

F. GIROUD.
MACHINE FOR MAKING PAPER BOXES.
APPLICATION FILED OCT. 24, 1908.

1,009,236.

Patented Nov. 21, 1911.

3 SHEETS—SHEET 1.

FIG. 1.

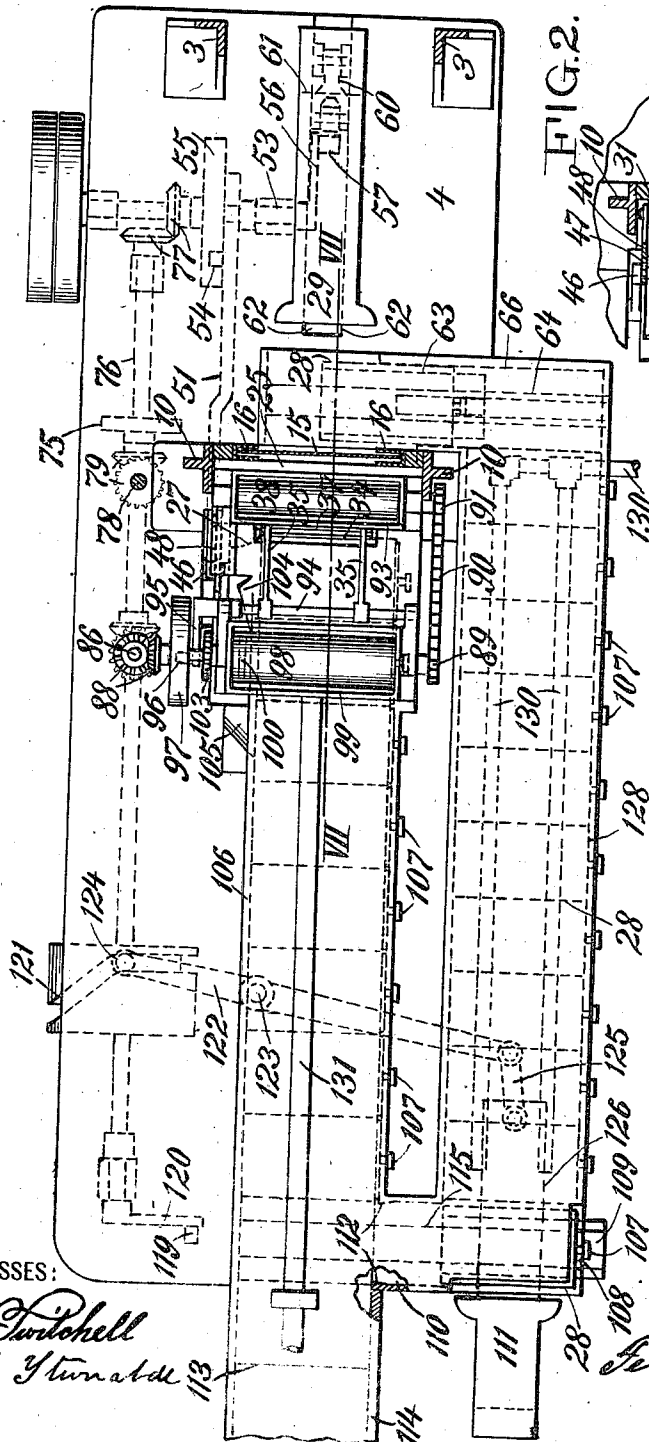


FIG. 2.

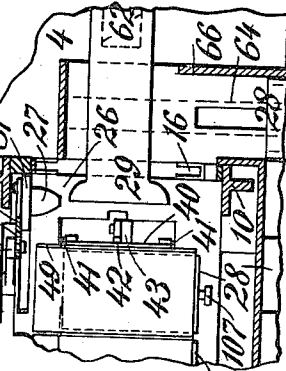


FIG. 5.

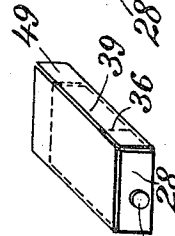


FIG. 4.

