Feb. 2, 1926. 1,571,716

V. S. FISHWICK

CARTON FILLING MACHINE

Filed March 30, 1925 5 Sheets-Sheet 1

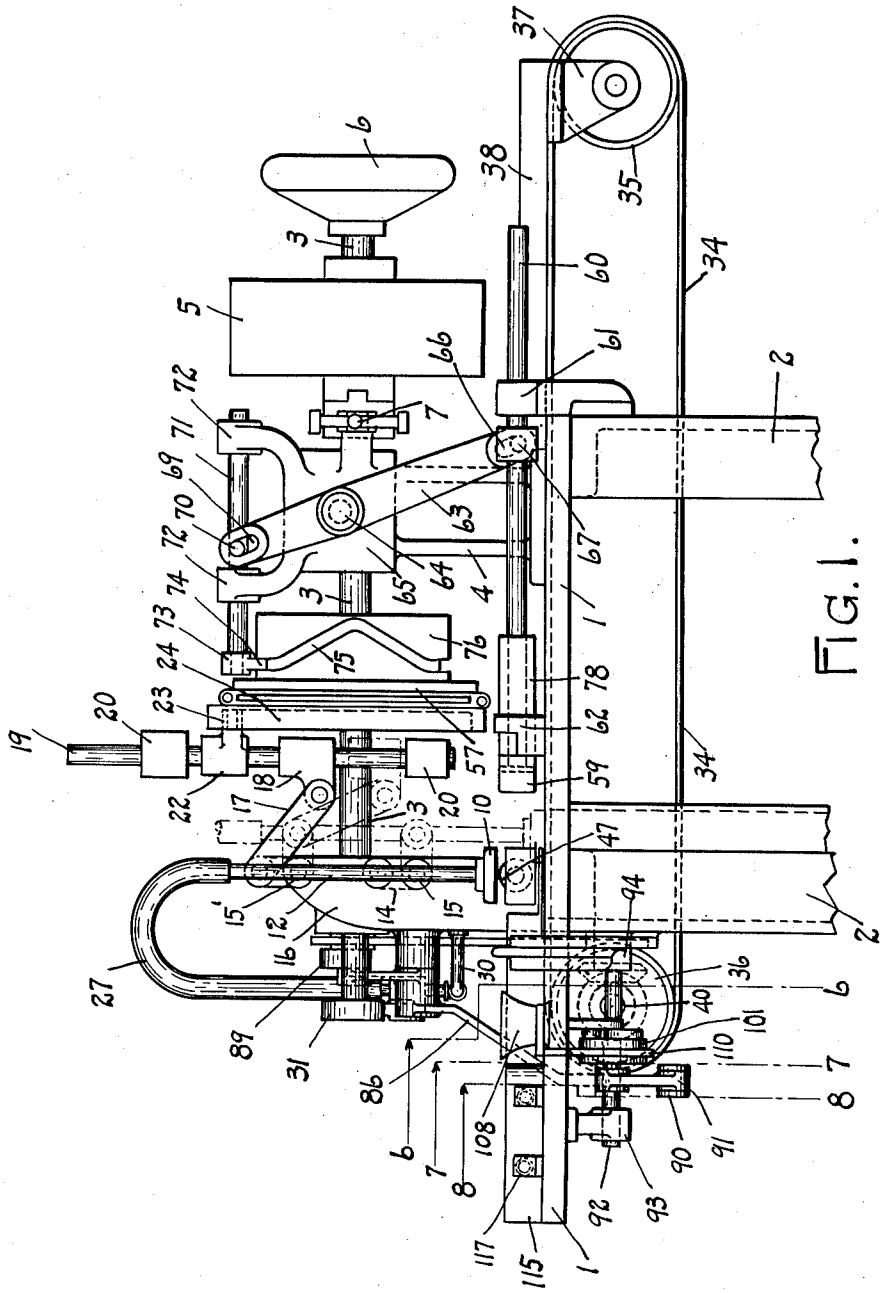


FIG. 1.

