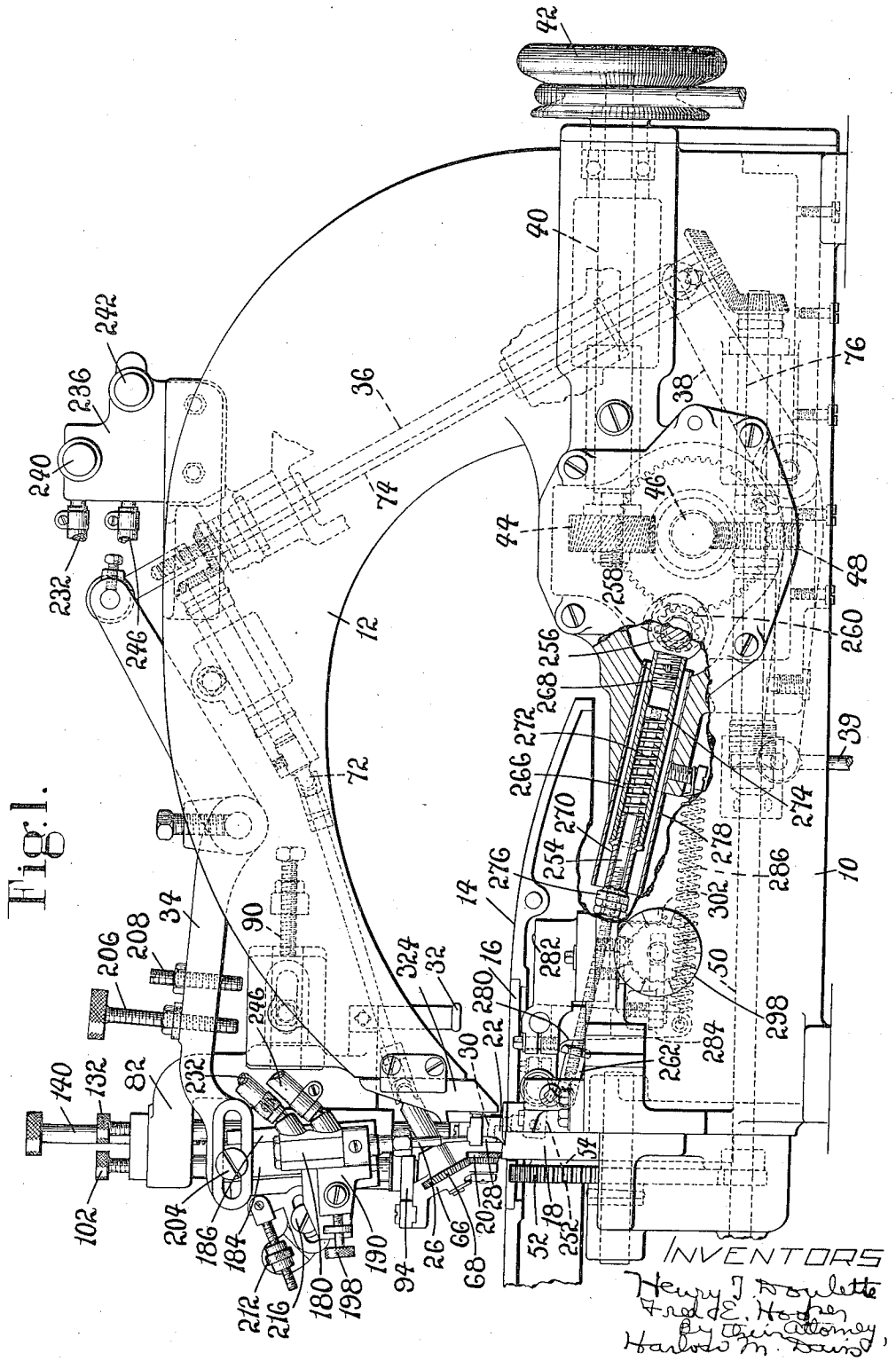
Oct. 15, 1935. H. T. DOULETTE ET AL 2,017,055

EDGE FINISHING MACHINE

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Fig. 1.



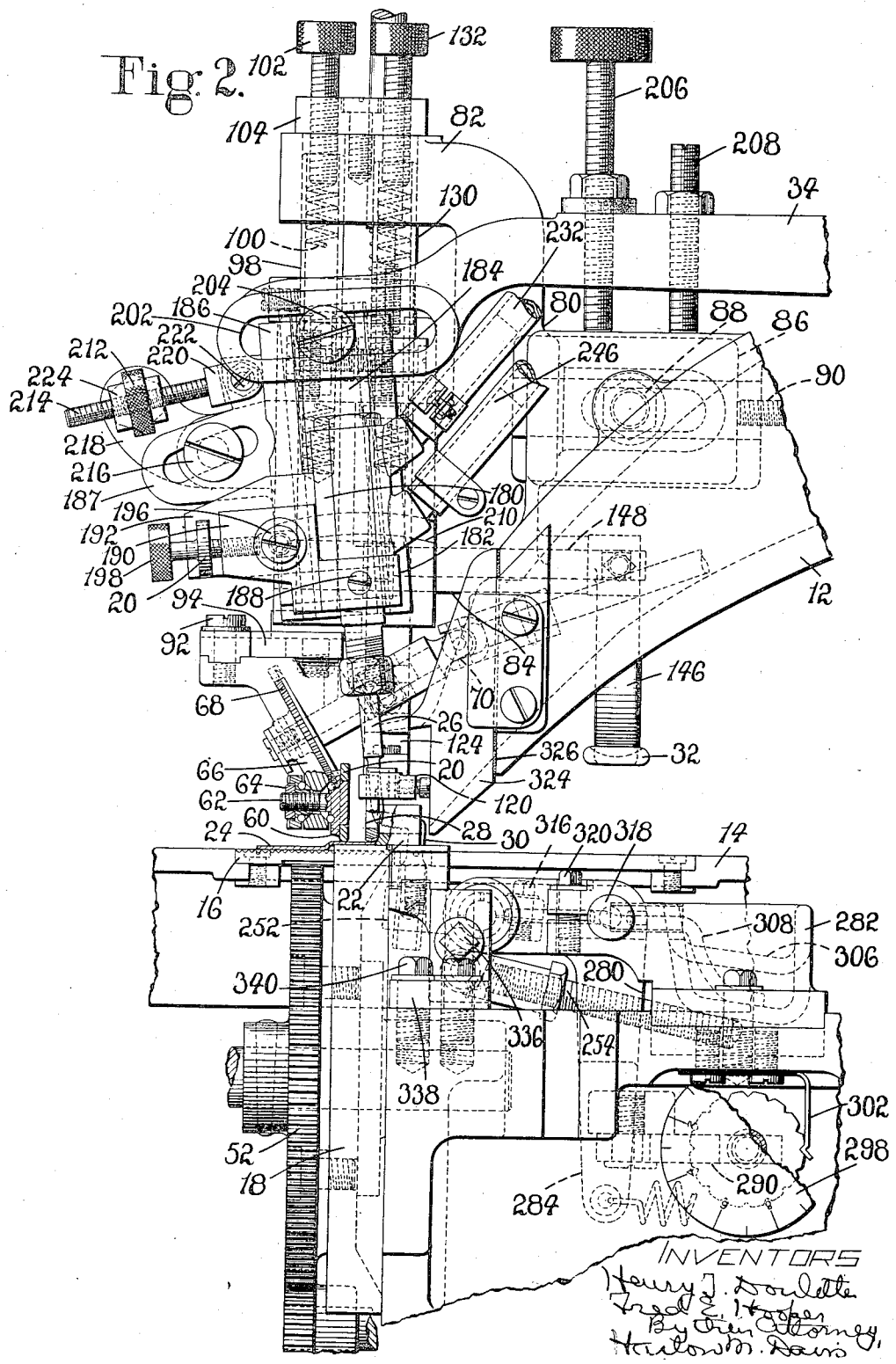
INVENTORS
Henry J. Doulette
Fred E. Hooper
By their Attorney,
Harlow M. Davis

Oct. 15, 1935. H. T. DOULETTE ET AL 2,017,055

EDGE FINISHING MACHINE

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Fig. 2.



