Sept. 14, 1926. 1,599,518

J. FOSSA

MACHINE FOR FINISHING THE EDGES OF SHEET MATERIAL

Filed April 15, 1924 3 Sheets-Sheet 1

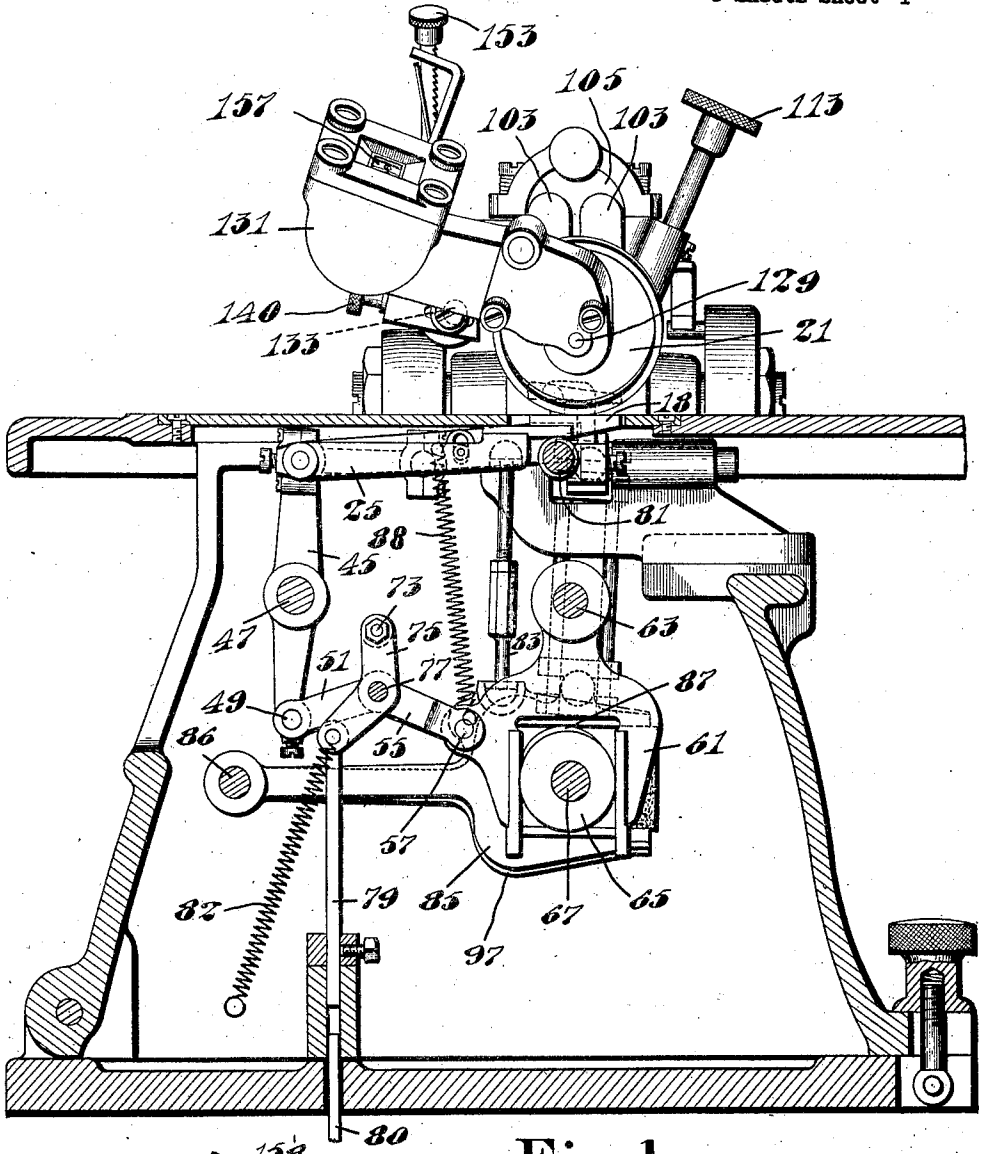

Fig. 1.

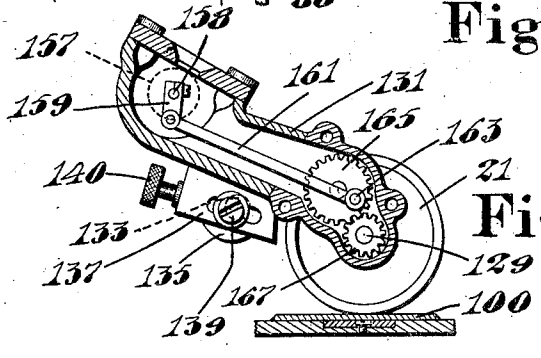

Fig. 2.

