Nov. 23, 1937. S. BERGSTEIN 2,100,022

CONTAINER ASSEMBLING MACHINE

Filed Aug. 6, 1934 4 Sheets-Sheet 1

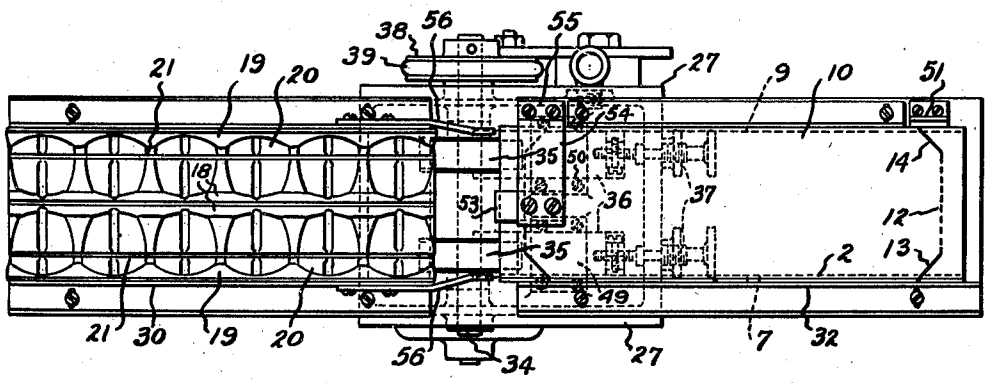

FIG. 1.

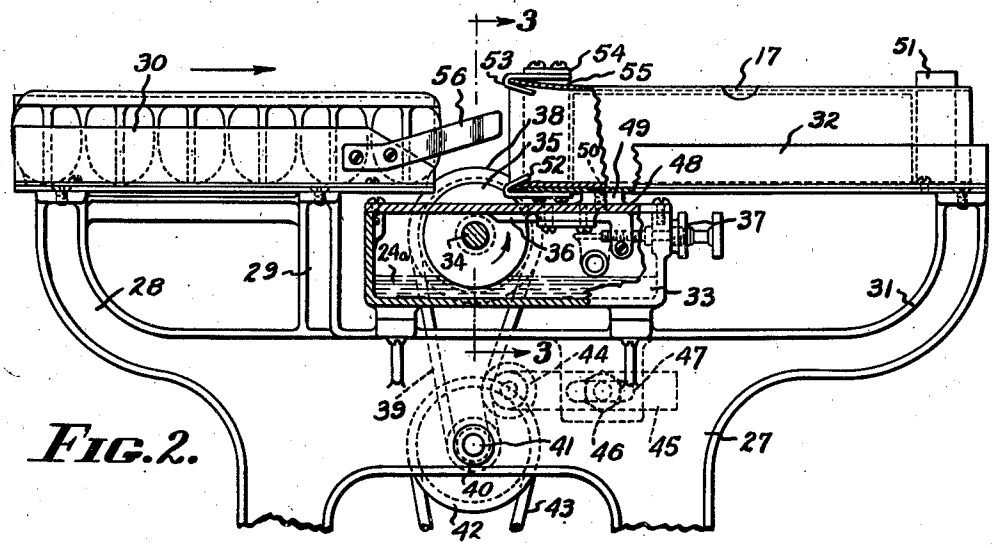

FIG. 2.

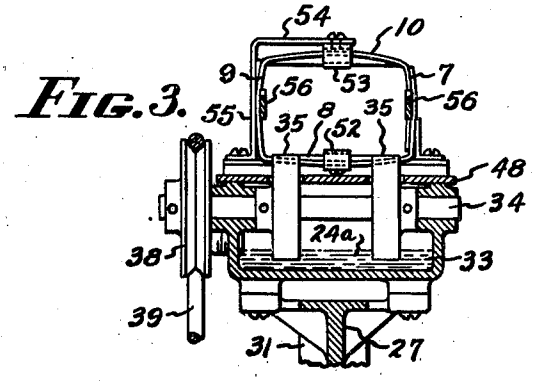

FIG. 3.

INVENTOR.
SAMUEL BERGSTEIN.

BY Allen & Allen

ATTORNEYS.

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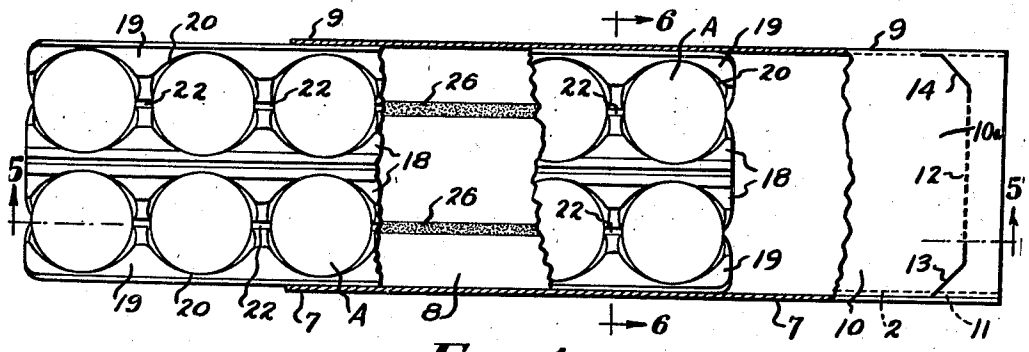

FIG. 4.

