Jan. 13, 1942. D. L. CHAFFIN 2,270,212

MACHINE FOR APPLYING STRIPS TO BOXES

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Fig. 1.

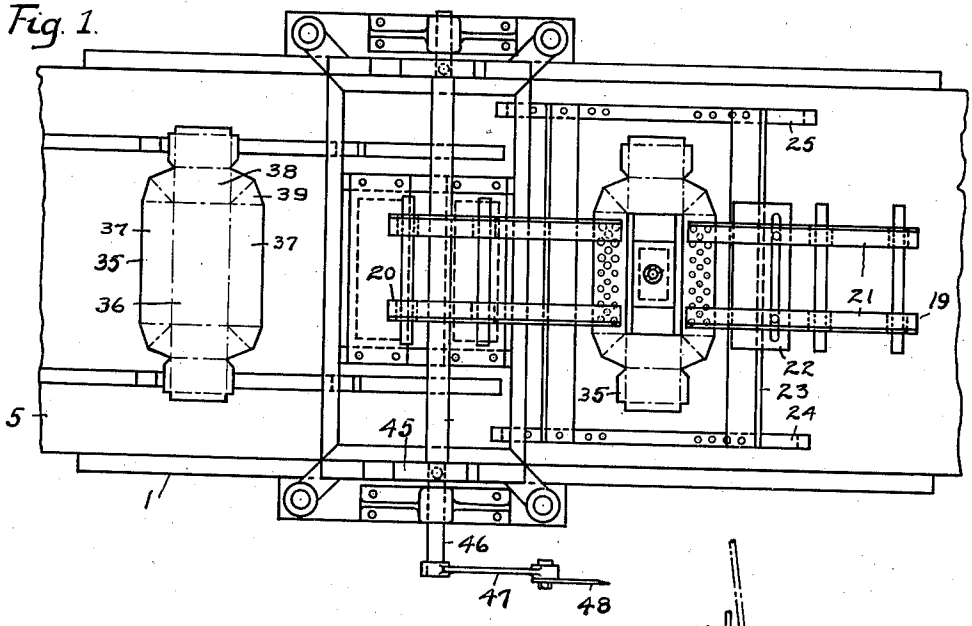
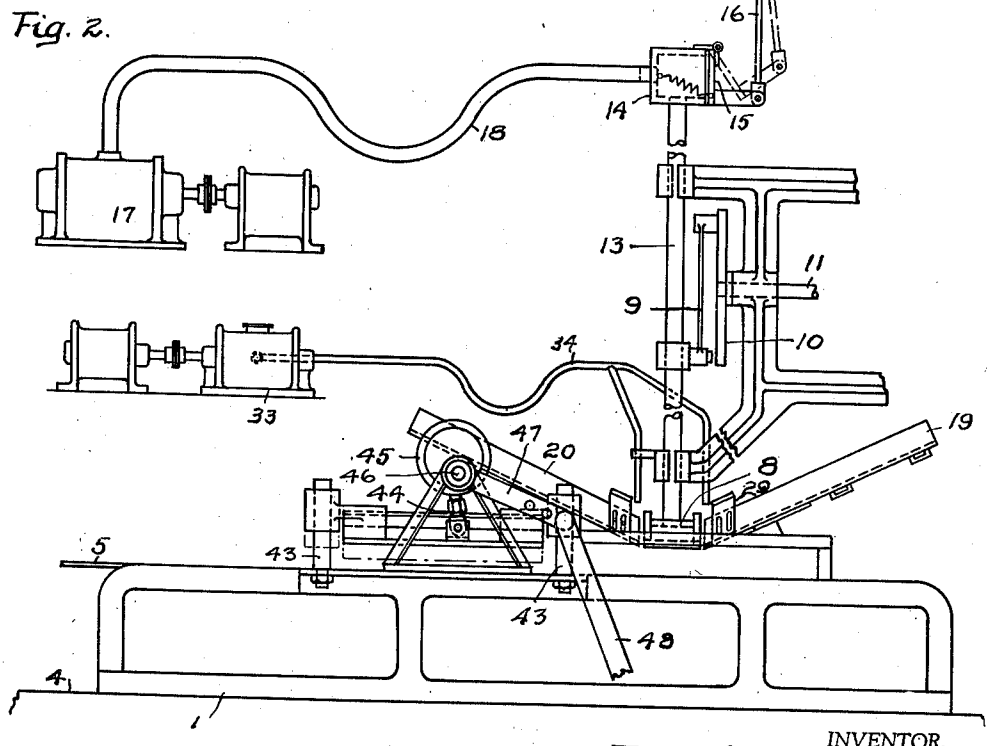


Fig. 2.



