W. L. & M. H. MONTGOMERY.

CARTON FILLING AND SEALING MACHINE.

APPLICATION FILED NOV. 19, 1914.

1,165,695.

Patented Dec. 28, 1915.

5 SHEETS—SHEET 1.

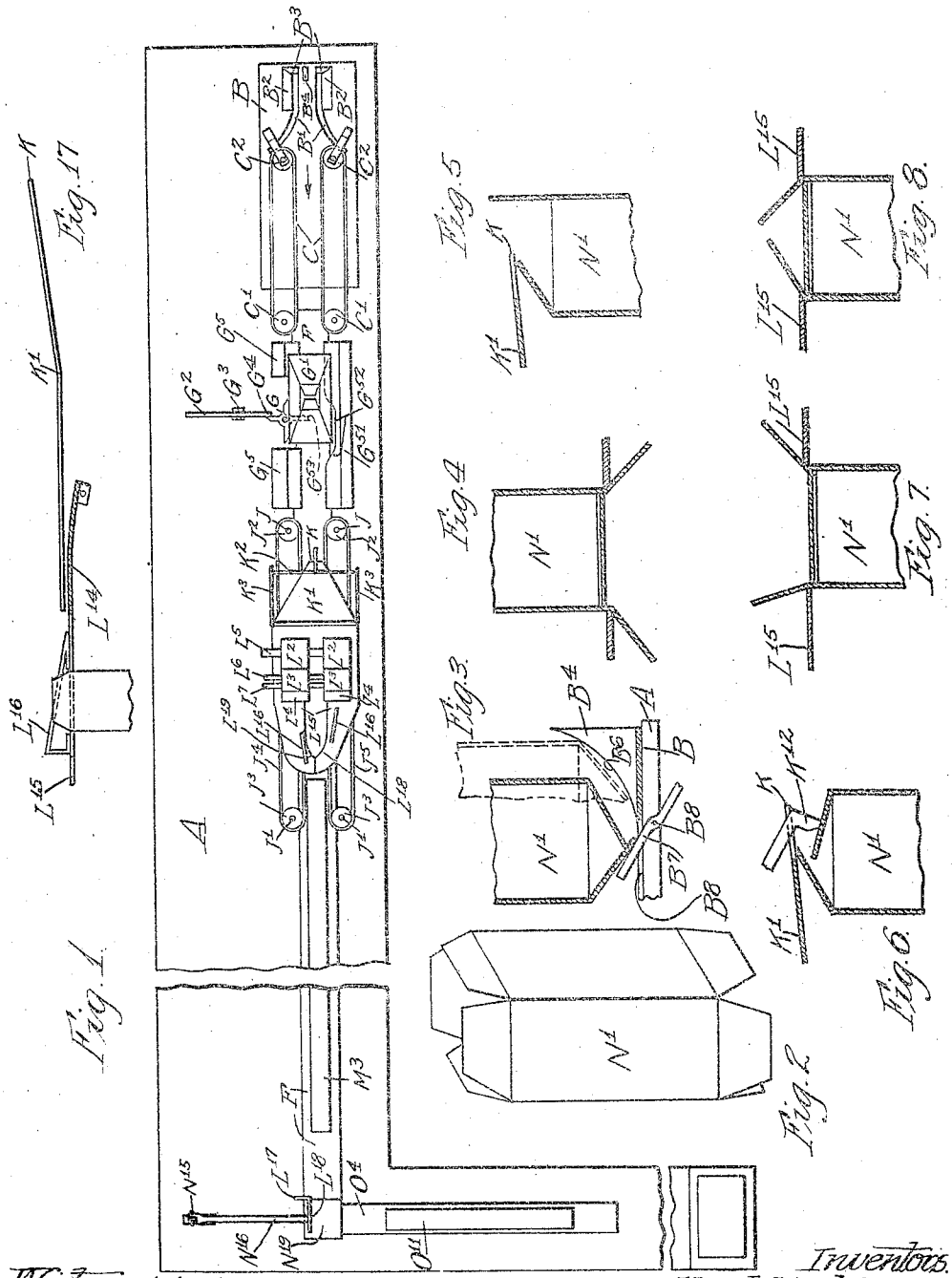


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