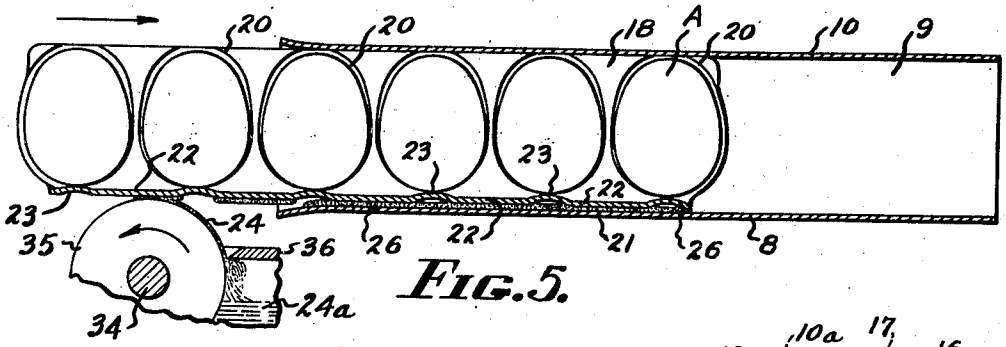

FIG. 5.

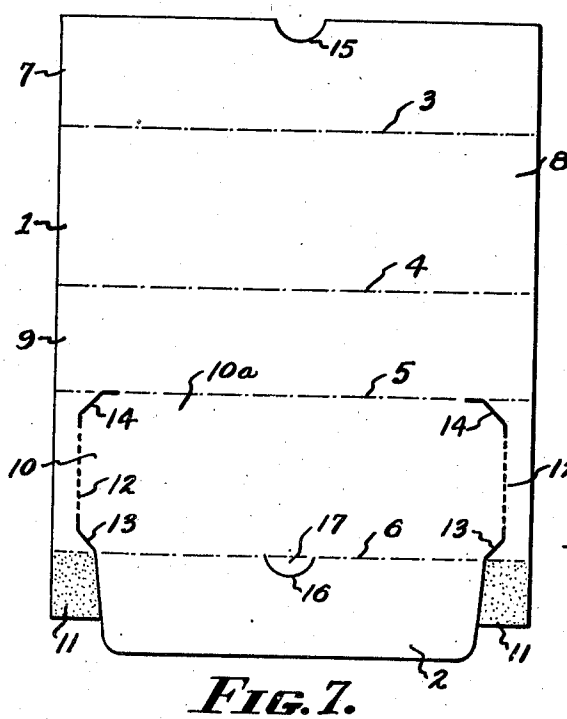

FIG. 7.

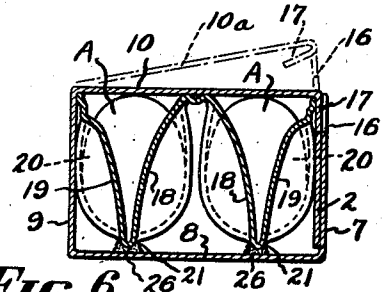

FIG. 6.

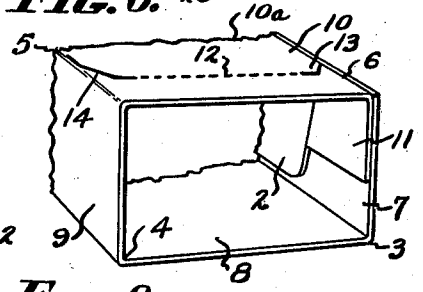

FIG. 8.

INVENTOR.
SAMUEL BERGSTEIN.
BY Allen & Allen
ATTORNEYS.

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CONTAINER ASSEMBLING MACHINE

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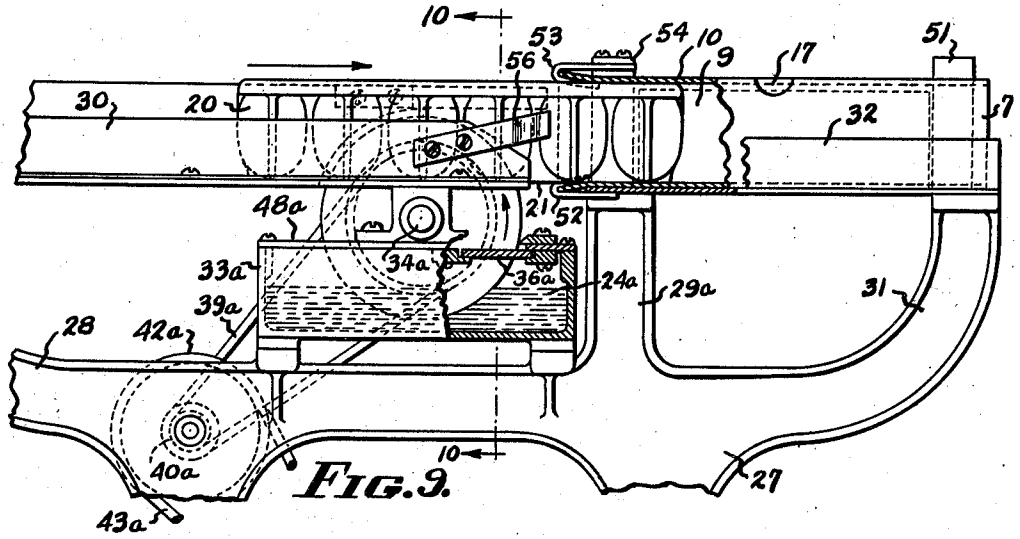

FIG. 9.

