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PROCESS OF FINISHING THE RAW EDGES OF LEATHER.

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**1,047,211.** Patented Dec. 17, 1912.

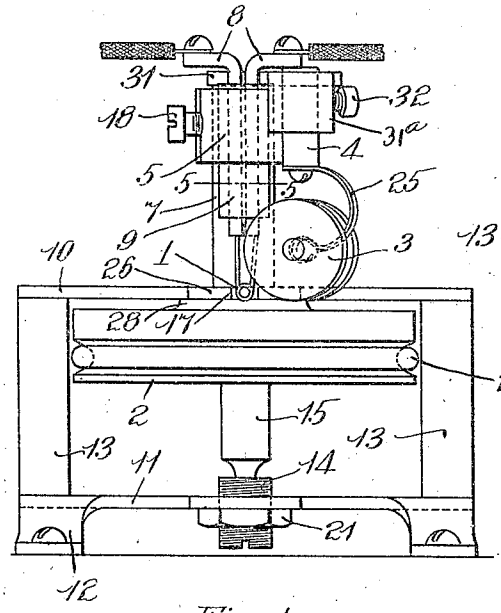


Fig. 1.

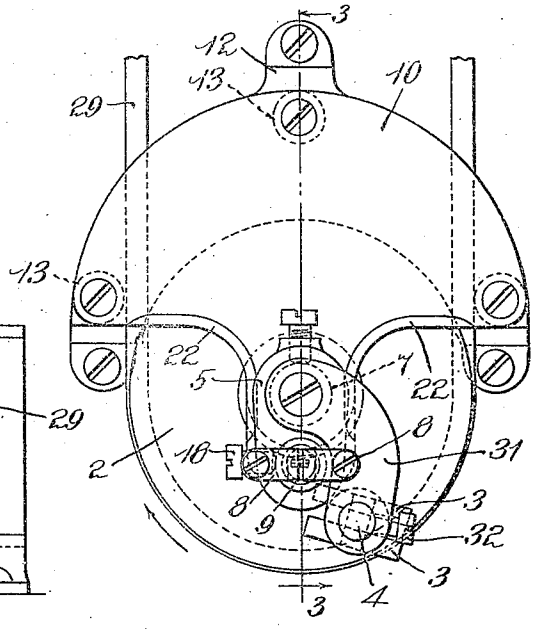


Fig. 2.

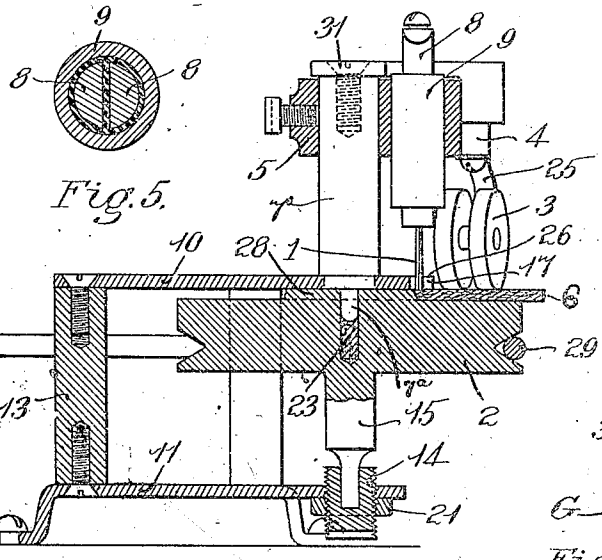


Fig. 3.




Fig. 5.

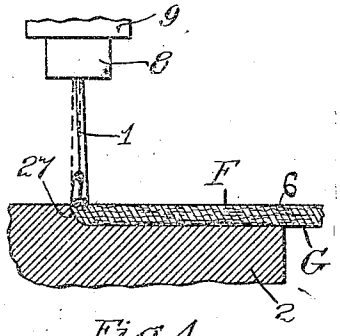


Fig. 4.

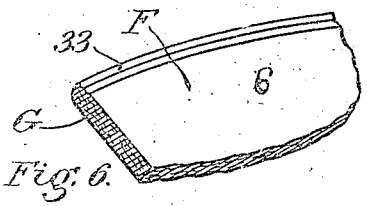


Fig. 6.

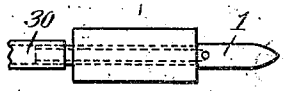


Fig. 7.

