M. J. MILMOE.

CARTON FILLING MACHINE.

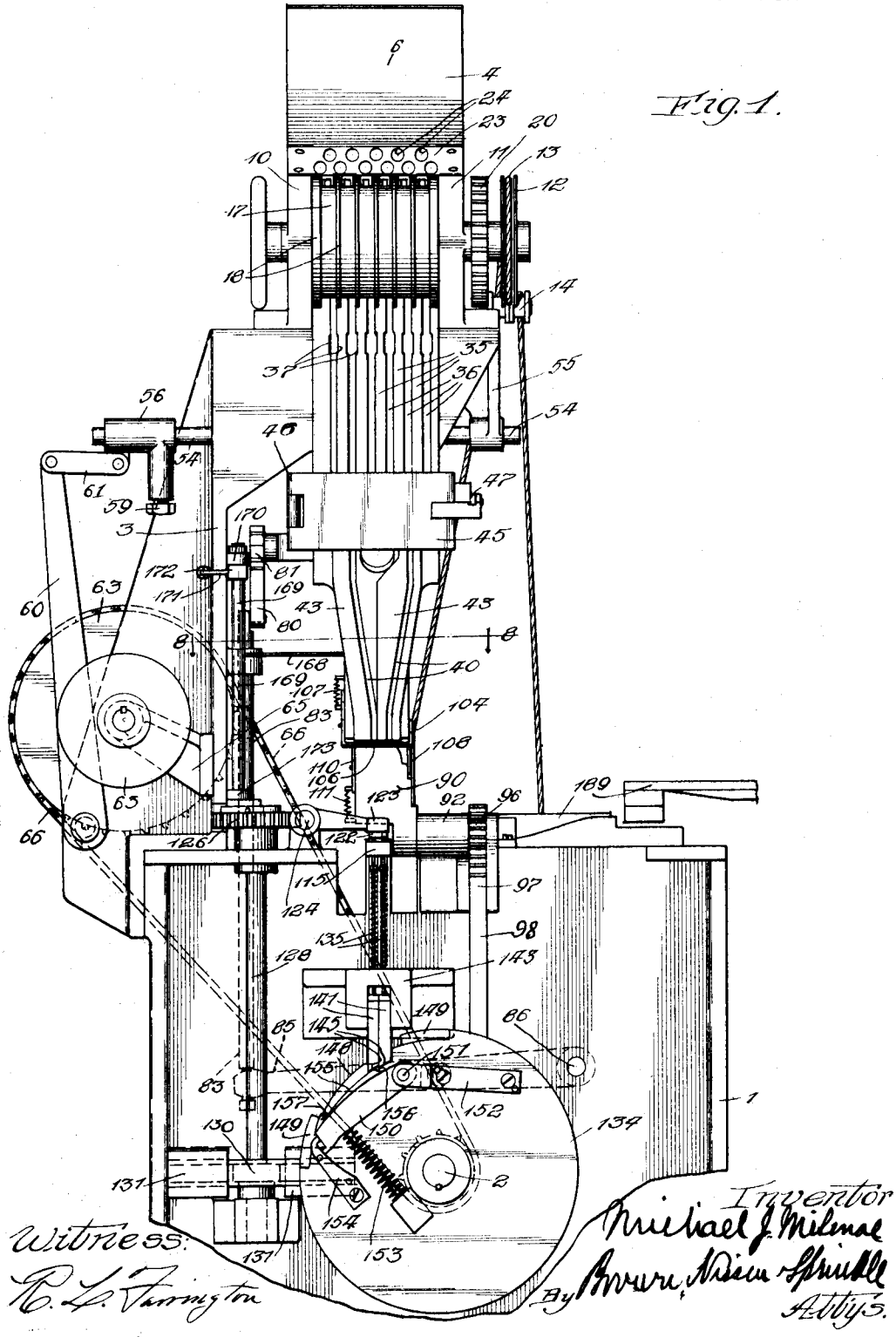
APPLICATION FILED MAR. 15, 1917.

1,384,844.

Patented July 19, 1921.

8 SHEETS—SHEET 1.

Fig. 1.



Witness:
R. L. Farrington

Inventor
Michael J. Milmoe
By Brown, Wilcox & Sprinkle
Attys.

M. J. MILMOE.

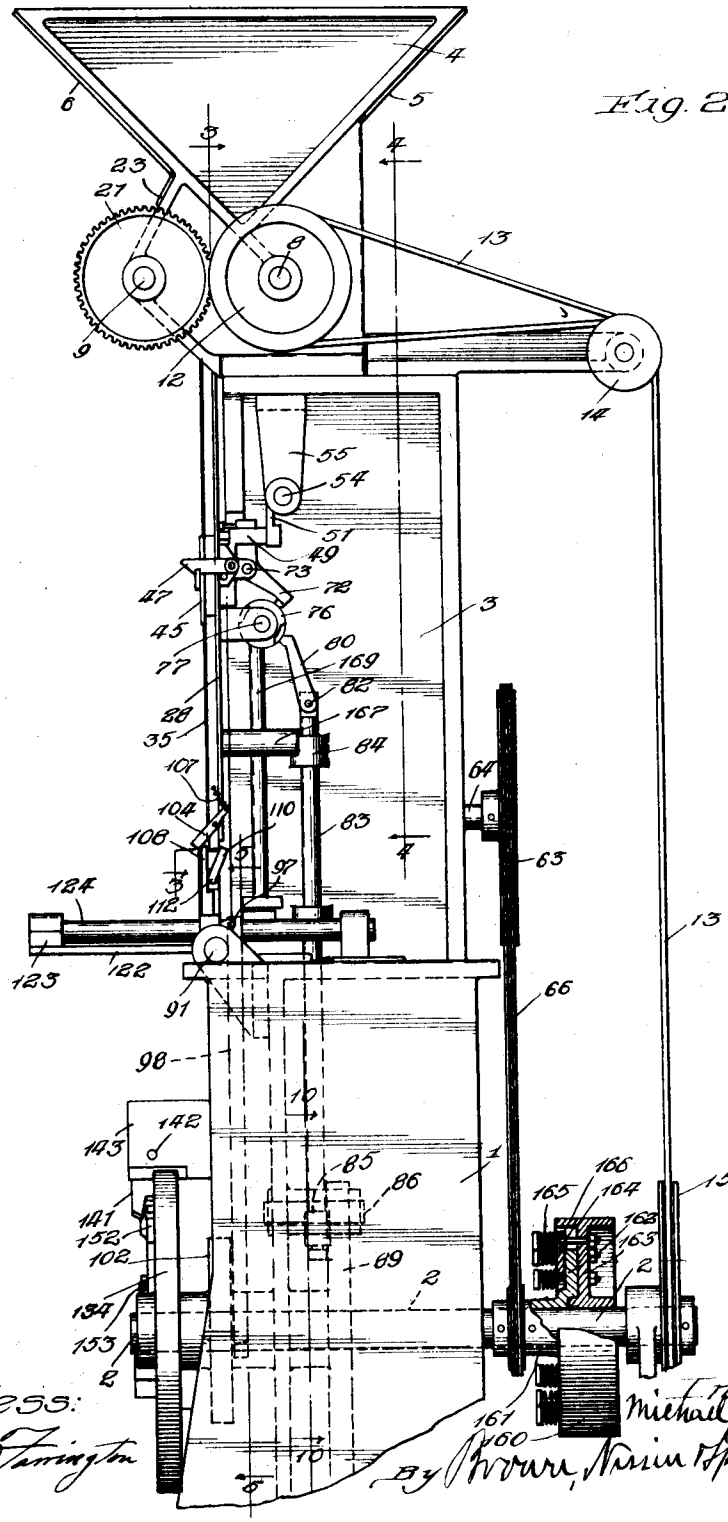
CARTON FILLING MACHINE.

APPLICATION FILED MAR. 15, 1917.

1,384,844. **Patented July 19, 1921.**

8 SHEETS—SHEET 2.

Fig. 2.



M. J. MILMOE.

CARTON FILLING MACHINE.

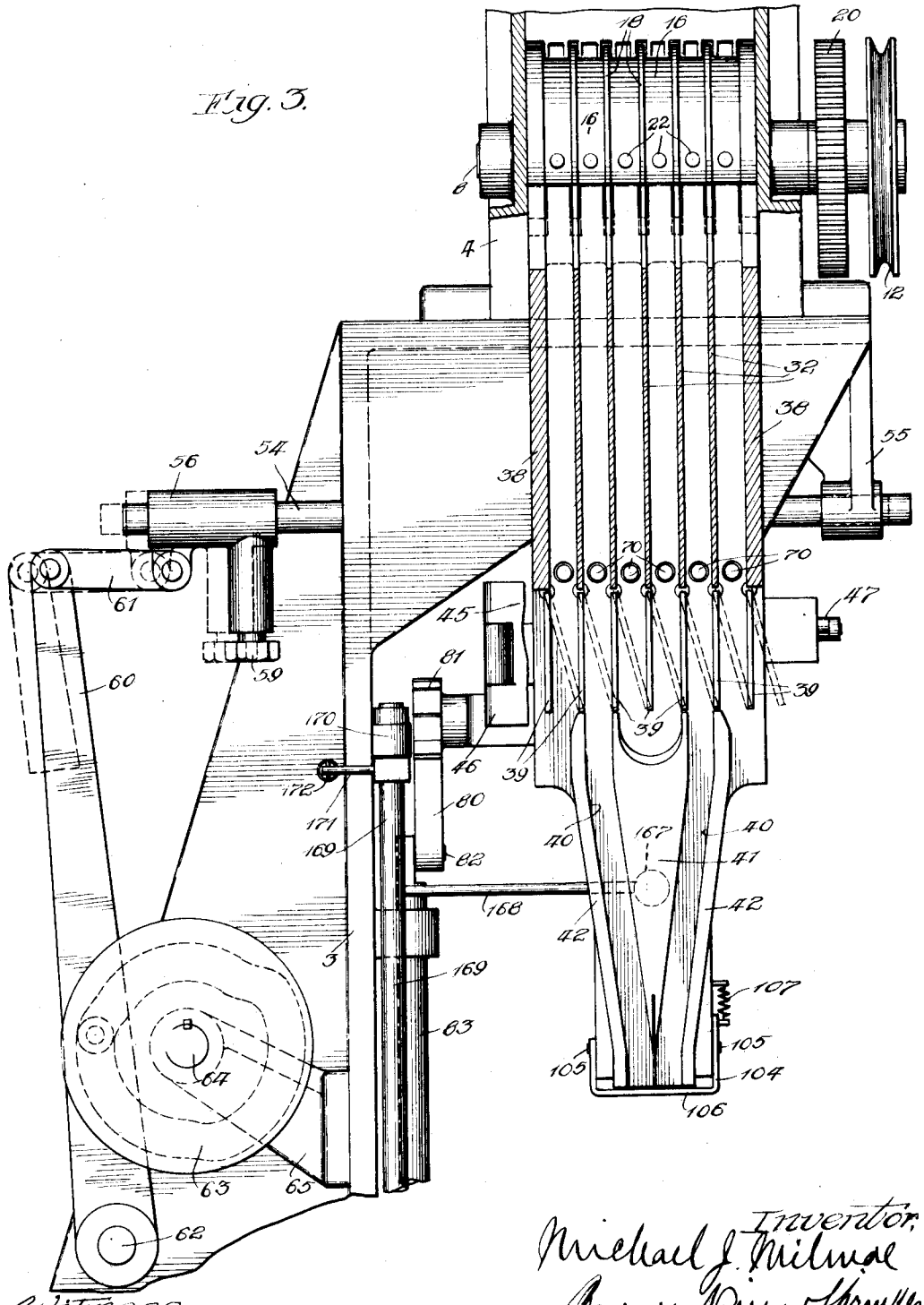
APPLICATION FILED MAR. 15, 1917.