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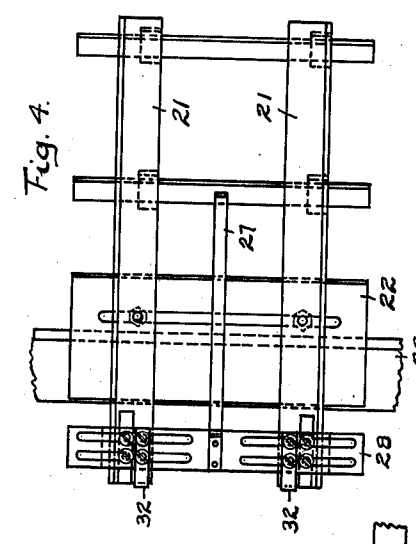


Fig. 4.

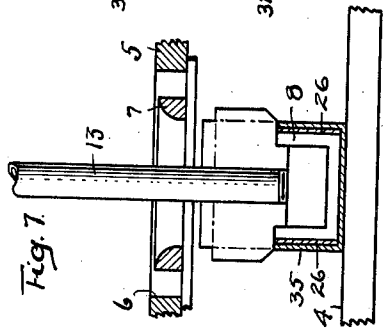


Fig. 7.

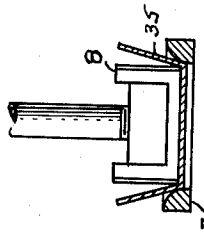


Fig. 6.

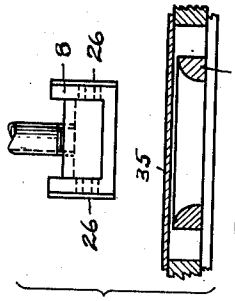


Fig. 5.