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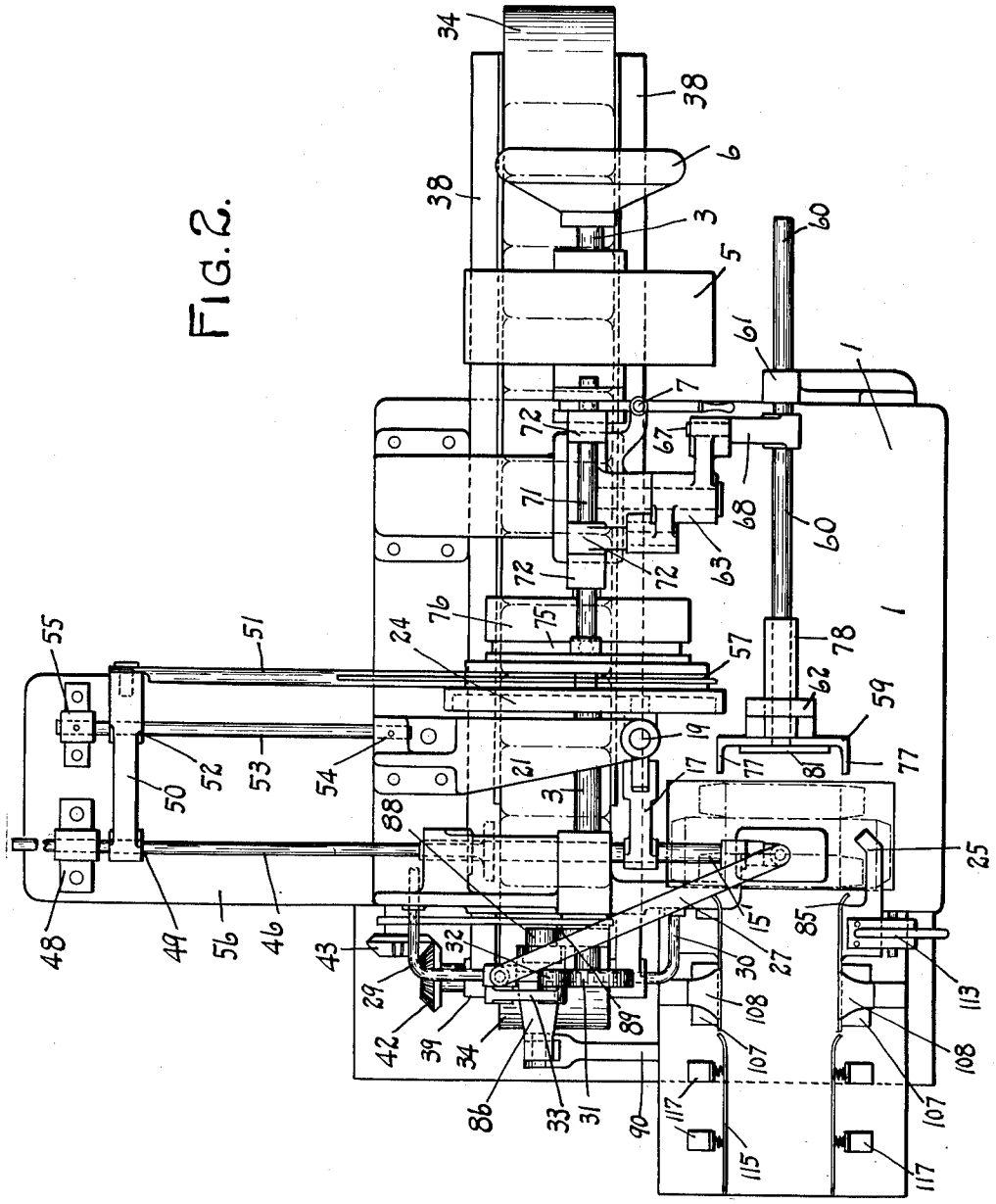
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FIG. 2.



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FIG. 3.

