

Nov. 7, 1939.

A. EPPLER, JR

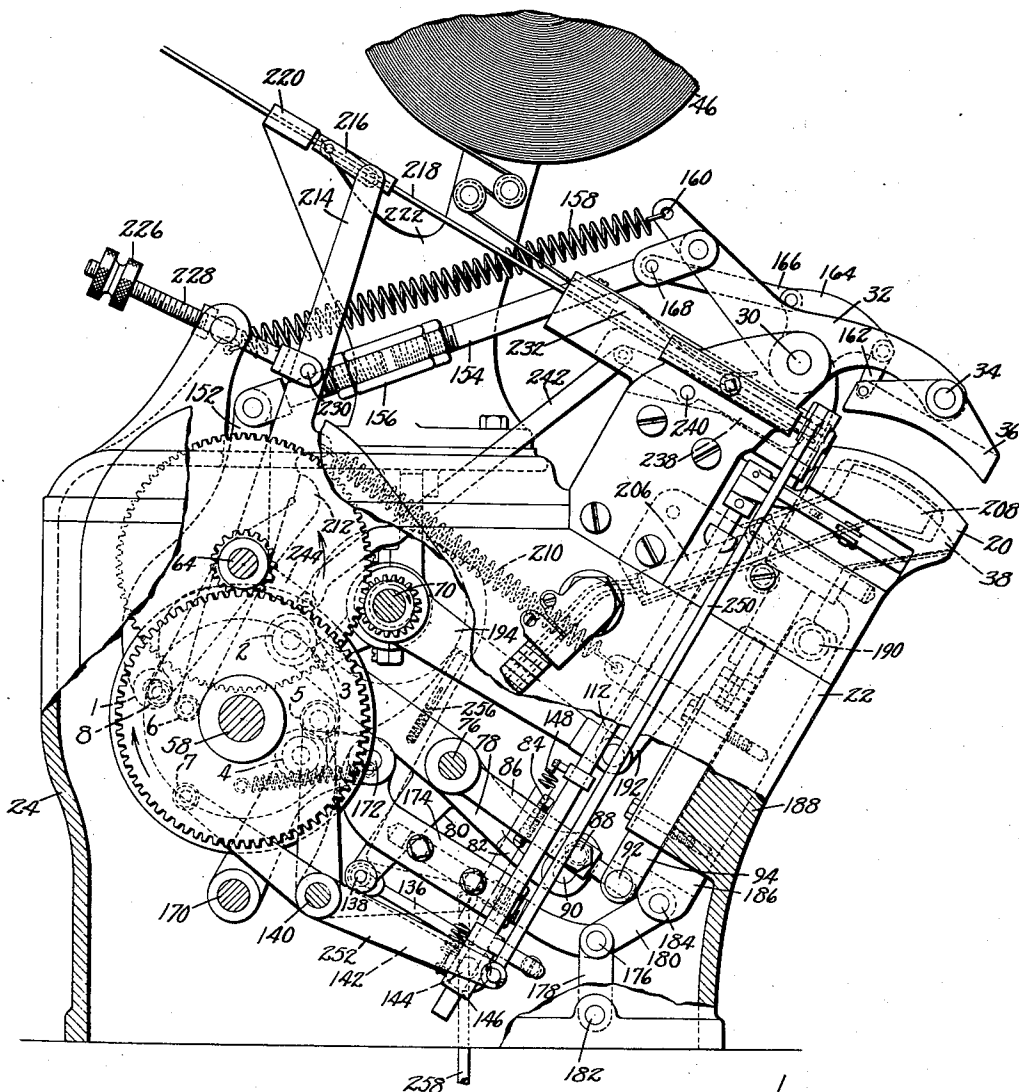
2,178,746

SEAM PRESSING AND REINFORCING MACHINE

Filed June 3, 1937

6 Sheets-Sheet 1

Fig. 1.



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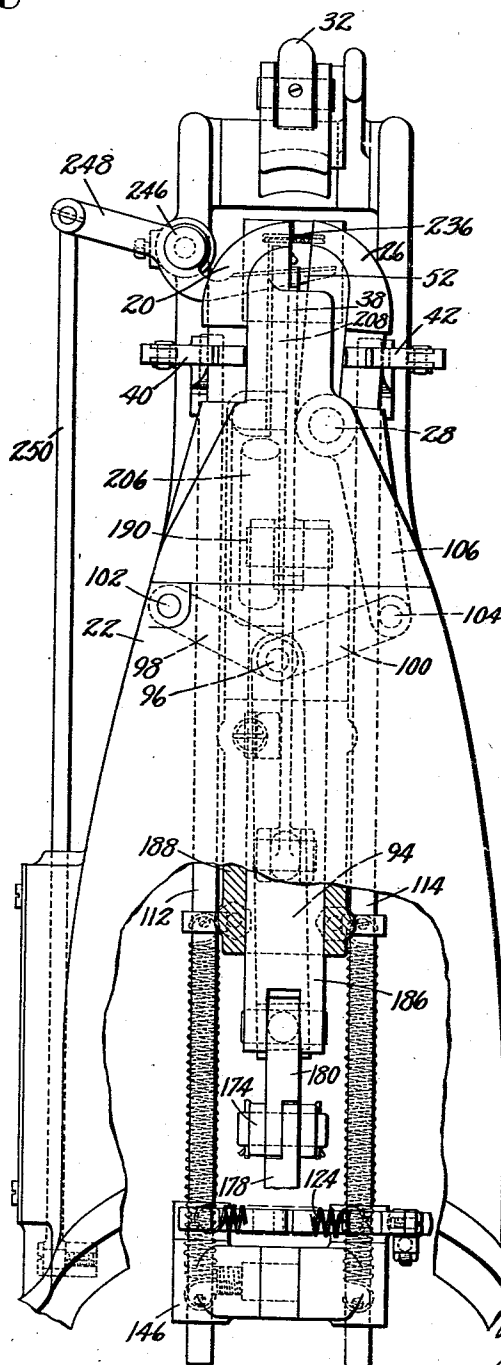
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6 Sheets-Sheet 2