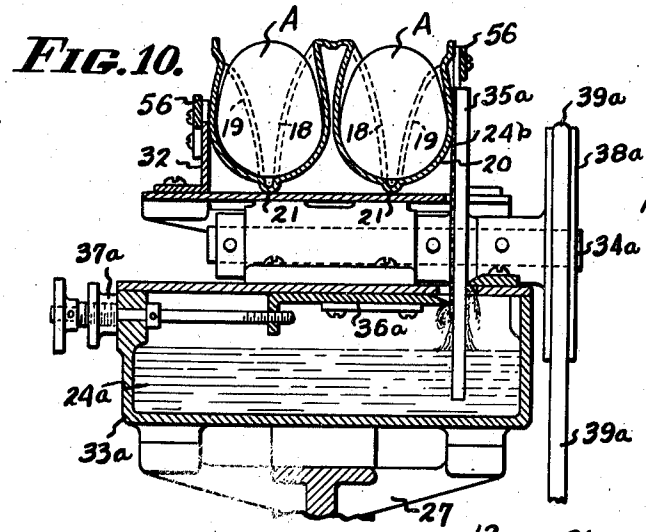

FIG. 10.

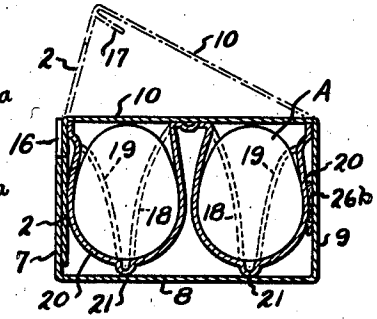

FIG. 12.

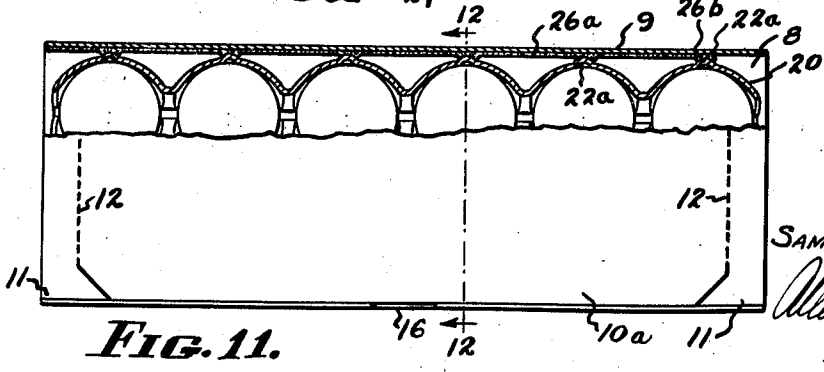

FIG. 11.

INVENTOR.
SAMUEL BERGSTEIN.
Allen & Allen
ATTORNEYS.

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CONTAINER ASSEMBLING MACHINE

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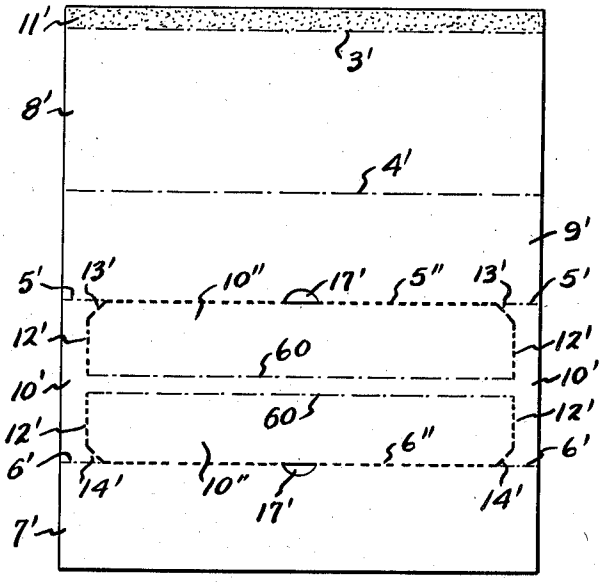

FIG. 13.

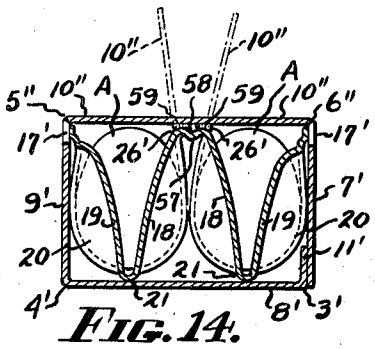

FIG. 14.

