June 20, 1939. L. Q. PRESBY 2,163,059

APPARATUS FOR APPLYING AND SECURING STRIP MATERIAL

Filed Dec. 17, 1936 4 Sheets-Sheet 1

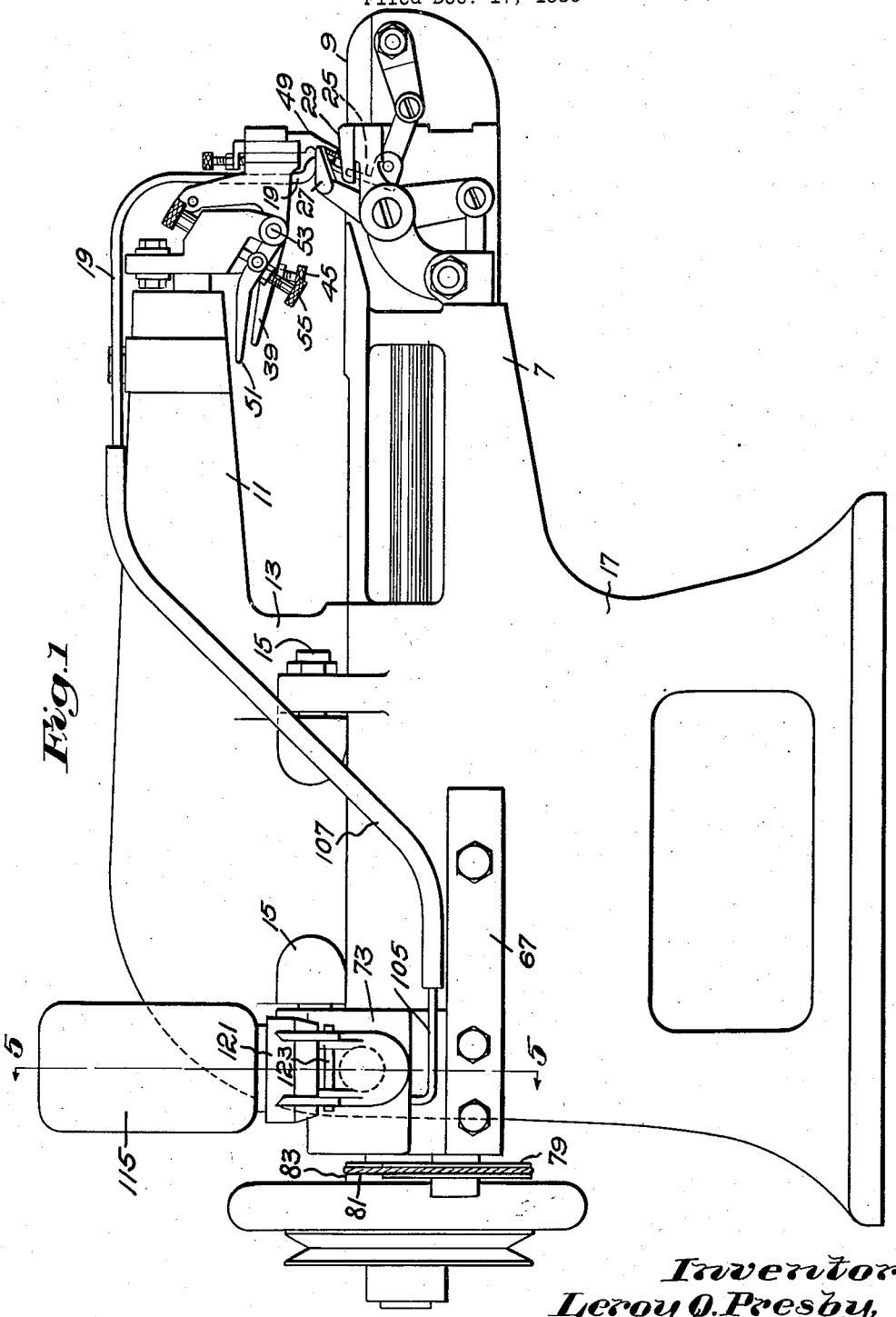


Fig. 1

Inventor:
Leroy Q. Presby,
by Emery, Booth, Townsend, Miller & Wardner
Attys.

