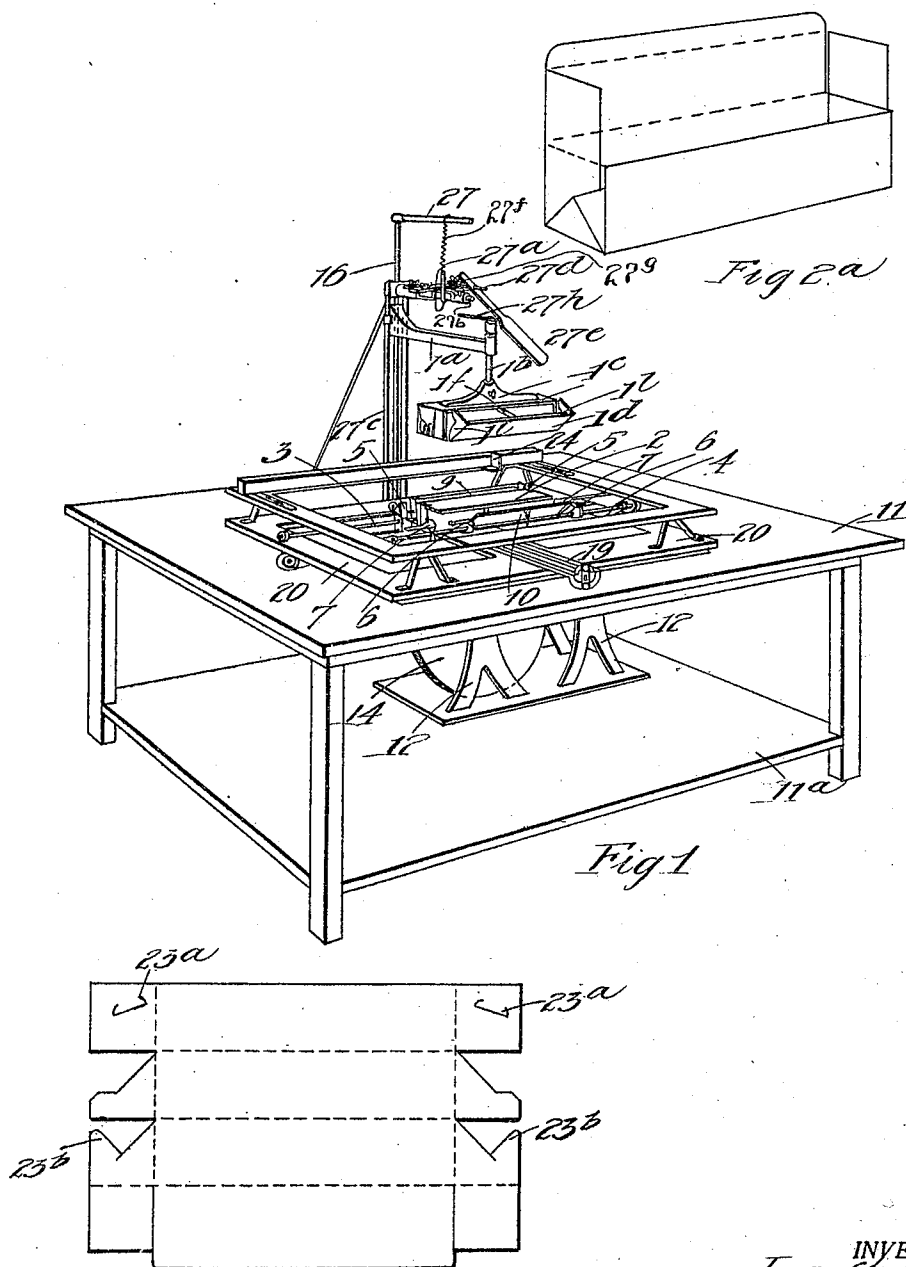


1,409,474.

I. SHAFER AND C. A. SMALL.
 CARTON FOLDING APPARATUS.
 APPLICATION FILED JUNE 18, 1917.

Patented Mar. 14, 1922.

6 SHEETS—SHEET 1.



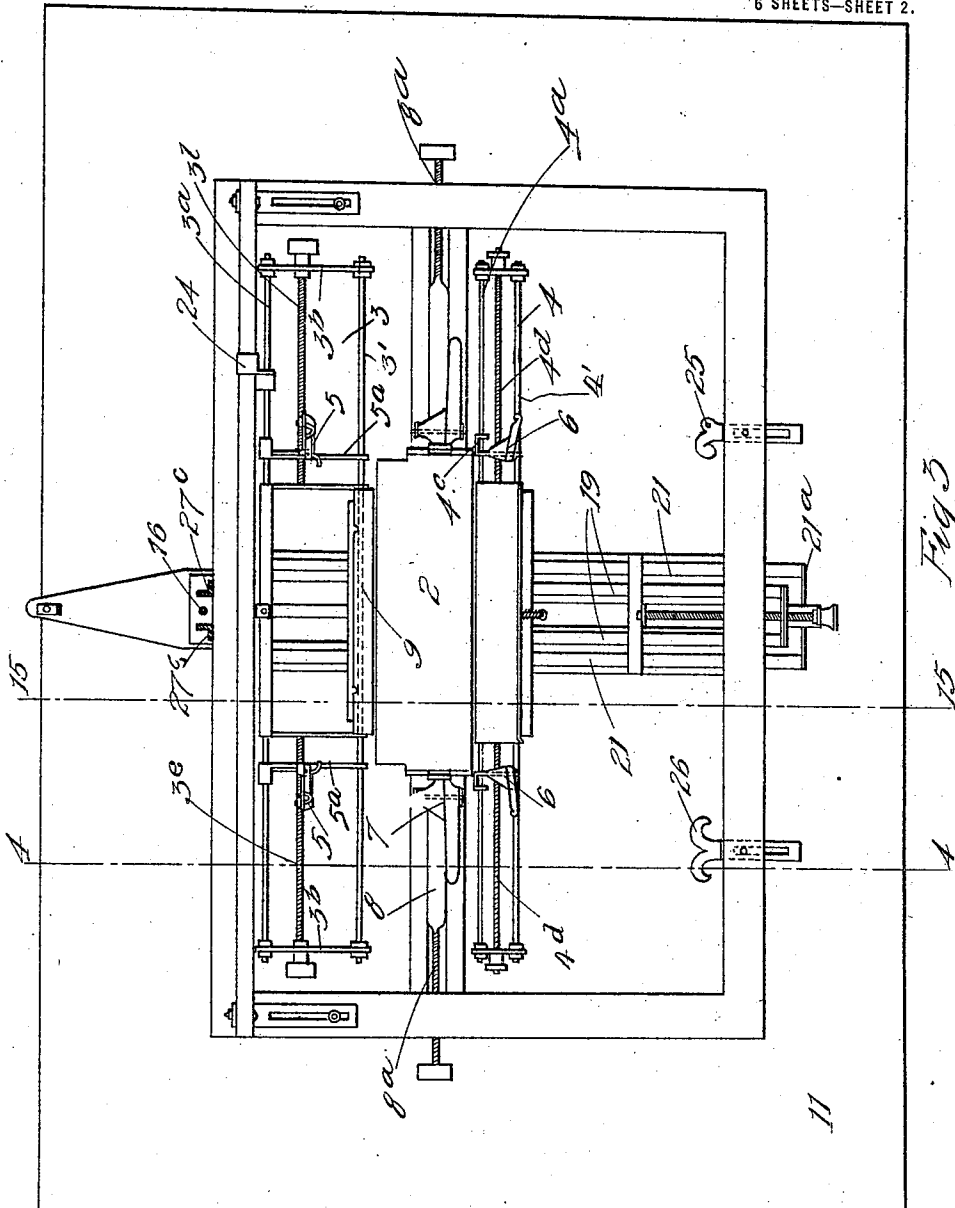
INVENTOR.
Ira Shafer
Charles A. Small
 BY *A. B. Bowman*
 ATTORNEY

