No. 816,273. PATENTED MAR. 27, 1906.

R. SUNDERMAN.

ATTACHMENT FOR CARTON MAKING MACHINES.

APPLICATION FILED MAR. 14, 1905.

3 SHEETS—SHEET 1.

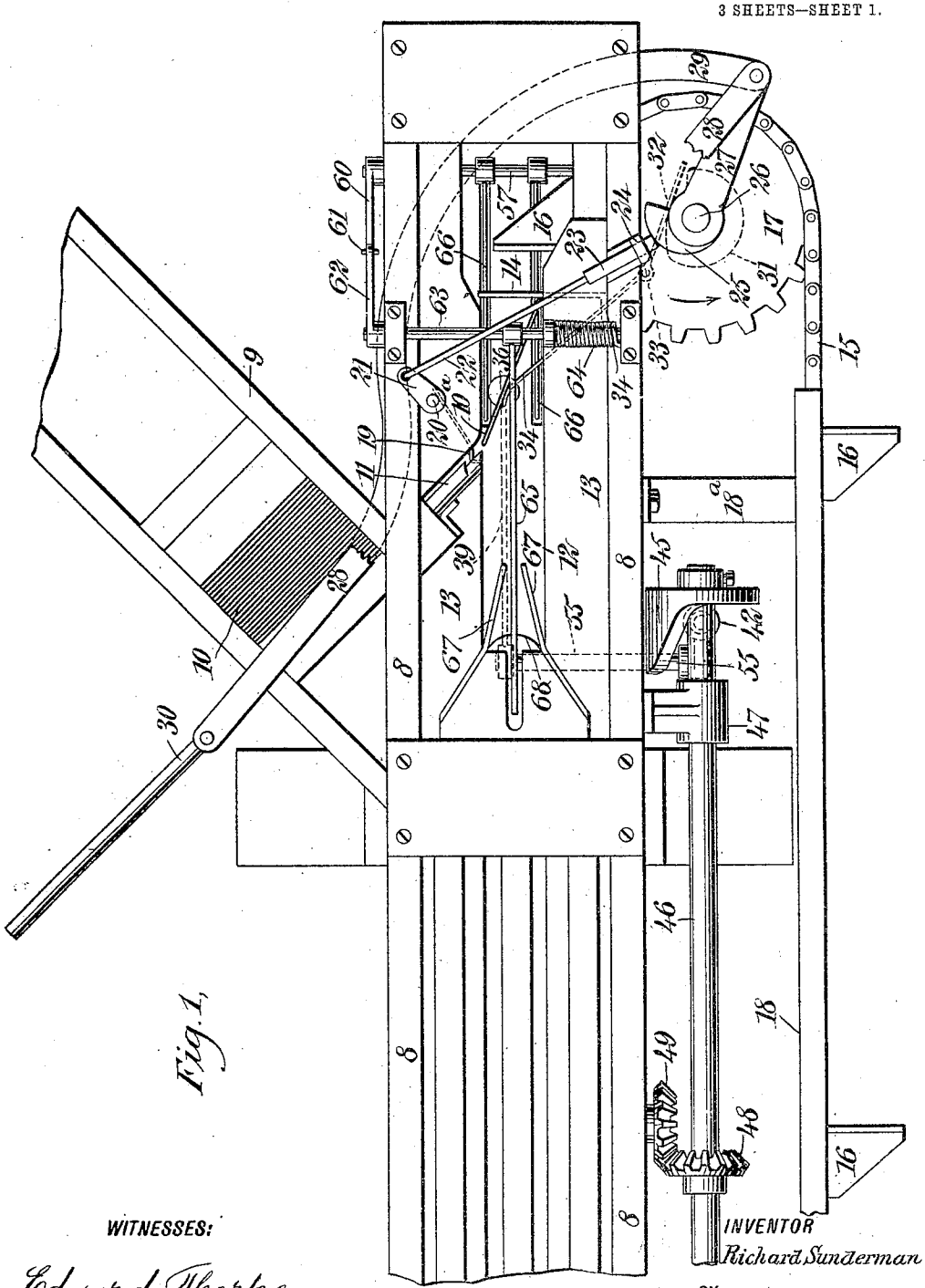


Fig. 1.

