

April 1, 1924.

S. LADD

1,489,134

CARTON FILLING MACHINE

Filed April 26, 1920

5 Sheets-Sheet 1

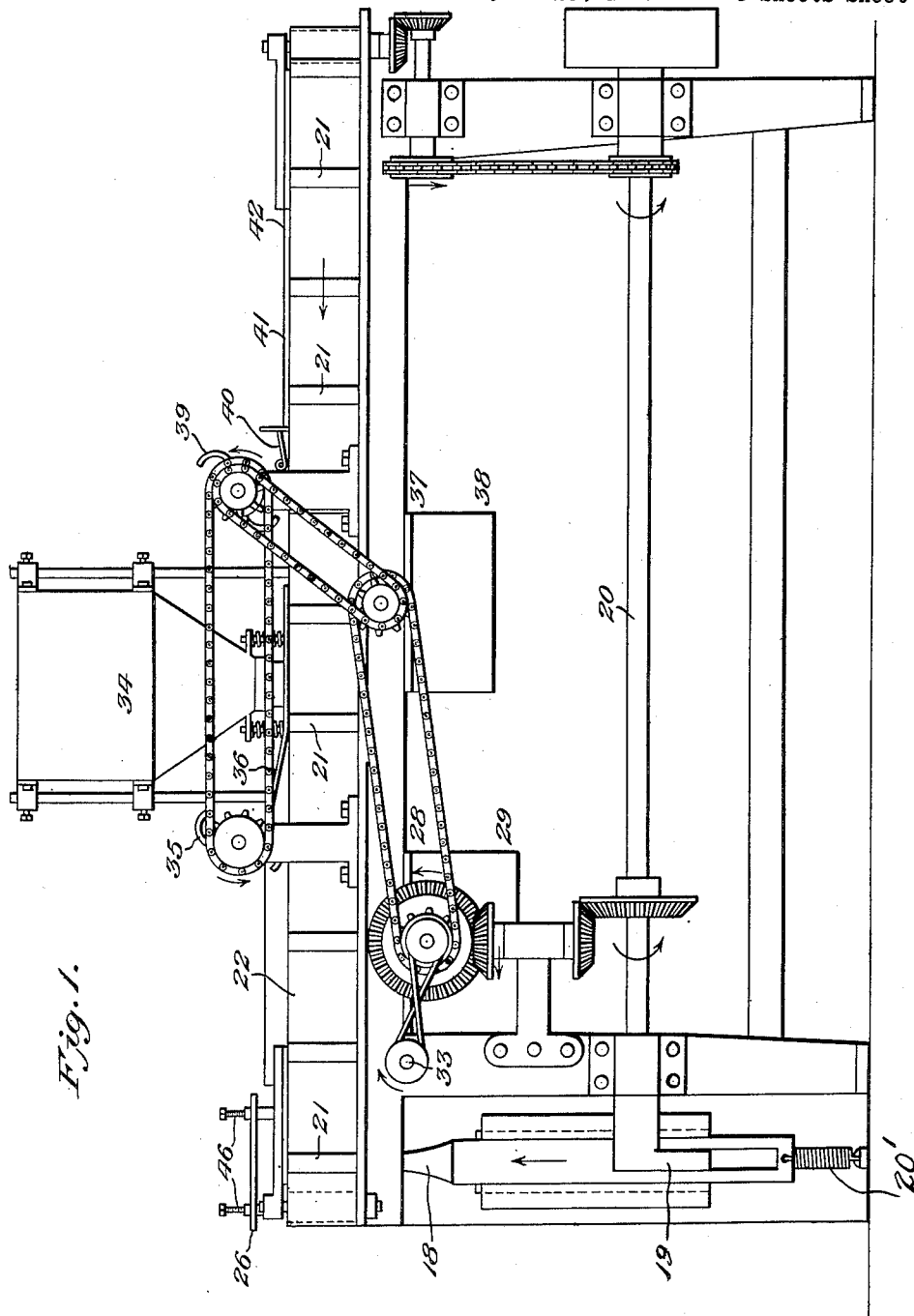


Fig. 1.

Edwin S. Mckee.

WITNESS:

Sherman Ladd INVENTOR

BY Victor J. Evans

ATTORNEY

April 1, 1924.