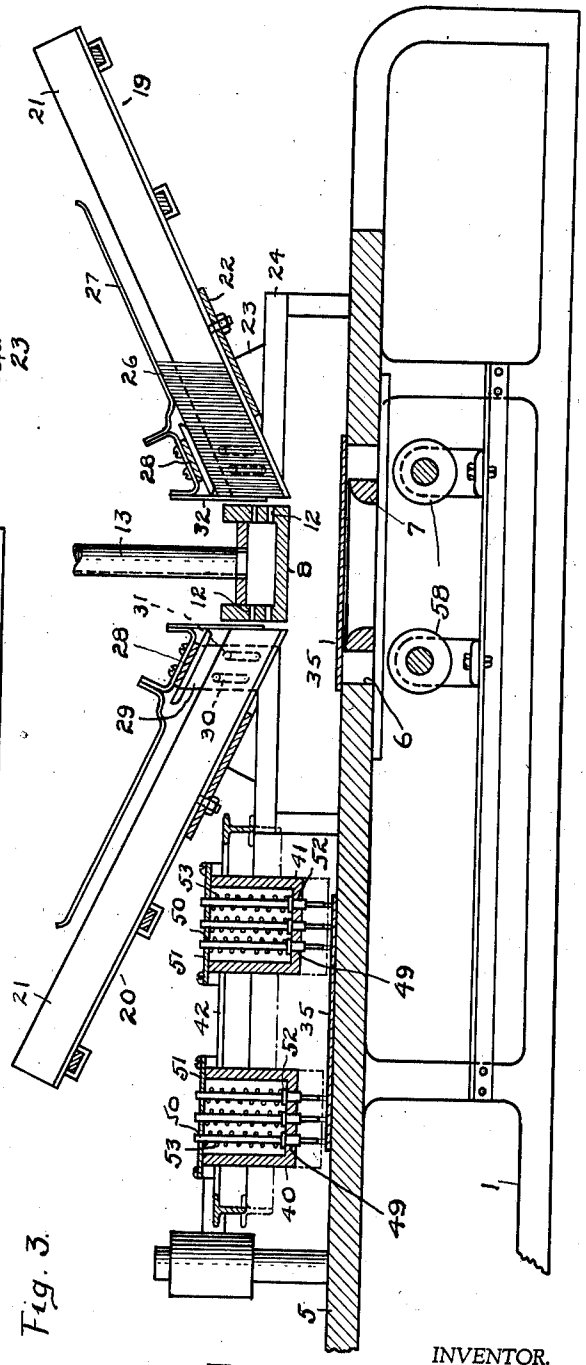


Fig. 3.

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Fig. 8.

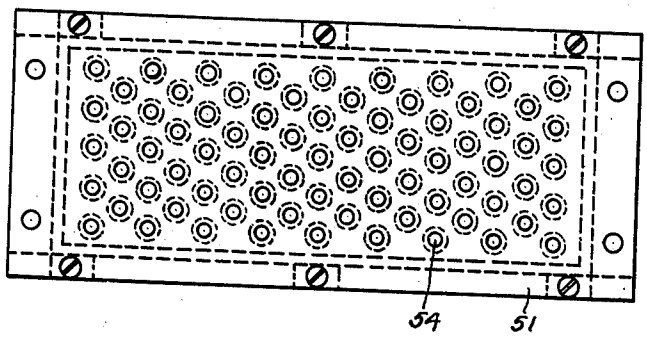


Fig. 9.

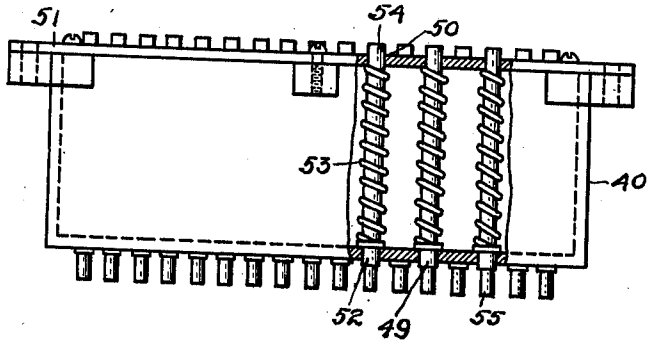
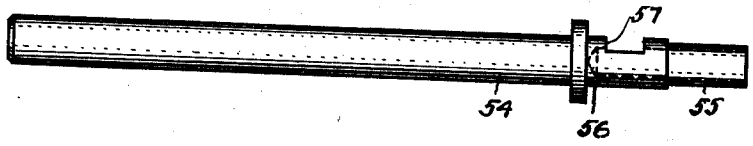


Fig. 10.



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Patented Jan. 13, 1942 2,270,212

UNITED STATES PATENT OFFICE

2,270,212

MACHINE FOR APPLYING STRIPS TO BOXES

Donald L. Chaffin, Fort Wayne, Ind., assignor to Flashfold Box Corporation, Fort Wayne, Ind., a corporation of Indiana

Application September 24, 1940, Serial No. 358,149

5 Claims. (Cl. 93—51)

The invention relates generally to machines for folding boxes and cartons and it is particularly directed to such machines wherein means is provided for applying strips of material to certain parts of the box.

Such forms of paperboard boxes require reinforced side walls for certain uses and such reinforcement is especially desirable on the side walls of certain folding boxes or cartons. Heretofore the reinforcement has been accomplished by providing a projecting section on the wall and folding it onto the wall and gluing it thereto. Another method has been to hand glue a strip of paperboard to the wall of the box. The first method is expensive in that there is excessive waste of material when the blank is cut and the second method requires much time and labor.

The object of the invention is to overcome the foregoing objections by providing a box folding machine with means by which strips of material are secured to the desired walls of the box as it is folded.

The invention is illustrated in the accompanying drawings in which

Figure 1 is a plan view broken away of a machine embodying the invention.

Fig. 2 is a side elevation broken away of the machine.

Fig. 3 is a longitudinal cross-section of the machine broken away.

