

Oct. 25, 1949.

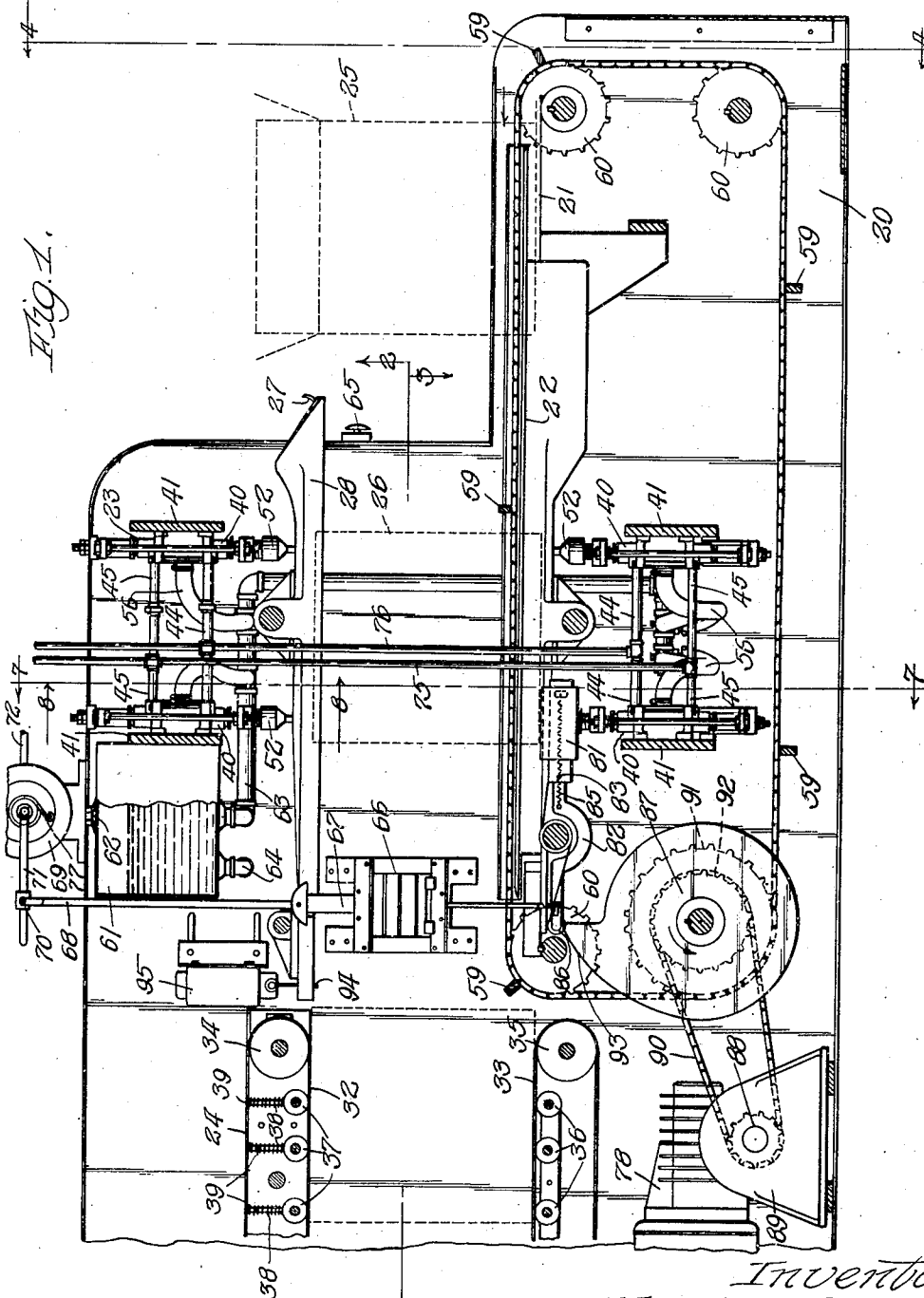
M. P. NEAL

2,485,912

PACKAGING MACHINE

Filed Jan. 25, 1946

5 Sheets-Sheet 1



Inventor:
Morris Neal,
By Charles Schaefer, Meriam H. J. Gray,
Attorneys.

Oct. 25, 1949.

M. P. NEAL
PACKAGING MACHINE

2,485,912

Filed Jan. 25, 1946

5 Sheets-Sheet 2

Fig. 2.

