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PNEUMATIC MEANS FOR STRIPPING LAMINATED PAPER STOCK

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2 Sheets-Sheet 1

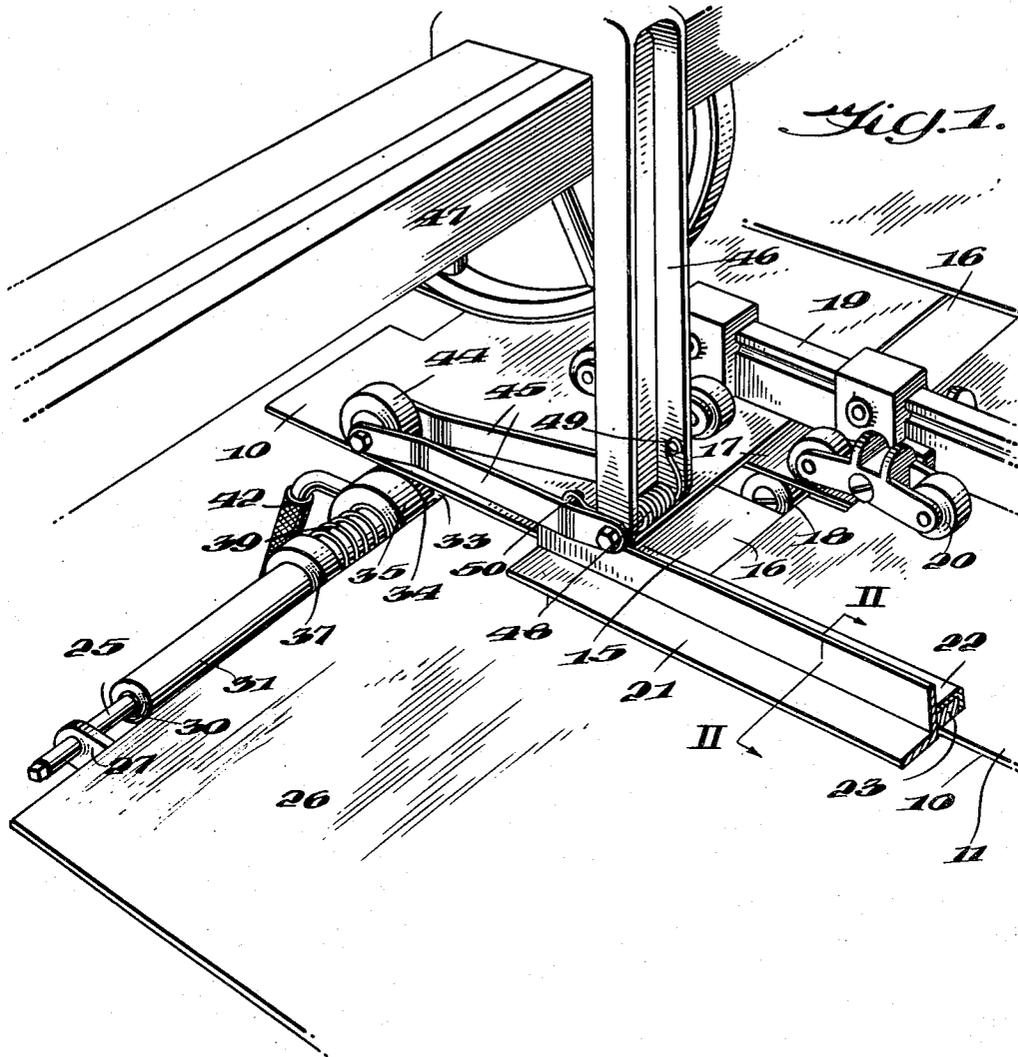


Fig. 1.