WITNESSES:

Edward Thorpe.

Walton Harrison

INVENTOR

Richard Sunderman

BY Munn & Co

ATTORNEYS

No. 816,273. PATENTED MAR. 27, 1906.

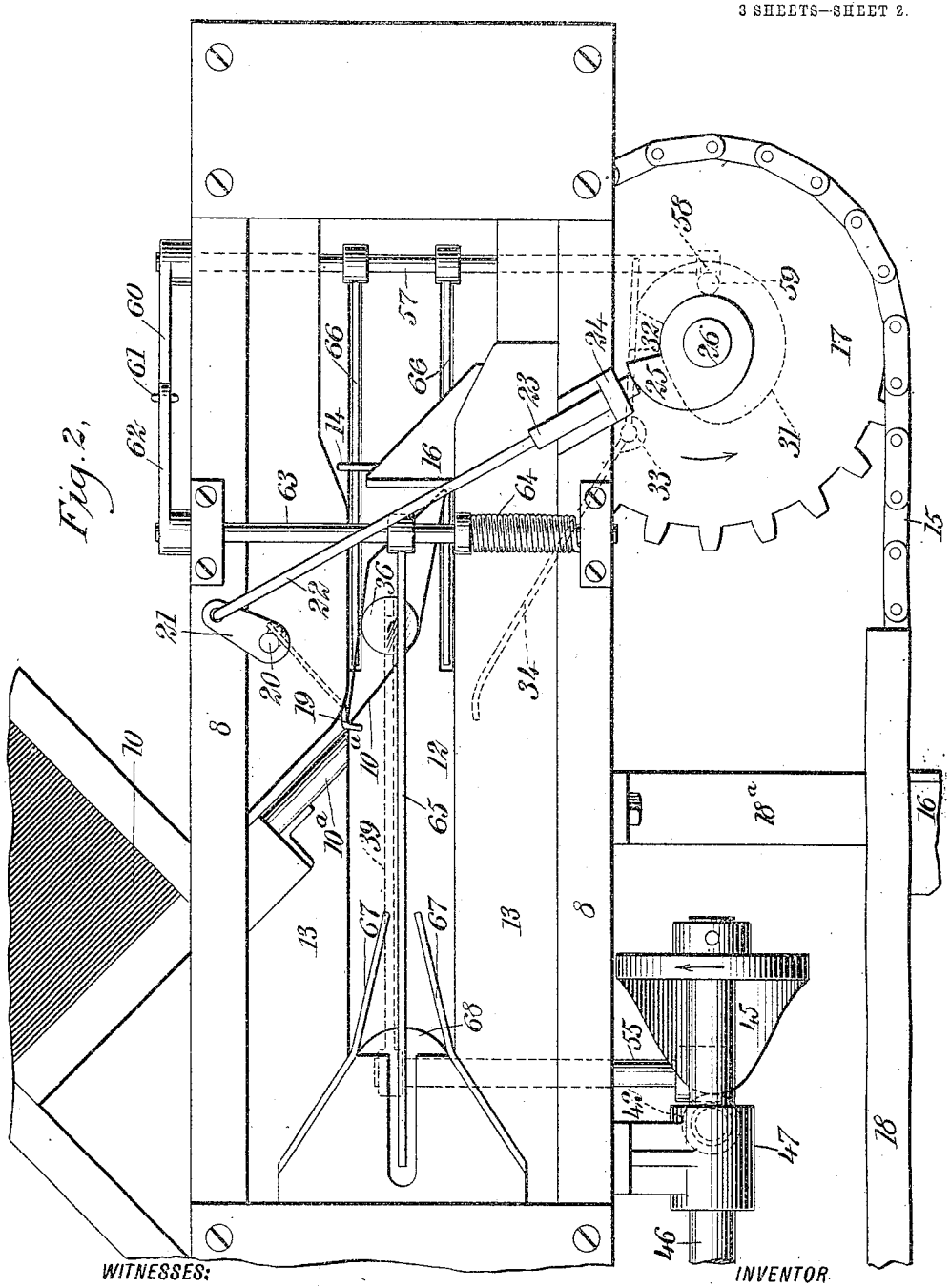
R. SUNDERMAN.

