No. 726,565. PATENTED APR. 28, 1903.

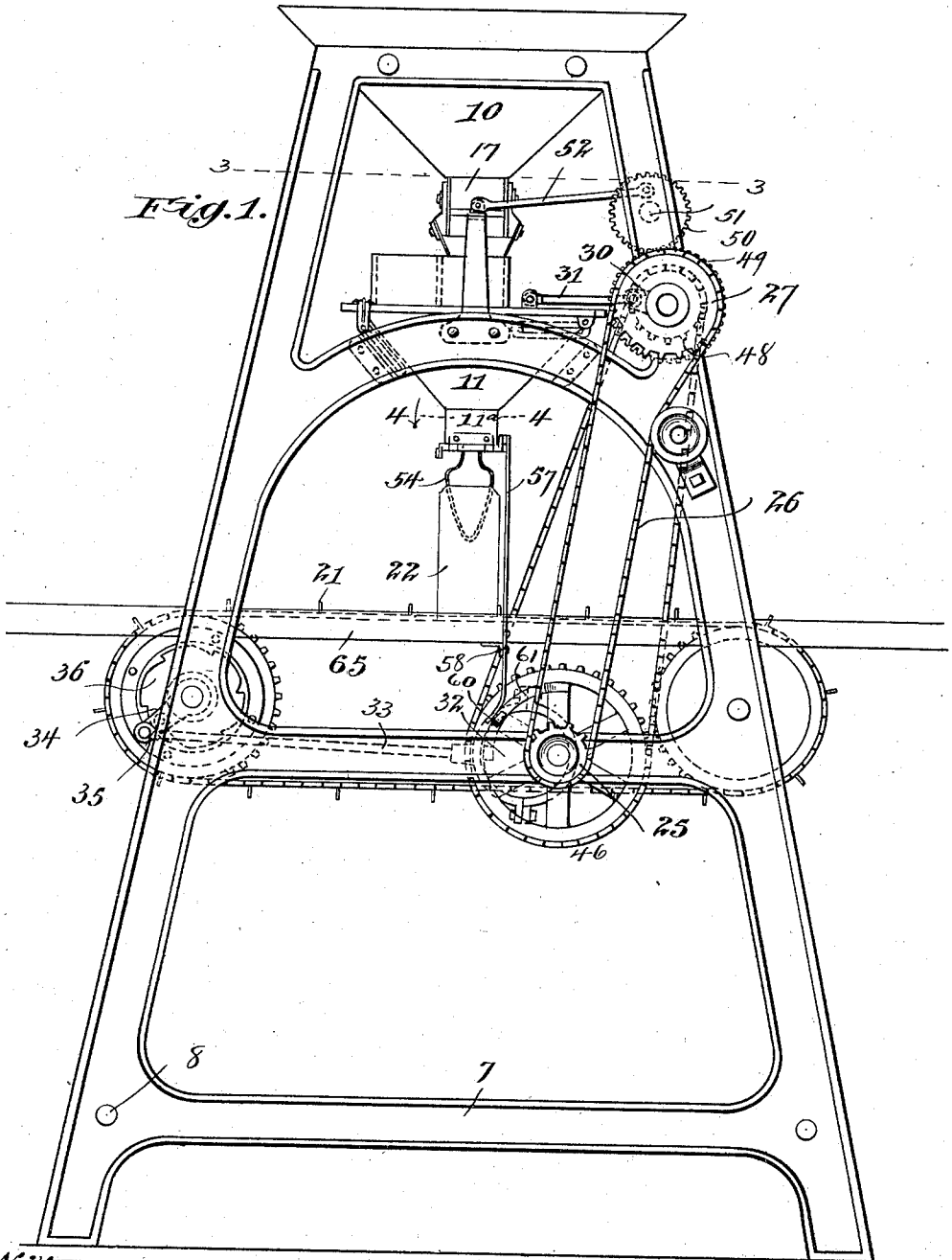
F. M. PETERS.

FILLING MACHINE.

APPLICATION FILED JULY 12, 1901.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



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No. 726,565. PATENTED APR. 28, 1903.