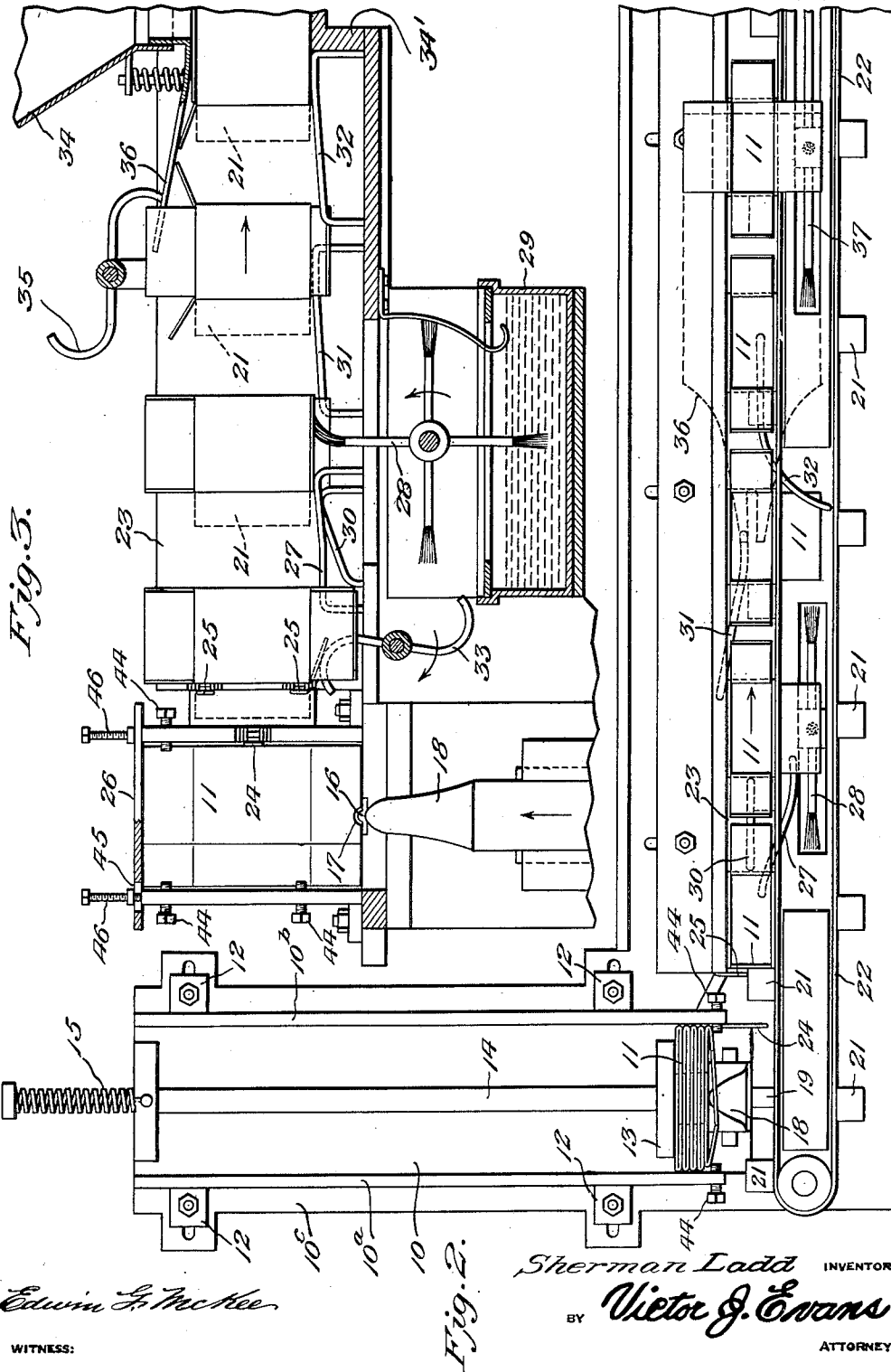
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April 1, 1924.