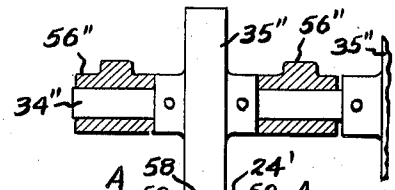

FIG. 16.

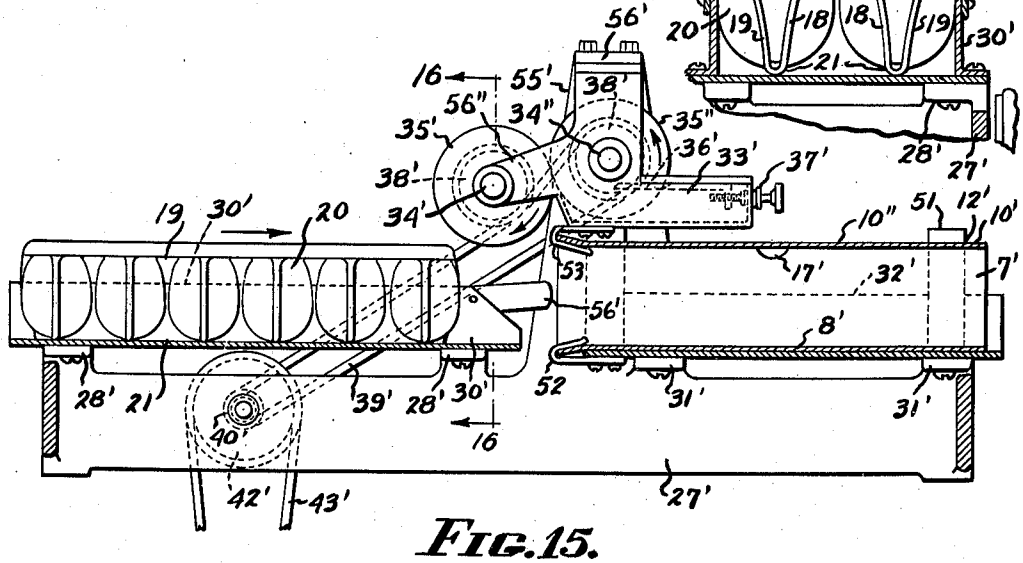

FIG. 15.

INVENTOR.
SAMUEL BERGSTEIN.
BY Allen & Allen
ATTORNEYS.

Patented Nov. 23, 1937 2,100,022

UNITED STATES PATENT OFFICE

2,100,022

CONTAINER ASSEMBLING MACHINE

Samuel Bergstein, Cincinnati, Ohio, assignor to Edna May Bergstein and Robert Morris Bergstein, as trustees

Application August 6, 1934, Serial No. 738,635

9 Claims. (Cl. 93—6)

My invention concerns cartons for fragile articles, such as egg cartons, in which the articles are packed in compartments, provision being made for protecting the articles from breakage during handling and shipping the cartons with the articles therein. My invention more especially concerns such cartons of the type comprising an outer tubular container and an inner cellular structure which is inserted into the tubular outer container from an end thereof; being an improvement upon the carton disclosed and claimed in my copending application, Serial No. 714,678, filed March 8, 1934; although it will be understood that my present invention is not limited in all respects to the use of carton structure of the type disclosed in said copending application.

One object of my present invention is to provide a mechanism to afford a secure fastening of the inner cellular container within the outer tubular container, by simple means and by simple operation, adapted to the requirements of especially rapid packing of articles such as eggs.

Other objects will appear in the course of the following description, illustrated by the drawings, in which—

Figure 1 is a plan view of apparatus which I prefer to employ, and embodying my invention;

Figure 2 is a partial side elevation of the same.

Figure 3 is a partial vertical cross section of the same on the line 3—3 of Fig. 2.

Figure 4 is an enlarged partial plan view of the two containers in process of assembly according to my invention, parts being broken away and omitted to reveal other parts.

Figure 5 is a vertical longitudinal section of the same on the line 5—5 of Fig. 4.

Figure 6 is a vertical cross section of the same on the line 6—6 of Fig. 4.

Figure 7 is a plan view of the blank used in the preferred construction of the outer tubular container.

Figure 8 is a partial perspective view of the outer tubular container, showing the end construction thereof.

Figure 9 is a partial side elevation of a modified apparatus which applies the adhesive to sides of the cells of the inner container, for adherence to a side wall of the outer container.

Figure 10 is a vertical cross section of the same on the line 10—10 of Fig. 9.

Figure 11 is a plan view of a carton, with one side portion broken away to show the adhesion of the cells to the side wall of the outer container, as made with the machine of Figs. 9 and 10.

Figure 12 is a vertical cross section of the carton, on the line 12—12 of Fig. 11.

Figure 13 is a plan view of a blank for a modified carton wherein the inner container has its top part adhesively secured to the interior of the top part of the outer container closely along its median longitudinal line.

Figure 14 is a vertical cross section of a carton made up with the blank illustrated in Fig. 13, dotted lines at the top of the figure representing the lid portions when raised for access to the carton.