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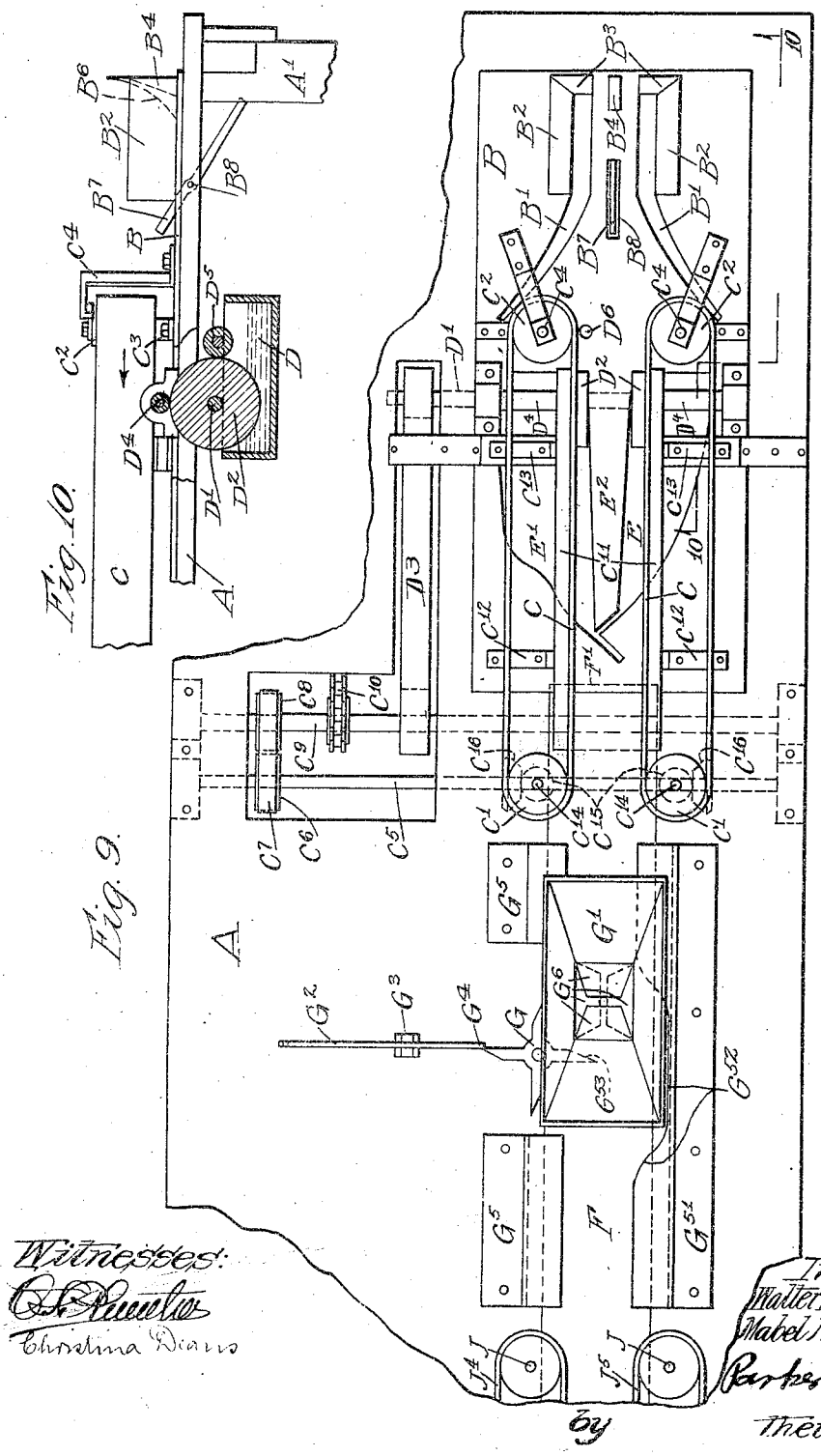


Fig. 10.

Fig. 9.

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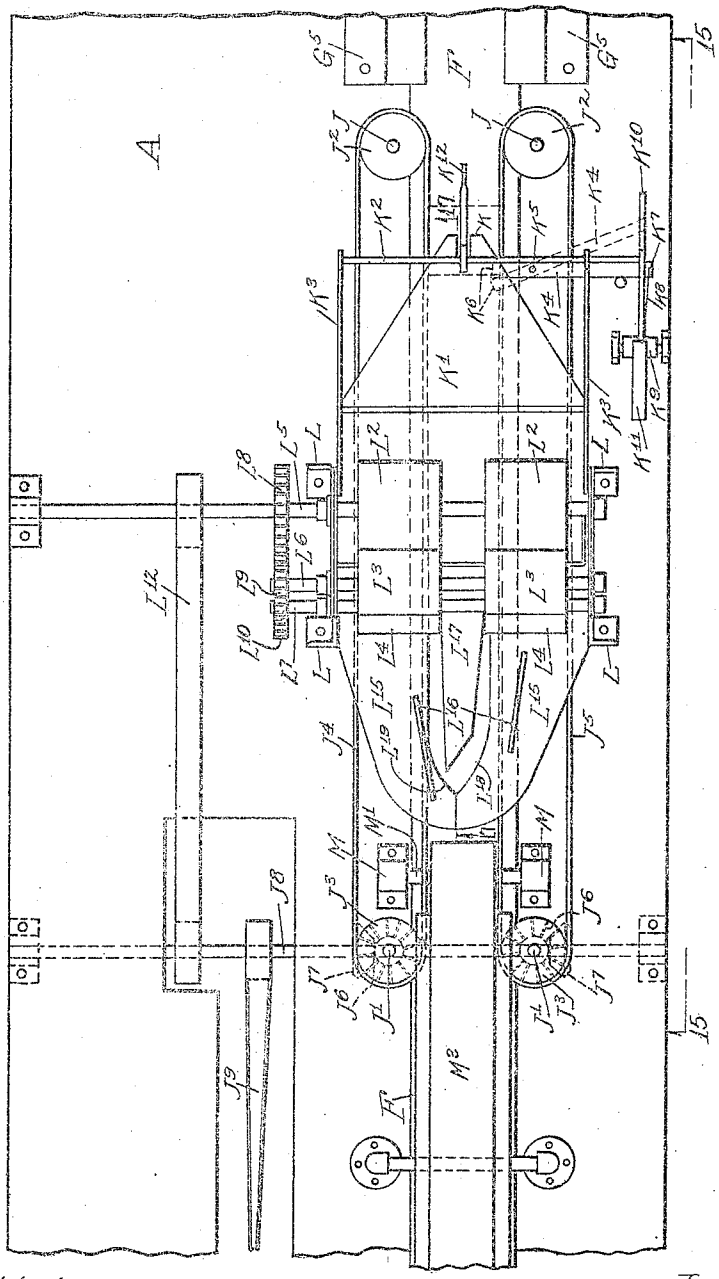
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5 SHEETS—SHEET 3.