June 20, 1939. L. Q. PRESBY 2,163,059

APPARATUS FOR APPLYING AND SECURING STRIP MATERIAL

Filed Dec. 17, 1936 4 Sheets-Sheet 2

Fig.3. Fig.4.

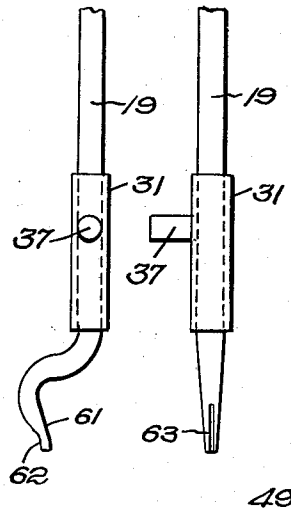


Fig.2.

Inventor:
Leroy Q. Presby.
by Emery, Booth, Townsend, Miller & Waidner
Attys

June 20, 1939. L. Q. PRESBY 2,163,059

APPARATUS FOR APPLYING AND SECURING STRIP MATERIAL

Filed Dec. 17, 1936 4 Sheets-Sheet 3

Fig. 5.

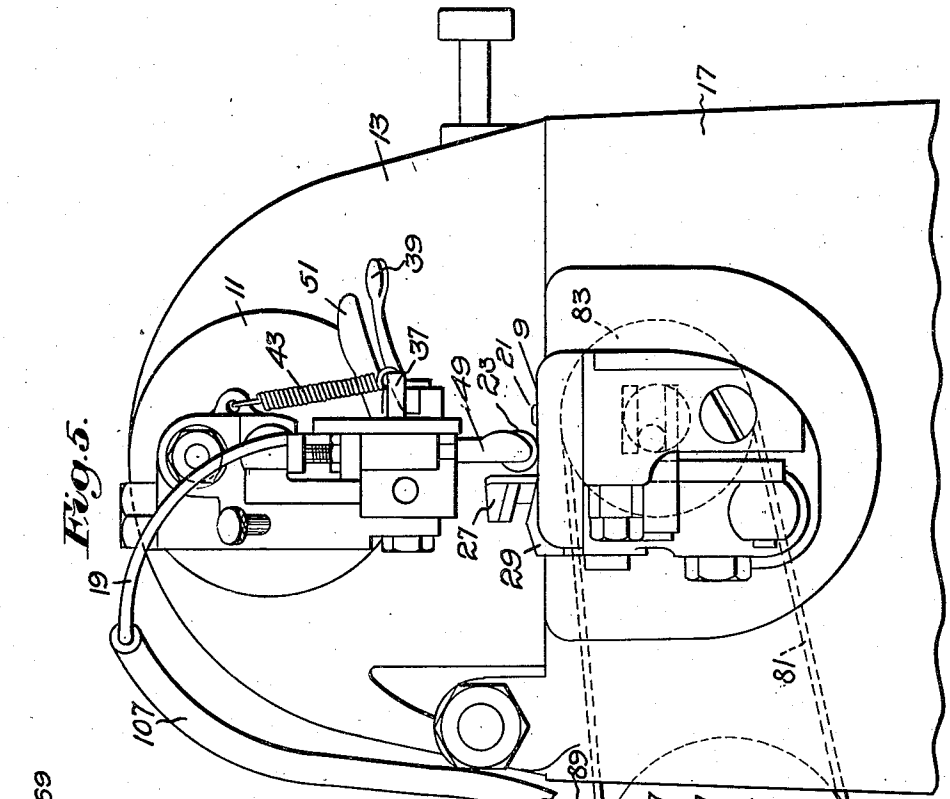
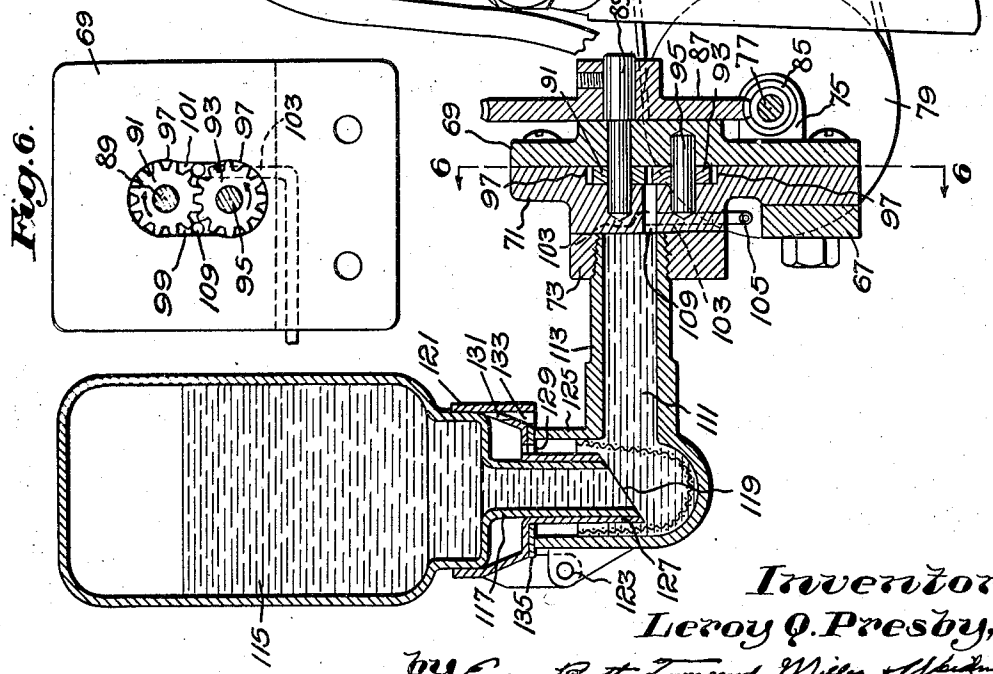