Figure 15 is a vertical longitudinal sectional view of apparatus for applying the adhesive to the top part of the inner cellular container and assembling the carton illustrated by Figs. 13 and 14.

Figure 16 is a partial vertical cross section of the apparatus illustrated in Fig. 15, on the line 16—16 of Fig. 15, certain supporting parts being omitted.

The outer tubular container of the first example, Figs. 1 to 8, inclusive, is very similar to that disclosed and claimed in my prior application above referred to. It is so designed that it will have front, bottom and rear walls, and a top wall with a lid portion making up the major intermediate part of its length, which is weakly joined, as by perforations, to end marginal portions which connect to both the front and rear wall of the container and maintain its tubular form when the lid portion is separated from them.

The blank for this container, as clearly shown in Fig. 7, is a single sheet of paper stock with a main rectangular part 1, from one end of which extends a narrower flap part 2. This main part 1 is scored along lines 3, 4, 5, and 6 so that there are defined a narrow front wall 7, a wider bottom wall 8, a narrow rear wall 9, and a wide top wall 10, succeeding each other in parallel relation. Extending from the main part 1 alongside the flap part 2, at each end thereof, are tabs 11 having continuations of the score line 6, so that they bend inside the front wall 7 along with the flap part 2; and they are adhesively, or otherwise suitably secured to the top edge part of the front wall 7. They thus serve to hold the blank in collapsed flat tubular shape when all of the folds have been made on the score lines 3, 4, and 5. Near the respective ends of the top portion 10, lines of perforations 12 extend thereacross, substantially nearer the ends of the blank than are the dividing cuts between the flap 2 and the connecting tabs 11. These lines of perforations join the cuts by diagonal cuts 13; and at the rear

ends of these lines of perforations 12, similar diagonal cuts 14 run to the score line 5 where the top 10 folds on the rear wall 9.

At the middle of the free edge of the front wall 7 a segmental recess 15 is left therein; and at the middle of the score line junction of the flap 2 with the top 10, an arc shaped cut 16 is made in the flap 2, leaving a flap or tab 17 that may be pressed into the recess 15 to afford a finger hold to open the middle lid portion 10a of the top wall, torn loose at the perforations 12.

This blank is folded on well known machinery, which is provided with adhesive applying means; the blank being folded on score line 5, bringing top 10, flap 2 and tabs 11 across bottom 8 and rear wall 9, and then, when adhesive has been applied to tabs 11, the front wall 7 is folded onto tabs 11, completing the tubular outer container in flat knock-down condition, in which it is stored and shipped, ready to set up into tubular form to receive the inner cellular container.

This cellular inner container comprises the middle downwardly converging members 18 and the outward members 19 slanting upward from the bottoms of these middle members 18; all of the four members 18 and 19 being pressed to form cavities 20, each approximately of the shape of one side of an egg. Normally, these portions have an outward spring, due to the resiliency of the pressed pulp material of which they are made, so that they will not enter an open end of the above described outer container without some contraction. Also, these inner containers are not fully self supporting as to outward spreading of the portions 18 and 19, especially when their oppositely facing cavities 20 have received eggs. I provide apparatus for facilitating the support and handling of these inner containers under these conditions, and for permitting an especially rapid insertion of the filled inner containers into the tubular outer containers.

I also, in conjunction with the method of holding, filling and inserting the inner containers, just above described, provide a method and means for fastening the inner container in the outer container so that it will not slide out either open end. The bottom folds 21, where the portions 18 and 19 connect together for their upward divergence, are, for a major portion of their length, fairly straight and adapted to bear down on the bottom 8 of the outer tubular container. As is seen best in Fig. 5, these folds 21 have these major bearing portions 22 alternating with slightly upwardly arched portions 23; the latter being coincident with the bottoms of respective egg cells formed by the cavities 20. My method of fastening the cellular container in the outer container comprises, broadly stated, the contact of the bottom folds 21 with adhesive supplied in the paths of these folds as the cellular container enters the outer container; as seen in Figs. 4 and 5, where the adhesive 24 is seen being applied by the rollers 35 to the portions, which drag the adhesive in along the bottom 8 of the outer container, in stripes 26. That is to say, the inner container brings in its adhesive merely incident to its movement into the outer container. When this movement is completed, with the cellular container fully in the outer container, there is a strip of adhesive 26 throughout the length of each bottom fold 21, fully adhesively attaching the longer portions 22 of the folds to the bottom 8, and to a lesser degree also securing the shorter arched portions 23 to the bottom 8 of the outer container.

The ease of inserting the filled inner container into one end of the outer container is preferably afforded by means that spreads apart the adjacent ends of the bottom 8 and top 10 of the outer container, and means that pulls together the two portions of the inner container as the latter progresses into the outer container. Support of the cellular inner container is provided, to prevent lateral spreading as the eggs are inserted, by a trough shaped structure, along which the filled container may be slid into the outer container, which also is held up in full tubular condition by other trough shaped means, along which the tubular container has been slid to the means that spreads the top and bottom edges of its receiving end. This outer container is held in this position by one hand of the operator, while the other hand is used to grip the filled inner container and slide it into the outer container; or two persons may cooperate in this work. For example, one worker may place the inner container in the trough and fill it with eggs; the other worker placing the outer container in the other trough and holding it while the first worker slides the filled inner container into the held outer container; and the second worker then taking the completed package away and stacking or packing it. In either case, my method admits of very rapid and economical operation, with little breakage of eggs, and very little care and attention necessary from the worker or workers.