Fig. 2.



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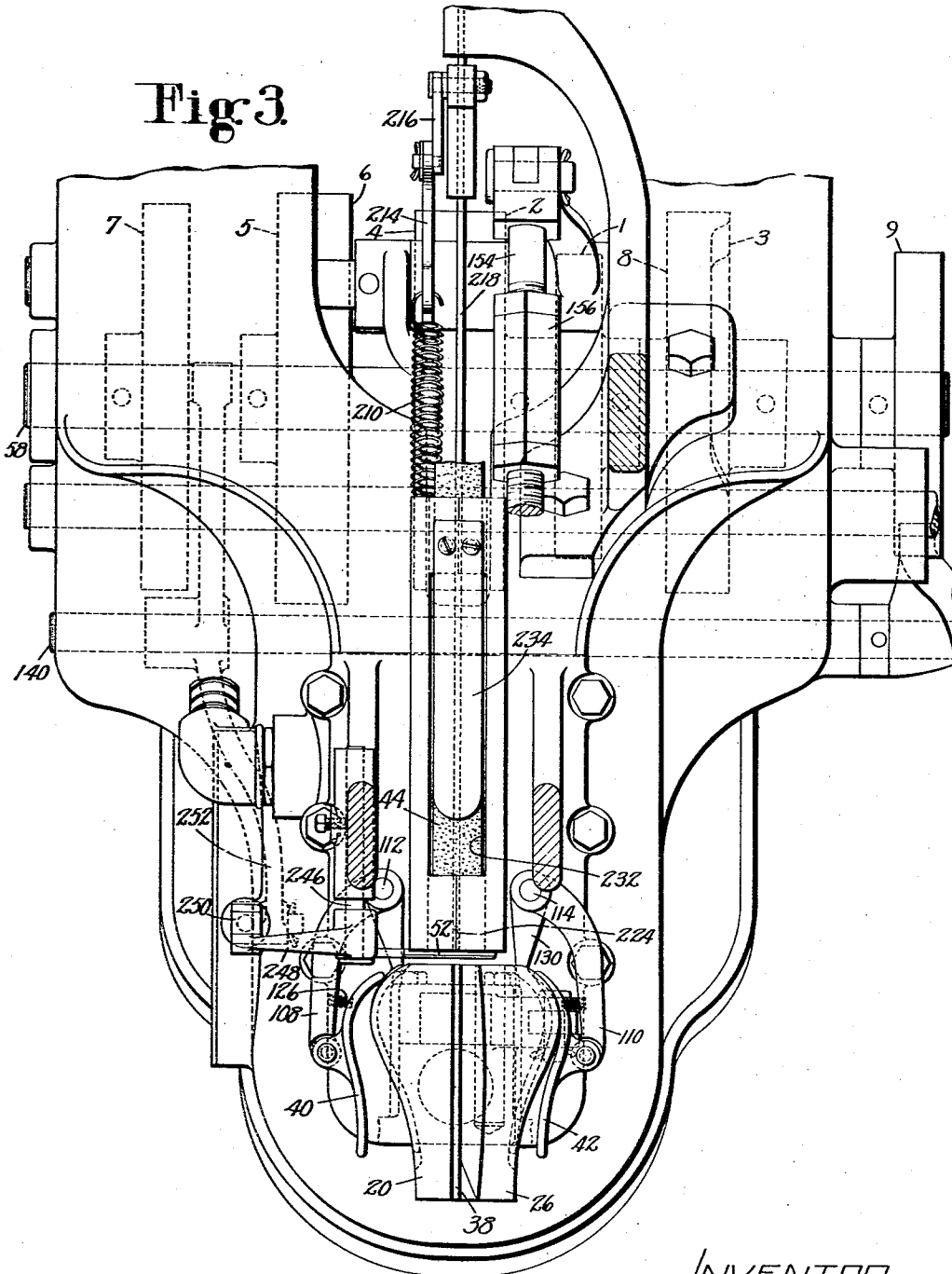
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6 Sheets-Sheet 3

Fig. 3.