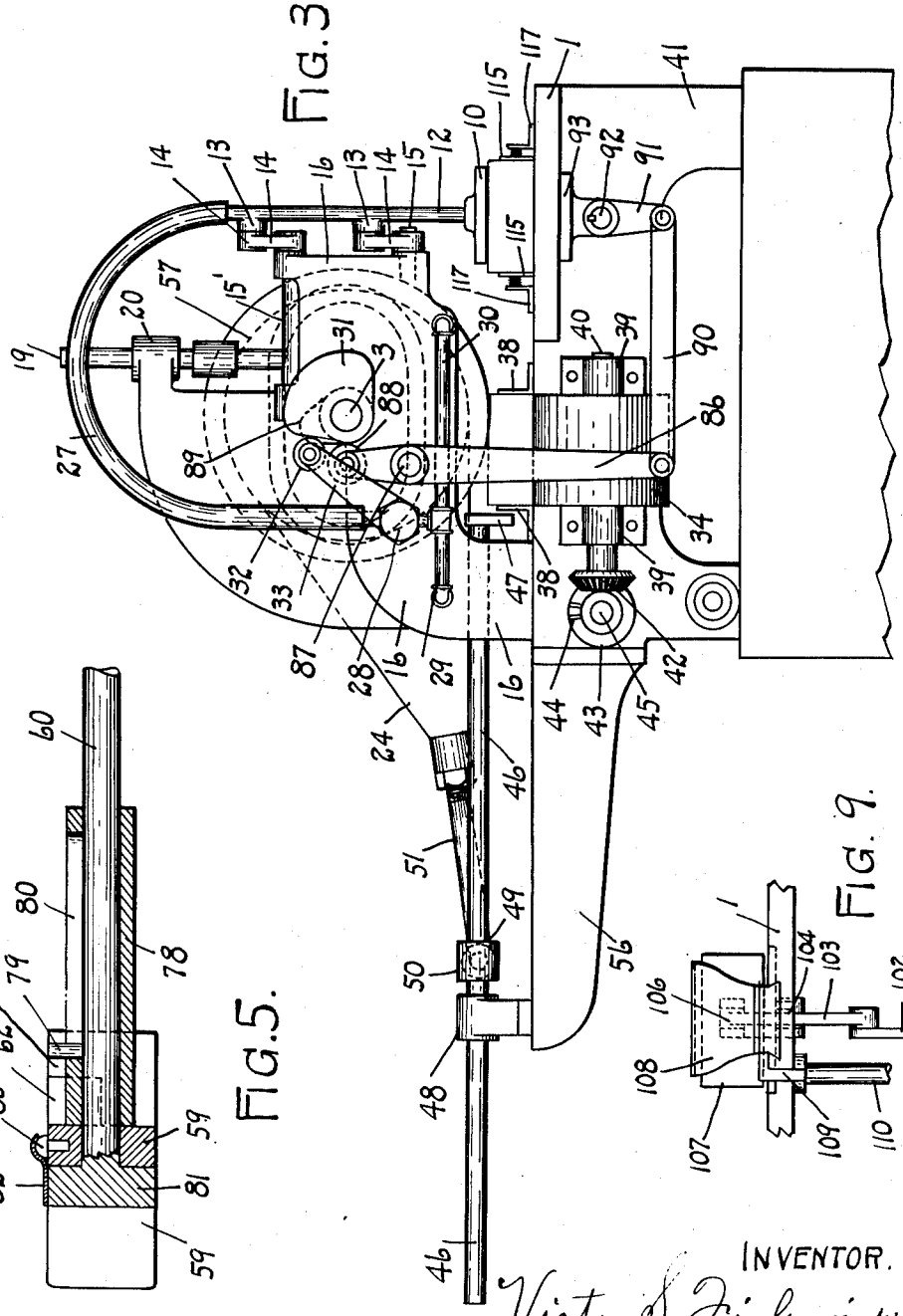


FIG. 5.

FIG. 9.

