March 31, 1936. C. D. KNOWLTON 2,035,552

BLANK MAKING MACHINE

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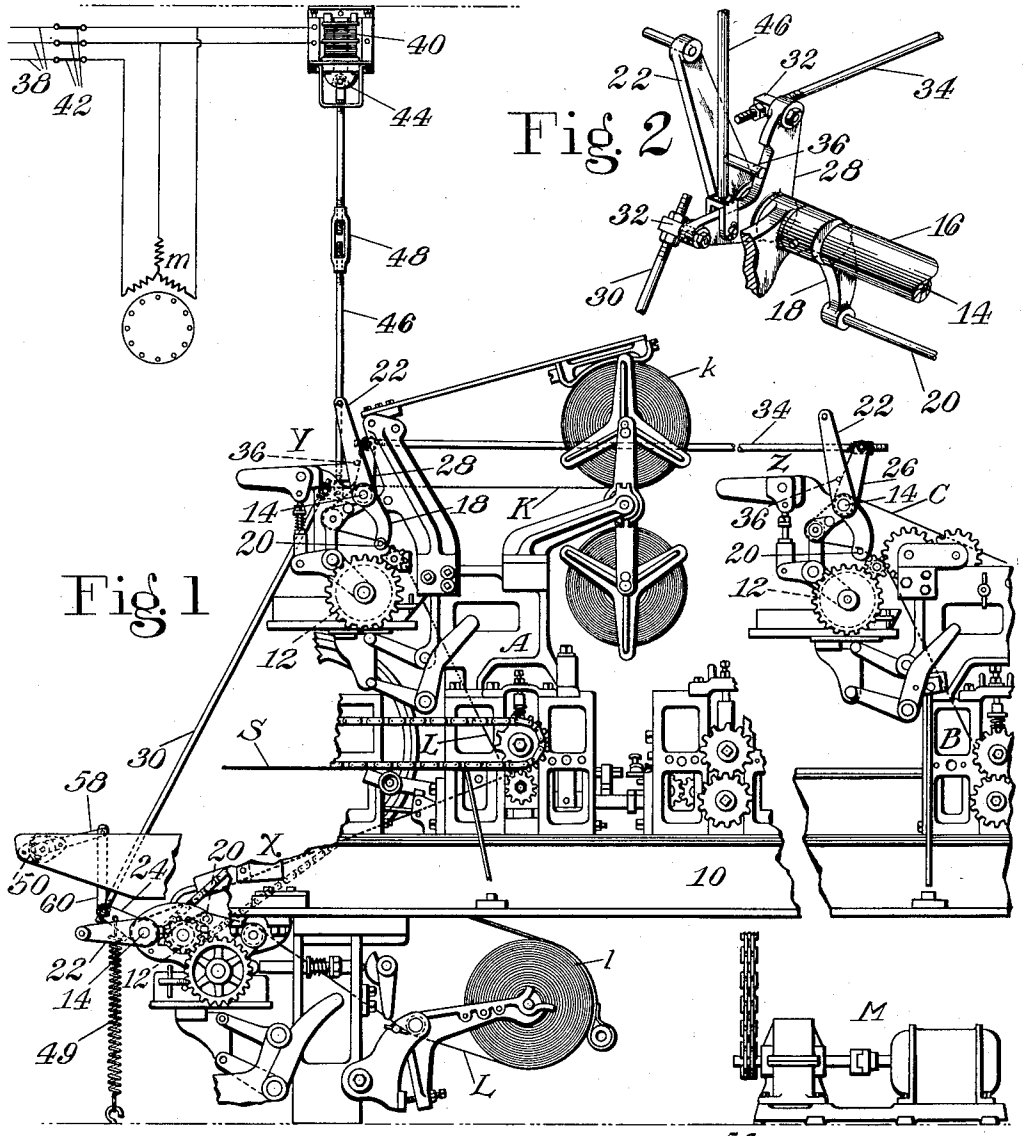