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Fig.4.

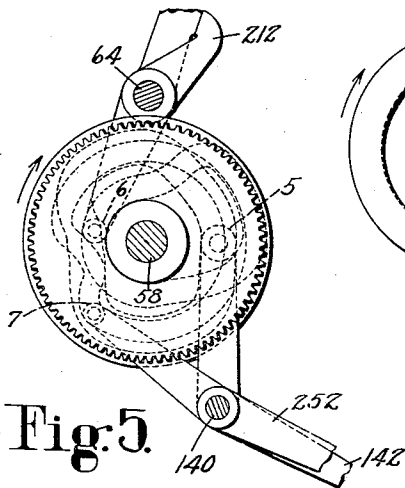
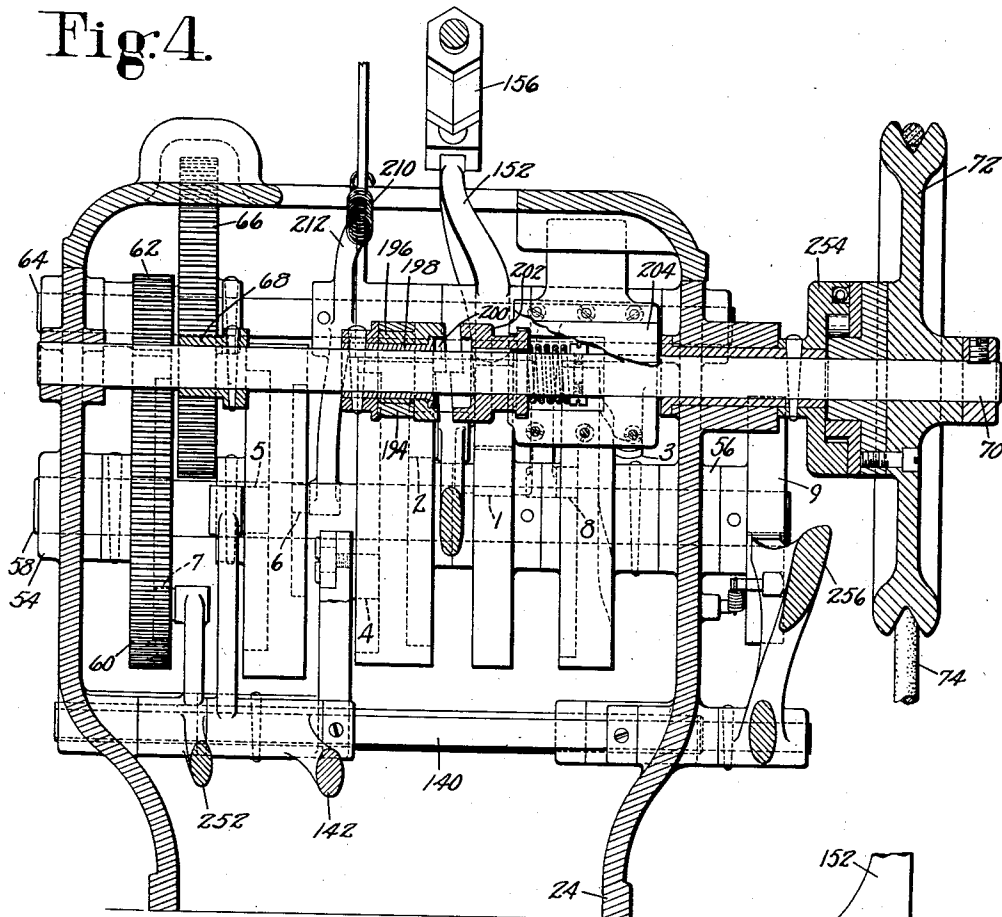


Fig.5.

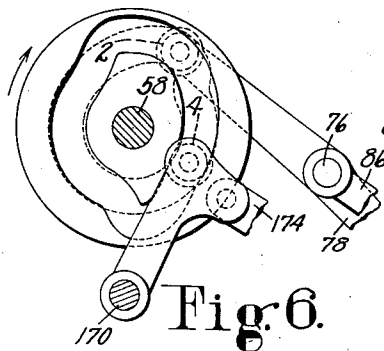


Fig.6.

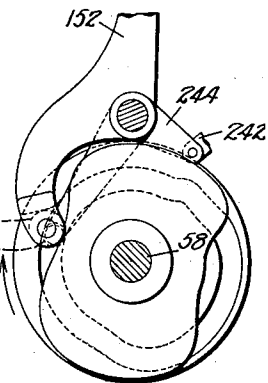


Fig.7

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SEAM PRESSING AND REINFORCING MACHINE

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Fig. 8.

