Sept. 28, 1954 A. F. SHIELDS 2,690,156

OPEN THROAT BOX GLUING MACHINE

Filed May 25, 1951 4 Sheets-Sheet 1

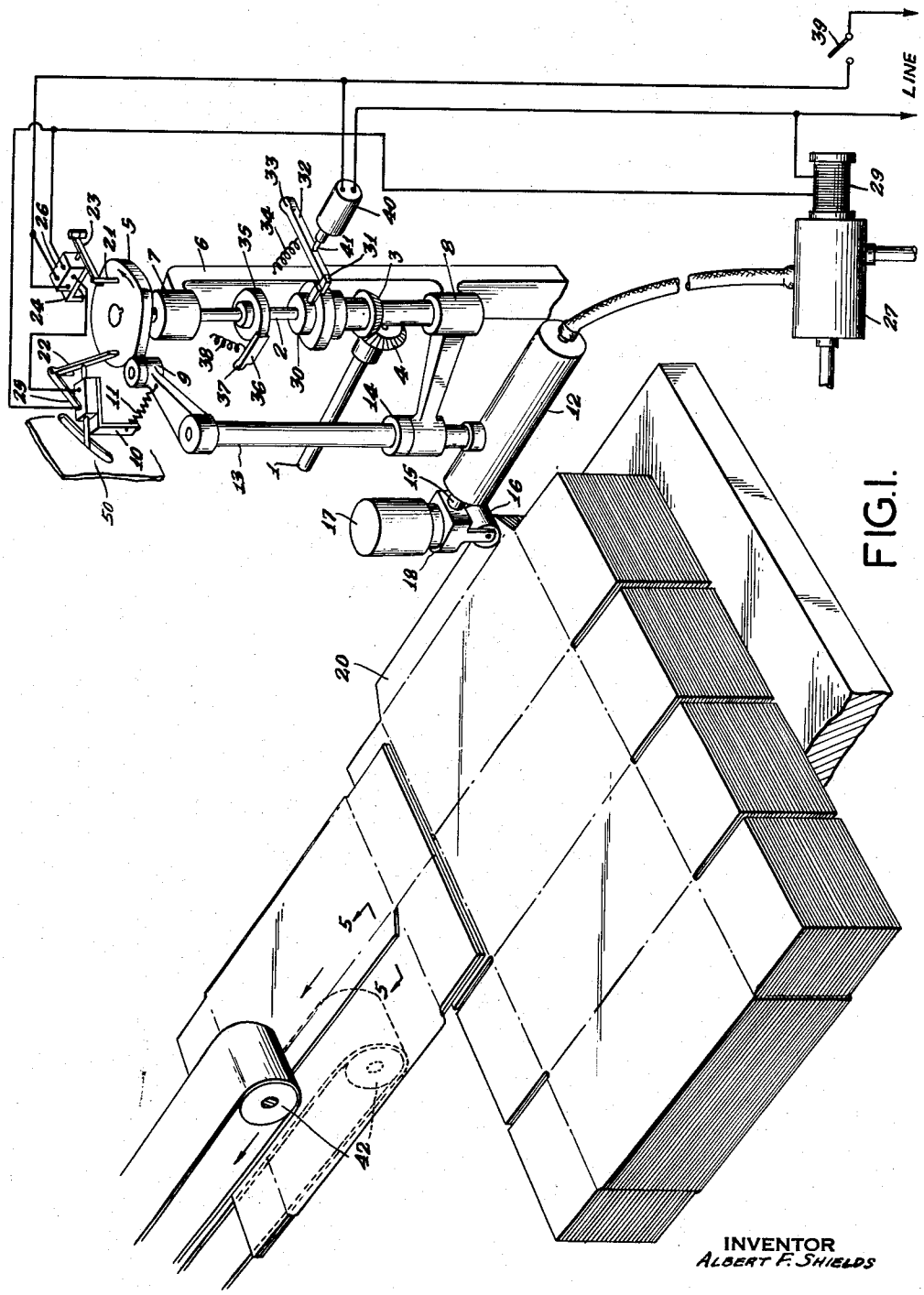


FIG. 1.

