The present invention relates to hat blocking machines and more particularly to a machine for the blocking of woman's hats.

As is well known, women's hats are of many and varied shapes, and it is necessary for each different shape to use a different type of hat block. The difference in shapes may be due to a difference in the design of the crown or of the brim or of the positioning of the crown relative to the brim towards the crown. The difference may be so slight that the brim of the hat does not extend radially from the crown but curves outwardly and angularly from the point of intersection therewith at varying degrees. In some instances, hats which are the same headsize have entirely different shapes of crowns, and generally the crown or center thereof is not centrally located relative to the outside edge of the finished brim, and as a result the brim width differs at many points around the crown, or it may be extremely broad on one side of the crown and extremely narrow to the other side. In practically every type of woman's hat the junction between the crown and the brim defines a line of curvature—that is, the depth of the crown at some points is greater than at others, and this depth likewise varies at many points around the intersection. Because of the differences in shape, it is necessary to block hats of the foregoing kind on a hat block which comprises both a crown portion and a brim board or flange block over which the hat felt is stretched to properly shape the finished hat.

The felts which are to be blocked into finished hats are initially rough blocked by hot water to provide a crown and brim portion, and the same shaped rough blocked felts are then blocked into finished hats which may take any one of a number of shapes. The finishing of such hats has heretofore been done by manual operation, and it is apparent that the manual blocking of such hats is not only tedious and slow but requires highly skilled and trained labor. Moreover, when the finished blocking is done manually, it is necessary to gradually and progressively stretch the hat felt from its rough blocked shape over the block which defines the new shape, and, in so doing, the felt will not be evenly stretched as it is impossible to place and maintain the same degree of tension around the entire periphery of the felt as it is being worked upon.

The object of the present invention is the provision of a machine for the finished blocking of felt irrespective of what the finished shape may be.

It is a still further object to provide such a machine where there is provided a hat block having a crown and brim portion and means associated therewith for receiving and tensioning a felt and for maintaining the felt under tension as the felt is shaped over the crown and wrapped around the brim board or as the felt is shaped over the flange block and the crown portion then positioned within the felt, whereby the felt will be evenly stretched at all points and maintained under a constant and even tension throughout the blocking operation.

A still further object is the provision of such a machine wherein finished blocking may be performed in extremely fast time by unskilled labor on a machine which is simple in operation, economical to manufacture, and of rugged and sturdy construction.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings:

Figure 1 is an end view of one embodiment of the machine;

Fig. 2 is a side view of the embodiment of Fig. 1;

Fig. 3 is a side view similar to Fig. 2 showing the steaming means and wherein a felt has been positioned within the machine;

Figs. 4 and 5 are fragmentary views illustrating the operation of the machine; and

Figs. 6 and 7 are views of another embodiment of the machine.

Referring to the drawings, the machine illustrated comprises a top plate 10 supported at a convenient working height from the floor on side frame members 12 and 14. The top plate 10 has a centrally located elliptical opening 16 cut therethrough, and located centrally of the opening is a hat block supporting means 18 on which there is removably supported a hat block A. The block A comprises a crown block 11 and brim board 13; the lower face 15 of the brim board being flat and having a centrally located opening 17 therein. The hat block A is carried on a block support 20 positioned above plate 10 and having a centrally located brim board positioning pin 22 extending upwardly therefrom and projecting into the opening 17 in the block; the pin 22 being smaller than the opening 17 to allow for...
lateral shifting of the block, for reasons herein-after described.

The support 50 is secured on a plunger of piston 24 which extends downwardly and connects to a piston 28 which is power operated in cylinder 26. The piston cylinder 26 is supported on a cross member 30 extending between the side frames 12 and 14 and on which there is also supported a four-way valve 32 for controlling the operation of the piston valve 28 being manually operated by a handle 34 arranged above the top plate 10. The valve 32 is of the usual construction and has an inlet 35 connecting to any suitable power medium, such as steam, an exhaust connection 40, and cylinder connections 42 and 44 adapted to be alternately connected to the inlet and exhaust connections to raise or lower piston 28 to properly position the block A relative to the peripherally disposed brim clamps 46, which extend around the opening 19 and are adapted to engage and hold the brim of a rough blocked hat felt B which may be positioned thereon above block A. The upward travel of piston 28 is such that the base of block A may be carried above the brim clamps, for reasons herein-after described.