INVENTORS
Harry J. Doulette
Fred E. Harper
By their Attorney,
Harlow W. Davis

Oct. 15, 1935. H. T. DOULETTE ET AL 2,017,055

EDGE FINISHING MACHINE

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Fig. 3.

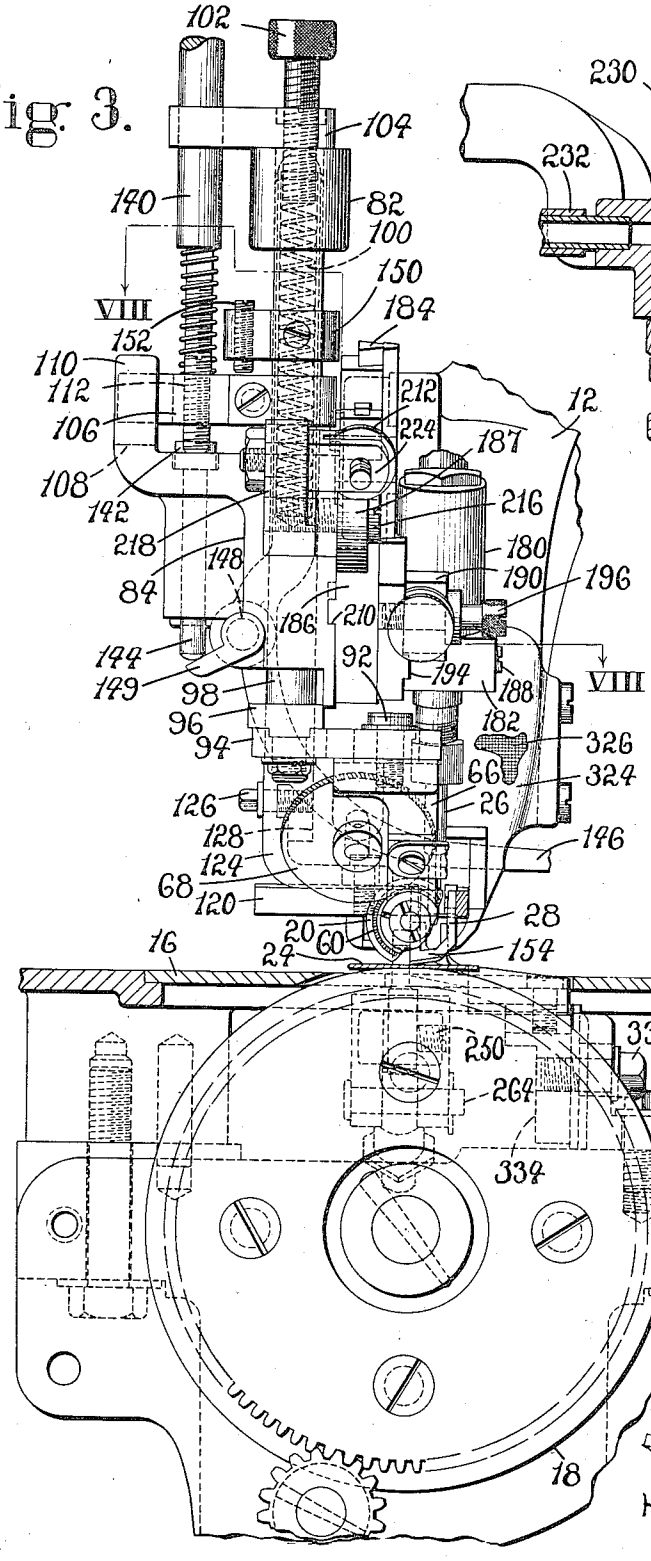
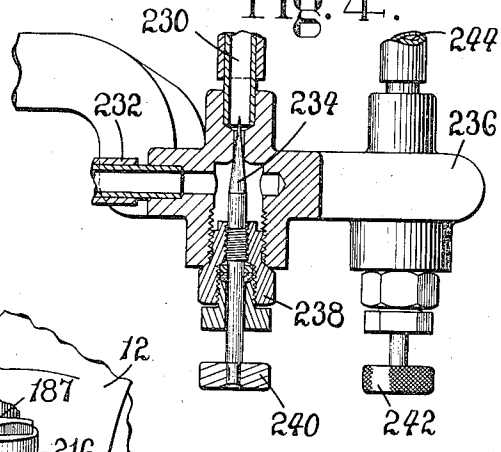


Fig. 4.



INVENTORS
Henry J. Doulette
Fred E. Harper
By their Attorney
Harlow N. Davis

Oct. 15, 1935. H. T. DOULETTE ET AL 2,017,055

EDGE FINISHING MACHINE

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Fig. 5.

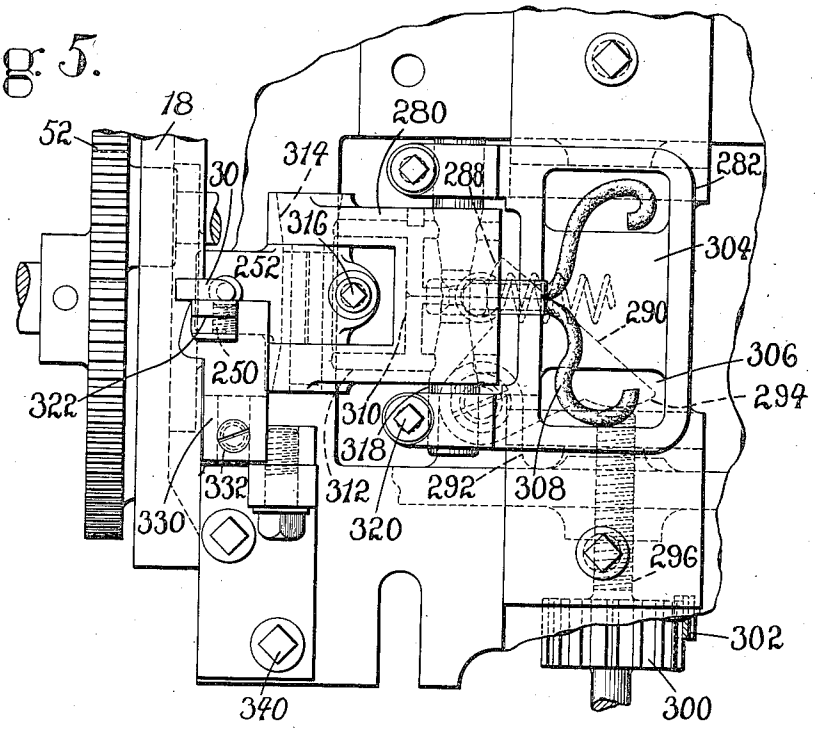


Fig. 7.