Fig. 6.



Inventor:
Leroy Q. Presby,
by Emery, Booth, Townsend, Miller & Underwood
Attys.

June 20, 1939. L. Q. PRESBY 2,163,059

APPARATUS FOR APPLYING AND SECURING STRIP MATERIAL

Filed Dec. 17, 1936 4 Sheets-Sheet 4

Fig. 7.

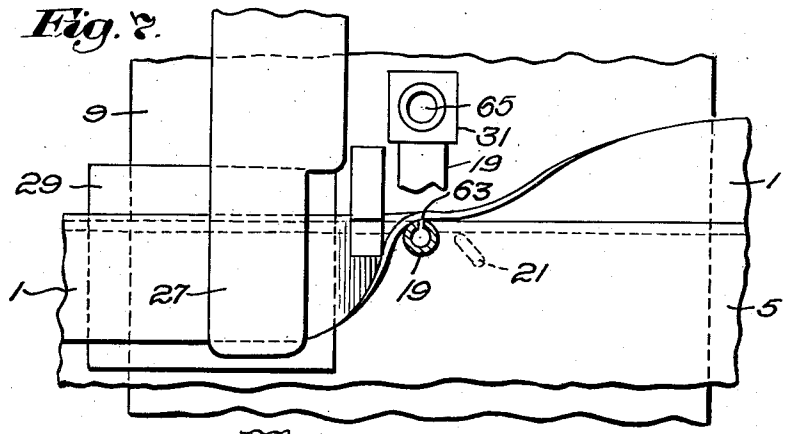


Fig. 8

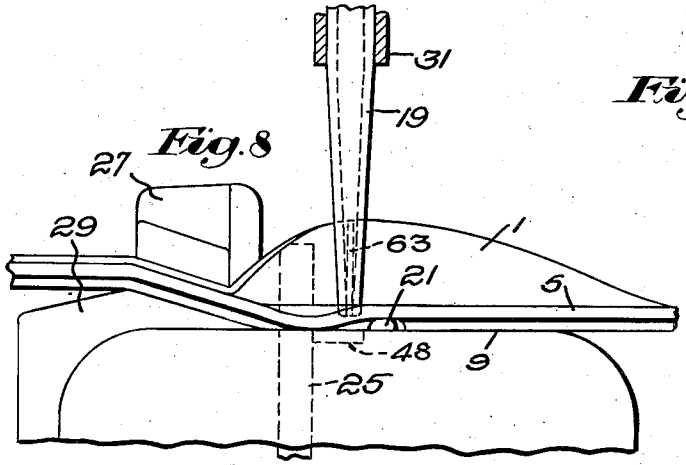


Fig. 9.