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By his Attorney
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Sept. 14, 1926. 1,599,518

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MACHINE FOR FINISHING THE EDGES OF SHEET MATERIAL

Filed April 15, 1924 3 Sheets-Sheet 2

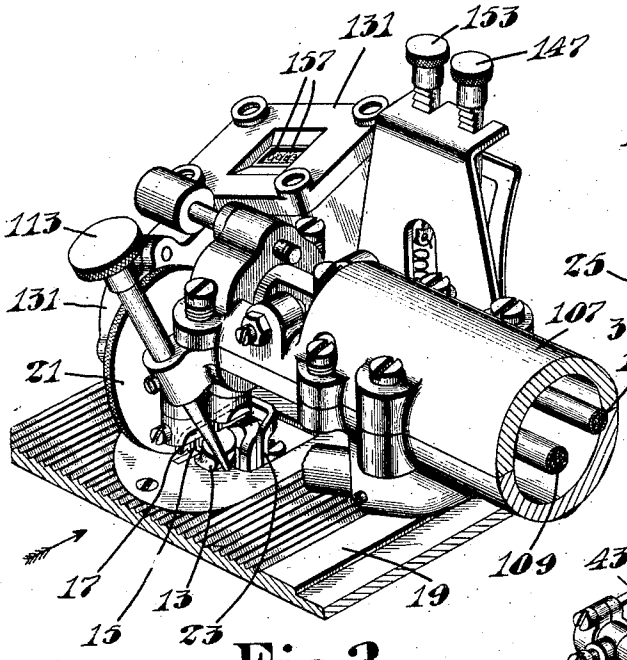

Fig. 3.

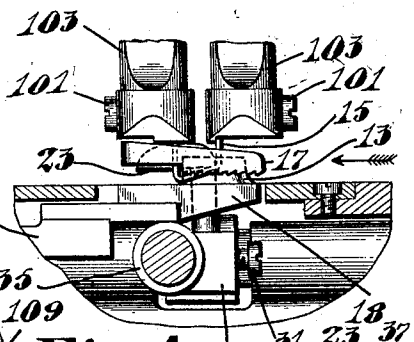

Fig. 4.

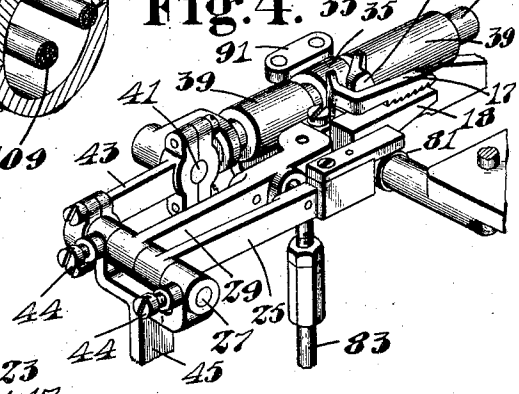

Fig. 5.

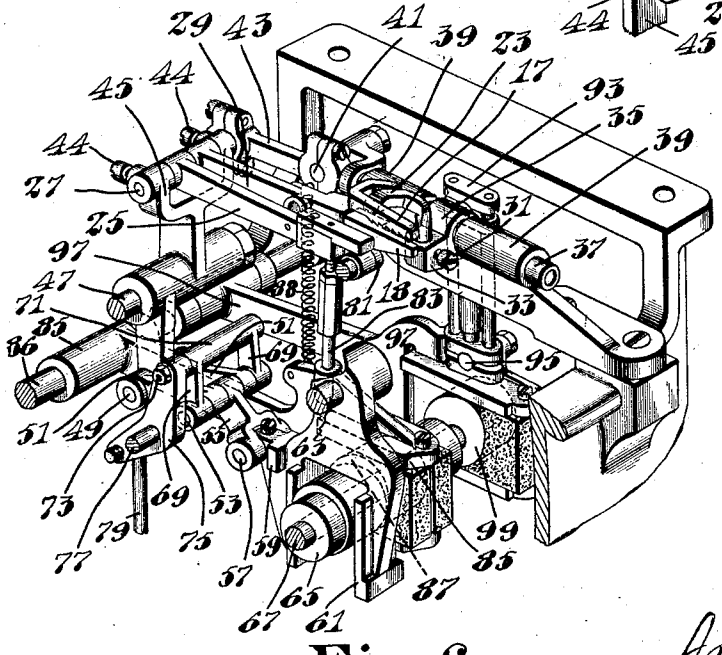

Fig. 6.