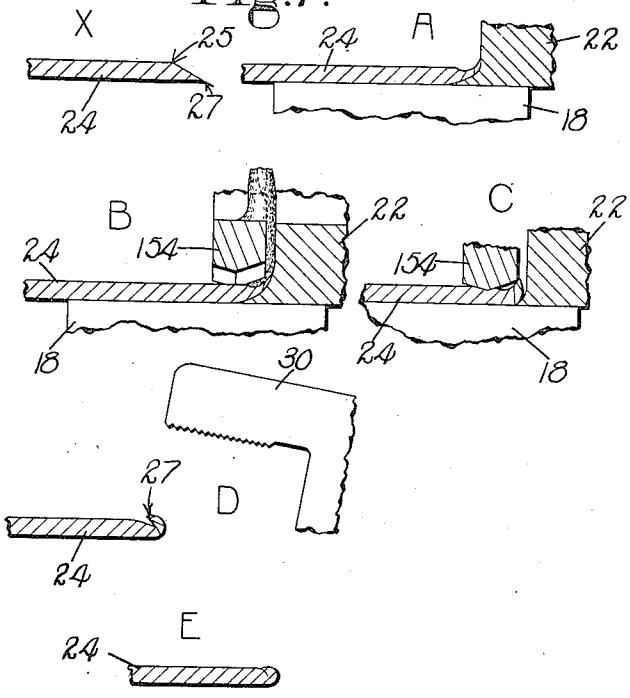
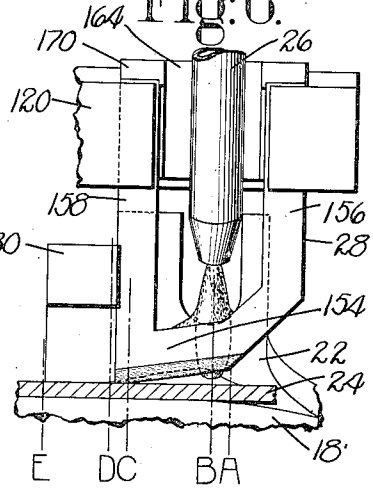


Fig. 6.



INVENTORS

Henry T. Doulette
Fred E. Hooper
By their Attorney
Harlow M. Davis

Oct. 15, 1935. H. T. DOULETTE ET AL 2,017,055

EDGE FINISHING MACHINE

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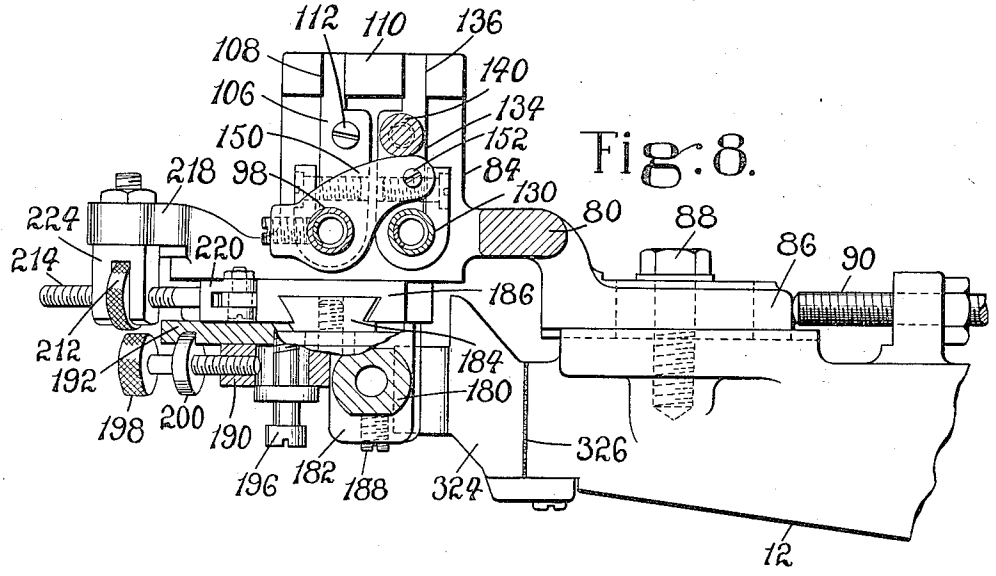


Fig. 8.

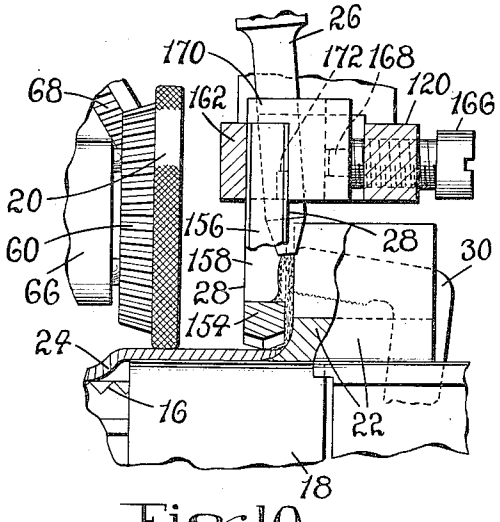


Fig. 10.

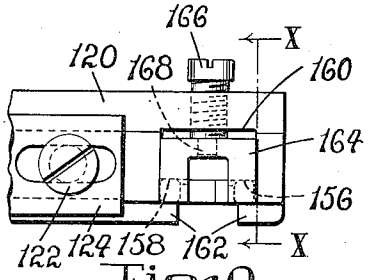


Fig. 9.

INVENTORS

Henry T. Doulette

Fred E. Hopper

By their Attorney,

Harlow B. Davis

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UNITED STATES PATENT OFFICE

2,017,055

EDGE FINISHING MACHINE

Henry T. Doulette, Brockton, and Fred E. Hooper, Swampscott, Mass., assignors to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application September 28, 1934, Serial No. 745,974

21 Claims. (Cl. 69—1)

This invention relates to machines for finishing the edges of pieces of sheet material and is herein illustrated as embodied in a machine of the type shown in Letters Patent of the United States No. 1,926,037, granted September 12, 1933, on the application of John B. Coffey, which is particularly adapted for finishing the edges of pieces of upper leather, such as those used in the manufacture of boots and shoes. Such machines commonly are used to shrink the flesh side of the upper leather thereby to cause the grain side to curl toward the flesh side so as to produce an edge in which only the grain of the leather may be seen.

