Nov. 28, 1939. C. K. MacDONALD 2,181,243

SEAM REDUCING

Filed Dec. 2, 1937

Fig1.

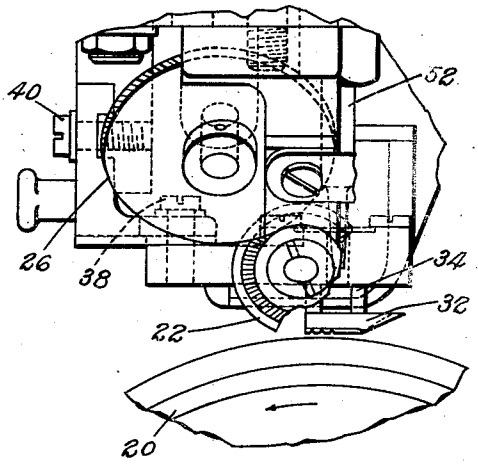


Fig2.

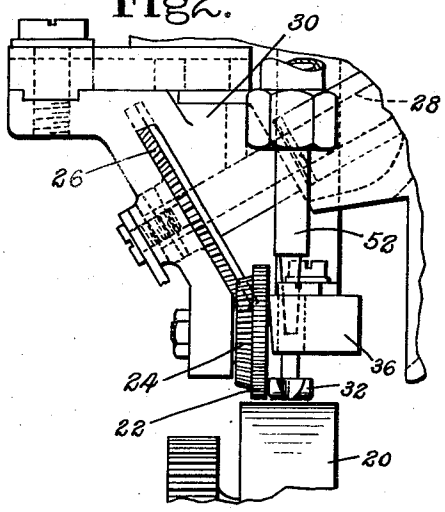


Fig3.

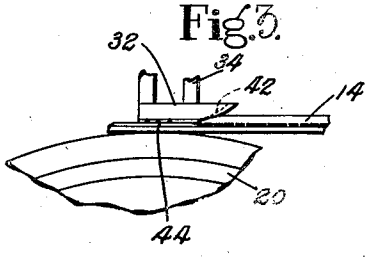


Fig4.

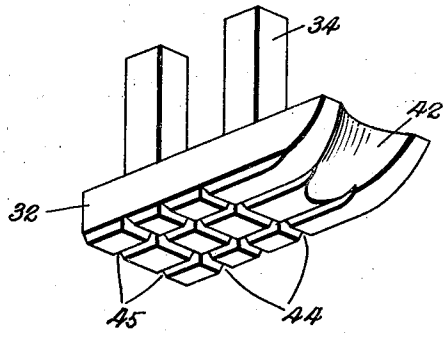


Fig5.

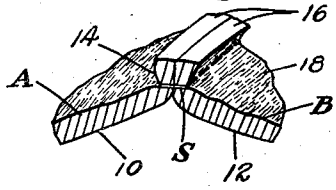
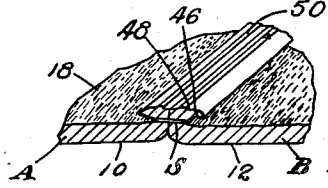


Fig6.



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UNITED STATES PATENT OFFICE

2,181,243

SEAM REDUCING

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Application December 2, 1937, Serial No. 177,768

10 Claims. (Cl. 69—1)

This invention relates to reducing the seams of articles of leather and the like and is herein illustratively described as applied to the reduction of the back seams of shoes.

One very common method of forming a seam in articles of leather or leather-like material is by placing the pieces face to face and stitching through the two layers closely adjacent to the edges thereof. Commonly, the sewing machine is equipped with a trimming knife which removes part of the surplus material and leaves projecting margins of uniform and equal width when the two pieces have been joined. Such seams are found in many articles, such as handbags, luggage, harnesses and the like, and are almost universally employed in forming the back seams of shoes. In many of the above-mentioned articles, the seam is exposed and somewhat unsightly because of the fibrous appearance of the edge of the leather or other similar material and the fact that there is often a gradation of color from one face of a piece of leather through to the other face. As applied to shoes, the projecting margins of the seam are inside the shoe and it is desirable to make them as low as possible without either distorting the seam or pressing it so hard that the stitches "smile", i. e., are visible on the outside of the shoe. Obviously, too, the strength of the seam must not be diminished by any treatment which is imparted to it.