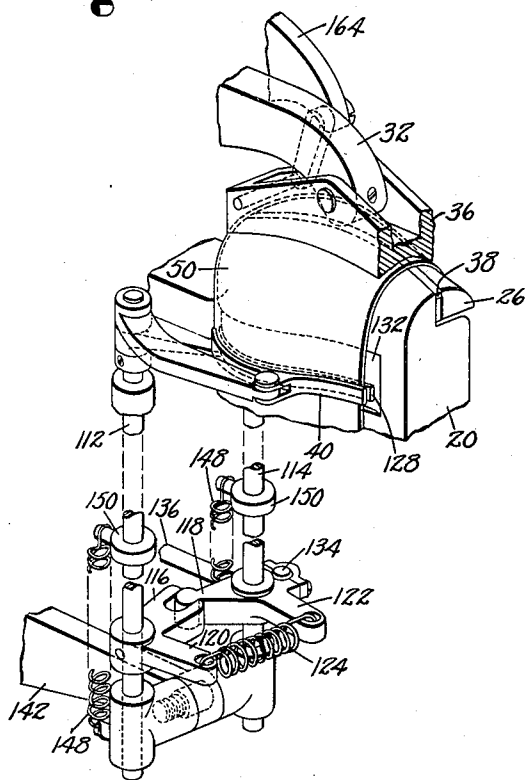


Fig. 9.

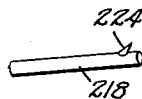
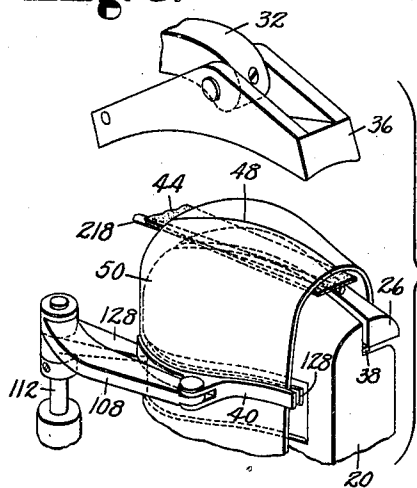


Fig. 10.

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SEAM PRESSING AND REINFORCING MACHINE

