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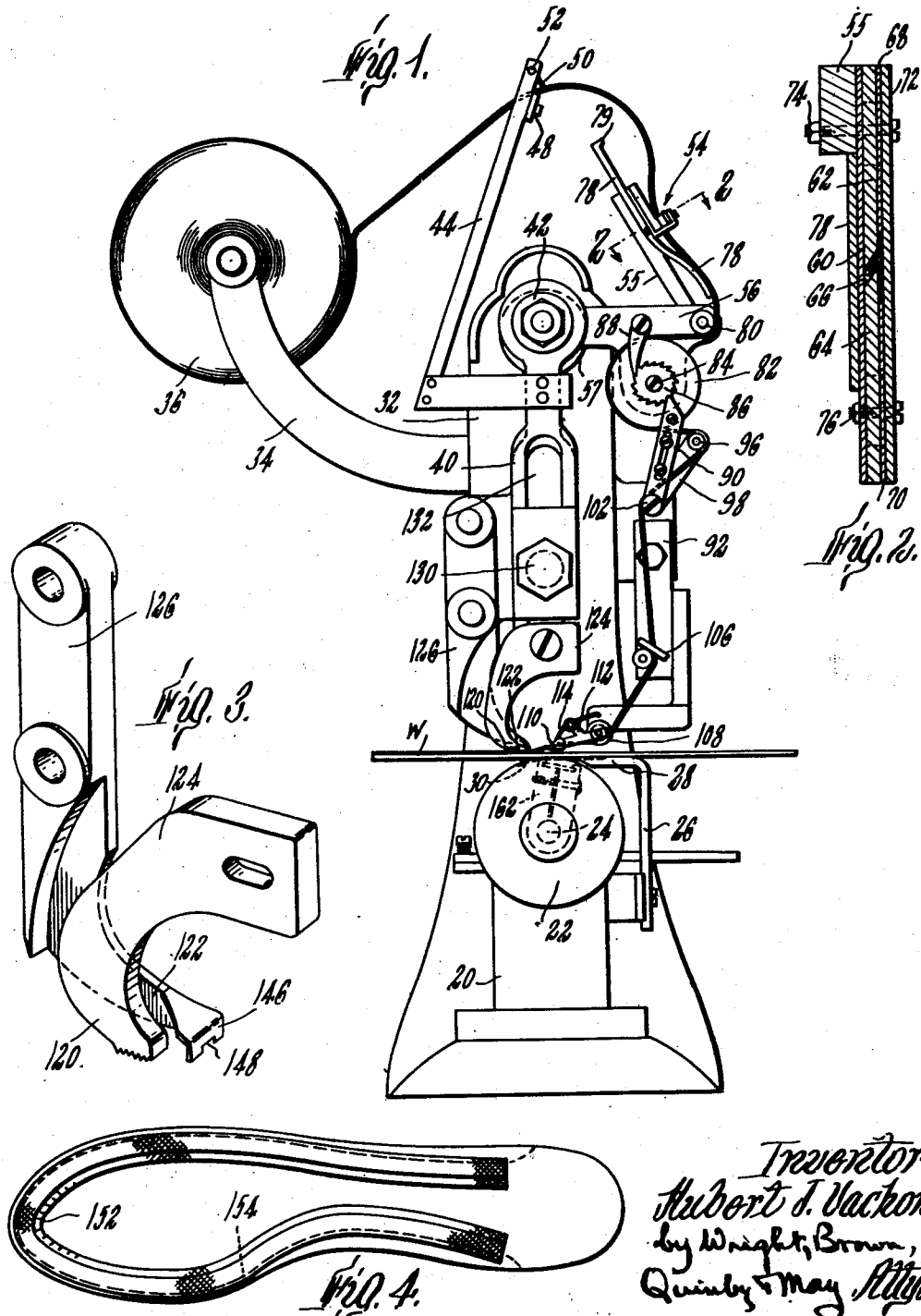
H. J. VACHON