Fig. 4 is a plan view of one of the strip feeding chutes.

Fig. 5 is an elevation of the plunger in retracted position relatively to the box blank and die which are shown in cross-section.

Fig. 6 is a view of the plunger in the act of forcing the blank through the die.

Fig. 7 is a view, partly in section of the plunger and blank at the bottom of the stroke of the plunger.

Fig. 8 is a plan view of the glue pot.

Fig. 9 is an elevational view of the glue pot partly broken away and in section and

Fig. 10 is a side view of one of the glue feeding plungers.

Referring to the illustrative embodiment of the invention, the box folding machine is similar in principle of operation to that described in Patent 2,110,368 to G. Lautzenheiser wherein the box blanks are successively intermittently moved under the plunger by an endless conveyor and the plunger forces each blank through the die to fold the side and end walls upwardly and the corners inwardly.

In Figs. 1, 2, 3, the main frame 1 has two decks 4, 5, one above the other. An opening 6 is formed in the upper deck 5 in which the die 7 is mounted. A plunger 8 is suitably mounted above the opening 6 for vertical reciprocation by the crank 9 mounted on the disc or wheel 10. The disc is mounted on the shaft 11 which is driven by any suitable means. The plunger 8 is hollow and apertures 12 are formed in each of its opposite side walls (Fig. 3). The plunger rod 13 is tubular and its upper end is secured to and opens into a chest 14 having a spring opposed trap door 15 pivotally connected to a member 16, that is so connected at its upper end to some fixed point or object that when the chest reaches a selected point in its downward travel the door will open. A pump 17 is connected by the conduit 18 to the chest and operates to produce a vacuum in the chest with resultant air suction at the apertures 12 in the plunger, the vacuum being broken when the door 15 opens.

Two chutes or racks 19, 20 are mounted on the upper deck 5 upon opposite sides of the plunger respectively. Each chute or rack consists of two angle bars 21 that are laterally adjustably mounted on a slotted support 22 that is fixed to a cross bar 23. The cross bar is adjustably mounted on two supports 24, 25, the latter supports accommodating both cross bars. The chutes or racks slope downwardly toward the plunger and since each chute is adjustable longitudinally on the supports 24, 25 and the angle bars of each chute are laterally adjustable, various sizes of box blanks may be operated upon as hereafter described. Strips of material 26 are placed on edge in each chute and a spring 27 bears lightly on the upper edges of the strips. This spring is mounted on a bar 28 having the depending arms 29 at its opposite ends, each arm having the vertical slots 30 therein in which engage the pins 31 which project from the outer face of the angle bars 21. The fingers 32 adjustably depend from the bar 28 and abut the opposite ends of the lowermost strip 26 to retain the stack of strips in the chute. A pump 33 drives a current of air through the conduit 34 which leads to a point above the lower end of each chute. The air strikes the stacks and separates the strips at the lower end of each chute so that the suction in the plunger will draw the lowest strip in each chute into contact with the opposite sides of the plunger and retain them thereon until the vacuum is broken.

In the adaptation of the invention the box blank 35, which is the folding type, is scored to form the bottom section 36, the side wall sections

37, the end sections 38 and the corner sections 39. The reinforcing strips are applied to the side wall sections 37. Glue is applied to the said wall sections by the following described mechanism. Two reservoirs 40, 41 containing an adhesive, preferably glue, are laterally adjustably suspended by the frame 42 that is vertically movably mounted on the posts 43. A crank 44 is pivoted to the frame and to an eccentric 45 mounted on the rock shaft 46. The lever 47 is secured to the shaft and a link 48 is suitably operated to cause the shaft to rock to alternately raise and lower the reservoirs. Any desired number of apertures 49 is formed in the bottom of each reservoir and a like number of apertures 50 is formed in the top or cover 51 of each reservoir, the apertures 50 being in vertical alinement with the apertures 49. Each aperture 49 is normally closed by a valve 52 under the influence of the spring 53. The stem 54 of each valve extends through the aperture 50 above it, and the valve carries a depending hollow stem 55 having its upper portion 56 normally snugly fitting the aperture 49. An opening 57 is formed in the wall of the stem portion 56 through which the glue passes into the stem 55 when the valve is inserted.