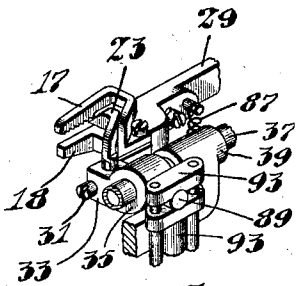

Fig. 7.

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MACHINE FOR FINISHING THE EDGES OF SHEET MATERIAL

Filed April 15, 1924 3 Sheets-Sheet 3

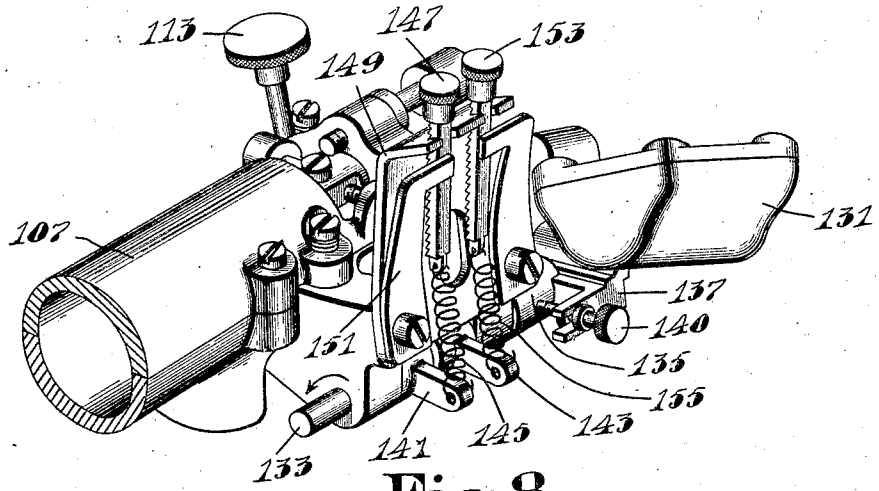

Fig.8.

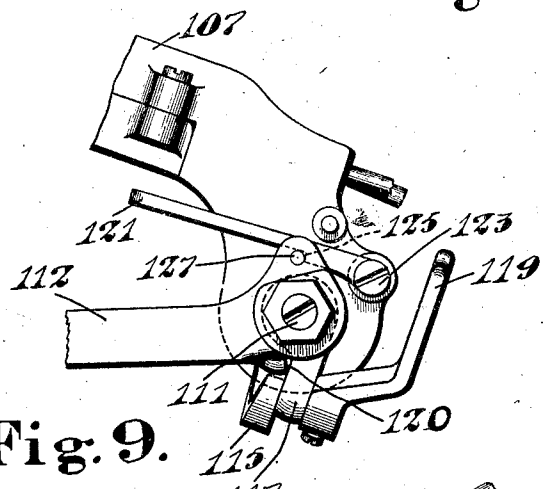

Fig.9.

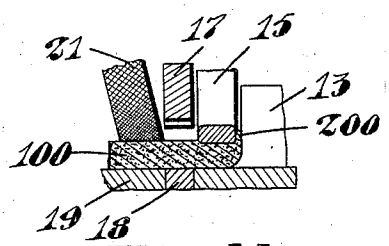

Fig.11.

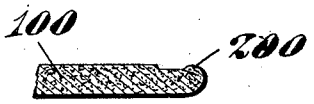

Fig.12.