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CARTON FILLING MACHINE

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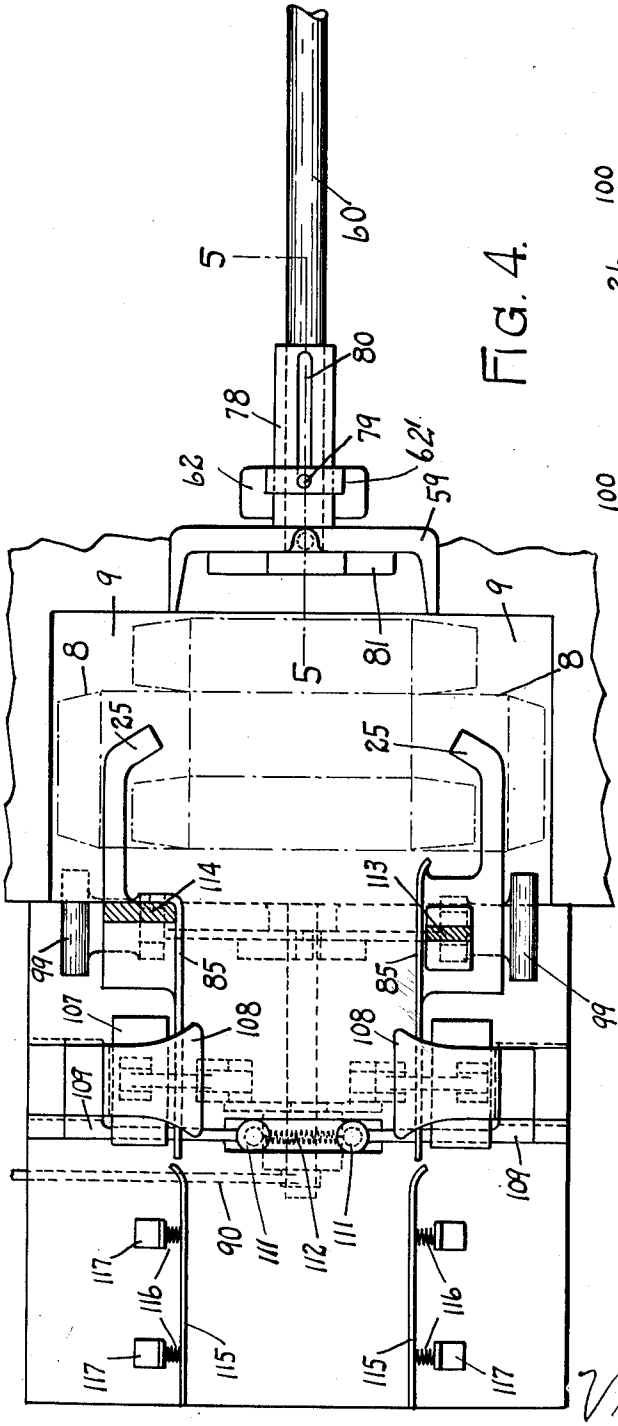


FIG. 4.

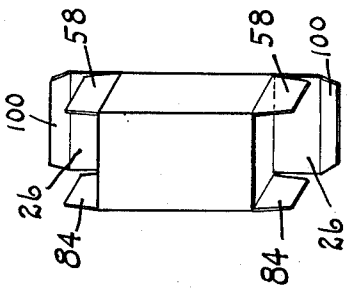


FIG. 10

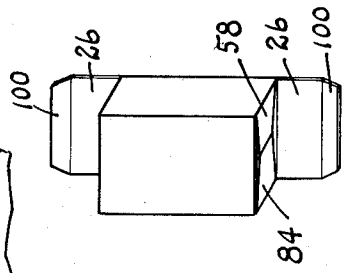


FIG. 11.

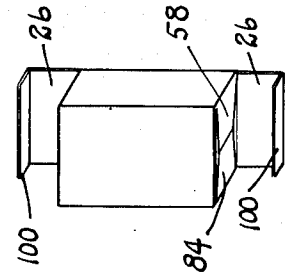


FIG. 12.

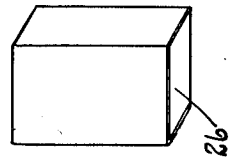


FIG. 13.

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CARTON FILLING MACHINE

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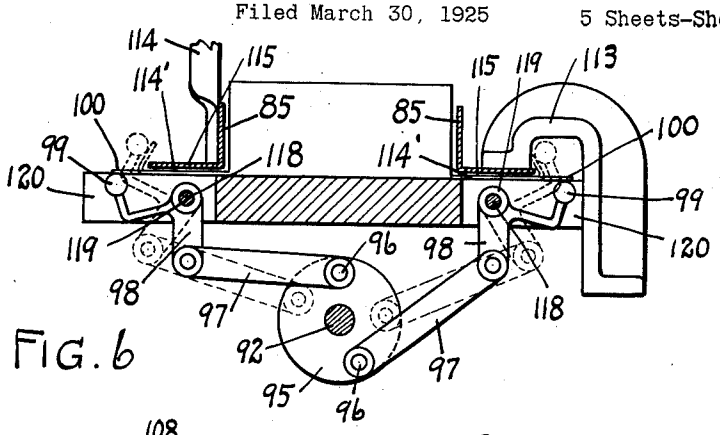


