Sept. 3, 1935. C. D. KNOWLTON 2,013,056

ART OF COATING MATERIAL

Original Filed Sept. 8, 1930 2 Sheets-Sheet 1

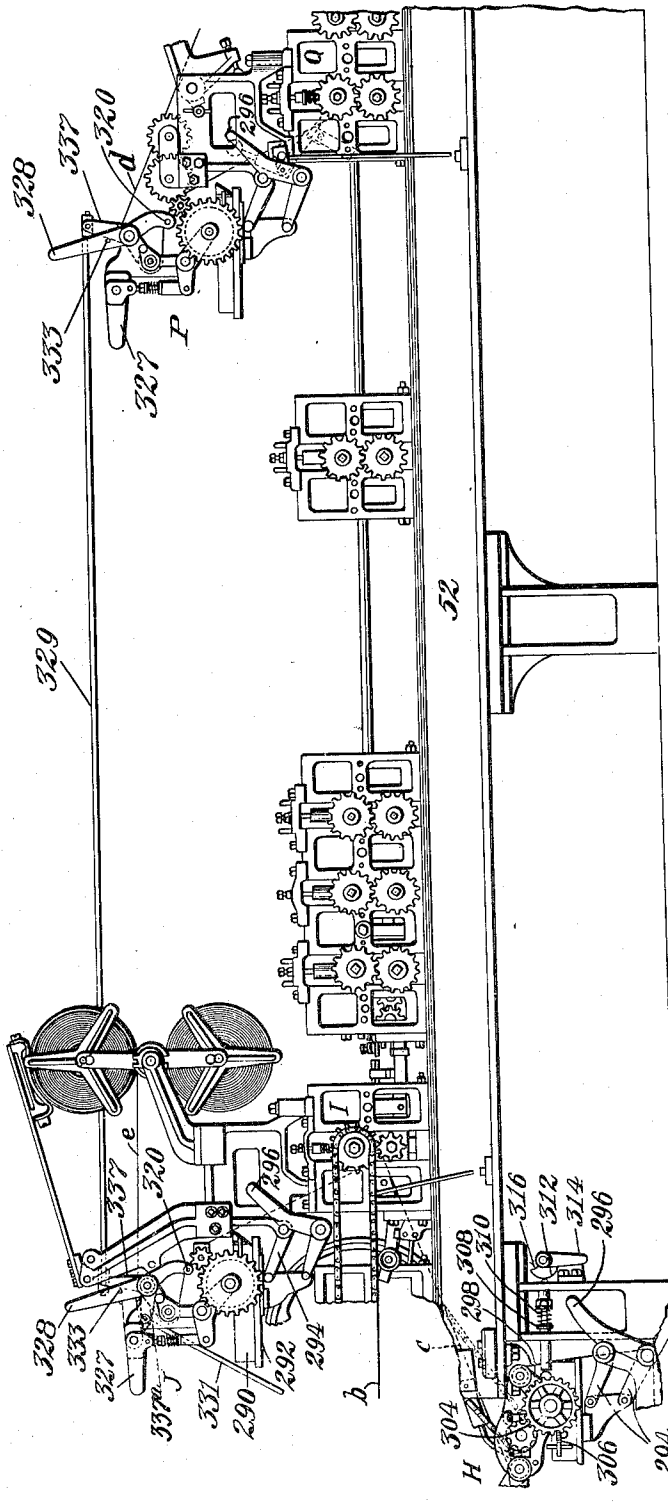


Fig. 1.