Fig. 11.



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5 SHEETS—SHEET 4.

Fig. 15.

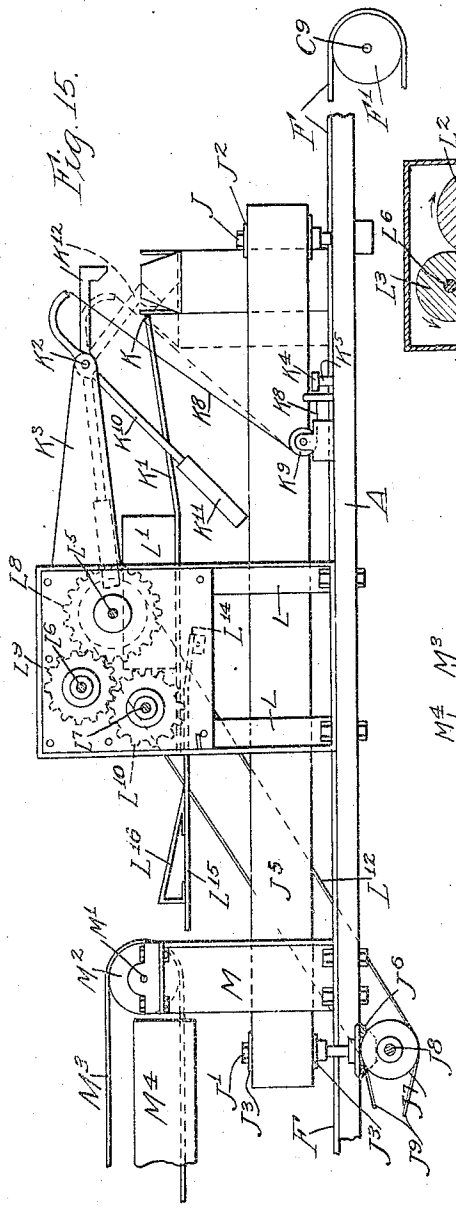
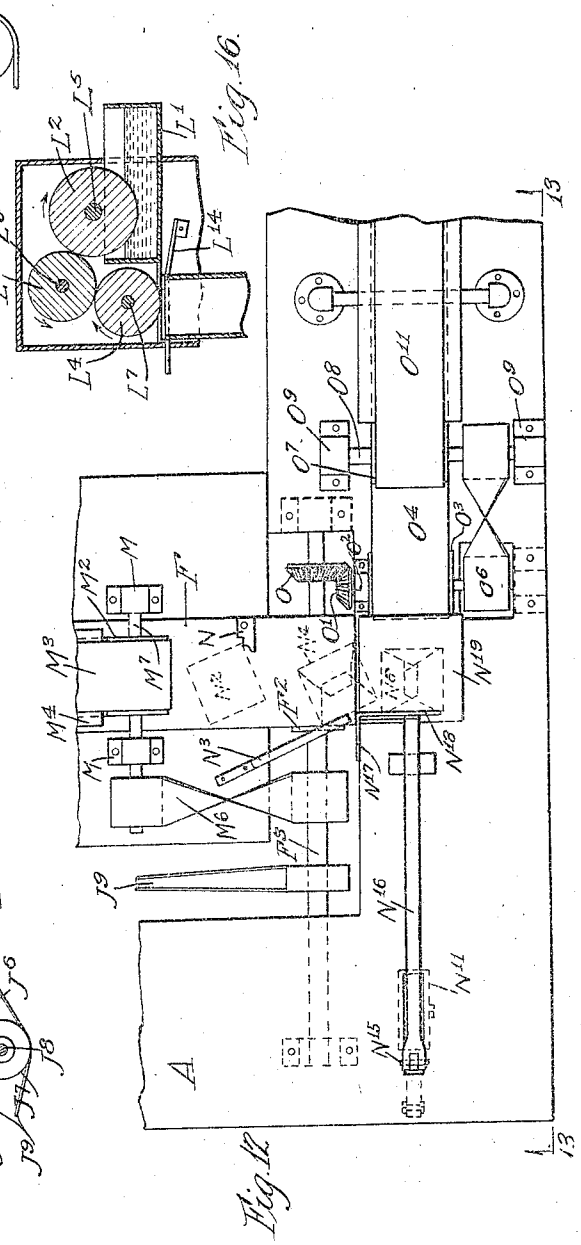


Fig. 16.



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5 SHEETS—SHEET 5.