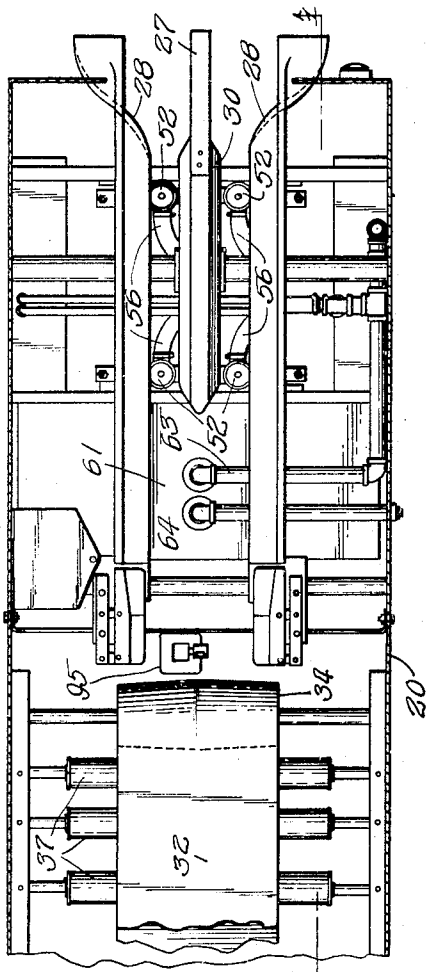
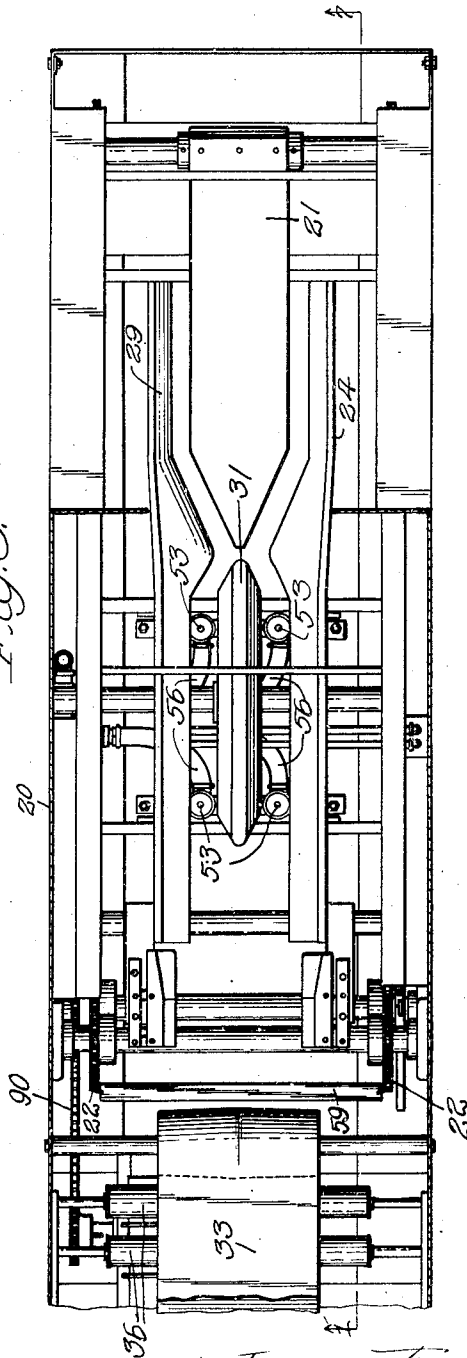


Fig. 3.



Inventor:
Morris Neal,
By Clinton, Schroeder, Merriam, & Hyman,
Attys.

Oct. 25, 1949.

M. P. NEAL

2,485,912

PACKAGING MACHINE

Filed Jan. 25, 1946

5 Sheets-Sheet 3

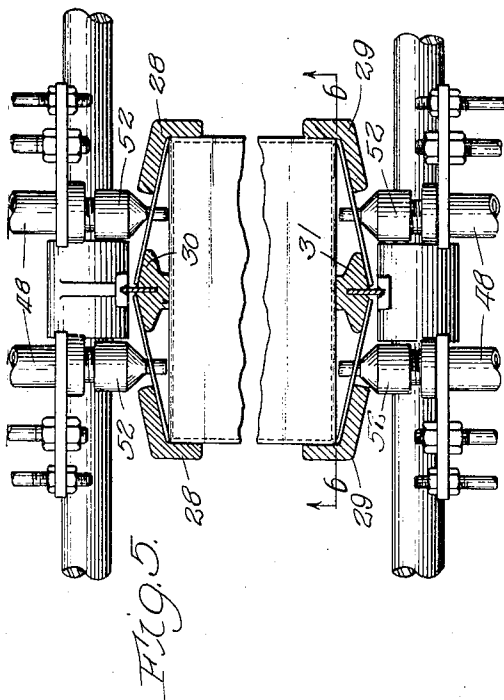
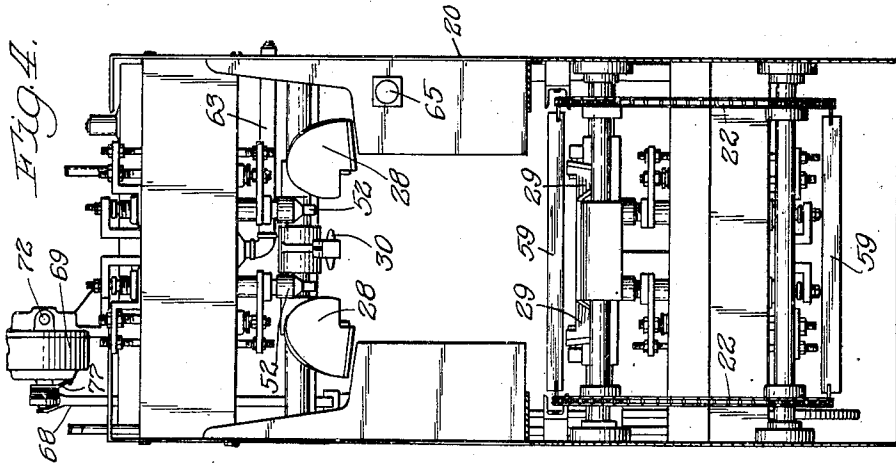
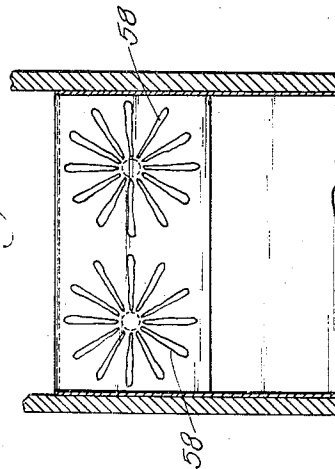


