A. A. & R. B. HAWLEY.
Manufacture of Felt Foot-Coverings, &c.

No. 203,148. Patented April 30, 1878.

Fig: 1.

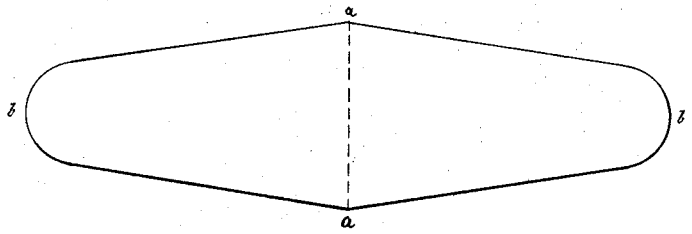


Fig: 2.

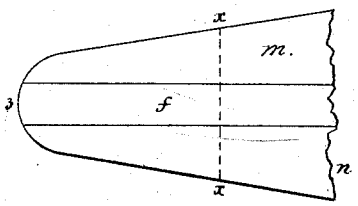


Fig: 3.

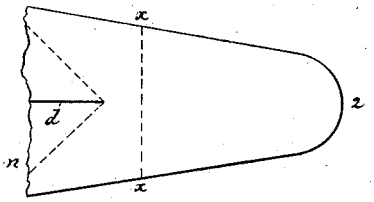


Fig: 4.

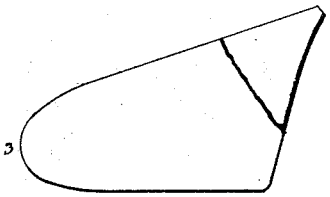


Fig: 6.

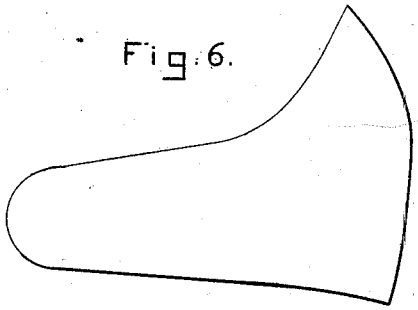
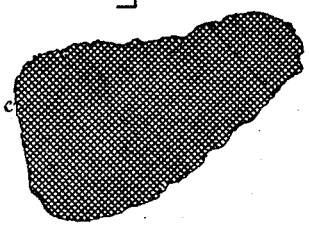


Fig: 5.



Witnesses.
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Alfred A. Hawley.
Robert B. Hawley.
by Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

ALFRED A. HAWLEY, OF MERRIMACK, AND ROBERT B. HAWLEY, OF AMESBURY, ASSIGNORS TO MERINO SHOE COMPANY, OF MERRIMACK AND BOSTON, MASSACHUSETTS.

IMPROVEMENT IN THE MANUFACTURE OF FELT FOOT-COVERINGS, &c.

Specification forming part of Letters Patent No. **203,148**, dated April 30, 1878; application filed March 29, 1878.

To all whom it may concern:

Be it known that we, ALFRED A. HAWLEY, of Merrimack, and ROBERT B. HAWLEY, of Amesbury, both in Essex county, State of Massachusetts, have invented an Improvement in the Method of Manufacturing Foot-Coverings, of which the following is a specification:

This invention relates to an improvement in the method of manufacturing foot-coverings, such as shoes, from wool or other feltable material.

The invention consists, primarily, in the method of manipulating the wool-bat so as to first partially harden that part of it which is to cover the main portion of the foot from at or near the ankle to the toe, and then lapping or closing the open end of the bat, shaping and partially hardening and felting together such lapped portion, to form a seamless blank approximating in shape that of the shoe or boot to be produced from such bat.

Figure 1 represents, in elevation, a bat sufficient for two shoes, it being yet contained upon the former. Fig. 2 shows one of the shoe-bats removed and folded; Fig. 3, an opposite side view of the shoe-bat, showing the slit which is to afford entrance to the bat or blank after closing its open end. Fig. 4 shows the shoe-bat closed and hardened; Fig. 5, the cloth to be used within the shoe-bat. Fig. 6 represents a boot-bat.