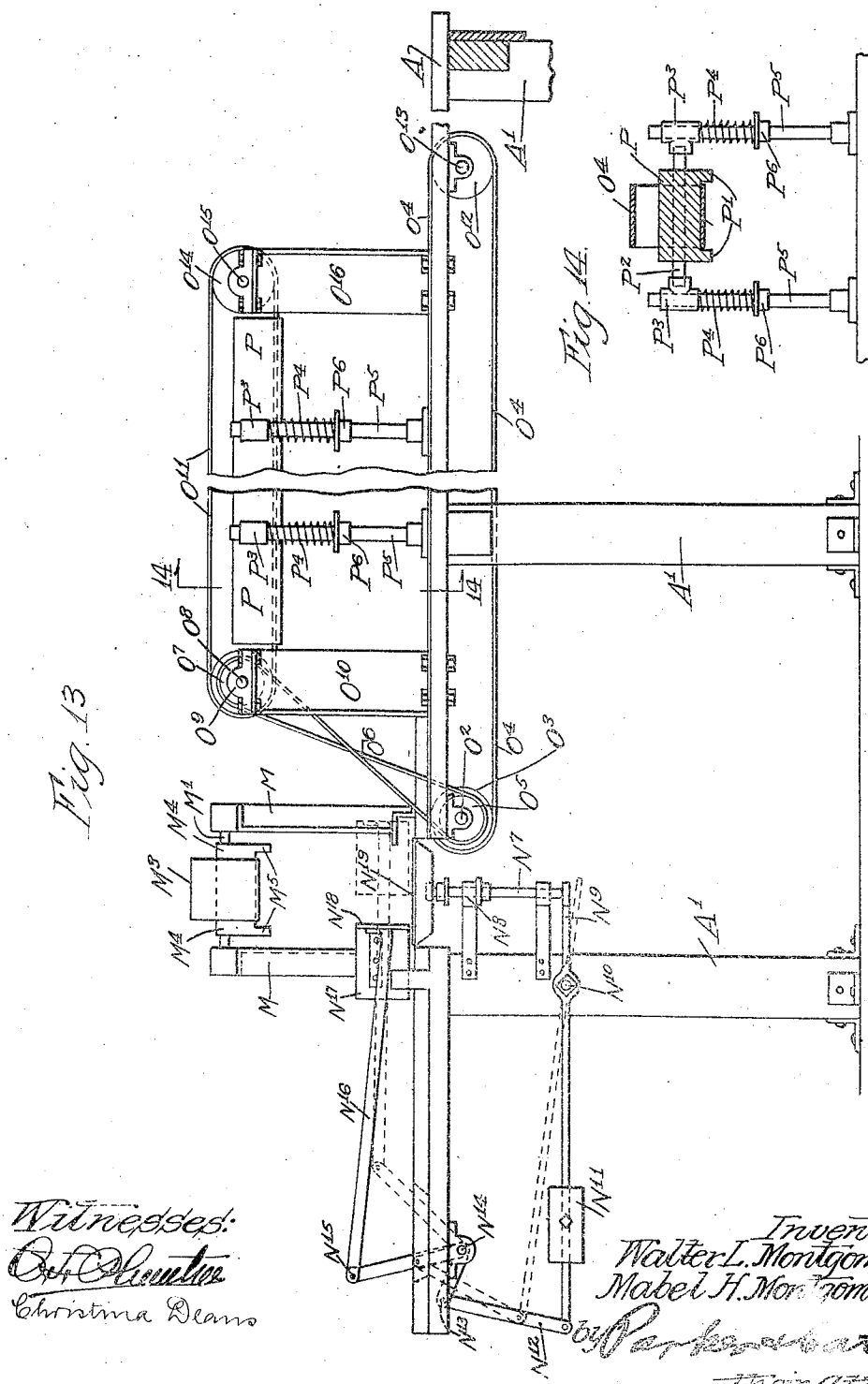


Fig. 13

Fig. 14

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UNITED STATES PATENT OFFICE.

WALTER L. MONTGOMERY AND MABEL H. MONTGOMERY, OF CHICAGO, ILLINOIS.

CARTON FILLING AND SEALING MACHINE.

1,165,695. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed November 19, 1914. Serial No. 872,930.

To all whom it may concern:

Be it known that we, WALTER L. MONTGOMERY and MABEL H. MONTGOMERY, citizens of the United States, residing at 1620 Leland avenue, Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carton Filling and Sealing Machines, of which the following is a specification.

Our invention relates to machines for sealing and filling cartons, and has for its object to provide means whereby from the collapsed carton tube a finished package may be produced by folding and sealing the bottom of the carton, filling the same, and folding and sealing the top. According to the means which we have set forth for the purpose of illustrating our invention, these several steps are performed in the order indicated above. This illustration of our invention is set forth in the accompanying drawings, wherein—

Figure 1 is a plan view somewhat diagrammatic of the machine; Fig. 2 is an elevation of the expanded carton; Fig. 3 is a cross-section of the carton in its first position; Fig. 4, a like view in its second position; Fig. 5, a like view in its third position; Fig. 6, a like view in its fourth position; Fig. 7, a like view in its fifth position; Fig. 8, a like view in its sixth position; Fig. 9 is an enlarged plan view of the bottom sealing and filling section of the machine; Fig. 10, a cross-section on the line 10—10 of Fig. 9; Fig. 11, an enlarged plan view of the top sealing section of the mechanism; Fig. 12 is a plan view of the conveying section of the mechanism; Fig. 13 is an elevation on the line 13—13 of Fig. 12, showing the conveying mechanism; Fig. 14 is a detail on the line 14—14 of Fig. 13; Fig. 15 is a side elevation on the line 15—15 of Fig. 11; Fig. 16 is a detail cross section of the top flap gumming device; Fig. 17 is a detail side elevation on the line 17—17 of Fig. 11.