As I prefer to construct an improved apparatus for carrying out my method of producing my improved package, referring more particularly to Figs. 1, 2, and 3, a base frame 27, understood to have a lower footing portion which is not shown in Fig. 2, has a left hand arm 28 and a pedestal 29 at the right of the arm. On these is supported the trough 30 for receiving and supporting the inner container while it is being filled. This frame 27 has a right hand arm 31 which supports the right hand end of the trough 32 that supports the outer container ready for reception of the inner container as above described.

The middle portion of the frame 27, above the plane of which the trough supporting arms 28 and 31 extend, supports a tank 33 to hold adhesive such as glue or the like, 24a, in which tank there is a roller shaft 34, journaled in the sides of the tank and having fixed on it two rollers 35 that dip the lower parts of their peripheries in the adhesive 24a. Doctor or scraper blades 36, adjusted to or from the rollers 35 by adjusting means 37, regulate the amount of adhesive carried up by the rollers. The upper portions of the peripheries of these rollers extend up between the adjacent ends of the troughs 30 and 32, close to these ends and slightly above the planes of their upper surfaces, said planes being substantially at the same elevation. The roller shaft 34 is rotated by means of a pulley 38 fixed on one end portion thereof which extends past its bearing. This pulley has passing around it a belt 39 which passes around a smaller pulley 40 fixed on a shaft 41 that is journaled in a lower part of the frame 27 and which has fixed on it a larger pulley 42 with a belt 43. It will be understood that this belt passes down around another pulley, not shown; the several pulleys forming part of a speed reducing system through which the adhesive applying rollers 35 are driven from a suitable motor, also not shown. An idler pulley 44 bears on the belt 39, being journaled on a bar 45 that is adjustable on the frame 27, being

held for adjustment by a bolt **46** through a slot **47** in the bar. The tank **33** has a cover **48** with slots through which the rollers **35** extend upwardly; and the right hand outer-container supporting trough has its adjacent end supported on this cover **48** by pads **49** to which it is screwed by screws **50**.

Near the right hand end of the outer container supporting trough, at one side, is a tongue **51** upstanding from the base part of the trough where the base part extends past the trough side walls; this tongue being resilient to press on the inserted outer tubular container, to hold it in position by pressing it against the opposite wall of the trough. This means supplements the holding by the operator before mentioned, or may supplant it, relieving the operator of that duty.

The means that spreads the top and bottom edges of the entrance end of the outer container, as here exemplified, comprises, for the lower edge, a hook member **52**, formed of a flat strip bent with a longer lower part under and screwed to the adjacent end portion of the outer container supporting trough **32**, and an upper part that hooks around the edge of this trough end and slants up above the plane of the bottom of the trough. For the upper edge, this means comprises the similar hook member **53**, which has its longer upper part fixed on the horizontal arm **54** that extends in from an upstanding bracket **55** fixed to the side extension of the base of the trough **32** as best seen in Fig. 3. The lower part of this hook member **53** slants down to the right from its curved left hand junction with the upper part of the member. These hook members, the lower one **52** and the upper one **53**, are located midway of the widths of the containers alined in the troughs **30** and **32**; and their slanting portions are so located and formed that when an outer tubular container is slid to the left along trough **32**, its end edge portions will be intercepted by these slanting portions of the hooks **52** and **53** and bowed; the lower one downward below the plane of the upper surface of the bottom of the trough **32**, and the upper one upward above the plane of passage of the top portions of the cellular inner container coming in from the trough **30**. As the lower hook **52** is at the middle, it does not engage lower portions of the inner container, though extending above the plane of their passage along the bottoms of the troughs; and the upper hook is above the plane of passage of the top middle portion of the cellular inner container. The hooks thus dispose the top and bottom edges of the entrance end of the outer container for easy entrance of the inner container, without in any way, themselves, obstructing this entrance.

The above provisions would not be fully adequate for the easiest insertion, as the side edges of the entrance of the outer container are not distended, but on the contrary are slightly drawn in due to the outward bowing of the top and bottom edges as above described. The provision is completed by the resilient prongs **56** secured to the ends of the side walls of the inner container supporting trough **30** adjacent to the above described means for disposing the entrance of the outer container. Preferably, these prongs, which are formed of flat strips, slant somewhat upwardly as well as converge slightly inwardly; and the adjacent corner portions of the walls of the trough **30** are cut away to give freedom for these prongs to spring in toward each other. The action of these prongs, slanting upward as they converge, is to act progressively upwardly on the first cell portion **20**, and upon each successive portion **20** reaching the prongs **56**. The prongs thus draw the inner container together transversely, so that it, in each successive cross section reaching the entrance of the outer container is so narrow as to readily and smoothly enter it. The prongs **56** being resilient, do not press inwardly with that positive force that might break the eggs A contained in the cells **20**.