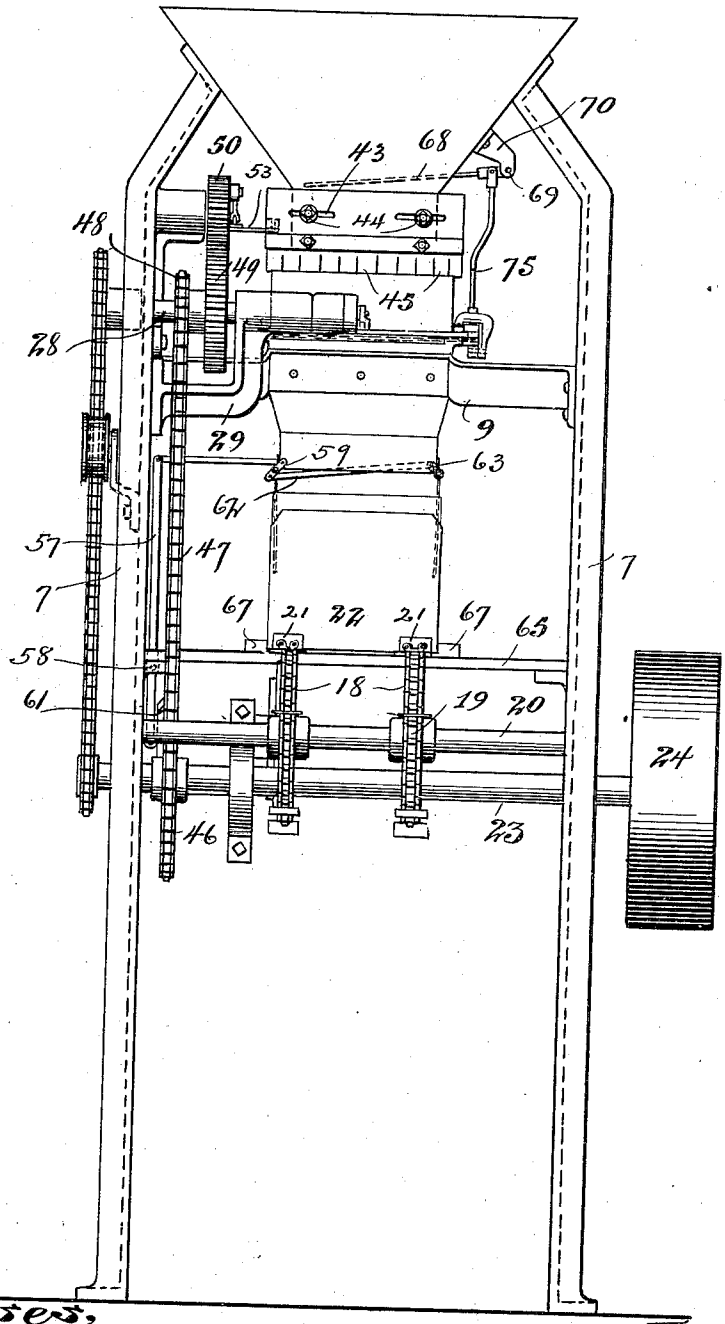
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APPLICATION FILED JULY 12, 1901.

NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



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No. 726,565. PATENTED APR. 28, 1903.

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APPLICATION FILED JULY 12, 1901.

NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.

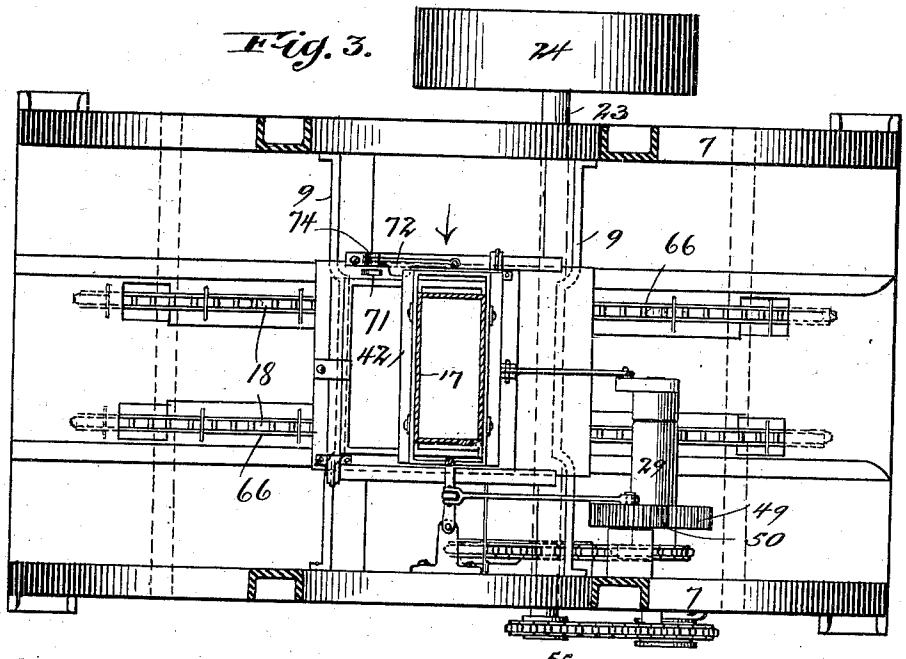
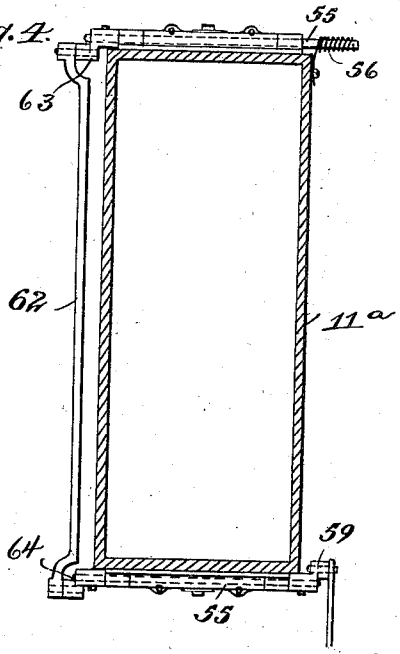