2,427,240

MACHINE FOR FOLDING AND APPLYING TAPE

Filed April 10, 1946

2 Sheets-Sheet 1



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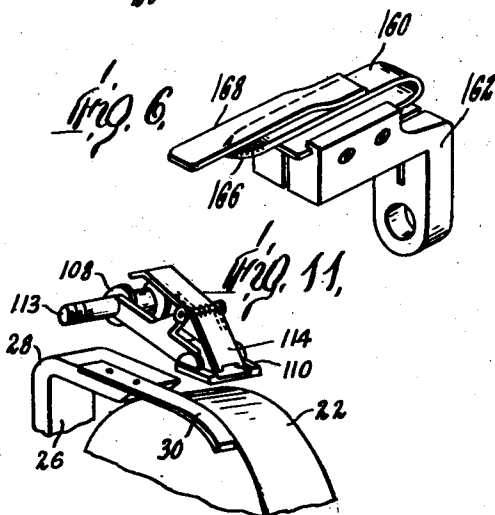
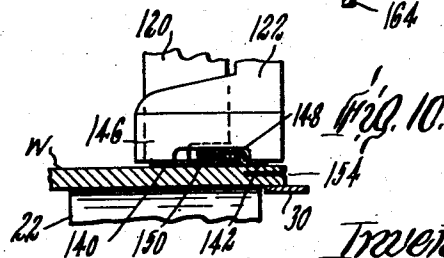
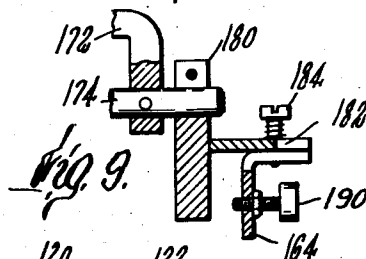
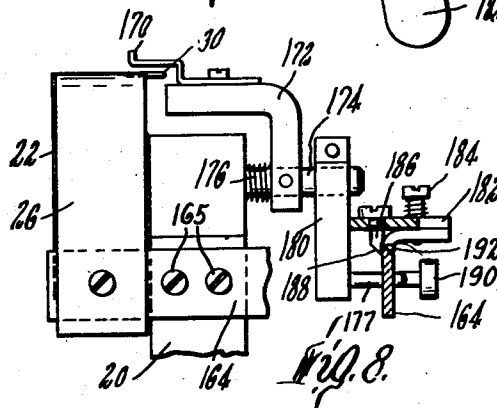
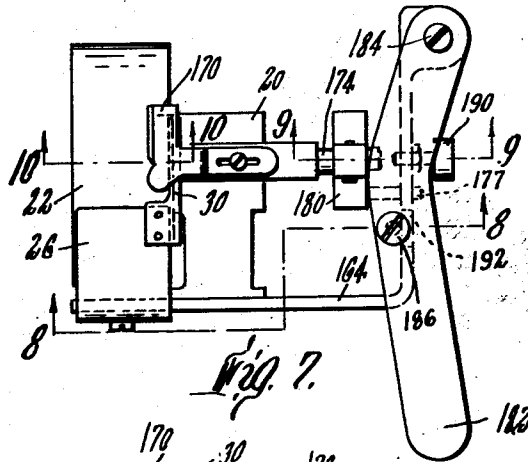
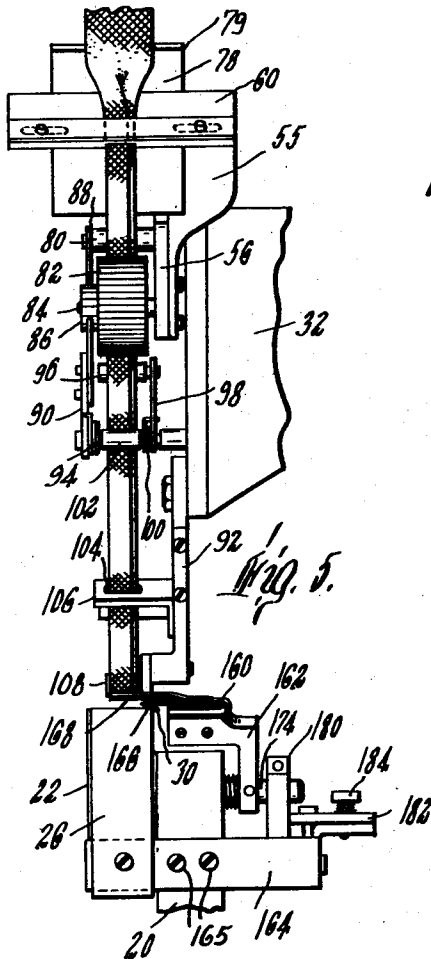
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UNITED STATES PATENT OFFICE