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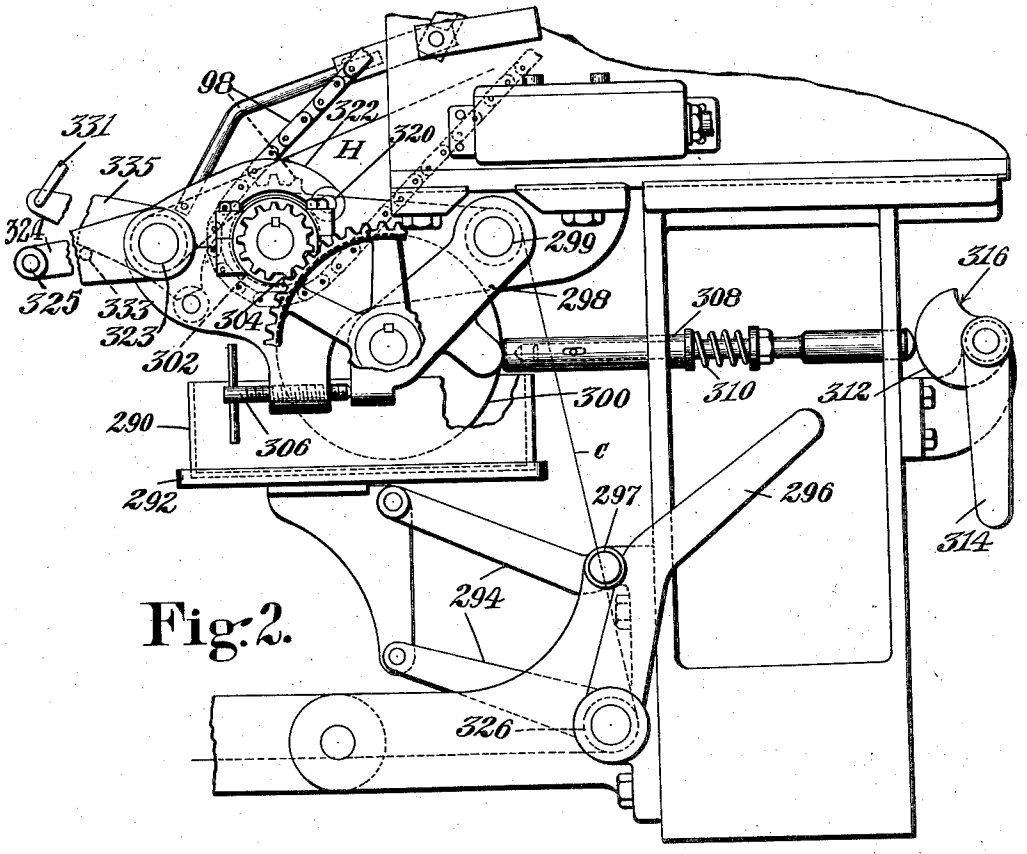


Fig. 2.

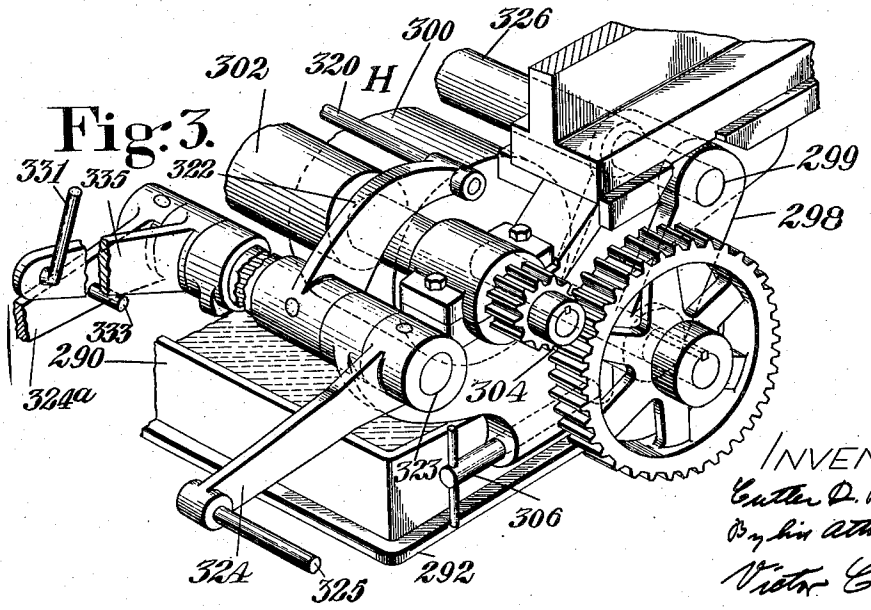


Fig. 3.

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Patented Sept. 3, 1935 2,013,056

UNITED STATES PATENT OFFICE

2,013,056

ART OF COATING MATERIAL

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Original application September 8, 1930, Serial No. 480,518. Divided and this application April 21, 1932, Serial No. 606,605

13 Claims. (Cl. 91—50)

This invention relates to the coating of material, it especially concerning the application of adhesives to such articles as the blanks which are to be set up to form boxes. In this connection, the present invention is described in an application for Letters Patent, Serial No. 480,518, filed in my name in the United States Patent Office on September 8, 1930, of which application this case is a division. The parent application has now matured as Letters Patent of the United States No. 1,988,451, granted January 22, 1935.