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## PROCESS OF FINISHING THE RAW EDGES OF LEATHER.

1,047,211. Specification of Letters Patent. Patented Dec. 17, 1912.

Application filed June 6, 1910. Serial No. 565,351.

*To all whom it may concern:*

Be it known that we, EDWARD S. HALSEY and GEORGE G. PERKINS, citizens of the United States and Canada, respectively, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Processes of Finishing the Raw Edges of Leather, of which the following is a full and complete description.

Our invention relates to a mode of finishing the raw edges of leather pieces, particularly such as are used in the manufacture of shoe uppers, so as to produce smoothly rounded edges in place of the raw edges formed by cutting the leather, at those places in the finished article where the edges of the leather pieces are exposed.

The invention consists in a mode of producing this effect without folding the leather, by shrinking one surface of the leather (the surface which is hidden when the leather piece is in use) along a line at or close to the edge which is to be finished, whereby such edge is drawn or curled over toward the surface acted upon. The shrinking is preferably accomplished by heat of such an intensity as to sear and shrivel the portion of the leather to which it is applied.

Our objects are primarily to save the time, labor and expense of skiving, cementing, folding back and pressing the edges particularly as is required in high grade shoe making; to produce at least an equally good result as with the more laborious method referred to and to save the leather wasted in folding.

Referring to the drawings which illustrate the devices we use in carrying out our invention similar numerals refer to similar parts throughout the several views in which—

Figure 1 is a front elevation, Fig. 2 a plan and Fig. 3 a side view in cross section through the line 3—3 of Fig. 2. Fig. 4 is a fractional enlarged cross sectional view of the leather scorching point and leather holding plate of Fig. 3. Fig. 5 is an enlarged cross section through the scorching tool holder at the line 5—5 of Fig. 1. Fig. 6 is a fragmentary perspective of a piece of leather after having been finished by our process. Fig. 7 is a side view of the gas heated scorching point which can be substituted for our preferred electrically heated scorching tool shown throughout the other views, with which it is interchangeable.

To describe the process in detail the leather indicated by 6 is being carried and fed toward the observer by the turn table wheel 2 driven by a belt 29 and guided and crowded by crowding caster 3 against and past the circular center stud or raised portion 28 of wheel 2 having the upward curving shoulder 27 which deflects the edge of the leather upward against the scorching point and the forked overhanging extension retaining fingers 26 of the upper plate 10. It will be observed that this upper plate 10 is joined to the lower plate 11 by means of the three posts 13—13—13 constituting the frame of the machine which carries the turn table pulley 2 mounted on a vertical shaft 15 stepped in an externally threaded bearing 14 passing through an extension on the lower plate 11 and adjusted in position by lock-nut 21. The upper side of the turn table is centered by a pin $7^a$ extending down from the upper plate and lubricated from the well beneath filled with oil saturated material 23.

Rising concentrically above said turn table is the vertical suspension post 5, the bottom end of which is turned down slightly for a shoulder and riveted securely into the top plate. The centering pin for the turn table is a turned down extension from this post. Said upright post serves to support the scorching tool 9 through the medium of the yoke 5 to which they both are fitted and are clamped by set screws. This post also supports the crowding caster stem 4 through the medium of yoke 31 which is adjustably swung and clamped at the center of the top of said post by a strong screw. The outer end of this arm or yoke has fixed to it a collar $31^a$ fitted with a set screw 32 adapted to hold and adjust the position of said stem 4 both laterally and longitudinally.

While we show only two implements for shrinking the back edge of the leather it is obvious that any other tool that would cause the desired curling back by means of the drawing or shrinking up of the back edge would come within the spirit of our invention.

Of the two scorching or curling tools we show we prefer the electrically heated platinum wire tip of two turns shown mounted with holder in position in Figs. 1, 2, 3 and 4.