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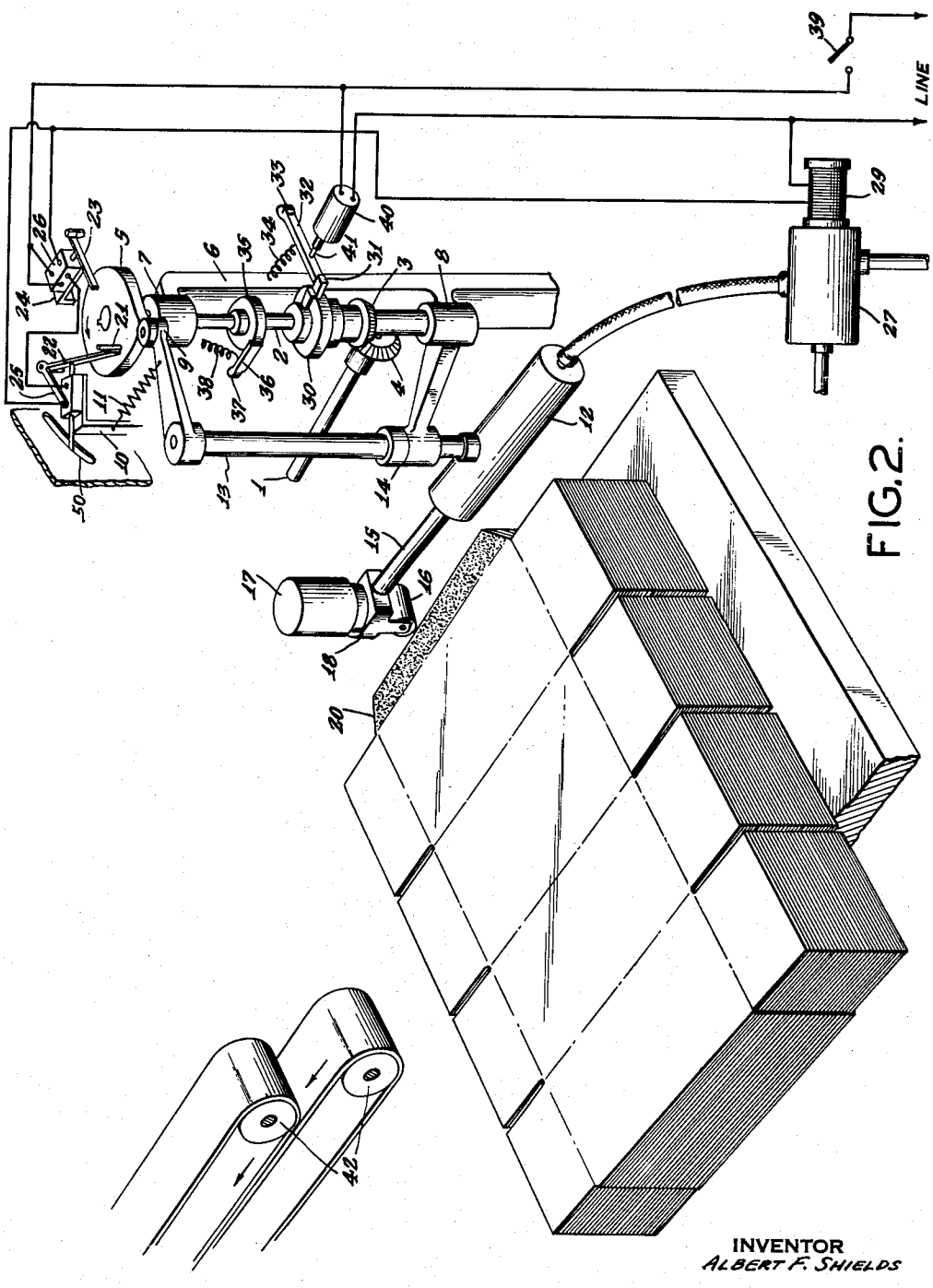


FIG. 2.