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MACHINE FOR FOLDING AND APPLYING TAPE

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Application April 10, 1946, Serial No. 661,175

11 Claims. (Cl. 12—20)

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This invention relates to a machine for drawing from a roll a strip of tape having a tacky side, folding the tape progressively to form a longitudinal rib between the side edges thereof, and applying the folded tape to an innersole or the like. It is an object of the invention to provide a machine which will operate rapidly and effectively.

It is a further object of the invention to provide gauge means by which the spacing of the tape from the edge of the work can readily be controlled, so that the machine can be successfully operated by relatively unskilled labor.

More particularly, the invention relates to improvements in a tape applying machine by which tape can be longitudinally folded and then applied to the ball and shank portions of an innersole which has been edge-channeled. Edge channels in innersoles customarily start near one side edge of the shank, progress along the margin of the sole around the ball portion thereof and back to the other side edge of the shank portion. The initial and final portions of the channel, that is, those portions which extend along the margins of the shank, are spaced a little further from the edge of the innersole than the intermediate portion of the channel which runs around the fore part of the innersole. It is desirable that the tape be applied in such a manner as to be uniformly adjacent to the channel. That means that the spacing of the tape from the edge of the innersole should vary exactly as does the spacing of the channel from the same edge. According to the present invention, a gauging device is provided to regulate such spacing.

For a more complete understanding of the invention, reference may be had to the following description thereof, and to the drawings, of which:

Figure 1 is a side elevational view of a machine embodying the invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a perspective view of the two presser members of the machine;

Figure 4 is a plan view of an innersole to which tape has been applied by the machine;

Figure 5 is a front view of the significant portions of the machine shown in Figure 1;

Figure 6 is a perspective view of an edge gauge on the machine;

Figure 7 is a plan view of the work support together with a modified form of edge gauge mechanism;

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Figure 8 is a section on the line 8—8 of Figure 7;

Figure 9 is a section on the line 9—9 of Figure 7;

5 Figure 10 is a section on the line 10—10 of Figure 7;

Figure 11 is a fragmentary perspective view of the work supporting anvil and the adjacent guiding means.

10 Basically, the machine is similar in many respects to earlier tape applying machines such as those shown and described, for example, in Patent No. 1,234,950, granted to Staples on July 31, 1917, Patent No. 1,549,376, granted to Osgood on

15 August 11, 1925, and other patents.
In Figure 1 the left side elevation of the machine is shown, including a base 20 on which is rotatably mounted a work table in the form of an anvil roll 22 freely revolvable about the axis of a horizontal shaft 24, the work W being supported on the top or crest of the roll 22. The work table also includes a bracket 26 having a horizontal portion 28, the upper surface of which is in a plane which is approximately tangent to the cylindrical periphery of the roll 22. From the end of the horizontal portion 28 an extension 30 projects beside the edge of the roll to a point somewhat beyond the crest of the roll. This projection 30 is preferably in the form of a narrow thin plate which aids in the support of the work as it moves over the table, especially when the work piece is relatively thin or limp.