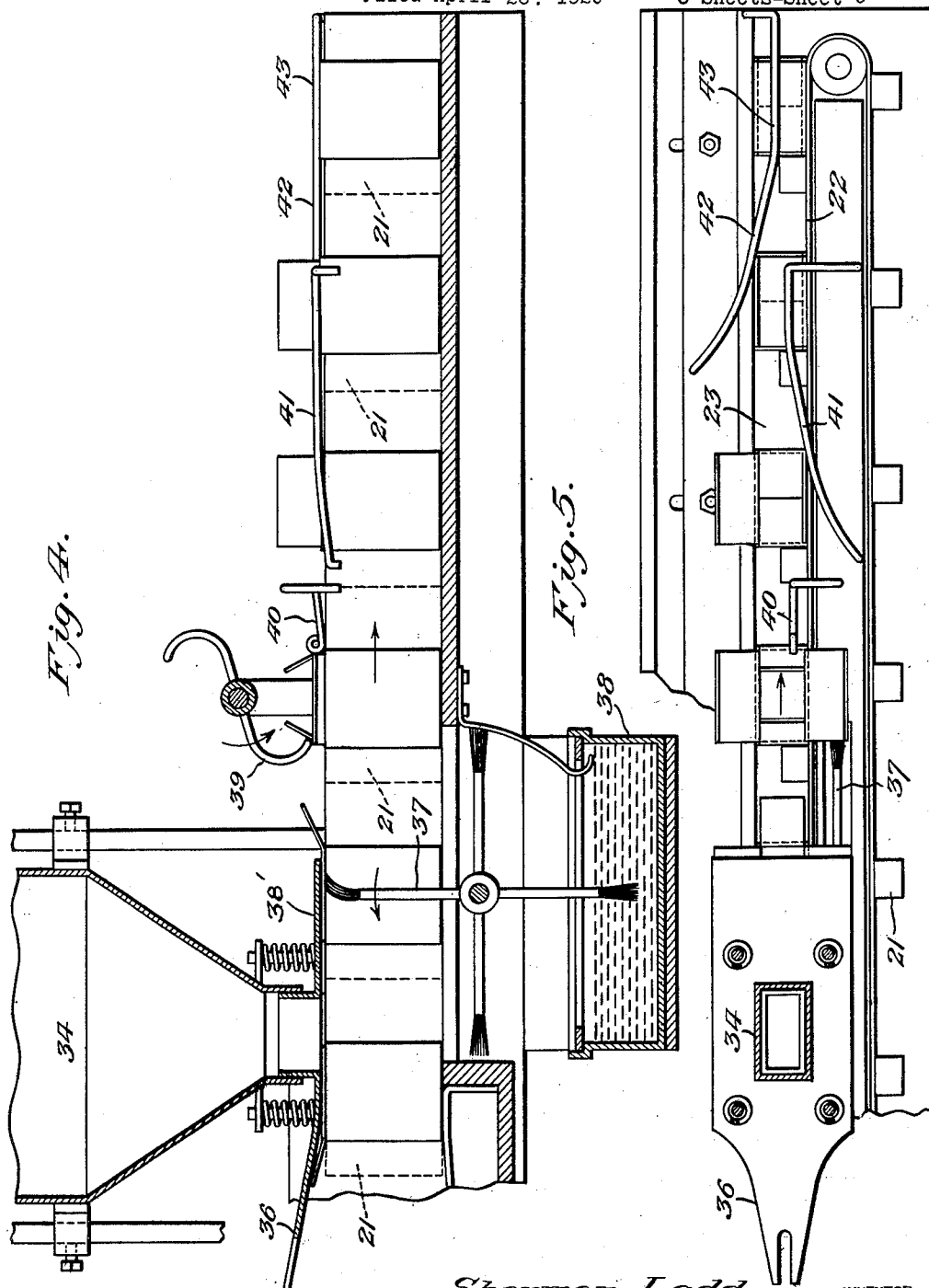
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5 Sheets-Sheet 4

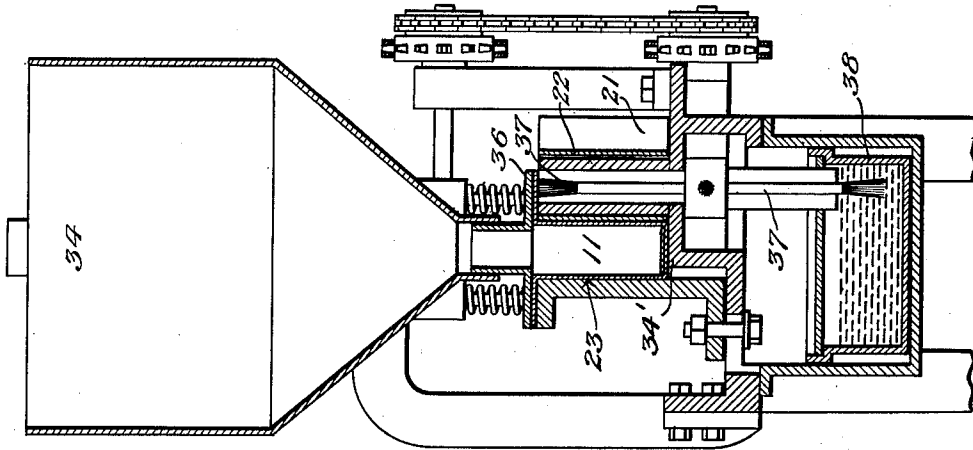


Fig. 7.