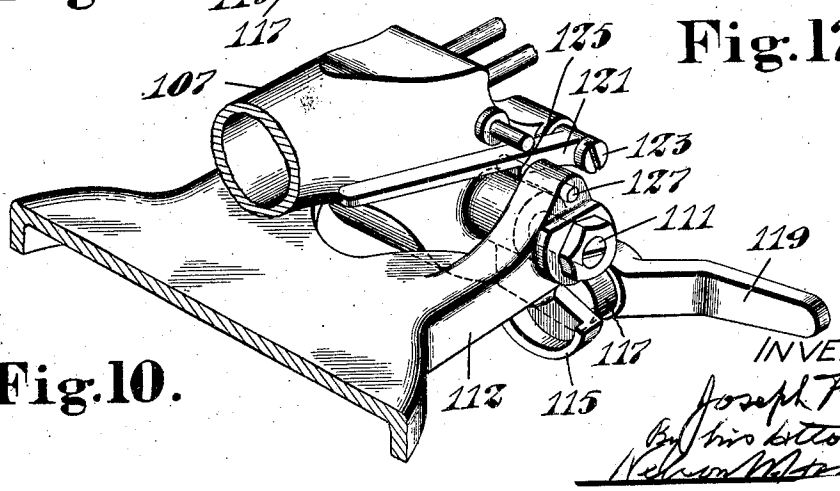

Fig.10.

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By his attorney
Nelson Monrad

Patented Sept. 14, 1926. 1,599,518

UNITED STATES PATENT OFFICE.

JOSEPH FOSSA, OF DANVERS, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR FINISHING THE EDGES OF SHEET MATERIAL.

Application filed April 15, 1924. Serial No. 706,776.

This invention relates to machines for finishing the edges of pieces of sheet material and is herein illustrated as embodied in a machine designed particularly for use in finishing the edges of pieces of leather preparatory to their incorporation in boots and shoes, a machine of this general type being shown in Patent No. 1,464,504, granted August 14, 1923, on an application filed in my name.

In that machine the leather is fed grain side downward beneath a hot shrinking or searing tool whereby the unshrunken grain side curls toward the flesh side. A plow extends under the extreme margin and holds the flesh side of the margin up against the under side of the shrinking tool, there being a small space between the tool and the plow to facilitate the formation of an upstanding fin. Located in the rear of the tool, considered in the direction of feed movement of the work, is a hammer which strikes the upstanding fin and bends it over upon the body portion of the leather piece, said piece being fed through the machine by a feed-foot which engages the leather piece at the side of the shrinking tool opposite that on which the plow is located. The work is thus fed past the shrinking tool and the plow by a feed-foot which engages the work at a considerable distance from the edge thereof.

Machines of this type in the use of which a piece of more or less flimsy sheet material is engaged at a locality spaced from the edge thereof and fed forward, with its extreme margin and edge held back more or less by the dragging action of the shrinking tool and the plow, while satisfactory on many kinds of material, have a tendency under some circumstances and with some kinds of material to produce wrinkles.

According to one feature of the present invention, means are provided for preventing such wrinkling. In the illustrative machine, the hammer, at the end of each hammering stroke and while it still grips the work, is given a movement in a direction to feed the work. This hammer, which is located directly behind the plow and the shrinking tool, thus seizes the work intermittently at its extreme edge and pulls the work past the tool and plow, the feed movement of the hammer being substantially synchronous with the feed movement of the feed-foot. The portion of the work which is being fed past the tool and the plow is thus held taut so that no wrinkling can occur.

In the patented machine, the shrinking tool and a presser wheel are rigidly mounted upon the free end of a pivoted arm, the arm being yieldingly urged at all times by a spring to rock about its pivot in a direction to cause the presser wheel and tool to move toward the work support, the construction being such that the weight of the arm is almost counterbalanced by the tension of the spring so that the presser wheel and tool rest lightly upon the work. It has been found desirable that the tool be adjusted into a position spaced a desired distance from the work support for work of a given thickness and density, and that the presser wheel be movable yieldingly toward and from the work independently of the tool, so that the pressure of the wheel on the work may be varied without varying the pressure of the tool.

According, therefore, to another feature of the invention, the presser wheel is yieldingly mounted upon the arm, and means are provided for locking the arm in adjusted position.

In machines of this general type it is desirable to provide mechanism for registering the linear extent of the work passed through the machine. According to another feature of the invention, such a mechanism is operated from the presser wheel so that only when the wheel is turning—that is, only when work is passing through the machine—is the registering mechanism operated.

Referring now to the accompanying drawings,

Figure 1 is an end view principally in elevation of a machine in which the present invention is embodied.

Figure 2 is a detail principally in elevation of the mechanism for driving the indicator.

Figure 3 is a perspective showing more particularly the work-engaging parts.

Figure 4 is an end elevation showing more particularly part of the feed mechanism.

Figure 5 is a detail in perspective of the feed mechanism.

Figure 6 is a perspective showing the connections from the drive shaft to the feed mechanism.