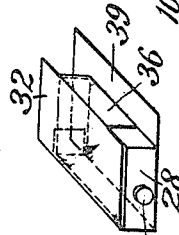
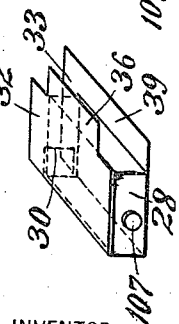


FIG. 3.



WITNESSES:

Donn Twitchell
Angel Turnade

INVENTOR

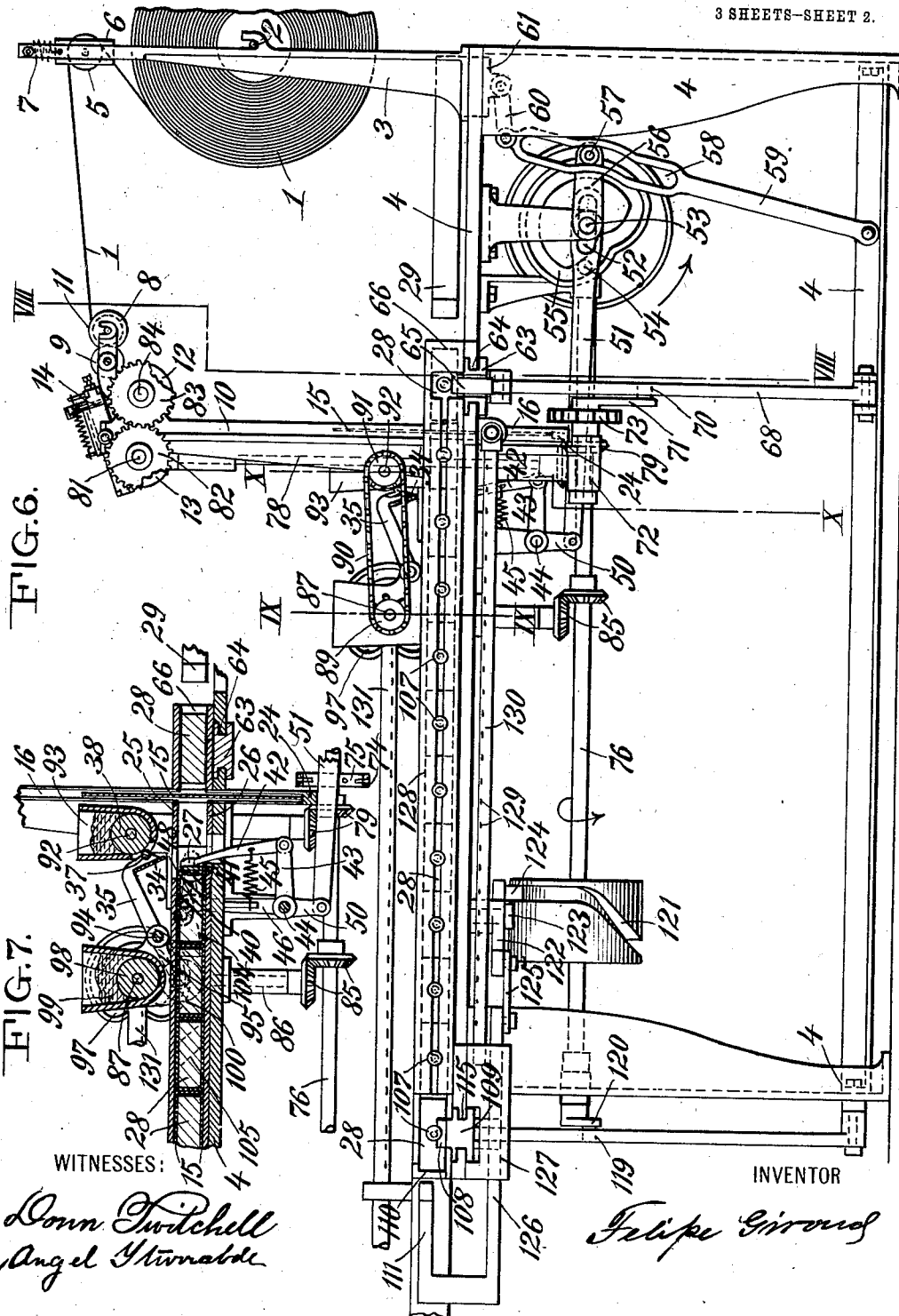
Felipe Giroud

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3 SHEETS-SHEET 2.