The brim clamps or gripping flanges 46 each comprise a lower, relatively fixed jaw 48 and an upper jaw 50 adapted to be moved into and out of engagement with jaw 48. The jaw 50 is pivotally connected intermediate of its ends to the lower jaw 48 by a pivot pin 52 and pivotally connected at its outer end by a pivot pin 54 to the upper end of a jaw actuating lever 56. The lever 56 extends beneath top plate 10 and has its lower end pivotally connected by a pin 58 to the head 59 of a connecting bolt 60, which bolt slidably extends through a lever actuating ring 62 and is secured in place by a nut 65. A cushioning spring 64 may be positioned between ring 62 and head 59 to compensate for slight irregularities in adjustment or felt thickness.

The lever actuating ring 62 is carried on the upper ends of link arms 66, which arms have their lower ends connected to links 70, which links are pivotally connected at 72 to the inner end of lever arms 74. The other ends of the lever arms 74 are keyed to a shaft 76 extending transversely of the machine and journaled in the end frames 12 and 14 with one end 78 thereof projecting beyond the frame member 12. Keyed to the projecting end 78 of shaft 76 is the inner end of an operating lever 80, the outer end of which is pivotally connected to the lower end of a vertically adjustable link 82 which has its upper end connected to an eccentric strap 84.

The eccentric strap is operated by an eccentric 86 (indicated by dotted lines in Fig. 1) carried on a plate 88 provided with a manually operable lever 90 and handle 92; the eccentric and plate being rotatably mounted on the housing by a suitable screw 94. The eccentric and strap are so designed that upon operation of handle 92 link 82 will move downwardly to lower lever 80 and rotate shaft 76 clockwise (Fig. 2). Rotation of shaft 76 clockwise will raise the outer end of lever 74 and simultaneously move links 70 and 78 vertically to raise the lever actuating ring 62, which, through spring 66, will lift lever arms 66 and pivot the upper jaws 59 into engagement with the lower jaw 48 to properly grip the brim of the rough blocked felt hat B (see Fig. 3).

The brim clamps 46 are likewise adapted to be moved towards and away from the block A, and to accomplish this the lower jaw 48 is formed integral with a bell crank lever having a vertically extending arm 71 and a horizontally extending arm 77 extending inwardly at right angles from the lower end of the arm 71. The lower end of arm 71 is pivotally mounted by a pin 73 on the outer end of a bracket 75 secured to the top plate 10. The outer end of arm 77 is pivotally connected by a pin 79 to the bifurcated arm 83. The lower portion 87 of the bolt 83 is of reduced diameter and extends through and below a corresponding opening provided therefor in a lever pivoting or expansion ring 85; the upper face of the expansion ring being adapted to abut against the downwardly facing shoulder 85 intermediate of the head 81 and reduced portion 87 of the bolt 83 and adapted upon upward movement to pivot the brim clamps outwardly. Upon downward movement of the expansion ring, the shoulder 85 is normally maintained in abutting engagement with the upper face of the expansion ring 85 by a collared spring 93 mounted on the bolt 87 intermediate of the securing nut 91 on the lower end thereof and the lower face of the expansion ring 85.