In the machine of the Coffey patent to which reference has been made above, heat is applied to the flesh side of the leather by means of an oxy-acetylene flame. In another type of edge finishing machine, illustrated in Letters Patent of the United States No. 1,464,504, granted August 14, 1923, on the application of Joseph Fossa, the shrinking of the leather is accomplished by means of a U-shaped tool pressed against the work and heated by the passage of an electric current through the tool. In accordance with important features of the invention, the illustrated machine enables the operator to secure increased production and to improve the results upon certain types of leather by combining features of the patented machines and utilizing a U-shaped shrinking tool with an oxy-acetylene flame. This flame is directed primarily upon the upper side of the shrinking tool to heat it. The direction of incidence of the flame upon the tool may be selected in accordance with the needs of the particular work to cause the flame to split on the shrinking tool and part of it to diverge so as to act directly upon a portion of the work adjacent to that which is treated by the shrinking tool itself.

The temperature of the oxy-acetylene flame which is employed is approximately 3400° centigrade and the diameter of the chromel wire, from which the U-shaped shrinking tool is made, is of the order of two millimeters. Under this terrific heat, the shrinking tool becomes approximately white hot and it is important that it shall be so supported as to resist deformation when pressed vigorously against the leather. To this end, features of the invention reside in an improved construction for supporting the shrinking tool including a clamp arranged to grip the legs of the tool on opposite faces and to resist deformation of these legs either toward or away from one another. At the same time, the clamp overlies the tops of the legs to avoid slippage of the iron in the clamp when the iron is pressed against the leather. Another feature of the invention resides in an open-sided clamp construction which allows the flame to be directed against the cross-bar of the U-shaped tool without interference and permits the tip of the torch to be positioned within the sides of the clamp, if desired.

During the periods of disuse of the machine between the times when the pieces of work are being presented thereto, it is desirable to move the torch away from the shrinking tool to avoid overheating adjacent parts of the machine. This is accomplished, in the illustrated embodiment of the invention, by means of a carrier slide which causes substantially right-line movement of the torch toward and away from the work, without disturbing the angular relation between the torch and the work. At the same time, provision is made for adjustment to predetermine the angle between the axis of the torch and the surface of the work, and for lateral displacement of the torch toward and away from the edge of the work.

After the edge of the work has been curled by the application of heat, it is compacted by the rapidly repeated blows of a hammer. Other features of the invention reside in an improved construction and arrangement of the hammer supporting and operating mechanism enabling the hammer to strike a yielding blow upon the work, to be readily adjusted for pieces of work of different thicknesses and to cause the operative face of the hammer to be always parallel to the surface of the work support.

These and other features of the invention will now be described in the following specification reference being had to the accompanying drawings, in which

Fig. 1 is a side elevation of the machine with parts broken away and in section;

Fig. 2 is a similar view, upon a much larger scale, of an end portion of the machine adjacent the work-engaging tools;

Fig. 3 is an end elevation;

Fig. 4 is a detail view, partly in section, showing control valves for the gases which are combined to feed the torch;

Fig. 5 is a plan view of the lower feed roll and a part of the hammer actuating mechanism;

Fig. 6 is a vertical section through the machine at right angles to the axis of the lower feed wheel and showing, greatly enlarged, the shrinking tool, the turning post and the hammer;

Fig. 7 illustrates the progress of a piece of work through the machine and comprises a se-

ries of sections at right angles to Fig. 6 taken on the lines A, B, C, D and E;

Fig. 8 is a horizontal section through the torch-carrying mechanism and adjacent parts upon the line VIII—VIII of Fig. 3;

Fig. 9 is a detail plan view of the clamp for the shrinking iron, and

Fig. 10 is an enlarged elevation of the work-engaging parts of the machine, the holder for the shrinking tool being in section upon the line X—X of Fig. 9.

The machine is built upon a frame comprising a hollow base portion 10 having a hollow overhanging arm 12. Near the end of the base portion is mounted a work supporting table 14 at the center of which is a removable ribbed plate 16 apertured to allow a lower feed roll 18 to project through the plate for engagement with the under side of a piece of work 24, which will usually be the grain side of a piece of upper leather, for example. The work is fed continuously during its presentation to the machine by this supporting lower feed roll 18 and a coacting driven upper feed roll 20. The work is usually skived, forming a shoulder 25, shown greatly enlarged at X in Fig. 7, and the edge 27 will contact with a plow or turning post 22, as is common in such machines, thus giving a preliminary upward turn to the margin of the leather of the work piece 24 (Fig. 7 at A). As the work is fed, the flesh surface thereof is treated by means of an intensely hot flame issuing from a torch 26 and by a shrinking iron 28 thus causing the marginal portion of the work to be made plastic and its edge to be curled up (Fig. 7 at B, C), as will be later more fully described. As soon as the leather work piece leaves these treating tools, its curled margin is compacted by a hammer 30 (it being shown after one below at D in Fig. 7) and after repeated blows of the hammer assumes approximately the condition illustrated at E. It will be understood that the showing in Fig. 7 comes as near as possible to illustrating what is happening to a piece of work of assumed characteristics but that, because of the intense heat, it is impossible to see or to show the progressive action with exactness. When a new work piece is to be inserted, the upper feed roll 20 and the shrinking iron 28 are lifted by depression of a finger piece 32 to allow the edge of the leather to be brought into contact with the plow 22, after which the finger piece is immediately released. At this time, the torch will be in an upper inoperative position, such as is shown in Fig. 1, and will be immediately brought down into an operative position, such as that illustrated in Fig. 10, by actuation of an operator-controlled lever 34. This lever, which is pivoted upon the overhanging arm 12, is joined by a connecting rod 36 to a bell crank lever 38 in the base and the outer end of this lever 38 is provided with a treadle rod 39 extending to a treadle (not shown). Associated with this treadle rod and also not shown is a spring which tends always to hold the rod in uppermost position so that the torch will be in an inoperative position away from the work. As the machine is put in use, the operator depresses the treadle in opposition to this spring.

The lower feed roll 18 is driven continuously from a drive shaft 40 having a hand wheel 42. This drive shaft is connected by skew gear 44 to a transverse shaft 46 which in itself is connected by means of a worm and gear 48 to a counter shaft 50 which has a pinion meshing with a large gear 52 secured to the side face of the lower feed roll 18 but separated therefrom by a deep groove 54 to prevent any possibility of oil being carried over on to the work-contacting surface of this feed roll.

The upper feed roll 20 is in the form of a thin annular disk (Fig. 2) attached to the body of a miter gear 60, this gear being provided with a threaded stud 62 to receive a nut 64 by means of which two sets of ball bearings are held in position between the stud and the lower portion of a bracket 66. This provides a very compact and free running construction which does not interfere with the operator's view of the work. This upper feed roll 20 is driven by a larger miter gear 68 engaging the pinion 60 and which is secured to a stub shaft journaled in the bracket 66 and is connected through a shaft having universal joints 70, 72 to an intermediate shaft 74 and thence to a short shaft 76 journaled in the base of the machine and driven from the transverse shaft 46.