Fig. 1

Fig. 2

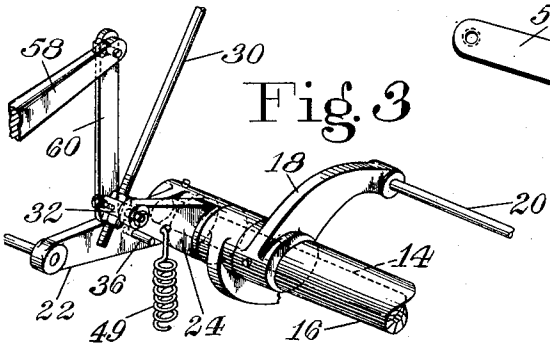


Fig. 3

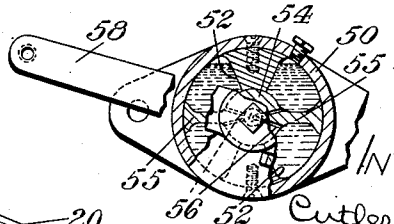


Fig. 4

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BLANK-MAKING MACHINE

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10 Claims. (Cl. 93—36)

This invention concerns apparatus by which blanks are formed from web-material, as pasteboard and paper, it being herein disclosed as applied to a machine for production of blanks from which box-parts are to be made.

In box-blank-making-machines organized for continuous production, the various constituents of the blank, as the shell, cover, lining and stay-material, are in the form of webs carried upon reels and advancing through the machine from one operating mechanism to another until the completed blanks are ejected. It is desirable to control the relation between some of the mechanisms and the webs. An example of this is furnished by the means which coat the webs with an adhesive for their assembly with one another. If the machine stops when a web is in engagement with a member which coats it, adhesion may occur, and when the apparatus is again started the web may be torn. In an application filed in my name in the United States Patent Office on April 21, 1932, with the Serial No. 606,605, this being a division of the application which resulted in Letters Patent of the United States No. 1,988,451, dated January 22, 1935, there is described and claimed an apparatus in which the operator may manually remove webs of box-material from contact with adhesive-applying rolls if this is necessary, as in event of the cessation of travel of the webs. Such an organization is entirely effective if the operator attends properly to his duties. If he is negligent, sticking and tearing of the webs may result. The present invention has, as an object, the provision of means whereby change of relation between the webs and the operating mechanism will occur automatically upon the stopping of the machine.

The above object I obtain by combining in a novel manner with mechanism for operating upon a web or webs of blank-material, an example of such mechanism being that for applying coating, and with advancing means for a web, means, as an electric motor, for driving the advancing means, and means for supplying current or other energizing agent to the motor means, together with unitary means for governing the supply of energy to the motor means and for changing the relation between the web-material and the operating mechanism. With such an organization, the cutting off of energy from the motor to stop the machine may be caused to so control the action of any operating mechanism upon the material that there will be no harmful result. Preferably, the control is exercised by the energizing agent itself, a desirable manner of accomplishing this being by the use of an electric motor in circuit with which is an electromagnetic device, herein shown as a solenoid. When current is allowed to flow through the winding of the motor, as by the closure of a switch, the solenoid-winding will also receive current, connections to the plunger of the solenoid being caused to move a member which controls the position of a web. In the present instance, this member is carried to an ineffective position when the solenoid is energized and the web is advanced because the machine is being driven by the motor. When the motor stops, and therefore the web ceases its advance, a force opposing the solenoid, this being shown as furnished by a spring, causes the member to separate the web from the operating member. Since abrupt movement of the relation-changing or positioning member in either direction might throw a rupturing strain upon the web, I preferably connect to the member a shock-absorbing mechanism which cushions both movements. An hydraulic type of mechanism is convenient for this purpose.

One of the several forms my invention may assume is illustrated in the accompanying drawing, in which

Fig. 1 shows portions of a blank-making machine in side elevation;

Figs. 2 and 3 are perspective views of connections for two of the position-controlling members; and

Fig. 4 is an elevation of the shock-absorber, with parts broken away and in section.