Fig. 6.



Inventor:
Morris Neal,
By Chas. E. Schroeder, Herman H. Hagen,
Attorneys.

Oct. 25, 1949.

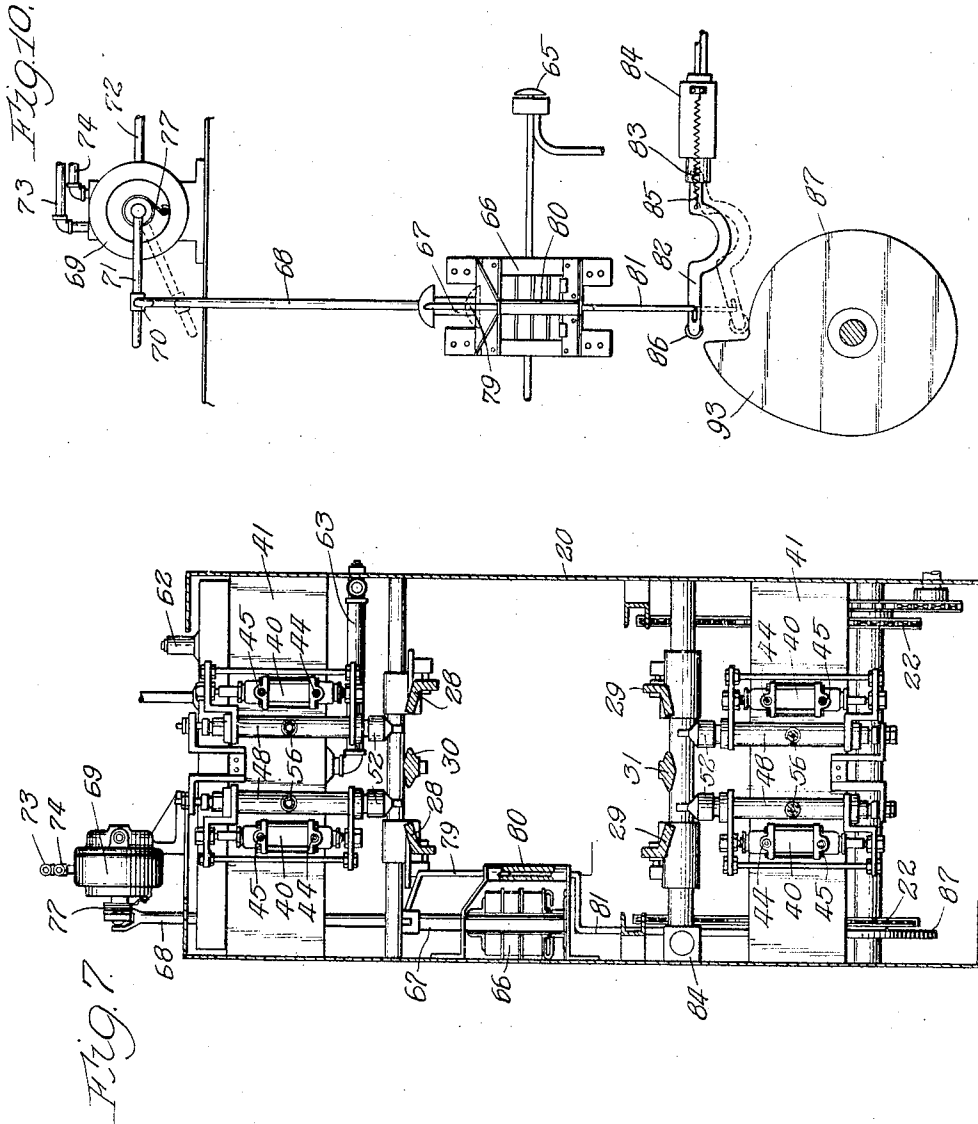
M. P. NEAL

2,485,912

PACKAGING MACHINE

Filed Jan. 25, 1946

5 Sheets-Sheet 4



Inventor:
Morris Neal,
By Chas. A. Schrader, Meriam P. Roffgren,
Attorneys.

Oct. 25, 1949.