I. SHAFER AND C. A. SMALL.
 CARTON FOLDING APPARATUS.
 APPLICATION FILED JUNE 18, 1917.

1,409,474.

Patented Mar. 14, 1922.

6 SHEETS—SHEET 2.

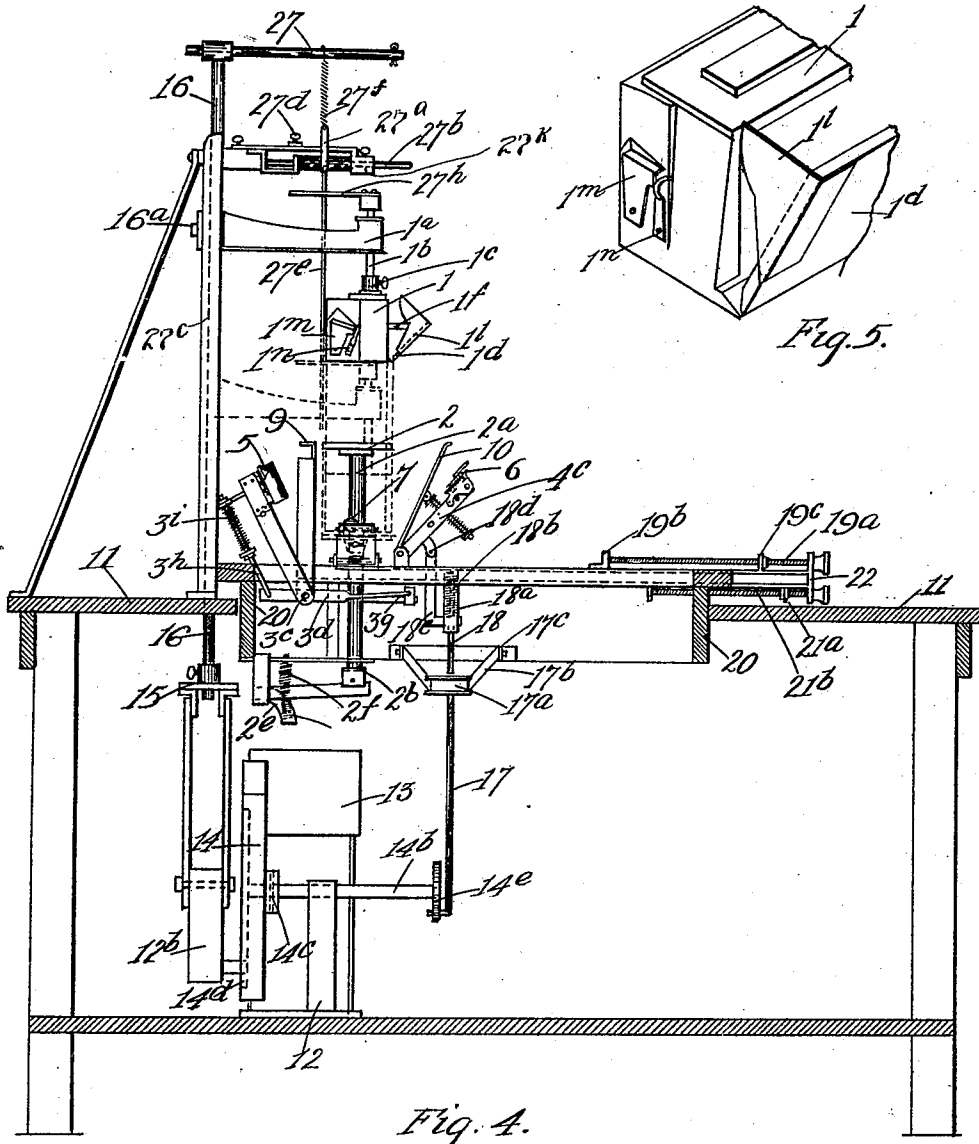


Inventor
 Ira Shafer
 Charles A. Small
 by A. B. Bowman
 Attorney

1,409,474.

I. SHAFER AND C. A. SMALL.
 CARTON FOLDING APPARATUS.
 APPLICATION FILED JUNE 18, 1917.

Patented Mar. 14, 1922.
 6 SHEETS—SHEET 3.



Inventor
 Ira Shafer
 Charles A. Small.
 by A. B. Bowman
 Attorney.

I. SHAFER AND C. A. SMALL.
 CARTON FOLDING APPARATUS.
 APPLICATION FILED JUNE 18, 1917.

1,409,474.

Patented Mar. 14, 1922.