To a fixed upper frame 32 is secured a fixed arm 34 for the support of a roll 36 of tape. The tape for which this machine is primarily designed is a heavy bias tape having a tacky surface on one side thereof so that some resistance is encountered when the tape is pulled from the roll. A puller device is shown in Figure 1 for pulling the tape from the roll so that there will not be excess tension on the tape folding and feeding mechanisms hereinafter described. This puller device is carried by an oscillating member 40 which is actuated by a suitable eccentric 42 in the manner shown in Patent No. 1,549,376. A bracket 44 is secured to this member, this bracket projecting up to a point in the path of the tape as it is drawn from the roll 36. Secured to the bracket 44 is a guide member 48 over which the tape passes. Above this guide member 48 is a detent or pawl 50 which engages the upper surface of the tape just after it passes the guide 48. The detent 50 is pivoted as at 52 so that it swings freely and acts to prevent retrograde movement of the tape across the guide member 48. The

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motion of the oscillating member 40 causes the bracket 44 to reciprocate with the detent 50, permitting the tape to move over the guide 48 in the direction of feed but preventing tape from moving in the opposite direction. Hence, as long as the slack beyond the guide 48 is taken up, the reciprocating detent 50 pulls more tape away from the roll 36.

Adjacent to the guide 48 is a folding device generally indicated at 54. This device is carried by an arm 55 projecting from a bracket 56 which is secured to a second oscillating member 57. The latter is located behind and is similar to the oscillating member 40. It is also actuated by an eccentric 42 but in opposite phase. As indicated in Figure 2, the folder comprises a number of plates or strips of metal or the like adjustably bolted together, some of the plates being spaced from each other in such a way as to provide an aperture through which the tape is drawn, this aperture being shaped to fold the tape progressively so as to form a longitudinal rib therein which is spaced from both side edges of the tape. As shown, a thin plate 60 is next to the arm 55. Next to the plate 60 are a pair of plates 62 and 64, these plates being of considerable thickness and being adjustably spaced apart to form a crevice 66. The edges of the plates 62 and 64 on either side of the crevice 66 are parallel and are inclined to the plane of the plates so that the crevice itself is inclined with respect to the plane of the plates. This crevice, as indicated in Figure 2, is adjusted to be slightly wider than double the thickness of the tape. Next to the plates 62 and 64 are a pair of thin plates 68 and 70, these plates being in a common plane and having a thickness slightly greater than that of the tape. The space between the plates 68 and 70 determines the width of the folded tape after it has been narrowed to form the longitudinal rib therein. The space between the edges of the thin plates 68 and 70 adjoins the crevice 66 so that they combine to form a properly shaped aperture through which the tape is drawn, the aperture being completed by a plate 72 which is against the plates 68 and 70. As a result of crowding tape through this aperture, the longitudinal rib is formed within the crevice. The marginal portions of the tape which remain in the original plane, pass through the space between the thin plates 68 and 70. The parts of the folder are held together by any suitable means such as bolts 74 and 76, the bolt 74 also serving to secure the folder to the arm 55. By adjusting the plates to widen the crevice 66 and to narrow the space between the plates 68 and 70, the size of the rib in the tape can be increased to a limited extent.

Secured to the back of the plate 60 by welding or otherwise is a guide member 78 having a rounded flange 79 along its upper edge which is located above the folder 54. The portion of the guide 78 below the folder 54 is curved convexly to support the folded tape in the plane of the plates 68 and 70 as it leaves the folder. This convex guide surface has important functions as hereinafter explained.

From the guide 78 the tape passes around a guide roller 80 to a knurled feed roll 82. The roll 82 is on a horizontal shaft 84 which also carries a ratchet wheel 86 and is journaled in the bracket 56. A detent 88 carried by the same bracket prevents reverse rotation of the ratchet wheel. The wheel is advanced by relative move-