Figure 7 is a detail in perspective show-

ing the mechanism for driving the hammer.

Figure 8 is a perspective of the mounting of the presser wheel.

Figures 9 and 10 are perspectives of the mechanism for locking the arm in lowered position.

Figure 11 is a sectional view showing a piece of work in process of being operated upon; and

Figure 12 is a sectional view of a finished piece of work.

The general mode of operation of the machine is like that of the machine shown in Patent No. 1,464,504, which has been referred to above. The work 100, the edge of which has preferably been skived on an abrupt angle, is fed intermittently past a plow 13 (see Fig. 11) and beneath a hot searing or shrinking tool 15 by a feed foot 17 and cooperating anvil 18, the work being pressed down at all times upon the table or work support 19 by an idle presser wheel 21. The margin on the upper side of the work is shrunk by the action of the hot tool 15 so as to cause the unshrunken side to curl toward the shrunken side; and during this action a thin fin 200 is forced up into the space between the tool 15 and the plow 13. In order to bend this fin over toward or upon the shrunken side of the work, a hammer 23 (not shown in Fig. 11 since it lies behind the plow) is provided. This hammer strikes the upstanding fin at an angle in such manner as to bend it inwardly of the body portion of the work and to lay it in the position indicated in Figure 12. As thus far described, the construction and mode of operation of the present machine is or may be substantially the same as that of the patented machine.

In the patented machine, the only function of the hammer is to strike a blow upon the edge of the work in the manner referred to above, the feeding of the work being accomplished entirely by the feed foot 17 and anvil 18. This feed foot, however, engages the work at a distance from the edge thereof, and when the work is fed in this manner, there is a tendency to produce wrinkles in the work by reason of the fact that the edge and extreme margin of the work are dragged past the plow and shrinking tool.

In order to counteract this tendency, the hammer of the present machine is also a feed member; and, after having descended upon the edge of the work to bend over the fin 200, moves with the feed-foot to feed the work. During each intermittent feed movement, therefore, the work is engaged at two localities. The hammer engages the extreme edge of the work behind the shrinking tool and the feed-foot engages a locality spaced from the edge at one side of the tool. With the work thus held at these two localities during the feed movements, wrinkling of the work is prevented. The feed-foot is caused to descend upon the work just before the hammer descends; and acts thereafter in unison with the hammer to feed the work. It also acts first to engage the leading end of a piece of work presented to the machine and advance the work to the hammer, and second to hold the work firmly while the hammer descends to bend the fin over upon the body portion of the work.

Referring first to Figures 3 and 4, in which the arrows indicate the direction of feed movement, and to Figures 11 and 12, the mode of operation of the machine will be briefly described. Assuming that the work is a piece of leather, it will be presented, grain side down, with its edge against the plow 13 and its margin beneath the hot tool 15 in position to have its leading end engaged by the feed-foot 17. The feed-foot and its cooperating anvil 18 act as the only feeding means until the leading end of the work comes into the range of the hammer. Thereafter the machine operates in the following manner. The feed-foot descends to press the work firmly against the anvil 18. Immediately thereafter and while the work is thus held against being pushed to one side of the line of feed, the hammer descends to bend the fin 200 over and also to press the edge of the work against the anvil. The three members—hammer, feed-foot and anvil—then move in unison to feed the work. At the end of the feed movement the hammer and feed-foot rise and return to initial position to repeat the cycle. It should be particularly noted first that the work is securely held while the hammer is bending the fin downwardly and second that during the feed movement the work is engaged at two localities in such manner that it cannot be wrinkled.

Referring now more particularly to Figures 5, 6 and 7, the anvil 18, with which both the feed-foot 17 and the hammer or presser 23 cooperate, is carried at the free end of an arm 25 the hub of which is loosely mounted upon a rod 27. The feed-foot 17 is carried at the free end of an arm 29, the hub of which is also loosely mounted on the rod 27. The hammer 23 is fastened by a set screw 31 to a lug 33 on a short sleeve 35 which is rotatable upon but held from longitudinal movement with respect to a hollow rod 37, said rod being slidable in alined bearings 39 and being pivoted at one end at 41 to one end of a connecting rod 43, the other end of which is rotatably carried by the rod 27. The rod 27 is fastened by set screws 44 in alined sockets at the ends of the arms of a forked member 45, the hub of said member being rotatably mounted upon a rod 47 carried by the frame of the machine. When, therefore, this forked member is rocked, the anvil 18, the feed-foot 17

and the hammer 23 are all caused to move in unison back and forth in the line of feed.