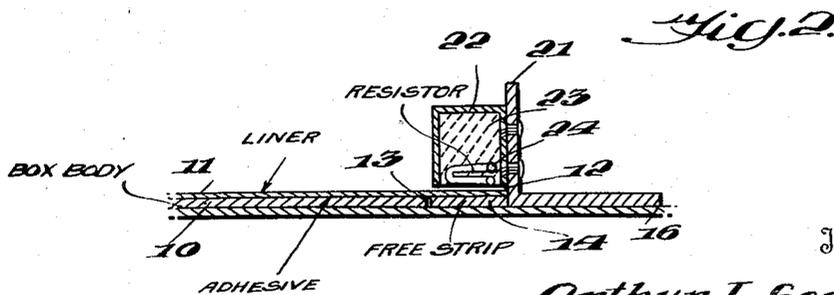


Fig. 2.

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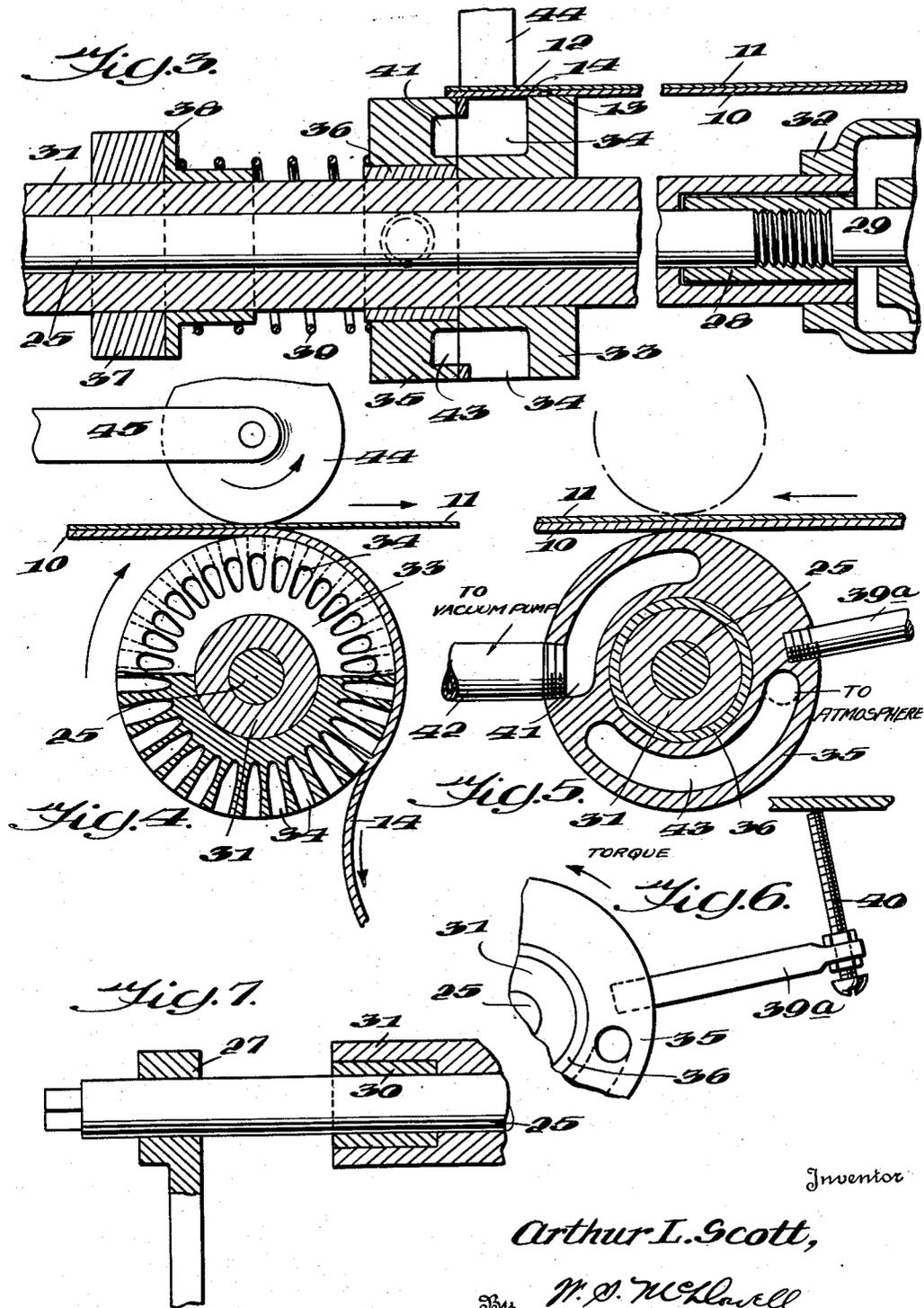
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PNEUMATIC MEANS FOR STRIPPING LAMINATED PAPER STOCK