Upon a frame 10 a series of mechanisms for operating upon blank-material are supported. This material is shown as in the form of webs S of pasteboard or other shell-material, L of lining paper, C of cover-paper, and K of kraft paper or stay-material. Reels *l* and *k*, from which the webs of liner and stay are respectively drawn, are shown, while those for the shell and cover-material do not appear. The particular character of the operating mechanisms is not important. It is sufficient that it be desired to alter the relation between them and one or more of the webs. The illustrated form of the invention is applied to the separation of the webs from the applying rolls of coating mechanisms. One of these, indicated at X, glues the liner L before it is pressed against the shell-web S by assembling mechanism A, which at the same time acts upon the stay K glued by a mechanism Y. A third coating mechanism Z glues the cover-paper, which is forced into engagement with the shell-

web by assembling mechanism B. The assembling mechanisms may also serve to advance the webs for the various operations. Power may be communicated to the entire machine from a motor, preferably electric. This motor is shown both as to its relation to the machine at M and as to the relation of its winding *m* to an energizing circuit.

The precise structure of the coating mechanisms is not important. In the present instance, each has a rotatable applying roll 12 constantly driven during the operation of the machine and in contact with which travels the web which it coats. Extending transversely of the frame above each applying roll 12 is a rotatable spindle 14, about which may turn a sleeve 16 serving as a guide for the corresponding web. Fast upon each spindle, near its extremities, are arms 18, 18 between which, parallel to the spindle, extends a rod 20 arranged for engagement with the uncoated side of a web acted upon by the mechanism. At the extreme end of the spindle is a crank-arm 22. When the operator turns this crank anticlockwise (Fig. 1), the rod 20 is raised against the web and this is separated from the applying roll. In this way the application of adhesive to any one of the webs may be discontinued when desired.

If the machine is stopped, all the webs should be lifted from the applying rolls to avoid sticking thereto. For this purpose, the web-positioning rods are interconnected to permit simultaneous operation. Turning loosely about the spindles 14 of the mechanisms X, Z and Y, adjacent to the crank-arms 22, are arms 24 and 26 and a bell-crank-lever 28, respectively. A substantially horizontal arm of the lever 28 is joined by a rod 30 to the arm 24 of the mechanism X, the connection at each end being through a rotatable stud 32. A rod 34 similarly unites an upstanding arm of the lever 28 and the arm 26 of the mechanism Z. One edge of each of these interconnected arms is movable into contact with a pin 36 projecting from the adjacent crank-arm 22. This allows any one of the crank-arms to be moved independently of the others to separate the paper from its applying roll, yet when the members 24, 26 and 28 are swung together by the interconnecting system so they engage the pins, all the web-controlling rods 20 are actuated simultaneously.

To cause automatic movement of the rods when the machine is stopped, and therefore when the webs would come tc rest upon the rolls with danger of adhering thereto, I connect to a circuit 38 which supplies the winding *m* of the motor a solenoid 40, the winding of which receives current from the circuit whenever it is closed, as by a switch 42, and the motor M is in operation to drive the blank-making machine. Within the solenoid is the usual core or plunger 44 which is joined by a rod 46, variable in length at 48, to the horizontal arm of the lever 28. It will be seen that with the switch 42 closed and the machine running under the influence of the motor M, the solenoid will attract the plunger, elevating the rod 46 to turn the lever 28 and therefore the arms 24 and 26 clockwise, as viewed in the drawing. This frees the pins 36 and their arms 22, so the tension of the advancing webs L, K and C will draw down the rods 20 and permit engagement of said webs with the applying rolls 12 to receive their coating. This relation continues as long as the motor receives current, and therefore the machine advances and operates upon the web. If for any reason the machine is stopped, as by opening the switch 42, the solenoid, as well as the motor, is deprived of energizing current. Joined to the arm 24 of the positioning elements is a tension-spring 49, or such equivalent as a weight, exerting its force in opposition to the pull of the solenoid. When the attraction of the latter ceases, the spring turns the arms 24 and 26 and the lever 28 anticlockwise against the pins 36 of the arms 22 at all the coating mechanisms. This forces the rods 20 against the webs L, K and C to separate them from the applying rolls 12. Consequently, neglect on the part of the operator can not lead to injury of the webs through their adhesion to the rolls.