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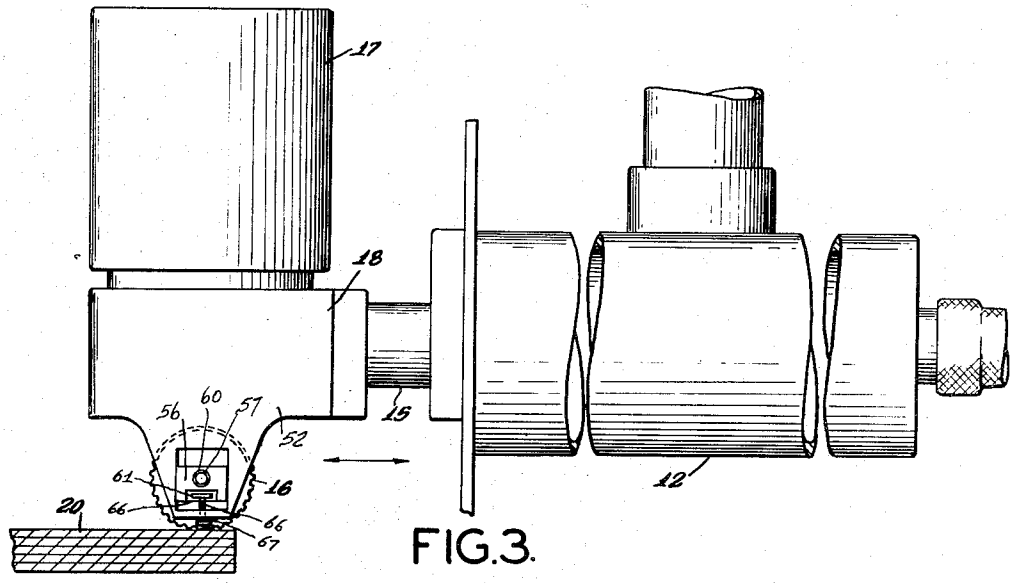


FIG.3.



FIG. 5.

FIG.4.

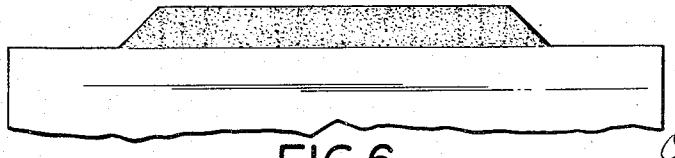


FIG.6.

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OPEN THROAT BOX GLUING MACHINE

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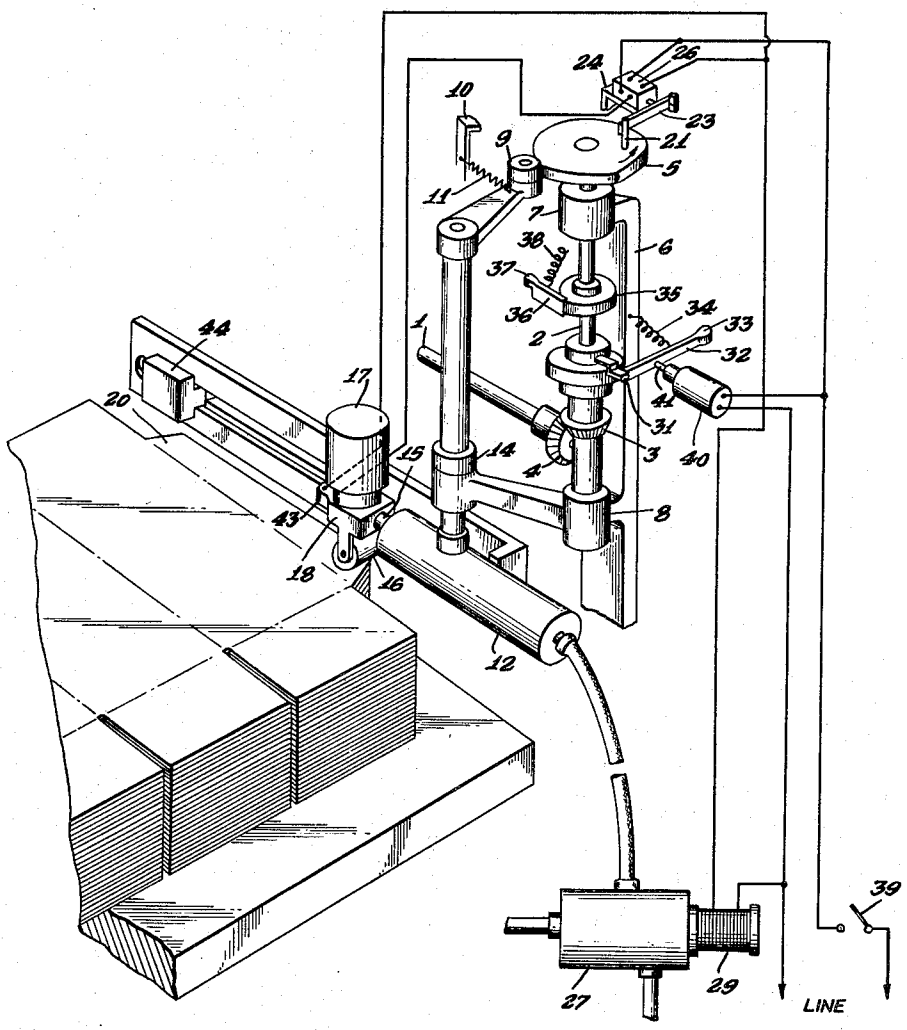


FIG. 7.