1,384,844.

Patented July 19, 1921.

8 SHEETS—SHEET 3.

Fig. 3.



Witness:
P. L. Farrington

Inventor:
Michael J. Milmoe
By Brown, Brown & Sprinkle
Attys.

M. J. MILMOE.

CARTON FILLING MACHINE.

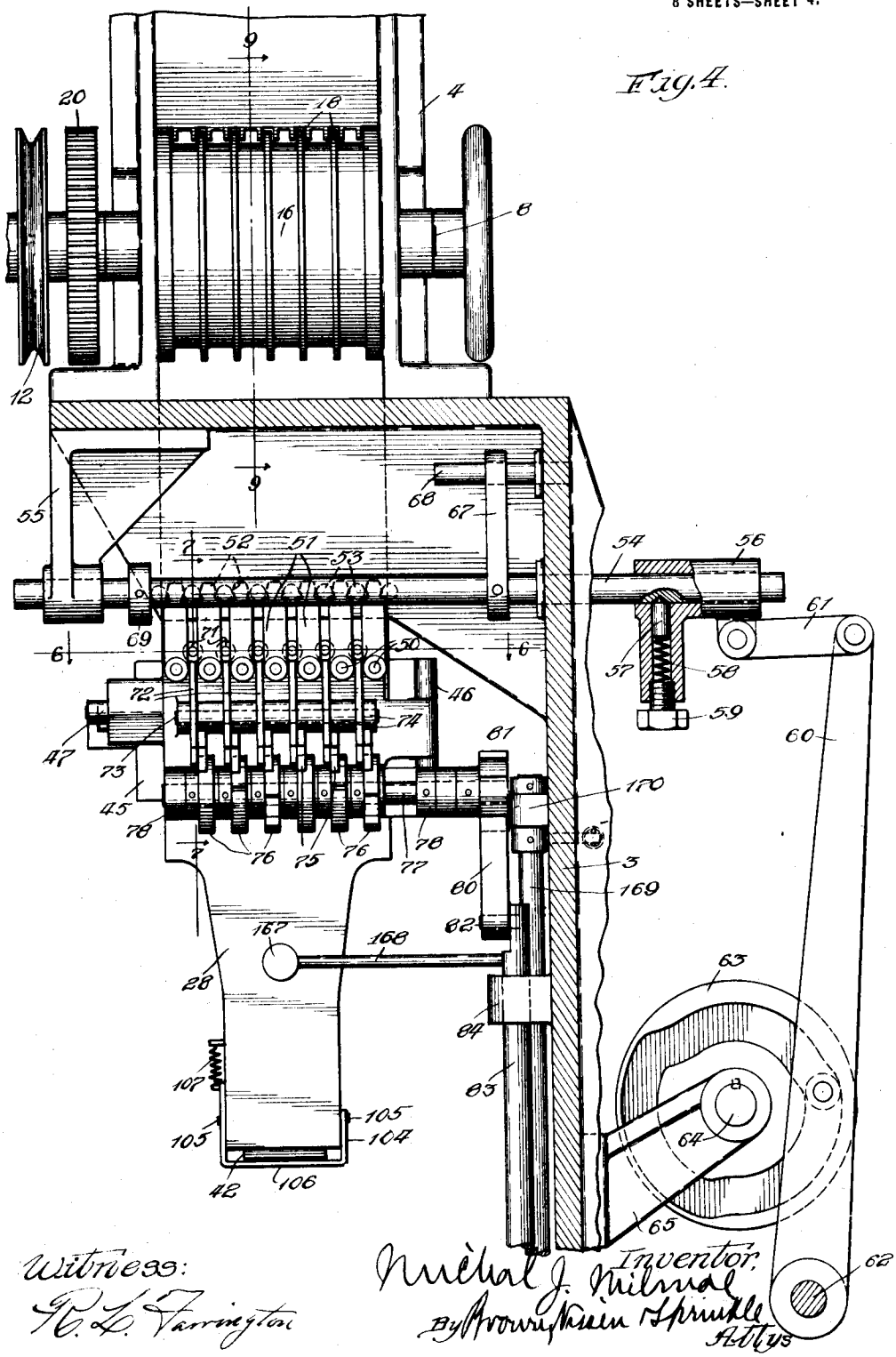
APPLICATION FILED MAR. 15, 1917.

1,384,844.

Patented July 19, 1921.

8 SHEETS—SHEET 4.

Fig. 4.



Witness:

H. L. Farrington

Michael J. Milmoe Inventor.

By Brown, Wilson & Spindle

Attys

M. J. MILMOE.

CARTON FILLING MACHINE.

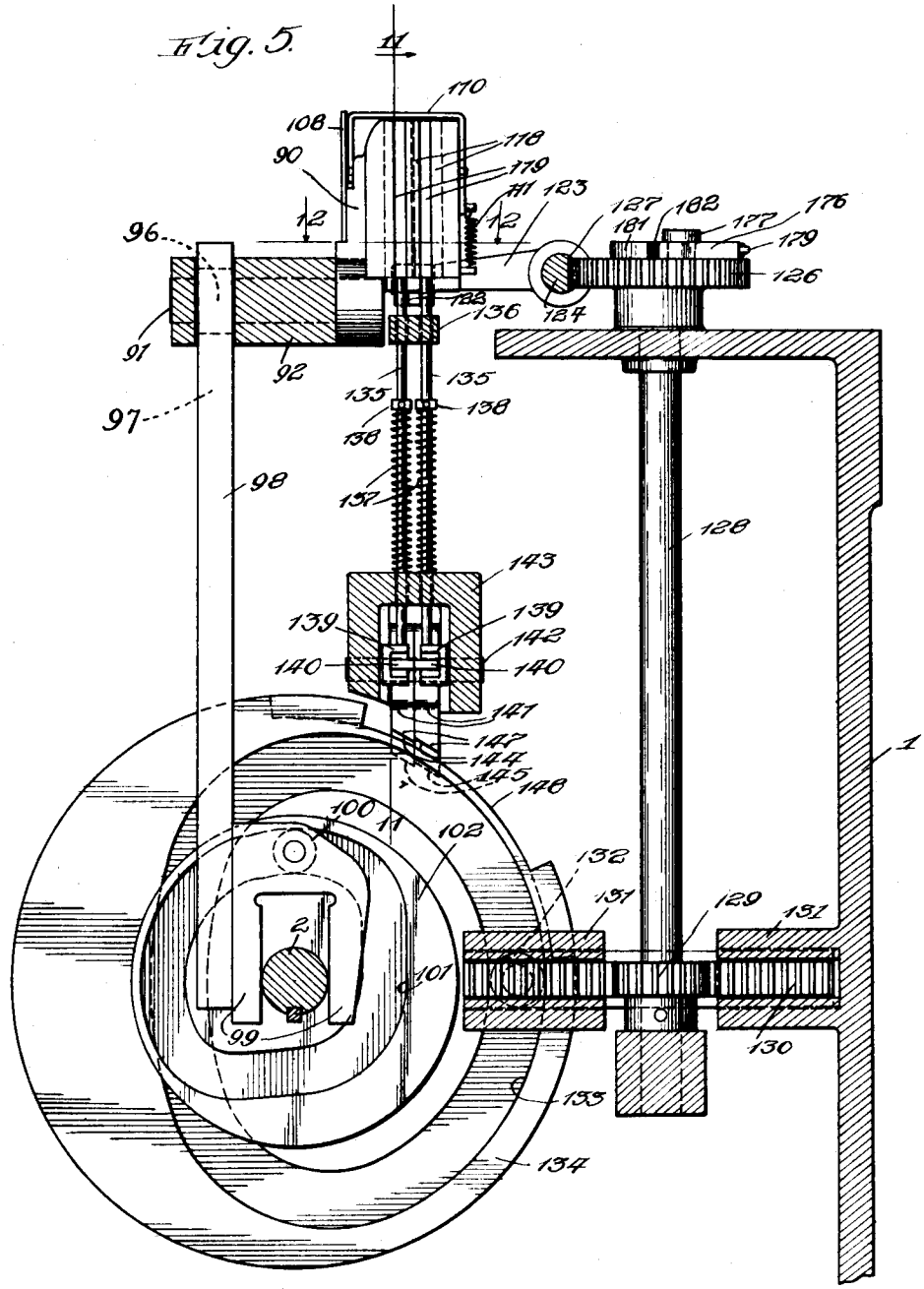
APPLICATION FILED MAR. 15, 1917.