The gas heated tool shown in Fig. 7 is interchangeable with the electrically heated one and consists of the tubular holder 9 which conducts a suitable mixture of gas and air from the rubber tube 30 to the hot platinum point 1 where it passes through an interior platinum gauze packing causing internal combustion and heating the point to a bright red or white heat after which it passes on out to a small vent hole as in the ordinary pyrographic point. We prefer the electrically heated platinum wire because it is more easily uniformly heated and because we have succeeded in working out a way of making its degree of heat self-regulating to a large extent. We accomplish this by the following means first by taking our current from a source of constant potential and arranging the resistance of the conducting leads up to the platinum wire so as to be relatively negligible as compared to the resistance of the platinum wire. Thus the resistance of the platinum wire becomes the dominating factor in determining the current flow and as its resistance increases rapidly with the temperature, the current and its heating effect is checked before the wire gets dangerously hot. Likewise when the leather is being pushed under the wire its cooling effect is compensated for by an increased current through the lowered resistance. A further compensation for cooling by the leather is afforded by giving the platinum wire a sufficiently high initial temperature to expel combustible gases from the leather in large enough quantities to excite catalytic heating of the platinum and also cause surface combustion.

We find that when the leather is under the hot poin. it is more or less plastic and that while the desired curling effect can be secured by simply searing the back edge of the leather by the highly heated point still a more uniform and more complete backward curl can be secured by the additional employment of mechanical molding of the leather while plastic beneath the heated point, by crowding it between the point and the rounded molding curve 27 formed between the face of the turn-table and the central raised edge guiding portion 28. This molding curve must be formed to the shape desired to be communicated to the leather edge.

It should be understood that the grain or finished side of the leather indicated by G lies downward and is curled upward by the heat and the curved corner 27 and also by the mere crowding of the edge of the leather up against the side of the small circular raised portion of the turn table 28 which acts as the back-stop and which on account of resisting the backward crowding of the leather by the small restricted area of its circular edge gives a decided upward turn to the edge of the leather throwing it against the scorching point and the overhanging tips 26 of the top plate.

It is to be understood that our process not only effects a permanent curling back and molding of the leather edge in the desired form, but that it also effects a smoothing and evening of the edge acted upon, burning off irregularities when the edge is ragged. A further result of the process is that the leather is darkened or blackened owing to the fact that the temperature applied by the hot tool is sufficiently high to commence destructive distillation of the leather, carbonizing to some extent the portion acted upon.

We have found that any reconstructive temperature that is sufficiently high to sear, momentarily render plastic and coagulate the flesh side of the leather, leaving it in a hardened, permanently shrunken state upon cooling, will answer in carrying out our process, and that temperatures of scarcely a red heat may be made to accomplish this to a greater or less degree, dependent upon the kind of leather treated and the speed with which it is passed under the heated point. In order to secure the best commercial results and efficient speed, however, we prefer to use scorching tools heated to a bright red or a white heat, dependent upon the character of leather treated and the rapidity with which it is possible for the operator (dependent on his skill) to guide and manipulate the leather.

As each kind and tan of leather is differently affected by the temperature of the tool and velocity of feed, the speed and temperature requires adjustment by the operator to secure the most perfect results on any particular grade of stock.

On account of the high temperature and speed with narrow contact of the burning point and non-conducting properties of the leather the scorching and shriveling of the back edge does not penetrate the body or front side of the leather so that its usefulness is not impaired. It should be borne in mind that the finished leather edge shown in Figs. 4 and 6 is on an enlarged scale and relatively is quite narrow so as to come outside the narrow seams or stitches used in shoe making.

Referring to our preferred scorching tool more particularly shown in Figs. 4 and 5 the holder is constructed of a metal tube 9 having forced down through it two half round insulation covered brass strips 8 and 8 the top ends of which are bent outward and tapped out for binding screws while the bottom ends are drilled or slotted for soldering in the two ends of the platinum wire.

We prefer to use a platinum wire of from twenty to twenty-four gage for use with light leather such as is used in the uppers of ladies' shoes, and to have the wire twisted

into a double loop so as to make dual contact with the leather although it is obvious that different sizes of wires can be used and even desirably for other kinds of leather. Also that the single loop wire can be used and may be desirable in certain cases, also a cheaper wire may be used such as nickel or its alloys at lower temperatures with a measure of success. We prefer, however, to use the double loop platinum wire at a bright red or white heat. One advantage of the double loop is the double trail of scorching, the inner one more effectually effecting the curling, and the one at the extreme edge blackening and smoothing in addition to the shrinking.

We wish it to be understood that our invention is not limited to the use of a heated tool as the agent for applying heat to the leather, but that any means whatever capable of being applied so as to heat the desired portions of the leather to the temperature desired and for the required brief period of time, over a sufficiently restricted area or path, is within the scope of our invention. For instance, it would not be a departure from the invention to employ a suitably directed and protected flame or jet of steam or blast of heated gas as the heating agent.