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6 Sheets-Sheet 6

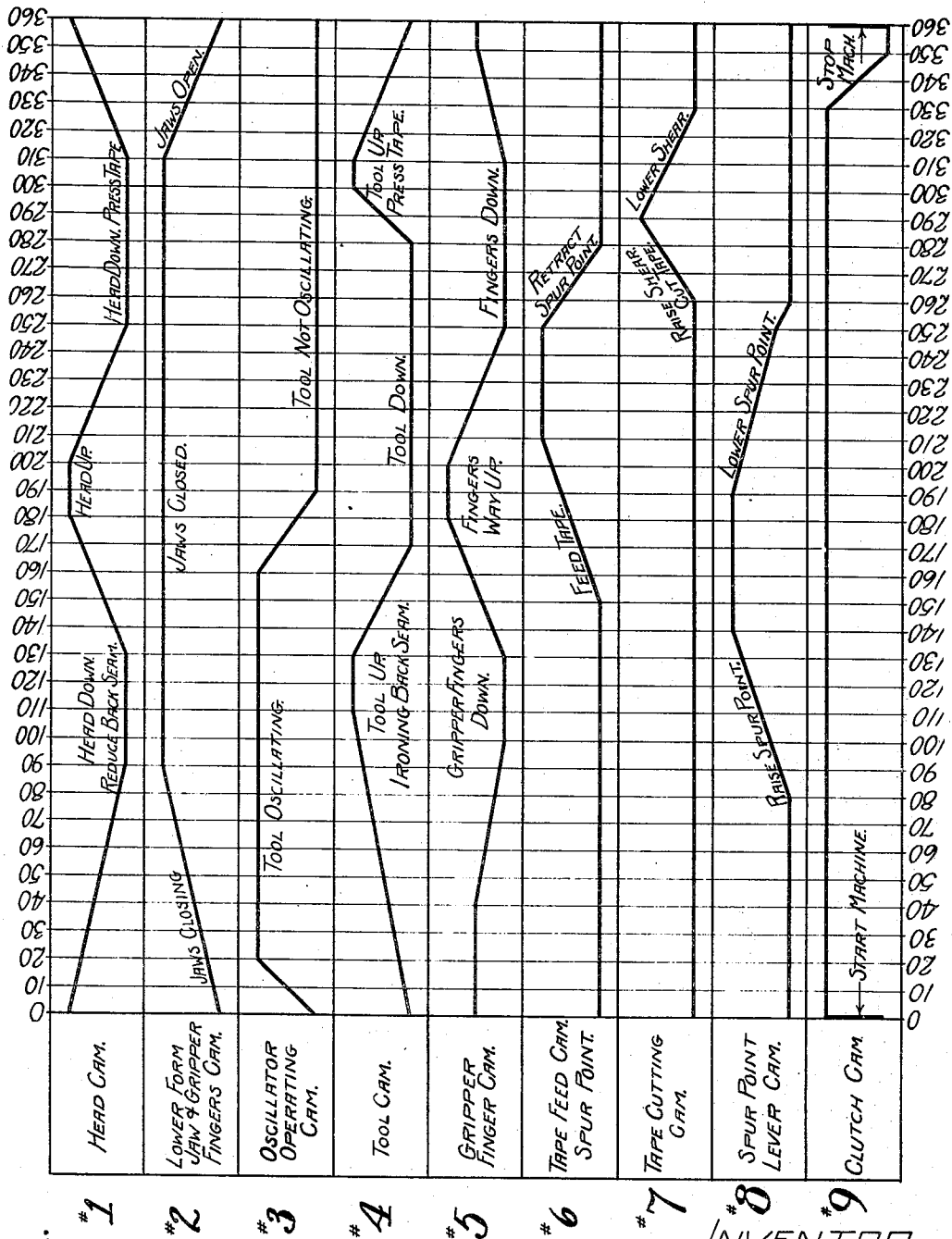


Fig. 1.

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UNITED STATES PATENT OFFICE

2,178,746

SEAM PRESSING AND REINFORCING
MACHINE

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Application June 3, 1937, Serial No. 146,300

14 Claims. (Cl. 12—51)

This invention relates to machines for pressing and reinforcing seams in shoe parts and is herein illustrated as embodied in an improved machine for performing the operations known in shoemaking as back seam pressing and taping.

In United States Letters Patent No. 2,094,905, granted October 5, 1937, upon an application filed in the name of Thomas C. Rowen, there is disclosed a machine for performing the operations of pressing and taping the back seam of a shoe quarter, and the present invention may, in certain respects, be regarded as a development of and improvement upon that of the said Rowen patent.

It is an object of the present invention to make the operation of seam pressing and taping machines automatic to a greater degree than heretofore with a view to increasing the speed and accuracy of operation, as well as improving the quality of the product and to this end I have provided mechanism for holding and moving the work in such a manner that the required amount of manipulation by the operator is greatly reduced. A feature of the illustrated machine consists in the provision of grippers which seize the work piece and draw it smooth and taut about the lower of a pair of pressing forms, hold it there while the seam is pressed, then lift the work from the lower form, to permit a tape to be introduced beneath the seam, and again lower it to pressing position to permit the tape to be pressed into adhesive contact with the work piece. The work is thus kept under perfect control during the seam pressing and tape applying operations, enabling those operations to be performed accurately and perfectly.

Another feature of the invention is to be found in an oscillating seam pressing tool which operates to press and flatten the seam ridge more effectively and easily than tools heretofore used. In the illustrated machine the mechanism for oscillating the tool is so timed relatively to the other operating mechanisms that the said tool remains stationary during the tape applying operation, since it is desirable to apply direct pressure, without any rubbing action, to the adhesively coated tape.

Invention is also to be recognized in the provision of mechanism for automatically presenting the tape in proper relation to the seam and for cutting it off after it is applied, so that no further cutting or trimming by hand is necessary.

Other improvements relating to the maintenance of parallelism of the presser head to the work supporting form, supplying heat to the os-

cillating seam pressing tool, and various other advantageous features will be set forth in the following detailed description of a machine embodying the invention, to be read in connection with the accompanying drawings in which,

Fig. 1 is a side elevation, partly in section, of a machine embodying the invention;

Fig. 2 is a view of the machine in front elevation;

Fig. 3 is a plan view;

Fig. 4 is a horizontal section showing the various driving mechanisms;

Figs. 5, 6 and 7 are detail views of the individual cams which operate or control the various mechanisms;

Fig. 8 is an angular view showing a work piece in seam pressing position;

Fig. 9 is a view similar to Fig. 8 showing the work piece lifted from the lower form and a tape introduced beneath the seam;

Fig. 10 is a view of a detail of the tape feeding member; and

Fig. 11 is a cam chart showing the timing of the movements of the various instrumentalities which operate upon the work.

The seam pressing and taping machine shown in the drawings is broadly similar to that shown in the Rowen patent referred to above. A lower pressing and work supporting form, comprising a stationary section 20, is mounted upon the forwardly projecting portion 22 of the housing 24 which is adapted to rest upon a bench and which encloses most of the operating mechanisms of the machine.

A second section 26 of the lower pressing form is pivotally mounted at 28 for swinging movement toward and from the section 20 and when the two sections are in juxtaposition the form is of a shape suitable to fit the inside of the back portion of a shoe quarter with the ridge of the back seam of the quarter occupying a narrow space between the two sections of the form.

Pivotally mounted at 30 above the lower pressing form is a lever 32 to the forward end of which is pivoted at 34 a vertically movable presser head 36 the shape of which is complementary to that of the lower pressing form to press and mold the portion of a shoe quarter adjacent to the back seam.

Operating in the narrow space between the sections 20 and 26 of the lower form is a seam pressing tool 38 which is in a lowered position at the time when the work piece is drawn over and pressed down upon the lower form and is thereafter elevated and oscillated to press and

rub the back seam against the presser head 36. After the seam pressing and rubbing operation the oscillation of the tool 38 is stopped and the work piece, which is held in grippers 40, 42, is raised to the position illustrated in Fig. 9 and adhesive reinforcing tape 44, drawn from a supply roll 46, is introduced beneath the back seam 48 of the quarter 50 by mechanism which will be described hereinafter.