1,384,844.

Patented July 19, 1921.

8 SHEETS—SHEET 5.

Fig. 5.



Witness:
E. L. Farrington

Inventor
Michael J. Milmoe
By Brown, Vilas & Pinckney
Attys.

M. J. MILMOE.

CARTON FILLING MACHINE.

APPLICATION FILED MAR. 15, 1917.

1,384,844.

Patented July 19, 1921.

8 SHEETS—SHEET 6.

Fig. 6.

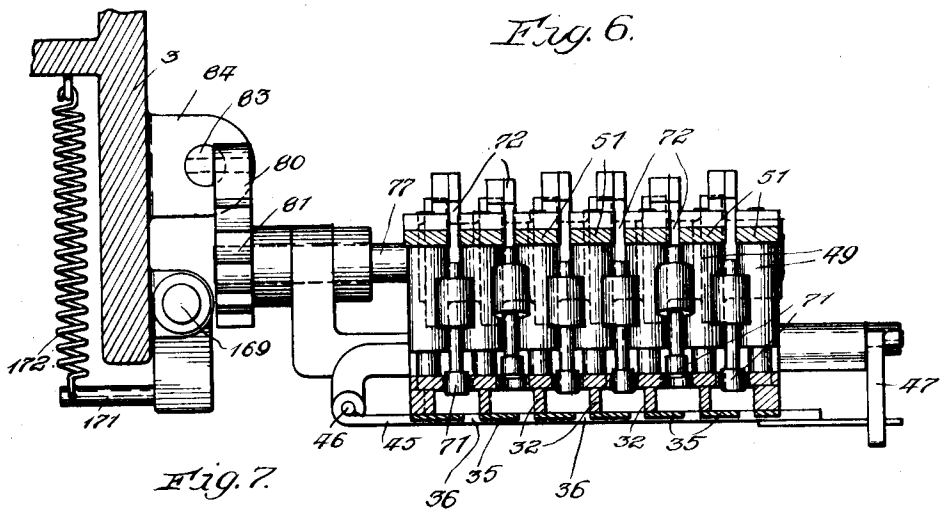


Fig. 7.

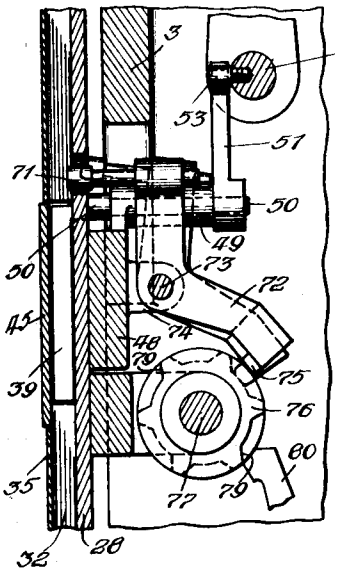
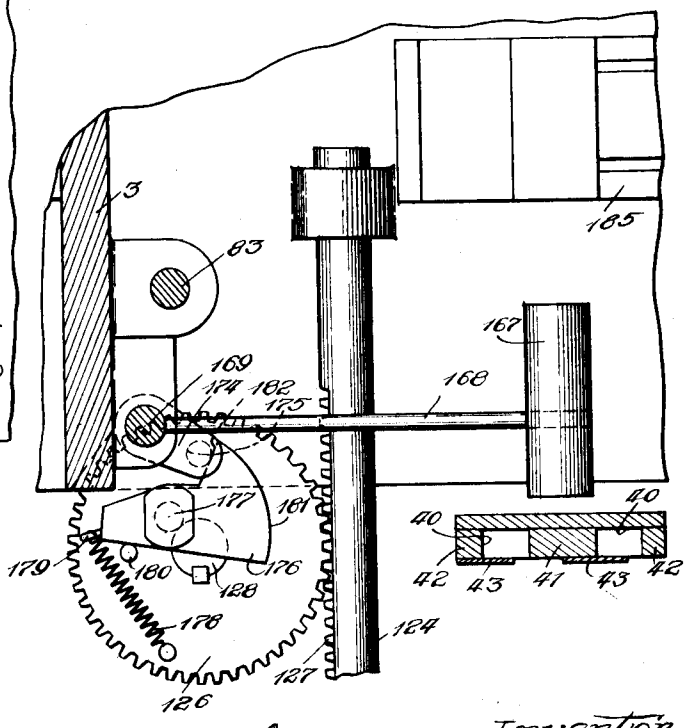


Fig. 8.



Witness:

T. L. Farrington

Inventor

Michael J. Milmoe

By Brown, Wheat & Sprinkle

Attys.

M. J. MILMOE.

CARTON FILLING MACHINE.

APPLICATION FILED MAR. 15, 1917.

1,384,844. **Patented July 19, 1921.**

8 SHEETS—SHEET 7.

Fig. 9.

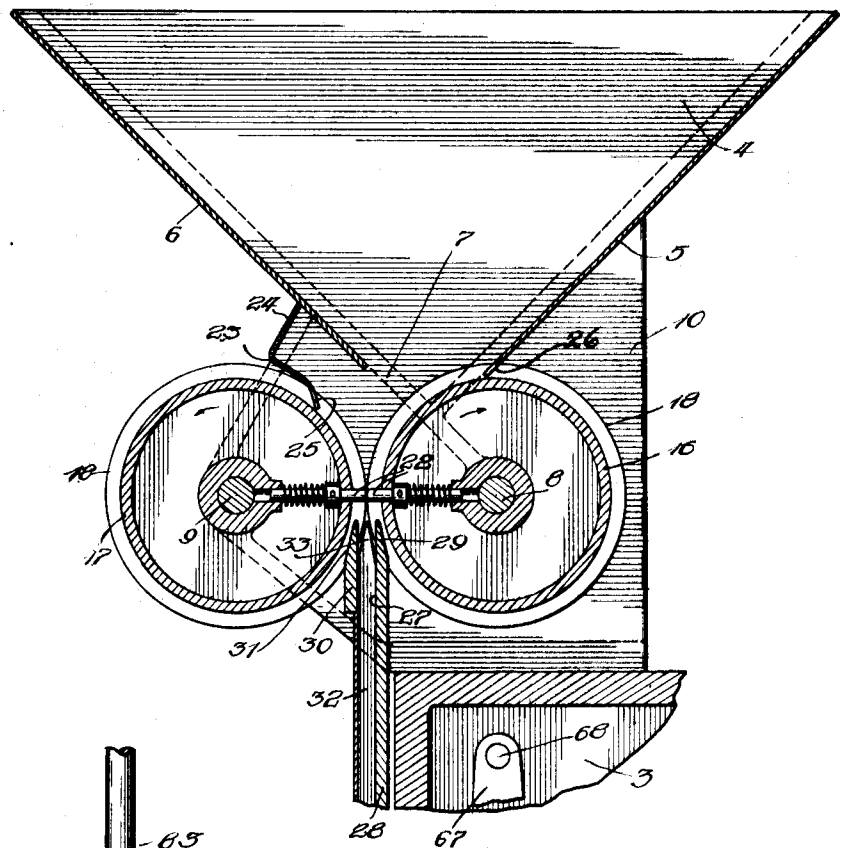


Fig. 10.

Witness:
P. L. Jarrington

Inventor,
Michael J. Milmoe
By Brown, Critchlow & Pritchard
Attys.

M. J. MILMOE.

CARTON FILLING MACHINE.

APPLICATION FILED MAR. 15, 1917.

1,384,844.

Patented July 19, 1921.

8 SHEETS—SHEET 8.

Fig. 11.

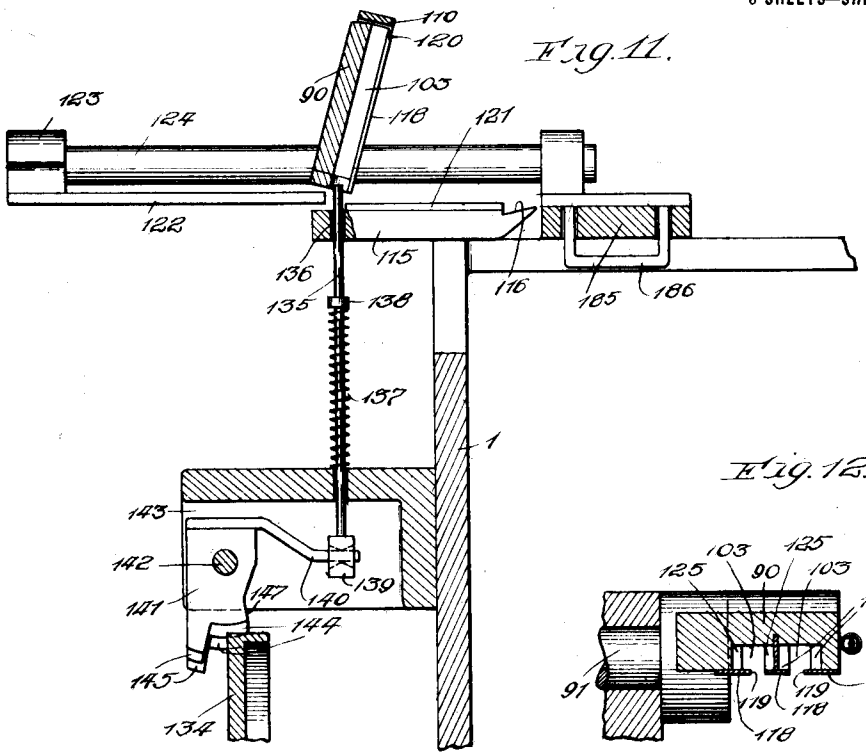


Fig. 12.

Fig. 13.

