Oct. 11, 1938. M. MEDNICK ET AL 2,132,859

APPARATUS FOR MAKING BOXES AND BOX COVERS

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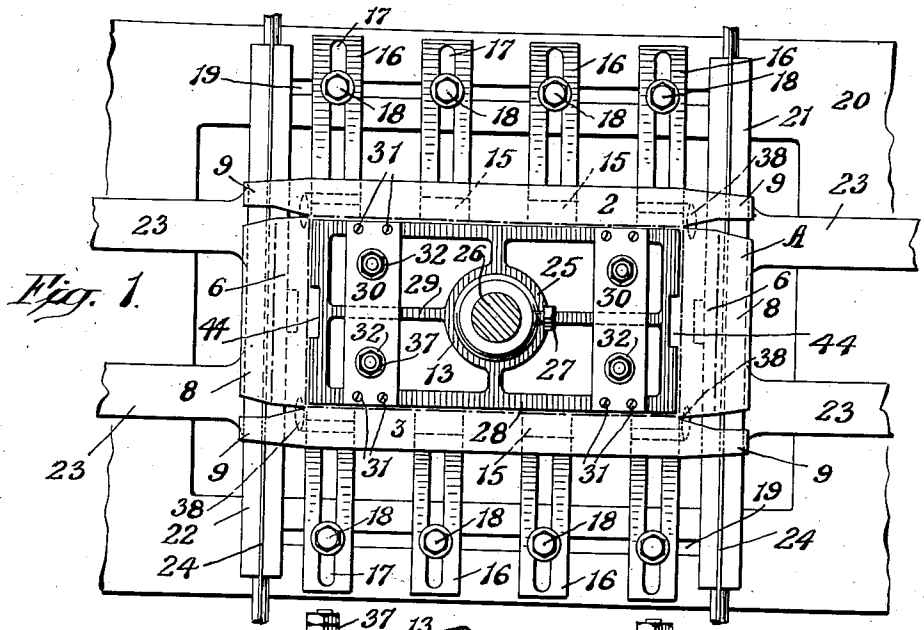


Fig. 1.

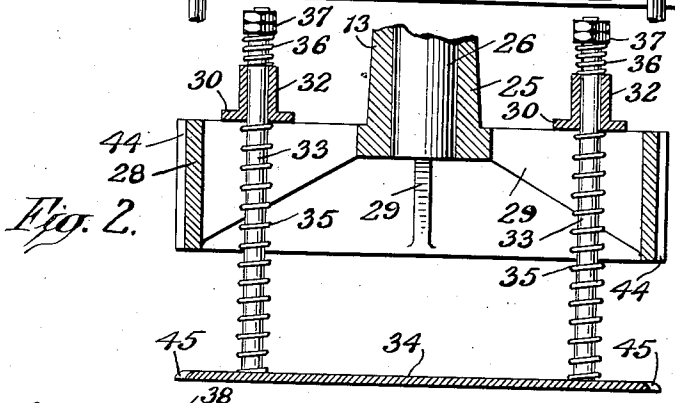


Fig. 2.

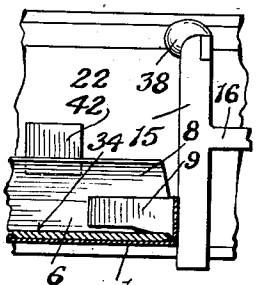
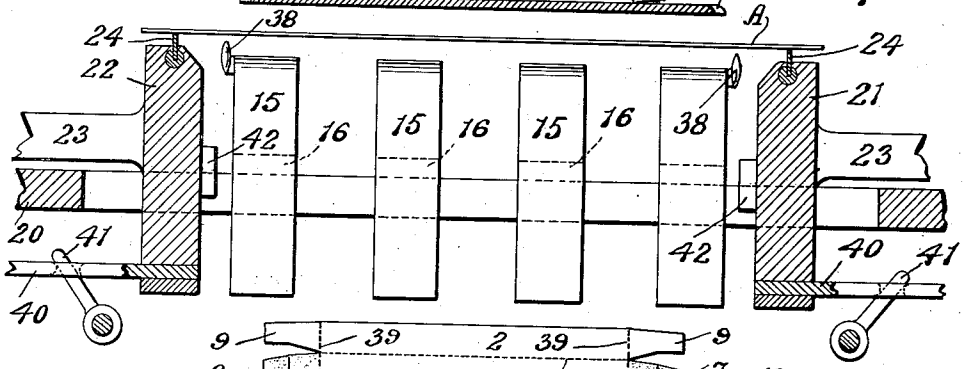


Fig. 4.