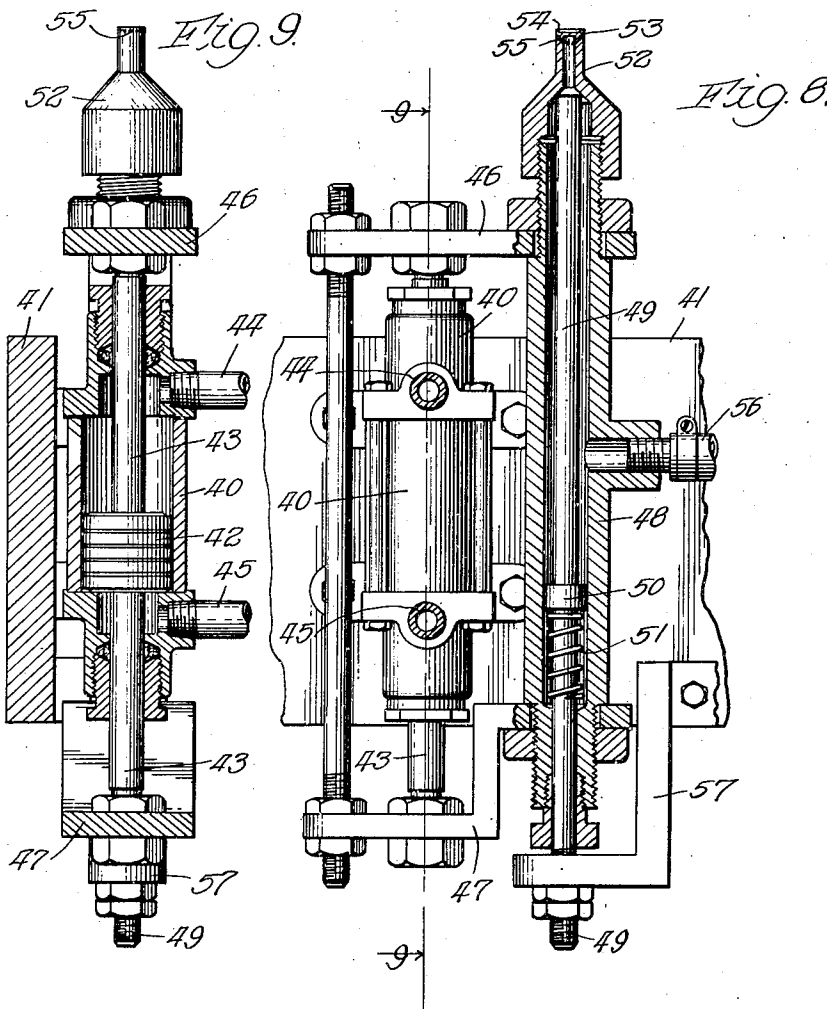
M. P. NEAL

2,485,912

PACKAGING MACHINE

Filed Jan. 25, 1946

5 Sheets-Sheet 5



Inventor:
Morris Neal,
By Clinton, Schrader, Meriam, & Wagon,
Attys.

UNITED STATES PATENT OFFICE

2,485,912

PACKAGING MACHINE

Morris P. Neal, Quincy, Ill., assignor to A B C
Packaging Machine Corporation, a corporation
of Illinois

Application January 25, 1946, Serial No. 643,250

19 Claims. (Cl. 93—6)

1

This invention relates to a packaging machine for use in gluing the top and bottom flaps of an ordinary container of pasteboard, cardboard, paper, and the like.

Most industrial products are today shipped in containers made of various kinds of heavy paper. These containers ordinarily come from the factory in a folded condition, and when used are opened up and filled, and the top and bottom flaps are glued together. Where the number of containers is large the time required for sealing all containers is an important factor. I have invented a packaging machine wherein the top and bottom flaps of the containers are glued, folded, and sealed automatically. This new machine is relatively light in weight, and its operation is quite simple. The machine takes up very little space and has a large hourly capacity when in use.

The new packaging machine comprises, broadly, a base plate for supporting a container with at least one of the inner bottom flaps folded into substantially the plane of the bottom of the container, means for moving the container into gluing position, means for moving an overlying bottom flap into position spaced from but adjacent to said inner flap, and unsupported against bending, means for punching a hole through said outer flap by a quick, sharp blow so as not to overcome the inertia of said outer flap, and means for simultaneously applying glue through said hole onto the outer surface of said inner flap. In the preferred embodiment both top and bottom outer flaps are folded into this position and both punched at the same time. There are then provided means moving the container out of gluing position and moving a second container into gluing position. The first container has its top flaps and bottom flaps pressed together as it is moved out of position, and the first container is moved into engagement with a conveyor which moves the sealed containers away from the gluing machine. An important feature of the invention are the control means by which the containers are moved from one position to another, and the punching and glue-applying means are operated.