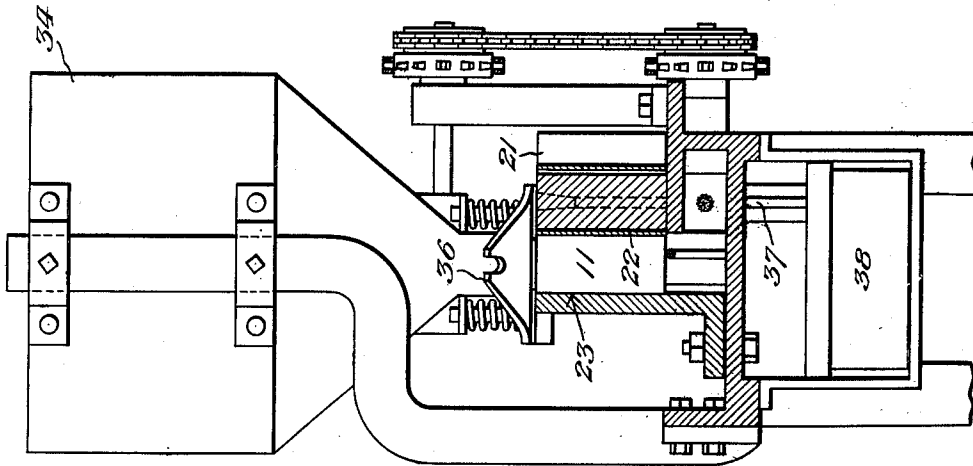


Fig. 6.

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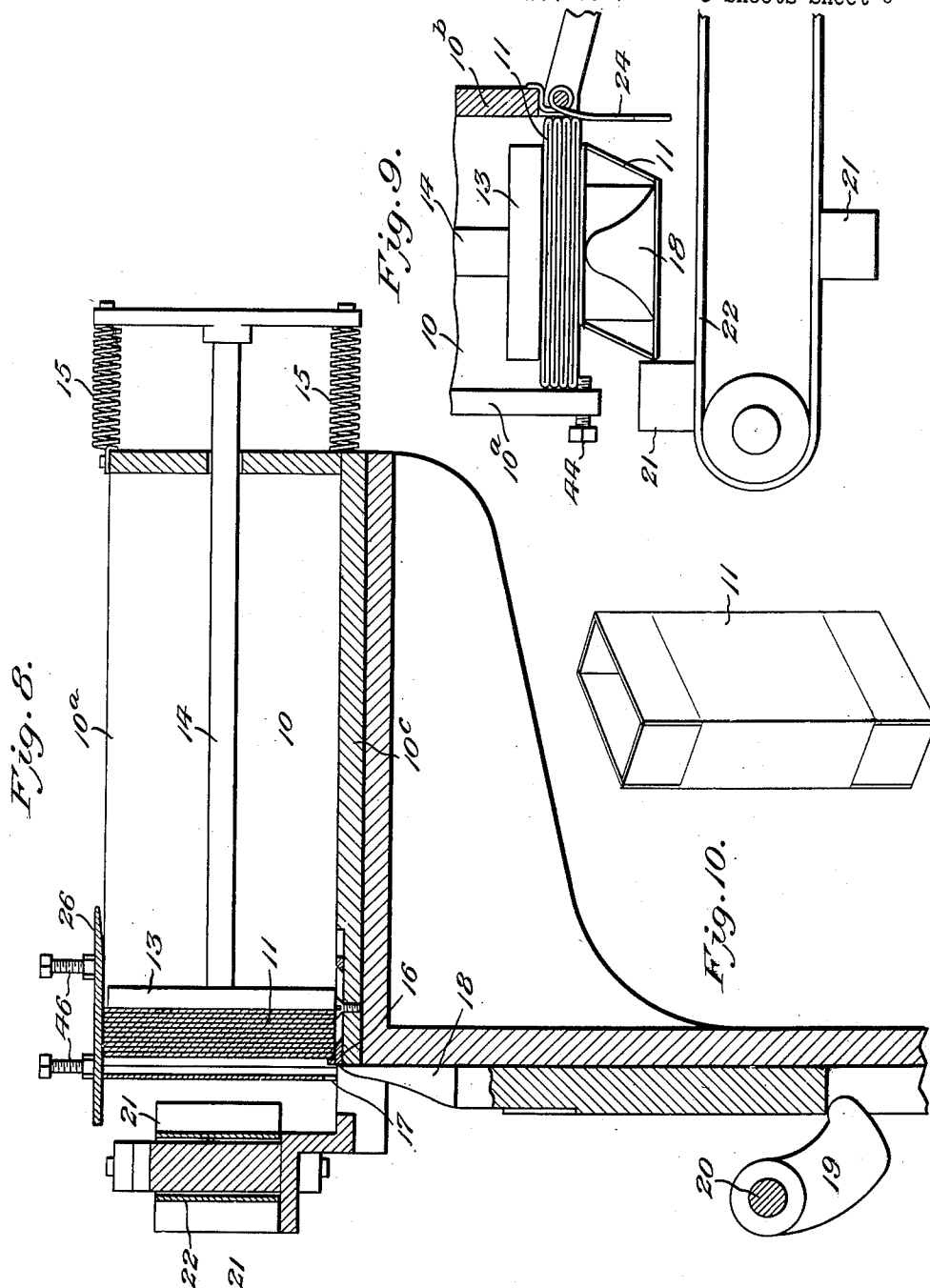
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CARTON FILLING MACHINE

