P. J. WENTWORTH.

FOLDING MACHINE.

APPLICATION FILED NOV. 7, 1916.

1,268,306.

Patented June 4, 1918.

2 SHEETS—SHEET 1.

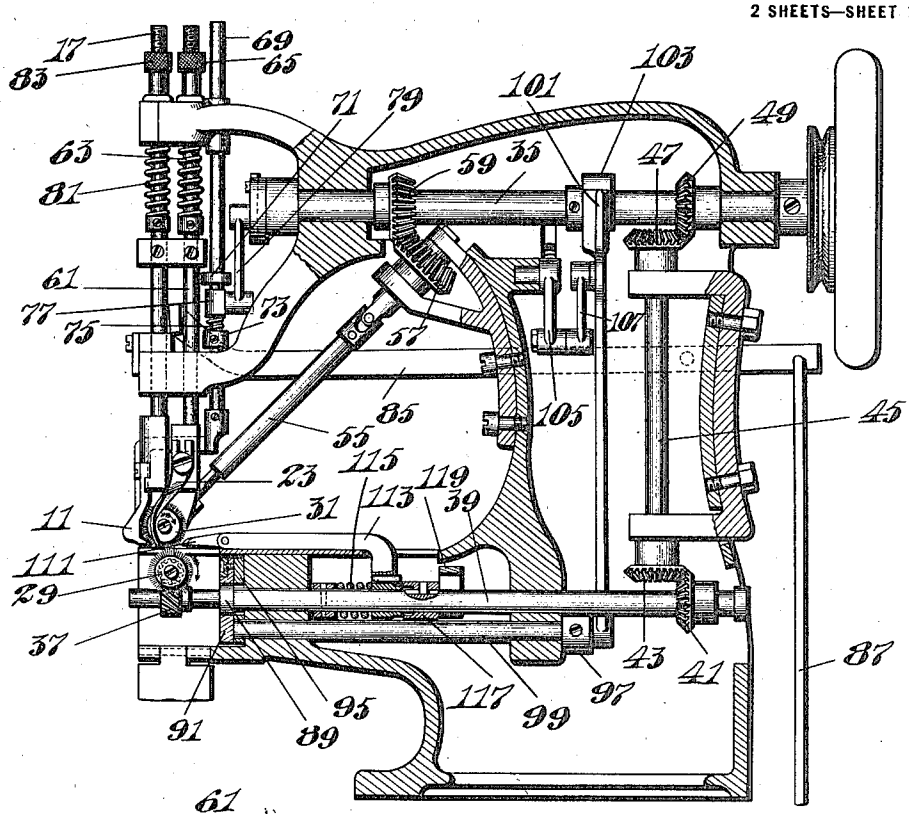


Fig.1.

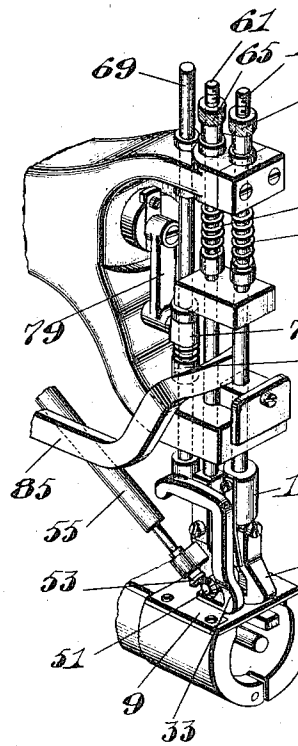


Fig.2.

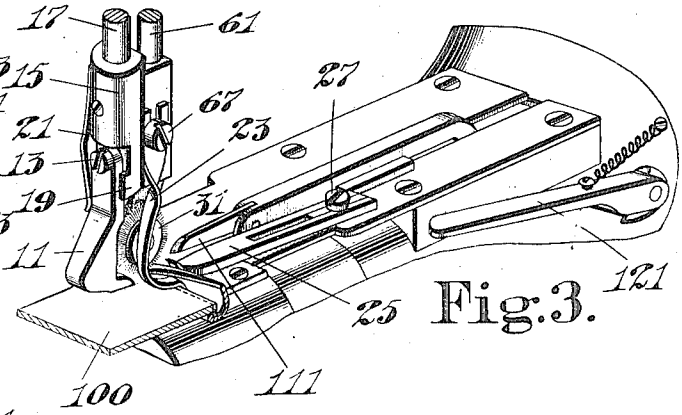


Fig.3.