6 SHEETS—SHEET 4.

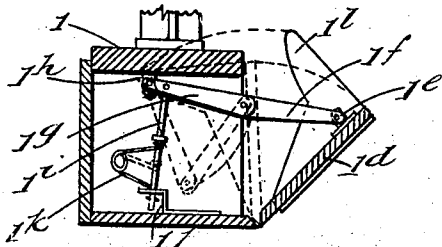


Fig 6

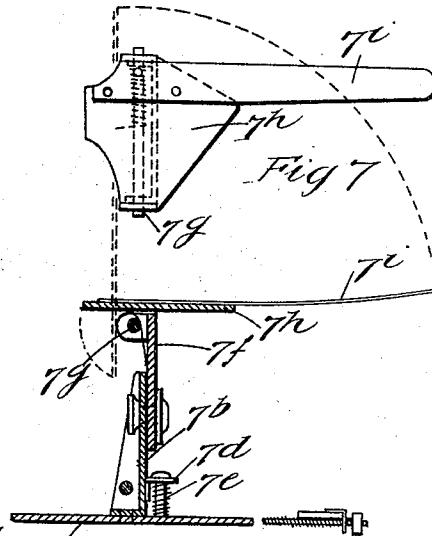


Fig 7

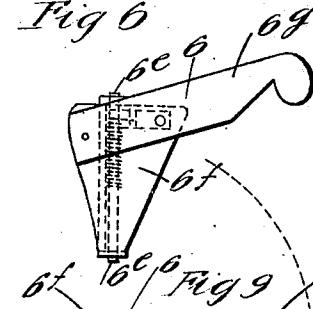


Fig 9

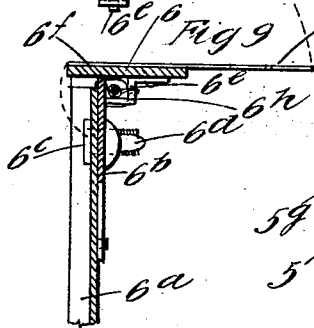


Fig 10

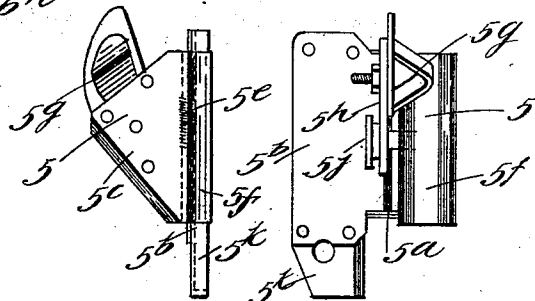


Fig 11 Fig 12

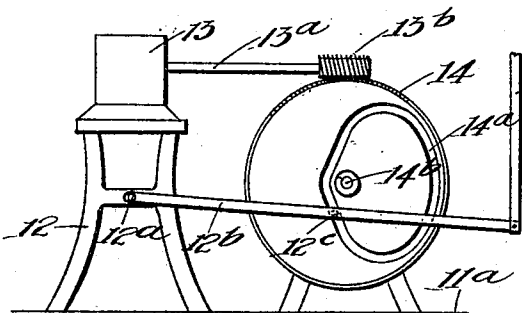


Fig 14

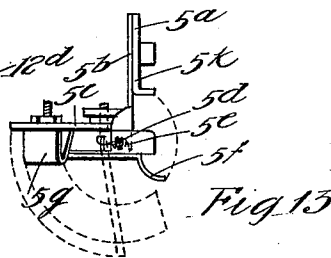


Fig 13

INVENTOR.
 Ira Shafer
 Charles A. Small
 BY A. B. Bowman
 ATTORNEY

I. SHAFER AND C. A. SMALL.
 CARTON FOLDING APPARATUS.
 APPLICATION FILED JUNE 18, 1917.

1,409,474.

Patented Mar. 14, 1922.

6 SHEETS—SHEET 5.

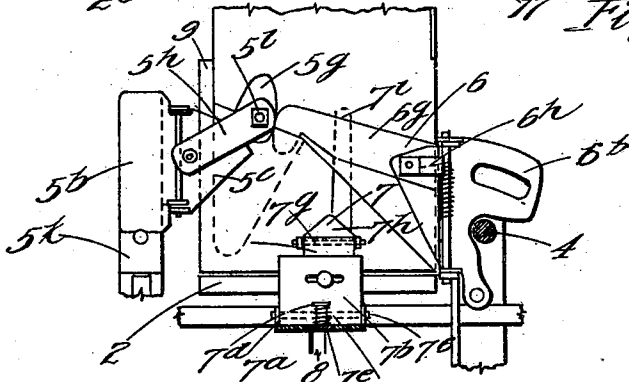
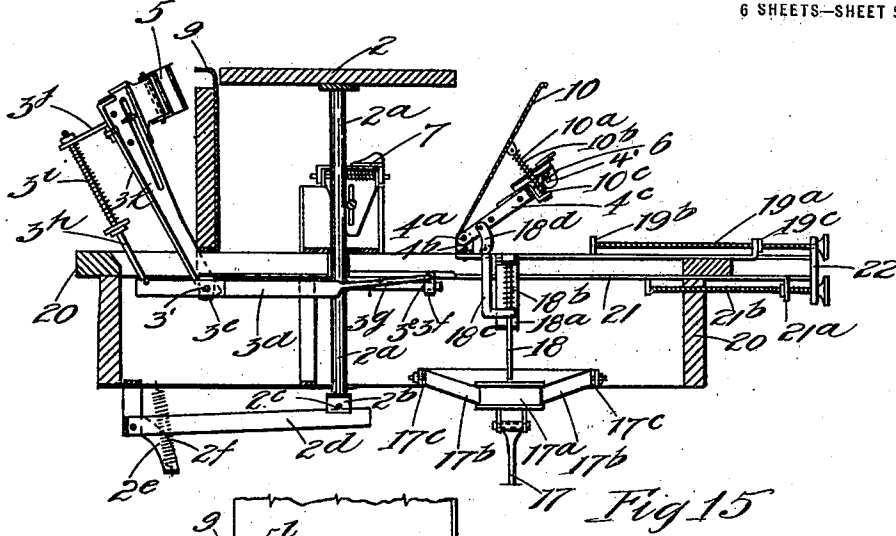


Fig. 16

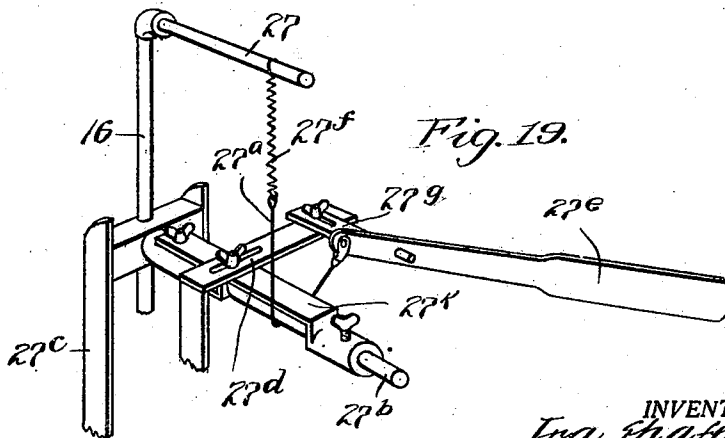


Fig. 19.