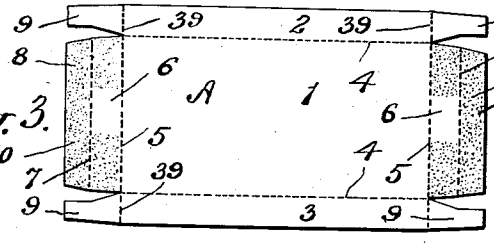


Fig. 3.

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Fig. 5

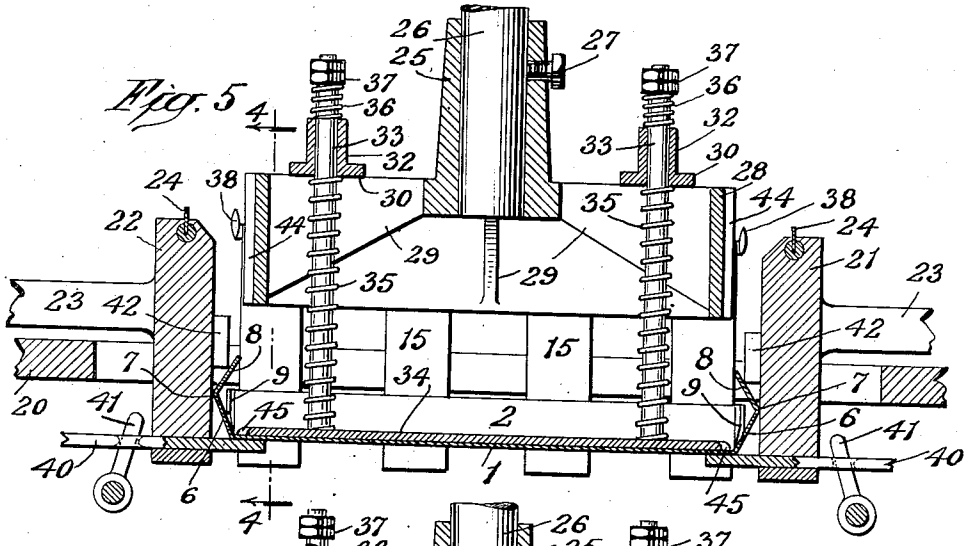


Fig. 6.