The invention will be described as related to the embodiment set out in the accompanying drawings. Of the drawings, Fig. 1 is a vertical section taken through the packaging machine along line 1—1 of Figs. 2 and 3; Fig. 2 is a horizontal section looking upward along line 2—2 of Fig. 1; Fig. 3 is a horizontal section looking downward and taken along line 3—3 of Fig. 1;

2

Fig. 4 is a vertical section taken along line 4—4 of Fig. 1; Fig. 5 is an elevation of the punching and glue-applying means; Fig. 6 is a horizontal section taken along line 6—6 of Fig. 5; Fig. 7 is a vertical section taken along line 7—7 of Fig. 1; Fig. 8 is a vertical section taken along line 8—8 of Fig. 1; Fig. 9 is a vertical section taken along line 9—9 of Fig. 8; and Fig. 10 is an elevation showing a schematic view of the control mechanism of the new machine.

The embodiment of the packaging machine shown in the accompanying drawings comprises a framework 20, a horizontal base plate 21 upon which a container rests with the bottom inner flaps folded into the plane of the bottom of the container, and with the outer bottom flaps hanging down on either side of the base plate, a pair of vertically arranged endless chains 22 arranged one on either side of the base plate 21 and the container with each chain including a horizontal reach on one side of and above the base plate 21, punching and glue-applying apparatus 23 mounted above and below the path of the containers through the machine and a conveyor 24 for removing the glued containers.

When the containers are moved by the chains 22 from a first position indicated at 25 to a second position indicated at 26, a horizontal strip 27 having an upturned end serves to hold the top inner flaps to the plane of the top of the container. During this movement the top curved plates 28 and bottom curved plates 29 fold the outer flaps into position adjacent to but spaced from the inner flaps. These outer flaps are held in position but unsupported against bending by a top bar 30 and a bottom bar 31. While the outer flaps are held in this position the punching and glue-applying apparatus above and below the container punches holes through the outer flaps by a quick, sharp blow which does not overcome the inertia of the flaps. Substantially simultaneously with this punching glue is sprayed onto the outer surface of the inner flaps. During the punching and gluing operation another container is placed in position in the base plate 21. The apparatus is operated to move this container into gluing position, while the other container is moved out of gluing position. While the glued container is moved out of gluing position the top curved plates 28 and the bottom curved plates 29 serve to press the top flaps and the bottom flaps together. The glued container is moved from gluing position into engagement with the conveyor 24. The conveyor comprises a top endless belt 32 and a bottom endless belt 33

3

running over rollers 34 and 35. The bottom belt is supported on small fixed rollers 36, while the top belt 32 is supported on small rollers 37 with each roller held against the belt by springs 38 fitted around carrying rods 39.

The punching and glue-applying apparatus 23 are arranged above and below the container when the container is in gluing position. The apparatus is arranged so that two holes will be punched through each top outer flap and through each bottom outer flap, and glue will be sprayed on the outer surfaces of the inner flaps as shown in Fig. 6. Each punching and glue-applying apparatus comprises a fixed cylinder 40 arranged in vertical position and mounted on a bar 41. The cylinder 40 contains a movable piston 42 attached to a vertical rod 43 extending through the cylinder 40. The cylinder 40 is connected by two pipes 44 and 45 to a source of fluid such as air under pressure. The outer ends of the vertical rod 43 are attached by means of plates 46 and 47 to a second cylinder 48. This second cylinder contains a concentric rod 49 running through it, with this rod having a second piston 50 near its rear end. Between the piston 50 and the end of the second cylinder is located a spring 51. At the forward end of the second cylinder 48 there is attached a spraying head 52 having a circular end 53 with a central cut out portion to form a sharp edge 54. Immediately behind the sharp edge 54 are a plurality of outwardly inclined holes 55 through which glue is sprayed. The inner portion of the second cylinder 48 is connected by means of a hose 56 to a source of glue under pressure. The point of attachment of the hose 56 is between the second piston 50 and the forward end of the cylinder 48. The second rod 49 is held in fixed position by means of a bracket 57 attached to the mounting bar 41.

As can be seen from the foregoing description, as soon as fluid under pressure is admitted through pipe 45 to the rear portion of the first piston 42 this piston and its attached rod 43 are moved sharply forward. This movement also moves the second cylinder 48 and its spraying and punching head 52 forward. During this movement, which is a quick, sharp blow, a hole is punched in one of the outer flaps. The second rod 49 normally closes off the head 52, but as soon as the cylinder 48 is moved away from the rod the glue inside the cylinder sprays out through the holes 55. Because of the sloping arrangement of the holes the glue is sprayed in a star pattern 58 as shown in Fig. 6. This star pattern gives more complete coverage of the glue.

The containers are moved along their path by means of spaced bars extending between the parallel chains 22. These chains run over three idler pulleys 60 and are driven by motor driven pulley 91. The bars are so arranged that one container is moved along the base plate 21 into gluing position, while a second container is moved from gluing position into engagement with the conveyor 24. The endless chains 22 are operated under intermittent movement so that while a container is being filled, and while another container is in gluing position, the chains are motionless. This operation and its control will be explained in greater detail hereinafter.

The glue applying portion of the apparatus includes a glue reservoir 61 connected to a source of air pressure 62 so that the glue in the reservoir is always under pressure. At the bottom of the reservoir 61 are pipes 63 and 64 leading

4

to the punching and glue-applying apparatus 23. Each pipe leads to those punches on one side of the container.