INVENTOR.
Ira Shafer
 BY *Charles A. Small*
A. B. Bonman
 ATTORNEY.

I. SHAFER AND C. A. SMALL.
 CARTON FOLDING APPARATUS.
 APPLICATION FILED JUNE 18, 1917.

1,409,474.

Patented Mar. 14, 1922.

6 SHEETS—SHEET 6.

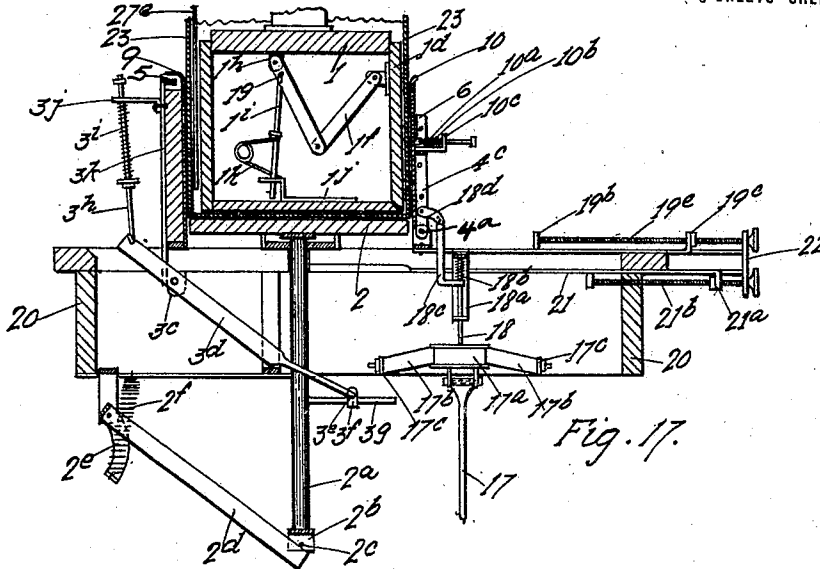


Fig. 17.

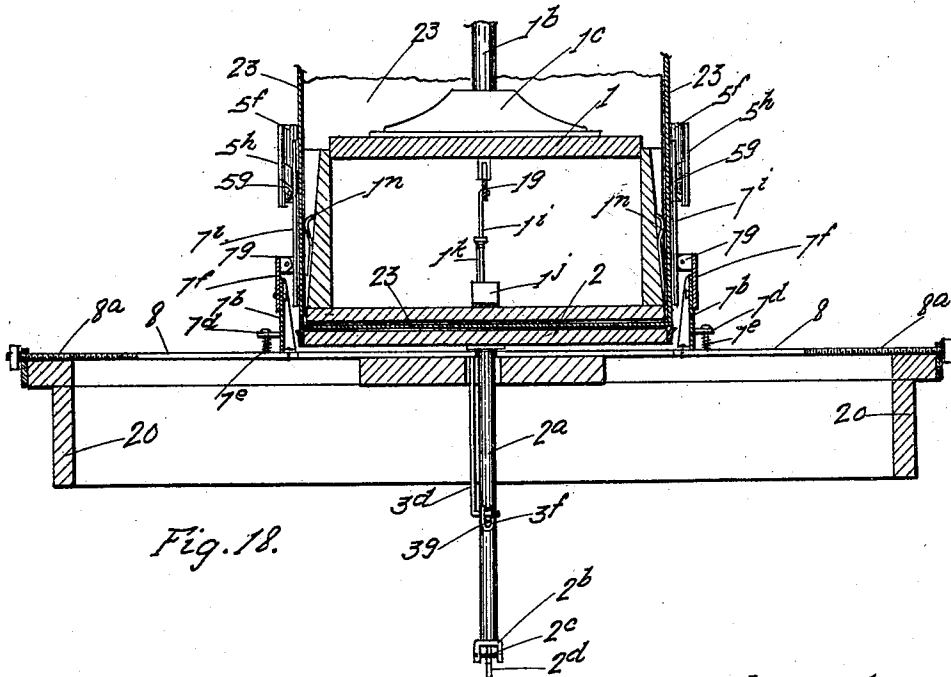


Fig. 18.

Inventor
 Ira Shafer
 Charles A. Small.
 by A. B. Bowman
 Attorney.

UNITED STATES PATENT OFFICE.

IRA SHAFER AND CHARLES A. SMALL, OF SAN DIEGO, CALIFORNIA.

CARTON-FOLDING APPARATUS.

1,409,474.

Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed June 18, 1917. Serial No. 175,317.

To all whom it may concern:

Be it known that we, IRA SHAFER and CHARLES A. SMALL, citizens of the United States, residing at San Diego, in the county of San Diego and State of California, have invented certain new and useful Improvements in Carton-Folding Apparatus, of which the following is a specification.

Our invention relates to an apparatus for folding cartons, more particularly, cartons of the conventional type as illustrated herein and in which in some cases an inner lining of paraffine or other paper is used inside of the carton and the carton together with the paper therein is folded in position ready for filling, and the objects of our invention are: First, to provide an apparatus for folding the ordinary or conventional carton blank with the inner lining in position into box form for filling; second, to provide an apparatus of this class which operates automatically throughout, when coupled with the power for driving the same; third, to provide an apparatus of this class which is adjustable throughout, thus providing for the folding of various sized carton blanks on the one machine, except different sized plungers are required; fourth, to provide means in connection with the folding device for automatically removing the carton after the same has been folded; and fifth, to provide an apparatus of this class which is simple and economical of construction, durable, easy to operate, easy to adjust and will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, our invention consists of certain novel features of construction, combination, and arrangement of parts as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this specification, in which:

Figure 1 is a perspective view of the apparatus complete, shown open ready for the placing of the carton blank; Fig. 2 is an open plan view of a conventional carton to be folded by said apparatus in the blank form before folding; Fig. 2^a is a perspective view of the carton after folding ready for filling; Fig. 3 is a top or plan view of the apparatus minus the plunger and its operating mechanism; Fig. 4 is a sectional view through 4-4 of Fig. 3 and showing said

plunger and its operating mechanism in elevation; Fig. 5 is a fragmentary perspective view of the plunger 1; Fig. 6 is a sectional view of said plunger slightly to one side of the middle thereof and showing by dotted line the closed position of the hinged side 1^a; Fig. 7 is a detailed plan view of the intermediate folding device in its opened position; Fig. 8 is a sectional view at right angles to that of Fig. 7 through the middle thereof; Fig. 9 is a side elevational view of the outer end flap folding device; Fig. 10 is a sectional view at right angles thereto through the middle thereof; Fig. 11 is a front elevational view of the inner end flap folding device; Fig. 12 is an elevational view at right angles thereto; Fig. 13 is an end view thereof; Fig. 14 is a side elevational view of the driving mechanism; Fig. 15 is a sectional view on an enlarged scale through 15-15 of Fig. 3; and Fig. 16 is an enlarged end view showing the plunger in its down position and the end flap folding devices in their position when the folding operation is completed and ready to be released and the carton discharged; Fig. 17 is a transverse fragmentary sectional view of the apparatus through the middle of the plunger and showing the carton folders closed; Fig. 18 is a similar longitudinal sectional view and Fig. 19 is an enlarged detailed view of the upper portion of Fig. 4 showing the carton discharging apparatus.

Similar characters of reference refer to similar parts throughout the several views.

Generally, our apparatus consists of a plunger 1, which engages a table 2; and movable supports 3 and 4, which carry the inner end flap closing devices 5 and outer end closing devices 6 and the intermediate end flap closing device 7 is secured intermediate the devices 5 and 6 on adjustable supports 8. Adjacent the table 2 on one side is a stationary perpendicular folding member 9 and on the opposite side of the table is a spring controlled plate 10 for folding the side of the carton carrying the cover, all of which are supported on a main table 11 which is provided with a shelf 11^a, upon which is mounted a bracket, 12, upon which is mounted the motor 13. This motor 13 is provided with a main shaft 13^a upon the extended end of which is secured a worm pinion 13^b which engages a worm gear 14 which is provided with a cam groove 14^a. The worm gear 14 is revolutely mounted on the shaft 14^b. Pivotally

mounted on the bracket 12 at 12^a is one end of a lever 12^b which is provided with a lug 12^c which engages the cam groove 14^a, and pivotally connected to the extended end of said lever 12^b is the connecting rod 12^d which extends upwardly and engages a saddle 15 which is adjustably mounted on the lower end of the vertical reciprocating shaft 16 which extends upwardly in a vertical position and operates the plunger and carton discharger as will be hereinafter described. Mounted adjacent the worm gear 14 on the shaft 14^b is a clutch 14^c adapted to permit the revolution of the gear 14 while a portion of the shaft 14^b stands still. Secured on the extended end of this shaft 14^b is a wheel 14^e which is provided with a hole in which is mounted one end of the connecting rod 17, which rod extends upwardly and is pivotally connected to the saddle 17^a which is secured to the double arms 17^b which are pivotally mounted on the side frame at 17^c. The upper surface of this saddle 17^a is adapted to engage with the vertical pin 18 which extends upwardly and is supported by a bracket 18^a, which is provided with a compression spring 18^b tending to hold said pin downwardly against said saddle, and pivotally secured to said pin is a bracket 18^c, the upper end of which is pivotally connected to the arm 18^d which arm is secured to the bar 4^c, so that when the shaft 14^b revolves, rod 17 is moved up and down carrying the saddle 17^a, operating the pin 18 which in turn moves the bar 4^c which is pivotally mounted on rod 4^a on a bracket 4^b which is secured to the adjacent bar 19 which is reciprocally mounted on the frame 20. It will be here noted that this bar 19 is provided with a screw 19^a, the one end of which engages with a lug 19^b secured to the frame 20 of the apparatus and said screw turns into an off-set portion 19^c of bar 19 so that when said screw 19^a is turned, the bar 19 is moved, thus providing for the adjustment of the position of the support 4, relatively to the table 2. The support 4 consists of two bars, 4' and 4^a, and pivotally mounted on the bar 4^a is one side of the plate 10, and pivotally connected to the back side of said plate 10 is a bolt 10^a which is provided with a compression spring 10^b, which rests against the lug 10^c which is secured to the bar 4^c, thus providing a spring tension for the plate 10 relatively to the bar 4^c adapted to hold said plate off at an angle to bar 4^c but permitting it to spring back against said bar when sufficient pressure is brought to bear on said plate when folding the carton. It will be here noted that this plate 10 is adapted to fit against and conform to side member 1^a. On the bar 4^a at an angle to conform to the side member 1^a and pivotally mounted on the bar 4^a is this side plate 10 supported by the support 4 permitting its pivotal movement relatively to the support 4 and it is held at an

angle thereto by the spring 10^a which is of suitable strength to bend the carton at the folding line as the plunger 1 moves downwardly and comes to rest, and the folding devices 5, 7, and 9 have performed their folding operations and the carton is in a partially folded condition.

The bar 4^c is operated by the driving apparatus through the members 18, 18^c and 18^d and moves upon its pivotal mounting 4^a compressing the spring 10^a and the folding devices 6 are carried along with the bar 4^c and engage with the side of the carton which is between the member 1^a and the plate 10. These devices 6 are movable to and from each other for adjustment. The distance between them when adjusted is slightly greater than the length of the carton side and the plate 10 just in front of the carton side which plate 10 is held at a proper angle to the folding device 1^a by means of the spring 1^k which is slightly stronger than the spring 10^a. As the downward movement of the plunger continues the opposite or outer ends of the levers 6^c are thrust forwardly by reason of their contact at their inner ends with the carton, carrying with them the end portions of the side and turning them to a right angle with the side and the movement continues until the centers of the folding devices are well past the outer face of the carton. At this point the bar 4^c, plate 10, carton and member 1^a, are in parallel planes, the supporting device for the member 1^a giving way, permitting the plate 10 to close against the plunger 1 and complete the operation.