ATTACHMENT FOR CARTON MAKING MACHINES.

APPLICATION FILED MAR. 14, 1905.

3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

Edward Thorpe.

Walton Harrison

INVENTOR

Richard Sunderman

BY Munn & Co.

ATTORNEYS

No. 816,273. PATENTED MAR. 27, 1906.

R. SUNDERMAN.

ATTACHMENT FOR CARTON MAKING MACHINES.

APPLICATION FILED MAR. 14, 1905.

3 SHEETS—SHEET 3.

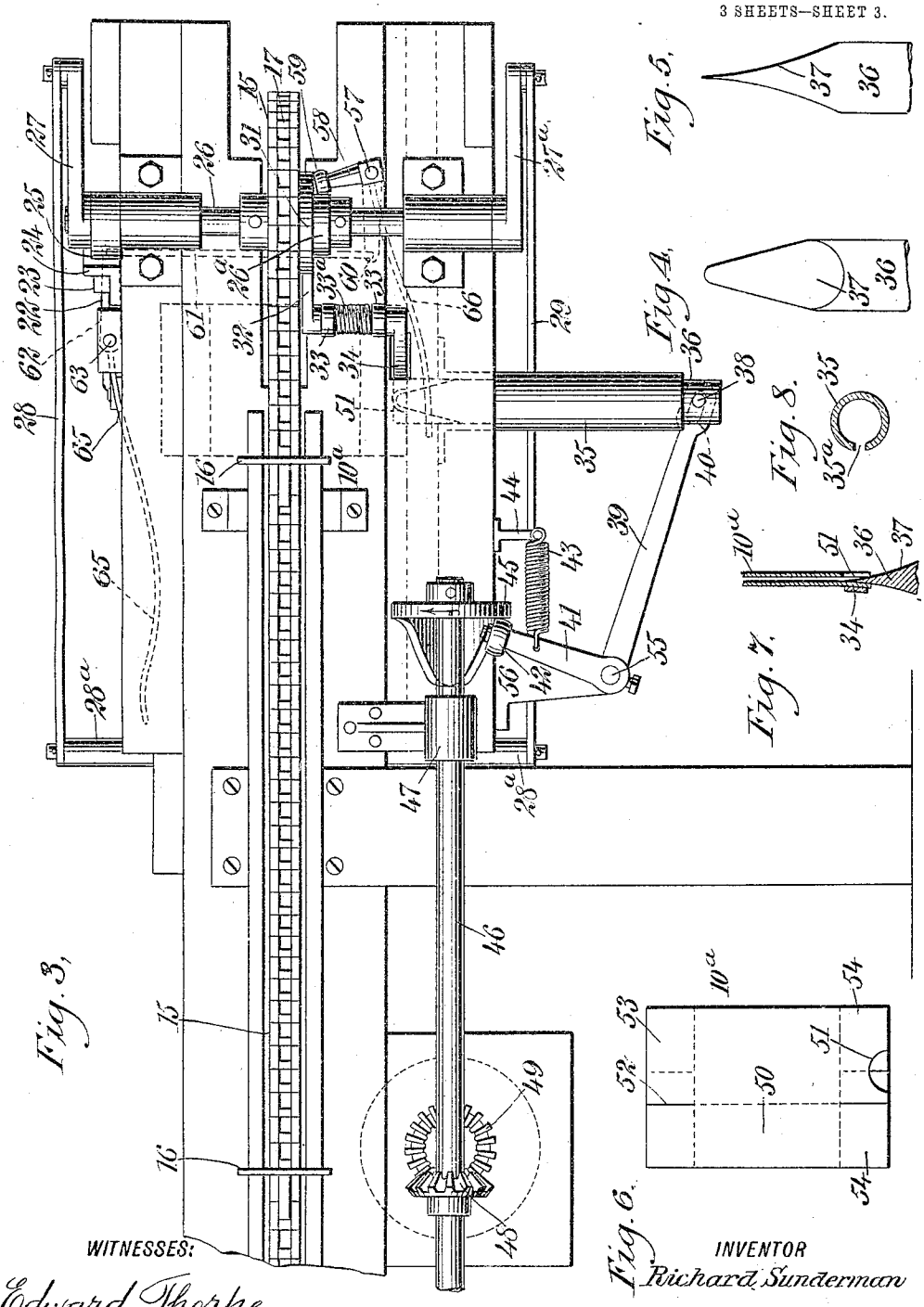


Fig. 3.

Fig. 5.

Fig. 4.

Fig. 8.

Fig. 7.

Fig. 6.

WITNESSES:

Edward Thorpe.

Walton Harrison

INVENTOR

Richard Sunderman

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

RICHARD SUNDERMAN, OF BUFFALO, NEW YORK.

ATTACHMENT FOR CARTON-MAKING MACHINES.

No. 816,273. Specification of Letters Patent. Patented March 27, 1906.

Application filed March 14, 1905. Serial No. 250,010.

To all whom it may concern:

Be it known that I, RICHARD SUNDERMAN, a citizen of the United States, and a resident of Buffalo, in the county of Erie and State of New York, have invented a new and Improved Attachment for Carton-Making Machines, of which the following is a full, clear, and exact description.

My invention relates to carton-making machines and admits of general use, but is of peculiar service in connection with machines of the kind described in my pending application, Serial No. 214,159, filed June 25, 1904.

My present invention embodies several objects, one of which is to slightly open the carton-blank immediately after the same is fed into the machine—that is to say, where carton-blanks are fed into a machine for the purpose of being formed into complete cartons, and especially where they are to be filled—while in the same machine it is desirable that some means be provided for opening the carton-blanks. My invention embraces certain other objects and mechanical details for fulfilling the same, as hereinafter described.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary plan view of a carton-machine equipped with my invention. Fig. 2 is a fragmentary plan view somewhat similar to Fig. 1, but enlarged and showing certain parts occupying a relatively different position. Fig. 3 is a side elevation otherwise similar to Fig. 1 and drawn upon the same scale as said figure. Fig. 4 is a detail elevation of the plunger. Fig. 5 is a somewhat similar detail of the plunger, but showing the same as viewed at a right angle to the view shown in Fig. 4. Fig. 6 is a fragmentary elevation of one of the carton-blanks ready to be fed into the machine. Fig. 7 is a vertical detail section through the lower end of a carton-blank, the same being opened for the point of the plunger; and Fig. 8 is a sectional view of the sleeve 35.

The general framework of the machine is shown at 8, and at 9 is a chute for feeding the group 10 of carton-blanks into the machine. A slide 11 is disposed obliquely to the general direction of the framework and is adapted to convey into the machine the individual carton-blanks 10^a, acting substantially as described in my pending application, above referred to. Guide-rails 13 are separated by a clearance-space 12, into which the carton-blanks are thus fed. Extending practically across this clearance-space is a standard 14, against which each separate blank 10^a lodges, as indicated in Fig. 1.