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3 Claims. (Cl. 93—36)

This invention relates to apparatus for manufacturing folding paper board boxes, particularly paper board boxes of the type having an inner lining.

In the manufacture of such boxes, it is often desirable to remove from the paper board blank a strip or other body of the paper board material in order that the lining may project beyond the marginal edges of said regions of the body. This is particularly true in cases where the lining is employed to seal completely the contents enclosed within the folded box, as set forth in the application Ser. No. 502,939 of Clarence F. Klein, entitled Method of making paper board containers, executed of even date herewith.

Accordingly, it is an object of the present invention to provide simple, inexpensive and efficient means whereby during the operation of folding and gluing a paper board box, a strip or other body may be removed from association with the lining of the box.

It is another object of the invention to provide an attachment for a box-folding and gluing machine so constructed that during passage of the box blanks through the machine, the strip or other region of the blank to be removed is brought into engagement with pneumatically actuated means to effect the removal of the part to be eliminated from the box blank, the operation taking place in an automatic manner and without in any way affecting the speed of operation of the folding and gluing machine.

It is a further object of the invention to provide in association with said pneumatic strip-removing means a heating mechanism by means of which an adhesive uniting the lining material with the strip or other body of the blank to be removed is adapted to be softened by the action of heat, so that when the strip is brought into engagement with said pneumatic means, the ready separation of the strip or body from the lining may be quickly and positively carried out.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a fragmentary perspective view showing the guideway of a box folding and gluing machine, and illustrating the heating and strip-removing mechanism comprising the present invention;

Fig. 2 is a vertical transverse sectional view taken through the heater mechanism on the line II—II of Fig. 1;

Fig. 3 is a vertical longitudinal sectional view

taken through the pneumatically operating strip-removing mechanism;

Fig. 4 is a view partly in vertical section and partly in side elevation of the rotary strip-removing head;

Fig. 5 is a vertical sectional view taken through the stationary ported collar;

Fig. 6 is a fragmentary side elevational view disclosing the adjusting mechanism for the ported collar;

Fig. 7 is a detail sectional view disclosing the adjusting end of the collar and head-supporting shaft.

The mechanism comprising the present invention is particularly applicable to the manufacture of folding paper board boxes of the laminated type. Such boxes, as shown in Fig. 2, are each formed from a blank 10 of paperboard or the like. To one or more surfaces of this blank, there is secured by means of a heat-softening adhesive a lining 11. The lining usually comprises a thin-moisture resisting and fat-repelling substance, such as parchment, various synthetic films, Cellophane, wax paper or their equivalents. The union of the lining with the paperboard stock is effected preferably by applying to the stock, the lining, or both, a heat-softening adhesive, such as wax, paraffin, or a soft plasticized resin. I have used advantageously an adhesive which has a melting point of the order of 160° to 165° Fahr. The adhesive is uniformly and ordinarily thinly distributed over the meeting surfaces of the paperboard stock and lining and, with the application of heat and pressure, the lining adheres firmly to the paperboard stock and becomes, in effect, a component part thereof.