The grippers 40, 42 are next caused to descend, carrying the quarter down upon the forms 20, 26, and the presser head 36 is lowered to press the quarter into adhesive contact with the tape. While the work is thus held under pressure a shear blade 52 is operated to cut off the tape flush with the edge of the quarter, after which the work is released and the operating instrumentalities are restored to positions where they are ready to begin operations upon the next work piece. The mechanisms for actuating the individual operating instrumentalities in their proper sequence will now be described.

Running through the machine from side to side and journaled in bearings 54, 56 in the housing 24 is a cam shaft 58 upon which are mounted a series of nine cams which cams, or the cam levers which they operate, are numbered from 1 to 9, inclusive, in the drawings. Cam No. 7 is formed in the side face of a gear 60 which is pinned to the cam shaft and meshes with a pinion 62 upon a countershaft 64 to which is pinned a gear 66 meshing with a pinion 68 fixed upon the main drive shaft 70 of the machine. The drive shaft 70 carries a loose pulley 72 driven by a belt 74 from any suitable source of power and the drive shaft and pulley are adapted to be connected by a treadle controlled one revolution clutch which will be referred to later. It will be seen that rotation of the drive shaft 70 will be transmitted to the cam shaft 58 through the gearing 60, 62, 66, 68. As previously stated, the section 20 of the lower work supporting form is stationary and the section 26 of the form is adapted to be moved toward and from the section 20 about the pivot 28. This movement of the section 26 is effected by cam No. 2 whose cam lever is fulcrumed upon a rod 76 and has a forward extension 78 and a downward extension 80. Projecting laterally from the lever extension 78 is an ear 82 engaged by the point of a screw 84 which is threaded through an arm 86 pivoted upon the rod 76. A stud 88 fixed in the arms 86 engages in an arcuate slot 90 in the forward end of the lever extension 78 to limit the amount of lost motion between said arm and lever extension.

The forward end of the arm 86 is pivotally connected at 92 to an upright link 94 the upper end of which is connected at 96 to the center of a toggle 98, 100. The outer end of the toggle link 98 is movable about a stationary pivot 102 and the outer end of the toggle link 100 is pivotally connected at 104 to the lower end of a downward extension 106 of the form section 26. During the rotation of cam No. 2 its cam lever will be swung in a direction to raise the forward lever extension 78 and, through the arm 86 and the link 94, to straighten the toggle 98, 100, and, consequently, move the form section 26 toward the stationary section 20 until only a narrow space, sufficient to receive and hold straight the back seam of a shoe quarter remains between the two form sections.

The grippers 40, 42 are arranged to receive and draw down the side portions of the quarter prior

to the completion of the closing movement of the form section 26 toward the section 20. The gripper jaws are pivoted, respectively, to the forward ends of arms 108, 110, which are fixed to the upper ends of upright rods 112, 114 mounted for both up and down sliding movement and oscillatory movement about their own axes, the said rods being interconnected for equal and opposite oscillatory movement by interengaging arms 116 and 118 of bell-crank levers of which the remaining arms 120 and 122, respectively, extend forward and are drawn toward each other by a pull spring 124 (see Fig. 8). Compression springs 126 (Fig. 3) tend to swing the rear ends of the gripper jaws 40, 42 toward each other, holding them lightly against inner gripper jaws 128, 130 which are loose upon the rods 112, 114 and the work engaging portions which lie in recesses 132 in the side faces of the work supporting form. The tension of the springs 126 is so light that the work piece may be easily pushed backward between the gripper jaws when the parts are in the positions illustrated in Fig. 3.

Pivoted at 134 to the outer side of the bell-crank lever 118, 122, is a link 136 which is connected at 138 with a lost motion connection to the lower end of the downward extension 80 of the cam lever 2 so that when the said cam lever is operated to move the work supporting form section 26 toward the form section 20, the rods 112, 114 will be permitted, under the influence of the spring 124, to turn in the proper directions to close the gripper jaws upon the work, simultaneously with the straightening and positioning of the back seam ridge of the quarter in the space between the form sections.

As soon as the gripper jaws seize the work piece they are moved downward by cam No. 5 to draw the work piece smoothly over the form. To this end the cam lever is pivoted on a shaft 140 and has a forward extension 142 which is connected at 144 to a cross head 146 slidable upon the lower ends of the rods 112, 114 and connected to the rods through pull springs 148, the upper ends of which are anchored to collars 150 fixed upon the rods. The purpose of the springs is to afford a yielding downward pull upon the sides of the quarter 50 through the grippers carried by the rods 112, 114.