The operation of the entire machine is controlled by switch button 65 near the front of the apparatus. When an operator has filled a container that is in position on the front of the base plate 21, he pushes the switch button 65. This charges a solenoid 66 which pulls down on a central rod 67. The downward motion of the rod 67 pulls a second rod 68 that is connected to a compressed air valve 69. The second rod has a slide 70 fitted over a horizontal rod 71 attached to the air valve 69. The air valve is connected by a pipe 72 to a source of compressed air and has two other pipes, 73, and 74, leading to compressed air lines 75 and 76. Air line 75 is connected to the rear end of the first cylinder 40 through pipe 45 so that when the switch button 65 is closed air flows into the cylinder 40 and pushes the piston 42 forward. This forward motion operates the combined punch and spraying head 52 to punch a hole through an outer flap and spray glue onto the outer surface of an inner flap. Because of the particular arrangement all eight punching and glue-applying members act simultaneously. As soon as the switch button 65 is released the solenoid armature 67 has returned to its normal position under the action of a coil spring 77 on the air valve 69. This return to normal position causes air to flow through the air line 76 and pipes 44 to the forward end of the cylinder 40 and pushes the pistons 42 back to their normal position. This withdraws the punching and spray heads 52. The switch button 65 should be pushed and then released so that the punching and withdrawal will be accomplished rapidly.

The cylinder 40 is vented on both sides of the piston 42 so that the piston may move back and forth in the cylinder. This venting may be in any desired manner. In the embodiment shown the venting occurs in the air valve 69. Thus as compressed air flows through pipe 44 into the cylinder on one side of the piston, the air on the other side of the piston is forced out through pipe 45 and into the air valve by the movement of the piston. It is there vented.

The switch button 65 and solenoid 66 also operate the motor 78 which drives the chains 22. When the switch 65 is closed and the armature 67 is moved downwardly, a third rod 79 is also moved downwardly. This third rod operates through a sleeve 80 to close a switch 84 which starts the motor 78. The rod 79 is divided into two parts within the sleeve 80 so that downward motion of the solenoid armature 67 pushes the bottom portion 81 of the rod down, but when the solenoid armature returns to its normal position the bottom portion 81 remains down. The bottom portion 81 of the rod is connected to a lever 82 hingedly mounted at 83 on the control switch 84. This lever 82 is held in position by an aligned spring 85 so that the lever 82 requires a positive force to move it from one position to another.

When the lever 82 is pushed down the switch 84 starts the motor 78. The outer end of the lever 82 has a roller 86 which rests against a circular cam 87 when the lever is in its downward position. As long as the lever is down the switch 84 remains closed and the motor 78 drives the chains 22 through gears 92 and 88, which are operated by a gear reducer 89. The gear 88 mounted on the gear reducer 89 is connected by a chain 90 to the gear 92 mounted concentrically

5

to driven gear 91. The motor continues to operate until the inclined surface 93 of the circular cam 87 has forced the lever 82 back to its normal position. As soon as this normal position has been reached switch 84 shuts off the motor 78. As shown in Fig. 1 the lever 82 has just reached this normal position so that the switch is shut off. The momentum of the movable parts of the machine will be sufficient to carry the inclined surface 93 beyond the roller 86 so that a subsequent closing of the switch 65 will cause the roller to be brought to bear against the circular portion of the cam 87 adjacent the inclined surface 93 and the machine will progress through another cycle of operation as has been previously described. The cam 87 is mounted on the same shaft that the driven pulley 92 is mounted upon. One complete revolution of cam 87 constitutes one cycle of operation of the machine as the cam controls the operation of the motor 78 through the switch 65. During this cycle a container is moved from the position shown by dotted lines at 25 (Fig. 1) to a position shown by dotted lines at 26. The pulleys 91 and 92 are so proportioned that this distance of movement occurs.

The spaced bars 59 between the endless chains 22 are arranged so that one bar moves the container into gluing position while another bar moves the container out of gluing position. The container that is moved out of gluing position contacts a switch arm 94 which closes the contacts of a switch 95 to start the conveyor 24. The switch 95 is in the electrical circuit to a motor (not shown) that serves to operate the conveyor 24. As long as the switch arm 94 is held turned to the left, as shown in Fig. 1, the conveyor continues to operate. The chains 22 move the container into engagement with the conveyor, and the conveyor moves the container to the position shown in dotted lines at the left of Fig. 1. As soon as the container has reached this position the switch arm 94 turns back to its original position, and the conveyor stops. With this operation each successive container on the conveyor 24 is arranged closely adjacent to its neighboring containers.

The term "glue" used herein is intended to include any fluid composition adaptable for gluing purposes. One of the most common forms of gluing compositions is water glass, which is cheap, yet provides good adhesion. Water glass is particularly adaptable for use in the apparatus shown and described, as it is sprayed on in a star pattern, as shown in Fig. 6, giving good coverage of the glued surfaces.

Having described my invention as related to one embodiment of the same, it is my intention that the invention be not limited by the details of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. A packaging machine comprising a base plate for supporting a container with at least one of the inner bottom flaps folded into substantially the plane of the bottom of the container, means for moving the container into gluing position, means for moving an overlying bottom flap into position spaced from but adjacent to said inner flap, means for punching a hole through said outer flap by a quick, sharp blow, and means for simultaneously applying glue through said hole onto the outer surface of said inner flap.