Like parts are indicated by the same letter in all the figures.

A is a table of any desired size, shape or thickness supported on the legs or pedestals A^1 A^1, or otherwise in any desired manner.

B is a plate preferably of brass set in or mounted on the table, and is provided with two slots B^1, B^1, shaped somewhat as shown, though the size, shape a arrangement of these slots could be greatly altered.

B^2, B^2, are the inclined sides of a bottom folding device rising from the outer edges of the slots, and B^3, B^3, are end pieces attached to such sides to form the end of the bottom folder.

B^4 is a rear flap guide with an inclined face B^6.

B^7 is a front flap guide lever pivoted in a slot in the table at B^8 and its upper end into the path of the carton.

Thus when the expanded carton such as illustrated in Fig. 2 is pressed down into the bottom folder, the front and rear flaps of the bottom are folded inwardly as shown in Fig. 3 while the side flaps pass down through the slots. When the carton has been brought to the lower end of its downward excursion, it is pushed forward in the direction indicated by the arrow in Fig. 1, and by this action the side flaps will be thrown outwardly as indicated in Fig. 4 until they have assumed a substantial horizontal position. By further pushing the carton forward along the brass plate and table, it will pass between the vertical belts C, C, which are carried by the vertical pulleys C^1, C^2. The pulleys C^2 are mounted on a shaft supported in the lower bearings C^3 and upper bearings C^4 which are respectively secured to the table or brass plate. The pulleys C^1, C^1, are mounted and driven by means of the driving connections from the shaft C^5, pulley C^6, belt C^7, pulley C^8 from the main drive shaft C^9, which is itself driven by the link belt C^{10}. The arrangement is such that the two belts C, C, are given a forward motion in the direction indicated by the arrow in Figs. 1 and 10 so that the cartons will be carried forward and maintained in an erect position by the two belts.

C^{11}, C^{11}, are plates within the belts to furnish a backing for them. These plates are held in position by angle bar braces C^{12}, C^{12}, and C^{13}, C^{13}, secured to the brass plate or the table or both. The driving connections from the vertical pulleys C^1, C^1, to the driving shaft consists of the vertical shafts C^{14}, C^{14}, beveled gears C^{15} thereon, meshing with the beveled gears C^{16}, C^{16} on the shaft C^5.

D is a gum receptacle over which is mounted on the shaft D^1, the two-part gumming roll D^2 which dips into the gumming receptacle and carries it to the line of travel of the laterally extending, horizontally dis-

posed lower flaps of the forwardly moving carton. The two ends of the two-part roll D^2 are seen through the openings hereinafter to be described, as illustrated in Fig. 9, and the shaft D^1 is driven by the belt D^3 from the main driving shaft C^9.

D^4, D^4, are short bearing rolls mounted above and bearing upon the two sections of the gumming roll.

D^5 is a wiper roll bearing against a section of the roll D^2 to prevent it from taking up too much gum or adhesive material.

D^6 is an opening in the brass plate whereby adhesive liquid may be supplied to the receptacle.

As the carton in its erect position is moved forward by and between the belts C, C, its two laterally extending lower flaps are gummed along their edges by the action of the gumming roll sections and the bearing rolls thereover.

The brass plate B is provided with two apertures E, E^1 on opposite sides of the tongue E^2, and these two apertures have forwardly formed edges as indicated in Fig. 9 though, of course, these edges can be given any desired shape and arranged in any desired manner. As the carton moves forward the gummed edges of the two lower flaps begin to approach and overlap each other, being inwardly folded by the action of the forward edges E, E^1, and eventually by the action of these two edges the two flaps will be folded together, the first to fold bringing its gummed edge against the previously folded front and rear flaps, the last to be folded bringing its gummed edge up onto the outside of the previously folded side flap, and thus the bottom seal is completed.

F is a belt which passes over the pulley F^1 at one end immediately adjacent the bottom sealing device, and at its other end over a pulley F^2 mounted on a shaft F^3 driven by the belt F. The shaft F^3 drives by means of the belt F^9 the shaft J^8. The carton so sealed at the bottom and open at the top is carried by means of the belt F forward until it comes against one of the projecting arms of the star wheel G at which time the carton will be found to be under the open mouth of the funnel G^1. Here the carton will stand resisting the tendency of the belt to move it forwardly until released. An automatic scale not shown operates to set aside a measured quantity which is then poured into the funnel G^1 and thence to the carton. When all of this measured quantity has been disposed of, the trip lever G^2 pivoted at G^3 and provided with the end G^4 in the path of one arm of the star wheel, will tilt being actuated by any suitable weighing mechanism upon which the carton is supported while at rest, so as to release the star wheel, whereupon the filled but open carton will be moved forward by the belt F. The arrangement is such that immediately the scale begins to refill the measured quantity in the receptacle this restores the trip lever G^2 to its position so that it engages an arm of the star wheel and arrests it preparatory to its action as a stop for the next oncoming carton.