It is therefore an object of the invention to produce an improved seam having a good appearance when it is an exposed seam and lying as flat as possible and to do this without reducing the strength of the seam. Still another object of the invention is to provide an improved method of reducing seams by means of which the desired results may be secured expeditiously and with a minimum of skill. To these ends, I have discovered that a seam of the desired characteristics may be obtained by the application to the edge of the seam of heat to a degree sufficient to sear and char the leather. Under this application of heat, lasting only a short time, the leather will become slightly plastic and may, by the application of pressure, be molded to spread and flatten the seam. The seam will at the same time become shrunken and compacted so that the surface of the treated edges is substantially bone hard. This results in producing a finished appearance on the edges of the seam and a surface which is not easily marred since it is hard enough so that when tested with the edge of the fingernail of an observer, only a slight mark will be made on the surface and no substantial crease will result.

It is another object of the invention to provide a machine by means of which the above-described process may be carried out. Such a machine as herein illustrated comprises a work-feeding mechanism designed to support the work and carry it along in the desired direction. Adjacent to the feeding mechanism is a searing tool arranged to be pressed firmly against the edges of the upstanding margins of the seam, there being provision for heating this tool by the application to the upper surface thereof of an oxyacetylene flame so that it becomes at least red hot. Preferably the work-engaging surface of the searing tool is grooved at its receiving end to guide into position the upstanding margin of the seam, and the operative face of the tool is corrugated to assist in removing charred portions of the leather which are produced by the application of a considerable heat.

A machine by means of which the method may readily be practiced will now be described in the following specification, taken in connection with the accompanying drawing, in which

Fig. 1 is an end view of the operative portion of such a machine;

Fig. 2 is a view of the portion shown in Fig. 1 viewed from the right and looking in the direction in which the work moves;

Fig. 3 is a fragmentary view of the operating tools, showing a piece of work being treated;

Fig. 4 is an angular view on a much enlarged scale of the searing tool, showing particularly the under face thereof;

Fig. 5 shows a fragment of an untreated seam, and

Fig. 6 illustrates approximately the condition of the seam after treatment, it being understood that the exact shape depends on a number of factors and, hence, is subject to variation.

When pieces of work A and B, having finished surfaces 10 and 12 placed face to face, are joined together by means of a row of stitches S, the resulting seam includes upstanding margins 14 having exposed edges 16 of substantially the thickness of the pieces of material. These edges, produced usually by a trimming knife on the sewing machine, are brought as close to the stitches S as is considered safe, having regard to the danger of damage to the seam itself and the resulting strength. Obviously, the exposed edges 16 are fibrous and do not present a finished appearance since there may be a gradation of color from the surfaces 10 and 12, which are

often the grain surfaces, to the unfinished or flesh surfaces 18. In previously employed methods of treatment, these margins have been compacted by means of pressure and heat, the pressure being applied both laterally and heightwise and tending to shrink the leather of the upstanding margins 14 slightly. Such heat as has been employed, however, has not been of a destructive temperature. Furthermore, it has been difficult, having in mind particularly the back seams of shoes, to compress the seam heightwise without, at the same time, applying such pressure to the outer surface of the shoe that the two pieces of leather are pushed away from one another with the danger of leaving an unsightly seam in which the stitches "smile."

I have discovered, however, that it is possible to apply a destructive temperature momentarily to the seam, said temperature being of the order of from 1200° to 1500° F., and thereby to shrink, sear and char the seam without in any way affecting its strength.

As one suitable way of applying heat to the seam, I have utilized a modified machine of the type of that shown in Letters Patent of the United States No. 2,017,055, granted October 15, 1935, on the application of Doulette and Hooper and reference may be had to that patent for a description of such parts of the machine as are not herein fully shown or described. The patented machine is designed for the treatinment of leather edges, heat being applied to the flesh or unfinished surface of the leath along a line slightly spaced from the edge, thereby causing the edge to shrink and the grain or finished surface to bend over to meet the level of the unfinished surface. In this machine, the work is supported on a substantially cylindrical feed roll 20 driven in the direction of the arrow shown in Fig. 1, and the work is held on this supporting feed roll by means of a thin toothed disk 22 which engages the flesh surface of the leather and is in turn driven through gears 24 and 26 by power supplied through a shaft 28. The feed wheel 22, and the driving mechanism therefor, are mounted in a head 30 which is capable of being raised and lowered for convenience in the insertion of the work and which is urged down resiliently to hold the feed wheel against the work.

