and normally coacting to close the same, means providing a relative movement between said support and spout end to enter said members into the carton and means for

simultaneously moving at least some of said members into a position opening said spout end to permit a passage of articles through said spout into said carton and swinging said plate into open position to relieve the pressure on said articles in the spout during the discharge of articles into said carton.

4. A carton filling machine embodying therein a spout, including a normally closed, swingable pressure relief plate, means for feeding quantities of articles with which the cartons are to be filled to said spout, means providing a support for said cartons, means providing a discharge end for the spout, a plurality of members carried by said spout end and normally coacting to close the same, means providing a relative movement between said support and spout end to enter said members into the carton and means for simultaneously moving all of said members into a position opening said spout end to permit a passage of articles through the spout into said carton, and swinging said plate into open position to relieve pressure on said articles in the spout during the discharge of articles into said carton.

5. A carton filling machine embodying therein a spout, including a part movable to relieve pressure on the articles therein, means for feeding quantities of said articles with which the cartons are to be filled to said spout, means providing a support for said cartons, means providing a normally closed discharge end for the spout, means for moving said spout end toward and into operative position with respect to a carton on said support and then away from said carton and means simultaneously opening said discharge end of the spout when in said operative relation with respect to said carton and for moving said part of said spout to relieve pressure from said articles as they pass out of the spout through said discharge end.

6. A carton filling machine embodying therein a spout, including a part movable to relieve pressure on the articles therein, means for feeding quantities of articles with which the cartons are to be filled to said spout, means providing a support for said cartons, means providing a normally closed discharge end for the spout, means for moving said spout end toward and into the top end of said carton on said support and then out of and away from said carton and means for simultaneously opening said discharge end while in said end of said carton and for moving said part of said spout to relieve pressure from said articles as they pass out of the spout through said discharge end.

7. A carton filling machine embodying therein a spout, including a swingable wall part for relieving pressure on the articles in said spout, means for feeding quantities of articles with which the cartons are to be filled, to said spout, means providing a discharge

end for said spout including a plurality of members normally coacting to close the same, means for moving the spout as a whole toward and away from said support to bring said discharge end into operative relation with respect to the open top end of a carton on said support and means for simultaneously moving some of said members on said discharge end into open position while in said end of said carton and for swinging said part of said spout to relieve pressure from said articles as they pass out of the spout through said discharge end.

8. A carton filling machine embodying therein a spout, including a swingable wall part for relieving pressure on the articles in said spout, means for feeding quantities of articles with which the cartons are to be filled to said spout, means providing a support for said cartons, means providing a discharge end for said spout including a plurality of members normally coacting to close the same, means for moving the spout as a whole toward and away from said support to enter said members on said discharge end into the open top end of a carton on said support and means for simultaneously moving said members when in said carton to open position to permit the passage of articles through the spout into said carton and for swinging said part of the spout to relieve pressure from said articles as they pass out of the spout through said discharge end.

9. A carton filling machine embodying therein a spout, means for feeding quantities of articles with which the cartons are to be filled to said spout, means providing a discharge end for said spout including devices some of which are movable, which devices normally close said end, means providing a relative movement between said support and spout end to bring said devices into operative relation within said carton and means for imparting an opening movement to some of said devices and which means operates to produce a vibration or "kick" to said some of said devices before final full opening thereof to permit the passage of said articles through the spout into the carton.

10. A carton filling machine embodying therein a spout, means for feeding quantities of articles with which the cartons are to be filled to said spout, means providing a discharge end for said spout including devices some of which are movable, which devices normally close said end, means providing a relative movement between said support and spout end to enter said devices into said carton and means for imparting an opening movement to some of said devices and which means operates to produce a vibration or "kick" to said some of said devices before final full opening thereof to permit the passage of said articles through the spout into the carton.

11. A carton filling machine embodying therein a spout, including a movable wall portion, means for feeding quantities or articles with which the cartons are to be filled to said spout, a support for the cartons to be filled, means providing a normally closed discharge end for the spout, means providing a relative movement between said support and spout end to bring them into operative relation for the passage of articles from the spout end into said carton, means for opening said spout end when in said operative relation with respect to said carton and means for imparting a movement of said wall portion of the spout.