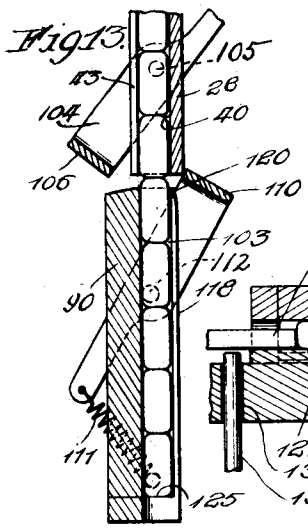
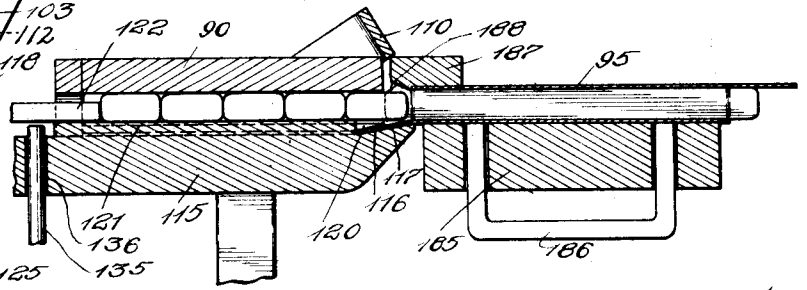


Fig. 14.



Witness:
T. L. Farrington

Inventor
Michael J. Milmoe
By Brown, Risley & Spinks
Attys.

UNITED STATES PATENT OFFICE.

MICHAEL J. MILMOE, OF CHICAGO, ILLINOIS, ASSIGNOR TO F. B. REDINGTON COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CARTON-FILLING MACHINE.

1,384,844. Specification of Letters Patent. Patented July 19, 1921.

Application filed March 15, 1917. Serial No. 154,966.

To all whom it may concern:

Be it known that I, MICHAEL J. MILMOE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carton-Filling Machines, of which the following is a specification.

This invention relates to improvements in machines for supplying various articles to cartons or similar containers, and has for its object the provision of a machine of the class named which shall be of improved construction and more efficient in operation than similar machines previously known.

The invention is exemplified in the combination and arrangement of parts shown in the accompanying drawings, and described in the following specification, and it is more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of a portion of a carton filling and closing machine having one embodiment of the present invention applied thereto, Fig. 2 is an elevation of the machine shown in Fig. 1, looking toward the left in that figure, some parts of the machine being omitted, Fig. 3 is a vertical sectional view on line 3—3 of Fig. 2, Fig. 4 is a vertical sectional view on line 4—4 of Fig. 2, Fig. 5 is a vertical sectional view on line 5—5 of Fig. 2, Fig. 6 is a fragmentary horizontal sectional view on line 6—6 of Fig. 4, Fig. 7 is a fragmentary vertical sectional view on line 7—7 of Fig. 4, Fig. 8 is a fragmentary horizontal sectional view on line 8—8 of Fig. 1, Fig. 9 is a vertical sectional view on line 9—9 of Fig. 4, Fig. 10 is a vertical sectional view on line 10—10 of Fig. 2, Fig. 11 is a fragmentary vertical sectional view on line 11—11 of Fig. 5, Fig. 12 is a horizontal sectional view on line 12—12 of Fig. 5, Figs. 13 and 14 are fragmentary sectional views showing details of the mechanism for separating the articles to be inserted in a carton.

In the figures of the drawings, a portion of the machine for filling and closing cartons made of heavy paper or cardboard is represented, there being shown only a sufficient part of the machine to disclose the present invention together with its relation to the other parts of the machine. The numeral 1 designates a supporting framework in which a main drive shaft 2 is journaled. The framework 1 carries an upwardly projecting standard or pedestal 3 which supports a hopper 4 at the upper portion thereof. The hopper 4, during the operation of the machine, is filled with the articles to be placed within the containers or cartons. The present embodiment of the invention is shown as being arranged for feeding articles in the shape of small briquets or lozenges which is one form in which various confections are supplied to the trade. It will be understood, of course, that the invention could be readily adapted to handle articles of a large variety of sizes and shapes, and that the drawings only exemplify one embodiment of the invention as applied to this particular form of merchandise. The side walls 5 and 6 of the hopper 4 converge downwardly and terminate short of their intersection with one another, forming an opening or mouth 7 through which the briquets may pass freely, as shown best in Fig. 9. A pair of shafts 8 and 9 is journaled in brackets 10 and 11, resting on the upper portion of the pedestal 3 and on which brackets the hopper 4 is supported. The shaft 8, as shown in Figs. 1 and 2, is provided with a roller 12 over which a drive belt 13 passes. The belt 13, as shown in Fig. 2, is guided by idler pulleys 14 and is driven by a pulley 15 secured to the shaft 2. The shafts 8 and 9 carry rollers 16 and 17 respectively, and these rollers are each provided with a series of circular flanges or ribs 18 spaced from one another longitudinally along the surface of the rollers and extending circumferentially around the rollers, as shown in Figs. 1, 3, 4 and 9. The flanges 18 of the two rollers are arranged opposite one another so that the grooves between each pair of flanges on one roller register with the corresponding grooves on the other roller, thus forming a series of openings or passages between the rollers having one dimension determined by the distance the flanges 18 are spaced from one another longitudinally of the rollers, and having the other dimension equal to the combined depths of the registering grooves of the two rollers. These openings form a series of passages or throats through which the briquets in the hopper 4 are fed down-

wardly from the bottom of the hopper. The rollers 16 and 17 are connected to rotate in unison with one another by a pair of spur gears 20 and 21, and are driven to rotate upwardly on their adjacent sides, as indicated by the arrows in Fig. 9. Each roller is provided with a series of spring pressed pins 22, there being one pin for each groove of each roller and the pins of the opposite rollers being located to register with one another once for each rotation of the roller. The grooves in the rollers are so proportioned that the briquets can pass downwardly between them only when arranged in a given relation relative to the grooves. The dimensions should preferably be such that the briquets must pass downwardly end first and with their sides extending in the direction of the axes of the rollers and with the briquets in the adjacent grooves being arranged in edgewise relation to one another, as indicated in Fig. 3. The upper rotary movement of the rollers at the feeding portion of the hopper agitates the articles being fed so that they will arrange themselves in proper position to pass between the rollers and also prevents clogging in the throat of the hopper. The pins 22, which pass upwardly through each feeding throat once for every revolution of the rollers, will remove any substance which may become lodged in any of the various passages. A sheet metal plate 23 is arranged above the outer roller 17 and is provided with a series of fingers 25 one of which extends into each of the grooves in the periphery of the roller and prevents escape of any of the briquets above the upper surface of the outer roller. This plate is provided with a series of openings 24 through which the feeding portion of the hopper may be seen and through which a rod may be inserted for clearing the throat of any obstruction or for any other purpose. The side 5 of the hopper is provided with a series of fingers 26 which extend between the ridges 18 on the roller 16 in a manner similar to the fingers 25 of the roller 17.

The hopper 4 is offset relative to the wheels 16 and 17 so that the mouth 7 of the hopper does not come directly over the opening between the two wheels but is disposed above one of the wheels at one side of a vertical plane between the two wheels. This arrangement prevents the weight of the material in the hopper from pressing directly upon the openings between the rollers through which the briquets are fed. If the entire weight of the material in the hopper rested directly upon the openings between the rollers there would be danger of clogging the grooves and stopping the feeding operation.

Located beneath the openings between the rollers 16 and 17 is a series of passageways or chutes 27, Fig. 9. A plate 28 forms the inner wall of these passageways and extends transversely across the entire series. This plate is provided with a series of beveled projections 29 which extend into the grooves between the flanges 18 on the roller 16. A corresponding plate 30 is provided with projections 31 coöperating with the grooves in the pulley 17. These projections 29 and 31 direct the briquets into the passageways 27 between the plates 28 and 30. The passageways 27 are separated by partitions 32 which have their upper ends pointed as at 33 and registering with the flanges 18 on the rollers 16 and 17. Below the plate 30 each of the partitions 32 carries on its outer edge a retainer strip 35 one lateral edge of which overlaps a short distance the passageway on one side of the partition. The strips 35 do not contact with one another but are spaced apart so as to leave openings 36 through which the briquets may be seen as they slide downwardly along the passageways 27. These openings 36 may be enlarged as indicated at 37, Fig. 1, to permit the removal of a briquet that may become lodged in any of the passageways.

At the lower ends of the partition walls 32 and of the outer side walls 38 of the passageways 27 is located a series of pivoted fingers 39 forming continuations of the partition walls 32 and the side walls 38. These fingers 39 may be swung upon their pivots by mechanism to be described, so that they will direct the downwardly passing briquets from any one of the passages 27 into one or the other of a pair of discharge chutes 40, as shown in Fig. 3. The passageways 40 are formed by a block 41 and side strips 42 secured to the outer face of the plate 28 at the lower end thereof, as shown in Figs. 3 and 9. Cover plates 43 are secured to one of the side strips 42 and to the block 41 and partially overlie the passageways 40. A swinging cover plate or door 45 is hinged at 46 and is provided with a catch 47 by means of which it may be held in position to close the outer sides of the openings between the pivoted fingers 39. This door may be swung open to give access to these fingers whenever required.

In the embodiment of the invention shown in the drawings, six of these passages 27 are provided which therefore require seven of the pivoted fingers 39 to form continuations of these passages. In the position of the fingers shown in full lines in Fig. 3, the passages 40 are each connected with the passage 27 directly above the upper end thereof. When the fingers 39 are swung into the position indicated by broken lines in Fig. 3, each of the passages 40 is connected with the chute 27 at the left of the one directly above the particular passage 40. The fingers 39 may also be swung to a third

position by which the passages 40 may be connected with the chutes 27 at the right of the ones directly above the passages. During the operation of the machine each of the passages 40 is successively connected with three of the chutes 27. The object of this arrangement is to insure a constant supply of briquets to the passages 40 even though one or more of the chutes 27 should become clogged during the operation of the machine. It will be noted that the passages between the fingers 39 not connected with the passages 40, are open at their lower ends so that any briquet which may have failed to enter the passage 40 will be free to fall from between the fingers before the passage is again brought into registration with the passage 40.