By the time the grippers have drawn the quarter smoothly over the form the presser head 36 will have descended sufficiently to exert pressure upon the work piece. This presser head is actuated by cam No. 1, the cam lever of which is loosely pivoted upon the countershaft 64 and has an upper extension 152 connected by a link 154, adjustable in length by means of a turn-buckle 156, to the lever 32 which carries the presser head. The presser head cam is an open cam and its cam roll is held in engagement with it by a strong spring 158, the rear end of which is attached to a stationary part of the machine frame and the forward end of which is anchored at 160 to the rear end of the lever 32. The rear end of the presser head 36 is connected by a link 162 to a rocker member 164 upon the pivot 30 and the said rocker member is in turn connected by a link 166 to the link 154 at 168. These parts are so proportioned that a parallel motion is imparted to the presser head as it moves downward, in order that it shall engage the work evenly and simultaneously throughout its full length.

In order to press and flatten the back seam after the work has been placed under pressure between the presser head and the work support-

ing form, the seam pressing and ironing tool 38 is raised and oscillated. The raising of the tool is effected by cam No. 4 whose cam lever is movable at its lower end about a stationary fulcrum 170. The upper end of the lever is connected at 172 to an adjustable link 174 which is in turn connected at 176 to the center of a toggle 178, 180. The outer end of the link 178 is movable about a stationary pivot 182 in the base portion of the machine and the outer end of the link 180 is pivotally connected at 184 to the lower end of a slide 168 which is movable up and down in a stationary guide 188.

The seam pressing tool 38 is pivoted to the upper end of the slide 186 at 190 and the tool has a downwardly extending leg 192 which is connected by an eccentric rod 194 to an eccentric 196 upon the drive shaft 70. The eccentric 196 rotates freely upon a bushing 198 which is pinned to the drive shaft (see Fig. 4) and one end of the eccentric member is extended and toothed at 200, constituting one element of a positive clutch by which the eccentric is driven from the shaft 70. The other element 202 of the clutch is splined to the shaft and is movable axially thereof to engage and disengage the clutch. The engagement and disengagement of this clutch is controlled by cam No. 3 operating upon a slide 204 which shifts the clutch member 202 axially of the driving shaft into or out of engagement with the clutch member 200.

It will be apparent that rotation of cam No. 4 will straighten the toggle 178, 180 and cause the seam pressing tool 38 to be raised, while engagement of the clutch 200, 202 will cause rotation of the eccentric 196 and oscillatory movement about the pivot 190 will be imparted to the tool.

In order to produce the best results it is desirable that the seam pressing tool 38 be heated. To this end there is provided an electrical heating unit 206 embedded in the lower portion of a stationary member 208 having a flat side face against which the movable seam pressing tool 38 rubs. Heat is thus transmitted continually to the tool regardless of its position and movement.

The mechanism for feeding the tape 44 into applying position is actuated by a spring 210 under the control of cam No. 6. The cam lever is fulcrumed upon the countershaft 64 and its upper arm 212 engages the front face of a lever 214 also fulcrumed upon said countershaft and under the influence of the spring 210 which tends to move it forward. The upper end of the lever 214 is connected by a link 216 to a tape feed rod 218 which slides loosely through a bearing 220 supported by a bracket 222 which carries the tape supply roll 46. The forward end of the rod 218 is provided with an upwardly pointed spur 224 which is arranged to enter the tape near its end and draw a portion of it forward into applying position. The length of tape fed forward is determined by adjustment of a nut 226 threaded upon a rod 228 which is pivoted at 230 to the lever 214.

The tape passes through a guide 232 in which it is held down by a leaf spring 234 and from which it emerges through a flat tubular opening 236. Inasmuch as the tape is impaled near its end upon the spur 224 and drawn out under tension very accurate control of the length of tape produced is had as compared with those machines in which tape is pushed or projected into applying position.

The feed rod 218 is raised to cause the spur 224

to enter the tape by a lifter 238 movable about a stationary pivot 240 and having its rear end connected by a link 242 to the arm 244 of the cam lever of cam No. 8, which cam lever is fulcrumed upon the countershaft 64. Cam No. 8 is timed to raise the rod 218 and the spur 224 into engagement with the tape just before the tape feed begins and to lower the rod and spur at the end of the tape feed and before the feed rod is retracted.

For the purpose of cutting off the tape flush with the edge of the quarter at the proper time there is provided the shear blade 52 previously mentioned. This shear is movable about a stationary pivot 246 and has an outwardly extending arm 248 connected by a link 250 to an extension 252 of the cam lever which is actuated by cam No. 7, said cam lever being fulcrumed upon the shaft 140.

Connection of the belt pulley 52 to the drive shaft 70 is controlled by a conventional one-revolution clutch mechanism comprising a Horton clutch 254, a clutch stop arm 256 adapted to be actuated by a treadle rod 258 to permit the clutch to engage, and a cam 9 for disengaging the clutch at the end of a single revolution of the shaft.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In a machine for operating on a seamed shoe part, the combination of a support for the shoe part, a seam pressing tool of sufficient length to engage the entire length of the seam simultaneously, means for holding the shoe part stationary upon the support, means for moving the pressing tool into engagement with the seam, and means for oscillating the pressing tool while it is in engagement with the entire length of the seam and while the shoe part is stationary.