Filed April 26, 1920

5 Sheets-Sheet 5



Edwin L. McKee

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Patented Apr. 1, 1924.

1,489,134

UNITED STATES PATENT OFFICE.

SHERMAN LADD, OF KILDEER, NORTH DAKOTA.

CARTON-FILLING MACHINE.

Application filed April 26, 1920. Serial No. 376,755.

To all whom it may concern:

Be it known that I, SHERMAN LADD, a citizen of the United States, residing at Kildeer, in the county of Dunn and State of North Dakota, have invented new and useful Improvements in Carton-Filling Machines, of which the following is a specification.

The object of the invention is to provide a relatively simple and comparatively inexpensive machine for feeding, opening, filling and sealing cartons to avoid the necessity of individually handling the same and with a view to securing an accuracy of manipulation both as to the filling and sealing which is unattainable by the use of the devices ordinarily employed for that purpose, and under condition which will insure uniformity of the charges deposited in successive cartons.

Further objects and advantages will appear in the course of the following description of a preferred embodiment of the device, it being understood that changes in form, proportion and details may be resorted to within the scope of the appended claims without departing from the spirit of the invention.

In the drawings:—

Figure 1 is a side elevational view of the machine.

Figure 2 is a top plan view of a portion thereof and

Figure 3 is a side elevation of a portion of the machine and showing parts in section.

Figure 4 is a side elevation of a portion of the machine and showing parts in section.

Figure 5 is a top plan view of a portion of the machine and showing parts in section.

Figures 6, 7 and 8 are transverse sectional views.

Figure 9 is a fragmentary top plan view.

Figure 10 is a detail perspective view of one of the cartons.

The mechanism consists essentially of a carton feeding device through and by which the cartons in a stack are fed successively to spreading devices by which the cartons are opened to permit of the folding in proper relation of the bottom flaps, means for gumming or applying glue to one of the flaps while the latter are in an open or spread condition, means for folding the flaps so as to cause the sealing thereof to form the bottom of the carton, means for continuously conveying the carton during the said gum-

ming and folding operation, means for opening or spreading the top flaps to permit of the introduction of the contents, means for depositing the desired material in the carton, means for gumming one of the cover or top flaps, and means for folding and sealing the top flap preparatory to delivery for packing and shipping.