The above-identified parent application is for an apparatus in which webs of box-material, as shell, stay, liner and cover, are advanced continuously to have performed upon them during their travel a plurality of forming operations which convert them into box-blanks. To effect a union of the webs, each of them, other than the shell-web, is coated with glue or other adhesive before they are subjected to a pressing operation. This invention has as an object the provision of a convenient coating mechanism, so organized that its elements may readily be adjusted to control the quantity of the coating substance applied and be separated for cleaning, and the so arranging this or a similar coating mechanism or mechanisms that injury to the webs will be prevented if the apparatus, and consequently the advance of said webs, stops.

A feature of the invention by which this object is achieved may be found in a coating mechanism in which a receptacle for a coating substance has a coating-supplying roll rotatable therein, with which supplying roll cooperates a coating-applying roll, one of these rolls having movable bearings. With one of these bearings contacts an expansible member, as a sectional rod, with a spring interposed between the sections, and there is means, herein shown as a rotatable cam, arranged to vary the position of the member. This will cause the bearing of the roll to be held yieldably against an adjustable member in all positions of the latter, such adjustment governing the quantity of the adhesive delivered to the applying roll, or will serve to separate the rolls and allow access to them for cleaning and the like.

As a further feature of the invention, I combine in a blank-making apparatus, including operating mechanism and means for advancing web-material thereto, a coating mechanism having an applying member, which may be a rotatable roll, in contact with which the web travels to the operating mechanism, and a rod or other member contacting with the web and being movable to separate it from the applying member. When the web is thus acted upon, if its advance ceases, injury to it by its adhesion to the applying member is prevented. I prefer to utilize the normal tension of the web to maintain the separating member ineffective, connections to the member acting to remove the web from the roll or other applying means when said web stops. If plural coating mechanisms are to be associated with plural operating mechanisms, each of said coating mechanisms having a coating-applying member which engages a web, I prefer to furnish means arranged to simultaneously separate the members and webs, as by connections between the separating members of the respective coating mechanisms arranged to move them simultaneously in one direction only. The operator may thus, by a single controlling movement, guard against the sticking of the webs to the applying members throughout the entire apparatus.

In the accompanying drawings,

Fig. 1 shows in side elevation a portion of a blank-making apparatus of the previously mentioned application, in which the present invention is embodied in one form;

Fig. 2 is a broken side elevation of my improved coating mechanism; and

Fig. 3 is a partial perspective view thereof.

The drawings illustrate three gluing mechanisms H, J and P, which, respectively, coat lining-material *c*, stay-material *e* and cover-material *d*, all of these being in web-form and drawn from coils by mechanisms which operate upon them. In Fig. 1, a series of these operating mechanisms appears supported upon a frame **52**. But two of these will, however, be particularly referred to. An assembling mechanism I presses the coated lining-web *c* and the coated stay-webs *e* into adhesive contact with the shell-web *b*, while an assembling mechanism Q similarly acts upon the cover-web *d*. The sources of the various webs, save that of the stay-material *e*, are not shown. The essential characteristics of all the gluing mechanisms are the same. Only the mechanism H, indicated partially in Fig. 1 and fully in Figs. 2 and 3, will be described in detail.

A glue-receptacle **290** rests upon a platform **292** arranged to be lowered and raised by the operator, for cleaning and filling the receptacle, by pivoted arms **294**, **294** connected to the platform to give a parallel motion. This platform is actuated by a hand-lever **296** attached to a spindle, to which one pair of arms is connected. It may be latched in a raised position by engagement with the hand-lever of a sleeve **297** sliding

upon the pivot-spindle of one of the pairs of arms 294 and movable into and out of the path of the lever. Pivoted in the frame and at opposite sides of the receptacle by a transverse spindle 299, to which they are secured, are arms 298, these arms furnishing at their lower extremities bearings upon which rotates a supply-roll 300 dipping in the glue in the receptacle. Receiving the adhesive from the supply-roll and delivering, in turn, to the web of lining-material *c* traveling in contact with it, is an applying roll 302 journaled in the frame. The roll 302 is driven by sprocket-gearing 98 from one of the operating mechanisms, it, in turn, rotating the roll 300, which is of greater diameter, through spur-gearing 304. Said roll 300 has imparted to it a considerably less peripheral speed than its companion, so it will not deliver an excessive quantity of glue. The spacing between the rolls, and, therefore, the amount of glue delivered to the applying roll, may be altered by adjustable stop-screws 306, against which the bearing arms 298 are forced yieldably by expansible rods 308 arranged to slide in the frame. Each rod is in sections, with an associated spring 310 which urges one section of the rod against the corresponding arm. The other rod-section presses against a cam 312 rotatable upon the frame by a hand-lever 314, thereby to control the condition of the expansible member or rod. As illustrated, a high or projecting portion of the cam holds the rod in so its spring is effective to maintain the roll 300 forward in its glue-supplying relation, pressed yieldably toward the roll 302 for all adjustments of the screws 306. This arrangement also allows a separation of the rolls if a foreign substance is carried between them. When the cam is rotated by the lever to bring a depression 316 opposite the rod, the roll 300 is free to fall away from the companion roll, pushing the rod before it. This release is utilized to facilitate the cleaning of the rolls when the receptacle 290 has been removed. The latter operation is effected by moving the sleeve 297 to one side, permitting the support 292 to descend.