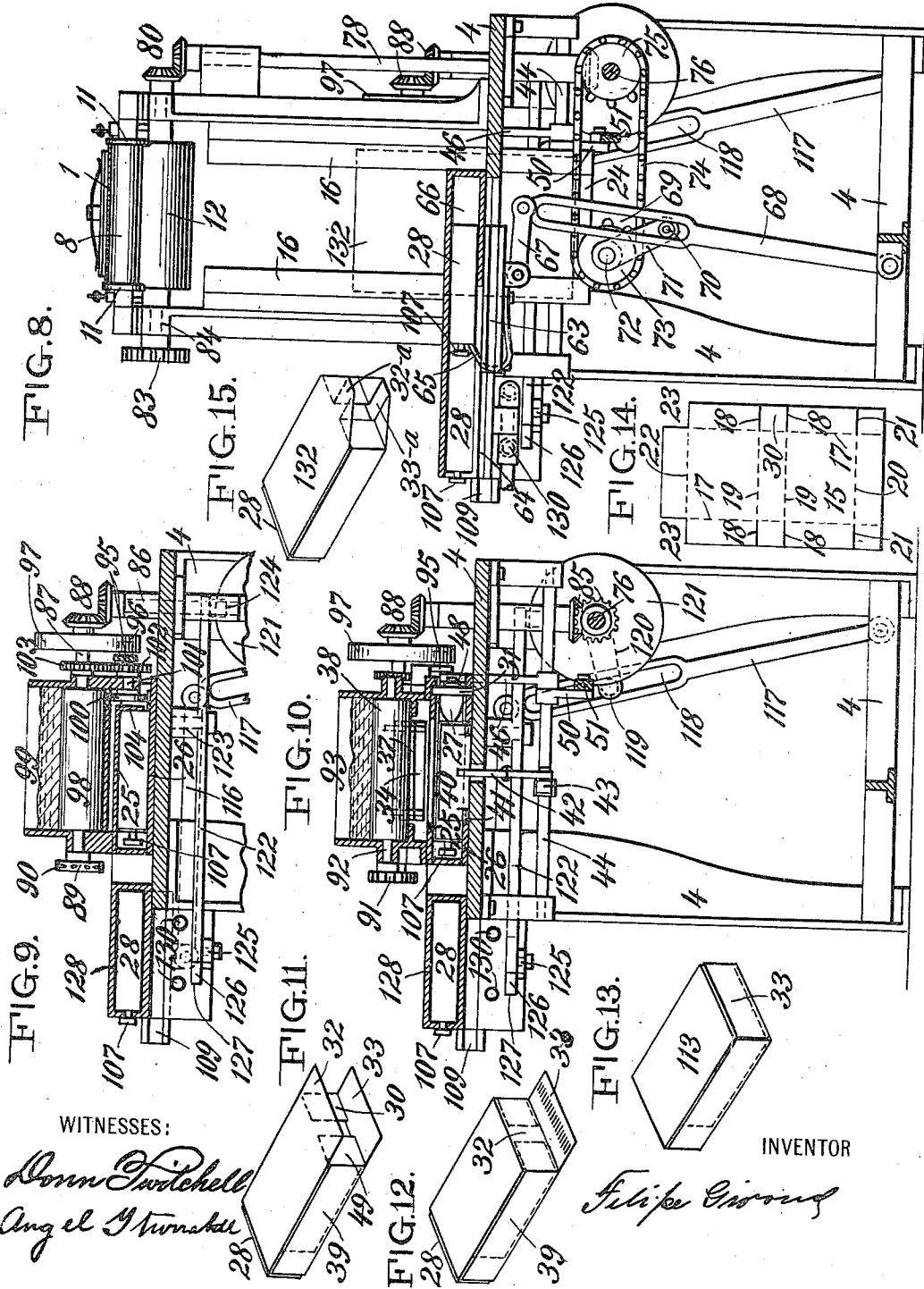


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3 SHEETS-SHEET 3.



UNITED STATES PATENT OFFICE.

FELIPE GIROUD, OF NEW YORK, N. Y.

MACHINE FOR MAKING PAPER BOXES.

1,009,236.

Specification of Letters Patent.

Patented Nov. 21, 1911.

Application filed October 24, 1908. Serial No. 459,360.

To all whom it may concern:

Be it known that I, FELIPE GIROUD, a citizen of Cuba, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Making Paper Boxes, of which the following is a specification.

This invention relates to a machine for folding paper upon forms for shaping paper boxes.

The object of the invention is to provide a means by which a form can force a wrapper through the machine, causing a box to be formed open at one end, to permit withdrawal of the form, and by so doing, leaving the box empty.

The invention consists of a means for moving the forms in an endless rectangular path, an intermittent movement being imparted to the forms by means of reciprocating plungers. A series of the forms travel through a heating channel, the heated and expanded forms successively coming to rest in range with a reciprocating plunger which carries the form at rest between a wrapper blank and another reciprocating plunger. Movement of the last mentioned plunger forces the form against the wrapper, and causes the wrapper and form to enter a folding device which folds the wrapper upon the form. A pasting device is provided to supply paste for securing the wrapper flaps together. Successive movements of the last mentioned plunger causes a series of forms with the folded wrappers to be moved along a cooling channel, until one of the cooled and contracted forms comes in line with a reciprocating plunger moving transversely, and provided with means for withdrawing the form and carrying it into range with a reciprocating plunger which forces the form along the heating channel.