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UNITED STATES PATENT OFFICE

2,690,156

OPEN THROAT BOX GLUING MACHINE

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Application May 25, 1951, Serial No. 228,287

12 Claims. (Cl. 118—11)

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My present invention relates to gluing machines and more particularly to devices for automatically gluing a flap of paper boxes, cartons, or the like.

My novel device will, after applying the glue, move sidewise to make possible the folding operation. My novel device is especially constructed so that it glues a flap from one end to the other.

The primary object of my invention, therefore, is the provision of novel gluing means for boxes and cartons.

Another object of my invention is the arrangement of the gluing mechanism so that one side of the gluing area is completely free of apparatus, thereby permitting extremely wide cartons or boxes to protrude from that side and thus making it possible for the gluing machine to operate on a wide range of sizes.

A further object of my invention is the provision of means for automatically moving the glue applicator sidewise out of the path of carton panels which are to be folded following the gluing operation.

Another object of my invention is the provision of means for automatically moving the glue applicator from one end of the cartons or boxes to the other.

These and many other objects and advantages of my invention will become apparent in the following description and drawings in which:

Figure 1 is an isometric schematic view of my novel gluing device shown ready for operation.

Figure 2 is an isometric view of my novel gluing device showing it immediately after operation to apply the glue strip.

Figure 3 is a side view of the glue applicator of Figure 1.

Figure 4 is a front view of the glue applicator of Figure 1.

Figure 5 is a side view of the folded carton or box showing the glued flap.

Figure 6 is a plan view of a portion of a carton or box showing the glued flap.

Figure 7 is an isometric view of a modified gluing machine showing a change in switching apparatus.

Referring now to Figure 1, a control shaft 2 is rotated through gears 3 and 4 by the driving shaft 1. Control shaft 2 carries a cam 5 at its upper end and a clutch 30 and is secured to the frame 6 through bearings 7 and 8. The cam follower 9 is biased toward the frame 10 by tension spring 11. The cam follower 9 is rigidly secured to the air cylinder 12 through a shaft 13 which can rotate inside bearing 14 secured to frame 6.

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The air cylinder 12 has a piston 15; the outer end of piston 15 carries the gluing apparatus 16 shown more in detail in Figures 3 and 4 made of the following main parts: a roller with serrations 16, a glue container 17 with housing 18 secured to piston 15, a glue flow regulating screw 51 which regulates clearance between serrated roll 16 and housing 18, through which the glue flows from container 17 to roller 16 and from there to the flap 20 of cartons or boxes to be glued.

More particularly, housing 18 has two extensions 52 and 53 with aligned rectangular openings 55. Each opening 55 carries a closely fitting rectangular shaft block 56. Blocks 56 are provided with a center bearing 57 in which shaft 60 of roller 16 can rotate. Blocks 56 are further provided with a recess 61 so shaped that when the end 65 of regulating screw 51 is placed in the recess 61 and the surface of screw recess 61 is appropriately hammered, the end 65 of regulating screw 51 cannot disengage from the recess 61. This not only permits simultaneous movement of screw 51 and block 56 but will also keep roller 16 at a fixed relative position with respect to housing 18. The threaded part 66 of regulating screw 51 engages a threaded opening 67 of extension 52. It is now evident that by appropriate rotation of the two screws 51, one at each side of roller 16, block 56 and, therefore, roller 16 can be raised or lowered, thus regulating the clearance between roller 16 and housing 18 and therefore also the flow of glue from container 17 to roller 16 and from roller 16 to flap 20 of cartons or boxes.

A pin 21 is secured to the upper surface of cam 5 in position to engage metallic fingers 22 and 23 secured to the frames 10 and 24, respectively. To the same frames 10 and 24 are secured two switches 25 and 26, respectively.