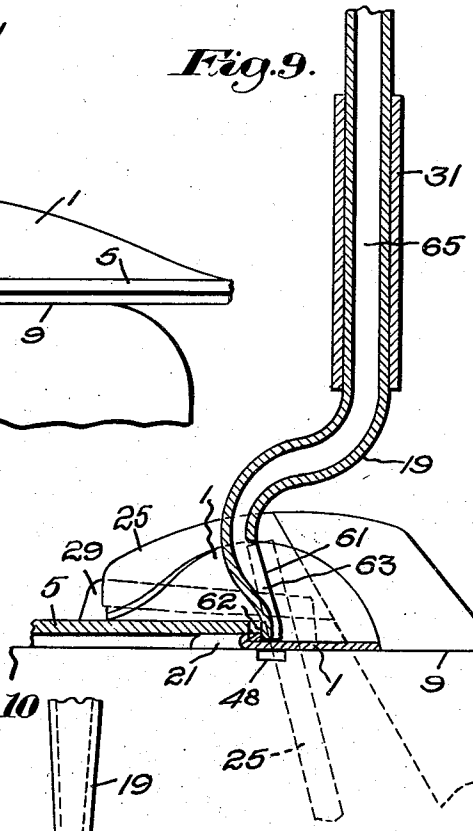


Fig. 11.

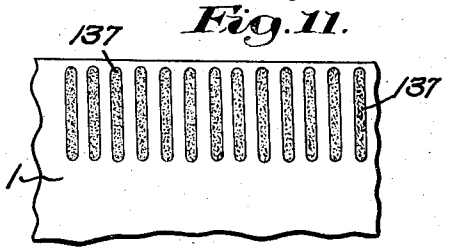


Fig. 12.



Fig. 13.

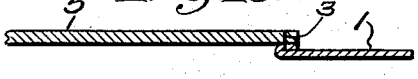


Fig. 14.

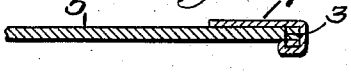


Fig. 10

Inventor:
Leroy Q. Presby,
by Emery, Booth, Townsend, Miller & Waidner
Attys.

Patented June 20, 1939

2,163,059

UNITED STATES PATENT OFFICE

2,163,059

APPARATUS FOR APPLYING AND SECURING STRIP MATERIAL

Leroy Q. Presby, Melrose, Mass., assignor to American Stay Company, East Boston, Mass., a corporation of Massachusetts

Application December 17, 1936, Serial No. 116,411

7 Claims. (Cl. 12—55)

My invention relates to apparatus for applying and adhesively securing strip material as, for example, folding and cementing the strip constituted by the margin of a shoe upper.

The invention, which is more particularly concerned with applying strips coated with non-tacky adhesive capable of being rendered tacky by treatment with a liquid softening agent, will be best understood from the following descriptions, when read in the light of the accompanying drawings, of examples of a method of and apparatus for folding and securing French bindings to shoe uppers, the scope of the invention being more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a side elevation, with parts omitted, of one form of folding machine according to the invention;

Fig. 2 is a side elevation, on an enlarged scale, of the right hand end of the folding machine according to Fig. 1 viewed from the opposite side;

Fig. 3 is a side elevation of one form of edge guide and liquid presenting instrumentality;

Fig. 4 is an elevation with parts shown in Fig. 3 as viewed from the right;

Fig. 5 is an end elevation, on an enlarged scale, of the machine according to Fig. 1 as viewed from the right, with parts in section on the line 5—5 of Fig. 1, and parts omitted;

Fig. 6 is a section on the line 6—6 of Fig. 5, with parts omitted;