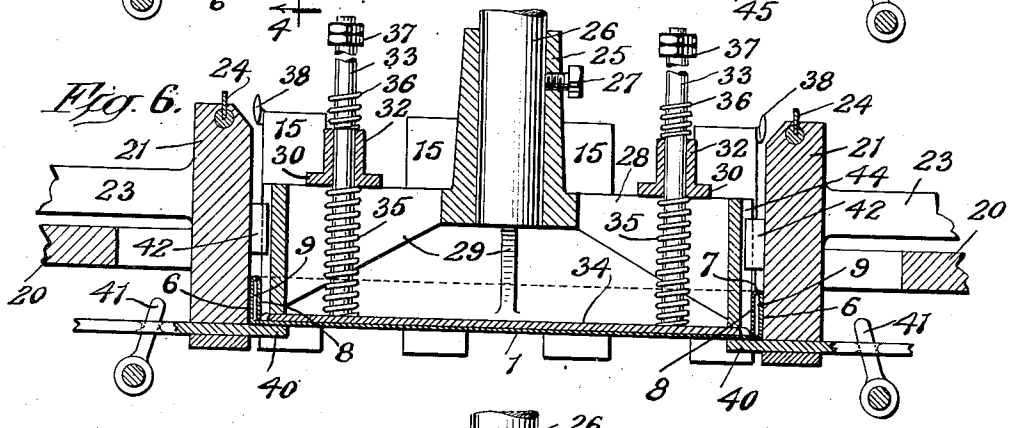
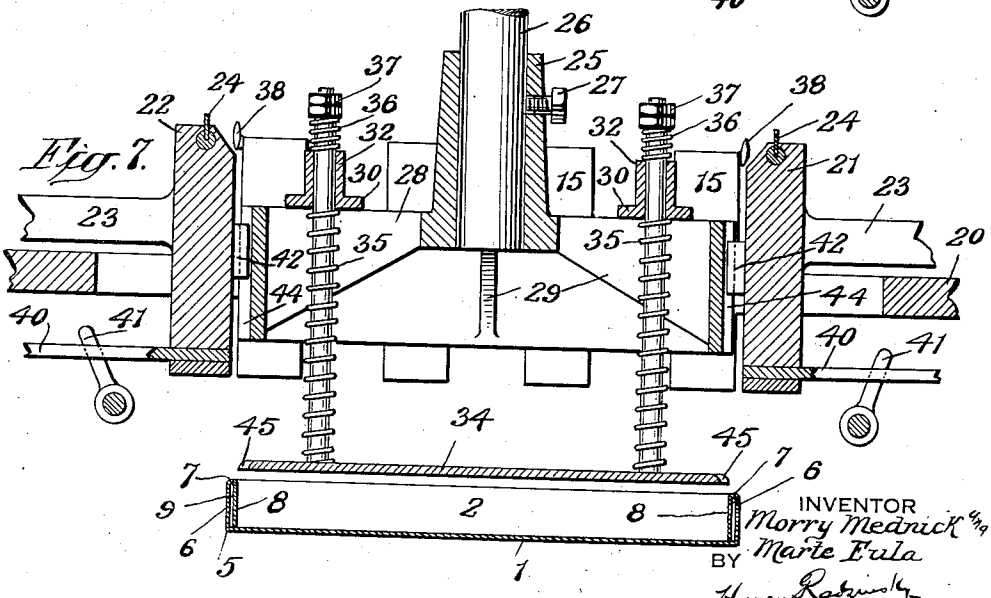


Fig. 7.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR MAKING BOXES AND BOX COVERS

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Application November 9, 1937, Serial No. 173,554

4 Claims. (Cl. 93—51)

This invention relates to an improvement in an apparatus for making boxes and/or box covers and has for its object the provision of efficient means which will fold the box or box cover blank to bring the several flap portions thereon into proper contact and cause said portions to be adhesively united to form the box or box cover.

A further object of the invention is to provide plunger means which will force the box or box cover blank into the folding box of the machine to bring the box or box cover blank, with its flap portions upturned, to rest on the stop means of the folding box; then inturn end flap portions on the blank and seal them in position on the inside of the box or box cover to complete the box or cover, and then eject the completed box or cover from the machine.

More particularly, the invention contemplates the provision of a plunger having a body portion or head carrying a lower, spring-pressed face plate. In operation, said face plate forces the blank downwardly within the folding box to cause the flap portions on the box to assume an upstanding position. When the blank reaches stop means at the lower end of the folding box, the body portion of the plunger continues its descent, moving relatively to the plate, and acts as a tucker to infold portions of the end flaps on the blank and seal them in position at the ends of the box or box cover thus formed. The box or box cover, thus completed, is ejected from the folding box. The invention also contemplates the inclusion of other elements co-operating in the formation of the completed box or box cover, as will be hereinafter pointed out.

In the accompanying drawings, forming a part hereof, Fig. 1 is a plan view with parts in section, of a folding box showing a box or box cover blank in position thereover and the plunger ready to force the same in the folding box; Fig. 2 is a vertical sectional view of the structure of Fig. 1; Fig. 3 is a plan view of the blank from which the box or box cover is produced; Fig. 4 is a sectional view on the line 4—4 of Fig. 5, looking in the direction of the arrows; and Figs. 5, 6 and 7 are sectional views similar to Fig. 2, and successively showing the blank being thrust into the folding box, the down-tucking of the underflaps by the head of the plunger and the ejection of the completed box or box cover out of the folding box.

The box or box cover produced by the improved apparatus, is formed from the single cardboard blank A, shown in Fig. 3. The blank there shown has a body portion 1, and longitudinally extending side flaps 2 and 3, separated from the body portion by the score lines 4. The opposite ends of the blank have the end flaps 6 separated from the body portion 1 by the score lines 5, said flaps 6 being longitudinally scored as at 7 to form end portions or tongues 8 adjacent to their outer ends. The ends of the side flaps 2 and 3 are scored as at 39 to thereby provide the tongues 9 which are tapered toward their extremities to facilitate their being inturned or tucked into position, as will be hereinafter explained.