We do not show the scale mechanism as that is no part of our invention. It is only necessary to provide a device which shall deliver successively measured quantities to the funnel, and simultaneously with the delivery thereof release the carton.

G^5, G^5, are guide brackets mounted on the table and adapted to furnish a runway to hold erect and guide the carton.

G^6 are guide aprons hinged to the lower edge of the funnel adapted to direct the material from the funnel into the carton.

J, J, J^1, J^1, are vertical shafts carrying respectively the pulleys J^2, J^2, and J^3, J^3, whereon are mounted the two vertical belts J^4, J^5. The shafts J^1, J^1, are each provided with a beveled wheel J^6 meshing with the beveled gear J^7 on the transverse shaft J^8 which is connected by means of the belt J^9 with the driving means. The carton is carried forward on the belt F and between the belts J^4 and J^5, and its upper front flap is folded by means of the forwardly projecting end K of the plate K^1. This plate K^1 is widened out toward its base so as to serve also as the means of spreading the two side flaps and bringing them ultimately in a horizontal position. K^2 is a shaft supported in the horizontal bars K^3 which are suitably secured on the frame. K^4 is a lever pivoted at K^5 and having an end K^6 which projects into the path of the carton, and an end K^7 to which is attached a cord K^8 which passes over a pulley K^9 and is secured at its upper end to a lever K^{10} which is secured to the shaft K^2, and has a free weighted end K^{11}.

K^{12} is a hammer projecting from the shaft K^2 and adapted when the parts just described are operated, by the engagement of the moving carton with the lever K^4, to strike the rear upward flap of the carton, and cause it to pass under the plate K^1 so that the front and rear flaps to be folded are held down while the side flaps are laterally extended as is indicated in Fig. 6.

L, L, are the members of a frame suitably mounted on the main frame, said frame adapted to hold the glue receptacle L^1 and the series of two-part glue rollers L^2, L^3, L^4, whereby the glue is lifted from the receptacle, and properly distributed and finally applied to the flaps of the carton as it passes underneath the glue receptacle. These sets of glue rollers are mounted on shafts L^5, L^6, L^7, whereby they are all driven from the shaft L^5 connected by L^{12} to the shaft J^8. The gear wheels L^8, L^9 and L^{10} intermesh.

L^{14} are plates suitably mounted and extending under the side flaps and adapted to hold them up against the glue rollers.

L^{15}, L^{15} are plates along and over which the flaps pass after the glue has been applied to them. Each contains a deflector L^{16} arranged to successively lift the two flaps.

L^{17} is a finger which rides upon the top of the carton holding the two end flaps in position.

L^{18} and L^{19} are suitably mounted curves on the inner edges of the separated plates L^{15}, L^{15}, adapted to complete the inward folding of the side flaps as suggested in Figs. 7 and 8. The folded flaps pass under the forward adjacent ends of the plates L^{15}, L^{15}, where they are pressed together.

M, M are standards mounted in two groups on the frame, and provided with bearings for the shafts M^1, M^1, which carry the pulleys M^2, M^2 for the belt M^3. This belt is adapted to coöperate with the belt F to hold the sealed bottom and top of the carton and move it along.

M^4 is a weight between the folds of the belt M^3 and adapted to ride on the lower reach thereof. This weight has downwardly projecting edges M^5 to inclose the upper end of the carton and hold it in position. The weight is preferably adjustably held by means of a structure which is exactly like that illustrated in Fig. 14 hereafter to be described. One of the shafts M^7 is provided with a pulley coöperating with a like pulley on the shaft F^3 and the two are connected by the twisted belt M^6 whereby the belt M^3 is driven. By this means the forward carton is given opportunity to dry and is carried to the end of its direct excursion.

N is a projection in the path of the carton near the end of its excursion and adapted to throw the carton N^1 to one side and slightly turn it as indicated at N^2. In this position it travels forward ultimately striking the deflector N^3 which throws it in the position indicated at N^4, and finally discharges it in the position indicated at N^6, on the table N^{19} which is supported by a vertical rod N^7 in the bearings N^8 and rests upon, or at its lower end is attached to the lever N^9 pivoted at N^{10}, and provided with an extending arm which carries the weights N^{11} and is connected at its outer end with the link N^{12} which is attached at N^{13} to one end of an elbow crank lever pivoted at N^{14} and connected at N^{15} with the long link N^{16}, which is connected to the pusher formed of the two plates N^{17}, N^{18} at right angles to each other. As the table N^{19} descends under the influence of the weight of the package delivered upon it, this system of levers and links is operated to cause the pusher to force the carton to the right as indicated in Fig. 12 off of the platform while at the same time the part N^{17} of the pusher prevents fouling of the apparatus of the delivery onto the plate of another carton. The shaft F^3 is provided with the gear wheel O meshing with the wheel O^1 on the short shaft O^2 which carries the pulley O^3 which drives the lower belt O^4. The shaft also carries a pulley O^5 adapted to drive the twisted belt O^6 to operate the pulley O^7 on the shaft O^8, which shaft is supported in bearings O^9 on the top of the standards O^{10} and drives the belt O^{11}. The other end of the belt O^4 is supported by the idler pulley O^{12} on the shaft O^{13}, and the other end of the belt O^{11} is supported by the pulley O^{14} on the shaft O^{15} which is mounted in suitable bearings on the uprights O^{16}.