In the accompanying drawings Figure 1 is a sectional plan view of the machine. Fig. 2 is a sectional plan of a portion of the machine, showing the parts in a different position. Figs. 3, 4 and 5 are perspective views showing successive steps in folding of the wrapper upon the form. Fig. 6 is a side elevation of the machine. Fig. 7 is a sectional elevation on the line VII—VII of Fig. 1. Fig. 8 is a cross section on the line VIII—VIII of Fig. 6. Fig. 9 is a

cross section on the line IX—IX of Fig. 6. Fig. 10 is a cross section on the line X—X of Fig. 6. Figs. 11, 12, and 13 are perspective views showing successive final steps in folding of the wrapper upon the form. Fig. 14 is a view of the wrapper blank. Fig. 15 is a perspective view showing folding of a wrapper blank made of thin paper.

In this machine I make use of a device for forming and cutting off wrapper blanks from a supply roll of paper, shown and described in my Patent No. 924,607, machine is there given, and any means for feeding a wrapper blank would answer the purpose in this machine, a description of the device for cutting the blanks is not considered necessary.

A roll of paper 1 of substantial thickness is mounted in bearings 2 on standards 3 forming part of the main frame 4. A roll 5 is mounted in slides 6 riding on standards 3 and held up by springs 7. The paper passes from beneath roller 6, partly around said roller and back between two guide rollers 8 and 9, which rotate in bearings formed on standards 10 forming part of main frame. As the paper passes between rollers 8 and 9, it is guided by flanges 11 formed on roller 8 into alinement with a drum 12, the paper passing beneath roller 9 onto drum 12. Drum 12 and another drum 13 actuate means for making creases and slits in the paper forming the wrapper blank; finally by means of a knife 14, cutting off the blank 15 and feeding it to a chute 16.