FIG. 6

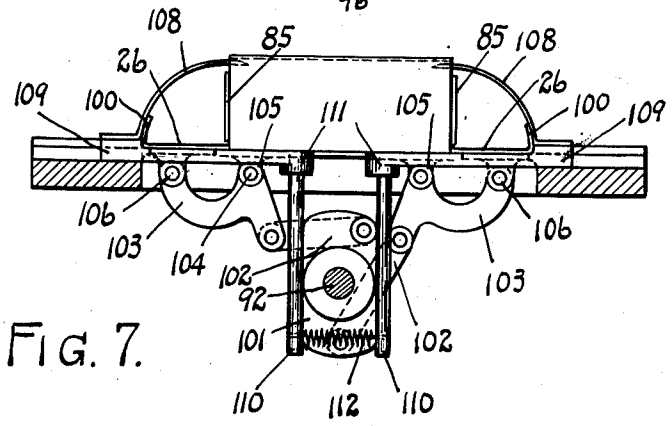


FIG. 7.

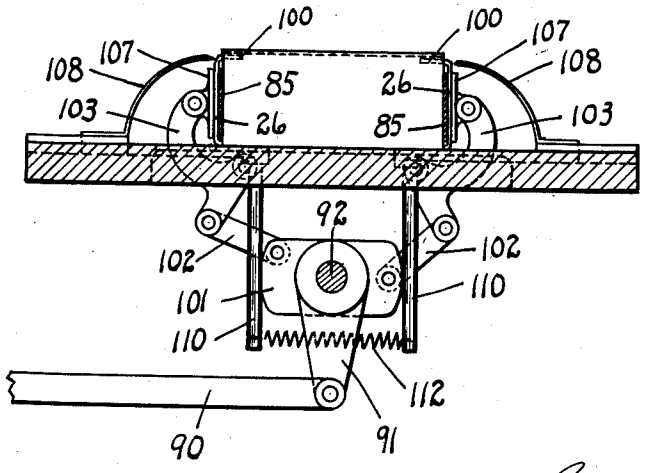


FIG. 8.

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Patented Feb. 2, 1926. 1,571,716

UNITED STATES PATENT OFFICE

VICTOR S. FISHWICK, OF CINCINNATI, OHIO.

CARTON-FILLING MACHINE.

Application filed March 30, 1925. Serial No. 19,227.

To all whom it may concern:

Be it known that I, VICTOR S. FISHWICK, a citizen of the United States, residing at the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Carton-Filling Machines, of which the following is a specification.

It is the object of my invention to arrange parts, combinations and mechanisms in order to evolve a simple and highly efficient machine for placing articles into cartons or receptacles, automatically, at predetermined periods, means being provided for automatically feeding the carton to its initial starting point; and providing novel mechanism for closing the side and end flaps of the filled carton, systematically, quickly and in a dependable way, so that when the operation is completed, the finished package is as perfect as if manually performed and is safely closed against ordinary handling and usage.

The various features and advantages of my invention will readily become apparent from reading the following specification and claims, which set forth in detail one form of carrying my invention into effect.

In the accompanying drawing, forming part of this specification:

Fig. 1, is a side elevation of my new machine, with the legs or supports broken away.

Fig. 2, is a plan view,

Fig. 3, is an end view,

Fig. 4, is an enlarged plan view of the folding mechanism employed by me,

Fig. 5, is a section taken on line 5—5 of Fig. 4,

Fig. 6, is a section taken on line 6—6 of Fig. 1,

Fig. 7, is a section taken on line 7—7 of Fig. 1,

Fig. 8, is a section on line 8—8 of Fig. 1,

Fig. 9, is an end elevation of the parts shown in Fig. 8,

Figs. 10, 11, 12 and 13 are isometric views of the carton, illustrating the different steps through which the carton passes in its formation by the machine.