Adjacent to the narrow feed wheel 22, there is, as in the patented machine, a searing tool 32, the form of which has, however, been radically changed. The searing tool has upstanding legs 34 enabling it to be clamped in a holder 36, which, by reason of a construction involving sliding joints and screws 38 and 40, may be adjusted from front to back and from side to side as in the patented machine. This holder is urged downwardly to press the searing tool 32 against the work by means of a spring (not shown) which imparts a pressure of from twenty to thirty pounds. It will be noted that the tool at its receiving or rear end, considered with respect to the direction of movement of the work, has a tapered entrance groove 42 facilitating the introduction of the upstanding margin 14 of the seam forwardly along the desired path. Inasmuch as the tool is heated to a red or cherry heat by an arrangement to be described, it has been found desirable to provide the surface of the tool beyond the entrance groove 42 with corrugations or grooves 44 extending transversely and grooves 45 extending lengthwise of the tool thereby assisting in the removal of charred material and enabling the tool to trim the work or reduce the seam under the destructive action of heat. Because substantial pressure is being applied to the seam through this tool, there will be a molding action on the leather at a time when it is in a momentarily plastic condition which will tend to spread the seam laterally, leaving overhanging lips 46 which apparently tend to protect the stitches S from the applied heat. At any rate, it has been found that the seam ridge may be reduced to a point where its surface is spaced only six to eight thousandths of an inch from the stitches S without any damage to the thread or any weakening of its holding power. The surface 48 of the reduced seam is seared and charred so that it is substantially bone hard, as has been heretofore brought out. At the same time, due to the action of the corrugations 44 in removing or trimming off the charred material, this surface 48 is only slightly discolored and its appearance is radically improved because of the shrinking and compacting action of the heat on the fibers of the leather. This shrinking action affects the leather to a substantial distance below the surface 48 and the strength of the seam is improved rather than lessened as it has been found that when test pieces are pulled in a direction transversely of the seam until a failure takes place, the stitches are more apt to pull through the leather from front to back thereof than they are to pull through the seared and shrunken edge surface 48. The slight ridges 50 shown in Fig. 6 of the drawings are the result of the effect of the longitudinal grooves 45 in the tool and may or may not be present, depending on the exact configuration of these corrugations 45. The action of the machine on a seam is uniform and there seems to be no tendency to distortion or twisting of the seam as so frequently happens when pressure of a considerable amount is applied without any such heat treatment as is here utilized.

The application of heat to the searing tool 32 is effected by a flame issuing from the lower end of a nozzle 52 and supplied with an oxyacetylene gas or the like. This enables the temperature of the searing tool to be raised to a white heat if desired but it has been found that a red or cherry heat of a temperature of from 1200° to 1500° F. is suitable.

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

1. A method of reducing back seams in shoe uppers which consists in applying to the seam ridge a member heated substantially to red heat to turn part of the ridge to charred fragments and spread the seam laterally.

2. A method of reducing a seam ridge such as the back seam of a shoe which consists in applying progressively to said ridge heat sufficient to turn part of the ridge to charred fragments and pressure to mold it while so heated.

3. A method of reducing seams in articles of leather-like material which consists in applying to the edges of the parts at the surface of the seam ridge a destructive heat of approximately 1200° to 1500° F., the application of heat being effected progressively along the seam.

4. A method of treating a back seam to reduce it which consists in applying a destructive heat to the seam ridge along the seams thereby to turn part of the ridge to charred fragments while leaving the seam free to spread laterally.

5. A method of reducing a back seam which consists in trimming the seam ridge by means of

a tool heated to a temperature sufficient to char the material.

6. A method of reducing back seams which consists in charring the seam ridge, and removing the charred material.

7. In a machine for reducing back seams, a work support, a feeding member, a searing tool adapted for engagement with the seam ridge, said tool being provided with a groove to receive the upstanding margins forming the seam ridge, and means for heating said tool to a destructive temperature.

8. In a machine for reducing back seams, a work support, a feeding member, a searing tool adapted for engagement with the seam ridge, said tool having means for removing charred leather from the reduced ridge, and means for heating said tool.

9. In a machine for reducing back seams, a work support, a feeding member, a searing tool adapted for engagement with the seam ridge, said tool having a ridge-receiving entrance groove and corrugations beyond said groove in the direction of feeding movement, and means for heating said tool.

10. In a seam-reducing machine, a work-supporting feed roll adapted for engagement with the display surface of a seamed upper, a grooved searing tool adapted for engagement with the seam ridge, means for pressing said tool into firm engagement with the work supported on said roll, feeding means engageable with the work adjacent to said tool, and means for heating said tool.

CLIFFORD K. MacDONALD.