Mounted between the bars 4 and 4^a of said support 4 are adjusting screws 4^d, which connect with the supports 4^e, upon which are adjustably mounted the outer end flap folding devices 6, thus providing for the adjustment of these outer end folding devices longitudinally on the support 4 thus providing for the folding of the outer end flap of the different length cartons as desired. Adjustably mounted on the shaft 16, by means of a set screw 16^a, is an arm, 1^a, in the outward extending end of which is reciprocally mounted a shaft 1^b on the lower end of which is adjustably secured a socket 1^c, which is secured to the upper surface of the plunger 1. This plunger is a rectangularly shaped hollow piece preferably composed of wood of the proper sizes to fit the inside of the carton to be folded when in its folded condition. One of its sides 1^d is hinged at its lower edge and secured to one side of the inner surface of the hinged side is a lug 1^e, to which is pivotally connected a link 1^f, to the end of which is pivotally connected another link 1^g, and the other end of said link is pivotally connected to a lug 1^h, secured to the lower surface of the top of said plunger. Connected to this link 1^g, close to the lug 1^h is a rod 1ⁱ, the extended

end of which extends through a Z shaped member 1³, and mounted on said rod 1¹, and adapted to rest against said member 1³ is a compression spring 1^k which tends to hold said rod 1¹ upwardly, holding links 1^f and 1^s in alignment, said rod 1¹ being provided with a pin in its lower end to regulate its movement, but when sufficient pressure is brought to bear against the side 1^d, the spring 1^k is compressed and the joint between the two links 1^f and 1^s is broken and the free edge of said side 1^d moves up against the plunger member all as shown best by solid and dotted lines in Fig. 6 of the drawings. Mounted on the opposite ends of this hinged side member 1^d are metallic members 1¹ which are for the purpose of supporting and guiding the inner lining when the outer end member is folding said end piece up against the end of the plunger 1. Mounted on the opposite ends of the plunger 1 are members 1^m and 1ⁿ, engaging with the end folding devices for properly folding the ends together. The table 2 is rigidly secured to a vertical shaft 2^a, which shaft is reciprocally mounted in the frame 20, and on the lower extended end of said shaft is provided a U member 2^b, which is provided with a pin 2^c, which engages the free end of a lever 2^d, which lever is provided with an extended lug 2^e, on the extended end of which is secured the one end of a tension spring 2^f, the other end of said tension spring 2^f is secured to the frame 20, thus tending to hold the free end of the lever 2^d upwardly against the pin 2^c, tending to hold the table 2 and shaft 2^a upwardly in the position shown best in Fig. 15 of the drawings, but said table is adapted to be pressed downwardly by the pressure of the plunger descending with the shaft 16. The support 3 consists of a rod 3¹ and another rod 3^a which are spaced apart and supported by means of bars 3^b, one at each end. The rod 3¹ is pivotally mounted on lugs 3^c, extending from the frame 20 and secured to this rod 3¹ is an arm 3^d, which extends forwardly and is provided with a right angle bend 3^e, to which is pivotally connected a socket lug 3^f, in which is mounted the one end of an arm 3^g, and the other end of said arm 3^g is secured to the shaft 2^a so that when the said shaft 2^a moves upwardly and downwardly the arm 3^d rocks the rod 3¹, thus rocking the support 3. Pivotally mounted at the outer end of the arm 3^d is a bolt 3^h which is provided with a compression spring 3ⁱ, the one end of which rests against a lug 3^j, which is secured to a bar 3^k, which is secured to the support 3 near the middle of said support thus tending to hold the support 3 at an angle from the vertical, but when the shaft 2^a is moved downwardly it permits the movement of the upper portion of the support toward the table 2. This support 3 is secured to the

bars 21, which are mounted for manual adjustment on the frame 20, and they are provided with a downwardly extended portion 21^a in which is screwed the bolt 21^b, which bolt is supported by a support 22 secured to the frame 20, so that when the bolt 21^b is turned the bar 21 is shifted on the frame, thus moving the support backward and forward as desired, thus providing for the adjustment of the support 3 as desired. Mounted on this rod 3¹ is the vertical folding member 9, which is also shifted with the shifting of the bar 21, thus providing for the proper adjustment of the member 9 and support 3 for folding different sized cartons. Mounted between the rods 3^a and 3¹ are threaded bolts 3^l, which are revolvably mounted in the supports 3^b and their inward ends screwed into brackets 5^a of the inside end folding device 5. Said inside folding device 5 is supported by said brackets 5^a, which are shiftably mounted on the rods 3¹ and 3^a, so that by turning the screws 3^l, the inside end folding devices may be readily shifted endways on the support 3, thus providing for the folding of different length cartons. Between said folding devices 5, and shiftably mounted on the frame 20, about the middle of the table 2, on opposite sides are the bars 8, which are provided with adjusting screws 8^a, adapted for shifting the bars 8 longitudinally on the frame and secured to these bars 8 are the secondary or intermediate flap-folding devices 7, thus providing for the shifting of said intermediate flap-folding devices relatively to the table 2, thus permitting the adjustment of said devices 7 for different length cartons.

The inner end folding devices 5, shown best in Figs. 11, 12, and 13 of the drawings, each consist of an angle bar 5^k to which is rigidly secured plate 5^b. Upon the plate 5^b is pivotally mounted the member 5^c by means of a pin 5^d. This pin is provided with a torsion spring 5^e, tending to hold the member 5^c in the position shown in Figs. 11, 12, and 13 of the drawings, but permits the member 5^c to swing on said pin as shown by dotted lines in Fig. 13 of the drawings. Secured to the member 5^c is a curved offset member 5^f, which is adapted to be engaged by the plunger which in its downward movement swings the member 5^c around into engagement with the end of the plunger. Adjustably mounted on this member 5^c is a lug member 5^g, which is adapted to engage the notch 23^a and the point 23^b, see Fig. 2, so that the point 23^b enters the notch 23^a in folding the carton. The lug 5^g is adjustably mounted on the member 5^c, by means of a link 5^h, pivotally mounted on the member 5^c by means of a thumb screw 5ⁱ and said link 5^h is provided with a slot 5^j, thus permitting the movement of the lug 5^g longitudinally and radi-

ally and said link 5^b is pivotally mounted on the member 5^c for double adjustment of lugs 5^e. It will be here noted that the angle bar 5^k is adjustably attached to bar 5^a.