In the accompanying drawings, I show a table 1 supported on legs 2. A drive shaft 3 is supported in the bracket 4 mounted on table 1. Shaft 3 is driven by the pulley 5, when used with power. A hand wheel 6 is present, if the machine is to be operated by hand. A clutch 7 is used to engage or disengage the pulley 5, which is securely mounted in shaft 3 in order to operate the machine.

The box blanks 8 as shown in dot and dash lines in Fig. 4, are nested in the hopper 9, and are drawn open as shown in Fig. 10, by a vacuum cup 10, supported on a vacuum tube 12. At points 13 I pivotally mount the levers 14, the other end of said levers being mounted on the ends of the shaft 15, 15′; which are supported in a support or housing 16. In order to operate the vacuum cup 10, I provide a link 17 having one end mounted on the shaft 15′, the other end of the lever being pivotally mounted on a support bearing 18, on a shaft 19, which shaft is slidably mounted in the housing bearings 20 of a bracket or housing 21. The shaft 19 is operated up and down by reason of bearing 22 being securely mounted thereon, this bearing carrying a roller 23 which engages in a disk slot cam 24, which is mounted on main shaft 3. As this shaft revolves the disc slot cam 24 revolving with the shaft causes the shaft 19 to slide up and down through the medium of the bearing 22; said shaft 19, also carrying a bearing 18 draws the link 17 downward, which acting on the shaft 15′ causes the levers 14 to travel over and downward as shown in dot and dash lines in Fig. 1, which brings the vacuum cup in contact with the top nested folded carton, at which time, the vacuum is turned on, (hereinafter described) and the aforesaid operation is reversed allowing the cup to draw upward on the folded carton which opens to the position shown in Fig. 10, the pressure fingers 25 hold down the flaps 26 of the carton while the vacuum cup 10 is lifting upwardly.

In order to operate and control the vacuum I employ a vacuum pump of the ordinary type. The vacuum cup is marked 10, from this cup leads the tube 12, to which is attached a flexible hose 27, the other end of which is attached to a valve 28, a pipe 29 leads from the valve to the vacuum pump, the pipe 30 is merely a support for the valve and connections. The valve 28 is operated by a cam 31 mounted on the main shaft 3 and this cam engages a roller 32 mounted in one end of arm 33, its other end securely mounted to the valve 28, which is of a rotary type. As the cam 31 revolves the arm 33 is carried back and forth, which gives an in-

terrupted vacuum on the cartons, as it is time to open and lift the carton. The vacuum is off when it is necessary for the vacuum cup 10 to reach down to pick up another carton.

The carton is now open ready to receive the article to be placed therein.

In further carrying out my invention I provide a conveyor belt 34 which passes over pulleys 35 and 36. The pulley 35 is mounted in a bracket 37 secured to guide extensions 38. The pulley 36 is mounted on shaft 40 in bearings 39 which are secured to the end frame 41. One end of the shaft 40 has securely mounted thereon a bevel gear 42, which engages with a bevel gear 43, this gear 43 carrying only two teeth, to give an intermittent motion to the shaft 40, as the shaft 45 is revolved by some outside power of any suitable character (not shown); this shaft 45 carries said gear 43, which drives pulley gear 42.

The above mechanism just set forth relates to my method of operating the conveyor belt 34; the shaft 45 revolving gear 43 imparts motion to the gear 42 only while the teeth 44 are in engagement. This intermittent motion causes the conveyor belt to travel the desired distance and then stop. This conveyor belt 34 carries the articles to be placed into the cartons; this is done by a pusher rod 46, having a head 47 and being mounted at one end in the housing 16, the other end of said push rod is slidably mounted in a bearing 48. At a point 49 I securely fasten one end of a link 50, the other end having pivotally mounted therein one end of an eccentric arm 51. The link 50 is slidably mounted at a point 52 on a shaft 53. This shaft is supported at one end in a bearing 54 and its other end in bearing 55; the bearings 55 and 48 are supported on a bracket 56. The eccentric arm 51 is operated by eccentric 57, which, in turn, is operated by the drive shaft 3 upon which it is mounted.