INVENTOR.

Pearl J. Wentworth

By his Attorney,

Nelson Howard

P. J. WENTWORTH.
FOLDING MACHINE.
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2 SHEETS—SHEET 2.

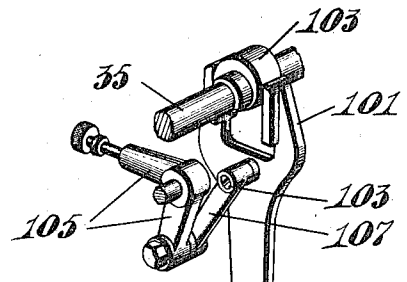


Fig.4.

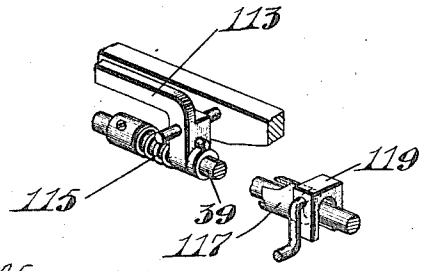
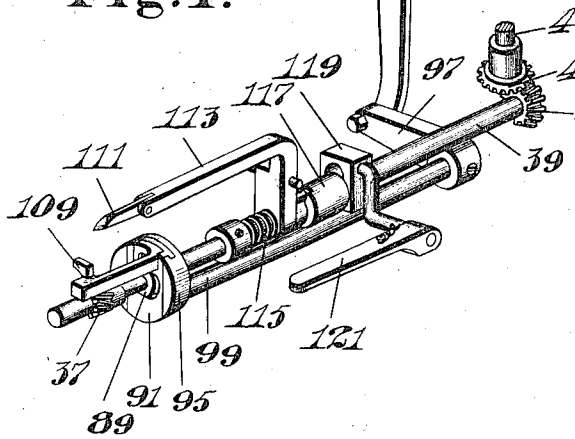


Fig.5.



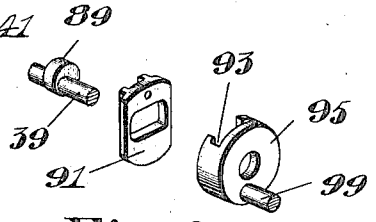


Fig.6.

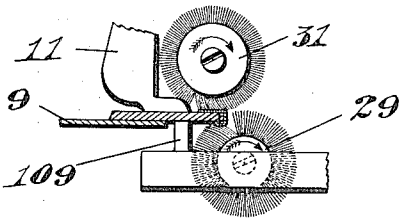


Fig.7.

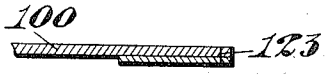


Fig.8.

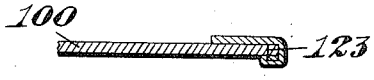


Fig.9.

INVENTOR.
Pearl J. Wentworth
By his Attorney
Nelson McDonald

UNITED STATES PATENT OFFICE.

PEARL J. WENTWORTH, OF FORT THOMAS, KENTUCKY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FOLDING-MACHINE.

1,268,306. Specification of Letters Patent. Patented June 4, 1918.

Application filed November 7, 1916. Serial No. 130,059.

To all whom it may concern:

Be it known that I, PEARL J. WENTWORTH, a citizen of the United States, and resident of Fort Thomas, in the county of Campbell and State of Kentucky, have invented certain Improvements in Folding-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for use in the manufacture of boots and shoes and is herein illustrated in connection with a machine for producing a so-called French edge.

It is customary in the manufacture of certain styles of boots and shoes to bind the edges of parts of the uppers with a strip of fabric. To this end such a strip is stitched to the edge of the vamp, quarter or other piece which is to be bound, cement is applied to the strip, and then the free portion of the strip is folded about the edge of the vamp or quarter and pressed down so that the cement will hold it firmly in place. For convenience the vamp, quarter or other piece will be referred to as a piece of leather and the binding as a strip of fabric.