As shown in Fig. 7, a bar 48 is located in the rear of plate 28 opposite the fingers 39 and this bar carries a series of bearings 49 in which rods or shafts 50 are journaled, there being one shaft 50 for each of the fingers 39, the shafts forming the pivotal supports for the fingers. The fingers are secured to the forward ends of the shafts 50 and have their upper ends terminating on a line with the axes of the shafts, as shown in Fig. 7, so that the fingers 39 will swing about their upper ends as a center whenever the shafts 50 are oscillated. Each shaft 50 is provided with an upwardly extending arm 51 (see also Fig. 4) which has a contact portion 52 extending between plugs 53 secured to a rod 54. It will be evident that longitudinal movement of the rod 54 will produce the oscillation of the fingers 39 previously referred to. The rod 54 is mounted to slide in a bracket 55 and in the portion 3 of the framework of the machine and is provided with a sleeve 56 which is held in place on the rod 54 by means of a spring pressed plug 57 having a conical point which bears in a conical depression in the rod. The tension of the spring 58 upon the plug 57 may be regulated by a screw 59. The sleeve 56 is connected to a rocker arm 60 by means of a link 61 and the rocker arm 60 is provided with a pivotal support 62 and is oscillated about its support by a cam 63 secured to a shaft 64 journaled in bearings in a bracket 65 supported by the frame 3. The cam 63, as shown in Fig. 1, is driven by a sprocket chain 66 connecting it with the main drive shaft 2. The cam is shaped to oscillate the fingers 39 in proper timed relation with the other parts of the mechanism as will be later described.

The rod 54 is provided with an upwardly extending arm 67 which is rigidly connected with the rod and which slides upon a pin 68 secured to the frame 3. This prevents rotation of the rod 54 upon its axis. A collar 69 is secured to the rod 54 to limit movement of the rod to the left, as shown in Fig. 4, and the arm 67 will likewise limit the movement of the rod in the opposite direction. If at any time during the operation of the machine it should happen that the fingers 39 should become stuck and refuse to oscillate for any reason, the parts of the mechanism will not be broken, but instead the spring pressed plug 57 will be forced from contact with its depression in the rod 54 and the sleeve 56 will slide longitudinally upon the rod. Since the longitudinal movement of the rod 54 is limited, the next stroke of the sleeve 56 will bring the plug 57 again into registration with its seat, and if the obstruction has become removed, normal operation of the rod will be resumed. If, however, the fingers 39 remain stuck, the sleeve 56 will continue to slide along the rod as long as the fingers 39 refuse to oscillate.

Since the chutes 27 are connected with the discharge passages 40, only a portion of the time, it is apparent that these chutes perform the function of magazines for supplying articles to the passages 40 and provision must therefore be made for retaining the briquets within these magazines during the periods of operation in which they are not connected with the discharge passages. For this purpose a series of openings 70 is provided in the plate 28 just above the upper ends of the pivot fingers 39. Each of these openings is provided with a plunger 71 which may be projected through the opening into contact with the rear face of the briquet positioned adjacent the opening. Each plunger 71 is carried at the upper end of a bell crank 72, the bell cranks all being mounted on a pivot pin 73 carried by lugs 74 projecting from the face of the bar 48. Each of the bell cranks 72 is provided with a contact member 75 which bears upon the surface of a cam 76. The cams 76 are all rigidly mounted on a common cam shaft 77 journaled in bearings 78 projecting from a bar secured to the inner surface of the plate 28. Each cam 76 is provided with a pair of oppositely arranged depressions 79 into which the contact point 75 of the corresponding bell crank 72 drops when the cam is located into position to cause either of the depressions 79 to register with the contact point. It will be apparent that whenever this occurs this corresponding plunger 71 will be withdrawn from contact with the briquets in its particular magazine and the briquets in that magazine will be permitted to slide downwardly between the fingers 39 corresponding thereto. The parts are so timed that this will occur only when the pivoted fingers connect the particular magazine in question with one of the discharge passages 40. At other times, the contact point 75 rides upon the outer periphery of the cam 76 causing the end of the plunger 71 to bear against the briquets and preventing

movement thereof within the magazine. The various cams 76 have their depressions 79 offset angularly relatively to one another progressively along the shaft 77. By this arrangement the briquets within the various magazines 27 are progressively released as these magazines are progressively brought into communication with the discharge passages 40 by the swinging of the fingers 39.

The shaft 77 and the cams 76 are rotated by a pawl 80 which coöperates with a ratchet wheel 81 (see also Fig. 4) and which is pivoted at 82 to the upper end of a rod 83 slidably mounted in a lug 84 projecting from the frame 3. The rod 83 is reciprocated longitudinally by means of an oscillating arm 85, Fig. 10, pivoted to the frame at 86 and provided with a cam roller 87 which coöperates with a cam groove 88 in a cam 89. The cam 89 is rigidly secured to the main drive shaft 2. The cam groove 88 is so arranged that the pawl 80 is operated once upon each movement of the fingers 39 and each operation of the pawl 80 releases two of the plungers 71 from contact with the briquets in their corresponding magazines, the magazines thus free being the ones connected with the discharge apertures. The timing is such that the briquets in the magazines are not released until the movement of the fingers is completed and the plungers 71 are brought back into contact with the briquets before a second movement of the fingers is begun. In this way all of the plungers are in engagement with the briquets of their respective magazines during the swinging operation of the fingers.

The embodiment of the invention shown in the drawings is arranged to separate a predetermined number of briquets from those which are fed downwardly from the hopper and to insert the briquets thus separated into a carton. The arrangement shown will separate five briquets from each series discharged from the passageways 40 and the two sets of five thus separated are inserted edge to edge with one another in the carton. The mechanism for separating the requisite number of briquets and for placing them in position to be inserted in the carton includes a conveyer or chute section 90, Figs. 1, 11 and 12, which is supported by a shaft 91 journaled in a bearing 92 carried by the frame of the machine. This chute section may be moved into an upright position as shown in Fig. 13, and in this position its upper end registers with the lower end of the discharge slideways 40. The section has another stationary position in which it is rotated in a clockwise direction from that shown in Fig. 13 to that shown in Fig. 11, the amount of rotation being sufficient to bring the upper end of the chute section out from beneath the lower end of the discharge slideways 40. A third position is that shown in Fig. 14. The carton to be filled is shown at 95 with its opening in alinement with the opening in the conveyer section 90. The conveyer section is rotated about its axis 91 by means of a pinion 96 secured to the shaft 91 and meshing with a rack 97 formed on an upright bar 98, as shown best in Fig. 5. The lower end of the bar 98 is provided with bifurcations 99 which straddle the shaft 2 and guide the lower end of the bar. A cam roller 100 is secured to the lower end of the bar 98 and coöperates with a cam groove 101 formed in a cam wheel 102 secured to the shaft 2. It will be apparent that rotation of the shaft 2 will cause longitudinal movement of the bar 98, the nature of the movement depending upon the shape of the cam groove 101. This groove is so shaped that the conveyer section 90 is moved into position to register with the discharge slideways 40 after the plungers 71 have released the briquets within the magazines connected with these slideways to replenish the supply of briquets within the slideways and have again come into operative position to hold the briquets in the magazine section from movement. During this time the columns of briquets within the slideways 40 will move downwardly a sufficient amount to fill the two openings 103 of the conveyer section 90 and free the passages between the pivoted fingers 39. The conveyer section 90 is then rotated a short distance in a clockwise direction into the position shown in Fig. 11, in which position a test is made, by mechanism to be described, to ascertain whether or not the proper number of briquets have been supplied to the conveyer section. After this test has been completed the conveyer section is then further rotated by the cam groove 101 into the lower position shown in Fig. 13. The conveyer section remains stationary in this position sufficiently long for the briquets to be discharged therefrom into the carton 95, as will be described. After this is done, the conveyer section is returned to its original position and the operation repeated. To prevent discharge of the briquets from the lower end of the slideways 40, during the time that the conveyer section 90 is removed therefrom, a stirrup 104 is pivoted at 105 to the lower end of the slideways and is provided with a cross bar 106 which normally swings across the mouth of the discharge slideways. A spring 107 normally holds this stirrup in position to close the mouth of the slideways 40. When the conveyer section 90 is swung into its upright position, the stirrup 104 is moved from beneath the mouth of the discharge chutes by a finger 108 which contacts with the stirrup as the conveyer section 90 is moved upwardly and pushes the stirrup from beneath

the mouth of the discharge chutes. A stirrup 110, similar to stirrup 104, closes the opening in the upper end of the conveyer section 90 and is held in place over these openings by a spring 111. The stirrup is pivoted at 112 and is capable of swinging to either side of the mouth of the conveyer section but is normally drawn centrally to close the opening by the spring 111. When the conveyer section is swung into its uppermost position to register with the discharge chutes 40, the stirrup 110 will strike the inner edge of the discharge chute, as shown in Figs. 2 and 13, and thus move the stirrup away from its closing position. It will thus be seen that in this position both of the stirrups 104 and 110 are removed from their closed positions and the briquets are free to travel downwardly into the conveyer section 90. The section 90 is of sufficient length so that the desired number of briquets will fill the section leaving the uppermost briquet protruding a sufficient distance to hold the lowermost briquet of the slideway 40 from extending below the mouth of the slideway. As the conveyer section 90 rotates to the right, the stirrup 104 will swing inwardly at a more rapid rate than that of the upper end of the movable conveyer section because of the fact that the finger 108 contacts with the edge of the stirrup 104 above the lower end thereof, and because of the comparatively short pivotal length of the stirrup 104. This will cause the closed portion 106 of the stirrup 104 to follow closely the projecting portion of the uppermost briquet and will close in beneath the lowermost briquet in the slideway 40. When the conveyer section has moved into the position shown in Fig. 11 the stirrup 104 will be in position beneath the discharge end of the slideway 40 and the stirrup 110 will close the upper end of the conveyer section 90 and contact with the protruding portion of the uppermost briquets within this section.