It should be observed that the twin crowding caster 3 is adjustable in every direction, circumferentially by swinging arm 31 laterally, and vertically by moving its round vertical stem 4 under the thumb screw 32; and that both its disks are fixed to the same shaft.

It will be observed from the direction of rotation of the turn table and the off-set and relatively canted position of said twin caster that when the leather is fed by the dual grip of said caster on the leather it will give to it a constantly crowding pressure against the curved central stop stud 28 of the turn table with the desired result.

We wish to state that it is not absolutely essential that the turn table should be power driven as it requires so little force that the operator can easily pull it through by hand but not so uniformly as when power fed. Nor is it absolutely essential that the underlying table and stop should turn at all or have the crowding caster as it is possible to feed and crowd the leather back entirely by hand.

We are aware that various edge finishing machines have been made that produce very different kinds of edges from that produced by ours and much less permanent and satisfactory, a number of which simply burnish or iron either the raw edge itself or iron into it colored wax with either cold or moderately heated irons (of about 250° F.). We are also aware that irons heated to such moderate temperatures have been used for generations for burnishing the edges and face of leather all of which we disclaim.

The machine herein shown for carrying out our process is not claimed in this application, but such a machine is shown, described and claimed in our co-pending application, Ser. No. 670,801.

What we do claim is:—

1. The process of edging leather which consists in searing a narrow portion of the flesh side of a leather piece at, and in close proximity to, its margin, and thereby contracting said portion, and causing the marginal portion of the grain side to curl toward the flesh side.

2. The process of edging leather which consists in searing a narrow portion of one side of a leather piece along a line in close proximity to the margin, and at the same time exerting pressure on the edge of the leather piece, the heat and pressure acting simultaneously to curl the marginal portion of the opposite side toward the side acted upon and form a finished edge.

3. The process of edging leather which consists in searing a narrow portion of the flesh side of a leather piece along a line in close proximity to the margin of the piece and at the same time exerting pressure against the surfaces of the flesh and grain sides of the piece near the margin thereof, the heat and pressure acting simultaneously to curl the marginal portion of the grain side toward the flesh side and form a finished edge.

4. The process of edging leather which consists in searing a narrow portion of a flesh side of a leather piece along a line in close proximity to the margin of the piece, and at the same time exerting molding pressure on the marginal portions of the flesh and grain sides, the heat and pressure acting simultaneously to curl the marginal portion of the grain side toward the flesh side compacting and smoothing the material to form a finished edge.

5. The process of edging leather which consists of heating a narrow portion progressively along the flesh side of a leather piece in a path at, and extending slightly back from, its margin, sufficiently to render it momentarily plastic and shrivel it, at the same time exerting pressure along the edge of the leather piece, the heat and pressure acting simultaneously to curl the marginal portion of the grain side toward the flesh side and form a finished edge.

6. The process of edging leather which consists of searing the raw edge and a narrow portion of the flesh side of a leather piece along a line parallel to and adjoining said edge, thereby shrinking said portions, at the same time smoothing, hardening and darkening them to form a finished edge.

7. The process of edging leather which

consists in momentarily passing under a suitable tool, a narrow, marginal portion of the flesh side of a leather piece and heating the tool to a temperature sufficient to sear the leather to produce a finished effect along the exposed edge of said piece.

8. The process of finishing the raw edge of a leather piece, which consists in subjecting one surface of the piece along a line close to its edge to a destructive temperature, for a period of time sufficient to cause searing of the surface, acted upon and insufficient to affect the opposite surface, whereby the edge is caused to curl toward the surface acted on.

9. The process of finishing the raw edge of a leather piece, which consists in searing one surface of the leather on a line or path of sharply defined and limited width, closely adjacent to, and approximately parallel with, the edge of the piece, whereby the portion acted upon contracts and draws back the edge of the piece.

10. The method of forming a finished rounded edge on leather, which consists in heating one side of the leather piece at the edge thereof to the temperature at which decomposition of the leather commences, for a period insufficient to injure the opposite side, whereby the side acted upon is shriveled and contracted, and the opposite side at the edge is curled over.

Having described our invention we herewith set our hands this third day of June A. D. 1910.

EDWARD S. HALSEY.
GEORGE G. PERKINS.

Witnesses:
FRANK E. LONGLEY,
FRED W. SCHATZ.