There are two distinct steps in the formation of a French edge after the fabric strip has been stitched to the piece of leather. First the fabric should be pulled out or drawn back until the stitches "smile," that is, until they can be plainly seen; and second, the portion of the fabric which then extends beyond the edge of the leather should be drawn tightly about said edge and maintained taut while it is laid over on the margin of the leather. The purpose of this treatment of the material is to avoid the formation of wrinkles or bunches in the binding strip.

The general object of the present invention is to provide novel and improved means by which either or both of the steps referred to above may be carried out.

According to one feature of the invention, means are provided for drawing or pulling the free portion of the binding over that portion of itself which is attached to the piece of leather or other material. Conveniently the work, which comprises a piece of material to which a strip of binding is stitched, may be acted upon by a binding-engaging member which moves over that side of the material to which the binding is attached and draws back or pulls out the free portion of the binding until the stitches "smile."

According to another feature of the invention, means are provided, in connection with the means referred to above, for operating upon the pulled-out binding to draw it about the edge of the material and lay its free edge down upon the margin of the material on the side opposite that to which the attached portion of the binding is fastened. Conveniently this means may be a second binding-engaging member similar to the first but arranged in such manner that its operative face moves over the side of the material opposite that to which the binding is attached, the operative faces of the two binding-engaging members being caused to move in opposite directions so that the free portion of the binding is first pulled out and then drawn over the edge of the material.

These and other features of the invention, including certain details of construction and combinations of parts, will be described in connection with an illustrative machine and pointed out in the appended claims.

Referring now to the accompanying drawings,—

Figure 1 is a vertical section of a machine in which the present invention is embodied;

Fig. 2 is a perspective of the members which engage the work;

Fig. 3 is a perspective showing more particularly how the binding is laid over on the material;

Figs. 4, 5 and 6 are perspectives of the knife operating and feed operating mechanisms;

Fig. 7 is a section showing the action of the brushes on the binding;

Fig. 8 is a section showing a piece of material to which the binding has been stitched, and

Fig. 9 is a section similar to Fig. 8 but showing the binding in its final, folded position.

Referring first to Figs. 1, 2 and 3, the work 100, which comprises a piece of mate-

rial such as leather to which a piece of binding such as fabric is attached, is adapted to be fed intermittently over a table or support 9 by a "four-motion" feed member presently to be described which engages the under side of the work and a feed member 11 which engages the upper side of the work. The member 11 is pivoted at 13 to a block 15 fast to the lower end of a rod 17 and is normally held against a stop 19 on said block by a leaf spring 21. The positive feeding of the work is done by the lower feed member. The function of this upper member 11 is merely to hold the work against the lower member while said work is being moved forward. The member 11 thus swings forward about its pivot 13 during the forward movements of the work and swings back again into the position shown during the pauses between said forward movements. A gage 23 has an operative lower end which engages the edge of the material about which the binding is to be drawn and serves by this engagement to guide the work properly. A preliminary turning member 25 adjustably fastened to the frame of the machine by a screw 27 serves to give a preliminary turn to the binding as it is fed along. Beyond the gage and the turner are located two binding-engaging members herein shown as brushes 29 and 31, one below and one above the work to both of which is imparted rotation in a clockwise direction, the effect of which is to cause their operative portions to travel in directions which are substantially opposite.

The function of the lower brush 29 is to turn back or draw back the binding (see Fig. 7) tightly so that the margin near the edge which is stitched to the leather will be close to the leather at this point. It is very desirable that the binding be drawn taut since otherwise there will occur slackness at the edge of the leather with resultant objectionable bunches or folds. The function of the upper brush 31 is to draw forward the binding about the edge of the leather and lay the free end or margin of the binding down upon the margin of the leather. After the free end or margin of the binding has been thus laid, a presser in the form of a hammer 33 pounds or presses it firmly into place against the margin of the leather. It will be understood that a coating of cement is applied to the binding prior to its presentation to the machine so that when drawn about the edge of the leather and laid down and pressed into place it adheres firmly to said leather.