If desired, the spring 93 may be omitted and the downwardly facing shoulder 85 of bolt 33 may be maintained in engagement with the upwardly facing shoulder of the expansion ring by a spring 102 having one end secured to the top plate 10 and the other end extending substantially at right angles thereto and engaged in a bracket on the rear of the vertically extending lever 71, thus tending to normally pivot the brim clamps towards the hat block. In the embodiment shown, the spring 102 is illustrated as assisting the action of the spring 93. However, it is apparent that either one of the springs could be dispensed with and the other spring would function to move the brim clamp inwardly upon downward movement of the expansion ring 85. If the spring 102 were utilized alone, the expansion ring 85 would serve, on its upward movement, to move the brim clamps outwardly in unison, but on its downward movement it would move independently of the brim clamps and the spring 102 would tend to maintain the shoulder 85 in engagement with the upper face thereof. With either construction, the expansion ring is adapted upon its downward movement to move relative to the bolt 87 with a certain amount of lost motion if the inward motion of the brim clamps is restrained upon coming into engagement with the block, as hereinafter described.

The vertical movement of the ring 85 is obtained by securing it to the upper ends of the arms 66 which extend upwardly from a yoke 97, which yoke is carried on the upper end of a plunger or piston rod 99 which connects to a suitable piston (not shown) in the cylinder 96. The operation of the piston and yoke 97 is controlled by a four-way valve 98 which is similar to the four-way valve 32 and is manually controlled by the handle 100 positioned above the top plate 10. Thus when the valve 100 is turned to admit steam or the like to the bottom of the piston, the piston rod 99 and yoke 97 will raise the expansion ring 85, causing it to move the downwardly facing shoulder 85 of the bolts 83 and simultaneously and positively pivot the brim clamp levers 71 and 56 about the pivot pins 73 and 58 and away from the hat block.

When the valve 98 is set to admit steam to the top of the piston, the expansion ring 85 will
be moved downwardly and through springs 93 will yieldingly draw the bolts 93 downwardly and pivot the brim clamps inwardly about the pivot pin 73. If the springs 93 are omitted, the expansion ring will move downwardly relative to and independently of the bolts 93 and the brim clamps will be pivoted inwardly by the action of the spring 102.

As it is necessary to steam and mellow the felt, there is provided a vertically arranged support 100 which carries on its upper end a collar 106 on which there is mounted an outwardly extending steam pipe 128 carrying on the end thereof a steam shower outlet 130. The pipe 128 connects through a flexible conduit 132 to a steam inlet pipe 133 through a control valve 134 on which there is pivoted an outwardly extending operating lever 135 which lies in the path of and is adapted to be operated by the collar 128. The steam shower outlet 130 normally lies to one side of the machine, and in order to position it over the felt the support 100 is rotatably and vertically movable in a standard 110 secured to the top plate of the machine; the standard 110 having a cam groove 112 in which there rides a cam follower 114 secured to the support 100 and adapted, as the support is lowered, to rotate the support in standard 110. To lower the support 108, the lower end thereof extends below the top plate and is pivotally connected to one end of a lever 116 which has its other end rotatably mounted on the shaft 76. Intermediate of the ends of the lever 116 there is pivotally connected a lever 118 which extends downwardly therefrom and has its other end pivotally connected intermediate of the ends of a handle 122. Intermediate of the foot pedal and the lever 116 there is provided a spring 124 which connects to the lever 120 and to the cross member of the frame 12 and normally maintains the lever 120 in its uppermost position.

It may also be desirable to steam the under side of the felt, and to accomplish this there is provided a steam shower 135 supported on the head of the cylinder 118 by brackets 137. The steam shower 135 has a plurality of openings 138 adapted to spray the steam outwardly against deflector 141 which will direct the steam beneath the hat felt B. The shower 135 is connected through a suitable inlet 143 and control valve 145 to the steam inlet pipe 133. The control valve 145 is of similar construction to the control valve 134 and is provided with a control lever 147 extending into the path of a collar 149 carried on the standard 106 and adapted to be actuated by the collar when the standard is lowered. Obviously it is only necessary to move one of the control levers 138 or 147 out of the path of the actuating collars on the standard 106.