5 The secondary or intermediate flap-folding device consists of a support 7^a secured to the bar 8, and pivotally mounted on support 7^a is a normally vertical member 7^b held inwardly by means of a lug 7^d on said member 7^b provided with a compression spring 7^e, tending to hold said member 7^b inwardly a little from the vertical but permitting its movement outwardly when excessive pressure is brought to bear against it, adjustably mounted, both horizontally and vertically by means of a horizontal slot in the member 7^b, and a vertical slot in the member 7ⁱ. Pivotally mounted on this member 7ⁱ, by means of the pin 7^g, is a support 7^h to which is secured the blade 7ⁱ, all as shown best in Figs. 7, 8, and 16 of the drawings.

The outside flap-folding device consists of an angle bar 6^a, which is secured to the member 4^e, and extends beyond the end of said member some distance. Adjustably mounted on the angle bar 6^a is a support 6^b by means of a lug on said angle bar engaging a slot in said support 6^b which permits its adjustment relatively to said support and it is held in position by means of the bolt 6^c with a wing nut 6^d. Pivotally mounted on this support 6^b by means of the pin 6^e is the member 6^f to the one side of which is secured the blade 6^g, which is adapted to engage the outer end flap and hold it in position so that the points 23^b engage the slots 23^a in folding the carton. Mounted on the opposite side of the member 6^f from the blade 6^g is a Z-shaped member 6^h which extends past the pin 6^e and serves as a stop for the member 6^f and the blade 6^g when it has reached a position approximately at right angles to the member 6^b, all as shown best in Figs. 9, 10, and 16 of the drawings. It will be here noted that the three folding devices at each end of the carton are constructed in cantilever form with a short portion over-hanging the pivot on one side, the other side being provided with an extended blade or lug for engaging purposes. These short over-hanging portions are adapted to be engaged by the plunger 1 with the carton thereon or the table 2 in its movement downwardly and each is operated by such engagement, the blade ends being brought up into their proper position by means of the engagement of the carton in position on plunger 1. It will also be here noted that the inner folding devices 5 engage the inner flaps which are provided with the slots 23^a at the same time that the stationary folding member 9 is forcing the portion supporting said flaps together with said flaps into a vertical position and turning

said flaps inwardly at right angles to said supporting portion. This operation takes place as the plunger 1 is moving downwardly, then the secondary or intermediate folding device 7 engages the middle flaps while the plunger is still moving downwardly and places them in position against the flaps provided with the slots 23^a, the cutaway portion of the middle flaps leaving the slots uncovered and after the plunger 1 has reached the end of its downward stroke the push rod 17 moves upwardly by means of the cam on the main shaft carrying with it the plate 10 and bar 4^c and at the same time the folding device 6 folds the flaps carrying the points 23^b at a right angle to its supporting portion and in alinement with the flaps provided with the slots 23^a, the portion supporting the flaps carrying the points 23^b remaining in an angular position until the flaps are turned into alinement as described, then the further movement of the push rod 17 overcomes the tension of the spring 1^k inside of the plunger allowing the foldable portion of plunger to close causing the points 23^b to engage the slots 23^a guided by the lugs 5^e on the members 5. These lugs also hold the slots 23^a open slightly to receive the points 23^b.

Adjustably mounted on the frame is a member 24 which is adapted for a guide positioning the carton blank, also on the opposite side of the frame are two guide brackets 25 and 26 which serve as guides for the opposite side of the carton blank to facilitate placing it into position. Adjustably mounted on the upper end of the shaft 16 is a horizontal arm 27 and to said arm is secured a spring 27^a which extends downwardly over an arm 27^b. This arm 27^b is secured to the uprights 27^c which extend upwardly parallel with the shaft 16 in a vertical position and are provided with a bearing for supporting the upper end of said shaft and said arm 27^b. Pivotally mounted on this arm 27^b is a lateral bar 27^d, upon which is pivotally mounted a bar 27^e by means of a bracket 27^k upon which is shiftably pivotally mounted a lever 27^e, the long end of which is adapted to extend downwardly and the free end engages the inner surface of the back side of the carton when folded up, and its short end is secured to the cable 27^a so that when the shaft 16 raises and lowers, the long extended end of the lever 27^e is thrown outwardly carrying the carton which has been folded, with it and throwing it out of the way. When the shaft 16 lowers, the extended end of the lever 27^e immediately takes its position against the inner surface of the back of the carton when folded in position for throwing out the carton when the shaft 16 rises again and the carton is released, thus providing for automatically discharging the carton immediately after fold-

ing. Adjustably mounted on the upper end of the shaft 1^b is an arm 27^h which serves as a stop for said lever 27^e in its downward movement.

5 Though we have shown and described a particular construction, combination and arrangement of parts; we do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the purview of our invention the
10 construction, combination and arrangement substantially as set forth in the appended claims.

It is obvious that with this construction
15 there is provided a carton folding apparatus which is adapted to fold different sized cartons by simply adjusting all of the parts excepting the plunger 1 and table 2, which plunger and table must be specific for the
20 particular carton to be folded. That there is provided means for discharging the carton immediately after folding. That there is provided means to facilitate the placing of the carton in proper position on the frame
25 that the folding members all operate automatically with the movement of the plunger for performing their various functions.

Having thus described our invention, what we claim as new and desire to secure by
30 Letters Patent is:

1. In an apparatus of the class described, a plunger provided with a foldable side adapted to fit the inner surface of a carton when folded and means operated by engage-
35 ment of said plunger for engaging the sides and end flaps of the carton blank and forcing them into folded position and means for adjusting said side and flap engaging means whereby different size cartons may be
40 folded.

2. In an apparatus of the class described, a plunger with a fixed vertical side and with fixed vertical ends and a collapsible side, means for holding said collapsible side open
45 and permitting its collapse under certain pressure, means positioned adjacent the sides and ends of side plunger adapted to engage the sides and ends of said plunger in its downward movement, each of said
50 means carrying means for engaging the sides and flaps of the carton blank and folding them into their proper position with the downward movement of said plunger.

3. In an apparatus of the class described,
55 a plunger with a fixed vertical side and with fixed vertical ends and a collapsible side, means for holding said collapsible side open and permitting its collapse under certain pressure, means positioned adjacent the ends
60 of said plunger adapted to engage the ends of said plunger in its downward movement, each of said means carrying means for engaging the end flaps of the carton blank and folding them into their proper position
65 with the downward movement of said

plunger, and a table mounted on a vertical shaft held in its upward position by a spring, adapted to be depressed by said plunger member for supporting the bottom portions of the carton blank.