When the machine is operating and a box blank is properly deposited on the upper deck 5 beneath the two glue reservoirs, the reservoirs having been adjusted to be disposed over the side wall sections 37 of the blank, the reservoirs descend sufficiently to cause the lower ends of all the hollow stems 55 to abut the side wall sections of the box blank and unseat the valves to expose the openings 57 in said stems for a brief interval of time, whereupon the reservoirs rise, releasing the valves which seat, and the further upward movement of the reservoirs raises the stems 55, each of which has deposited a spot of glue on the box wall section below it.

The box blank is then conveyed under the plunger 8 which, due to the suction therein, is holding a strip 26 on each of its two opposite sides. The plunger descends, engages the bottom section of the blank and forces it downwardly through the die. The corner sections of the blank are folded inwardly and the side and end walls are folded upwardly, the spot glued inner faces of the side wall sections being contacted with the strips 26 respectively. Below the die are arranged two idler rollers 58 which engage the outer face of the wall sections as the plunger descends and press the said walls firmly on the strips 26. At the end of the stroke of the plunger, where it deposits the partially folded blank on the lower deck 4, the trap 15 momentarily opens to release the strips and the plunger returns to its uppermost position to repeat the operation on the next box blank. Each partially folded blank with the strips attached to its side walls, is further folded by devices on the deck 4 which engage the blank as it travels forwardly, such devices being shown in said patent numbered 2,110,368.

The number of active glue depositing stems on the reservoirs is readily varied by removing such as are not required and substituting therefor plugs to close the exposed apertures 49.

It is now seen that adhesive is applied to the upper face of the box blank which becomes the inner face of the folded box and that the reinforcing strips are applied to the adhesive-carrying surfaces as the blank is folded.

What I claim is:

1. The combination in a machine for folding box blanks, of means to apply adhesive to selected foldable sections of the blank, a reciprocating plunger adapted to move the blank while folding the selected sections upwardly, vacuum means to releasably support strips of material vertically on the plunger and means to cause the sections having adhesive thereon to fold upwardly and engage on said strips respectively as the plunger descends.

2. The combination in a machine for folding box blanks, of means to apply adhesive to the upper surface of selected foldable sections of the blank, a reciprocating ported hollow plunger adapted to move the blank downwardly, means to produce a vacuum in the plunger, means to feed vertical strips of material to the plunger to be held thereon by said vacuum, means effective as the plunger descends to fold the adhesive-carrying box sections into adhering contact with the strips and means to break the vacuum at the end of the stroke of the plunger.

3. The combination in a machine for folding box blanks having foldable side walls, of means to apply adhesive material to said walls, a die adapted to support the box blank, a reciprocating hollow plunger to move the blank through the die whereby to cause the said side walls to fold upwardly, the plunger having apertures in its opposite sides, means to feed strips of reinforcing material toward said opposite sides of the plunger, means to produce a suction of air at the apertures in the plunger whereby to remove a strip from each feeding means and support it on the plunger for adhering engagement by the side walls of the box blank when folded by the die, and means to release the suction on the strips.

4. The combination in a machine for folding a flat paperboard box blank having opposite foldable walls, of means to apply adhesive material to said walls in spots, a die to support the box blank, a reciprocating plunger to move the blank through the die and cause said walls to fold upwardly, means adjacent to the opposite sides of the plunger to feed strips of paperboard toward said plunger, means to separate the strips in the feeding means, means to simultaneously remove a strip from each feeding means and releasably retain them on opposite sides of the plunger respectively for engagement and adherence by the folded walls of the box blank as the blank is moved through the die and means to release the plunger from the strips.

5. The combination in a machine for folding box blanks, of a folding die therefor and a plunger to force the box blank through the die, means to apply an adhesive to the surface of selected foldable sections of the blank, vacuum means to releasably support strips of material vertically on opposite sides of the plunger while it is forcing the blank through the die, the die causing the said adhesive-carrying sections to fold into contact with the said strips and means to subsequently coact with the plunger to firmly press the said sections and the strips together.

DONALD L. CHAFFIN.