The moving parts of the machine all derive their motion directly or indirectly from a driving shaft 35 mounted in bearings in the frame of the machine and rotated continuously from any suitable source of power. The lower brush 29 has integral with or fast to it a gear which meshes with a gear 37 fast to a counter-shaft 39, said counter-shaft being driven from the main shaft 35 through bevel gears 41, 43, an upright shaft 45 and bevel gears 47, 49. The upper brush 31 has fast to or integral with it a bevel gear 51 which meshes with a bevel gear 53 fast to an inclined shaft 55 which is driven from the shaft 35 through a universal joint and bevel gears 57, 59. The universal joint is made necessary by the fact that the upper brush 31 is carried by a rod 61 slidably mounted in bearings in the head of the machine, said rod being urged downwardly at all times by a spring 63 and limited in its downward movement by a nut 65 threaded upon the upper end of said rod. By manipulating this nut the normal position of the brush 31 may be varied. It should be noted that the edge gage 23 is also carried by the lower end of the rod 61 and is adjustably held in place by a screw 67 which passes through a yoke formed at the upper end of said gage.

The hammer or presser 33 is fast to the lower end of a rod 69 slidably mounted in bearings formed in the head of the machine. Fast to this rod are two collars 71 and 73; and slidable on the rod 69 between the collar 71 and a coiled spring 75 which rests upon the collar 73 is a sleeve 77 which may be driven in any suitable manner from the shaft 35, as for example by the crank 79. It will be noted that the collar 73 is adjustably held in place by a set screw, and that by adjusting this collar the tension of the spring 75 through which power is yieldingly applied to the hammer, may be varied.

The rod 17, by which the upper feed member 11 is carried, is mounted in a manner similar to that of the rod 61, a spring 81 and adjusting nut 83 being provided which are similar to the spring 63 and nut 65 of the rod 61 and have similar functions. The springs 63 and 81 rest upon collars which are adjustably secured respectively to the rods 61 and 17 and may therefore be adjusted. A lever 85 pivoted to the frame of the machine and connected to a treadle rod 87 furnishes means for raising the upper brush and the upper feed member when desired.

Referring now more particularly to Figs. 4 and 6 in connection with Fig. 1, the mechanism for operating the lower feed member will be described. Fast to the counter-shaft 39 is an eccentric 89 which coöperates with a slot in a sliding block 91, said block being slidably mounted in an undercut guideway 93 in a collar 95 which is loose on the counter-shaft 39. Fast at one end to said collar and at the other end to an arm 97 is a rod 99 which in the operation of the ma-

chine swings bodily about the axis of the counter-shaft 39 and serves to oscillate the collar 95. Actuation of the rod is accomplished through the arm 97 which is pivoted at its outer end to the stem of a yoke 101 the arms of which embrace an eccentric 103 on the driving shaft 35. The yoke is oscillated about a pivot 103 the position of which with respect to the shaft 35 determines the amplitude of movement of the stem of the yoke and consequently of the collar 95. The position of the pivot 103 may be varied by manipulating a bell-crank lever 105 which is connected with the pivot by a link 107. The lower feeding member 109 is provided with a stem which is fastened to the sliding block 91. With this construction a "four-motion" feed is imparted to the member 109, and the extent of the forward and backward movement may be varied by manipulating the bell-crank lever 105. The feed mechanism of the illustrative machine has been briefly described since the details of its construction form no part of the present invention.

It is sometimes desirable to snip or slip the margin of the binding which is to be folded over on the leather for example when the edge of the leather has a concave curvature. To this end a slitting knife 111 is mounted in a holder 113 having an eye through which the shaft 39 passes. A spring 115 normally holds the knife in inoperative position. To cause the knife to be moved into operative position and to be reciprocated in a path parallel to the shaft 39, a cam 117 keyed to the shaft 39 but slidable thereon is adapted to be engaged and moved forward by a sliding block 119 when a finger-piece 121 is depressed. As long as this finger-piece is held depressed the knife will snip or slit the upstanding margin of the binding. When the lever is released, the slitting ceases.

The operation of the machine is as follows:

The work 100 which comprises a piece of material such as leather to which a strip of binding such as fabric has been attached by stitches 123 comes to the operator in the form shown in Fig. 8, there being a coating of cement on what is shown as the lower face of the binding in that figure. The operator first roughly pulls the binding out or back and presents the work to the machine with the gage 23 in contact with the edge of the leather and the turning member 25 in contact with the binding as shown in Fig. 3. If desired, the treadle rod 87 may be manipulated to raise the upper brush 31 and the member 11 to permit the forward edge of the work to be placed farther along in the machine. Power is now applied to the machine whereupon the work is fed intermittently over the table 9. The gage 23 guides the work, the turning member 25 produces a preliminary turn; the lower brush 29 turns back that portion of the binding adjacent the stitches and draws it taut, the upper brush 31 draws the free edge or margin of the binding tightly about the edge of the leather and lays or wipes it down upon the margin of said leather and the hammer 33 presses the binding firmly into place where it is held by the cement.