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ment between it and a pawl 90 which is mounted on the frame 32 and is spring pressed by a spring 94 (Figure 5) to hold the pawl in engagement with the ratchet wheel 86. Since the tape puller 48 is carried by the oscillating member 40, and the bracket 56, on which are the folder 54 and the feed wheel 82, is carried by the other oscillating member 57, the puller 48 and feed wheel 82 are always moving in mutually opposite directions as they oscillate, since the members 40 and 57 are in opposite phase. Thus when the puller 48 and feed wheel 82 move toward each other, tape is pulled from the roll 36 and slack is provided between the puller and the feed wheel. When these members move away from each other, this slack is taken up by the feed wheel which is rotated at the same time by the pawl 90, and the puller recedes for a fresh grip on the tape. The feeding movements of the feed wheel 82 which drags the tape through the folder 54 result in a considerable tension in the tape between the folder and the feed wheel owing to the resistance of the tape to passage through the folder. The convex portion of the guide member 78 supports the folded tape at this point and serves to prevent diagonal stresses which would tend to crowd the edges of the tape still nearer together and thus to jam the tape in the crevice 66. This convex guide also serves to set the fold in the tape since the tape is pressed strongly against this portion of the guide member by its own tension as it leaves the folder 54.

From the feed wheel 82 the tape passes around an idle roller 96 which is mounted on an arm 98 pressed by the spring 100 to maintain a tension on the tape as it comes from the feed wheel 82. The tape extends from the guide roll 96 around another guide 102, then down through a guide slot 104 in a bracket 106 which projects out from a fixed arm 92 secured to the frame 32, and from there to a guide 108 which is located above the work table. From under the guide 108 the tape passes over a guide 110 which is a shallow trough supported by arms 112. These arms project from a bolt 113 which also carries the guide 108 and is secured to the fixed arm 92. A spring pressed detent 114 bears on the upper face of the tape as it passes over the guide element 110 and thus prevents retrograde movement of the tape over the guide 110. As indicated in Figure 1, the guide 110 is directly over and adjacent to the crest or top of the work supporting roll 22. Adjacent to the guide 110 are a pair of presser feet 120 and 122 which may be termed a hammer and a pleating bar, respectively, and which are the lower terminals of members 124 and 126 illustrated in Figure 3. The bottom faces of the presser feet 120 and 122 are serrated or knurled so as to provide a firm grip on the tape which passes under and is pressed down by these feet. The presser foot members 124 and 126 are secured respectively to the oscillating members 40 and 57 which rock about the axis of a fixed bolt 130 as a fulcrum, these oscillating members each having a central slot 132 through which the bolt 130 projects from the upper frame 32. Since the eccentrics which actuate the members 40 and 57 cause circular movement of the eccentric straps at the upper ends of these members, it is evident from Figure 1 that the feet 120 and 122 will also move in somewhat circular paths. Since the eccentrics are in opposite phase, the feet will engage the tape on the work in alternation and will

feed the work piece as the tape is pressed against the upper face thereof. As indicated in Figure 10, the presser foot 120 engages the inner or wider leg 140 of the tape. The presser foot 122 engages the outer or narrower leg 142 of the tape. At the end of the presser foot 122 is a narrow transverse presser element 146 which is centrally notched as at 148 to straddle the rib 150 of the tape so that the element 146 can press firmly against both the inner and outer legs of the tape. The effect of this presser element is to smooth down the plaits 152 formed in the inner leg 140 of the tape and the toe of the innersole where the greatest curvature of the tape takes place, as indicated in Figure 4.

The innersoles to which tape is to be applied by the machine herein described are edge channeled as at 154 (Figure 10). This edge channel extends along the margins of the shank and wall portions of the innersole starting at the rear of the shank portion and proceeding around to the rear of the shank portion on the other side as indicated in Figure 4. The channel is deeper along the margins of the shank portion than it is along the margins of the ball portion of the innersole. It is desirable that the tape be applied so that it is uniformly arranged with relation to the inner edge of the channel. To facilitate the proper application of the tape to the innersole, an edge gauge 160 is provided as illustrated in Figures 5 and 6. This gauge may be conveniently mounted in a suitable bracket 162 which is carried on an arm 164 secured to the base 20 by screws 165. The upper base of the bracket 162 is channeled to receive the gauge member 160. The latter, as indicated in Figure 6, may be of U-shape, the upper arm of the U terminating in a rounded bevelled end 166 which is adapted to enter the channel 154 in the edge of the innersole and act as a feeler. Spaced slightly above the feeler 166 is a guard element 168 beneath which the margin of the innersole moves. This prevents the innersole from being pulled upward in such a way as to dislodge the feeler 166 from the edge channel 154. Since the tip of the feeler 166 is definitely located with respect to the guide element 110, the tape which leaves this guide element is definitely located with respect to the inner edge of the channel engaged by the tip of the feeler 166.

