A. A. & R. B. HAWLEY.

Mechanism for Hardening or Felting Hollow Articles of Wool.

No. 203,147. Patented April 30, 1878.

Fig: 1.

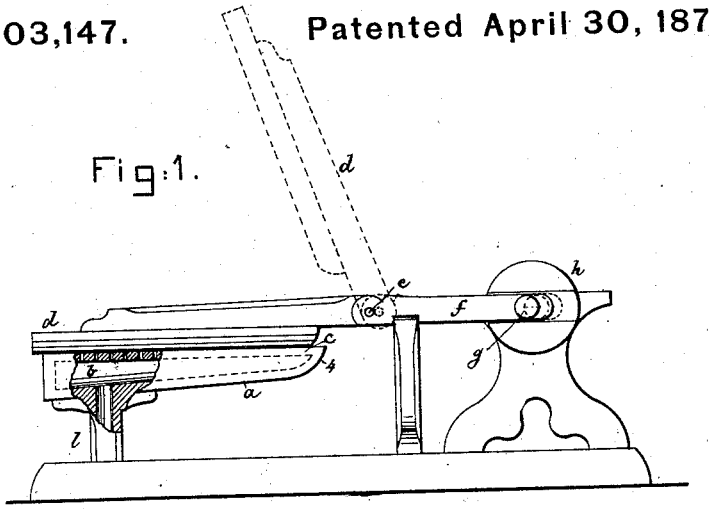


Fig: 3.

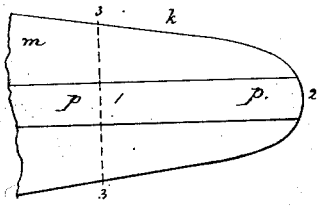


Fig: 4.

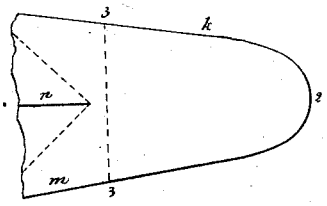


Fig: 2.

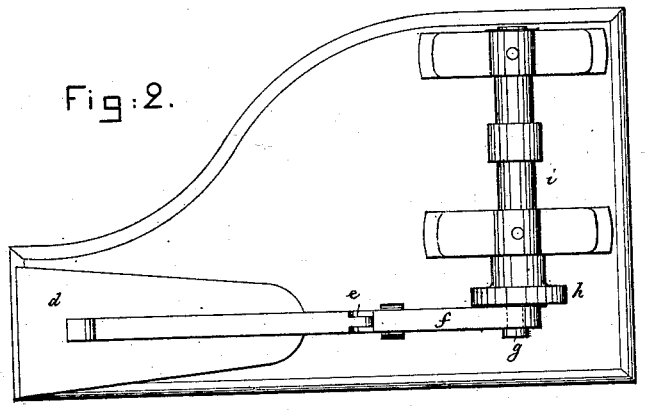
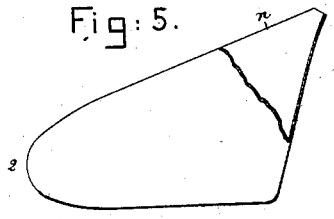


Fig: 5.



Witnesses.

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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 MECHANISMS FOR HARDENING OR FELTING HOLLOW ARTICLES OF WOOL.

Specification forming part of Letters Patent No. **203,147**, 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 Mechanism for Hardening or Felting Hollow Articles of Wool, of which the following is a specification:

This invention has reference to mechanism for felting or hardening hollow articles of wool, such as shoes, boots, &c.

The invention consists in a horn, which is adapted to enter the formed bat, so that any single portion of the bat may be hardened or its open end be united and hardened, as will be hereinafter described.

Figure 1 represents, in side elevation, a felting-horn and hand or jigger, illustrating this invention; Fig. 2, a top view thereof; Fig. 3, one side of a wool-bat; Fig. 4, a view of its opposite side, and Fig. 5 a shoe-blank made from a bat such as shown in Figs. 3 and 4.