4. In an apparatus of the class described,
70 a plunger with a fixed vertical side and with fixed vertical ends and a collapsible side, means for holding said collapsible side open and permitting its collapse under certain
75 pressure, means positioned adjacent the ends of said plunger adapted to engage the ends of said plunger in its downward movement, each of said means carrying means for engaging the end flaps of the carton blank and
80 folding them into their proper position with the downward movement of said plunger, a table mounted on a vertical shaft held in its upward position by a spring, adapted to be depressed by said plunger member, and
85 means for raising and lowering said plunger member.

5. In an apparatus of the class described, a plunger with a fixed vertical side and with fixed vertical ends and a collapsible side,
90 means for holding said collapsible side open and permitting its collapse under certain pressure, means positioned adjacent the ends of said plunger adapted to engage the ends of said plunger in its downward movement,
95 each of said means carrying means for engaging the end flaps of the carton blank and folding them into their proper position with the downward movement of said plunger, a table mounted on a vertical shaft held in
100 its upward position by a spring adapted to be depressed by said plunger member, means for raising and lowering said plunger member, and means in connection with said raising and lowering means and actuated there-
105 by for engaging the folded carton and discharging the same.

6. In an apparatus of a class described, a plunger provided with a fixed vertical side and with fixed vertical ends and a
110 hinged outwardly extending side, means tending to hold said side outwardly but permitting it to be closed up against said plunger under certain pressure, means for engaging said extended side and closing the
115 same at a certain position with the downward movement of said plunger and means actuated by the downward movement of said plunger for engaging the side and end flaps of the carton and folding them in proper
120 position.

7. In an apparatus of a class described, a plunger provided with a fixed vertical side and with fixed vertical ends and a hinged
125 outwardly extending side, means tending to hold said side outwardly but permitting it to be closed up against said plunger under certain pressure, means for engaging said extended side and closing the same at a
130 certain position with the downward move-

ment of said plunger, means actuated by the downward movement of said plunger for engaging the side and end flaps of the carton and folding them in interlocking position and means for vertically reciprocating said plunger.

8. In an apparatus of the class described, a plunger provided with a fixed vertical side and with fixed vertical ends and a hinged outwardly extending side, means tending to hold said side outwardly but permitting it to be closed up against said plunger under certain pressure, means for engaging said extended side and closing the same at a certain position with the downward movement of said plunger and means actuated by the downward movement of said plunger for engaging the side and end flaps of the carton and folding them in interlocking position, means for vertically reciprocating said plunger, and means in connection with each of said folding means for adjusting said folding means in position for varying length cartons.

9. In an apparatus of the class described, a plunger provided with a fixed vertical side and with fixed vertical ends and a hinged outwardly extending side, means tending to hold said side outwardly but permitting it to be closed up against said plunger under certain pressure, means for engaging said extended side and closing the same with the downward movement of said plunger and means actuated by the downward movement of said plunger for engaging the side and end flaps of the carton and folding them in position against said plunger, means for reciprocating said plunger upwardly and downwardly, means in connection with each of said folding means for adjusting said folding means in a position for varying length cartons and a table member reciprocally mounted in the path of said plunger supported in its raised position by a spring means and adapted to be depressed by said plunger in its downward movement.

10. In an apparatus of the class described, a plunger provided with a fixed vertical side and with fixed vertical ends and a hinged outwardly extending side, means tending to hold said side outwardly but permitting it to be closed up against said plunger under certain pressure, means for engaging said extended side and closing the same with the downward movement of said plunger and means actuated by the downward movement of said plunger for engaging the end flaps of the carton and folding them in position against said plunger and means for reciprocating said plunger upwardly and downwardly and means in connection with each of said folding means for adjusting said folding means in a position for varying length cartons and a table member reciprocally mounted in the path of said

plunger supported in its raised position by a spring means and adapted to be depressed by said plunger in its downward movement and means secured to said plunger reciprocating means adapted to engage the carton when folding and discharge the same to one side with the raising of the plunger.

11. In an apparatus of the class described, an upwardly and downwardly reciprocating plunger adapted to fit the inner side of a folded carton and provided with a hinged side, means for holding said hinged side outwardly but permitting its movement inwardly under certain pressure, a plurality of lugs and recesses on each end of said plunger, a plurality of pivotally mounted means actuated by the downward movement of said plunger for engaging the separate flaps of the carton and folding them into position by engagement with said lugs and recesses on the ends of said plunger, and means for reciprocating said plunger.

12. In an apparatus of the class described, an upwardly and downwardly reciprocating plunger adapted to fit the inner side of a folded carton, and provided with a hinged side, means for holding said hinged side outwardly but permitting its movement inwardly under certain pressure, a plurality of lugs and recesses on each end of said plunger, a plurality of pivotally mounted means actuated by the downward movement of said plunger for engaging the separate flaps of the carton, and folding them into position by engagement with said lugs and recesses on the ends of said plunger, means for reciprocating said plunger and means for adjusting said pivotally mounted flap engaging members, thereby adapting them for engagement with different sized cartons.

13. In an apparatus of the class described, an upwardly and downwardly reciprocating plunger member adapted to fit the inner side of the folded carton provided with a hinged side, means for holding said hinged side outwardly but permitting its movement inwardly under certain pressure, a plurality of lugs and recesses on each end of said plunger, a plurality of pivotally mounted means actuated by the downward movement of said plunger for engaging the separate flaps of the carton and folding them into position by engagement with said lugs and recesses on the ends of said plunger, means for reciprocating said plunger and means for adjusting said pivotally mounted flap engaging members, thereby adapting them for engagement with different sized cartons and adjustable means secured on the frame of the apparatus for facilitating the positioning of the carton before folding.

14. In an apparatus of the class described, an upwardly and downwardly reciprocating plunger member adapted to fit the inner side of a folded carton provided with a

hinged side, means for holding said hinged side outwardly but permitting its movement inwardly under certain pressure, a plurality of lugs and recesses on each end of said
5 plunger, a plurality of pivotally mounted means actuated by the downward movement of said plunger for engaging the separate flaps of the carton and folding them into position by engagement with said lugs and
10 recesses on the ends of said plunger, means for reciprocating said plunger, means for adjusting said pivotally mounted flap engaging members, thereby adapting them for engagement with different sized cartons, and adjustable means secured to the frame of the
15 apparatus for facilitating the position of the carton before folding and means in connection with the means for reciprocating said plunger for engaging the folded carton and discharging the same when released by the
20 upward movement of the plunger.

In testimony whereof, we have hereunto set our hands at San Diego, California, this 11th day of June, 1917.

IRA SHAFER.
CHAS. A. SMALL.