The forked member is rocked and the extent of its rocking movement controlled in the following manner. A downwardly projecting arm on the hub of the forked member 45 carries a rod 49 on which are pivoted the far ends (the left-hand ends in Figure 6) of two parallel links 51, the near ends of the links being pivoted about a rod 53. Pivoted on this same rod 53 is one end of a link 55 the other end of which is pivoted about a rod 57 held fast by a set screw in a bore in a lug 59 which is integral with a yoke 61. This yoke is pivoted about a fixed rod 63 and straddles an eccentric 65 on the driving shaft 67. The two parallel links 51 on the one hand and the link 55 on the other form the arms of a toggle, the knuckle of which is the axis of the rod 53. Pivoted to this rod and extending upwardly are two arms 69 which are integral at their upper ends with a sleeve 71 through which passes loosely a rod 73. One end of this rod is carried by the upper end of a bent lever 75 pivoted to the frame of the machine at 77 and having pivoted to its lower end a rod 79 adapted to be pushed by a treadle rod 80 (Figure 1). A spring 82 holds the parts normally in the position shown. In this position in which the rod 73 is directly above the knuckle 53 of the toggle the maximum amount of rocking movement will be imparted to the forked member 45, and consequently the maximum amount of reciprocating feed movement will be imparted to the feed-foot 17, hammer 23 and anvil 18. In this case, the arc in which the knuckle 53 swings is approximately horizontal. When, however, the treadle rod 80 is pushed upwardly the arc in which the knuckle 53 swings is inclined, and consequently less of the swinging movement of the knuckle 53 is imparted to the forked member 45, and the feed movement of the parts 17, 18 and 23 is less.

In the operation of the machine, as has been described above, the feed-foot 17 descends to hold the work against the anvil 18, then the hammer 23 descends, and then the three members move in unison to feed the work. Thereafter the hammer and feed-foot rise to release the work, and all three members return to initial position. The anvil 18 is supported upon a roller 81 and moves in a straight path, while the feed-foot and the hammer move in substantially rectangular paths.

Referring first to the feed-foot 17, the mechanism for raising and lowering it at the proper times comprises a small rod 83 having semispherical ends. The upper end of the rod is received in a suitable socket formed in the under side of the arm 29 which carries the feed-foot 17, and the lower end of the rod is received in a similar socket in the upper part of a yoke 85 which straddles an eccentric 87 on the driving shaft 67, this yoke being carried by a stem the hub of which is loosely mounted on a fixed rod 86. A tension spring 88 is fastened at its upper end to the arm 29 and at its lower end to the yoke 85 so as to hold the ends of the rod 83 respectively in contact with the arm 29 and the yoke.

The hammer 23, as has been explained, is fast to a sleeve 35, which is rockable on but held from longitudinal movement with respect to the slidable hollow rod 37. In order to oscillate the hammer at the proper times to cause it to grip and to release the work, a pin 89 (Figure 7) rigid with the sleeve 35, is rotatably held in the upper end of a skeleton connecting rod 93, while a second pin 95, carried by a yoke 97, is similarly held in the lower end of said rod. This yoke straddles an eccentric 99 on the driving shaft 67, and, like the yoke 85, is pivoted on the rod 86.

The shrinking or searing tool 15, like that of the patented machine, is approximately U-shaped, its upstanding legs being held by screws 101 in downwardly bent copper rods 103 which pass through a fibre bushing 105 (see Figure 1) adjustably mounted in a hollow arm 107 in such manner as to be longitudinally and angularly adjustable, the copper rods being soldered to insulated conductors 109, said conductors being in turn attached to wires which lead to an adjustable transformer (not shown) by manipulating which the temperature of the tool may be controlled. All this construction is or may be substantially the same as in the patented machine and will not be further described.

