J. BATLEY, J. KEATS, & J. NEIL.

THE MANUFACTURE OF FELTED ARTICLES.

No. 195,078. Patented Sept. 11, 1877.

Fig. 2.

Fig. 3.

Fig. 1.

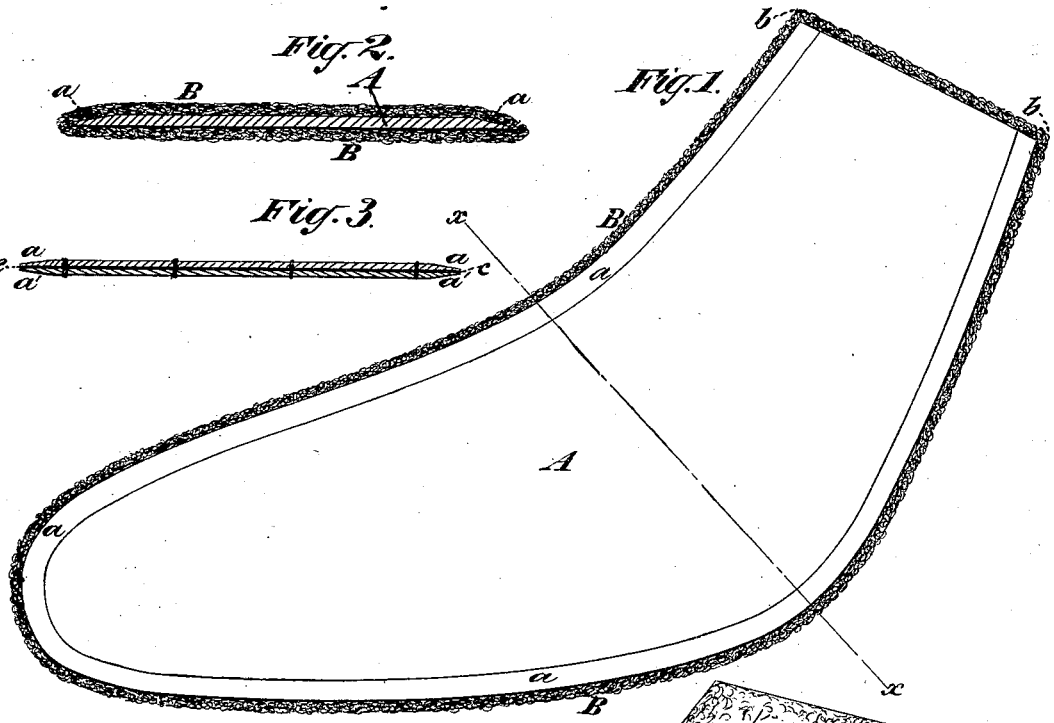


Fig. 4.

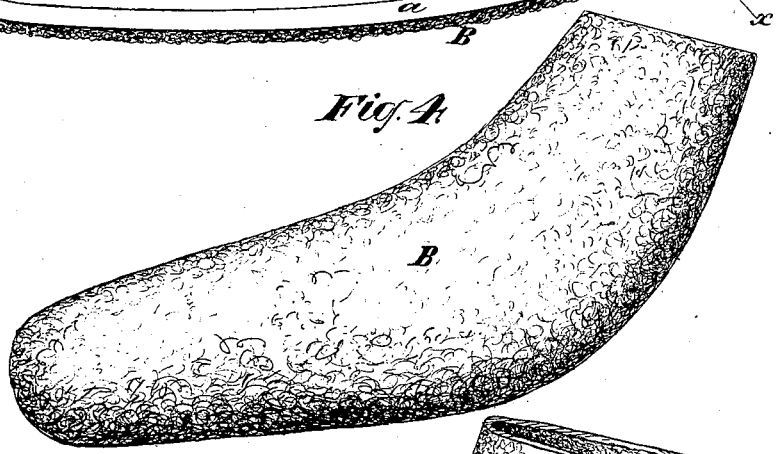
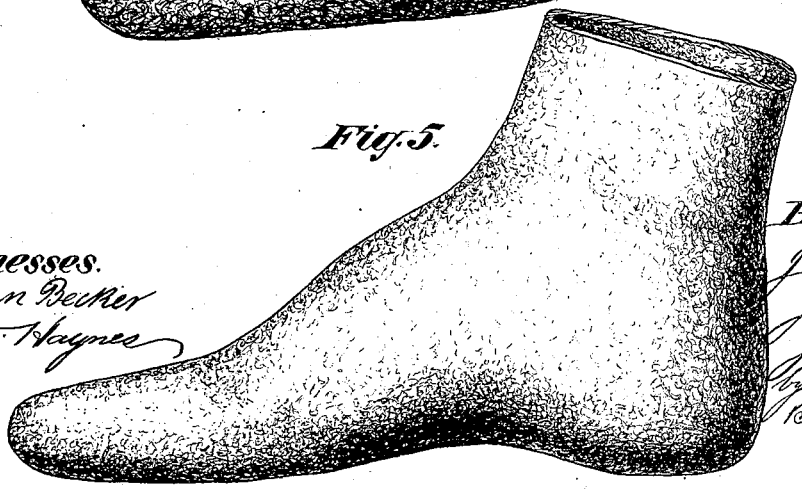


Fig. 5.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN BATLEY, OF KENSINGTON PARK GARDENS, JOHN KEATS, OF WOOD GREEN, AND JAMES NEIL, OF WORSHIP STREET, MIDDLESEX COUNTY, ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF FELTED ARTICLES.

Specification forming part of Letters Patent No. 195,078, dated September 11, 1877; application filed June 19, 1877.