As shown in Figs. 11 and 14, a horizontal block 115 is secured to the frame 1 of the machine and extends from a position beneath the lower end of the conveyer section 90 to a position adjacent the receiving end of the carton 95. The block 115 has a notch 116 at the end thereof adjacent the carton to be filled for the purpose of receiving the closing flap 117 of the carton. As shown in Fig. 12, the openings 103 in the conveyer section 90 are closed on their inner faces by plates 118, which plates are spaced from one another to leave openings 119 through which a portion of the briquets are exposed. The plates 118 are beveled at their upper ends as shown at 120, and these beveled portions bear upon the upper surface of the flaps 117 of the cartons to be filled when the conveyer section 90 is moved into its lowermost position, as is shown in Fig. 14. In this way the flaps 117 are clamped in the notches 116 and thus the cartons are held in place against displacement during the filling operation. The openings 103 are somewhat larger laterally than the thickness of the briquets, thus insuring easy entrance of the briquets into the openings when the conveyer section is in its upright position. In order that the briquets may be accurately guided into the cartons, however, the plate 115 is provided with a pair of upwardly projecting ridges 121 of sufficient width to enter the openings 119 between the cover plates 118, as shown in Fig. 14, and thus substantially diminish the width of the openings 103 in the conveyer section when the conveyer section is in the position shown in that figure. In this way the briquets are accurately alined before they are pushed into the carton.

The transfer of the briquets from the conveyer section 90 into the carton 95 is accomplished by means of a pair of plungers 122 secured to a head 123 carried at the end of a reciprocating bar 124. The plungers 122 are arranged in alinement with the openings 103 in the conveyer section 90 when this conveyer is in its lowermost position and movement of the bar 124 brings the forward ends of the plungers 122 into contact with the briquets within the conveyer section. As the plungers move forwardly, they force the briquets before them into the carton. As will be seen in Fig. 12, the lower ends of the openings 103 are provided with projecting ledges 125 for supporting the briquets when the conveyer section is in its upright position but these ledges are spaced sufficiently apart to permit the passage of the plungers 122 therethrough. The bar 124 is operated by a gear 126 which meshes with rack teeth 127 on the bar, as shown in Figs. 5 and 8. The gear 126 is secured to the upper end of a shaft 128 which is journaled in a frame 1 and is provided with a pinion 129 at its lower end. The pinion 129 meshes with a rack 130 mounted to slide in guides 131 secured to the frame and provided with a cam roller 132 at one end thereof which roller meshes with a cam groove 133 formed in a cam wheel 134 secured to the main drive shaft 2. By this mechanism a reciprocatory movement is imparted to the plungers 122 controlled by the shape of the cam groove 133, and which is so timed that the plungers 122 are moved forwardly a sufficient distance to force the briquets from the conveyer section 90 into the carton 95 while the conveyer section is held in its lowermost position by the action of the cam groove 101.

It is very important in a device of this kind that every carton, which is placed upon the market, shall be completely filled and that no cartons shall go out that are short

one or more pieces. In order to be absolutely certain that every carton is completely filled, mechanism is provided for detecting any shortage within the conveyer section 90 just prior to the filling of each carton from this section. This mechanism is shown best in Figs. 5 and 11, and comprises a pair of testing rods 135 loosely guided in openings 136 in the outer end of the block 115. These rods 135 and openings 136 are in position to be in alinement with the lower ends of the openings 103 of the conveyer section 90 when this section is in its upright position. Coiled springs 137 bear against collars 138 on the rods 135 and normally tend to force the rods upwardly into the passages 103 in the conveyer section 90. The lower ends of the rods 135 are attached to heads 139 (see also Fig. 5) which are supported by arms 140 secured to detent plates or blocks 141 which are pivotally mounted on a shaft 142 carried by a bracket 143 secured to the frame 1. The detent blocks 141 together with their respective arms 140 each forms what is in effect a bell crank and the blocks 141 are each provided with two beveled portions 144 and 145 offset from one another. The lower ends of the blocks 141 extend to a position adjacent the cam 134 and the shoulder portions 147 of the detent blocks just above the beveled portions 144 normally bear against the outer lateral face of the cam 134 near the periphery thereof. The cam wheel 134 is cut away, however, as shown at 148, Fig. 5, so that when the cut away portion of the cam comes opposite the shoulders 147, the detent blocks 141 are rocked inwardly due to the tension of the springs 137 on the rods 135. The extremities of the cut away portion 148 of the cam 134 are beveled as shown at 149, Fig. 1, so that further rotation of the cam wheel will bring the shoulders 147 into contact with the beveled portions 149 and force the detent blocks 141 to the left as viewed in Fig. 11, thus returning the blocks to their normal position. In this normal position, the upper ends of the rods 135 are just below the lower portions of the openings 103 in the conveyer section 90. When the detent blocks 141 swing inwardly into the opening 148 the rods 135 are thrust upwardly into the passages 103 in the conveyer section unless they are prevented from doing so by the presence of the briquets within the conveyer sections. If the conveyer sections are properly filled with the requisite number of briquets, the ends of the rods 135 will impinge upon the lowermost briquet and will thus be prevented from entering the passages 103 since this operation is timed to take place during the period that the conveyer section 90 is in the position shown in Fig. 11 and while the stirrup 110 is in position to close the upper end of the passages 103 and prevent upward movement of the column of briquets within the passage.

Mechanism is provided for stopping the movement of the machine when either of the rods 135 is permitted to enter the opening 103 because of the absence of the complete quota of briquets within the opening. This mechanism will be best understood from Fig. 1, in conjunction with Figs. 5 and 11. A stop member 150 is pivoted at 151 to a bracket 152 on the outer face of the cam 134. This stop member 150 is pressed outwardly by a spring 153 and the amount of such movement is limited by a stop member 154. The member 150 is provided with a friction surface 155 arranged to bear against the beveled portions 145 of the detents 141 when these beveled portions are swung inwardly by upward movement of the rods 135. The cam member 134 rotates in a clockwise direction as viewed in Fig. 1, and the friction surface 155 is provided with a beveled portion 156 at the end thereof which contacts first with the detents 141 so that the stop 150 is pressed inwardly against the tension of the spring 153 to permit the beveled surfaces 145 of the detents 141 to ride upon the friction surface 155 of the stop member 150. The bevel 156 is sufficiently abrupt to offer considerable resistance to the movement of the operative parts, tending to bring them to a stop, and this tendency is augmented by the friction between the surface 155 and the beveled surfaces 145. The end of the stop member 150 is provided with a catch 157 which brings the movement of the cam 134 to a positive stop when this catch is brought into contact with either of the detents 141.

In order that the operation of the machine may be brought to a stop by the mechanism just described, it is necessary to provide means for disconnecting the driving power when the stop mechanism operates, or for permitting slip in the driving mechanism. Any well known means may be employed for accomplishing this purpose, the one shown in Fig. 2 of the drawings being a spring friction drive which will permit slippage when the driven mechanism is positively held from movement. This driving mechanism includes a pulley 160 rotatably mounted on the shaft 2 adjacent the collar 161 rigidly secured to the shaft. The collar 161 carries a flange 162 which bears against the web 163 of the wheel 160 and which has its outer surface in contact with a flat ring 164 which is drawn inwardly against the flange 163 by a series of springs 165 held to the web 163 by bolts 166. Normally the friction between the flange 162 and the members 163 and 164 is sufficient to transmit the driving power from the pulley 160 to the shaft 2. When a positive stop is

brought to bear upon the shaft 2 by means of the stop mechanism carried by the cam 134, the drive pulley 160 may continue to rotate although the collar 161 and drive shaft 2 are held stationary because of the slippage between the drive pulley and the flange 163. The mechanism is shielded from too sudden a stop by the action of the surfaces 156 and 155 which cause the mechanism gradually to slow down before it is brought to a complete stop by the catch 157.

It will be understood that at each time the conveyer section 90 is filled and while the section is held stationary in its inclined position, as shown in Fig. 11, that the cut-away portion 148 will come opposite the detents 141 and the detents will thus be free to swing inwardly and to permit the springs 137 to force the rods 135 upwardly into the openings 103. If the openings are properly filled with the requisite number of briquets, this upward movement will only be of sufficient amount to bring the upper ends of the rods into contact with the lowermost briquet within the conveyer section and this is not a sufficient movement to bring the surfaces 145 opposite the stop 150. This will be the normal operation of the machine, and when this occurs the cam 134 will not be interfered with by the detents 141, but the operation of the machine will continue uninterrupted. If, however, either of the openings 103 is not completely filled with the requisite number of briquets, the rod 135 corresponding to such opening will move upwardly and the entire operation of the machine will be brought to a standstill until the deficiency is supplied. To do this, the attendant may swing the stirrup 110 to one side sufficiently to expose the opening in the upper end of the conveyer section 90 and insert a sufficient number of briquets into the conveyer section to force the rods 135 back into their normal position after which the machine may be restarted and the operation continued as before.