Fig. 4.



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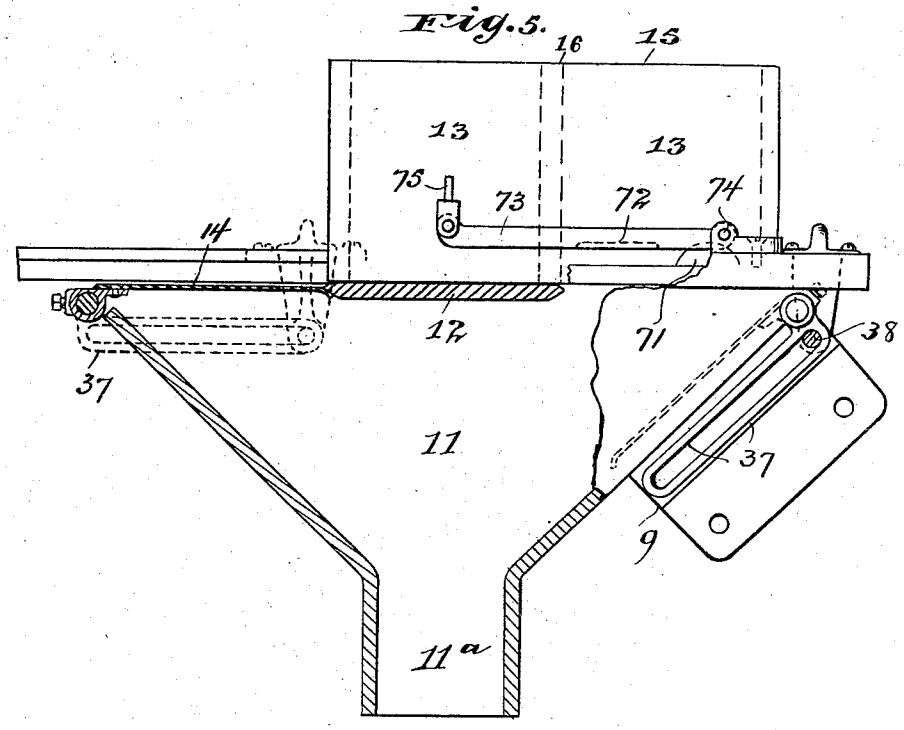
F. M. PETERS.

FILLING MACHINE.

APPLICATION FILED JULY 12, 1901.

NO MODEL. 4 SHEETS—SHEET 4.

Fig. 5.



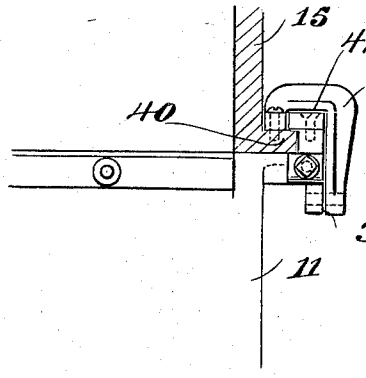


Fig. 6.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANK M. PETERS, OF CHICAGO, ILLINOIS.

FILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 726,565, dated April 28, 1903.

Application filed July 12, 1901. Serial No. 67,965. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. PETERS, of Chicago, Illinois, have invented certain new and useful Improvements in Filling-Machines, of which the following is a specification.