As shown in Fig. 14, a crease 17 is formed lengthwise of the blank a distance from each margin equal to the narrowest side of the finished box. At the center of the blank two slits 18, are cut, extending from each margin to crease line 17 at a distance apart equal to their length, and creases 19, are formed across the center part on a line with slits 18. At the lower end of the blank a crease 20 is formed crosswise, a distance from the end equal to the narrowest side of the finished box, and slits 21 are cut extending from the side margins to crease 17 on a line with crease 20. A crease 22 is formed across the upper end of the blank at a distance from the upper margin equal to the narrowest side of the finished box. The

upper corners of the blank are cut away at 23, extending from the upper and side margins to creases 22 and 17. A blank made of thick paper and provided with the slits 5 and creases above described, cause the formation of flaps which are folded to form the box, as will be hereinafter described. The blank 15 as it passes from between drums 12 and 13 comes to rest on a support 10 24 at the lower end of the chute 16. The center of the blank then stands on a line with a channel formed by a top plate 25, a bottom plate 26, and a side folder 27.

When the wrapper comes to rest on support 15 24, a form 28 stands on the side of the wrapper opposite the channel formed by plates 25, 26, and side folder 27. A reciprocating plunger 29 then forces the form against the center of the wrapper, causing 20 the upper and lower ends of the wrapper to be folded upon the form by means of the top plate 25 and bottom plate 26. At the same time the center end flap 30, as shown in Fig. 3, is folded upon the form by means 25 of the side folder 27. Side folder 27 is attached to a slide 31 riding in guides formed in top plate 25 and bottom plate 26, a space being left between the folder and the top and bottom plates for the passage of end 30 flaps 32 and 33. When the form 28 and the wrapper folded as shown in Fig. 3, are moved by the plunger 29 to the end of its forward movement, and the plunger started on its return movement, an upper folder 34 35 attached to arms 35, moves down and turns the side flap 36 from the position shown in Fig. 3 to the position shown in Fig. 4. Mounted in arms 35 is a roller 37 which engages a paste cylinder 38 when the arms 35 40 are in their up position, so that when downward movement of the arms causes upper folder 34 to turn the side flap 36, paste roller 37 will occupy a position above the lower side flap 39. Then as the lower side 45 flap 39 is turned upward by means of lower folder 40, the lower flap 39 will receive paste from the roller 37, and after the upper folder 34 has moved up, continued movement of the lower folder 40 will cause the 50 pasted lower flap 39 to be pressed against the upper flap 36 as shown in Figs. 5 and 2.

Lower folder 40 is pivoted at 41 to the bottom plate 26, and is actuated by means of a finger 42 pivoted at its lower end to 55 an arm 43 attached to a rock shaft 44. Finger 42 is held in engagement with folder 40 by means of a spring 45. Secured to rock shaft 44 is an arm 46, the upper end of which engages a slot 47 formed in one end 60 of a link 48. The other end of link 48 is connected to the slide 31 to which side folder 27 is attached. When the lower folder 40, is actuated by finger 42, arm 43 and rock shaft 44, the upper end of arm 46 which is 65 secured to the rock shaft, will have reached

the end of the slot 47 formed in link 48. Then the side folder 27 occupying the position shown in Fig. 2 will be moved forward against the end flap 49 and turn it from the position shown in Figs. 2 and 5 to the position shown in Fig. 11. Side folder 27 70 will then begin its return movement, and when the plunger 29 has arrived at the end of its return movement, folders 27 and 40 will occupy the position shown in Figs. 1, 7 75 and 10.