To properly weigh the packages and hold their sealed ends together as they pass on between these upper and lower belts O^4 and O^{11}, we provide the weight P provided with downwardly projecting parts P^1 which inclose the carton. This weight lies between the reaches of the upper belt and rests upon the lower reach of that belt. A pin P^2 passes through the weight and is secured at each end to the slides P^3 upwardly held by spiral springs P^4 on the standards P^5 which are provided with the set nuts P^6 whereby the tension of the springs and the effective pressure of the weight P may be adjusted. There may be a series of these weight supporting apparatuses arranged along the conveyer, and the conveyer may be of any desired length.

The guide bracket G^{51} is cut away as indicated both in Fig. 9 and in Fig. 1 as at G^{52} at a point opposite the star wheel G so that when the star wheel is released and it commences to rotate responsive to the pressure of the carton against it the inclined surface G^{53} on the end of the star wheel will by pressing against the forward right-hand corner of the carton tend to press it over into the cut-out portion of the guide. This separates the filled carton from the approaching empty one and permits the next finger of the star wheel to penetrate the two cartons.

The use and operation of our invention are as follows: In the first place, we wish to say that while we have illustrated somewhat in detail a structure which sets forth our invention, we do not wish to be limited to the particular size, form, shape and arrangement of the several parts or even to their grouping, as very considerable alterations in these particulars can obviously be made without departing materially from the spirit of our invention.

Broadly speaking, our invention comprises a series of elements which coöperate together to produce the total unitary result. There is a conveyer which is provided with varying means for holding and carrying the carton and which may have means for deflecting the carton from one line of travel to another.

It contains also means for holding two lower flaps, means for spreading two lower flaps, means for gumming two lower flaps, means for folding the gummed lower flaps, means for filling the carton responsive to the movement of the carton, means for folding two upper flaps of the filled carton, means for spreading two upper flaps, means for gumming two upper flaps, means for folding the gummed upper flaps, means for holding the gummed and folded ends of the carton as it is moved along, means for deflecting the carton to a new line of travel and means for holding the gummed and folded ends and conveying the carton. The exact sequence of these several operations naturally can be varied. As here illustrated, the sequence is as follows. The front and rear lower flaps are folded together to partially finish the bottom of the carton by the process of inserting it or bringing it into operative relation on the machine and by moving it toward the other operating parts. By this motion the lower flaps which have not been folded together are spread laterally into a horizontal position and then carried over the gumming roll arrangement whereby the edges of such flaps are supplied with adhesive fluid. The gummed flaps are then folded over together by the action of the perforated plate and its several parts and thereafter the gummed and sealed bottom of the carton rests upon the supporting belt or table. The carton so far completed is then passed under the filling apparatus, which automatically arrests the progress of the carton, directs or guides a measured quantity of material into it and then releases it so that the conveyer belt carries it forward. During most of its travel it is supported by a lower belt and during a considerable part of the travel between a side vertical guide belt and during a considerable part of the travel between an upper and lower belt. As soon as the package is filled, it passes into the apparatus which as it progresses first pushes forward the upper flap down into folded position and then knocks the rear flap into a folded position and laterally extends the side flaps. These then pass under the gumming roll, and while the folded portions are held in position by a finger, they are first slightly raised and then subsequently folded one on the other to complete the closure. The cartons then pass forwardly between the belts arranged one above another and adapted to hold the carton by its sealed ends while it is being carried forward. Pressure may be applied by means of the weights through the belts to the upper slotted end. If it is desired that the direction of travel of the package be changed, this is accomplished automatically by means of the deflecting devices and the movable table and pusher operated by it, whereupon the finished and more or less dried package is delivered to another conveyer with belts arranged one above the other and conveyed to any desired place. The particular method of communicating motion from one part to another or to all the parts from the drive mechanism is unimportant, as it can, of course, be greatly varied to suit any particular situation and the convenience of the operator.

We claim:

1. In a carton sealing and filling machine, the combination of an inclined folding device for the rear lower flap with an inclined pivoted folding device for the front flap, and a table with slots outwardly inclined in the direction of movement of the carton laterally extended side flaps.

2. In a carton sealing and filling machine, the combination of an inclined folding device for the rear lower flap with an inclined pivoted folding device for the front flap, a table with slots outwardly inclined in the direction of movement of the carton laterally extended side flaps and upwardly extending curved guides to direct the side flaps into such slots.

3. In a carton sealing and filling machine, the combination of an inclined folding device for the rear lower flap with an inclined pivoted folding device for the front flap, and a table with slots outwardly inclined in the direction of movement of the carton laterally extended side flaps, and separated gumming rolls which apply adhesive material to the edges of the side flaps when in their extended position, said gumming rolls being in the line of travel of the carton.