Were the apparatus stopped and the web *c* brought to rest in contact with the applying roll 302, said web would be injured as a result of sticking to the roll. To prevent this, I associate with the applying roll a device for separating the material from it. Herein, this device consists of a stripper-rod 320 parallel to the axis of the applying roll and extending beneath the web, the uncoated side of which runs in contact with it. The rod is carried by a pair of arms 322 fixed to a transverse spindle 323 rotatable in the frame. Also secured to this spindle are a crank arm 324, having a crank handle 325, and a duplicate crank arm 324*a* on the far side of the machine, as observed in Fig. 3, which provide for turning the spindle and, hence, for the consequent lifting of the web clear of the roll. Normally, the tension of the traveling material maintains the stripper-rod 320 depressed and ineffective. But, after the operator has lowered the crank and thus lifted the rod, the web being now stationary, the weight of the crank and the resistance of the spindle to rotation is sufficient to continue to hold the web out of contact with the applying roll after the crank has been released. The web being again started, its pull returns the rod to normal, the web now engaging the applying roll. To guide the web into and out of the gluing mechanism and obtain the necessary arc of contact with the periphery of the applying roll, the structure may be simplified by utilizing the spindles which serve other purposes, surrounding them, if desired, with rolls 326 to reduce the friction of the web. Such guiding means is illustrated as furnished by the spindles of the arms 294, 298 and 322.

Between the gluing mechanism H for the lining-material *c*, just described, and the mechanisms J and P, which respectively coat the stay-material *e* and the cover-material *d*, there are but minor differences. In the mechanisms J and P, the expansible actuating means for the supply-rolls are operated by bell-crank-levers 327, instead of by cams. Their lever-arms 328, for operating the stripper-rods 320 to remove the webs from engagement with the applying rolls, extend upwardly and have, turning freely upon their fulcra, arms 337 which are joined by a connecting-rod 329, a rod 331 also joining a portion 337ª of the arm 337 of the mechanism J to an arm 335 constituting an operating member which is rotatable about the spindle 323 of crank-arms 324 and 324ª at the mechanism H. When these intermediate connections 329 and 331 are employed, they are preferably arranged as one-way connections so that a single act on the part of the operator will cause the webs at all three gluing mechanisms to be removed simultaneously from contact with their glue-applying rolls, or that any one of said mechanisms may be independently controlled. To this end, each of the arms 324*a* and 328 has a lateral projection 333, with which contacts the arm 335 at the mechanism H or one of the arms 337 at the mechanisms J and P. By moving the rod 329 to the left (Fig. 1) or the rod 331 down, the operator may, even if not stationed at the gluing mechanisms, carry the operating members 335 and 337 against the projections 333 positively to actuate all the stripper-rods. If the removal of the material from but one of the applying rolls 302 is desired, this may be accomplished by movement of the chosen arm 324 or 328, the projection 333 thereon traveling away from the associated arm and leaving the stripper-rods of the other mechanism unaffected.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A coating mechanism comprising a receptacle for a coating substance, a coating-supplying roll rotatable therein, an applying roll receiving coating substance from the supplying roll, movable bearings for one of the rolls, a multi-part expansible member spring expanded to contact with a bearing and operating by its expansion to urge said rolls toward one another, and means arranged to vary the condition of said member to control the relation of said rolls.

2. A coating mechanism comprising a receptacle for a coating substance, a coating-supplying roll rotatable therein, an applying roll co-operating with the supplying roll and receiving coating substance therefrom, movable bearings for one of the rolls, an expansible member contacting with a bearing, means arranged to vary the position of said member to control the separation of said rolls, and an adjustable member against which the bearing is forced by the expansible member.