As the inner container has to rise slightly to pass over the rollers **35**, and the weight of the contained eggs causes the folds **21** to press firmly down on these rollers, the adhesive is taken off in ample and regular quantity and carried into the outer container and distributed in stripes **26** along the bottom **8** thereof, as previously referred to.

Another very important advantage of pulling down the end edge of the bottom **8** of the outer container, by the hook **52** at its middle, is that the portions of this edge in line with the rollers **35** are well below the plane of passage of the bottom folds **21** of the inner container, and the adhesive carried by said folds **21**, so that no adhesive is scraped off by these end edges of the bottom **8**. There is no smearing of adhesive at any place where it would cause sticking of packages to each other, in their subsequent packing, pending complete drying of the adhesive; and no unsightly appearance is given to the package at any part of it, as might be with inadequate control of the adhesive application.

As the inner container reaches the farther portions of the outer container not spread by the hooks **52** and **53**, and passes from the drawing-together prongs **56**, the inner container is closely hugged by the top **10** and bottom **8**, and it expands into firm contact with the sides **7** and **9** of the outer container. The result is that the inner container is held firmly in the outer container, permitting handling and packing of the completed packages while the adhesive is still setting and drying or hardening. The adhesive may be glue, or any suitable adhesive.

In the example of Figs. 9, 10, 11, and 12, the outer and inner containers are the same as in the first example of Figs. 1 to 8, inclusive. The difference is in the place of application of the adhesive, and in the modification of the apparatus for so doing.

The apparatus is generally similar to that of the preceding example, with frame **27** having arms **28** and **31** supporting troughs **30** and **32**, respectively. These troughs are similar to those of the preceding example; the left hand trough having the prongs **56** that draw together the sides of the inner container as it enters the outer container; and the right hand trough having the bottom hook shaped member **52** and the top hook shaped member **53**, for spreading the bottom and top of the outer tubular container apart.

Instead of rollers applying adhesive to the bottom folds of the inner cellular container, however, a disk **35***a* contacts with sides of the cells **20** of this inner container, as best seen in Fig. 10. A tank **33***a* holds the adhesive **24***a*, into which the disk **35***a* dips; and a scraper **36***a*, adjusted by means **37***a*, regulates the amount of adhesive **24***b* carried up by the disk. The disk **35***a* is driven by a belt **39***a* around a pulley **38***a* fixed on the disk shaft **34***a*, which is journaled in bearings upstanding from the top of the tank **33***a*. This belt passes around a small lower pulley **40***a* which is fixed on a shaft with a larger pulley **42***a*, around which passes a belt **43***a*, understood to be part of an

operative connection to suitable motive means, not shown.

As the sides of the cells 20 pass in contact with the adhesive 24b on the face of the disc, they carry with them portions of the adhesive, which is applied to the inner side of the rear wall 9 of the tubular outer container in a strip or stripe 26a. When the inner container reaches its final position, it is secured to the wall 9 by patches 26b of the adhesive, at the respective cells 20, where their convex sides bear against the inner side of said rear wall 9. No adhesive is applied at the front, where the flap 2 has to be free for withdrawal when the carton is opened.

In the third example, Figs. 13, 14, 15, and 16, the outer container is of a somewhat different construction; the inner container being the same cellular container shown in the two preceding examples. Here, the adhesive is applied to the top middle ridge 57 of this inner cellular container, at the junction of the two rows of cells, that is, where the two inner members 18 meet. As shown in Figs. 14 and 16, this ridge 57 has a slight middle depression throughout its length, at 58, so that two parallel beads 59 are formed, spaced by this depression 58. This is the same formation as seen in the preceding illustrations of the inner container; it not having been previously described in detail, as it is not of controlling consequence in the previous examples, except to form a bearing against the top wall of the outer container, for snug fitting of the two containers together.

The blank for the outer container, as shown in Fig. 13, is a simple rectangular sheet of paper stock, with parallel scores 3', 4', 5' and 6' across it, defining the front wall 7', top wall 10', rear wall 9', bottom wall 8', and narrow flap 11', which receives adhesive by which it is connected to the bottom free edge of the front wall 7' when the blank is folded on the score lines. The top 10' is so formed, by means of perforations and score lines, that it has two lid portions 10'' adapted to be opened when detached from the front edges and the end marginal portions of the top. Thus, the major middle portions of the lengths of the score lines 5' and 6' are provided with perforations 5'' and 6'', respectively; and these join, by diagonal lines of perforations or cuts 13' and 14', respectively, with transverse lines of perforations 12' that meet the ends of respective spaced score lines 60 along the longitudinal median line of the top 10'. When the lid 10'' is severed by tearing along these perforations 5'' or 6'' and 12'', it hinges at its respective score line 60, to raise and uncover one row of cells of the inner container for removal of the eggs A therein. Semicircular slots 17' midway of the lengths of the perforation lines 5'' and 6'' serve to admit the finger or thumb under the lid 10''.

The apparatus for assembling and adhesively securing together this modified outer container and the inner container is modified from those of the preceding examples to the extent that is required for applying the adhesive to the top ridge 57 of the inner container, instead of to the bottom or side as in the preceding examples.