4. In a carton sealing and filling machine, the combination of an inclined folding device for the rear lower flap with an inclined pivoted folding device for the front flap, a table with slots outwardly inclined in the direction of movement of the carton laterally extended side flaps and upwardly extending curved guides to direct the side flaps into such slots and separated gumming rolls which apply an adhesive material to the edges of the side flaps when in their extended position, said gumming rolls being in the line of travel of the carton.

5. In a carton sealing and filling machine, the combination of means for folding the front and rear flaps with means for laterally extending the side flaps, means for gumming the same and means for folding the gummed side flaps in on the other flaps comprising curved surfaces in the line of travel of the carton and differing between themselves so as to fold the side flaps in succession and an upwardly projecting finger which underlies the folded front and rear flaps and holds them in position.

6. In a carton sealing and filling machine the combination of means for folding the

front and rear flaps with means for laterally extending the side flaps, means for gumming the same and means for folding the gummed side flaps in on the other flaps comprising curved surfaces in the line of travel of the carton and differing between themselves so as to fold the side flaps in succession, said curved surfaces forming the forward edges of large apertures in the supporting table and an upwardly projecting finger which underlies the folded front and rear flaps and holds them in position.

7. In a carton sealing and filling machine, the combination of a rear flap folding above with a front flap folding device consisting of a lever, a table having a slot in which the lever is pivoted, said lever downwardly inclined toward the carton so as to fold the forward flap and permit the carton to move forwardly over such lever.

8. In a carton sealing and filling machine, the combination of means for moving the filled carton forwardly with a plate in the path of the carton to fold the forward flap, and a movable lever adapted to strike and fold the rear upper flap of the carton as it moves forward, said lever operatively controlled by a mechanism part of which lies in the path of the carton and is operated by the moving carton to move the lever.

9. In a carton sealing and filling machine the combination of means for moving the filled carton forwardly with a plate in the path of the carton to fold the forward flap, said plate inclined from the level of the carton top upwardly toward the approaching carton, and a movable lever adapted to strike and fold the rear upper flap of the carton as it moves forward, said lever operatively contfolled by a mechanism part of which lies in the path of the carton and is operated by the moving carton to move the lever.

10. In a carton sealing and filling machine the combination of means for moving the filled carton forwardly with a plate in the path of the carton to fold the forward flap and a movable lever adapted to strike and fold the rear upper flap of the carton as it moves forward, said lever operatively controlled by a mechanism part of which lies in the path of the carton and is operated by the moving carton to move the lever.

11. In a carton sealing and filling machine the combination of means for moving the filled carton forwardly with a plate in the path of the carton to fold the forward flap, said plate inclined from the level of the carton top upwardly toward the approaching carton, and a movable lever adapted to strike and fold the rear upper flap of the carton as it moves forward, said lever operatively controlled by a mechanism part of which lies in the path of the carton and is operated by the moving carton to move the lever.

12. In a carton sealing and filling machine means for holding the carton erect and moving it forwardly, in combination with a lever pivotally mounted above the carton, another lever pivotally mounted in the path of the carton and operative means connected one to the other whereby the upper lever is downwardly rocked to forwardly fold the rear upper flap of the filled carton when the lower lever is rocked by the forward movement of the carton.

13. In a carton sealing and filling machine means for holding the carton erect and moving it forwardly, in combination with a lever pivotally mounted above the carton, another lever pivotally mounted in the path of the carton and operative means connected one to the other whereby the upper lever is downwardly rocked to forwardly fold the rear upper flap of the filled carton, and a weighted arm connected with the upper lever to restore the parts to their normal position after the carton has passed.

14. In a carton folding machine, a support and means for feeding cartons along it, a plate located above the support distant therefrom, approximately the height of the carton, said plate being tapered and having inclined bounding walls framing in the direction of movement of the carton, the plate at its discharge end being slotted and provided with a finger in said slot, the slots being formed one on either side of said finger and merging immediately beyond the finger being bounded by two converging curved surfaces, the finger having an inclined bounding wall in line with the movement of the carton.

15. In a carton folding machine a carton supporting slotted plate, the slots being outwardly diverging, means for moving the carton along said plate, the plate being provided with a finger integral therewith in line with the movement of the carton and apertured on either side thereof to permit passage of the carton flaps, the aperture being bounded by converging walls terminating in two intersecting slots immediately beyond the end of the finger and in line with the path of the carton.

16. In a carton folding machine, a support and means for feeding cartons along it, a plate located above the support distant therefrom, approximately the height of the carton, said plate being tapered and having inclined bounding walls framing in the direction of movement of the carton, the plate at its discharge end being slotted and provided with a finger in said slot, the slots being formed one on either side of said finger and merging immediately beyond the finger being bounded by two converging

curved surfaces, the finger having an inclined bounding wall in line with the movement of the carton, and gum applying means in line with said plate.

17. In a carton folding machine a carton supporting slotted plate, the slots being outwardly diverging, means for moving the carton along said plate, the plate being provided with a finger integral therewith in line with the movement of the carton and apertured on either side thereof to permit passage of the carton flaps, the aperture being bounded by converging walls terminating in two intersecting slots immediately beyond the end of the finger and in line with the path of the carton, and gum applying means in line with said plate.

Signed at Chicago, Illinois, this 29th day of October, 1914.

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