The carton feeding mechanism includes a runway 10 of which the side walls 10^a and 10^b are inwardly and outwardly adjustable to accommodate cartons of different sizes or dimensions, said cartons being indicated at 11 in stacked form as they are fed through the runway. While in depth and width the cartons are preferably of the same size, they vary in thickness and hence the end folds thereof being deeper require a wider runway, and obviously the side flaps of the top and bottom being correspondingly wider a deeper runway is necessary. Any suitable means for securing the said walls in their adjusted positions may be employed such as the brackets 12. Operating in the runway and designed to advance the stack of cartons as they are removed successively at the outlet end, is a follower 13, with the stem 14 of which is connected actuating springs 15 while at the outlet end of the runway is located a stop finger 16 to hold the foremost carton and hence those in rear thereof until positively removed by means hereinafter described. This stop finger projects upwardly from the floor or bottom of the runway to engage the carton at the lower edge and the forward wall or element of the carton which is represented by one of the side covering flaps for the bottom is provided with a notch 17 adapted to pass the finger, by straddling the same, so that the foremost carton springs at its forward wall slightly beyond the end of the runway as shown in Figure 2 to permit of the introduction into the carton of the tapered upper end of a plunger 18. The plunger is mounted to slide vertically on the frame of the machine and is provided with a longitudinal slot which receives a cam or arm 19 on the main or driving shaft 20 which may receive its motion from any suitable source. The cam is adapted to raise the plunger against the tension of a coil spring 20' secured to the frame and upon a half revolution of the shaft releases the plunger for a downward movement. While the stop finger 16 permits the forward springing of the outermost

or forward wall of the carton as above noted, it restrains the rear wall thereof until the plunger has been introduced into the carton to bring the forward wall of the carton into the plane of movement of the flights 21. The cam 19 then releases the plunger which is returned to normal position by action of the spring 20' to await the cam on its upward movement. The flights 21 are arranged on an endless carton conveyor 22 which traverses a carton guide or runway 23 and serves to carry the cartons continuously and successively through said runway or guide from the outlet end of the feeding mechanism to the delivery point of the machine where the cartons having been filled and sealed are discharged for packing and storing or shipment. The disengagement of the rear walls of the cartons from the stop or detaining finger 16 is due to the forcible action of the plunger and the movement of the carton longitudinally of the runway or guide 23 when the carton is engaged by a flight of said endless conveyor. Obviously the engaging flight of the conveyor, as indicated in Figure 9, will engage one corner of the carton that is to say one corner representing the joint between the front wall and an end wall of the carton, and disposed in the path of the carton in its movement received from the conveyor is a retarding device 24 consisting of a yielding or spring arm adapted to engage the side diagonally opposite angle of the carton, so that the restraining effect of this detaining device opposed to the forward pressure of the engaging flight of the conveyor will tend to open or spread the carton so as to permit the bottom flap to be folded. The said detaining device is located as shown at the forward vertical angle of the outlet of the carton runway, and its action as described may be supplemented, so as to hold the carton in the spread condition for the required length of time, by additional yielding restraining or detaining elements 25 arranged on the rear wall of the carton guide and projecting toward the conveyor in the path of cartons carried thereby. Also covering the top of the feed runway at its outlet end is a check plate 26 to prevent the upward displacement of the cartons as they are successively engaged by the spreader consisting of the plunger 18.

As a carton engaged by and carried forward through means of the conveyor as above described enters the main runway or guide 23 the bottom flaps thereof are engaged by a presser foot 27 which closes the first side flap and spreads the front flap outwardly and exposes the front flap to the action of a gluing or sealing dauber 28. While the glue is being applied to the bottom flaps the carton is partially supported by the presser foot 27 and the bristles of the

brush respectively. The gluing or sealing device is of the rotary type indicated, which is charged with glue or other suitable cement from a reservoir or glue pot 29, motion being communicated thereto through suitable gearing from the drive shaft, which latter also through corresponding intermediate means communicate motion to the endless conveyor.

After the front flap of the carton has received the glue or sealing material, the carton is carried beyond the field of action of the presser foot and as it approaches the inclined U-shaped folders indicated at 30, 31 and 32, the last side flap which has been in what may be termed a dragging position is moved forward into position to lie in contact with the first side flap by means of a rotary winged folder 33, continuously actuated from the drive shaft, so that the first and last side flaps are engaged by the cam folder 30 and the front and rear flaps are successively engaged by the cam folders 31 and 32 and are brought into parallelism with the side flaps with the gummed or glued surface or portion of the front flap innermost, to secure the elements of the bottom of the carton in operative relation. The folder 32 may be extended to any desired point to maintain this relation of the folded flaps until the sealing material or glue has had an opportunity to set.