Figs. 7, 8 and 9 are more or less schematic diagrams illustrating the operation of the machine, Fig. 7 being a plan of a fragment of the work table with the work inserted and parts omitted, Fig. 8 being a side elevation according to Fig. 7, and Fig. 9 being an end elevation according to Fig. 7 as viewed from the right with parts in section;

Fig. 10 is an elevation of the lower end of the combined edge guide and liquid softening agent presenting instrumentality on an enlarged scale;

Fig. 11 is a schematic diagram illustrating a step in the operation of applying the liquid softening agent to the work; and

Figs. 12, 13 and 14 illustrate steps of applying French binding to shoe uppers.

In the manufacture of shoes it is customary to fold the margin of a shoe upper. Two procedures are in common use. In the first the margin of the upper leather is skived. A coating of cement is applied to the skived surface and then the margin is folded to press that surface against the body of leather. In the second a narrow binding strip 1 (Fig. 12), commonly termed "French binding" and usually of textile material, is sewed by a line of stitching indicated at 3 (Fig. 12) along the edge of the upper leather 5. The binding strip is bent to its position shown by Fig. 13 and cement is applied. It is then folded to its position shown by Fig. 14, and pressed to the upper leather to secure it thereto. Commonly the skived margin of the shoe in the first mentioned procedure, or one side of the French binding in the second mentioned procedure, is coated with a non-tacky layer of rubber-base compound capable of being rendered tacky by the application of heat. The present invention is concerned with folding and otherwise applying bindings, stays and other strips, and folding margins of sheets, which are coated with non-tacky material capable of being rendered tacky by treatment with a liquid softening agent such as water.

It will be understood that in the drawings the French binding is shown on an enlarged scale and of exaggerated thickness, the binding in practice when coated with the adhesive being in the order of one hundredth of an inch in thickness.

The folding machine illustrated comprises a lower arm 7 carrying a work support 9, and an upper arm 11, the base portion 13 of the latter along one edge being pivotally connected at spaced points 15 to the edge of the base portion 17 of the former so that the upper arm may be swung about a horizontal axis afforded by the pivotal connections 15 to give access to the mechanism carried by these arms and their base portions.

The parts for operating upon the work are carried by the two arms 7 and 11. These parts comprise a combined edge guide and liquid presenting instrumentality 19, in some instances a second edge guide 21 (Figs. 2 and 7), a rotary wheel presser foot 23, a folder 25, a hammer or presser 27, and an anvil 29. Except that the combined edge guide and liquid presenting instrumentality 19 is a modified form of an edge guide of a well known commercial folding machine, the parts just mentioned and the mechanism for operating them are well known and need not be described with more particularity than is necessary for an understanding of the present invention.

The edge guide 19 engages the edge of the shoe upper as it passes through the machine as diagrammatically illustrated in Fig. 9, while the other edge guide 21, if employed, engages the

bent edge of the binding as diagrammatically illustrated in Fig. 9.

The folder 25 reciprocates longitudinally in an inclined path from a position below the level of the work to such position above that level as will place the upper end of the folder adjacent the upper edge of the binding when the latter has been bent or folded by the folder approximately 90° from its position shown in section in Fig. 9, and with the upper end of the folder slightly over the upper leather 5 so as to cause the binding to be "wiped" over the edge of the upper leather. In practice provision is made for adjusting the inclination of the folder to adapt it to different kinds of work.

The anvil 29 reciprocates to and fro transversely of the work table in the direction of feed movement of the work. The hammer or presser 27 cooperates with the anvil to complete the fold and press the fold against the body of the upper leather and progressively feed the work step by step across the work table. In practice provision is made for adjusting the lengths of these steps. The hammer 27 has a four motion movement. It descends upon the folded binding to press it and the upper leather against the anvil when the latter is close to the edge guide 19 as diagrammatically illustrated in Fig. 7. Then the hammer and anvil move together away from the edge guide to feed the work one step, say from $\frac{1}{16}$ to $\frac{3}{16}$ of an inch long, whereupon the hammer rises and the hammer and anvil return to the position shown by Fig. 2 in position for repetition of the cycle. The folder 25 is in approximately its upper position when the hammer descends upon the work just before the beginning of the feeding stroke of the hammer and anvil, and is in approximately its lower position when the hammer recedes from the work.