The machine is provided with a sprocket-chain 15, having movable flights 16, mounted thereupon, the chain engaging a sprocket-wheel 17, and with a guide 18, connected with the frame-work 8 by means of a brace 18^a, as indicated in Fig. 1. A dog 19 is connected rigidly with a rocking shaft 20, the latter being connected by a crank 21 and a cam-rod 22 with a head 23, which slidably engages a bearing 24. A cam 25 is rigidly connected with a shaft 26, upon which the sprocket-wheel 17 is likewise rigidly mounted. Cranks 27 27^a are rigidly mounted upon opposite ends of the shaft 26 and are pivotally connected by pitmen 28 29 with the slide 11, which has an extension 30. The rotation of the shaft 26 not only causes the slide 11 to reciprocate, and thus feed the individual blanks 10^a one at a time, as above stated, but after each blank is thus fed in the dog 19 grips the edge of the blank, and thus squeezes the latter edgewise. (See Fig. 2.) For this purpose the cam 25 raises the head 23 in the general direction of its length and causes the crank-arm 21 to rock. The carton-blank being locked against the standard 14 is unable to move any farther in the general direction of its travel obliquely downward, so that the standard 14 serves as a limiting-stop and enables the dog 19 to be effective. Another cam 31 is mounted rigidly upon the shaft 26 and engages an arm 32, so as to lift the same at intervals. This arm is pivoted at 33, carries a spring 33^a, and is provided with a spring portion 34, which extends obliquely upward, as indicated by dotted lines in Fig. 2.

Centrally disposed at the bottom of the framework is a tube 35, provided with a slot 35^a, and within this tube is a plunger 36, provided with oppositely-disposed faces 37 of the shape indicated in Figs. 4 and 5. The plunger 36 is connected, by means of a pivot 38, with an arm 39, the outer end of which is provided with a slot 40, working loosely upon the pivot 38. Another arm 41 is rigidly connected with the arm 39, the two arms virtually constituting a bell-crank lever. The arm 41 is provided at its upper end with a roller 42 and is connected by a spiral spring 43 with a boss 44. The tendency of the

spring 43 is to maintain the arm 41 in an oblique position, as indicated in Fig. 3, so that the plunger 36 is normally in its lowermost position. A cam 45 is mounted rigidly upon one end of a shaft 46, this shaft being revolubly mounted within a bearing 47 and provided with a bevel-gear 48, which engages another bevel-gear 49 for the purpose of actuating the gluing machinery described in my pending application.

One of the individual carton-blanks 10^a is shown in Fig. 6 and is provided with a body portion 50, having an indenture 51, the indenture being made by simply cutting out a semicircle of the cardboard material of which the carton-blank is made. The blank is split at 52, so that its top and bottom portions are formed into flaps 53 54. When ready for use, the carton-blank is in the form indicated in this figure and may be considered as a rectangular member which has been rendered flat by a pressure diagonally across it. (See 10^a, Fig. 2.)

The arms 39 41 are mounted upon a rocking shaft 55, supported by hangers 56, as indicated in Fig. 3. Another rocking shaft 57 is provided with a stud 58, carrying a roller 59. The shaft 57 is provided with an arm 60, extending laterally therefrom, and this arm is connected by a link 61 with another arm 62, the latter being rigidly mounted upon a rocking shaft 63. By means of a spiral spring 64 this shaft 63 is normally held in a predetermined position. Extending laterally from the shaft 63 is a curved arm 65, which projects into the space 12. This arm 65 is curved slightly, as indicated in Fig. 3. The connection of the pitmen 28 29 with the slide 11 is made by means of bosses 28^a, as indicated in said figure. Mounted upon the shaft 57 are spring-arms 66, which move upward periodically. The shaft 57 is rocked by means of the stud 58, which is in turn actuated by means of a cam 26^a on the shaft 26. Spreaders 67 are employed for the purpose of bending the flaps 53 outwardly after the carton-blank is opened, and a surface 68 is so disposed as to bend one of the flaps inward, thereby assisting in forming the bottom of the carton.