For the support of the bracket 66 carrying the upper feed roll and for other purposes, there is provided a subframe 80 (Fig. 2) having an upper arm 82, a lower arm 84 (Fig. 3) and a ribbed extension 86 cooperating with a grooved portion of the frame arm 12. This extension is slotted to receive a clamp screw 88 and may be adjusted in setting up the machine by means of a screw 90 threaded in a lug on the frame (Fig. 1). The bracket 66 for the upper feed roll 20 is mounted for adjustment toward and away from the operator by a screw and slot connection 92 with a block 94, and this block 94 is capable of adjustment in a direction parallel with the axis of the feed roll with respect to a block 96 mounted upon the lower end of a hollow carrier rod 98. The carrier rod 98 is slidable in the arms 82 and 84 of the subframe and receives a spring 100 bearing at its lower end against the bottom of the bore of the hollow rod and at its upper end against a tension adjusting screw 102 threaded in a block 104 which is secured (Fig. 2) to the upper arm 82. Turning movement of the carrier rod 98 is prevented by an arm 106 which is clamped thereto and which is received in a slot 108 in a flange 110 on the lower arm 84 of the subframe. A screw 112 threaded in this arm 106 is adapted to bear against the subframe and determines the limit of downward movement of the carrier rod 98 and hence of the upper feed roll 20.

Similarly, the shrinking iron 28 is clamped in a block 120 adjustable by reason of a slot and screw connection 122 (Fig. 9) upon a curved arm 124 so that the shrinking iron may be moved toward and away from the operator. This arm 124 may, by reason of another slot and screw connection 126, be adjusted in a direction parallel to the axes of the feed rolls with respect to a block 128 which is secured upon the lower end of a hollow carrier rod 130. This hollow carrier rod 130 is slidably mounted for vertical movement in bores in the arms 82 and 84 of the subframe, and an adjusting screw 132 is provided adjacent to the screw 102 to adjust the tension of a spring within this carrier rod 130. Turning movement of the carrier rod 130 is prevented by a guide arm 134 (Fig. 8) clamped thereto and having an end portion which is received in a slot 136 in the flange 110. To control the lowermost position of the shrinking iron 28, the machine is provided with a stop screw 140 (Fig. 3) which passes through the block 104 and is threaded in the guiding arm 134, contacting at its lower end in a cup formed

in the head 142 (Fig. 3) of a rod 144 which is slidable in the arm 84 of the subframe. When the operator desires to lift the shrinking iron and the upper feed roll, he depresses the finger piece 32 upon a curved lever 146 which is secured to a rod 148 journaled in the subframe and carrying at its opposite end an arm 149. Engagement of this arm with the lower end of the rod 144 lifts the rod and with it the screw 140 and, hence, the carrier rod 130 for the shrinking iron 28. Upward movement of the carrier rod 98 along with the rod 130 is secured by means of an arm 150 clamped to the rod 98 and having a stop screw 152 contacting with the upper side of the arm 134. Thus, when the operator wishes to place a new piece of work in the machine, he may by depression of the finger piece 32 lift both the carrier for the burning iron 28 and the carrier for the upper feed roll 20. Commonly, in order to prevent any danger of leaving the shrinking iron 28 in contact with the work after the feeding has stopped, the adjustment of the screw 152 will be such that the shrinking iron will be lifted out of contact with the work before the upper feed roll is lifted out of contact with the work and, when these work engaging elements are again brought into engagement with a piece of work, the feeding action will start slightly before the shrinking iron 28 comes into contact with the work.

The shrinking iron 28 must be held very firmly in the associated carrier block 120, first, because a substantial pressure is applied to the same to hold it in firm contact with the work and, second, because the iron is heated nearly to incandescence and, hence, is likely to collapse if not properly clamped to and supported in the carrier block. It will be seen from Fig. 3 that the ends of the shrinking iron are bent to form parallel, upstanding legs and that the iron is substantially U-shaped. The work engaging or crossbar portion 154 of the iron slopes downwardly slightly toward the work in the direction of feeding movement (Fig. 3) and is made slightly shorter than the distance between the legs 156 and 158 (Fig. 10) of the iron in order that it may not contact with the work for too long a period and to prevent it from interfering with the operator's view of the work. Provision must be made for the torch 26, the lower end of which may be brought into close relation to the crossbar 154 of the iron, as illustrated in Figs. 2, 3 and 10. Accordingly, the carrier block 120 is provided with an open recess 160 (Fig. 9) at the lateral sides of the open end of which are overhanging flanges 162. The outer faces of the legs of the iron rest against these flanges and are pressed or gripped thereagainst by means of a U-shaped clamp 164 positioned within the recess and moved into gripping relation to the iron by a screw 166. A reduced unthreaded end 168 of this screw is received in a socket in the U-shaped clamp to prevent this clamp from falling out of position when the screw is released for the purpose of replacing the shrinking iron 28. Any tendency toward upward displacement of the iron is prevented by extensions 170 (Fig. 10) upon the U-shaped clamp which overhang the tops of the legs of the iron. At the same time, any tendecy for the legs to collapse inwardly is resisted by small lugs 172 (Fig. 10) formed upon the U-shaped clamp 164 and engaging the adjacent inner faces of the legs of the iron.

In order that there may not be any overheating of the adjacent parts of the machine when the work is not being presented thereto, provision is made for moving the torch 26 to an inoperative position away from the work by means of the operator controlled lever 34. It is also found to be desirable to vary the angular relation of the torch to the work support and, hence, to the shrinking iron 28 so that the best results may be obtained with different classes of work by pointing the flame so that more or less of it will hit the work directly, and for similar reasons it is desired at times to adjust the torch horizontally. These results are accomplished by a torch carrier mechanism, best shown in Figs. 2 and 3, and the parts of which are supported upon the lower arm 84 of the subframe 80. The torch itself comprises a mixing chamber 180 which is held by a set screw in a torch carrier 182 supported upon a slide 184 which is received within a slide carrier 186 adjustably mounted in the subframe. The torch carrier 182 comprises a loop-like portion, in which the torch is supported by means of a set screw 188, and a lateral flattened portion 190 which abuts the laterally extending plate 192 upon the slide 184. Between the torch carrier and the slide is a rib and groove connection 194 permitting relative adjustment of these parts in a direction substantially at right angles to the length of the slide and, hence, more or less parallel to the work support depending on the degree of angularity of the torch. A locking screw 196 passing through a slot in the flattened portion 190 serves to clamp the two parts together. When loosened, a fine adjustment of the relative position of the parts may be obtained by moving an adjusting screw 198 which has a flange 200 dipping in a groove in the plate 192. Relative movement across the face of the machine between the screw and the plate is thus prevented and turning of the screw causes the torch carrier to be adjusted laterally upon the slide, after which the adjusted position is maintained by tightening the clamping screw 196. For convenience, the head of the clamping screw 196 does not rest directly on the flattened portion 190 but the screw is provided with an integral flange which serves as a clamping member. The slide 184 is dovetailed in the slide carrier 186 thus permitting easy straight-line movement of the torch toward and away from the work. For this purpose, the operator controlled arm 34 has a slot 202 through which passes the shank of a screw 204 entering the slide. Adjustment of the lower position of the torch is effected by a hand screw 206 threaded through the lever 34 and abutting the top of the frame. Another screw 208 similarly arranged serves as a limit screw so that a careless operator can never adjust the screw 206 to a point where the torch will be allowed to contact with the shrinking iron 28 or any adjacent part. Adjustment of the angular position of the torch with respect to the work support and the shrinking iron is obtained by an adjustment of the slide carrier 186. The rear face of this slide carrier abuts the front face of the subframe 80 and is connected thereto by means of an arcuate rib and groove 210, the center of which is just above the point of contact of the shrinking iron with the work. To facilitate positioning the slide carrier on the frame, an adjusting nut 212 cooperating with a screw 214 is provided and, when the desired position has been obtained, the parts may be locked by a clamp screw 216. This screw

216 passes through a slot in an extension 187 of the slide carrier 186 and enters a hook-like extension 218 of the subframe. The adjusting screw has a forked end 220 which is pivotally connected to the slide carrier by a pivot screw 222 and the nut 212 is received between the sides of a forked member 224 which is loosely pivoted in the outer end of the hook-like extension 218. The pivotal connection provided by the screw 222 and the pivot of the forked member 224 prevents any binding of this adjusting device when the angular relation of the slide carrier to the frame is varied.