To insure the proper downward movement of the briquets within their guiding passages, mechanism is provided for delivering a blow upon the rear of the plate 28 to jar any of the briquets loose that may have adhered in any way to the walls of the passages. This mechanism is shown in Figs. 1, 3 and 8, and comprises a hammer 167 positioned in the rear of the plate 28 and having its striking surface spaced slightly from the rear of the plate, as shown in Fig. 8. The hammer is carried by a bar 168 which extends horizontally from an upright shaft 169. The shaft 169 is journaled at its upper end in a bracket 170 and is provided with an arm 171 rigidly secured to the shaft and to the end of which a tension spring 172 is attached. The spring 172 normally tends to swing the hammer 167 inwardly to strike the plate 28. The lower end of the shaft 169 is journaled in a bracket 173 secured to the upright 3 slightly above the upper face of the gear 126, as shown in Figs. 1 and 8. The lower end of the shaft 169 carries a rocker arm 174 provided with a downwardly extending lug 175. The upper surface of the gear 126 has a plate 176 pivoted eccentrically thereon at 177. A coiled spring 178 is attached to the plate at 179 and normally draws the portion at the left of the pivot, in Fig. 8, against a stop pin 180. The portion of the plate 176 at the side of the pivot opposite the spring 178 is provided with an arcuate periphery 181 and a shoulder 182 which bears against the lug 175 on the arm 174. As has been previously stated the gear 126 has an oscillating rotary movement and is shown near the extremity of its movement in a clockwise direction in Fig. 8. Upon the return rotation of the gear the shoulder 182 engages the lug 175 and the spring 178 is extended until the shoulder 182 slides off the lug 175 at which time the spring 178 rotates the plate 176 about the pivot 177 to bring the arcuate portion 181 of the periphery of the plate into position to bear against the lug 175. During the return movement of the gear 126, the periphery 181 acts as a cam to force the lug 175 and the shaft 169 to rotate in a counter-clockwise direction due to the fact that the periphery 181 is eccentric relative to the axis of the gear 126. When the gear finally returns to the position shown in Fig. 8, the lug 175 suddenly slips from the surface 181 over the shoulder 182 and the shaft 169 is left free to rotate under the influence of spring 172, and thus cause the hammer 167 to deliver a blow upon the rear surface of the plate 28. The resiliency of the rod 168 which supports the hammer head 167 permits the momentum of the hammer head to carry it past its limiting position to strike the plate and as soon as the blow is struck, the supporting rod 168 springs the head away from the plate so that the effect of the blow upon the plate is not deadened by contact of the plate with the hammer head.

Any well known or approved form of mechanism may be employed for bringing the cartons into position to receive the articles with which they are filled and for closing the cartons after the articles have been inserted. Such mechanism is described in my prior Patent No. 1,177,719, issued August 4, 1916. In Fig. 14 is shown the supporting plate for the carton during the filling operation which is designated by the numeral 185 and a part of the transporting mechanism is shown at 186. 187 designates a stop for holding the carton in place during the filling operation and where the mechanism, described in the prior patent referred to, is used for moving a carton into

filling position, this stop is brought down upon the upper surface of the carton after the carton has been placed in position to be filled. The stop may, however, be fixedly attached to the framework of the machine and the cartons opened and inserted by hand into position to be filled. The forward end of the stop is so located that the stirrup 110 is intercepted by the stop as the conveyer section 90 moves downwardly and is thus moved away from over the opening in the conveyer section so that the briquets are free to move into the carton when pushed forwardly by the plunger 122. The stop 187 may be beveled as at 188 to assist in guiding the briquets into the carton 95. The mechanism for folding over the carton flaps and tucking them in is fully described in the prior patent referred to and is only sufficiently shown at 189 in Fig. 1 to show its relation to the other parts of the machine.

The operation of the various parts of the machine has been described in connection with the description of the parts themselves and it is believed that further detailed description of the operation is not necessary. It may be said, however, that the articles to be inserted in the cartons feed by gravity from the hopper 4 through the plurality of passages formed by the recesses between the flanges 18 on the rollers 16 and 17. The rotation of the rollers in opposition to the downward movement of the feeding articles is very efficient in preventing more than one article at a time from attempting to pass through the throat of the hopper. There is no forcing of the articles downwardly and it therefore follows that the articles will not feed, until they are positioned properly to pass through freely. The rotation of the rollers 16 and 17 also agitates the articles at the throat of the hopper sufficiently to cause them to arrange themselves for passage downwardly. The spring pressed plungers 22 pass through the feeding openings once for every revolution of the rollers and thus clear the openings of any obstruction that may have become caught therein. A surplus of feed openings is provided so that it is not necessary that the articles be continuously and uninterruptedly fed through any one of the openings and so that one or more could become entirely inactive and yet there would be no interruption of the continuous feeding of the articles into the carton filling mechanism. From the hopper the briquets pass downwardly into the magazine chutes 27 which chutes are preferably of sufficient length to hold more than enough briquets to furnish one charge for one of the openings in the conveyer section 90, that is half of the number of briquets placed in each carton. The embodiment shown in the drawings is arranged to supply each carton with two rows of fire briquets each. The articles in the magazine chutes 27 are normally held from moving downwardly by the plungers 71 which bear against the inner face of the lowermost article in each chute. The swinging fingers 39 at the lower ends of the magazine chutes form in a sense a set of selective switches. The discharge chute sections 40 are each successively connected with the three magazine sections corresponding thereto by the swinging of the fingers 39 and immediately after connection is made the plungers 71 in the magazine sections thus connected are released. When the plungers 71 are thus released a continuous passageway is established from the mouth of the hopper to the bottom of each discharge section 40 and the passageways thus arranged are filled with briquets, as shown in Fig. 3 of the drawings. While the fingers 39 remain in this position the plungers 71 are again brought to bear against the lowermost article in each magazine section and immediately thereafter the conveyer section 90 is brought into position to register with the lower end of the discharge chutes 40. The briquets in the discharge chutes are now free to slide into the conveyer section 90 and this operation is assisted by the tapping of the hammer 167 upon the rear of the plate 28. The downward movement of the briquets will free the passages between the fingers 39, thus leaving the fingers free to oscillate into a new position at the next operation. If it should happen during any operation that any magazine section is clogged, or that the briquets stick between the fingers 39, there will always be a sufficient number of briquets within the discharge section 40 to supply the five requisite articles for the conveyer section 90 and the deficiency will be supplied from the next magazine section to be connected with the discharge section. In this way it may be possible to have two of the magazine sections, which supply any one discharge section, or two of the passages between the fingers 39, clogged at the same time without interrupting the filling of the conveyer section 90 from that particular discharge chute since each discharge chute is made of sufficient length to hold three charges for the conveyer section 90 and it is therefore only necessary to fill this discharge section from the one magazine section remaining in commission at every third operation of the machine. This abundance of precaution is provided because of the very great importance of preventing the failure of the machine to fill each carton presented. It should also be noted that after each operation of the fingers 39, the passages between any two fingers previously connected with the discharge chute section 40 is brought into position to discharge freely from the lower end away from the passageway thus giving an

opportunity for the openings between the fingers to clear themselves of any obstruction which may have become lodged therein.

After the pivoted conveyer section 90 is thus filled it is rotated in a clockwise direction, as viewed in Fig. 11, a sufficient distance to bring it out of registration with the lower end of the discharge chutes and to permit the closing of the stirrups 104 and 110. While the chute section is in this position the cut-away portion 148 of the cam 134 is brought opposite the detent plates 141 and the rods 135 are forced upwardly by their springs 137 to ascertain whether or not the conveyer section has been filled with the requisite number of articles. If it has been so filled the operation of the machine is not interrupted but the conveyer section 90 is rotated into position to bring the passages 103 into alinement with the carton and the briquets are forced from the conveyer section into the carton by the plungers 122. If either of the openings 103 is not properly filled, the operation of the machine is brought to a stop until the shortage has been remedied. The conveyer section is then returned to its upright position leaving the carton 95 properly filled and ready to be moved forwardly and closed by the mechanism described in the prior patent previously referred to.

I claim:

1. In combination, a hopper having an opening through which articles are fed therefrom, and means for continuously moving during a feeding operation the walls of the hopper adjacent said opening in a direction opposite to that in which the articles move while passing through said opening.

2. Feeding mechanism for loose articles comprising a pair of rollers having an opening therebetween through which said articles pass, and means for rotating said rollers during a feeding operation in a direction opposite to that in which said articles travel while passing through said opening.

3. In feeding mechanism, a pair of rollers arranged adjacent one another with a passage therebetween, means for maintaining articles in position to move through said passage, and means for rotating said rollers during a feeding operation in a direction opposite to that in which said articles move through said passage.

4. In a feeding mechanism, a pair of rollers spaced from one another and having their axes parallel, registering peripheral flanges on said rollers for dividing the space between said rollers into sections, means for maintaining articles in position to pass through the openings between the rollers thus provided and means for rotating said rollers in a direction opposite the direction of passage of said articles to properly arrange said articles in position to enter said openings, without distorting said articles.

5. In feeding mechanism, a pair of rollers spaced from one another and having their axes parallel, registering peripheral flanges on said rollers for dividing the space between said rollers into separate passages, means for maintaining loose articles in position to move through said passages, and means for rotating said rollers during a feeding operation in a direction opposite to that of the movement of said articles.

6. In feeding mechanism, a pair of rollers spaced from one another and having their axes parallel, means for maintaining loose articles in position to pass between said rollers, registering peripheral flanges on said rollers for dividing the space between said rollers into passages of a size and shape to prevent the movement of said articles through said passages unless said articles present themselves to said passages in a predetermined position relative to said passages and means for operating said rollers to oppose passage of articles therebetween during a feeding operation.

7. In feeding mechanism, a pair of rollers having their axes parallel and spaced from one another to form a passage therebetween, means for maintaining loose articles in position to be fed between said rollers, the peripheries of said rollers being arranged to so restrict the size and shape of the passage between said rollers so that said articles will pass between said rollers in one position only relative to said passage, and means for rotating said rollers in a direction opposite to the movement of said articles through said passage to cause said articles to properly arrange themselves to move through said passage.

8. In feeding mechanism, a pair of rollers having their axes arranged horizontally and parallel with one another, said rollers having their peripheries shaped to form passages therebetween, a hopper for containing loose articles above said rollers in position to move through said passages, means for rotating said rollers in a direction to cause their adjacent peripheries to move upwardly, and means for periodically clearing the passages between said rollers.

9. In feeding mechanism, a pair of rollers have their axes arranged horizontally and parallel with one another and having their peripheries shaped to form passages therebetween, a hopper for maintaining loose articles above said rollers in position to move downwardly through said passages, means for rotating said rollers in the opposite direction to the movement of said articles, and spring pressed projections on the peripheries of said rollers for periodically clearing said passages.

10. In combination, a pair of rollers hav-

ing their axes arranged parallel with one another and having their peripheries shaped to form openings between the adjacent sides of said rollers, means for receiving articles which move through said openings, said means having passageways arranged to register with said openings and means for rotating said rollers in a direction to cause the peripheries thereof to move oppositely to the movement of articles therebetween.