My invention is used as follows: Power being applied to the sprocket-chain and other movable parts, the shaft 26 rotates in a direction contraclockwise, as seen in Fig. 1. As each carton-blank 10^a moves into engagement with the standard 14 and is squeezed edgewise by the dog 19, as above described, the indenture 51 at the lower edge of the carton lodges directly against the plunger 36, comparatively near the sharp edge thereof, as indicated in Fig. 7. The spring-arm 32 is at different instances released by the cam 31, as indicated by dotted lines in Fig. 1, and its portion 34 is thus caused to press laterally against the lower edge of the carton, so as to lead the same into a favorable position for allowing the plunger 36 to ascend into the carton-blank. The revolution of the cam 45 next raises the arm 39 and forces the plunger up into the lower end of the blank, so as to spread the same considerably, as indicated in Fig. 2. During the time while the plunger is thus rising the dog 19 continues to press edgewise upon the carton-blank, so that the latter is widened until it extends completely across the space 12. A moment later, however, the cam 25 having turned slightly so as to release the head 23, the dog 19 is free to swing back out of the way. The continued revolution of the cam 45 causes the plunger 36 to drop back into its normal position. The revolution of the cam 26^a causes the stud 58 to rock outward, thus raising the arm 60 and causing the spring-arm 65 to move abruptly downward. This movement does not occur until after the carton has been fully opened and started upon its way, being engaged for this purpose by one of the flights 16. The carton-blank having moved a little to the left of the position indicated by dotted lines in Fig. 3, the upper flaps 53 are spread forward and backward by the downstroke of the spring-arm 65. Before leaving the position indicated by dotted lines in this figure the spring-arm 60 makes its stroke upward, however, and bends any one of the flaps 54. Another of these flaps is bent inward by contact with the surface 68, whereas the spreaders 67 cause two upper flaps 53 to bend outward, as above described. I do not limit myself, however, to the particular means shown for manipulating the flaps, nor does the present invention contemplate a complete manufacture and filling of the carton-blank. What I seek more particularly to do at this time is to provide for opening the carton-blank by means of the plunger 36, which preferably moves upwardly from the bottom.

Referring to the section shown in Fig. 7 and to the view indicated by dotted lines in Fig. 3, it will be seen that the oppositely-disposed faces 37 of the plunger 36 gradually approach each other at the point of the plunger, so as to render the same very sharp. It will also be seen that the spring-arm 34 in pressing laterally against the sharp point of the plunger so that the indenture 51 passes loosely over the point, causes the extreme lower edge of the carton-blank to open slightly before the plunger begins to rise, so that when the plunger is forced upward the continued opening of the carton is effected by a positive motion. The opening of the carton is instantaneous, being accelerated by the engagement of a flight 16 with one of its edges, this flight and the dog 19 traveling toward each other. By the time the carton-blank is opened sufficiently to prevent contact between it and the plunger the latter is suddenly retracted, but the carton now friction-

ally engages the rails 13 and is moved along by the flight. The several successive operations of closing and gluing the flaps and filling the carton form no part of my present invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a guideway through which carton-blanks are adapted to travel, means for passing a carton-blank through said guideway, means for exerting pressure upon oppositely-disposed portions of said carton-blank, a plunger to be forced into said carton-blank for the purpose of opening the same, and means for actuating said plunger.

2. The combination of a frame provided with a passage-way, a plunger supported by said frame and adapted to move into said passage-way, means for actuating said plunger, mechanism for passing a carton-blank into said passage-way and into alinement with said plunger, and means for exerting pressure progressively upon opposite portions of said carton-blank in order to facilitate the entrance of the plunger thereinto.

3. The combination of a frame provided with a passage-way, a chute disposed adjacent to said frame for feeding carton-blanks into said passage-way, a slide coacting with said chute for delivering said carton-blanks into said passage-way one at a time, means for squeezing each carton-blank edgewise after it enters into said passage-way, a plunger for partially entering each carton-blank so as to distend the same, and means for actuating said plunger.

4. The combination of a frame provided with a passage-way, means for feeding into said passage-way carton-blanks one at a time, a standard extending into said passage-way and serving as a limiting-stop for each carton-blank, a movable dog for gripping one end of said carton-blank and forcing the same toward said standard so as to exert pressure edgewise upon said carton-blank, a plunger disposed adjacent to said carton-blank and in alinement with the position thereof when said plunger is in contact with said limiting-stop, and means for actuating said plunger so as to partially open said carton-blank.

5. The combination of means for exerting pressure edgewise upon a carton-blank, a member movable relatively to said carton-blank and adapted to be inserted thereinto for the purpose of opening said carton-blank, and mechanism for actuating said member.