To the rock shaft 44 which actuates the folders 27 and 40, is secured an arm 50 connected to one end of a rod 51. The other end of rod 51 is provided with a slot 52 80 through which the drive shaft 53 passes. Rod 51 is provided with a roller 54 engaging a cam 55 secured to the drive shaft 53. To one end of drive shaft 53 is secured a crank 56 having a roller 57 at its free end 85 which engages a slot 58 formed in a lever 59 which is pivoted at its lower end to the frame 4. The upper end of lever 59 is connected by a link 60 to a slide 61 carrying the plunger 29, and riding in guides 62 90 formed on the main frame 4. The slot 58 in lever 59 is provided at its center with a curvature which is concentric with the path of roller 57 of crank 56, when the plunger 29 occupies the position shown in 95 Fig. 6. Plunger 29 will therefore remain stationary while cam 55 moving in the direction indicated by the arrow will actuate rod 51, arm 50, and rock shaft 44, causing return movement of side folder 27 to the 100 position shown in Fig. 2, and causing finger 42 to release lower folder 40, permitting it to fall to a position parallel with bottom plate 26. During the travel of the folders 27 and 40 to the last mentioned position a 105 plunger 63 has been moving a form 28 from the position shown in Fig. 1, to a position directly in range with plunger 29; and a wrapper blank 15 has been fed to chute 16; so that the operations described following 110 forward movement of plunger 29 can be repeated. Plunger 63 has reciprocating movement in guides 64 formed in the main frame, and is provided with a spring 65, having a free end adapted for engagement with a 115 form 28, at the end of a return movement of the plunger, and causing the form 28 to be moved in a channel 66 to the aforesaid position. Plunger 63 is connected by a link 67 to the upper end of a lever 68 having its 120 lower end pivoted to the main frame. The upper end of lever 68 is provided with a slot 69, in which a roller 70 attached to a crank 71 has movement, causing the reciprocating movement of plunger 63. Crank 71 125 is secured to a short shaft 72 attached to a chain wheel 73 which is rotated by means of a chain 74 from a chain wheel 75. Chain wheel 75 is secured to a shaft 76 extending longitudinally of the machine which is 130

driven by bevel gearing 77 from drive shaft 53.

Longitudinal shaft 76 drives a vertical shaft 78 by means of bevel gearing 79; and vertical shaft 78 by means of bevel gearing 80 drives a shaft 81 to which the drum 13 is secured. To shaft 81 is secured a spur gear wheel 82 in mesh with a spur gear wheel 83 attached to the shaft 84 to which drum 12 is secured. Longitudinal shaft 76 by means of bevel gearing 85 drives a vertical shaft 86, which drives a shaft 87 by means of bevel gearing 88. Shaft 87 by means of a chain wheel 89, chain 90, and chain wheel 91, drives a shaft 92 to which cylinder 38 is secured and which rotates in a paste reservoir 93. The arms 35 on which paste roller 37 is mounted, are secured upon a rock shaft 94 to which is attached an arm 95 provided with a roller 96. Roller 96 engages a cam 97 secured to shaft 87, serving to actuate the arms 35 carrying paste roller 37 and upper folder 34. To shaft 87 is also secured a cylinder 98 rotating in a paste reservoir 99, and supplying paste to a paste wheel 100. Paste wheel 100 is secured to a short shaft 101 having a gear wheel 102 attached in mesh with a gear wheel 103 secured to shaft 87.

When plunger 29 forces a form 28 and wrapper 15 to the end of the plunger's movement, the form and wrapper previously operated on will be moved a distance equal to the space occupied by the succeeding form and wrapper. When this takes place, the upper end flap 32 will be turned down by means of the stationary folder 104, and paste will be applied to the lower flap 33 by means of the paste wheel 100. The wrapper will then have the appearance shown in Fig. 12. When this form and wrapper are again moved by means of another succeeding form and wrapper, the pasted lower end flap 33 will be turned up against the wrapper 32 by means of the stationary folder 105.

Successive operations of the machine will cause a series of forms and folded wrappers to be moved along a channel 106 until a hook 107 on the forms engages a projection 108 on a plunger 109 moving transversely of the channel 106, whereby the form is withdrawn from within the folded wrapper and moved through a channel 110, into range with a reciprocating plunger 111. Channel 110 is provided with shoulders 112 adapted to retain the folded wrapper in channel 106 during withdrawal of the form 28. The empty folded wrapper or boxes 113, as shown in Fig. 13, are discharged through a continuation 114 of the channel 106.