Wool-bats for shoes, boots, and other hollow articles are commonly formed on rotating cones or "formers" placed near and operated to receive a wool web from the doffer of a carding-engine. These bats are now commonly hardened by placing them upon a broad steam bed or table, a cloth being placed within the hollow bats to prevent their sides from coming together and being united. During the hardening operation each bat is frequently opened, the cloth is removed, the bat folded in a different place, and the cloth again inserted. This frequent change of cloths prevents the formation of croze marks in the hardened bat.

In hat-making the large end of the bat is never closed, but in the manufacture of shoes, where the open end of the formed bat is closed to produce the heel-covering portion, it has been found by experience that, by the use of a horn-like bed, a much superior shoe or boot can be produced, both as to shape and strength, and at a greater saving in time and cost than if the bat were closed at its end and hardened on a bed external to the bat. Another application made by us, filed concurrently with this, and to which reference may be had, describes at length the method employed to form, harden, and close the end of a bat to form a seamless shoe or boot blank.

The horn-like bed *a*, made hollow as at *b*, and connected in any usual or suitable way with a steam reservoir or generator, has a pervious top, *c*, (see Fig. 1,) through which steam in the horn passes outward to heat and moisten the bat being hardened or felted. This horn, in practice, will be covered with a coarse cotton, linen, or jute cloth, such as used with the ordinary flat bed. The felting hand or jigger *d* (shown in Fig. 1, full lines, in working position, and in dotted lines as turned up out of action) is pivoted at *e* to an arm, *f*, connected with a crank-pin, *g*, of a disk, *h*, on a rapidly-rotating shaft, *i*, the hand *d*, when the shaft is rotated, being reciprocated very rapidly over the bat laid upon the horn. The weight of the hand or jigger is adjusted or adapted to the class of work being hardened.

The bat *k*, to form a shoe shaped as shown in Fig. 3, may be hardened from the toe-forming portion 2 back to the line 3 3, somewhat near or back of the line of the ankle, leaving the rear or open large end *m* of the bat unhardened. This bat, slit as at *n*, is then laid under the projecting end 4 of the horn, with the slit uppermost and the small or toe-forming end 2 next the part *l*, after which the large end *m* of the bat is lifted, and its lower half, below the slitted part, is carried forward and upward over the end of the horn toward the post, and laid upon the upper surface of the horn, the slitted portion of the bat spreading open below, and embracing the under side of the horn. The open end of the bat is then contracted or brought together, torn or cut, and lapped one portion over the other on top of the horn, thereby properly shaping the bat so as to give it the form requisite for the heel-producing part of the shoe; after which such lapped portion (the horn then extending within the hollow bat) is subjected to the action of the felting hand or jigger, which closes and effectually unites and hardens the ends of the bat lapped as described, forming a seamless shoe-blank open only at the slit in which the horn rested when the end of the bat was

closed. This blank, so produced, is shown in Fig. 5. If it is desired to make the heel-covering portion of the shoe stiffer than the vamp, care will be taken in overlapping the edges of the open end of the bat, or layers of wool may be added to produce the required thickness.

In the manufacture of boots, the part *l* may be larger than shown in the drawings, and it and the horn be shaped more as the leg and foot part of a boot. The dotted lines at the side of the slit *n*, Fig. 4, show how some of the bat will be torn out when lapping and closing the bat for the heel. The amount so torn out will be varied according to the extent it is desired to lap the bat at the heel and the degree of contraction at the heel from the bottom of the shoe toward the ankle. The lines *p* indicate where a strip of wool may be applied to thicken the bat at the sole.

We claim—

1. In a felting or hardening apparatus, a horn-like bed to enter and support a hollow article being hardened, substantially as described.

2. The horn-like pervious steam-heated bed combined with a felting hand or jigger, substantially as described.

3. The herein-described method of uniting the open end of a wool-bat, consisting in slitting the bat to fit about and embrace the lower end of the horn-like felting-bed, and carrying the lower side of the bat upward and backward above the bed toward its rear end, and contracting and lapping the open end of the bat each side the slit, and closing, felting, and hardening the same, 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.