My invention relates to new and useful improvements in filling or packing machines, the same being designed for use more particularly in connection with the filling of boxes or packages with manufactured food products, such as bakery goods and similar articles designed for human consumption and which are usually put up in pasteboard cartons or similar receptacles carefully wrapped and sealed to keep the contents fresh and in such form placed upon the market. Many kinds and varieties of such bakery goods are prepared in special sizes and shapes, and in the packaging thereof the containing-receptacles in which the goods are sealed and placed on the market are made to conform generally in size and shape to a given quantity or weight of the articles disposed in close and regular order, whereby waste space within the package is avoided, and the contents being snugly and closely packed are less liable to breakage in the subsequent handling of the package. In the packaging of such special and uniform sizes and shapes of goods where the external conformation of the package is designed to indicate the general shape of the contained articles, as round, square, &c., the latter if properly packed require to be placed in the receptacle in a particular manner and relation to the receptacle, and in the United States Patent No. 656,826, granted to me on August 28, 1900, is shown a packing-machine designed and adapted to packing this class of goods.

The machine embodying my present invention is, like that covered by the patent above referred to, intended, primarily, for packing crackers, biscuit, and the like class of bakery goods, but has been designed more especially to operate upon goods of smaller and finer sizes and more or less irregular shapes, such as "oyster-crackers" and the like, in the packing of which no attempt at regular order or particular positioning of the goods within the receptacle is sought, but the goods are loosely and freely deposited therein *en masse* in quantities to just fill the receptacle; and the principal object of the invention is to facilitate the filling of the boxes or receptacles with this class of goods in measured quantities in an even, uniform, and practically continuous manner and with a rapidity and despatch in excess of that obtainable by the purely manual efforts of a skilled operator.

To this and other minor ends my invention resides in an organized machine and in various combined and coöperating elements thereof designed to facilitate the rapid filling and packing of the above-mentioned class of bakery products and other articles of similar nature having the same general characteristics and capacity for being packaged, all as hereinafter described, and pointed out in the claims.

A machine embodying my present invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the complete machine, showing a box or receptacle in position to be filled thereby. Fig. 2 is an end elevation of the same. Fig. 3 is a sectional plan view of the machine on the line 3 3 of Fig. 1. Fig. 4 is an enlarged sectional detail in plan view on line 4 4 of Fig. 1, illustrating a part of the spreader mechanism attached to the chute of the discharging-hopper. Fig. 5 is an enlarged detail side elevation of the discharging-hopper and the sliding measuring-frame coöperating therewith, and Fig. 6 is an enlarged detail illustrating the means for actuating the swinging valve-plates of the discharging-hopper.

In the drawings, 7 indicates the supporting-frame of the machine, which comprises, essentially, a pair of parallel A-frames suitably connected and braced apart by transverse bolts 8 and stays 9, as shown in Figs. 1 and 2. In the top of the frame 7 rests a receiving-hopper 10, of a considerable capacity and designed to receive and hold a considerable quantity of the goods to be packed. Directly beneath the receiving-hopper 10 and in vertical axial alinement therewith is placed what I term a "discharging-hopper" 11, the latter being suitably secured to and supported by the transverse stays 9 and having in its bottom a suitable discharge-chute 11^a. Across the top of the

discharging-hopper 11 and centrally thereof rests a stationary plate 12, the functon of which is to form a temporary bottom for a pair of measuring-cells 13, which reciprocate thereabove, as more fully hereinafter described. In the opposite upper ends of the discharging-hopper 11 are also pivoted a pair of oppositely-disposed swinging valve-plates 14, which latter serve as false bottoms for the measuring-cells 13 and are actuated by suitable mechanism connected with said measuring-cells at proper times to permit a free discharge of the articles contained within the measuring-cells of the body of the hopper therebeneath.

15 designates as a whole the rectangular measuring-frame above referred to, which frame is open at top and bottom and is divided by a transverse partition 16 into two parallel and equal measuring-cells 13, above alluded to. This frame 15 is designed to have a limited reciprocating travel over the top of the hopper 11, it being slidingly supported thereon by contact of the lower edges of its opposite sides with the upper edges of the corresponding sides of the hopper 11, as clearly indicated in Fig. 6.

Depending from and forming the throat of the receiving-hopper 10 is a discharge-chute 17, through which the material is passed from the hopper alternately into the two measuring cells or chambers 13, it being observed that the reciprocation of the measuring-frame 15 is such as to bring the cells 13 thereof alternately into a position directly beneath the chute 17.