In the machine, blanks A of the character shown in Fig. 3 are disposed in a stack and gumming means descends and applies an adhesive to the opposite end portions or flaps 6 and 8 of the blank, as indicated at 10 in Fig. 3. The blank thus gummed is lifted from the stack and received by reciprocating conveyor elements 24, which carry it, with its gummed surfaces uppermost, to a position over a folding box into which it is thrust by means of the plunger 13. The folding box has its longitudinal sides composed of a series of cooperating spaced plates 15, provided with lateral extensions or supports 16, having elongated slots 17, engaged by the bolts 18, passing through the slots 19 formed in the frame portion 20 of the machine. Through the arrangement described, plates 15 may be adjusted relatively to one another at any desired position to regulate the size and shape of the opposite side walls of the folding box. The end walls of the folding box are shown at 21 and 22 and arms 23 extend from said walls to suitable mechanism by which the opposite walls 21 and 22 are moved toward and away from one another for a purpose to be hereinafter described.

The upper ends of the end walls 21 and 22 are recessed to receive the reciprocating blank conveyor members 24 which carry the blank A to a position above the folding box, as indicated in Figs. 1 and 2. Blank A, when in such position, is located in readiness to be thrust downwardly into the folding box, defined by the plates 15 at opposite sides of the box and by the walls 21 and 22 on opposite ends of the box.

The plunger 13 which performs this operation is provided with a central boss 25 secured to the lower end portion of a vertical shaft 26 by means of the set screw 27. The plunger is vertically reciprocated by means of the usual plunger-actuating mechanism found in box-making machines in this art. Said plunger includes a head 28 shown in the form of a frame substantially corresponding in shape to the body portion 1 of the blank shown in Fig. 3. The walls of the head 28 are integrally connected to the boss 25 by means

of the radially extending webs **29**. Extending across the top of the head **28** are spaced plates **30** which are secured to the top of the head by the screws **31**. These plates are provided with the tubular guides **32** through which rods **33**, extending upwardly from a plunger face plate **34**, extend. Springs **35** are located between the underside of each of the plates **30** and the top of the plunger face plate **34**, said springs acting to hold the head **28** and face plate **34** of the plunger normally in spaced relationship as indicated in Fig. 2. Recoil springs **36** surround the rods **33** above the guides **32** and have their upper ends operatively bearing against the nuts **37** threaded on the ends of the rods.

In Figs. 1 and 2 blank A is shown in position over the folding box in readiness to be forced downwardly therein and the plunger **13** is about to begin its descent. As the plunger descends, the under face of its face plate **34** strikes the blank A within the outlines of the body portion **1** thereof as defined by the score lines **4** and **5**, and forces the blank downwardly into the folding box. At the beginning of the descent of the blank into the folding box, projections or heads **38** formed on four of the plates **15** at each corner of the folding box, contact with the tongues **9** and fold them inwardly on the score lines **39** to bring them against the inner gummed faces of the end flaps **6**. The position of these tongues when fully infolded, is shown in Fig. 4. The plates **15** forming the opposite side walls of the folding box cause the said flaps **2** and **3** on the blank to be folded on the score lines **4** to thus assume the upstanding position, as shown in Fig. 4. Similarly, the end walls **21** and **22** of the folding box cause end flaps **6** to assume a like upstanding position, substantially as shown in Fig. 5. The blank is forced downwardly within the folding box by the plunger face plate **34** until it is brought to rest upon stop members **40** which are movable toward and away from one another through the end walls **21** and **22** by suitable mechanism, a portion of which consists of the rocking fingers shown at **41**. When the plunger is descending into the folding box and forcing a blank downwardly therein, the stop members **40** are in their extended position as shown in Fig. 5 and the blank is brought to rest thereon. The end walls **21** and **22** are now moved toward one another and each of these walls carries a projection **42** on its inner face which has its lower front edge brought into contact with the end portions **8** on the end flaps **6** upon movement of the walls **21** and **22** toward one another, as shown in Fig. 5, causing said flap portions **8** to be bent or inclined inwardly on the score lines **7**, the beginning of this movement being shown in Fig. 5. The vertical shaft **26** of the plunger continuing its descent, moves the head **28** of the plunger downwardly against the pressure of springs **35** and said head, on its descent, contacts with the projecting end portions **8** of end flap **6**, and downturns said portions **8** causing them to extend over or enclose the tongues **9**. As the inner faces of the portions **8** are coated with an adhesive, they will adhere to the inner faces of the tongues **9** and also to the central portions of the inner face of the flap **6**, thereby providing end walls on the box or box cover of extremely rigid and stury construction.