Plunger 109 has reciprocating movement in guides 115 formed in the main frame, so that after plunger 111 has moved the form out of engagement with projection 108, plunger 109 will be moved back in order

that projection 108 will be behind the hook 107 of another form when the forms are moved along channel 106. Plunger 109 is connected by a link 116 to the upper end of a lever 117 which is pivoted at its lower end to the main frame. The upper end of lever 117 has a slot 118, in which a roller 119 attached to a crank 120 has movement causing the reciprocating movement of plunger 109. Crank 120 is secured to the end of longitudinal shaft 76. To shaft 76 is also secured a cam 121 which actuates a lever 122 pivoted near its center at 123 to the main frame. A roller 124 attached to one end of lever 122 engages cam 121, the opposite end of the lever being connected by a link 125 to a slide 126 attached to plunger 111, and having reciprocating movement in guides 127 on the main frame.

When the parts occupy the position 85 shown in Fig. 1, movement of plunger 111 will move a form 28 out of engagement with projection 108 and along a channel 128, together with a series of forms 28 previously moved along said channel by means of plunger 111. This will cause a form to be moved into channel 66 during travel of plunger 63 to the position in line with plunger 29. Then as plunger 63 moves back, spring 65 will pass beneath the last mentioned form, and at the end of return movement of plunger 63, the spring will engage the end of the form and move it to the position shown in Figs. 1 and 8 when plunger 63 is again moved forward. During this time, plunger 111 will have returned to the position shown in Fig. 6 in order that plunger 109 can have a free path for movement of a form to the position shown in Fig. 1. The forms passing through channel 128 are heated by burning gas liberated through perforations 129 formed in a pipe 130 beneath the channel. The form that is moved into channel 66 is consequently expanded so that, after movement of plunger 29, when the wrapper is folded upon the form, the size of the box formed by the folded wrapper will correspond with the expanded form. During travel of the forms with the folded wrapper through channel 106, the forms are contracted by cooling caused by blowing cold air through a perforated pipe 131, onto the channel 106. The forms being made of material which contracts by cooling to a greater extent than the folded wrapper, causes sufficient play to permit ready withdrawal of the form from the folded wrapper.

In Fig. 8 is shown a modified wrapper blank 132, made of thin paper and having no creases or slits. When this wrapper blank and a form 28 is passed through the machine, the wrapper will be folded as shown in Fig. 15 when it has reached a position 135

corresponding to the folded blank shown in Fig. 11. The upper flap 32^a will then be folded to the position shown in Fig. 12 and the lower flap 33^a will be turned to the position shown in Fig. 13.

I claim as my invention:

1. A box forming machine comprising a wrapper folding device, a form, and a reciprocating plunger, means supporting a wrapper between the folding device and the form, means for actuating said plunger whereby the plunger forces the form and the wrapper through the folding device, means for applying paste to the wrapper flaps and for folding them upon the form; a channel receiving said form with the folded wrapper, means for withdrawing the form from said channel, and means for holding said wrapper in said channel during withdrawal of the form.

2. A box forming machine comprising a wrapper folding device, a form, and a reciprocating plunger, means supporting a wrapper between the folding device and the form, means for actuating said plunger whereby the plunger forces the form and the wrapper through said folding device, means for applying paste to the wrapper flaps and for folding them upon the form; a reciprocating plunger moving transversely of the line of travel of the first mentioned plunger and having means for withdrawing the form from within the folded pasted wrapper.

3. A box forming machine comprising a reciprocating plunger, a series of forms, a wrapper folding device, and a receiving channel, means for forcing said forms and wrappers in succession into the folding device, said means adapted by the movement of one of said forms and wrappers into said folding device, to force a previously folded wrapper and a form into said receiving channel; and means for withdrawing the form from the folded wrapper and from the channel.