In the machine illustrated the edge guide and liquid presenting instrumentality 19 is in the form of a tube which extends through and is fixed to a block 31 (Figs. 2, 3 and 4) slidably mounted for vertical movement in the opening 33 of the member 35 operatively carried by the arm 11. The block 31 has a projecting pin 37 embraced by the opposite portions of the bifurcated end of the finger lever 39. This finger lever is pivoted at 41 and is urged to move the member 19 downward by means of a tension spring 43. A stop screw 45 adjustably threaded through the finger lever, the end of which screw engages with the stop surface 47, is effective to determine the extent of downward movement of the member 19. Ordinarily this stop screw will be adjusted to cause the extreme lower end of the edge guide to contact with the coated side of the binding, a short narrow groove 48 (Figs. 8 and 9) being formed in the work table directly below the end of the edge guide to prevent pinching of the binding.

The presser roller 23, similarly to the member 19, is carried by a vertically slidable part operatively carried by the arm 11, this part being indicated at 49. Similarly to the member 19, the part 49 is urged downward by a spring pressed finger lever, this lever being shown at 51 and being operatively pivoted to the upper arm at 53 (Fig. 1). The finger member carries an adjustable stop screw 55 (Fig. 2) the upper end of which cooperates with the stop surface 47. The compression spring 57 cooperating with the rod 59, which is pivotally attached at its lower end to the finger member, is effective to urge the presser roller 23 downward.

By pressing downward the free ends of the two finger members 39 and 51 the edge guide 19 and presser roller 23 respectively may be raised to permit insertion of the work, and upon release of the finger members the springs associated therewith move this guide and roller into operative relation with the work.

As illustrated (Figs. 3, 4, 9 and 10), the tube forming the member 19 at its lower end is shaped to form an inclined face 61 with which the coated side of the binding is adapted to engage during the folding operation, and with an approximately vertically positioned face 62 with which the edge of the shoe upper is adapted to engage as it feeds across the work table. In the face 61 is formed a slot 63 communicating with the bore 65 of the tube 19 and preferably extending to and opening on the end of the edge guide. In these figures the parts are shown on a much enlarged scale and the slot 63 of exaggerated width. In practice satisfactory results are secured with a tube about ⅛ of an inch outside diameter and a bore about $\frac{1}{16}$ of an inch diameter, with the lower end of the edge guide as viewed in Fig. 10 about 0.08 of an inch wide and the slot 63 about 0.003 of an inch wide and about 0.25 of an inch long, the length of the slot corresponding to the width of that portion of the binding which is to be folded, or being of length slightly less than that width. On account of the narrow width of this slot, which forms an orifice to which the cementitious coating of the binding is presented, as will hereinafter be explained, it is herein termed a "capillary" orifice as the results secured by it are understood to be subject to explanation by phenomena relating to surface tension of liquids.

As illustrated, attached to the rearward end of the machine is a rearwardly extending bracket 67 carrying a casing formed by the detachably connected plate-like parts 69, 71 and 73. Rotatably mounted in bearings 75 carried by this casing is a shaft 77 to which is secured a pulley 79 driven by a belt 81 which passes around a pulley 83 fixed to the drive shaft of the machine. The shaft 77, as shown, carries a worm indicated at 85 which meshes with the worm wheel 87, the latter being carried by a shaft 89 rotatably mounted in the parts 69 and 71 of the casing. Fixed to the shaft 89 is a gear wheel 91 which meshes with a gear wheel 93 mounted on a spindle 95 also rotatably carried by the casing parts 69 and 71. These gear wheels are received in shallow recesses 97 formed in the casing part 71. These recesses intersect, and at the side portions of their intersections are cut away to form chambers 99 and 101. The construction just described forms a gear pump in which the chamber 99 forms the inlet and the chamber 101 the outlet. Upon the gear wheels being rotated in the direction of the arrows shown in Fig. 6, liquid which is supplied to the chamber 99 enters the interstices between the gear teeth of each gear wheel, and is carried around the peripheries of the two recesses 97 to the outlet chamber 101.