A frame 27' has left hand pedestals 28' supporting the left hand trough 30', which has prongs 56' to compress the inner container laterally; being generally like that of the first two examples. This frame 27' has right hand pedestals 31' supporting the right hand trough 32', which is in all respects like that of the preceding examples; having the bottom and top hook members 52 and 53 for spreading the bottom and top of the outer container, and having the side resilient member 51 to help hold this container while the inner container is inserted.

A pedestal 55' extends up from one side of the frame 27' and has a cross extension 56' from which depends a member with arms 56'' extending to the left to carry a roller 35' with its shaft 34' journaled in the end parts of the arms. This roller 35' is so located that it contacts the top ridge 57 of the inner container as the latter enters the outer container. It is supplied with adhesive by a second roller 35'' on a shaft 34'' journaled in the pedestal 55' and the main part of the member that has the arms 56''; this second roller 35'' dipping into adhesive in a tank 33' supported on this member above the right hand trough 32'. A scraper 36' regulates the amount of adhesive brought up by this second roller; being adjusted by the means 37'. The two rollers 35' and 35'' are rotated by means of a belt 39' passing around a pulley 38' fixed on the shaft 34'' of the second roller 35'' and passing against a pulley 38' fixed on the shaft 34' of the first roller 35'. This belt 39' passes around a small lower pulley 40' fixed on a shaft with a larger pulley 42', around which passes a belt 43', understood to form part of an operative connection with suitable driving means, not shown.

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

1. Apparatus for assembling an inner container with an outer tubular container by causing entrance of the inner container through an open end of said tubular container, comprising alined trough members with adjacent ends spaced apart, adhesive applying means between said ends, having its effective adhesive applying surface above the planes of the bottoms of the trough members and located in the path of travel of a bottom portion of the inner container from one trough into the tubular container held in the other trough, which bottom portion is to carry adhesive from said applying means and thereby adhere to the interior surface of the bottom of the tubular container, means receiving top and bottom edge portions of the open end of the tubular container as it is slid along the trough toward the adhesive applying means, said means diverging in the direction of sliding, to distort said edges upward and downward, respectively, and said means being laterally displaced from the path of travel of the bottom portion of the inner container, but effecting sufficient downward distortion of the bottom edge portion to prevent its scraping adhesive from the entering bottom portion, and said one trough, from which the inner container slides, being provided with members converging across the path of the inner container in the direction of its passage to the outer container, to reduce the width of the inner container as it enters the outer container.

2. Apparatus for assembling a flexible walled inner cellular container in an open ended rectangular shaped flexible walled outer container comprising spaced open ended holders, one for the outer container and one for the inner container, and means independent of said holders for supplying adhesive to predetermined surface portions of said inner container during its insertion in the outer container.

3. Apparatus for assembling a flexible walled inner cellular container in an open ended rectangular shaped flexible walled outer container

comprising open ended holders, one for the outer container and one for the inner container, and means associated with said holder for the outer container for spreading the top and bottom walls thereof during insertion of the inner container therein, and means independent of said holders for supplying adhesive to predetermined surface portions of said inner container during its insertion in the outer container.

4. Apparatus for assembling a flexible walled inner cellular container in an open ended rectangular shaped flexible walled outer container comprising open ended holders, one for the outer container and one for the inner container, means associated with said holder for the inner container for constricting the inner container sidewise during its insertion into the outer container, and means independent of said holders for supplying adhesive to predetermined surface portions of said inner container during its insertion in the outer container.

5. Apparatus for assembling a flexible walled inner cellular container in an open ended rectangular shaped flexible walled outer container comprising spaced open ended trough shaped holders mounted in fixed position, and means associated with said holders for facilitating the guiding of the inner container into the outer container, and means spaced between said holders for applying adhesive to predetermined portions of said inner container during its movement into the outer container.

6. Apparatus for assembling a flexible walled inner cellular container in an open ended rectangular shaped flexible walled outer container comprising spaced open ended trough shaped holders mounted in fixed position, and means associated with said holders for facilitating the guiding of the inner container into the outer container, and means spaced between said holders for applying adhesive to predetermined portions of said inner container during its movement into the outer container, and comprising glue rollers.

7. Apparatus for assembling a flexible walled inner cellular container in an open ended rectangular shaped flexible walled outer container comprising open ended holders, one for the outer container and one for the inner container, and means associated with said holder for the outer container for spreading the top and bottom walls thereof during insertion of the inner container therein, and means associated with said holder for the inner container for constricting the inner container sidewise during its insertion into the outer container.

8. An egg carton packaging machine comprising means to position and guide a flexible walled inner cellular egg receiving container during the insertion thereof into a rectangular flexible walled outer container, means to hold walls of the outer container open for receiving the inner container, and means for applying adhesive to the inner container during its insertion into the outer container.

9. An egg carton packaging machine comprising means to position and guide a flexible walled inner cellular egg receiving container during the insertion thereof into a rectangular flexible walled outer container, means to hold walls of the outer container open for receiving the inner container, and means for applying adhesive to the inner container during its insertion into the outer container, comprising glue wheels.

SAMUEL BERGSTEIN.