The torch 26 is supplied with an inflammable gas from the mixing chamber 180 which is connected to a supply of oxygen by means of a pipe 230 (Fig. 4) which is connected to the mixing chamber 180 through a hose 232 and the quantity is controlled by a needle valve 234 which coacts with a passage provided in a regulator bracket 236 mounted upon the frame of the machine. This valve is threaded in a backing device 238 and provided with a hand wheel 240. A similar valve arrangement having a hand wheel 242 is interposed between a pipe 244 leading from a supply of acetylene gas, and a hose 246 interconnecting this valve and the lower part of the mixing chamber. The flame produced at the tip of the torch 26 is small because of the tiny passage through the torch tip. It has the general characteristics of the flame utilized in oxy-acetylene welding, metal cutting and the like, and when properly adjusted will have an inner cone which is incandescent and an outer envelope or secondary flame. If properly adjusted, the flame will be a so-called neutral flame and will be clear and steady, having no streaky appearance.

The hammer 30, oscillating close to the side of the turning post 22, has an operating portion which overhangs the edge of the work and the under face of which is slightly serrated. This under face will be so positioned that, when it contacts with the work, it will be approximately parallel to the surface of the work support thereby bearing firmly upon the leather. The hammer is also provided with a depending shank which is held by means of a set screw 250 near the end of the horizontal arm of a bell crank 252, the depending arm of which is pivotally connected to a connecting rod 254 at one end of which is mounted a sleeve 256 surrounding an eccentric 258 upon a stub shaft driven from the cross shaft 46 by means of a gear and pinion connection 260 (Fig. 1). The connecting rod 254 has two parts, a rod-like portion which is threaded at its outer end in a clevis 262 joined by a pivot pin 264 (Fig. 3) to the lower arm of the bell crank 252, and a sleeve-part 266 one end of which is threaded upon a stud 268 secured to the eccentric sleeve 256. The other end portion 270 of this sleeve-part is threaded in the main portion 266 and provides an abutment for a spring 272 surrounding the inner rod and acting upon a nut 274 secured at the end of that rod. A stop nut 276 threaded upon the inner rod engages the end of the portion 270 of the sleeve and may be adjusted to vary the tension of the spring 272. This connecting rod passes through a protecting sleeve 278 in the frame 10. By having the end portion 270 of the sleeve detachable, the spring 272 may be replaced without necessitating the removal of the eccentric carrying shaft, the cross shaft 46 and the like or else necessitating rethreading the outer sleeve 266 upon the stud 268 after they have been separated. This latter operation would be difficult because of the dropping of the stud 268 after the sleeve 266 has been detached therefrom. The arrangement thus far described therefore provides a yielding connecting rod by means of which the hammer is caused to strike a yielding blow and damage to the machine or the work because of irregularities in the thickness of the piece of work is overcome. The operative lower face of the hammer 30 may be brought into a position parallel to the work support by adjusting the length of the connecting rod and may be adjusted heightwise with respect to the lever 252, if this proves to be necessary, by loosening the set screw 250.

In order that the machine may be made to accommodate radically different types of work, as, for example, from the light soft kid which is sometimes employed in women's shoes to the very heavy Scotch grain calf sometimes used in men's shoes, the machine is also provided with an arrangement whereby the pivot point of the bell crank 252 may readily be raised and lowered. To this end, this pivot point is positioned at the end of the horizontal arm of another bell crank 280 which is pivotally supported in a casting 282 attached to the frame 10. The depending arm 284 of this bell crank 280 is held firmly by a very stiff spring 286 in contact with a curved surface 288 of a pivoted abutment 290. This abutment is pivoted between ears 292 projecting inwardly from the side wall of the frame casting 10 and rests at 294 against a screw 296 which is threaded in the side of the frame and has a graduated hand wheel 298. This screw is also provided with a notched disk 300 cooperating with a spring retaining pawl 302. When the hand wheel 298 is turned, the abutment 290 is swung upon its pivot, moving the surface 288 against which the lower arm of the bell crank 280 is held by the spring 286 and raising or lowering the pivot point of the bell crank 252.

The hammer 30 carried by the bell crank 252 is oscillated very rapidly during the use of the machine and, being near the heated tool, becomes quite warm. Accordingly, special provision has been made for the lubrication of the joints between the bell cranks and the associated parts. To this end, the casting 282 is provided with a well 304 (Fig. 5) having sumps 306 at each end. In these sumps rest the ends of wicks 308 which pass through a tube in the side of the casting into the corner of the bell crank 280, thence through passages bored therein laterally at 310 and forwardly at 312 to supply oil to a two-part conically ended pivot pin 314 which forms the pivot for the oscillating hammer-carrying lever 252. This pivot pin has conical ends received in the arms of the bell crank 280 and telescoping portions which are clamped in the bell crank 252 by a screw 316. The inner faces of the arms of the bell crank 280 are provided with grooves (not shown) by means of which oil is carried to the pivot pin 264 (Fig. 3). The oil passages 312 will also extend to the right to lubricate the conical holes which receive the conical pins 318, these pins being gripped in arms of the casting 282 by clamp screws 320. With this arrangement the work is fed continuously by the upper and lower feed rolls 20 and 18 past the shrinking tool and the intensely hot jet of flame, and the hammer is oscillated at such a rapidity relative to the speed of operation of the feeding means that the hammer is caused to strike a succession of blows upon each portion of the edge of the work without interference with the

feed of the work. Thus, the output of the machine is increased and the finished edge of the work is improved by reason of this repeated action of the hammer.

It will be noted that the plow or turning post 22 has a channel 322 through which the smoke of combustion is drawn into a passage provided by a cap 324 mounted upon the end of the hollow arm 12. A suction apparatus (not shown) either entirely separate from or embodied in the machine causes this smoke to be drawn off through the hollow arm 12 into a suitable conduit. To prevent sparks from passing through this hollow arm 12, a fine mesh screen 326 is interposed between the cap 324 and the hollow arm 12.

The turning post or plow 22 is part of a relatively massive metal piece 330 adjustable toward and away from the operator by means of a screw and slot connection 332, and by means of which the metal piece 330 is mounted upon an upright bracket 334 (Fig. 3) which in turn is vertically adjustable by a screw and slot connection 336 upon a bracket 338 attached by screws 340 to the frame 10.