The outlet chamber 101 of the gear pump is connected by a passage 103 formed in the casing part 71 which leads to the exterior of that part. Communicating with the passage 103 is a tube 105. This tube is connected to the tube 19 by a length of rubber hose or other flexible conduit 107 that will permit the upper arm 11 to be swung on the pivotal connections 15.

The inlet chamber of the pump above described

is supplied with liquid by a passage 109 connected to the bottom portion of a liquid reservoir 111 formed by a pipe-like part 113 the end of which is screwed into an opening in the part 73 of the casing.

In the present machine, for supplying liquid to the interior of the reservoir 111, and maintaining a substantially constant level or head of liquid therein, a vertically positioned inverted bottle 115 having an elongated tubular spout 117 is provided, which spout extends into the reservoir 111 and has its end face 119 formed at an angle, so that when the level of the reservoir 111 drops to uncover the opening at the end of the spout sufficiently to permit a bubble or bubbles of air to enter the bottle liquid softening agent contained in the bottle will flow downward from the bottle until the rise in liquid in the reservoir 111 again closes the opening. As shown, the bottle is carried by a socketed member 121 pivotally carried at 123 to the upstanding terminal portion 125 of the pipe 113. The socketed member conveniently also has a depending tubular portion 127 which receives the neck of the bottle. Entrance of atmospheric air to the reservoir 111 is provided by the communicating passages 129, 131 and 133 formed in the socketed member and sealing washer 135.

On account of the extreme reduction ratio of the gearing whcih drives the gear pump, and the small size of the gears and their gear teeth, the capacity of the pump is rather minute. Satisfactory results will be secured, for example, when employing the binding coated with the adhesive described in co-pending application of Edward B. Luitwieler Serial No. 115,661, filed December 14, 1936, and a machine which progresses the work from 2 to 3 inches per second, if the pump supplies one drop of water to the capillary orifice 61 above described in about 2½ seconds, that is to say, one drop of water when the work has been fed through a distance of from about 5 to 7½ inches. Satisfactory results have been secured under these conditions with gears 91 and 93 about one-half inch diameter and $\frac{3}{32}$ of an inch thick each having 24 teeth and rotating at about 18 revolutions per minute. However, the exact amount of liquid which it is necessary to supply will depend upon the sensitivity of the coating to becoming tacky when treated with such liquid.

In the customary manner of operating a folding machine, after the work is inserted the operator depresses a foot treadle to place the machine in operation, and when the work is folded permits the treadle to rise to place the machine out of operation. It will thus be noted that with such operation and employing the present machine the gear pump will operate only when the folding mechanism operates. Further, the folding machine is commonly provided with a slip-clutch operated by the pressure exerted on the foot treadle to control the speed of the machine. In binding curves and corners the speed of the machine commonly is much reduced by the operator. It will be observed, however, that when so reduced the speed of the pump likewise will be reduced, and that therefore the amount of water supplied to the orifice is variably measured by the pump to regulate that amount in accordance with the speed of operation of the machine.

On account of the small width of the orifice 63 when the machine ceases operation water or other liquid cannot drip from the orifice. Thus is eliminated a serious defect of prior machines which attempt to moisten bindings. If any drip could occur the resulting accumulation of water or other liquid softening agent would be liable so seriously to mar the work as to make it unsalable, it being observed that French bindings are usually applied only to women's shoes, the uppers of which commonly are of delicate color, and much persuasive evidence could be produced to establish that the ultimate consumer of this class of goods is commonly meticulous in respect to the appearance of wearing apparel.