Figures 7, 8, and 9 illustrate a modified form of edge gauge comprising a gauging member 170 against which the edge of an innersole is pressed by the operator during the application of the tape thereto. This gauge element 170 is mounted on a bracket 172 which is carried by a rod 174 a portion of which is slidable in a hole in the base 20. The rod 174 is pressed toward the right by a spring 176 which is compressed between the bracket 172 and the rear face of the base 20. A guide pin 177 projects from the arm 180 and slides in a hole through the arm 164 to steady the rod 174 against rotation. The rod 174 carries an arm 180 which bears against a hand lever 182 pivoted at 184 to the arm 164. The hand lever carries a pin 186 which projects down from the lower face thereof and is bevelled at 188. This pin is adapted to catch behind the arm 164 so as to hold the edge gauge 170 in an operating position toward the left. Since the edge of the innersole is pressed against the gauge element 170 during the application of tape thereto, the tape is located as near as permissible to the edge of the innersole when the gauge element 170 is in

this position. Hence the hand lever 182 is maintained in the position shown in Figures 7 and 8 during the application of tape to the ball portion of the innersole. At the commencement of the application of the tape to an innersole, the hand lever 182 should be swung to the right. This can be done by raising the handle portion sufficiently to move the pin 186 clear of the arm 164. This permits the spring 176 to push the rod 174 and the parts secured thereto toward the right, the extent of such movement being limited by engagement of the arm 180 with an adjustable stop element 190 mounted on the arm 164. As soon as the tape has been applied to the shank portion of the innersole, the operator swings the handle 182 toward the left until the pin 186 engages behind the arm 164. A portion of the top edge of the arm 164 in the path of travel of the pin 186 is bevelled as at 192 so that the bevelled end 188 of the pin can cam the lever 182 upward when it is swung toward the left, and thus prevent inadvertent catching of the pin against the bracket. It is held in this position while the tape is being applied to the ball portion of the innersole whereupon the hand lever is released and swung toward the right so that the final portion of the tape applied to the innersole is spaced at a greater distance from the edge of the innersole as indicated in Figure 4.

I claim:

1. In a tape applying machine, a support for a roll of tape having a tacky surface on one side, oscillating means for pulling said tape progressively from said roll, means for folding said tape to form a longitudinal rib spaced from the edges of the tape, a work support, means for guiding the folded tape to said work support, presser feet adjacent to said support, means for pressing said feet in alternation against work on said support, and an edge gauge engageable by the work piece to determine the spacing of the tape from the edge of the work piece.

2. In a machine for applying tape to a face of an innersole or the like, a support for a roll of tape having a tacky surface on one side, oscillating means for pulling said tape progressively from said roll, means for folding said tape to form a longitudinal rib spaced from the edges of the tape, feed means for drawing the tape through said folding means, a work support, means for guiding the folded tape to said support, presser feet adjacent to said support, means for pressing said feet in alternation against work on said support, and an edge gauge engageable by a work piece on the support to determine the spacing of the tape from the edge thereof.

3. In a machine for applying tape to an edge-channeled innersole or the like, a support for a roll of tape having a tacky surface, means for folding the tape to form a longitudinal rib therein between the edges thereof, feeding means mounted near said folding means and adapted to pull the tape therethrough, reciprocating means between the roll and folding means for pulling the tape progressively from the roll, an anvil roll rotatable on a horizontal axis to support the work, a hammer and a pleating bar supported immediately above said anvil roll, means for imparting oscillating movements to said hammer and pleating bar in opposite phase to press said hammer and bar alternately against work on said anvil roll, means for guiding the tape from said feeding means to said anvil roll, and an edge gauge supported adjacent to said anvil roll, said gauge having a feeler element adapted

to engage in the edge channel of the work to which the tape is being applied.