Thus when the foot pedal 122 is pressed downwardly, the lever 116 will be carried downwardly to lower the frame 76 (see Fig. 2) and lower the support 108. As the support 108 is lowered, it will be rotated by the cam follower to position the steam shower outlet over the felt. Just before the outlet 130 is positioned over the felt, collars 122 and 149 will engage with their respective slots and 138 and 147 in order to open the control valves and permit the steam to flow to the showers, and the steam will continue to flow as long as pedal 122 is pressed down-wardly. Upon removing the foot from the pedal 122, spring 124 will raise the pedal and, through the various connections, will raise the standard 106, whereupon the control valves, which may be of the automatically closing type, will shut off the steam flow to the steam showers and the standard 106 will likewise be rotated to rotate the upper shower 130 out of position over the hat block.

In the blocking of hats, it is necessary to "cut the band"—that is, to clearly define the junction between the crown and the brim of the hat, and as is evident from the drawings, the junction C does not lie in a horizontal plane. In some instances, it is only necessary to cord the hat with the felt stretched over the block and then force the cord down and around the junction of the crown and brim of the hat. However, with other types of hats, in order to properly "cut the band", there is utilized a banding ring 140 which is preferably of a flexible compressible material, such as rubber, which, when forced over the crown and into contact with the brim, will adjust itself to the curvature thereof. The ring 140 is forced into position by a positioning ring 142 which is pivotally mounted on trunnions 143 in the sides of a yoke 146. The yoke is carried on a lever 148 which extends rearwardly of the machine and is pivotally mounted on a pin 149 in a bracket 150 secured to the frame or the machine; the outer end of lever 146 extending beyond the pivot and being provided with a suitable counterweight 155. Extending forwardly of the yoke is a suitable operating handle 156 for drawing the yoke down and over the block to properly position the ring 142 over the banding ring 140 to enable it to be forced into position.

In carrying out the blocking, the selected hat block A is positioned on the block support 20 with the centering pin 22 of the support projecting into the opening 17 in the base of the trim board. The rough blocked hat felt B is then positioned with its brim 146 on the lower jaws 48 of the brim clamps 46; the brim clamps having been opened to the approximate periphery of the brim. The hand lever 52 is then operated to pivot the upper jaws 50 of the brim clamps over the brim 146 and secure the felt in position. The hat block A may then be raised to the approximate position shown in Fig. 3 wherein it just extends into and prevents the felt B from being turned inside out during the subsequent steaming.

The foot pedal 122 is next operated to position the upper steam shower and emit steam over or under the felt as desired to mellow it to the desired degree, and when the felt is properly mellowed the foot pedal is released. The brim clamps 46 are now pivoted outwardly and away from the block to place the felt and brim under tension, as indicated by the dotted lines in Fig. 3.

The valve 52 is again opened and kept open to raise piston 28, whereupon hat block A will be forced into the felt to progressively stretch the felt until the resistance of the felt equalizes the pressure on the block and stops the upward movement thereof. A selected banding ring 140 is now placed over the felt, as indicated in Fig. 4, and the yoke 146 brought downwardly to position the ring 142 over the banding ring 140. The yoke will now be forced downwardly to force the banding ring down and over the felt to draw the felt properly around the crown and define the junction between the crown block and the brim board, and if, as in the block illustrated, the brim is wider at one side than the other, the ring will also cause
the block A to shift laterally on the block support and properly position same in the felt with the center of the crown offset from the center of the inner periphery of the brim. When the binding ring is so positioned, ring 142 is lifted out of position and valve actuating handle 100 is now operated to cause the brim clamps 48 to gradually move inwardly, and, as the piston 28 is still under pressure, the hat block A will continue to properly move upwardly as the fingers are drawn inwardly, and the felt is thus maintained under tension while it is wrapped and positioned around the brim board 160.