Although the invention has been described in connection with a particular machine, it should be understood that the invention is not limited in the scope of its application to the particular machine which has been shown and described.

Throughout the appended claims the words "above" and "beneath" are used instead of the expressions "at one side of the work" and "at the other side of the work" merely to promote brevity, since it is obvious that the location of the plane of the work whether horizontal, vertical or otherwise is immaterial.

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

1. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, and means for drawing the free portion of the binding about the attached portion thereof and about the edge of the material and for laying the free edge of said binding down upon the margin of the material.

2. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, means for supporting and feeding the work, and means for pulling a portion of the binding over that portion of itself which is attached to the material, and for pulling the remainder of the binding over the edge of the work and laying it over upon the margin of the material.

3. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, means for supporting and feeding the work, means for pulling a portion of the binding over that portion of itself which is attached to the material, means for pulling the remainder of the binding over the edge of the work and laying it over upon the margin of the material, and means for pressing the laid-over portion against the margin of the material.

4. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting

the work, means for feeding the work over the bed, a binding-engaging member located beneath the work, a second binding-engaging member located above the work, and means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material.

5. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a resilient binding-engaging member located beneath the work, a second resilient binding-engaging member located above the work, and means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material.

6. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a brush located beneath the work, a second brush located above the work, and means for operating said brushes to turn back the binding and then bend it forwardly about the edge of the piece of material.

7. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a binding-engaging member located beneath the work, a second binding-engaging member located above the work, means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material, and means for pressing the binding against the material.

8. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a resilient binding-engaging member located beneath the work, a second resilient binding-engaging member located above the work, means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material, and means for pressing the binding against the material.

9. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a brush located beneath the work, a second brush located above the work, means for operating said brushes to turn back the binding and then bend it forwardly about the edge of the piece of material, and means for pressing the binding against the material.

10. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a binding-engaging member located beneath the work, a second binding-engaging member located above the work, and means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material.

11. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a resilient binding-engaging member located beneath the work, a second resilient binding-engaging member located above the work, and means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material.

12. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a brush located beneath the work, a second brush located above the work, and means for operating said brushes to turn back the binding and then bend it forwardly about the edge of the piece of material.

13. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a binding-engaging member located beneath the work, a second binding-engaging member located above the work, means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material, and means for pressing the binding against the material.

14. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a resilient binding-engaging member located beneath the work, a second resilient binding-engaging member located above the work, means for operating said members to turn back the binding and then bend it forwardly about the edge of the piece of material, and means for pressing the binding against the material.

15. A machine for operating upon a piece

of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a brush located beneath the work, a second brush located above the work, means for operating said brushes to turn back the binding and then bend it forwardly about the edge of the piece of material, and means for pressing the binding against the material.

16. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, a binding-engaging member located above the work, a second binding-engaging member, located beneath the work, and means for causing the operative portions of said members to move in opposite directions to wrap the binding about the edge of the material.

17. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, a resilient binding-engaging member located above the work, a second resilient binding-engaging member located beneath the work, and means for causing the operative portions of said members to move in opposite directions to wrap the binding about the edge of the material.

18. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, a brush located above the work, a second brush located beneath the work, and means for causing the operative portions of said brushes to move in opposite directions to wrap the binding about the edge of the material.

19. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, a binding-engaging member located above the work, a second binding-engaging member located beneath the work, means for causing the operative portions of said members to move in opposite directions to wrap the binding about the edge of the material, and means for pressing the binding against the material.

20. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, a resilient binding-engaging member located above the work, a second resilient binding-engaging member located beneath the work, means for causing the operative portions of said members to move in opposite directions to wrap the binding about the edge of the material, and means for pressing the binding against the material.

21. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached, having, in combination, a bed for supporting the work, a brush located above the work, a second brush located beneath the work, means for causing the operative portions of said brushes to move in opposite directions to wrap the binding about the edge of the material, and means for pressing the binding against the material.

22. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, a brush for wiping back the free portion of the binding, a second brush for wiping said portion forwardly about the edge of said material, and means for operating said brushes.

23. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a brush for wiping back the free portion of the binding, a second brush for wiping said portion forwardly about the edge of said material, and means for operating said brushes.

24. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a brush for wiping back the free portion of the binding, a second brush for wiping said portion forwardly about the edge of said material, and means for operating said brushes.

25. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, a brush for wiping back the free portion of the binding, a second brush for wiping said portion forwardly about the edge of said material, means for operating said brushes, and means for pressing the binding against the material.

26. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a brush for wiping back the free portion of the binding, a second brush for wiping said portion forwardly about the edge of said material, means for operating said brushes, and means for pressing the binding against the material.

27. A machine for operating upon a piece of work which consists of a piece of mate-

rial to which a strip of binding has been attached, having in combination, a bed for supporting the work, means for feeding the work intermittently over the bed, a brush for wiping back the free portion of the binding, a second brush for wiping said portion forwardly about the edge of said material, means for operating said brushes, and means for pressing the binding against the material.

28. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a gage arranged to engage the edge of the material, a brush for drawing the free portion of the binding about the edge of the material, and means for operating said brush.

29. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a gage arranged to engage the edge of the material, a brush for drawing the free portion of the binding about the edge of the material, and means for rotating said brush.

30. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a gage arranged to engage the edge of the material, a brush for drawing the free portion of the binding about the edge of the material, means for operating said brush, and means for pressing the binding against the material.

31. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, a bed for supporting the work, means for feeding the work over the bed, a gage arranged to engage the edge of the material, a brush for drawing the free portion of the binding about the edge of the material, means for rotating said brush, and means for pressing the binding against the material.

32. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, means for feeding the work intermittently over the bed, a gage arranged to engage the edge of the material, a brush arranged in the rear of the gage and adapted to draw the free portion of the binding about the edge of the material, and means for operating said brush.

33. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, means for feeding the work, a gage arranged to engage the edge of the material, a brush arranged in the rear of the gage and adapted to draw the free portion of the binding about the edge of the material, and means for rotating said brush.

34. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, means for feeding the work, a gage arranged to engage the edge of the material, a brush arranged in the rear of the gage and adapted to draw the free portion of the binding about the edge of the material, means for operating said brush, and means arranged in the rear of said brush for pressing the binding against the material.

35. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding has been attached, having, in combination, means for feeding the work, a gage arranged to engage the edge of the material, a brush arranged in the rear of the gage and adapted to draw the free portion of the binding about the edge of the material, means for rotating said brush, and means arranged in the rear of said brush for pressing the binding against the material.

36. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached having, in combination, means for supporting the work, and means for pulling the free portion of the binding over that portion of itself which is attached to the material preparatory to folding the free portion over the edge of the material.

37. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached having, in combination, means for feeding the work, a binding-engaging member and means for causing said member to pull a portion of the binding over that portion of itself which is attached to the material.

38. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached having, in combination, means for feeding the work, a resilient binding-engaging member and means for causing said member to pull a portion of the binding over that portion of itself which is attached to the material.

39. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached having, in combination, means for feeding the work, and means for progressively wiping back the free portion of the binding over that portion of itself which is attached

to the material preparatory to folding the free portion over the edge of the material.

40. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached having, in combination, means for feeding the work, a binding-engaging member, and means for actuating said member to cause it to separate the free portion of the binding from the work and draw said free portion over the portion which is attached to the work.

41. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached having, in combination, means for feeding the work, a binding-engaging member having an operative portion located to move over that side of the work to which the binding is attached, and means for actuating said member to cause it to separate the free portion of the binding from the work and draw said free portion over the portion which is attached to the work.

42. A machine for operating upon a piece of work which consists of a piece of material to which a strip of binding is attached having, in combination, means for supporting the work, means for pulling a portion of the binding over that portion of itself which is attached to the material, and means for drawing the remainder of the binding over the edge of the work and laying it upon the margin of the material.

In testimony whereof I have signed my name to this specification.

PEARL J. WENTWORTH.