At a suitable distance below the discharging-hopper 11 is placed an endless horizontal conveyer belt or chain. This latter, as best shown in Fig. 2, is preferably formed by a pair of parallel-disposed chains 18, supported by and carried over suitable sprocket-wheels mounted on transverse shafts 20, extending between the upper side members of the supporting-frame. These chains 18 are provided at suitable intervals with flights 21, designed to insure the travel of boxes or receptacles 22 placed thereon into and out of filling position with reference to the discharging-hopper 11.

The above-described devices constitute the principal coöperating elements of my improved machine, and the moving parts thereof may be operated from the main power-shaft in any suitable or convenient way; but the mechanism I prefer to employ for this purpose is illustrated in the drawings and consists of the following: 23 is the upper power-shaft, journaled in the opposite side frames of the machine and carrying a power-pulley 24. On the end of shaft 23 opposite the pulley 24 is keyed a driving-sprocket 25, which through a chain 26 and sprocket 27 operates at a reduced speed a counter-shaft 28, journaled in one side of the supporting-frame 7 and in a suitable bracket 29 secured thereto. The inner end of the counter-shaft 28, which shaft, it is noted, is located substantially on a level with the top of the hopper 11, is connected by a crank 30 and a connecting-rod 31 to one end of the measuring-frame 15, and thus effects the uniform reciprocation of the latter through the distance allowed by the throw of the crank-arm 30, all in an obvious manner.

In order to secure a proper operation of the machine, it is essential that the conveyer-belt be given an intermittent or step-by-step travel continuously in one direction in order that the boxes or receptacles carried thereby may remain stationary beneath the discharging-hopper through a sufficient interval of time to insure their being properly filled and may then be moved along to give place to the next following receptacles. The mechanism I prefer to employ for giving such step-by-step movement to the conveyer-belt is as follows: On the main shaft 23 is keyed an eccentric 32, the rod 33 of which extends to and is connected with the outer end of an arm 34, loose on one of the transverse shafts 20. The arm 34 carries a pawl 35, which latter is normally held spring-pressed into engagement with the teeth of a ratchet-wheel 36, keyed on the shaft 20. From the foregoing it is obvious that each complete revolution of the eccentric 32 will rotate the shaft 20 through an angle measured by the angular distance between successive teeth on the ratchet-wheel and will return the pawl 35 idly over the periphery of the ratchet-wheel for engagement with the next-succeeding tooth, thereby advancing the conveyer-belt by intermittent movements equal in extent to the distance between successive flights 21.

Referring now to the discharging-hopper 11 and to the means whereby the hinged valve-plates 14, journaled therein, are actuated in such a manner as to effect the discharge from one of the superposed measuring-cells while the other is being filled, and vice versa, 37 indicates a pair of slotted arms, secured at their outer ends fast on the pivoted shaft of valves 14 on opposite sides of the hopper, the slots in said arms 37 being engaged by horizontal pins 38, carried in the lower end of downwardly-curved arms 39, which latter arms are secured at their upper and inner ends to horizontal flanges 40, formed on the lower edges of opposite sides of the frame 15, all as clearly shown in Fig. 6. These curved arms 39 ride over a pair of horizontal slideways 41, secured to the upper edges of the opposite sides of the hopper 11.

From the foregoing construction it will be obvious that the engagement of the pins 38 in the slots of the bars 37 will hold the valves 14 in their elevated or horizontal position until the pin 38 strikes that end of the slot which is adjacent to the hinge or pivot of the valve, whereupon the pivot-shaft will be rocked and the valve suddenly drawn downward into its open position, as indicated at the right of Fig. 5.