When the machine is in operation and the folder 25 moves upward to fold the binding, and when the hammer 27 moves downward to press the binding against the anvil 29, the coated side of the binding is drawn against the capillary orifice 63, as diagrammatically illustrated in Figs. 7, 8 and 9. When the folder moves to its lower position, and the hammer and anvil move to the left from their position shown in Figs. 7, 8 and 9, to feed the work, ordinarily the binding will move from in contact with the capillary orifice. In this manner ordinarily liquid will be applied to the coating through spaced areas 137 roughly determined by the size of the capillary orifice, as diagrammatically illustrated in Fig. 11, which areas are spread more or less to contact with each other by absorption and the action of the hammer in pressing the work. It will be understood, however, that the operation illustrated in these figures, which are for the most part on a much exaggerated scale, is only approximate.

As will be observed from Figs. 1 and 5, the level of the liquid in the reservoir 111 is preferably below that of the orifice 63 to insure against untoward conditions breaking the surface tension of the liquid at the capillary orifice and siphoning liquid out of the tubes or reservoir. Although not essential, preferably the gears closely fit the recesses in the gear pump casing which receives them, which fit insures against liquid emptying in either direction from any portion of the tubes when the machine is out of operation if any untoward conditions should break the surface tension film of the liquid at the orifice. If the tube should be empty when the machine is placed in operation water would not be immediately supplied on account of the small capacity of the pump. It is of course necessary in initially placing the machine in condition for operation to run it for a time necessary to cause the liquid to appear at the orifice 63. After this is done, however, the machine may be placed in and out of operation without it being necessary to repeat the initial operation of filling the tube with water.

It will be understood that within the scope of the appended claims wide deviations may be made from the forms of the invention described without departing from the spirit of the invention.

I claim:

1. Apparatus for applying a strip having a coating of non-tacky cement capable of being rendered tacky by treatment with a substantially non-setting liquid softening agent of water-like consistency, an instrumentality for presenting such liquid, means for progressively moving said strip to present said coating to said instrumentality to contact with and remove liquid thereat by reason of such contact and pressing said strip to the part to which it is to be applied with said coating in contact with said part, and means for maintaining a continuous supply of such liquid at said instrumentality comprising

a liquid reservoir and a constantly driven pump for constantly supplying liquid from said reservoir to said instrumentality.

2. Apparatus according to claim 1 in which the pump is a constantly driven displacement pump operated only when said means for moving said strip to present said coating to said instrumentality operates and automatically therewith.

3. Apparatus according to claim 1 in which the pump is a displacement pump operated only when said means for moving said strip to present said coating to said instrumentality operates and automatically therewith, and in which apparatus is included means for maintaining a substantially constant head of liquid at the intake of said pump.

4. Apparatus according to claim 1 in which said instrumentality comprises a capillary orifice at which the supply of liquid is maintained, and the pump for maintaining the supply of liquid at said orifice is a constantly driven displacement pump operated only when said means for moving said strip to present said coating to said instrumentality operates and automatically therewith.

5. Apparatus according to claim 1 in which said instrumentality comprises a capillary orifice at which the supply of liquid is maintained, the pump for maintaining the supply of liquid at said orifice is a displacement pump operated only when said means for moving said strip to present said coating to said instrumentality operates and automatically therewith, and in which apparatus is included means for maintaining a substantially constant head of liquid at the intake of said pump corresponding to a liquid level close to the level of said orifice.

6. Apparatus according to claim 1 in which said instrumentality comprises a capillary orifice at which the supply of liquid is maintained, the pump for maintaining the supply of liquid at said orifice is a displacement pump operated only when said means for moving said strip to present said coating to said instrumentality operates and automatically therewith, and in which apparatus is included means for maintaining a substantially constant head of liquid at the intake of said pump corresponding to a liquid level below the level of said orifice.

7. Apparatus for applying a strip having a coating of non-tacky cement capable of being rendered tacky by treatment with a substantially non-setting liquid softening agent of water-like consistency having, in combination, a conduit terminating in a capillary orifice, displacement means for continuously urging a flow of such liquid through said conduit to said orifice to maintain a supply of liquid at said orifice, means for progressively presenting said coating to said orifice to contact with and remove liquid thereat by reason of such contact and pressing said strip to the part to which it is to be applied with said coating interposed between the two, and means for operating said displacement means automatically with the operation of said means for presenting said coating to said orifice and discontinuing its operation automatically therewith.

LEROY Q. PRESBY.