Often it is desirable that the lining should project marginally beyond the blank, as indicated at 12 in Fig. 2. This is done during the forming of the blank by cutting through the latter to the lining, as shown at 13, leaving a free strip 14 which temporarily is held in association with the blank by the adhesive uniting the strip with the marginal portion of the lining. It is the purpose of the present invention, as previously explained, to provide efficient production means for removing the strip 14, or other equivalent body, from its association with the lining.

Such an operation may be carried out by means of mechanism forming an attachment upon a standard blank-folding and gluing machine, although, as the nature of the invention is better understood, it will be appreciated that the mechanism may be embodied in a separate machine if

such a mechanism should for any reason be desirable.

In the drawings, the blank guideway of a folding and gluing machine is indicated at 15, the bottom of the guideway being provided with spaced bottom plates 16, between which is arranged the upper run of a blank-advancing belt 17, the latter being supported on the usual guide and operating rolls 18. Above the belt, the frame of the machine is provided with a bar 19 which effects the support of pivoted pressing rollers 20 which engage the upper surfaces of the blanks moving through the guideway, causing the blanks engaged positively with the upper surfaces of the belt 17 to assure their rapid and positive movement through the guideway.

In accordance with the present invention, one of the side bars 21 of the guideway has its inner and vertical flange provided with an elongated stationary housing 22, in which is arranged a body of insulation 23 carrying a suitably energized heating resistor 24. The housing is of such length, in proportion to the speed of linear advance of the blanks through the guideway, that a sufficient period of time will be provided to enable the heat developed by the resistor to permeate through the lining and soften the adhesive uniting said lining with the strip 14, whereby to permit the strip to be separated from the marginal portion 12 of the lining.

To effect such separation, I employ preferably pneumatically operated means. This means, in a preferred embodiment, comprises a stationary shaft 25 which is mounted so that it will be disposed transversely of the bed 26 of the gluing and folding machine. One end of the shaft is journaled in a bracket bearing 27 stationarily carried by the bed or frame of the machine, while the opposite end of the shaft is machine pressed into one end of a sleeve 28, as shown in Fig. 3. This sleeve is internally threaded to receive the threads of a stationary stud shaft 29, projecting from the bed frame. Adjacent to the bearing 27, the shaft 25 carries a stationary bushing 30 which effects the rotatable support of one end of a revolving tubular shaft 31, the opposite end of the latter being journaled on the sleeve 28 and provided with a belt wheel 32 by means of which power is imparted to the sleeve to effect its rotation about the axis of the stationary shaft 25.

Fixed to rotate with the shaft 31 is a circular ported head 33, the latter being provided with a multiplicity of circumferentially spaced, radially disposed ports 34. Each of these ports at one end opens to a side of the head 33 and at the other end to the outer peripheral surface of said head, said surface being disposed immediately beneath the removable strip 14 of the box blank. Cooperative with the head 33 is a stationary ported collar 35, this collar being mounted on a bushing 36 carried by the shaft 31.

To prevent rotation of the collar in unison with the shaft 31, the latter has fixed thereto a ring 37 with which engages a loose spring-seating quill 38. One end of a coiled expansion spring is engaged with the quill, while the opposite end of the spring presses on one of the side surfaces of the collar 35, thereby exerting a pressure on the collar by means of which the opposite face of the collar is positively held in close engagement with the ported face of the head 33. Further, the collar, as shown in Fig. 6, is provided with an outwardly projecting arm

39, the outer end of said arm carrying an adjusting screw 40. The outer end of this screw engages with one of the members of the bed frame of the folding and gluing machine. By adjusting the screw 40, the collar may be axially adjusted with respect to the shaft 31. The screw also serves to prevent rotation of the collar, except in accordance with adjustment requirements furnished by said screw.

The interior of the collar is provided with a port 41, which is connected by means of a pipe or hose line 42 to a vacuum pump, not shown. The end of the port 41 opposite to the pipe 42 communicates with one side of the collar 35 and with the ports 34 of the head 33. The collar 35 is provided with an additional port 43, one end of which is disposed in communication with the ports of the head 33 and the other with the atmosphere.