4. A box forming machine comprising a series of forms, a heating channel through which said forms travel causing expansion of the forms, a wrapper folding device, a reciprocating plunger, and means supporting a wrapper and one of said expanded forms between the folding device and the plunger, means whereby movement of the plunger forces the form and the wrapper through the folding device, means for folding the wrapper upon the form, a cooling channel receiving a series of said forms with the folded wrappers, and causing contraction of the forms; a reciprocating plunger having means for withdrawing one of said contracted forms from within a folded wrapper, and a reciprocating plunger moving transversely of the last mentioned plunger and adapted to move the withdrawn form into said heating channel.

5. A box forming machine comprising a channel containing a series of forms, a reciprocating plunger, a folding device, and a reciprocating plunger moving transversely of the first mentioned plunger, means whereby said first mentioned plunger moves one of said forms between the last mentioned plunger and the folding device, means whereby the last mentioned plunger forces said form and a wrapper through the folding device, means for folding the wrapper upon the form; a reciprocating plunger having means for withdrawing said form from within the folded wrapper, a reciprocating plunger moving transversely of the last mentioned plunger and adapted to move the withdrawn form through said channel.

6. A box forming machine comprising a wrapper folding device, a reciprocating plunger, a series of forms, and another reciprocating plunger causing forward movement of said forms, a reciprocating plunger moving transversely of the last mentioned plunger and having means for moving one of said forms between the first mentioned plunger and the folding device, means whereby the first mentioned plunger forces said form and a wrapper through the folding device, means for folding the wrapper upon the form, a reciprocating plunger having means for withdrawing said form from within the folded wrapper, and for moving said form into alinement with the plunger causing forward movement of the series of forms.

7. A box forming machine comprising a wrapper folding device, and a reciprocating plunger, means supporting a wrapper and a form between the folding device and the plunger, means actuating said plunger whereby the plunger forces the form and the wrapper through the folding device, means for folding the wrapper upon the form, a second reciprocating plunger having means for withdrawing said form from within a folded wrapper, a third reciprocating plunger moving transversely of the last mentioned plunger and adapted to move the form into alinement with a fourth reciprocating plunger moving transversely of the first mentioned plunger, and means whereby said plunger causes the form to be moved into alinement with the first mentioned plunger.

8. A box forming machine comprising a reciprocating plunger, a series of forms, a wrapper folding device, and a receiving channel, means for forcing said forms and wrappers in succession into the folding device, means for applying paste to the wrapper flaps and for folding them upon the form, said means adapted by the movement of one of said forms and wrappers into said folding device, to force a previously folded pasted wrapper and a form into said re-

ceiving channel; and means for withdrawing the form from the wrapper and for retaining the wrapper in said channel.

9. A box forming machine comprising a wrapper folding device and a reciprocating plunger, means supporting wrappers and forms between the folding device and the plunger, means for actuating said plunger whereby the plunger forces the form and the wrapper through the folding device, means for folding the wrapper upon the form, a cooling channel receiving a series of forms with the folded wrapper, and causing contraction of the forms, and a reciprocating plunger having means for withdrawing one of said contracted forms from within a folded wrapper.

10. A box forming machine comprising a series of forms, a heating channel through which said forms travel causing expansion of the forms, a wrapper folding device, a reciprocating plunger, and means delivering a wrapper and one of said expanded forms between the folding device and the plunger,

means whereby movement of the plunger forces the form and the wrapper through the folding device, a cooling channel receiving a series of said forms with the folded wrappers, and causing contraction of the forms, means for withdrawing a form from within a folded wrapper, and means for restoring the form to said heating channel.

11. In box making machines the combination of a support for paper blanks, a supply of loose cores; means for folding and gumming a blank around each core; means for taking out the core from the finished box, and means whereby the core taken out from the finished box is brought back to the initial position.

Signed at New York city, in the county of New York and State of New York this 17th day of October A. D. 1908.

FELIPE GIROUD.

Witnesses:

DONN TWITCHELL,
ANGEL YTURRALDE.