The plunger at the limit of its descent, is shown in Fig. 6. In order to permit the head **28** of the plunger to clear the projections **42** on the end walls **21** and **22**, recesses **44** are formed in the opposite end walls of the head of the plunger. Similar recesses **45** are also formed in the opposite ends of the face plate **34**. When the plunger has completed the formation of the box or box cover, as shown in Fig. 6, the stop members **40** are moved in a direction away from one another or withdrawn as shown in Fig. 7, and as soon as this occurs, the pressure on springs **35** is released. The face plate **34** of the plunger immediately springs away from the head **28**, thereby causing the completed box or box cover to be ejected downwardly and out of the open bottom of the folding box. This action of the springs provides a positive ejection of each completed box or box cover so that the possibility of a blank becoming inadvertently lodged in the folding box and causing subsequent blanks to pile up and clog the box and damage the mechanism is completely avoided.

The completed box is shown in section in Fig. 7 and it will be seen that the end walls are of extreme sturdiness enabling the box or box cover to withstand rough handling and considerable abuse before the walls of the same will break down.

It will be obvious that the structure may be modified to accomodate boxes and box covers of various forms and shapes, without departing from the spirit of the invention.

What we claim is:

1. An apparatus of the character described comprising, a folding box, a plunger for forcing a box or box cover blank within said folding box to cause flap portions on the blank to be upturned, with end flaps on said blank extending above the side flaps thereon, the plunger having a head portion, a plate portion located below the head portion and normally held spaced therefrom, means for suspending said plate portion from the head portion, springs interposed between the plate portion and head portion, and means located within the folding box and comprising fixed elements on two of the walls thereof for moving parts of the end flaps on the blank inwardly after the blank has reached a predetermined point in its descent in the folding box to thereby locate said parts of the end flaps in the path of descent of the head of the plunger as the head thereon is moved downwardly within the folding box relatively to the plate and against the tension of said springs.

2. In an apparatus of the character described, a folding box, a plunger mounted over and adapted to be moved into the folding box to force a blank downwardly within said folding box, movable stop means at the lower end of the folding box for limiting the descent of the blank therein, said plunger having an upper head portion carrying a resiliently mounted lower face portion, said face portion being adapted to move the blank down into the folding box upon descent of the plunger and into contact with the stop means, the folding box having movable walls, fixed projections on said walls for inwardly inclining certain flap portions on the blank upon inward movement of said walls to bring said flap portions in the path of descent of the head portion of the plunger whereby said head portion will, upon its descent, downturn said inwardly inclined flap portions.

3. In an apparatus of the character described, a folding box, a plunger for forcing a box or box cover blank formed with flaps into said folding box, movable stops at the lower end of the folding box for limiting the descent of the blank,

movable walls on the folding box, fixed projections located on said walls and carried thereby for bending end portions of at least some of the flaps on the blank inwardly when said movable walls are moved toward one another, the plunger having a face portion for holding the blank down on the stops and having a head portion movable relatively to said face portion after the blank has reached a position of halt on the stops, said face portion engaging and downturning the inwardly bent portions of the flaps as it moves downwardly relatively to the face portion.

4. In an apparatus of the character described, a folding box including a pair of side walls movable toward and away from one another, a plunger for forcing a box or box cover blank within the folding box to cause the walls of the box including the two movable walls thereof to upturn flap portions on the blank, each of the movable walls including a fixed projection on the inside face of the wall for contacting with a portion of the upturned flaps on the blank when the walls are moved toward one another to inbend said part of the flap at an angle to the rest of the flap on which it is formed.

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