6. The combination of means for exerting pressure upon the edges of a carton-blank so as to distend the same, a plunger provided with a sharp point and disposed substantially in alinement with said carton-blank, means for forcing said plunger into said carton-blank, and automatic mechanism for withdrawing said plunger.

7. The combination of means for exerting pressure upon the edges of a carton-blank so as to open the same, a movable member to be forced against said carton-blank so as to bend outwardly certain flaps thereof, another member movable relatively to said carton for closing another flap thereof, means for actuating both of said last-mentioned members, a plunger to be forced into said carton-blank so as to assist in distending the same, and means for actuating said plunger.

8. The combination of a limiting-stop, means for feeding a carton-blank thereagainst, a dog for engaging the free edge of said carton-blank and forcing the same toward said limiting-stop, thereby exerting pressure edgewise upon said carton-blank, a plunger provided with a sharp point and disposed in alinement with said carton-blank, and cam-controlled mechanism for causing said plunger to reciprocate.

9. The combination of framework provided with a passage-way, means for forcing carton-blanks one at a time through said passage-way, a member disposed adjacent to said passage-way and adapted to move relatively to said carton-blanks for the purpose of bending the flaps thereof outwardly, and a cam coacting with the movements of said blank for actuating the movements of said member.

10. The combination of means for holding a carton-blank, a plunger disposed substantially in alinement with said carton-blank, means for reciprocating said plunger in the general direction of said carton-blank for the purpose of opening the latter, a spring-arm movable relatively to said plunger and adapted to press a portion of said carton-blank into engagement therewith, and cam mechanism for moving said spring-arm into and out of engagement with said carton-blank.

11. The combination of means for holding a carton-blank, a plunger provided with a comparatively sharp point to be inserted within said carton-blank, means for automatically actuating said plunger relatively to said carton-blank, and a swinging arm provided with a spring portion for engaging the exterior of said carton-blank for the purpose of assisting said plunger to enter the same.

12. The combination of mechanism for feeding carton-blanks one at a time, means for momentarily holding each blank after being thus fed, a plunger provided with a sharp point for entering the carton-blank and distending the same, an arm connected with said plunger for actuating the same, mechanism connected with said arm for retracting said plunger, and a movable member for pressing momentarily against said carton-blank so as to guide said plunger thereinto.

13. The combination of means for holding a carton-blank, a plunger disposed in alinement with said carton-blank when thus held,

mechanism for forcing said plunger partially into said carton-blank for the purpose of distending the same, means for squeezing said carton-blank edgewise while said plunger makes its thrust, a movable member provided with a portion for pressing the portion of said carton-blank directly against said plunger, and means for actuating said movable member.

14. The combination of a carton-blank, a plunger to be forced thereinto for opening the same, a swinging arm provided with a portion for gently pressing a part of said carton-blank against said plunger in order to facilitate the insertion of said plunger into said carton-blank, and means for actuating said swinging arm.

15. The combination of means for holding a carton-blank, a plunger to be inserted within said carton-blank for the purpose of opening the same, mechanism provided with a movable member for forcing a part of said carton-blank laterally against said plunger so as to dispose said carton-blank favorably for the action of said plunger, means for actuating said plunger, and means for squeezing said carton-blank edgewise while said plunger is being inserted thereinto.

16. The combination of a framework provided with a passage-way, a plunger mounted upon said framework and movable relatively thereto, means for passing a carton-blank into said passage-way and into alinement with said plunger, mechanism for holding said carton-blank in fixed position, and a member provided with a spring portion for pressing upon the exterior of said carton-blank in order to facilitate the entrance of said plunger into said carton-blank.

17. The combination of a framework provided with a passage-way, means for passing the carton-blank into said passage-way, and members mounted oppositely and adapted to exert pressure upon the edges of said carton-blank for the purpose of distending the same.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RICHARD SUNDERMAN.

Witnesses:
WILLIAM A. MINOTT,
J. F. CHUMASERO.