The bats from which are formed the foot-coverings are produced by winding a wool web or sliver from the doffer of a wool-carding machine upon a former somewhat like that employed in the manufacture of wool hats, its terminus, however, being more blunt, to give the proper shape to the toe of the shoe, such former being supported, and automatically rotated and changed as to its axial position with relation to the axis of rotation of the doffer, so as to cause each successive layer of the wool web or sliver to be crossed from end to end of the rotating former. The former, covered with sufficient wool for two shoes, is severed axially on the line *a a*, Fig. 1, producing two bats, *b b*. One of these bats *b* has placed within it a piece of coarse cotton or jute cloth, *c c*, shaped as shown at Fig. 5, it serving to keep the sides of the bat separated, while the bat placed upon a steam bed or table under a felting-hand is partially hardened from the toe end 3 back to about the line *x x*, Figs. 2 and 3, or to the heel-forming portion. When partially hardened, this bat is removed from between the felting-surfaces, is opened, the cloth *c* removed, the bat refolded in another place, the cloth reinserted, and the bat again partially hardened, as before. This last operation removes the "croze marks" formed by the first partial hardening. If the bat was hardened from its small end to the line *x x* between two rotating reciprocating cones, then one hardening operation would be sufficient.

The bat having been partially hardened, except at its rear or open end, is next to be converted into a seamless blank approximating in shape, but of larger size than, the shoe. To do this the cloth *c* is removed, a slit, *d*, is formed at the side near the large end of the bat, and the bat is so held and the open ends lapped each side of the slit as to close and shape the bat to form a heel, and such lapped part, kept separated from the main foot and toe part by a suitable cloth, is then rubbed or hardened until the soft heel-forming portion *m* from the line *x x* to the end *n* of the bat is brought into one seamless whole, hardened to substantially the same degree as the foot and toe forming portions.

It is quite difficult to close the end of this bat, as described, upon any of the usual felting-beds; but to do it cheaply, rapidly, and effectually, we have devised a horn-like felting-bed, which is fully described in another application for patent filed concurrently with this, to which reference may be had. To close the open end of the bat upon and about this horn, the toe of the bat is placed to point toward the base of the horn, and the portion of the open end each side the slit is brought above and lapped one part over the other upon the top of the horn, where it is closed and hardened. This bat, closed at its large open end and hardened after being hardened at its foot and toe forming portions, produces what is herein denominated a "seamless-shoe blank."

It is of substantially uniform strength in all directions, except where there is any increased thickness of wool, as herein provided for. This blank is afterward subjected to a fulling or shrinking action, reducing it to substantially the size of the shoe to be made. When sufficiently fulled, and while yet moist, a last is driven into the slit hereinbefore referred to, it serving for entrance into the shoe, such last giving to the blank the shape it is desired that the shoe retain. The blank is left to dry thereon. If the shoe is to have a fine soft face, the blank is pounced in any usual way.

The upper portion of the shoe about the slit or open part is cut away to permit the entrance of the foot therein, the shape of the cut being in accordance with the pattern of shoe to be made. A sole may be applied to this shoe, if desired. If the portion of this bat to form the bottom next the sole of the foot is to be thicker and stronger than that about the top of the foot, there may be added to the bat, before hardening, as shown in Fig. 2, a strengthening-strip of wool, *f*, taking care, however, that such addition be made opposite the slit at the top of the shoe where the foot is to enter. A shoe made from a flat bat of wool would not retain its shape as well as one formed upon a former, as herein described.

When lapping this bat to form the heel, it is desirable that the ends lap by each other sufficiently far to increase the strength of the bat at that portion, and form a thickened portion to serve as a heel-stiffener. It is obvious, however, that this additional thickness at the heel may be formed by the addition of more sliver or wool as the bat is being closed or hardened.

The method herein described of partially hardening and subsequently closing the open end of the bat affords ample opportunity for the workmen to get at the cloth *c*, change it readily from time to time, as required, to prevent the wool working into the cloth, or the bat from having formed in it objectionable craze-marks, which could not be so well nor so rapidly and economically done if the unhardened bat were first closed at the heel and all hardened together. It is obvious that a seamless-boot blank may be hardened and closed in the manner above described.

To produce a boot-bat, we would change the shape of the former, enlarging it at its central portion, as shown and described in another application filed concurrently with this, wherein is contained mechanism for rotating such former of novel shape. When dividing the material wound upon such a former to form boot-blanks, the line of severance will be made diagonally across the former through its enlarged central portion, as shown in Fig. 7 of said application.

We claim—

That improvement in the method of manufacturing foot-coverings from wool which consists in winding and crossing the wool fibers on a former to produce a bat, then hardening the main portion of the foot and toe portions of the bat, while the large end thereof is left unhardened and open so as to permit ready change of the cloth within it, and then subsequently closing the open end of and hardening and shaping the bat at the heel to form a blank, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ALFRED A. HAWLEY.
ROBERT B. HAWLEY.

Witnesses:
W. H. KEENE,
F. G. SEYMOUR.