2. In a machine for operating upon a seamed shoe part, the combination of a support for the shoe part, a seam pressing tool arranged to engage and press the seam of a shoe part upon the support, means for oscillating said tool while it is in engagement with the seam, a stationary heating unit, and means for transferring heat from said unit to said tool while the tool is oscillating.

3. In a machine for operating on a seamed shoe part, the combination of a stationary support for the shoe part, a vertically movable presser head above said support, means for lowering the head into engagement with a shoe part upon said support, a vertically movable, horizontally oscillatory seam pressing tool beneath the work supporting surface of said support, means for raising the tool into engagement with the under side of a seam in the shoe part upon the support, and means for oscillating the tool while it is in engagement with the seam.

4. In a machine for operating on a seamed shoe part, the combination of a work support comprising relatively movable spaced apart sections upon which the shoe part may rest and between which the seam ridge may be positioned, means for effecting relative approach of the sections with the seam ridge between them, a seam pressing tool movable vertically between said sections, means for moving said tool upward into engagement with the seam, and means for oscillating said tool while it is in engagement with the seam.

5. In a machine for operating on a seamed shoe part, the combination of a work supporting

form the surface of which is shaped in accordance with the curvature of the inner surface of the portion of a shoe part adjacent to the back seam, a cooperating presser form which is substantially complementary to the part of the work supporting form which it covers, movable grippers at each side of the work supporting form arranged to seize a shoe part positioned on said form, means for moving the grippers to draw the shoe part smooth upon the form, and means for effecting relative approaching movement of the forms to press the smoothed shoe part therebetween.

6. In a machine for operating on a seamed shoe part, the combination of a work supporting form, movable means for sustaining a shoe part with its seamed portion spaced from the form, means for feeding a strip of reenforcing tape between the seam and the form, and means for pressing the work against the form to apply the tape to the seam.

7. In a machine for operating on a seamed shoe part, the combination of a work supporting form, movable grippers at each side of said form arranged to seize and hold a shoe part positioned over the form, means for raising and lowering the grippers, with the shoe part seized thereby, relatively to the form, means for feeding a strip of reenforcing tape over the form beneath the shoe part when the latter is raised, and means for pressing the work against the form to apply the tape to the work when the latter is lowered.

8. In a machine for operating on a seamed shoe part, the combination of a work supporting form, movable means for sustaining a shoe part with its seamed portion spaced from the form, means for feeding a strip of reenforcing tape between the seam and the form, means for pressing the work against the form to apply the tape to the seam, and means for cutting off the tape flush with the edge of the work while the latter is under pressure.

9. In a machine for operating on the rear portion of a shoe quarter, the combination of a work supporting form the surface of which is shaped in accordance with the curvature of said quarter adjacent to the back seam, a cooperating presser form which is substantially complementary to the part of the work supporting form which it covers, a lever upon which the presser form is pivotally mounted, means for swinging the lever to move the presser form toward or from the work supporting form, and linkage connections between the presser form and said lever constructed and arranged to maintain the presser form parallel to the supporting form regardless of the position to which the lever is swung.

10. In a machine for pressing and taping the back seam of a shoe quarter, the combination of a work supporting form the surface of which is shaped to conform to the curvature of the inner surface of the quarter adjacent to the back seam, a complemental presser form movable toward and from said supporting form, a seam pressing tool operable to press the back seam of the quarter while the latter is held between said forms, and means for presenting and applying a tape to the seam after the latter has been pressed.

11. In a machine for pressing and taping the back seam of a shoe quarter, the combination of a work supporting form the surface of which is shaped to conform to the curvature of the inner surface of the quarter adjacent to the back seam, a complemental presser form movable toward and from said supporting form, a seam pressing tool operable to press the back seam of the quarter while the latter is held between said forms, means for presenting and applying a tape to the seam after the latter has been pressed, and means for cutting off the tape flush with the edge of the quarter after the tape has been applied.

12. In a machine for applying adhesive tape to a shoe part, the combination of a tubular tape guide, reciprocating means for feeding tape through said guide, a shear, means for operating the shear in synchronism with the feeding means to cut off the tape fed through said guide, and pressing members adapted to press the tape upon the shoe part, said pressing members being of sufficient length to operate simultaneously upon the entire length of tape fed through the guide at one reciprocation of the feeding means.

13. In a machine for applying adhesive tape to a shoe part, the combination of a tape guide, reciprocating means for feeding a predetermined length of tape through the guide, pressing members adapted to press the tape upon the shoe part, a shear, and means for operating the shear to cut off the tape while it is held pressed upon the shoe part by said pressing members.

14. In a machine for applying adhesive tape to a shoe part, the combination of a support for the shoe part, tape feeding means constructed and arranged to engage the tape near its end, mechanism for moving the tape feeding means a measured distance to draw a predetermined length of tape over the support and then disengaging said feeding means from the tape, and pressing means movable toward the support to press the tape and the shoe part together.

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