The mechanism as thus far described con-

stitutes a complete and operative machine for the purpose for which the machine is designed, and the operation of said parts may be briefly described as follows: The receiving-hopper 10 being placed in communication with a source of supply of small crackers or similar goods to be packed and the boxes or receptacles 22 being fed to the conveyer-belt by an attendant, power is applied to the main shaft 23, whereupon the filling operation proceeds as follows: Assuming the parts to be in the positions shown in Figs. 1 and 2 and further assuming that the discharge-chute 17 of the hopper 10 is in sliding engagement with the upper edges of the measuring-frame 15, or substantially so, the articles contained in the hopper 10 fall by gravity through the chute 17 into and fill the registering right-hand cell 13 directly therebeneath. By the continued operation of the machine the right-hand cell 13 is quickly drawn into its opposite position, bringing the left-hand cell 13 into registry with the chute 17 and permitting said cell to be filled. As soon as the frame 15 has reached the right-hand limit of its travel the engagement of the pin 38 with the end of the slotted arm 37 instantly rocks the discharge-valve 14 into open position, as indicated at the right in Fig. 5, and the contents of the right-hand cell 13 immediately drop therefrom into and through the hopper 11 and the discharge-chute 11^a thereof, falling thence directly into the open upper end of the box 22 therebeneath and completely filling the same. As soon as the box 22 has been thus filled the belt 18 is given a forward movement by the mechanism already described, carrying the filled box out from under the discharge-chute 11^a and bringing the next empty box into registering position directly thereunder. While this latter operation is taking place the crank-arm 30 has passed its dead-center and the frame 15 begins its travel to the left, carrying the filled left-hand cell 13 into discharge position and simultaneously bringing the right-hand cell 13 into filling position. As soon as said cells have reached the extreme of their left-hand movement the discharging operation already described in connection with the right-hand cell 13 at the right-hand side of the discharge-hopper occurs in connection with the left-hand cell 13 at the left side of the discharge-hopper. It will be observed that in this operation the presence of a pair of false bottoms in the nature of a pair of swinging valve-plates 14 or their equivalents is necessary, for the reason that inasmuch as a constant flow of the material is taking place from the receiving-hopper 10 into the measuring-cells each cell begins to fill before it has reached the central receiving position above the fixed bottom 12, and hence some means must be provided to prevent a partial discharge from one cell while being filled simultaneously with the regular discharge from the other filled cell. The presence of the valves 14 is also desirable to prevent the premature discharge from the filled cell before it has traveled to the full limit of its movement and reached its proper discharging position.

In order to prevent injury to the material or goods being handled—such as a breaking or crumbling thereof, which would occur to a greater or less extent were the upper edge of the measuring-cells caused to travel in sliding engagement with the lower edge of the discharge-chute of the receiving-hopper—I have devised a wiper mechanism which is applied to the discharge-chute 17 of the hopper and the function of which is to yieldingly level off the material in the filled cell as it moves from its receiving to its discharging position without injury to the material. This wiper mechanism consists, essentially, of a rectangular frame 42, the opposite sides of which are slotted at 43, as shown in Fig. 2, and ride over pins 44, fixed in the engaging sides of the discharge-chute 17. To the lower edges of the slotted sides of this frame are attached the wiping devices proper, each of which consists of a strip of rubber, leather, or equivalent flexible and yielding material, the lower edge of which is transversely slitted at intervals, as shown, thereby forming a series of adjacent flexible and laterally-yieldable tongues 45. In order to make these wiping devices most effective for their intended function, it is found necessary to impart thereto a rapid reciprocating or shaking movement in a longitudinal direction. This may be imparted by any desired train of gearing from the main shaft 23, that herein shown consisting of a sprocket-wheel 46, keyed on the main shaft 23, a sprocket-chain 47, a combined sprocket and gear 48 and 49, respectively, mounted loosely on the counter-shaft 28, a small gear 50, mounted on the stub-shaft 51 and driven by the gear 49, and a pitman and toggle connection 52 and 53, respectively, between said last-named gear and the wiper-frame.

In view of the fact that certain of the boxes or receptacles which may be used in connection with this machine and for the filling of which the machine has been more particularly designed (although by no means limited thereto) are folded up from pasteboard cartons with side and end folding flaps designed to form the closure for the open side thereof when the boxes have been filled I have found it desirable to provide a mechanism for holding these flaps open during the filling operation in order that their presence may not interfere with the proper charging of the receptacles. This mechanism, as herein shown, consists of a pair of spreaders 54, preferably formed of wire bent to the shape shown and secured at their upper ends to a pair of rods or shafts 55, journaled horizontally in the lower opposite ends of the discharge-chute 11^a. A coiled spring 56, (see Fig. 4,) secured at one end to one of the shafts 55 and at the other to the side of the discharge-chute,

normally tends to draw said spreaders 54 upwardly into a horizontal position immediately below the bottom of the discharge-chute, so as to permit an open receptacle to move freely into charging position therebeneath. In order to depress the spreaders 54, so that they will engage and hold open the end flaps of the receptacles, I cause a simultaneous rocking of the shafts 55 in opposite directions against the closing tendency of the spring 56 by means of a rocking-lever 57, pivoted at 58, the upper end of which is pivoted to an arm 59 on the proximate shaft 55 and the lower end of which carries a roller 60, lying in the path of a cam-block 61, secured to the face of the gear 46. In order to secure a simultaneous and opposite rocking of the shafts 55, the latter are connected at one end thereof through a connecting-rod 62, secured to oppositely-disposed arms 63 and 64 on said shafts 55.