The article is placed into the carton which is open as shown in Fig. 10. This is done by the pusher rod 46, as before stated, during the rest period of the conveyor belt 34. This pusher rod is carried back and forth by the eccentric 57 which being pivotally mounted on the sliding link 50, carries said pusher rod 46 back and forth, because of it being securely fastened to the aforesaid sliding link. When the pusher rod 46 is at the limit of its travel, the article has been pushed into the carton through its open end. While the pusher rod is on its return, the conveyor belt 34 is again moved forward placing in position the next article to be put into the carton.

The article has now been placed into the carton and it is necessary to crease and fold the flaps of the carton into position.

In order to fold the end vertical flaps 58, I provide a bifurcated folding head 59, which is slidably mounted to a push rod 60 which is mounted in the bearings 61 and 62. This push rod is operated back and forth by a lever 63, fulcrumed on a pin 64, which is mounted in a housing 65. The lever 63, having at its lower extremity a slotted portion 66, which engages the pin 67 secured to an arm 68, said arm being securely mounted upon the push rod 60. Lever 63 has a slotted portion 69 which engages a pin 70, securely mounted in the shaft 71 and supported in the bearings 72, having at its one end a bearing 73 in which is mounted roller 74, which engages a slot 75 in a cam 76, mounted securely to the main shaft 3.

The push rod 60 carries an integral head 81. On the upper portion of the head 81, I provide a spring 82, which engages a pin 83, which is secured in the bifurcated head 59. A pin 79 is mounted in a bracket 62'. As the cam 76 is rotated or revolved, the shaft 71 is carried back and forth, and this action is transferred to push rod 60 through lever 63. The push rod carries with it the bifurcated head 59, the head 82 and sleeve 78, the head 82 as before stated being made integral with the push rod. When the end of slot 80 in sleeve 78 reaches the end of this movement it abuts against the pin 79, the head 59 having now reached its limit of travel. At this point, the bifurcated head having reached its limit of travel and the flaps 58 having been closed in, the head 81 secured to end of push rod 60, continues to push forward by reason of push rod 60 continuing its forward action by forcing spring 82 from the holding pin 83 thereby releasing the head 81, to allow this forward movement.

As the head 81 continues to push forward it carries with it the carton and its contents, and the flaps 84, are closed by being pressed between the folding sides 85; at which time the entire length of travel of the push rod 60 has been reached and is ended when the carton is folded into the position shown in Fig. 11 when the push rod moves back the spring 82 again engages pin 83 and the parts remain in this condition until the push rod again moves forward for another operation.

We will now describe my method and means for folding the end flaps 26. In order to do this I provide a rocker arm 86, fulcrumed on a pin 87, said rocker arm having at its upper extremity a roller 88, which engages a cam 89, mounted on the shaft 3, which when rotating imparts a rocking motion on a link 90, one end of which is pivotally mounted to the rocker arm 86, and the opposite end is mounted to a lever 91, the other end of this lever

is keyed to a shaft 92, which is journaled in the bearings 93 and 94.

On the shaft 92 I mount a disc 95 having the pivotal connections 96, to the links 97, the other end of said links being pivotally mounted to the rocker arms 98, having at their upper extremities the folding bars 99, which engage the end portions 100 of the flaps 26 of the carton. The arms 98 which pivot on the pins 118 are mounted at point 119 in a slot 120 of the table or top. The flaps just mentioned above are bent upward into the position shown in dotted lines in Fig. 6, when the shaft 92 is rocked, causing the bars 99 to press upward; this is caused by the cam 89 rocking the arm 86, which causes a rocking motion on shaft 92, which placed the carton into the position shown in Fig. 12. The L portions 115 of folding guides 85 are stationary and the flaps 26 are folded thereover by the folding bars 99, which fold flaps 26, with the upturned fold or edge 100, into a position shown in Fig. 12.

It is now only necessary to fold the flaps 26, with the turned up portions 100 over into the carton body as shown in Fig. 13; it will be understood when this operation is completed the end flaps 26 will be folded into said carton body between the contents and in upper face of the carton. I accomplish this in the following manner.