Unrestrained, the action of the rods 20 upon the webs, especially when the spring 49 acts to lift said webs, may be sufficiently violent to cause their breakage. This I avoid by combining with the web-positioning means a shock-absorber having a portion movable by the interconnecting elements. Attached to the frame 10 is shown a casing 50 in which project opposite fixed abutments, 52, 52. Movable in the casing, which contains some such liquid as oil, is a rotor 54 provided with opposite vanes 55, 55 extending into close proximity to the casing, the hub of the rotor also fitting closely the ends of the abutments. Contracted passages 56 through the hub permit the gradual flow of liquid between the compartments formed between the abutments and vanes. An arm 58 extends from the rotor outside the casing and is joined by a link 60 to the stud 32 of the arm 24. The flow of liquid through the passages 56, as the rotor turns under the influence of the connections, offers sufficient resistance to the movement of the web-positioning rods to render this too gradual to cause damage, it being equally effective in cushioning the action of the spring and of the solenoid.

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

1. In a blank-making machine, operating mechanism, means for advancing web-material to the operating mechanism, motor means for driving the advancing means, controlling mechanism having a member movable in engagement with the web to present it to the operating mechanism or to separate it therefrom, and means for supplying an energizing agent to the motor means and to the controlling mechanism.

2. In a blank-making machine, operating mechanism, means for advancing web-material to the operating mechanism, motor means for driving the advancing means, controlling mechanism having a member movable in engagement with the web to present it to the operating mechanism or to separate it therefrom, means for supplying an energizing agent to the motor means and to the controlling mechanism, and means for simultaneously governing the supply of the energizing agent to both the motor means and to the controlling mechanism.

3. In a blank-making machine, operating mechanism, means for advancing web-material to the operating mechanism, motor means for driving the advancing means, a movable controlling member arranged to position the web in active or inactive relation to the operating mechanism, an electric motor for driving the machine, an electromagnetic mechanism in circuit with the motor, and connections to the elec-

tromagnetic mechanism for moving the controlling member in engagement with the web.

4. In a blank-making machine, operating mechanism, means for advancing web-material to the operating mechanism, motor means for driving the advancing means, a movable web-controlling member, an electric motor for driving the machine, an electromagnetic mechanism in circuit with the motor, connections to the electromagnetic mechanism for moving the web-controlling member, and shock-absorbing mechanism having an element movable by said connections.

5. In a blank-making machine, means for advancing web-material, coating mechanism having an applying member for contact with the web, a member movable to separate the web from the applying member, an electric motor for driving the machine, and a solenoid having a winding in circuit with the motor and a plunger joined to the movable member.

6. In a blank-making machine, means for advancing web-material, coating mechanism having an applying member for contact with a web, a member movable to separate the web from the applying member, an electric motor for driving the machine, a solenoid having a winding in circuit with the motor and a plunger joined to the movable member, and a switch by which the current in the motor and solenoid may be governed simultaneously.

7. In a blank-making machine, means for advancing web-material, coating mechanism having an applying member for contact with the web, a member movable to separate the web from the applying member, an electric motor for driving the machine, a solenoid having a winding in circuit with the motor and a plunger, connections to the plunger acting when the solenoid is energized to maintain the movable member ineffective, and means joined to the connections and opposing the action of the solenoid.

8. In a blank-making machine, means for advancing web-material, coating mechanism having an applying member for contact with the web, a member movable to separate the web from the applying member, an electric motor for driving the machine, a solenoid having a winding in circuit with the motor and a plunger, connections to the plunger acting when the solenoid is energized to maintain the movable member ineffective, a spring joined to the connections and opposing the action of the solenoid, and a hydraulic shock-absorber having a member movable by the connections and modifying the action of the spring upon the web.

9. In a blank-making machine, means for advancing webs of material, a plurality of coating mechanisms each having an applying member for contact with a web and a member movable to separate said web from the applying member, an electric motor for driving the machine, an electromagnetic mechanism in circuit with the motor, and connections to the electromagnetic mechanism for moving all the separating members.

10. In a blank-making machine, means for advancing webs of material, a plurality of coating mechanisms each having an applying member for contact with a web and a member movable to separate said web from the applying member, an electric motor for driving the machine, an electromagnetic mechanism in circuit with the motor, connections to the electromagnetic mechanism for moving all the separating members, and means whereby a separating member may be moved individually.

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