The mechanism last described is so timed that as soon as the conveyer 18 brings an empty receptacle 22 into receiving position beneath the discharge-hopper 11 the spreaders 54 immediately drop and engage the end flaps of the receptacles, thrusting the same outwardly and insuring the proper opening of the receptacle immediately prior to the actuation of the valve-blade 14 and the discharge of a charge of filling material from one of the cells 13.

It will of course be understood that all of the several coöperating mechanisms hereinabove described will be so timed as that each shall perform its proper function in a true cooperative relation to the other mechanisms and in such manner as to insure the rapid and safe delivery of the material operated upon without waste or injury from the receiving-hopper 10, through the machine, and into receptacles 22. It should be mentioned that the upper lap of the endless conveyer 18 may, and preferably will, be caused to travel substantially flush with the upper surface of a suitable table 65, which latter will preferably be provided with longitudinal grooves or slots 66 for the reception and travel of the endless chains 18, and along the outer sides of said grooves or slots will preferably be secured a pair of longitudinal guides 67, spaced apart a distance equal to or very slightly exceeding the longitudinal dimension of the receptacles and serving to prevent longitudinal displacement of the latter during their travel over the table 65. This table or support 65, constructed as described, is not an essential element of my invention and may obviously be dispensed with, if desired, without detracting from the efficiency of the machine; but I prefer to employ this latter feature, inasmuch as it facilitates the work of the operator or attendant both in feeding the empty receptacles to the machine and in removing the charged receptacles therefrom to be closed and sealed.

It will be understood that the cells 13 of the measuring-frame 15 may be considerably varied in size in any given machine. This may be accomplished in several ways. For instance, the frame may be formed with walls and a transverse partition of varying thickness, which would of course have the effect of varying the capacity of the cells, or the measuring-frame and be carried in a slidable rectangular base-frame capable of carrying measuring-frames of somewhat varying dimensions. In this way a single machine by the employment of different sizes of measuring-cells therein may be utilized to fill cartons of varying capacity. By varying the distance apart of the horizontal guides 67 longer or shorter cartons may be used.

Some classes of goods on which this machine is adapted to operate sometimes show a disposition to clog and arch slightly just above the throat of the receiving-hopper. In order to overcome this fault, I may employ, where found necessary, a vertically-oscillating agitating rod or finger 68, pivoted at 69 to a lug 70, secured on one side of the hopper, said finger entering the hopper through a vertical slot in the side thereof and overlying the discharge-throat 17. Any convenient automatic means for oscillating the finger 68 from some moving part of the machine may be employed; but the mechanism which I have devised consists of a cam projection 71, formed on the upper surface of one of the side members of the reciprocatory frame carrying and forming the base-support of the measuring-frame 15, which cam projection in its reciprocations rides under a laterally-extending lug 72, formed on an arm 73, pivoted at 74 to the stationary guide in which the sliding measuring-frame reciprocates, the opposite end of said arm 73 being connected with finger 68, near the heel of the latter, by a link 75. By this mechanism the finger 68 will be given a vertical oscillatory movement of a limited extent in the central vertical transverse plane of the receiving-hopper and just above the discharge chute or throat thereof, thus effectually breaking up any tendency of the material to arch or clog at such point.

While, as hereinabove stated, this invention has been designed primarily for use in the putting up of bakery products and like goods, it is obvious that the utility of the machine is by no means limited to its employment in such a relation. The machine would be found equally useful in the packaging of cereal products or any other material or goods of a generally loose and granular nature such as would flow by gravity readily through the machine in the manner described. I wish it, therefore, to be understood that I reserve to myself the right to use the machine of this invention in all relations in which it is capable of useful employment entirely irrespective of the nature or character of the material or goods handled thereby.

I claim—

1. In a filling-machine, the combination with a receiving-hopper of a discharging-hopper disposed therebeneath and in vertical axial alinement therewith, and a sliding frame comprising a pair of parallel measuring-cells open at top and bottom and adapted to reciprocate across the top of the discharging-hopper, said discharging-hopper having a fixed plate disposed centrally across the top thereof and forming a bottom for each cell when in central or receiving position, and having also a pair of false bottoms disposed on either side of said fixed plate adapted to support the contents of the cells until the latter reach the end of their reciprocations and then discharge said contents, substantially as described.

2. In a filling-machine, the combination with a receiving-hopper of a discharging-hopper disposed therebeneath and in vertical axial alinement therewith, and a sliding frame comprising a pair of parallel measuring-cells open at top and bottom reciprocatingly disposed across the top of the discharging-hopper, said discharging-hopper having a central fixed plate across the top thereof and forming a bottom for the cells alternately when in central or receiving position, and having also a pair of false bottoms in the nature of hinged discharge-valves disposed on either side of said fixed plate, said false bottoms being automatically dropped to discharge the cells of their contents when the latter reach the outer limits of their reciprocations, substantially as described.