4. A machine for longitudinally folding a strip of tape and applying the same to an edge channeled innersole, comprising a main frame, a support for a roll of tape mounted on said frame, a folding device mounted on said frame and adapted to produce a longitudinal rib in tape drawn therethrough, feeding means on said frame for drawing tape from said roll through said folding device, oscillating members on said frame, a bracket secured to one of said oscillating members, detent means on said bracket engaging said tape between the roll and the folding device, an anvil roll mounted on said frame and rotatable about a horizontal axis to support a work piece during the application of tape thereto, a fixed support member having a horizontal portion approximately tangent to the crest of the roll, an edge gauge mounted on said frame adjacent to said roll, said gauge having a feeler element adapted to engage in the channel of the work piece on the roll, means for guiding said tape from said feeding means to said roll, and a hammer and a pleating bar carried by said oscillating members and movable thereby into alternate pressing engagements with the work piece on the roll.

5. In a machine for applying tape to innersoles or the like, a work support, means for guiding to said work support a tape having a longitudinal rib spaced from both edges thereof, and means for pressing the tape against the work piece on said support, said pressing means including a presser member having a knurled surface adapted to press against length of the marginal surface of the tape near the point of application thereof to the work and on one side of the rib and a second presser member having a knurled portion adapted to engage surface of the tape on the other side of the rib and a transverse portion straddling the rib to engage the tape on both sides thereof, and means for oscillating said presser members in opposite phase whereby said members press said tape in alternation.

6. In a machine for applying tape to edge-channeled innersoles or the like, a work support, means for guiding tape to work on said support, an edge gauge for the work mounted adjacent to said support, said gauge having a feeler element projecting over said support from a side thereof to engage in the edge channel of the work and a guard element above said feeler element to be engaged by the upper surface of the work.

7. In a machine for applying tape which has one sticky face, a frame, a work support carried by said frame, a support on said frame for a roll of tape, an oscillating member mounted on said frame, a presser foot carried by said member in position to cooperate with said work support, one-way feeding means carried by said member and oscillating therewith to draw tape from said roll, and means for guiding the tape from said feeding means to said work support.

8. In a machine for applying tape to innersoles

or the like, a tape folding device comprising a pair of thin plates arranged in a common plane and having parallel edges spaced apart a distance equal to the overall width of the folded tape, the thickness of said plates being slightly greater than that of the tape to be folded, a pair of thicker plates in face to face engagement with said thin plates, said thicker plates being spaced apart and presenting to each other parallel edges which are inclined with respect to the plane of the plates, the spacing between said inclined edges being slightly more than twice the thickness of the tape to be folded, and means adjustably securing all four said plates together with the spaces between said pairs of plates arranged in the form of the desired cross-sectional shape of the folded tape.

9. In a machine for applying tape having a tacky surface, a support for a roll of said tape, a folding device supported adjacent to said roll support, a feed wheel adapted to draw said tape through said folding device, and a convex guide surface between said folding device and feed wheel, said guide surface being arranged to receive and support the tape as it leaves the folding device.

10. In a machine for applying tape having a tacky surface, a support for a roll of said tape, means for pulling said tape progressively from the roll, means for folding the tape as it comes from said pulling means, a feed wheel for dragging said tape through the folding means, and a guide between said folding means and feed wheel against which the tape is pressed by its tension between the folding device and feed wheel.

11. In a machine for applying tape having a tacky surface, a main frame, a support for a roll of tape mounted on said frame, a device for pulling tape from said roll mounted for oscillation on said frame, a bracket mounted for oscillation on said frame, tape folding means, a convex guide surface and a feed wheel mounted on said bracket and a ratchet wheel on said feed wheel, a pawl supported by a stationary part of said frame for engagement with said pawl to rotate said feed wheel when said bracket oscillates, said guide surface being arranged to be pressed by the tape as it leaves the folding device whereby to set the folds in the tape.

HUBERT J. VACHON.

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