In preparing the machine for use, certain adjustments are made which are essentially setting-up adjustments. These include the positioning of the plow 22 in correct relation to the lower feed roll 18, the setting of the hammer 30 in its carrier lever 252, the determination of the length of the connecting rod 254 and the adjustment of the hand wheel 298 to bring the abutment 290 into some intermediate position. The shrinking iron 28 should be parallel with the working face of the plow 22 and this is effected by loosening the clamp screw which holds the guide arm 134 to the rod 130 (Fig. 8). The iron 28 should also be separated from the plow just enough to allow the edge of the work to turn up somewhat, as illustrated in Fig. 10. For this adjustment, the clamp screw 68 will be loosened and the subframe 80 adjusted horizontally by means of the screw 90. Clearance between the iron 28 and the hammer 30 is secured by moving the block 120 on the arm 124. The lowermost position of the shrinking iron is determined by the stop screw 140 and the pressure on the shrinking iron is determined by adjusting the screw 132.

Similarly, the upper feed roll 20 will be set parallel to the shrinking iron by loosening the screw which holds the guide arm 106 on the rod 98, turning the holder and retightening the screw. The upper feed roll should always clear the bottom feed roll when no work is in the machine and this result is secured by means of the stop screw 112. Adjustment of the spring tension on this feed roll is obtained by turning the screw 102.

The desired position of the torch will next be secured, moving it horizontally by means of the adjusting screw 198, determining its angular position by means of the adjusting nut 212, and setting the lowermost position of the torch by means of the limit screw 208 and the adjusting screw 206. Preferably the torch tip will stand midway between the legs of the iron 28 and point slightly toward the turning post 22.

In the operation of the machine upon a particular grade of work, the fulcrum for the hammer lever will be adjusted by means of a hand wheel 298 at the front of the machine. Presumably, the position already determined for the shrinking iron will be satisfactory and, if not, it can be adjusted toward and away from the plow by means of the slot and screw connection 126. Frequently, the position of the crossbar 154 of the shrinking iron will be such that it bears upon the shoulder 25 formed between the skived edge and the flesh surface of such a piece of work as is shown at X in Fig. 7. In so doing, it will reduce the thickness of the work at the shoulder formed by the skive so that, when the edge is finished by curling the thin margin upwardly, the work will be of substantially uniform thickness and the work having been made plastic by the heat of the shrinking iron, any surplus material crowded into the shoulder of the skive will be displaced or burned away thereby to secure a greater uniformity in the treated margin. It will be noted that the upper feed roll 20 is so thin and that its driving gear 60 is so cut back from the surface of the feed roll that there is no interference thereby, either with the turning of the work or with the view of the operator.

Ordinarily, the torch will be adjusted to a point slightly inwardly of the crossbar of the shrinking iron but many times it will be found desirable to bring the tip of the torch approximately opposite the center of the crossbar 154 of the shrinking iron or slightly to the left of the position shown in Fig. 10. The height of the tip of the torch should be such that the inner cone of the oxy-acetylene flame does not touch the crossbar 154. Such heightwise adjustment can be secured by the screw 206. At the beginning of the day, the torch is lighted by first opening the acetylene valve by the hand wheel 242, lighting this gas and then immediately opening the oxygen valve by means of the hand wheel 240 to develop a flame having an incandescent inner cone and an outer envelope or secondary flame. Starting with the condition where the flame has a slight excess of acetylene, this gas is gradually cut down until any streaky appearance of the inner cone disappears and a so-called neutral flame is obtained. This flame will be pencil like, being from one to two millimeters in diameter and five to six millimeters long.

The machine is then ready for the presentation of a piece of work which should be entered with its edge against the plow 22 and its advancing edge beneath the upper feed roll. At this time, the torch is in an elevated position due to the spring (not shown) upon the treadle rod. The iron 28 and the upper feed roll 20 are held up by depressing the finger piece 32 to allow the work to be inserted and are then immediately released. The operator will then depress the treadle, bringing the flame into position to heat the crossbar of the shrinking iron, and also to be split thereby and act directly upon the edge of the work. The shrinking iron and the flame will act progressively along the edge of the work as the work is fed forward and the curled edge will be compacted by means of the hammer 30, as shown in the successive steps A, B, C, D and E of Fig. 7. At the termination of the operation upon a particular piece of work, the treadle will be released, allowing the torch to be raised. Movement of the torch is substantially axial and almost vertical toward and away from the work and removes the flame from the immediate neighborhood of the carrier 120 for the shrinking iron.

Having described our invention, what we 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 leather having, in combination, a support for the leather piece, a shrinking tool having a work-contacting portion extending substantially paral-

lel to the edge of the work, a torch positioned to direct a flame against said work-contacting portion on the side thereof away from the work thereby to heat said shrinking tool to a temperature sufficient to cause the leather to become plastic and the edge to curl, and means for causing relative movement between the leather piece and the shrinking tool thereby to subject successive portions of the margin of the leather to the action of the tool.

2. A machine for finishing the edge of a piece of leather having, in combination, a support for the leather piece, a U-shaped shrinking tool having a work-contacting crossbar, means for pressing the crossbar of said tool against the margin of the work, and a torch positioned to direct a flame against the upper side of the work-contacting crossbar of the shrinking tool thereby to heat said crossbar to a temperature sufficient to cause the leather to become plastic and the edge to curl.

3. A machine for finishing the edge of a piece of leather having, in combination, a support for the leather work-piece, a plow for bending up the margin of the piece, a shrinking tool having a narrow portion extending substantially parallel with the edge of the work, means for supporting said shrinking tool adjacent to and spaced from said plow thereby permitting the margin of the work to be bent up between the plow and the tool, a torch for directing an intensely hot flame against the upper face of the work-contacting portion of the shrinking tool and against the portion of the leather piece between said tool and the plow whereby the edge of the work is caused to curl by the combined action of the heated shrinking tool and the flame, and means for feeding the work past the plow and shrinking tool thereby to cause successive portions of the margin of the work to be treated.

4. A machine for finishing the edge of a piece of leather having, in combination, a support for the leather work-piece, a plow adjacent to said work support for bending up the margin of the piece, a U-shaped shrinking tool having a crossbar, means for pressing the crossbar of said tool against the margin of the work in a position spaced slightly from the plow, a torch for directing a flame against the inside of the crossbar of the shrinking tool and also against the portion of the leather piece between the shrinking tool and the plow thereby to cause the edge to curl, means for feeding the work past the shrinking tool, a hammer, and means for actuating the hammer to turn back the curled edge of the work.

5. A machine for finishing the edge of a piece of leather having, in combination, a support for the leather work piece, a plow adjacent to said work support for bending up the margin of the piece, a U-shaped shrinking tool having a crossbar, means for pressing the crossbar of said tool against the margin of the work in a position spaced slightly from the plow, a torch for directing a flame against the inside of the crossbar of the shrinking tool and also against the portion of the leather piece between the shrinking tool and the plow thereby to cause the edge to curl, a hammer, means for feeding the work continuously past the tool, and means for causing the hammer to strike a succession of blows with a rapidity relative to the speed of operation of the feeding means sufficient to permit said means to feed the work continuously and to cause each portion of the edge of the work to receive a plurality of momentary blows.