3. In a filling-machine, the combination with a receiving-hopper of a discharging-hopper disposed therebeneath and in vertical axial alinement therewith, a sliding frame comprising a pair of parallel measuring-cells open at top and bottom reciprocatingly disposed across the top of the discharging-hopper, said discharging-hopper having a central fixed plate across the top thereof forming a bottom for the cells alternately when in central or receiving position, a pair of hinged false bottoms on either side of said fixed plate, and coöperating devices connected with said cells and false bottoms respectively whereby the latter are maintained in closed position during the travel of the cells thereover and are suddenly opened as the cells reach the outer opposite limits of their reciprocations, substantially as described.

4. In a machine of the character specified, the combination with a hopper having a discharge-chute in its bottom, of a horizontally-sliding receptacle divided into a series of measuring cells or chambers disposed therebeneath, a wiper slidingly secured to said chute directly over said receptacle, and means for effecting simultaneous reciprocations of said receptacle and wiper in directions at right angles to each other, substantially as described.

5. In a machine of the character specified, the combination with a hopper having a discharge-chute in its bottom, of a horizontally-sliding receptacle divided into a series of parallel measuring cells or chambers disposed therebeneath, a wiper comprising a rectangular frame slidingly engaging the sides of said chute and having depending from its opposite longer sides a pair of flexible or yielding brushes adapted to sweep across the top of said sliding receptacle, and mechanism for effecting simultaneous reciprocations of said receptacle and wiper in directions at right angle to each other at suitable relative speeds, substantially as described.

6. In a machine of the character described, the combination with a hopper of a horizontally-traveling conveyer arranged therebeneath, said conveyer serving to carry empty receptacles into charging position beneath the hopper and subsequently withdraw the filled receptacles, and outwardly-swinging spreading device hinged to the base of the hopper adjacent the discharge-opening and operating to separate the upstanding flaps of the receptacles and thus facilitate the charging of the latter, substantially as described.

7. In a machine of the character described, the combination with a hopper of an intermittently-moving conveyer-belt located therebeneath, said conveyer-belt serving to present empty receptacles successively to the discharge-opening of the hopper, a pair of oppositely-disposed spreaders hinged to the bottom of the hopper, their free ends being adapted to engage and spread the upstanding flaps of the receptacles, and mechanism for operating said spreaders in properly-timed relation to the discharge from the hopper, substantially as described.

8. In a machine of the character described, the combination with the supporting-frame of the upper receiving-hopper surmounting the same, the lower valved discharging-hopper, the slidable measuring-cells superposed on the discharging-hopper, the wiper located above the measuring-cells, the main power-shaft journaled in the supporting-frame, and suitably-timed driving conections between said shaft and the slidable measuring-cells and the wiper, substantially as described.

9. In a machine of the character described the combination with the supporting-frame of the upper receiving-hopper surmounting the same, the lower valved discharging-hopper, the slidable measuring-cells open at top and bottom superposed on the discharging-hopper, the wiper slidably carried by the receiving-hopper and having a double movement relatively to and over the top of the measuring-cells, the spreader mechanism hinged to and depending from the discharge-chute of the discharging-hopper, an endless intermittently-movable conveyer-belt transversely disposed below the discharging-hopper, a main power-shaft journaled in the supporting-frame, and suitably-timed driving connections from said power-shaft to the wiper, the measuring-cells, the spreader

mechanism and the conveyer, said parts all combined and coöperating substantially in the manner and for the purpose set forth.

10. In a machine of the character described, the combination with a receiving-hopper having a discharge-throat, of a vertically-movable rod or finger arranged directly over the discharge-throat near the mouth thereof and in a substantially horizontal position, and means operated from a moving part of the machine for effecting a limited up-and-down movement of the said rod to produce an intermittent lifting effect upon the material passing through the hopper, thereby preventing arching or clogging of the material above the discharge-throat, substantially as described.

11. In a machine of the character described, the combination with a receiving-hopper having a discharge-chute forming a throat in the bottom thereof and a horizontally-reciprocable measuring-frame disposed therebeneath, of an agitating rod or finger pivoted at one end to the side wall of the hopper and extending through a vertical slot therein and overlying the discharge-throat in a substantially horizontal position, and operating connections intermediate said measuring-frame and said pivoted agitating-rod, whereby the latter is automatically given a limited vertical oscillation to intermittently lift the material lying thereabove and thereby prevent arching and clogging of the same above the discharge-throat, substantially as described.

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