In the patented machine, the arm, which overhangs the table and corresponds to the arm 107 of the present machine, is held yieldingly in adjusted position about its pivot by a tension spring, the purpose of the spring being to balance the arm in position so that the shrinking tool will ride lightly upon the work. Referring now more particularly to Figures 9 and 10, the arm 107 of the present machine is pivoted at one end at 111 to the frame 112 of the machine; but, instead of being yieldingly held in its lowered operative position, it is swung downwardly until the lower end of a stop screw 113 (see Figure 3) contacts with the table and is then locked in this position, said stop screw being threaded through a lug formed at the outer end of the arm. The locking mechanism comprises a cam 115 carried at one end of a stub shaft (not shown) which is rotatable in a lug 117 formed on the arm, and has fastened to its other end a handle 119 by which the cam may be turned. In Figure 9 the arm 107 is shown in raised, in-

operative position, the cam in such case being also in inoperative position. When now the arm is swung down into the position shown in Figure 10, the cam may be rotated to force its tapered end into the space between the left-hand face of the lug 117 and the substantially parallel face 120 of a lug formed on the frame. In the operation of the machine, the stop-screw 113 is adjusted so as to bring the shrinking tool 15 to the desired height above the table, said height being determined by the thickness of the work which is to be operated upon; and then the handle 119 is turned into the position shown in Figure 10 to lock the arm 107 in position. As in the patented machine, a latch 121 pivoted at 123 to the arm has a shoulder 125 adapted to engage a stationary pin 127 to hold the arm 107 in raised position after the arm has been raised by the operator in order to replace or adjust the shrinking tool.

In order to permit the presser wheel 21 to yield when thicker localities in the work are encountered, as well as to regulate the pressure with which it engages the work, this wheel is mounted on a pivot 129 (Figures 1 and 2) carried by the casing 131 of a registering mechanism presently to be described, said casing being yieldingly urged at all times in a clockwise direction about the axis of a rod 133. This rod is loosely mounted in alined bearings formed in the overhanging arm 107 and has at its outer end a cylindrical head 135. The head is provided at its outer end with an inclined guideway (not shown) in which is mounted a slide 137, the slide being integral with and forming a support for the casing 131 of the registering mechanism. The slide 137 is slotted as shown to receive a screw 139 which is threaded into the head 135 and holds the indicator casing, and with it the presser-wheel 21, in adjusted position with respect to said head. An adjusting screw 140 (Figures 2 and 8) extends through a right-angled extension of the slide 137, being held from longitudinal movement with respect to said extension, and is threaded into the head 135. After the holding screw 139 has been loosened, the screw 140 may be turned to adjust the presser wheel in the line of feed of the work.

In order to hold the presser wheel yieldingly down upon the work, the rod 133 has fast to it two arms 141, 143 (Figure 8). A tension spring 145 is fastened at its lower end to the arm 141 and at its upper end to a pull-rod 147 which is held in a guideway in a member 149 by a leaf spring 151, the pull-rod 147 having downwardly-pointed teeth as shown so that it will remain in any position to which it is drawn up. A second pull-rod 153 in every way similar to the pull-rod 147, and similarly connected by a spring 155, provides additional means for urging the rod 133 in the direction indicated by the arrow in Figure 8. By pulling up on one or both of these rods, the desired tension may be produced to cause the presser wheel 21 to bear with the desired force upon the work. Two springs the tension of which may be varied independently are provided instead of a single spring because with only a single spring it has been found impractical to obtain as wide a range of tension as is desirable.

The present machine is provided with mechanism for registering the linear extent of the work passed through the machine. The details of this mechanism, comprising the usual numbering wheels 157, which are adapted to be turned in proper sequence when the shaft 158 is rocked, form no part of the present invention and will not be described. In order to cause the shaft 158 to be rocked when work is passing through the machine, a short arm 159 clamped at one end to the shaft is pivoted at its other end to one end of a connecting rod 161, the other end of which is pivoted on a crank-pin 163 carried by a gear 165, said gear meshing with a smaller gear 167 which is rigid and turns with the presser wheel 21. Whenever, therefore, a piece of work 100 is passing through the machine and the presser wheel is being turned, the linear extent of the work is being registered.

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

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

1. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool arranged to operate upon the margin thereof, and means for gripping the work at two localities spaced apart in the direction of feed movement of the work, one at the extreme edge of the work and one spaced from said edge, and feeding the work while so gripped past the tool.

2. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool adapted to operate upon the margin thereof, a combined hammer and feed member, a feed-foot and means for operating said combined member and said foot to feed the work past the tool and to increase the curl imparted to the edge of the work by the action of the tool.

3. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool adapted to operate upon the margin thereof, a com-

bined hammer and feed member located in the rear of the tool considered in the direction of feed movement of the work, a feed-foot located at one side of the tool and arranged to engage the work at a locality in advance of that engaged by the combined member, and means for operating said foot and said combined member.

4. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool arranged to operate upon the margin thereof, two feed members one located behind the tool and adapted to engage the edge of the work and the other located at one side of the tool and adapted to engage the work at a locality spaced from the edge, and means for causing said members to operate intermittently substantially in unison to feed the work past the tool.

5. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool arranged to operate upon the margin thereof, two feed members one located behind the tool and adapted to engage the edge of the work and the other located at one side of the tool and adapted to engage the work at a locality spaced from the edge, and means for causing said members to operate intermittently substantially in unison to feed the work past the tool, the first-named member serving also to hammer the edge of the work.

6. A machine for finishing the edge of a piece of work having, in combination, a support for the work including an anvil, a shrinking tool adapted to operate upon the margin of the work, a hammer arranged to cooperate with the anvil, a feed-foot also arranged to cooperate with the anvil, means for moving the anvil back and forth in the line of feed movement of the work, and means for causing the hammer and the feed-foot to press the work against the anvil and to move with the anvil in a direction to feed the work past the shrinking tool.

7. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a heated shrinking tool, a plow located at one side of the tool for bending the margin of the work and holding it against the tool, a feed-foot located on the opposite side of the tool from that occupied by the plow, a combined hammer and feed member located in the rear of the tool considered in the direction of feed movement of the work, and means for operating the feed-foot and the combined member.

8. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool adapted to cause the edge of the work to curl, a feed-foot located at one side of the tool considered with respect to the direction of feed movement of the work, a combined hammer and feed member located in the rear of the tool, means for intermittently causing the feed-foot to press the work against the support, then to move in a direction to feed the work and then to rise and return to initial position, and means for imparting movement in a similar path to the hammer, the timing being such that the feed-foot descends upon the work prior to the descent of the hammer.

9. A machine for finishing the edge of a piece of work having, in combination, a support for the work, means for shrinking the margin of the work on one side to cause the edge to curl, a hammer, and means for causing the hammer first to descend upon the edge to increase the curl thereof and then to move in a direction to feed the work.

10. A machine for finishing the edge of a piece of work having, in combination, a support for the work, means for shrinking the margin of the work on one side to cause the edge to curl, a combined member for hammering the edge and for feeding the work, and means for operating said member.

11. A machine for finishing the edge of a piece of work having, in combination, a support for the work including an anvil, means for shrinking the margin of the work on one side and thereby causing the unshrunken side to curl toward the shrunken side, a hammer arranged to cooperate with the anvil, and means for first causing relative movement of approach between the hammer and the anvil to grip the edge of the work in such manner as to increase the curl thereof and then movement in unison in a direction to feed the work past the shrinking means.

12. A machine for finishing the edge of a piece of work having, in combination, a support for the work including an anvil, a heated tool adapted to shrink one side of the margin of the work and thereby cause the unshrunken side to curl toward the shrunken side, a hammer arranged to cooperate with the anvil, and means for first causing relative movement of approach between the hammer and the anvil to grip the edge of the work in such manner as to increase the curl thereof, and then movement in unison in a direction to feed the work past the heated tool.

13. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a pivoted arm overhanging the support, a shrinking tool mounted in the free end of the arm, an adjustable stop to limit the approach of said free end toward the support, and means for locking said arm in adjusted position.

14. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a pivoted arm overhanging the support, a shrinking tool mounted in the free end of the arm, an adjustable stop to limit the approach of said

free end toward the support, means for locking said arm in adjusted position, a presser wheel mounted on the arm, and yielding means for urging said wheel toward said support.

15. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool for operating upon the margin of the work, means for feeding the work over the support in contact with the tool, a presser wheel adapted to engage the work, mechanism for registering the linear extent of the work fed through the machine and means for operating said mechanism from said wheel.

16. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool for operating upon the margin of the work, means for feeding the work over the support in contact with the tool, a presser wheel, a casing in which the wheel is rotatably mounted, mechanism located in the casing for registering the linear extent of work passed through the machine, and means for causing rotation of said wheel to operate said mechanism.

17. A machine for finishing the edge of a piece of work having, in combination, a support for the work, a shrinking tool for operating upon the margin of the work, means for feeding the work over the support in contact with the tool, a presser wheel, a casing in which the wheel is rotatably mounted, yielding means for urging the casing in a direction to cause the presser wheel to engage the work, mechanism located in the casing for registering the linear extent of work passed through the machine, and means for causing rotation of said wheel to operate said mechanism.

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

JOSEPH FOSSA.