2. The machine of claim 1 wherein the glue-applying means is a part of the punching means.

6

3. A packaging machine comprising a base plate for supporting a container with at least one of the inner bottom flaps folded into substantially the plane of the bottom of the container, means for moving the container into gluing position, means for simultaneously moving at least one overlying bottom flap into position spaced from but adjacent to said inner flap, means for punching a hole through said outer flap by a quick, sharp blow, means for substantially simultaneously applying glue through said hole onto the outer surface of said inner flap, said glue-applying means being a part of the punching means, means for withdrawing the punching and glue-applying means, means for moving the container out of gluing position, and means for pressing the two flaps together.

4. A packaging machine comprising a base plate for supporting a container with the inner bottom flaps folded into substantially the plane of the bottom of the container, a transfer means, means for operating the transfer means to move the container into gluing position, means for holding the top inner flaps in substantially the plane of the top of the container, means for substantially simultaneously moving the bottom outer flaps and the top outer flaps into position spaced from but adjacent to the inner flaps, means for punching holes through said outer flaps by quick, sharp blows, means for substantially simultaneously applying glue through said holes onto the outer surface of said inner flaps, said glue-applying means being a part of the punching means, means for withdrawing the punching and glue-applying means, means for operating the transfer means to move the container out of gluing position, and means for pressing together the bottom flaps and the top flaps.

5. The packaging machine of claim 4 wherein the means for pressing the flaps together is brought into operation as the container is moved out of gluing position.

6. A packaging machine comprising a base plate for supporting a container with the inner bottom flaps folded into substantially the plane of the bottom of the container, an intermittently operable transfer means, means including a control switch for operating said transfer means and moving the container into gluing position while moving a second container out of gluing position, means for holding the top inner flaps of the first container in substantially the plane of the top of the container, means for substantially simultaneously moving the bottom outer flaps and top outer flaps of the first container into position spaced from but adjacent to the inner flaps and unsupported against bending, means operably connected to said control switch for punching holes through said outer flaps by quick sharp blows when said control switch is closed, means for substantially simultaneously applying glue through said holes onto the outer surfaces of said inner flaps, said glue-applying means being a part of the punching means, means for withdrawing the punching and glue-applying means, means for pressing the flaps together as the transfer means moves a container out of gluing position, and conveyor means for removing a container after the flaps have been pressed together.

7. A packaging machine comprising a base plate for supporting a container with the inner bottom flaps folded into substantially the plane of the bottom of the container, a transfer means comprising a pair of endless chains arranged substantially parallel to each other on opposite sides

7

of the base plate with a reach of each chain being substantially parallel to the base plate, a substantially flat plate for holding the top inner flaps of the container within the plane of the top of the container, two pairs of curved members for moving the bottom outer flaps and the top outer flaps into position adjacent to but spaced from the inner flaps, bar members for holding said outer flaps in said position unsupported against bending, punching and glue-applying means opposite the top and bottom of the container for punching holes through said outer flaps by quick, sharp blows and simultaneously applying glue to the outer surfaces of the inner flaps, two pairs of second curved members for pressing the outer flaps against the inner flaps, spaced bar members connecting the endless chains of the transfer means with one bar member serving to move a container into gluing position between the top and bottom punching and glue-applying means and another bar member serving simultaneously to move a second container from gluing position, means including a control switch for operating said transfer means to accomplish said movement, means also including said control switch for operating said punching and glue-applying means, means including said switch and said operating means for the punching and glue-applying means serving to cause forward movement of the punching means when the switch is closed and rearward movement when the switch is opened, and means for stopping the operation of the transfer means when the containers have been moved to their designated positions.

8. The packaging machine of claim 7 wherein the transfer means includes a motor operably connected with said control switch for driving the parallel chains, a cam driven by the motor with the cam having a raised portion on its periphery, and a switch adapted to be closed by said raised portion to stop the motor after the motor has been started by the control switch, said cam making substantially a complete revolution before said motor switch is closed with the revolution being sufficient to move one container into gluing position and a second container out of gluing position.

9. The packaging machine of claim 7 wherein each of the punching and glue-applying means comprises a cylinder; a piston therein attached to a rod member extending through the cylinder; a second cylinder, piston and rod member arranged substantially parallel to the first piston, rod member and cylinder with the second cylinder being attached to the first rod member and the first cylinder and the second piston and rod member being fixed; a valve operably connected to the control switch to be operated thereby; means including a source of fluid under pressure operably connected to the valve; a fluid line operably connected from the valve to the interior of the first cylinder on the rearward side of the first piston; means including a source of glue under pressure operably attached to the interior of the second cylinder between the second piston and the forward end of the second cylinder; a punching and glue-applying head on the forward end of the second cylinder; the second rod serving to close off flow of glue to said head when the first rod and piston is in withdrawn position; and means including a second fluid line from the valve to the interior of the first cylinder on the forward side of the first piston; said valve being arranged to cause flow of fluid through the first fluid line to force the punching head

8

forward when the control switch is closed; and to cause flow through the second fluid line to withdraw the punching head when the control switch is open.