The position of switch 25 and finger 22 with respect to switch 26 and finger 23 can be regulated since switch 25 and finger 26 are movable along groove 50 of frame 10. This regulable switch system makes possible the gluing of boxes and cartons having flaps of different length. A hand operated mechanism can move switch 25 and finger 22 forward or backward along groove 50 according to the length of flap 20 of the box or carton to be glued.

Cam 5 performs two functions, namely, that of moving the glue aplicator 16 from an "on" position to an "off" position and vice versa, as well as that of closing and opening switches 25 and 26 controlling the air cylinder 12 by means of solenoid 29 and valve unit 27.

As the pin 21 on the cam 5 strikes the metallic finger 23, it closes the switch 26 so that the solenoid 29 is energized and opens the air intake valve in valve unit 27. The air goes into cylinder 12 and pushes piston 15 out of cylinder 12. This operation continues until pin 21 strikes metallic finger 22 of switch 25, opening switch 26 and de-energizing solenoid 29. As solenoid 29 is de-energized, the exhaust valve of valve unit 27 is open while the intake valve of valve unit 27 is closed.

Clutch 30 is controlled by stop 31 which is held in position by arm 32 pivoted at 33 and tension spring 34. Clutch 30 is preferably of the well-known single revolution overrunning type which permits the gear 3 to rotate without driving control shaft 2 until the stop 31 is moved away from the clutch 30, whereupon the clutch 30 rotates shaft 2 one complete revolution.

To prevent any back lash from developing when stop 31 is suddenly brought to bear against the clutch 30 to stop its rotation, a notched disc 35 with pawl 36 is used. The pawl 36 is pivoted at 37 and held against disc 35 by spring 38 to prevent reverse rotation of the shaft 2.

When the operator pushes foot pedal 39, solenoid 40 is energized and pulls toward itself the armature 41 to which arm 32 is mechanically coupled. Arm 32 disengages clutch stop 31 from clutch 30 permitting one complete rotation of clutch 30. Stop 31 thereupon re-engages the clutch 30 until the operator pushes again foot pedal 39.

When foot pedal 39 is down, cam 5 can rotate. Pin 21 then first strikes the finger 23 closing the circuit of valve unit 27. Air enters through the air intake of valve 27 and pushes the piston 15 of air cylinder 12 out of air cylinder 12. As the piston 15 moves out, the gluing roller 16 rotates on the flap 20 of the box or carton leaving a coat or layer of glue on said flap 20 as shown in Figure 6.

When pin 21 strikes finger 22, the circuit of solenoid 29 is opened and the air intake is closed while the air exhaust is open to let the air in cylinder 12 escape, permitting the piston 15 biased by a tension spring to return to its original position.

At the same time that circuit of solenoid 29 is opened, cam 5 moves cam follower 9 to the position shown in Figure 2, moving the glue applicator 16 away from the flap 20 of the box or carton.

The box or carton is then folded by the operator who feeds the folded box or carton between rollers 42 which press flap 20 of the box or carton to the other side of the box or carton while at the same time pulling away from the operator the folded box or carton.

A modified switching system is shown in Figure 7; as in the previous case, the valve unit solenoid 27 is energized when pin 21 strikes finger 23, but here the second switch 43 is placed at the outer end of the glue applicator 16 so that it opens the circuit of solenoid 29 when the glue applicator reaches the regulable stop 44.

This arrangement makes possible the gluing of boxes and cartons having flaps of different lengths. A hand-operated mechanism can move the stop 44 forward or backward according to the length of flap 20 of the box or carton to be glued.

Although I have described a preferred manner for carrying out my invention, I am aware that modifications are entirely feasible in the physical construction thereof and accordingly I do not intend to be limited except as set forth in the following claims.

I claim:

1. A gluing machine for applying glue to a marginal flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue; means for applying said glue; electro-mechanical means for cyclically initiating and terminating the operation of the machine and means for automatically moving said glue applying means in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

2. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue; an opening at the bottom of said container, a screw regulating the flow of the glue through said opening to grooves of a roller, said roller while moving applying said glue to the flap of said blanks; electro-mechanical means for cyclically initiating and terminating the operation of the machine; and means for automatically moving said glue applying means in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

3. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue; means for applying said glue; electro-mechanical means for cyclically initiating and terminating the operation of the machine comprising a cyclically moving member to bend a spring finger and initiate said operation, said moving member bending a second spring finger at the end of said operation to terminate said cycle; and means for automatically moving said glue applying means in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

4. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue; means for applying said glue; electro-mechanical means for cyclically initiating and terminating the operation of the machine comprising a cyclically moving member to bend a spring finger and initiate said cycle, said moving member bending a second spring finger at the end of said cycle to terminate said cycle; clutch means for starting and stopping said mechanisms; solenoid means for engaging and disengaging said clutch means; and electrical switch in circuit with said solenoid means; means wherey said solenoid means is energized, and means for automatically moving said glue applying means in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

5. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue, an opening at the bottom of said container, a screw regulating the flow of the glue through said opening to grooves of a roller applying said glue to the flap of said blanks; piston and cylinder means associated with said

roller for moving said roller along said flap, valve and valve solenoid means starting and terminating said movement, electro-mechanical means for cyclically initiating and terminating the operation of said piston; and means for automatically moving the piston and cylinder in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

6. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue, an opening at the bottom of said container, a screw regulating the flow of the glue through said opening to grooves of a roller applying said glue to the flap of said blanks; piston and cylinder means associated with said roller for moving said roller along said flap, valve and valve solenoid means starting and terminating said movement, electro-mechanical means for cyclically initiating and terminating the operation of said piston comprising a cyclically moving member to bend a spring finger and initiate said operation; said moving member bending a second spring finger at the end of said operation to terminate said cycle; said spring fingers operating electrical switches; said switches being the means whereby said valve solenoid is energized and de-energized; and means for automatically moving the piston and cylinder in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

7. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue, an opening at the bottom of said container, a screw regulating the flow of the glue through said opening to grooves of a roller applying said glue to the flap of said blanks; piston and cylinder means associated with said roller for moving said roller along said flap, valve and valve solenoid means starting and terminating said movement, electro-mechanical means for cyclically initiating and terminating the operation of said piston comprising a cyclically moving member to bend a spring finger and initiate said operation; said moving member bending a second spring finger at the end of said operation to terminate said cycle; said spring fingers operating electrical switches; said switches being the means whereby said valve solenoid is energized and de-energized; a cam follower associated with said cylinder and a cam associated with said cyclically moving member; means driving said cam follower to said cam; said cam moving said cam follower and associated cylinder away from said blanks at the end of said operation.

8. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue; means for applying said glue; electro-mechanical means for cyclically initiating and terminating the operation of the machine comprising a cyclically moving member to bend a spring finger and initiate said cycle, said moving member bending a second spring finger at the end of said cycle to terminate said cycle; the portion of said second spring finger in the path of said moving member being regulable; clutch means associated with the glue application for starting and stopping said mechanisms; solenoid means for engaging and disengaging said clutch means; an electrical switch in circuit with said solenoid means; means whereby said solenoid means is energized; and means for automatically moving the piston and cylinder in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

9. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue, an opening at the bottom of said container, a screw regulating the flow of the glue through said opening to grooves of a roller applying said glue to the flap of said blanks; piston and cylinder means associated with said roller for moving said roller along said flap, valve and valve solenoid means starting and terminating said movement, electro-mechanical means for cyclically initiating and terminating the operation of said piston; said electro-mechanical means comprising a cyclically moving member to bend a spring finger and initiate said cycle, and a second member on said container to hit a regulable stop on its path and terminate said cycle, and means for automatically moving the piston and cylinder in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

10. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue, an opening at the bottom of said container, means regulating the flow of the glue through said opening to grooves of a roller, said roller while moving applying said glue to the flap of said blanks; electro-mechanical means for cyclically initiating and terminating the operation of the machine, and means for automatically moving said roller in a path substantially transversely of said marginal flap and beyond said blank in a longitudinal direction clearing said blanks for folding.

11. A gluing machine for applying glue to a marginal flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue; means for applying said glue, hydraulic means for cyclically initiating and terminating the operation of the machine and means for automatically moving said glue applying means in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

12. A gluing machine for applying glue to the flap of blanks passed therethrough, said blank being substantially stationary during the operation of the gluing machine, said machine comprising a container for glue; an opening at the bottom of said container, a screw regulating the flow of the glue through said opening to grooves of a roller, said roller while moving applying said glue to the flap of said blanks; pneumatic means for cyclically initiating and terminating the operation of the machine; and means for automatically moving said roller in a path substantially transversely of said marginal flap away from said marginal flap at the end of the glue applying operation.

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