6. A machine for finishing the edge of a piece of leather comprising, in combination, a substantially U-shaped shrinking tool having legs, a support for said tool provided with a recess having overhanging edge portions, and means comprising a screw and a clamp member for gripping the legs of said shrinking tool against the inside of said overhanging edge portions.

7. A machine for finishing the edge of a piece of leather comprising a substantially U-shaped shrinking tool having legs, a support for said tool provided with a recess having overhanging edge portions, and means comprising a screw and a clamp for gripping the legs of said shrinking tool against the inside of said overhanging edge portions, said clamp having lugs contacting with the inner faces of the legs of the tool adjacent to one another to prevent an inward collapse of the tool.

8. A machine for finishing the edge of a piece of leather comprising a substantially U-shaped shrinking tool having legs, a support for said tool provided with a recess having overhanging edge portions, and means comprising a screw and a clamp for gripping the legs of said shrinking tool against the inside of said overhanging edge portions, said clamp having portions overlying the upper ends of the legs of the tool thereby to prevent slippage in the clamp when downward pressure is exerted upon the tool.

9. A machine for finishing the edge of a piece of leather comprising a substantially U-shaped shrinking tool, a support for said tool provided with a recess having overhanging edge portions, means comprising a screw and a clamp for gripping the legs of said shrinking tool against the inside of said overhanging edge portions, said clamp having portions overlying the upper ends of the legs of the tool, and lugs coacting with the opposite adjacent faces of said legs.

10. A machine for finishing the edge of a piece of leather comprising a shrinking tool having upstanding legs interconnected at their lower ends by a crossbar adapted to contact with the leather, a support for said tool having an open-sided recess to receive the legs of the tool and supporting the opposite outer sides thereof, said support having overhanging portions partially closing the open side of the recess to support the legs of the tool by contact with the lateral faces thereof, a U-shaped clamp the open ends of which are adapted to contact with the opposite lateral sides of the legs, and a screw pressing against said clamp to force it into engagement with the tool thereby to grip the tool against said overhanging lugs.

11. A machine for finishing the edge of a piece of leather comprising a shrinking tool having upstanding legs interconnected at their lower ends by a crossbar adapted to contact with the leather, a support for said tool having an open-sided recess to receive the legs of the tool and supporting the opposite outer sides thereof, said support having overhanging portions partially closing the open side of the recess to support the legs of the tool by contact with the lateral faces thereof, a U-shaped clamp the open ends of which are adapted to contact with the opposite lateral sides of the legs, said clamp having portions overlying the tops of the legs to resist vertical movement of the tool with respect to the support, and means to actuate said clamp.

12. A machine for finishing the edge of a piece of leather comprising a shrinking tool having upstanding legs interconnected at their lower ends by a crossbar adapted to contact with the leather,

a support for said tool having an open-sided recess to receive the legs of the tool and supporting the opposite sides thereof, said support having overhanging portions partially closing the open side of the recess to support the legs of the tool by contact with the lateral faces thereof, a U-shaped clamp the open ends of which are adapted to contact with the opposite lateral sides of the legs, said clamp having lugs upon its legs engaging the inner opposed faces of the legs of the shrinking tool thereby to resist an inward collapse of the loop, and means to actuate said clamp.

13. A machine for finishing the edge of a piece of leather comprising a shrinking tool having upstanding legs interconnected at their lower ends by a crossbar adapted to contact with the leather, a support for said tool having an open-sided recess to receive the legs of the tool and supporting the opposite sides thereof, said support having overhanging portions partially closing the open side of the recess to support the legs of the tool by contact with the lateral faces thereof, a U-shaped clamp the open ends of which are adapted to contact with the opposite lateral sides of the legs, said clamp having upon its legs portions to overlie the upper ends of the legs of the shrinking tool, lugs to engage the adjacent inner faces of the legs of the tool, and means to actuate said clamp.

14. A machine for finishing the edge of a piece of leather which comprises leather supporting and feeding mechanism, a substantially U-shaped shrinking tool having upstanding legs and a crossbar, a support for said shrinking tool having an open-sided recess and provided with an open-sided clamp, and a torch for heating said shrinking tool to direct a flame upon the upper face of the crossbar of the shrinking tool, without interference by said clamp.

15. A machine for finishing the edge of a leather work piece comprising a frame, a work support thereon, a torch for directing a flame toward the work on the support, means for supporting said torch on the frame for movement toward and away from the work support, means for adjusting the angular relation of the torch to the work support, and operator controlled means for moving the torch toward and away from the work support without varying said angular relation.

16. A machine for finishing the edge of a leather work piece comprising a frame, a work support thereon, a torch for directing a flame toward the work on the support, a slide carrier mounted on the frame for adjustment about a center adjacent to the work support, a torch carrying slide on said carrier, and operator controlled means for moving said slide to move the torch toward and away from the work support without varying the angular relation of the torch to the work support.

17. A machine for finishing the edge of a leather work piece comprising a frame, a work support thereon, a torch for directing a flame toward the work on the support, a slide carrier on said frame, a torch carrying slide on said carrier movable toward and away from the work support, and means for mounting said torch on said slide comprising means for adjusting said mounting means in a direction substantially parallel to the work support.

18. A machine for finishing the edge of a leather work piece comprising a frame, a work support thereon, a work edge contacting member adjacent to the work support, a torch for directing a flame toward the work to cause its edge to curl, a slide carrier having an arcuate rib and groove connection with the frame, means for adjusting said slide carrier to vary its angularity with respect to the work support, a slide on said carrier movable toward and away from the work support, an operator controlled lever loosely connected with said slide, a torch carrier having a rib and groove connection with said slide extending substantially at right angles to the direction of movement of the slide, and means for adjusting the torch carrier laterally along said connection.

19. A machine for finishing the edge of a leather work piece comprising work feeding means, a hammer, means for causing said hammer to pound the margin of the work comprising a bell crank carrying the hammer, an expansible operating link constructed and arranged to oscillate the bell crank thereby allowing the hammer to yield to accommodate variations in the thickness of the work, a movable fulcrum for said bell crank, and means for adjusting said fulcrum comprising a variable abutment together with means for holding the fulcrum against the abutment.

20. A machine for finishing the edge of a leather work piece comprising work feeding means, a hammer, means for causing said hammer to pound the margin of the work comprising a bell crank carrying the hammer, an expansible operating link constructed and arranged to oscillate the bell crank thereby allowing the hammer to yield to accommodate variations in the thickness of the work, a pivoted fulcrum for said bell crank having a depending arm, means for urging said arm in one direction, and an adjustable abutment opposing said urging means.

21. A machine for finishing the edge of a leather work piece comprising work feeding means, a hammer, means for causing said hammer to pound the margin of the work comprising a bell crank carrying the hammer, an expansible operating link constructed and arranged to oscillate the bell crank thereby allowing the hammer to yield to accommodate variations in the thickness of the work, a pivoted fulcrum for said bell crank having a depending arm, means for urging said arm in one direction, a pivoted abutment opposing said urging means, and an operator-controlled screw for adjusting said abutment.

HENRY T. DOULETTE.
FRED E. HOOPER.