It will be seen from a comparison of Figs. 1 and 2 that the longitudinal axis of the hat block is greater than the transverse axis thereof, whereupon the end brim clamps of Fig. 2 will come into alignment with the brim board and further movement thereof will be temporarily restrained and the spring connection 33 to the expansion ring 83 will yield as the ring continues to be lowered. If the springs 83 are not utilized, the expansion ring 83 will move independently of the brim clamps and the springs 102 will move the brim clamps inwardly and yieldingly hold them in engagement with the brim board of the hat blockers. However, the brim clamps will continue to move inwardly independently of the restrained clamps until the felt is wrapped closely to the brim board and tensioned over same; it being desirable to have the rough blocked felt of such size that the brim clamps may wrap in and around the base of the brim board (see Fig. 5).

When the felt has been completely wrapped around the block, the handle 92 is actuated to open the gripping fingers and release the felt, whereupon the block A will move to its upward limit of travel and may be readily removed from the machine. The hat is then corded immediately beneath the banding ring and also in the brim board groove. When so corded, the banding ring may be removed, and when sufficiently dry the blocked hat is cut around the lower periphery of the brim.

As previously stated, in some instances it will not be necessary to use the banding ring 140 as the hat may be corded at the band at the time that the banding ring is usually applied thereto. However, either the cord or the banding ring will be in position to maintain the crown and brim in proper relationship to one another during the subsequent operations.

It will be observed that after the felt is mellowed, pressure is exerted to raise block A and this pressure is maintained throughout the subsequent blocking operations, thus at all times maintaining the felt under tension to obtain a maximum and uniform stretching thereof and working of the felt around the crown block and brim board. Likewise, to assist in the proper blocking thereof, the block is permitted to shift laterally on the support 20 and properly position and center itself as the felt is drawn and tensioned around the block.

In the embodiment illustrated in Figs. 6 and 7, the hat is blocked in inverted position. In order to accomplish this, there is provided a steam pot 180 to which there is admitted steam through a suitable connection 182. Carried with-in the steam pot and supported on a platform 184 is a banding ring support 188. The periphery of the support is smaller than the inner periphery of the steam pot to allow lateral movement thereof on the bearings 186. Projecting upwardly from the support 188 are a plurality of hollow guide members 190 into which there extends the downwardly depending arms 192 of the flexible banding ring 194. The lower ends of arms 192 are provided with collars adapted to overlie spring members 198 positioned therebetween and the bottom of the guides 190. The collars 196 are made slightly less in diameter than the inside diameter of the guides 190 to allow for a wobbly motion of the posts 192 within the guides.

In carrying out the process with the embodiment shown, there is placed on the support 185 the proper sized banding ring 194. The brim of the felt is then secured in the groove, fingers 15 and the block placed within the felt. The felt is then steamed as before in order to properly mellow it and, when properly mellowed, the gripping fingers 46 are pivoted outwardly to place the felt under tension. The lever 148 has pivotally mounted thereon a downwardly extending member 200 adapted to engage the base of the brim board when the handle 156 is lowered. Pressure is then applied to the brim board to force the block into the felt and properly position the ring 25 at the junction of the crown and the brim. Due to the 194 the banding ring may be forced downwardly and below the level of the gripping jaws to angularly tension the felt over the brim board, and the support 185 may shift within the steam pot, whereupon the banding ring may properly position itself regardless of the contour of the hat. As before, when the band is properly cut, the pressure is maintained on the block as the gripping fingers 46 are released and brought inwardly around the base of the block to wrap the felt around the brim and bring it into contact with the brim board. When properly wrapped, the fingers are released and the handle 156 raised, whereupon the banding ring will be raised by the tension of springs 198 and the block may be removed from the machine and corded as before.

It will be observed that in this embodiment, as in the last, the pressure is maintained on the block from the time the felt is mellowed until the gripping fingers are opened to release the brim.