10. Gluing apparatus comprising means for maintaining two sheets of material in spaced-apart adjacent relationship, means for punching a hole through one sheet, and means for applying glue through the hole onto the surface of the second sheet, said means for applying glue being a part of the means for punching the hole.

11. The apparatus of claim 10 wherein the punching and glue-applying means comprises a cylinder; a piston therein attached to a rod member extending through the cylinder; a second cylinder, piston and rod member arranged substantially parallel to the first piston, rod member and cylinder with the second cylinder being attached to the first rod member and the first cylinder and the second piston and rod member being fixed; a control switch; means including a valve operably connected to said control switch; a source of fluid under pressure connected to the valve; a fluid line from the valve to the first cylinder on the rearward side of the first piston; a source of glue under pressure operably attached to the portion of the second cylinder between the second piston and the forward end of the second cylinder to admit glue to said portion; a punching and glue-applying head on the forward end of the second cylinder; the second rod serving to close off flow of glue to said head when the first rod and piston is in withdrawn position; and a second fluid line from the valve to the first cylinder on the forward side of the first piston; said valve causing flow of fluid through the first fluid line to force the punching head forward when the control switch is closed; and causing flow through the second fluid line to withdraw the punching head when the control switch is open.

12. Gluing apparatus comprising a glue-applying and punching head adapted to contain glue therein, means for maintaining said glue under pressure, a valve seat forming a part of said head; a valve member closing off said seat, and means for moving said head forward thereby pulling the head away from the valve member for simultaneously punching and applying glue.

13. A packaging machine comprising a transfer means, a loading station and a gluing station; a punching and glue-applying means, means for operating said transfer means to move a container from the loading station to the gluing station and to move a second container from the gluing station, and means for operating the punching and glue-applying means when a container is in the gluing station, said punching and glue-applying means being arranged for punching a hole through one portion of the container and spraying glue on another portion of the container.

14. The packaging machine of claim 4 wherein there are provided a main control switch; means including an auxiliary switch operably connected to said control switch to close when said control switch is closed, means including a motor having an electrical circuit in which said auxiliary switch is located with the motor being arranged to drive said transfer means and with said auxiliary switch serving to open and close said circuit when the auxiliary switch is opened and closed, and means for maintaining said auxiliary switch closed for a predetermined time upon closing said control switch, said predetermined time being sufficient to cause the transfer means

to move one container into gluing position while moving a second container out of gluing position.

15. The packaging machine of claim 4 wherein there are provided a main control switch, means including an auxiliary switch operably connected to said control switch to close when said control switch is closed, means including a motor having an electrical circuit in which said auxiliary switch is located with the motor being arranged to drive said transfer means and with said auxiliary switch serving to open and close said circuit when the auxiliary switch is opened and closed, means for maintaining said auxiliary switch closed for a predetermined time upon closing said control switch, said predetermined time being sufficient to cause the transfer means to move one container into gluing position while moving a second container out of gluing position, fluid operated means for operating the punching and glue-applying means, and means including said control switch for operating said fluid operated means.

16. A packing machine comprising a base plate for supporting a container with the inner bottom flaps folded into substantially the plane of the bottom of the container, an intermittently operable transfer means, a main control switch, means including an auxiliary switch operably connected to said control switch to close when said control switch is closed, means including a motor having an electrical circuit in which said auxiliary switch is located with the motor being arranged to drive said transfer means and with said auxiliary switch serving to open and close said circuit when the auxiliary switch is opened and closed, means for maintaining said auxiliary switch closed for a predetermined time upon closing said control switch, said predetermined time being sufficient to cause the transfer means to move one container into gluing position while moving a second container out of gluing position, means for holding the top inner flaps of the first container in substantially the plane of the top of the container, means for substantially simultaneously moving the bottom outer flaps and top outer flaps of the first container into position spaced from but adjacent to the inner flaps,

means operably connected to said control switch for punching holes through said outer flaps by quick sharp blows while said control switch is closed, means for substantially simultaneously applying glue through said holes onto the outer surfaces of said inner flaps, said glue-applying means being a part of the punching means, means for withdrawing the punching and glue-applying means, means for pressing the flaps together as the transfer means moves a container out of gluing position, and conveyor means for removing a container after the flaps have been pressed together.

17. The packaging machine of claim 16 wherein the control switch means is arranged to operate first the punching and glue-applying means and then the transfer means.

18. The packaging machine of claim 16 wherein the transfer means comprises a pair of endless chains substantially parallel to each other and connected by spaced bar members for moving the containers, said bar members being spaced so that one member moves a container into gluing position while another member moves a container from gluing position into conveyor-engaging position.

19. The packaging machine of claim 13 wherein there are provided operating means including a single control means for setting in operation said transfer means and said punching and glue-applying means.

MORRIS P. NEAL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
445,940	Salisbury	Feb. 3, 1891
2,378,457	Arelt	June 19, 1945

FOREIGN PATENTS

Number	Country	Date
355,237	Great Britain	Sept. 15, 1930