As soon as the closing of the bottom of the carton has been effected as described it is ready for filling and is therefore brought into operative relation with the filling hopper 34, but in approaching said hopper the closed bottom of the carton is moved over the platform 34' of the first side flap of the top is brought into operative relation with a winged rotary folder 35 serving to swing or fold said flap forwardly or in the direction of progress of the carton, so that said flap will pass in an open and unobstructing position under the presser foot 36. Obviously the tapered extremity or entering end of the presser foot will flatten out the other flaps and cause them to lie parallel with the upper edges of the walls of the carton guide or runway beneath the presser foot which consists of a plate. The front flap is exposed to the action of a rotary dauber 37 operating in connection with a reservoir or glue pot 38, which, in common with the reservoir or glue pot 29 may be kept at the desired temperature to insure the liquid condition of the liquid or cement by any suitable or approved heating device, not shown, for the reason that such devices are common and well known in the art.

While the top or covering flaps of the carton are held in the open or spread condition by the presser foot 36 the material with which the carton is to be charged is introduced thereinto through the hopper 34.

This material is "struck" even with the top of the carton by means of a presser foot 38' on the opposite side of the hopper. While beyond the presser foot 38' another rotary winged or armed folder 39 engages the last or dragging side flap and folds it forward so that it, in common with the first flap, which has sprung up after leaving the presser foot, may be engaged by the folder guide 40. The two overlapping end flaps are thus held in proper relation while the front and rear flaps are folded successively down upon the same by the action of the folder guides 41 and 42 to bring the gummed or glue coated surface of the front flap into contact with the surface of the rear flap to effect the sealing of the carton top. The guide 42 is extended as shown at 43 to insure the proper setting of the glue or sealing material before releasing the flaps, so that an effective sealing of the top of the carton is assured.

Auxiliary lateral stops 44 are provided on the side walls of the carton feed runway to assist the stop finger in detaining the foremost carton until detached by the action of the plunger, so that the premature release of the carton is prevented. An adjustable connection is afforded between the check plate 26 and side walls of said runway, to allow for the necessary lateral adjustment of said walls. This connection consists of slots 45 formed in the check plate which are engaged by screws or pins 46 as clearly shown in Figures 1 and 3.

From the foregoing description the operation of the mechanism will be obvious in that it consists essentially in the successive removal of the cartons from the feeding mechanism and the preliminary spreading of the same by the insertion or introduction of the plunger which serves to effect the disengagement of the cartons from the restraining or detaining means in the outlet of said feeding mechanism, and the complete spreading of the carton into its normal shape by the joint action of the forwardly moving conveyor and the detaining or resistance devices in the carton guide or runway until the disposition of the bottom flaps is effected for the application of the sealing means preparatory to folding.

After the flaps of the bottom have been folded and sealed, the carton obviously will maintain its proper form while it is being carried successively under the upper presser plate and is being filled, while the folding of the top or cover flap is effected substantially by the equivalent of the means employed for folding the bottom flaps, so that the filled carton duly sealed top and bottom is delivered at the outlet end of the main guide or runway ready for packing and storing or shipping,—all of the moving parts of the mechanism being actuated by a common drive shaft so that a continuous operation upon successive cartons is effected with the resulting economy and accuracy in charging the containers.

Having described the invention I claim:—

1. A carton filling machine having a feeder provided with a runway having temporary checking means at its outlet, a carton guide disposed transversely to the outlet of the runway and having an endless conveyor traversing the same and provided with spaced flights for successively engaging cartons received from the feeder, spring influenced means for successively removing cartons from the feeder and arranging them in the paths of the flight of said conveyor, yielding restraining means arranged in the guide and in the path of advancing cartons for opposing the forward movement of the cartons carried by the conveyor, and angularly arranged U-shaped cam folders disposed in the path of the cartons for successively folding the flaps thereof to form the bottom.

2. A carton filling machine having an adjustable carton feeder, an endless conveyor for receiving cartons successively from the feeder, rotary means for gumming the bottom carton flap, and inclined outwardly U-shaped folding means for the flaps, a presser for spreading the top carton flap and including a rotary winged folder for advancing the foremost end flap, a filling hopper disposed in operative relation with the flap spreading means, and means for gumming and folding the top flaps after leaving said spreading and filling means.

In testimony whereof I affix my signature.
SHERMAN LADD.