On the shaft 92 I mount a cam 101, having pivotally mounted thereto, the links 102, the other end of said links being pivotally mounted to the arms 103, having the fulcrums 104, mounted in the bearings 105. Pivotally mounted at points 106, on the arms 103, I provide the folding flapping heads 107, which engage underneath the flaps 26 of the carton. As the shaft 92 rotates the arms 103 are brought upward, causing the flaps 26 to pass through an arc of a circle, by reason of the curved portions 108 allowing the ends 100 to enter the carton while the curved portions 108 are still in the carton as shown in Fig. 7 these curved portions 108 operated back and forth by reason of the guides 109, on which they are mounted, said guides being carried back and forth by the cam pins 110, which are mounted in bearings 111 of the guides; as the cam rotates the pins 110 are carried back and forth, which it will be seen causes the curved portions 108 to enter the carton as shown in Fig. 7, when the cam is in one position and being drawn out of position and free; that is, the curved portions 108, to allow the carton to pass on in order to make the next fold. The cam pins 110 are brought back to their closed position by a tension spring 112.

In order to allow the carton to pass from its first folded position, as shown in Fig. 11. the folding guides 85 which are supported by the brackets 113 and 114, which are mounted to the main frame, a space 114′ is provided underneath the L portions 115 of the folding guides 85 to allow the flaps 26 to pass underneath in order to take the next folds.

It will be understood that the push rod 60, during each cycle of operation advances the carton with its contents into its next phase of folding operation. This intermittent pushing action continues while the machine is running which causes the carton to continue to pass until they enter and pass through the pressure guides 115, which is maintained by being mounted on the spring 116, mounted in brackets 117, which are secured to the top of the machine. These pressure guides 115 squeeze or press the ends or flaps 26 in a firm compact folded position as shown in Fig. 13, from which they pass from the table into any receptacle provided (not shown).

It will be understood that I do not confine myself to any particular form of carton used, but may, if necessary, change the shape and contour of the folding flap elements, to adapt them to fold the different shaped flaps.

While I have described and shown one form of machine and apparatus for carrying my invention into effect, it is obvious that the same may be changed and modified to some extent, so long as such changes and modifications fall within the scope of this specification and claims.

What I claim as new and my invention and desire to secure by Letters Patent is:—

1. In a carton filling machine of the character described, comprising vacuum means for temporarily placing a carton into an extended position, means for placing the article into the carton, in combination with pusher means for closing the vertical flap ends of the carton at one end, part of said pusher means, after the vertical flaps have been folded into position at said one end, continuing to push the carton until it engages means for closing the vertical flaps at the opposite ends, and means for folding and closing the remaining horizontal flaps.

2. In a carton filling machine of the character described, comprising means for placing the article into the carton, in combination with pusher means for closing the vertical flap ends of the carton, said pusher means, after the vertical flaps have been folded into position at one end, continuing to push the carton until it engages means for closing the vertical flaps at the opposite ends, and means for folding and closing the remaining horizontal flaps.

3. In a carton filling machine of the character described, comprising means for placing the article into the carton, in combination with pusher means for closing the vertical flap ends of the carton, said pusher

means, after the vertical flaps have been folded into position at one end, continuing to push the carton until it engages means for closing the vertical flaps at the opposite ends, and means for folding and closing the remaining horizontal flaps, so that the extreme end of said horizontal flap enters the carton itself, and means for placing said flaps home, against displacement.

4. In a carton filling machine of the character described, vacuum means for temporarily placing a carton into an extended position, means for placing the article into the carton, in combination with pusher means for closing the vertical flap ends of the carton, said pusher means, after the vertical flaps have been folded into position at one end, continuing to push the carton until it engages means for closing the vertical flaps at the opposite ends and means for folding and closing the remaining horizontal flaps, so that the extreme end of said horizontal flap enters the carton itself, and means for placing said flaps home, against displacement.

5. In a carton filling machine of the character described, comprising means for placing the article into the carton, in combination with pusher means for closing the vertical flap ends of the carton at one end, part of said pusher means, after the vertical flaps have been folded into position at said one end, continuing to push the carton until it engages means for closing the vertical flaps at the opposite ends, and means for folding and closing the remaining horizontal flaps.

In testimony whereof, I affix my signature at Cincinnati, Ohio, this 28th day of March, 1925.

VICTOR S. FISHWICK.