It will be seen that the head 33 has its outer peripheral wall arranged so that the ports thereof will be in registration with the removable strips 14 of the box blanks which pass through the guideway 15. Close registration is secured by the provision of a pressing roller 44. This roller is carried by the outer ends of a pair of pivoted links 45, the inner ends of said links being pivoted to a yoke 46 carried by a transverse frame beam 47 of the folding and gluing machine. A coil spring 48 surrounds the pivot rod for the links 45, and has one end fastened as at 49, to the yoke 46, while the opposite end of said spring is engaged with a pin 50 which projects inwardly and laterally from one of the links 46. By this means, the roller 44 presses downwardly on the blanks maintaining the strip portions 14 thereof in firm engagement with the ported peripheral surface of the head 33.

In the operation of the machine, successive box-forming blanks, having the cut strips 14, are fed rapidly through the guideway 15. While such blanks are in a flattened state, and before they reach the folding and gluing instrumentalities of the machine, the strip regions 14 thereof pass immediately under the housing 22 of the heater. During the passage of the blanks beneath the heater, the adhesive employed thereon in uniting the strips 14 with the linings 11, is softened so that when the adhesive is in this state, the strips may be readily parted from their associated linings. The rotary suction head 33 is located in the gluing and folding machine at the point of termination of the heater housing, so that as the strips 14 pass over the head 33, the suction forces created in the ports of said head will cause the strips to adhere to the outer peripheral surface of the head, after the manner indicated in Fig. 4. The released lining continues to advance in the horizontal plane of the guideway 15, while the removed strips are deflected downwardly away from the guideway. As the head 33 turns, the ports thereof are removed from engagement with the suction-inducing forces and by engagement with the port 43 of the collar, communicate with the atmosphere. This equalizes the air pressure on both sides of the removed strips, so that the latter may fall into a collecting receptacle, not shown, at the bottom of the folding and gluing machine. Strips or other bodies are thus removed at a rapid rate from laminated paperboard and the operation is carried out economically and without any sensible addition to the normal operations involved in making a standard paperboard carton.

I claim:

1. In apparatus for producing folding cartons of the type formed from a sheet of paperboard on which a sheet of lining material is secured by means of a heat-softening adhesive and wherein the paperboard sheet possesses a region severed from its body but retained in connection therewith by said lining sheet, a guideway, means for effecting linear advance of the blanks through said guideway, a heater in said guideway for locally heating said blanks as the same move there-
through, said heater serving to soften the adhesive uniting the severed region of each blank with its lining material, and means operative while said adhesive is in a softened state to remove the severed region of each blank from the lining material.

2. In apparatus for producing folding cartons of the type formed from a sheet of paperboard on which a sheet of lining material is secured by means of a heat-softening adhesive and wherein the paperboard sheet possesses a region severed from its body but retained in connection therewith by said lining sheet, a guideway, means for effecting linear advance of the blanks through said guideway, a heater in said guideway for lo-

5 cally heating said blanks as the same move there-
through, said heater serving to soften the adhesive uniting the severed region of each blank with its lining material, and means operative when said adhesive is in a softened state to establish unbalanced pressures on opposite sides of the severed region of each blank to remove the same from the lining material.

10 3. In apparatus for producing paperboard boxes from blanks composed of a sheet of paperboard on which a sheet of lining material is applied and wherein the paperboard sheet but not the lining is severed along selected lines within the confines of each blank to provide removable bodies, a guideway, means for advancing said paperboard blanks linearly and in successive order through said guideway, a heater for locally heating the blanks to soften the adhesive uniting the severed bodies thereof with said lining sheets, and pneumatically actuated means operative during the continued advance of the blanks through said guideway to remove the severed bodies from said blanks and their associated lining sheets.

25
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