3. A coating mechanism comprising a receptacle for a coating substance, a coating-supplying roll rotatable therein, an applying roll co-operating with the supplying roll, movable bearings for one of the rolls, a sectional rod contacting at one extremity with a bearing, a spring interposed between the rod-sections, and an actuating member

contacting with the rod at the end opposite the bearing.

4. A coating mechanism comprising a receptacle for a coating substance, a coating-supplying roll rotatable therein, an applying roll co-operating with the supplying roll, movable bearings for one of the rolls, a sectional rod contacting at one extremity with a bearing, a spring interposed between the rod-sections, an actuating member contacting with the rod at the end opposite the bearing, and a screw with which the roll-bearing contacts at the side opposite the sectional rod.

5. A coating mechanism comprising a receptacle for a coating substance, a coating-supplying roll rotatable therein, an applying roll co-operating with the supplying roll, movable bearings for one of the rolls, a sectional rod contacting at one extremity with a bearing, a spring interposed between the rod-sections, and a rotatable cam contacting with the rod at the end opposite the bearing.

6. A web-coating mechanism comprising a frame, an adhesive-receptacle supported thereon, an adhesive-applying roll rotatable in the frame, means for guiding the web about the periphery of the applying roll, arms pivoted upon the frame, an adhesive-supplying roll rotatable upon the arms and dipping in the receptacle and delivering to the applying roll, and an expansion spring acting upon each arm to turn said arm about its pivot and force the supplying-roll toward the applying roll.

7. A web-coating mechanism comprising a frame, an adhesive-receptacle supported thereon, an adhesive-applying roll rotatable in the frame, means for guiding the web about the periphery of the applying roll, arms pivoted upon the frame, an adhesive-supplying roll rotatable upon the arms and dipping in the receptacle and delivering to the applying roll, a support for the adhesive-receptacle movable toward and from the supplying roll, the supplying roll being movable into the space left by the withdrawal of the receptacle, and means for forcing the supplying roll toward the applying roll and for releasing said supplying roll after the receptacle has been withdrawn.

8. In a blank-making apparatus, operating mechanism, means for advancing web-material to the operating mechanism, coating mechanism having a rotatable applying roll in contact with which the web travels to the operating mechanism, and a separating member contacting yieldably with the web and movable to separate the web from the applying roll, the web in its advance maintaining the separating member normally ineffective.

9. In a blank-making apparatus, operating mechanism, means for drawing web-material through the operating mechanism, gluing mechanism having a rotatable applying roll in contact with which the web travels to the operating mechanism, a rod contacting with the under side of the web adjacent to the applying roll pivotally supported and yieldably retained in operative position, said rod being normally depressed by the tension of the web, and an operating member having a one-way connection to the rod constructed and arranged to elevate it and separate the web from the roll, while permitting operation of the rod without disturbing the operating member.

10. In a blank-making apparatus of the type in which webs of material are advanced from a plurality of supplying rolls into engagement with the applying rolls of a plurality of coating mechanisms and thence to operating mechanisms wherein the webs are combined to make blanks, the combination of movable members arranged to separate the applying rolls and the webs, operator-controlled members for moving said separating members, and a common operating device having a lost-motion connection to said operator-controlled members.

11. In a blank-making apparatus of the type in which webs of material are advanced from a plurality of supplying rolls into engagement with the applying rolls of a plurality of coating mechanisms and thence to operating mechanisms wherein the webs are combined to make blanks, the combination of members one contacting with each web and being movable to separate said web from the corresponding applying roll, and connections between the members arranged to move them simultaneously in one direction only.

12. In a blank-making apparatus of the type in which webs of material are advanced from a plurality of supplying rolls into engagement with the applying rolls of a plurality of coating mechanisms and thence to operating mechanisms wherein the webs are combined to make blanks, the combination of members one contacting with each web and being movable to separate said web from the corresponding applying roll, and connections between the members to move them simultaneously to operative position, such connections being arranged to permit independent movement of the members to inoperative position.

13. In a blank-making apparatus of the type in which webs of material are advanced from a plurality of supplying rolls into engagement with the applying rolls of a plurality of coating mechanisms and thence to operating mechanisms wherein the webs are combined to make blanks, the combination of rods each contacting with a web adjacent to the applying roll of each coating mechanism, levers upon which the rods are mounted, each lever being provided with a projection, arms pivoted adjacent to each lever and contacting with only one side of its projection, and connections between the arms.

CUTLER D. KNOWLTON.