12. A carton filling machine embodying therein a spout, including a movable wall portion, means for filling quantities of articles with which the cartons are to be filled to said spout, a support for the cartons to be filled, means providing a normally closed discharge end for the spout, means providing a relative movement between said support and spout end to bring them into operative relation for the passage of articles from the spout end into said carton and means for simultaneously opening said spout end and for imparting a movement to said wall portion of the spout when the discharge end is in operative relation with respect to said carton.

13. A carton filling machine embodying therein a spout, including a movable wall portion, means for feeding quantities of articles with which the cartons are to be filled to said spout, a support for the carton to be filled, means providing a normally closed discharge end for the spout, means for moving the spout end toward and away from said support into and out of operative relation with respect to a carton thereon, means operative to open said discharge end and said wall portion of the spout when the spout end is in said operative relation with respect to said carton and means for closing said spout end and wall portion as said spout end moves away from said carton.

14. In combination with a carton conveyor, a carton filling machine embodying therein a spout movable toward and away from said conveyor, a swingable relief plate forming a part of said spout, means providing a discharge end for said spout including devices normally closing said end, means operable in timed relation with the movement of said spout toward the conveyor to arrest the carton in filling position on the conveyor so that said spout end devices may enter the carton, means for actuating said devices to open said spout end while entering the carton and for simultaneously swinging the pressure relief plate into open position and means operable in the movement of the spout end away from the carton to actuate said devices to close the spout end and to swing the pressure relief plate into closed position.

15. In a carton filling machine, a spout having a discharge end and including a movable pressure relief plate, a plurality of devices associated with the discharge end to provide a normally closed, angularly formed bottom therefor and means for imparting movement to certain of said devices to open said bottom of said discharge end and for simultaneously opening said pressure relief plate.

16. In a carton filling machine, a spout having a discharge end, a plurality of devices associated with the discharge end to provide a normally closed, angularly formed bottom therefor, certain of said devices including depending fingers thereon and means for imparting movement to certain of said devices to open said bottom of the discharge end.

17. In a carton filling machine a spout having a discharge end and including a movable pressure relief plate, a plurality of devices associated with said discharge end to provide a normally closed angularly formed bottom therefor, certain of said devices being pivotally connected to said spout end and means for swinging the pivoted devices from a position closing said end to one opening said end and vice versa and for simultaneously moving said relief plate into open and closed positions.

18. In a carton filling machine a spout having a discharge end and including a normally closed pressure relieving portion, a plurality of substantially inverted triangularly shaped plates each hinged at its base end to one side of said discharge end and normally coacting to close the same, and means for simultaneously swinging all of said plate members about their hinged base ends into open position and for moving said pressure relieving portion of the spout into open position.

19. In a carton filling machine a spout having a discharge end, a plurality of substantially inverted triangularly shaped plates each hinged at its base end to one side of said discharge end, and normally coacting to close the same, a finger depending from the apex end of certain plates and means for simultaneously swing all of said plate members about their base end into an open position.

20. In a carton filling machine a spout having a discharge end including four-side wall portions, a rock shaft parallel with each wall portion and all operatively connected together, a plurality of substantially inverted triangularly shaped members each fixed at its base end to a shaft and normally acting to close said discharge end and means for imparting a simultaneous rocking movement to all of said shafts to open and close said discharge end.

21. In a carton filling machine a spout having a discharge end including wall portions, a rock shaft parallel with each wall portion and all operatively connected together, a

plurality of substantially inverted triangularly shaped members each fixed at its base end to a shaft and normally acting to close said discharge end and a finger depending
5 from the apex end of desired members and means for imparting a rocking movement to said shafts to open and close said discharge end.

22. In a carton filling machine, a spout
10 having a movable wall portion and a discharge end, a plurality of devices associated with said discharge end and normally closing the same, some of said devices being movable and means operating to move said movable devices together with said wall portion
15 of said spout into open position.

In testimony whereof, I have hereunto set my hand, this 18th day of April, 1930.

CHARLES C. COLVER.

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