11. In combination, a pair of rollers having their axes arranged parallel with one another and having their peripheries shaped to form passages between the adjacent sides of said rollers, means for receiving articles fed through said openings, said receiving means having passages conforming in size and shape to the openings between said rollers and arranged to register therewith and means for rotating said rollers in a direction to cause the peripheries thereof to move oppositely to the movement of articles therebetween.

12. In combination, feeding mechanism for articles comprising a passageway of a size to contain a plurality of the articles to be fed, means for extracting articles from said passageway in quantities less than the total capacity of said passageway, a plurality of magazines for supplying articles to said passageway, and means for selectively connecting one of said magazines with said passageway to supply articles thereto for each operation of said extracting mechanism.

13. In combination, a feeding device for articles comprising a passageway of a size to permit said articles to move therethrough in a single file, a plurality of magazine passageways having pivoted sections for selectively connecting them with said first mentioned passageway, means for periodically receiving a predetermined number of articles from said first named passageway, and means for operating said pivoted sections to change the connection between said first named passageway from one of said magazine passageways to another for each operation of said receiving device.

14. In combination, a feeding device having a passageway for articles to be fed, a plurality of supply passageways for said first named passageway, means for selectively connecting said supply passageways with said first named passageway, and means for exerting pressure upon the lateral face of one of said articles in said supply passageways to prevent movement of said articles in any of said supply passageways not connected with said first named passageway.

15. In combination, a plurality of feed chutes, means arranged to receive articles from different ones of said feed chutes, means connected with each of said feed chutes successively for preventing movement of articles therefrom, and mechanism for releasing said last mentioned means in the feed chute connected with said receiving means during a receiving operation.

16. In combination, a receiving chute, a plurality of supply chutes having pivoted sections movable into registration with said receiving chute, mechanism for preventing movement of material in said supply chutes, and means for releasing said last named mechanism in one of said supply chutes at a time, said releasing means being arranged to operate in timed relation with the movement of said pivoted sections.

17. In combination, a receiving chute section, a magazine chute section, a pivoted chute section movable into position to direct the passage of articles from said magazine section to said receiving section and into another position to discharge freely away from said receiving section, and means operable in timed relation with the movement of said pivoted section for controlling the discharge of articles from said magazine section.

18. In feeding mechanism, a receiving chute section, a plurality of magazine chute sections, a pivoted chute section connected with each of said magazine sections and each movable into position to connect its respective magazine section with said receiving section, stop mechanism for preventing movement of material within said magazine sections, and means for independently releasing the stop mechanism connected with each of said magazine sections, said releasing means being operable in timed relation with the movement of said pivoted chute sections and timed to prevent discharge of material from any one of said magazine sections at any period when said section is not connected with said receiving section.

19. In feeding mechanism, a device for supplying articles to a container, a plurality of magazine chute sections for feeding articles to said supplying device, pivoted chute sections having continuous connection with said magazine sections and movable for selectively connecting said magazine sections with said supplying device, means for preventing movement of material from said magazine sections to said chute sections at certain periods in the operation of said feeding mechanism, said supplying device being arranged to receive the material in the pivoted chute section connected therewith at any operation of said feeding mechanism during operation of the means for preventing movement of material in the magazine section connected with said supplying device and before said pivoted section is moved to a new position.

20. In feeding mechanism, means for sup-

plying articles to a container, pivoted gates for controlling said supplying means, a reciprocating bar for controlling said gates, a sleeve for moving said bar, means for normally holding said sleeve in a fixed position on said bar, said means being arranged to permit movement of said sleeve relative to said bar when unusual resistance is offered to the movement of said bar.

21. In mechanism for filling receptacles, means for selecting the quantity of material for properly filling a receptacle, means for testing the quantity of material selected to prevent short measure in said receptacle, and means for inserting the material selected and tested into a receptacle.

22. In filling mechanism, a device for counting out a predetermined number of articles to be inserted into a receptacle, means for testing for shortage the number of articles counted out, and means for inserting said articles in said receptacle.

23. In mechanism for filling a receptacle, means for separating out a predetermined number of articles, means for inserting said articles in a receptacle, and means controlled by the number of said articles for interrupting the operation of said filling mechanism.

24. In combination, means for supplying a continuous series of articles, means for separating a predetermined number of said articles, means for testing the articles thus separated for shortage, and means for inserting the separated articles into a carton.

25. In combination, a receiver, means for supplying articles to said receiver when in one position, means for testing the number of articles supplied to said receiver, and means for discharging the articles from said receiver into a container.

26. In combination, a pivoted receiver, means for supplying articles to said receiver when in one position, means for testing the number of articles supplied to said receiver while said receiver is in a second position, and means for discharging the articles from said receiver while said receiver is in a third position.

27. In combination, a receiver, means for supplying articles to said receiver, a gate for the intake end of said receiver, and means for displacing said gate when said receiver is moved into position to coöperate with said supplying means.

28. In combination, a movable receiver, means for supplying articles to said receiver, means for discharging articles from said receiver, a gate for closing the intake and discharge end of said receiver, means for displacing said gate when said receiver is in position to coöperate with said supplying means, and means for displacing said gate when said receiver is in position to have articles discharged therefrom.

29. In combination, a chute for discharging articles at the lower end thereof, a gate for closing said chute, a pivoted device for receiving articles from said chute, and a gate for closing the receiving end of said device, said gates being displaceable by the movement of said receiver into position to register with the discharge end of said chute.

30. In a machine for filling receptacles, means for supplying articles for said receptacles, means for transferring the articles supplied into position to be filled into said receptacle, and means for testing for shortage the number of articles transferred.

31. In a machine for filling receptacles, means for supplying articles for said receptacles, a device for receiving a predetermined number of articles from said supplying means, mechanism for discharging the articles from said receiving means into a receptacle, and means for arresting the operation of said machine in case of shortage in the number of articles supplied to said receptacle.

32. In a filling machine, means for supplying articles for a receptacle, means for receiving a predetermined number of said articles, mechanism for stopping the operation of said machine, and a device arranged to contact with the articles in said receiving means for controlling the operation of said stop mechanism.

33. In a machine for filling receptacles, a receiver, means for supplying articles to said receiver at one end thereof, mechanism for stopping the operation of said machine, and a device arranged to bear against the articles in said receiver for controlling said stop mechanism.

34. In a machine for filling receptacles, a pivoted conveyer section, means for supplying articles to said section at one end thereof, means for contacting with the articles in said section at the end thereof opposite that to which they are supplied and arranged to control the operation of said machine, means for swinging said section about its pivot away from its receiving position, and a plunger movable into said section while in said second position for forcing the articles from said section into the container to be filled.

35. In a machine for filling receptacles, a conveyer section pivotally mounted at one end, means for supplying articles to said section at the end thereof opposite said pivot, means for entering the pivoted end of said section and arranged to contact with the articles therein for controlling the operation of said machine, and a plunger for entering said section at the pivoted end thereof for discharging the articles from said section into a container.

36. In a filling machine, mechanism for supplying articles to a container to be filled,

and stop mechanism for said machine comprising means for offering yielding resistance to the movement of said machine and subsequently bringing said machine to a positive stop.

37. In filling means for filling receptacles, mechanism for stopping the operation of said machine when said filling means does not operate properly, said mechanism comprising a device for first offering a yielding resistance to the movement of said machine and subsequently bringing said machine to a positive stop.

38. In a machine for filling receptacles, stop mechanism comprising a plunger arranged to bear upon articles to be filled into a receptacle, a brake controlled by said plunger and movable thereby into contact with a yielding friction surface, and a positive stop arranged to contact with said brake subsequent to the operation of said brake on said yielding surface.

39. In a machine for filling receptacles, duplicate devices for supplying articles to be filled into said receptacles, means for successively receiving articles from said duplicate devices, means for presenting the articles received from said supplying devices to the receptacles to be filled, and mechanism for interrupting the operation of said machine whenever the requisite number of articles for filling the receptacle is not presented to said receptacle.

40. In a machine for filling receptacles, mechanism for presenting articles to a receptacle to be filled, mechanism for interrupting the operation of said machine when less than the requisite number of articles for filling a receptacle is presented, duplicate mechanisms for supplying articles to said presenting means, each of said duplicate mechanisms having a sufficient capacity to supply the articles to said presenting means in case of interruption of the operation of the other supplying mechanism.

41. In a machine for filling receptacles, a device for presenting articles to a receptacle to be filled, a plurality of chutes for supplying articles to said presenting device, and means for automatically causing one of said chutes to supply the requisite number of articles to said presenting device in case of interruption of the operation of the others of said chutes.

42. In a machine for filling cartons, a device for presenting articles to said cartons, mechanism for interrupting the operation of said machine when less than the requisite number of articles for filling said carton is contained in said presenting device, and a plurality of chutes for supplying articles to said presenting device, each of said chutes being capable of supplying a sufficient number of articles for a continuous operation of said machine and operable to supply said devices in case of interruption of the others of said chutes.

43. A feeding device comprising two grooved rollers having their axes in an approximately horizontal plane in combination with a hopper having an opening in the bottom disposed entirely over one of said rollers so that the weight of the material inside the hopper will not bear directly upon the opening between said rollers.

44. A feeding device comprising a pair of rollers arranged adjacent one another and having an opening therebetween, and a hopper for supplying material to said rollers, said hopper having a discharge opening offset relative to the opening between said rollers so that the material in said hopper will be discharged to said rollers at one side of the opening therebetween, said hopper having a portion of the bottom thereof projecting over the opening between said rollers.

45. A feeding device comprising a pair of rollers having substantially horizontal axes, said rollers being arranged adjacent one another with an opening therebetween, a hopper disposed above said rollers for discharging material through said opening, and means for rotating said rollers in a direction opposed to the movement of material through said opening, said hopper having a portion of the bottom thereof extending over the openings between said rollers and having a discharge opening therein arranged at one side of the opening between said rollers so that the weight of material in said hopper will be sustained by one of said rollers and not bear directly upon the opening between rollers.

In testimony whereof I have signed my name to this specification on this 13th day of March, A. D. 1917.

MICHAEL J. MILMOE.

Witnesses:
L. E. MILLS,
G. J. BECKER.