To all whom it may concern:

Be it known that we, JOHN BATLEY, of Kensington Park Gardens, in the county of Middlesex, JOHN KEATS, of Wood Green, in the same county, and JAMES NEIL, of Worship street, in the same county, England, have invented certain new and useful Improvements in the Manufacture of Felted Boots and Shoes and other Felted Articles; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates, mainly, to improvements in the manufacture of coverings for the feet made of felted fibrous materials, which is the subject of English Letters Patent No. 2,048, dated June 3, 1875, granted to Mark Bailey, and which is also the subject of an application of said Bailey for United States Letters Patent. An important feature of the invention of said Bailey is the pliable flat former upon which the web or bat to make the slipper, shoe, or other foot-covering is formed and hardened.

One of our improvements consists in making such pliable former with a chamfered or beveled and thinned edge, so that in the hardening process the felt will be less thickened at the crease which is formed around the edge of the former than when the edge is made as thick as the other parts of the former.

Another of our improvements consists in the construction of such pliable former of two or more thicknesses of cloth of such nature as to absorb moisture, with an interposed layer of india-rubber or other material impervious to moisture, whereby the said former is made capable after absorbing from the web formed upon it a portion of the moisture with which the web has been moistened preparatory to the hardening process, and of giving back such moisture to the web in the later stages of such process, and yet the moisture is prevented from passing through the former from one side to the other, and hence that half of the web on either side of the former is prevented from depriving the other half of its own proper share of moisture in the said process, and the equal hardening of the web or felt on both sides of the former is obtained.

In the accompanying drawing, Figure 1 exhibits a face view of a former constructed according to our invention, and a section of the covering of fibrous material formed thereon for the purpose of making a gaiter boot. Fig. 2 is a section of the same in the plane indicated by the line *x*. Fig. 3 is a similar section of a modification of the former. Fig. 4 is a side view of the web, showing its condition after the fulling operation. Fig. 5 is a side view of the shaped boot.

A is the former, which may be made of one or more thicknesses of cloth, or of other pliable material or fabric. This is represented in Fig. 2 as beveled or chamfered at *a a* on one face only, but it may be beveled or chamfered on both faces, as shown at *a a a' a'*, in Fig. 3, to make it present a thin edge. In Fig. 2 it is represented as made of a single thickness of material; but we prefer to make it, as shown in Fig. 3, of two thicknesses of stout cloth, sewed together, with a thin layer, *c*, of india-rubber between them. The india-rubber may be so applied as to cement the two thicknesses of cloth together.

The cloth which we have successfully used for the purpose is composed of a mixture of wool and linen, which, while it is capable of absorbing moisture readily, is not liable to shrink.

Fig. 1 shows this former of a shape approximating to the side profile of the human foot, but with less fullness at the heel; but it may be made of a shape approximating to the section of the foot in a direction parallel, or nearly so, to the sole thereof.

The covering-web B is formed upon the former A by wrapping, lapping, or winding upon it a sheet, bat, or sliver of carded wool or other fibrous material; and when the former has been entirely covered to a desirable thickness, the former, with the covering-web upon it, is first dipped in water and then put into a hardening-machine, and the covering-web is hardened, as in the process of Mark Bailey, here-

inbefore mentioned, while upon the former. After the hardening process a slit is made in the covering at *b b*, across the upper edge of the former, which provides for the taking out of the former, as well as constitutes the opening for the foot when the boot or shoe is finished. After the removal of the former the web is fulled by suitable means, and afterward shaped upon a last, and may have a leather sole applied, and may be finished in any manner or style, according to fashion or taste.

By thinning the edge of the former we prevent the too great thickening of the felt at the crease which is formed around the edge of the former, such thickening having a tendency to produce an unsightly crease in the finished shoe or boot. It may be desirable, however, to preserve a slight crease as a centerline by which to work in lasting and finishing the shoe, and this crease may be regulated by more or less thinning the edge of the former.

The former made of two or more thicknesses of absorbent cloth, with a layer of india-rubber between them, absorbs some of the moisture from the web B, when the latter is wetted preparatory to the hardening process, and during the first stage of the hardening process; and as this process proceeds and the moisture is worked out from the web, the latter takes back, by absorption, some of the moisture from the former.

If the former were made absorbent all the way through, the heat of the hardening-table would expel the moisture from the lower half of the web through the former and into the upper half of the web, and the upper half of the web being kept more moist than the lower half, the two halves would be unequally hardened; but this is prevented by the impervious or water-proof center layer of india rubber, and the upper and lower halves are equally hardened.

By making the flat flexible former of a shape to conform or approximate to the shape of the side profile of the foot, or foot and leg, not only is greater facility afforded for inserting the last without unduly stretching the opening provided in the shoe or boot for the insertion of the last and of the foot, but the process of lasting is enabled to be performed more correctly; and, moreover, it enables a boot with any length of leg to be made of seamless felt without any opening except at the top of the leg.

It may be remarked that it is better that the former should be made with less fullness at the heel than the profile of the foot would present, as this provides for the better shaping of the heel and instep of a shoe or boot by the final operation of stretching and shaping it on the last.

In order to provide for the easy insertion of the last into the fulled web shown in Fig. 4, the last should be made in such manner that the heel may be drawn in toward the instep.

A last especially adapted for this purpose is the subject of our United States Patent No. 189,418, dated April 10, 1877.

What we claim as our invention is—

1. The flat pliable former made with a beveled or chamfered and thinned edge, substantially as and for the purpose herein described.

2. The pliable former made of two or more thicknesses of absorbent cloth, having interposed between them a layer of india-rubber or other water-proof material, substantially as for the purpose herein described.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

JOHN BATLEY.
JOHN KEATS.
JAMES NEIL.

Witnesses to the signature of John Batley:
WILMER M. HARRIS,
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Witnesses to the signature of John Keats:
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Witnesses to the signature of James Neil:
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