In the embodiments illustrated, a hat block has been shown of rather extreme form. However, in practice all instances a woman's hat is non-symmetrical and the outer periphery of the brim is not concentric with the band. Likewise, the brim does not extend radially therefrom, but at an obtuse angle thereto, which angle varies at most every point around the hat. However, with the present machine it is possible to properly shape the crown felt around the crown block, define the junction between the crown block and the brim board while angularly tensioning the brim, and, while maintaining the tension on the brim, wrap it around the brim board and shape it thereto.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that there is provided herein a description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of
the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. The method of blocking a hat which comprises gripping a hat felt around its brim edge and stretching the brim radially outward and while maintaining the brim edge stretched outwardly forcing a hat block into the felt to tension the felt on a line from the peak to the brim edge and then while maintaining the felt tensioned from the peak to the brim edge wrapping the brim edge inwardly and around the block.

2. In a hat blocking machine, a hat block support, means for moving said hat block support, a plurality of brim clamps disposed around said support and movable towards and away from same, each brim clamp including cooperating gripping jaws movable relative to one another to grip a brim edge therebetween, means for opening and closing said gripping jaws and maintaining the same in fixed gripping relation when closed and throughout the range of movement of the brim clamps, actuating means for moving said brim clamps outwardly from said hat block support, and means associated with said brim clamps for moving same inwardly independently of said last named means.

3. In a hat blocking machine, a hat block support, means for moving said support, a plurality of brim clamps disposed around said support and movable towards and away from same, each brim clamp including cooperating gripping jaws movable relative to one another to grip a brim edge therebetween, means operating independently of movement of said brim clamps for opening and closing said gripping jaws and maintaining the same in fixed gripping relation when closed and throughout the range of movement of the brim clamps, actuating means movable in reverse directions for moving said brim clamps towards and away from said hat block support, means on each of said brim clamps simultaneously engageable by said actuating means when moved in one direction for moving said brim clamps outwardly and yielding means associated with each of said brim clamps for normally maintaining said last named means in engagement with said actuating means when moved in the other direction and for yieldingly releasing same when said brim clamps have reached a predetermined position.

4. In a hat blocking machine, a hat block support, means for moving said support, a plurality of brim clamps disposed around said support and movable towards and away from same, each brim clamp including cooperating gripping jaws movable relative to one another to grip a brim edge therebetween, means operative independently of movement of said brim clamps for opening and closing said gripping jaws and maintaining the same in fixed gripping relation when closed and throughout the range of movement of the brim clamps, an expansion ring movable in reverse direction for moving said brim clamps towards and away from said hat block support, a connection between each brim clamp and said expansion ring including a member carried by said brim clamp and extending through an opening in said expansion ring, a shoulder on said member positioned above said expansion ring and adapted to be engaged by same upon movement in one direction, and spring means positioned on said member below said expansion ring and normally maintaining said shoulder in engagement with said expansion ring.

5. In a hat blocking machine, a hat block support, means for moving said support, a plurality of brim clamps disposed around said support and movable towards and away from same, each brim clamp including cooperating gripping jaws movable relative to one another to grip a brim edge therebetween, means operative independently of movement of said brim clamps for opening and closing said gripping jaws and maintaining the same in fixed gripping relation when closed and throughout the range of movement of the brim clamps, an expansion ring movable in reverse direction for moving said brim clamps towards and away from said hat block support, a connection between each brim clamp and said expansion ring including a member carried by said brim clamp and extending through an opening in said expansion ring, a shoulder on said member above said expansion ring, and spring means associated with each brim clamp for normally maintaining said shoulder in engagement with said expansion ring.

6. In a hat blocking machine, a banding ring adapted to support a hat block therein, a plurality of brim clamps disposed around said banding ring and movable towards and away from same, each of said brim clamps including cooperating gripping jaws movable relative to one another to grip a brim edge therebetween, means for opening and closing said gripping jaws and maintaining the same in fixed gripping relation when closed, means supporting said banding ring for vertical and lateral movement relative to said gripping clamps, actuating means for moving said brim clamps outwardly from said hat block support, and means associated with said brim clamps for moving same inwardly independently of said last named means.

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