

No. 891,454.

PATENTED JUNE 23, 1908.

Z. S. BLACKADAR.
REINFORCED LEATHER.
APPLICATION FILED AUG. 30, 1907.

Fig. 1.

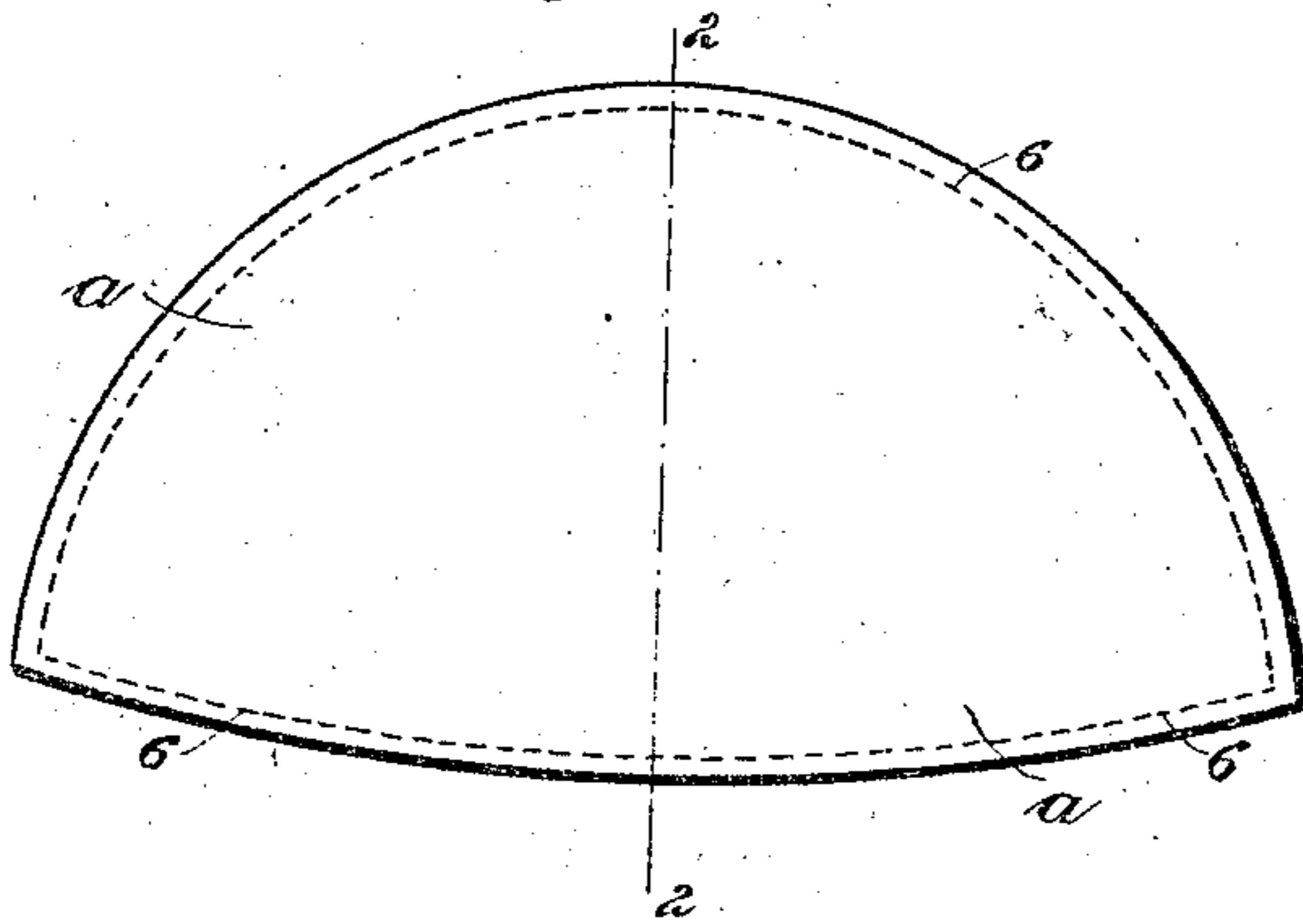


Fig. 2.



Fig. 3.

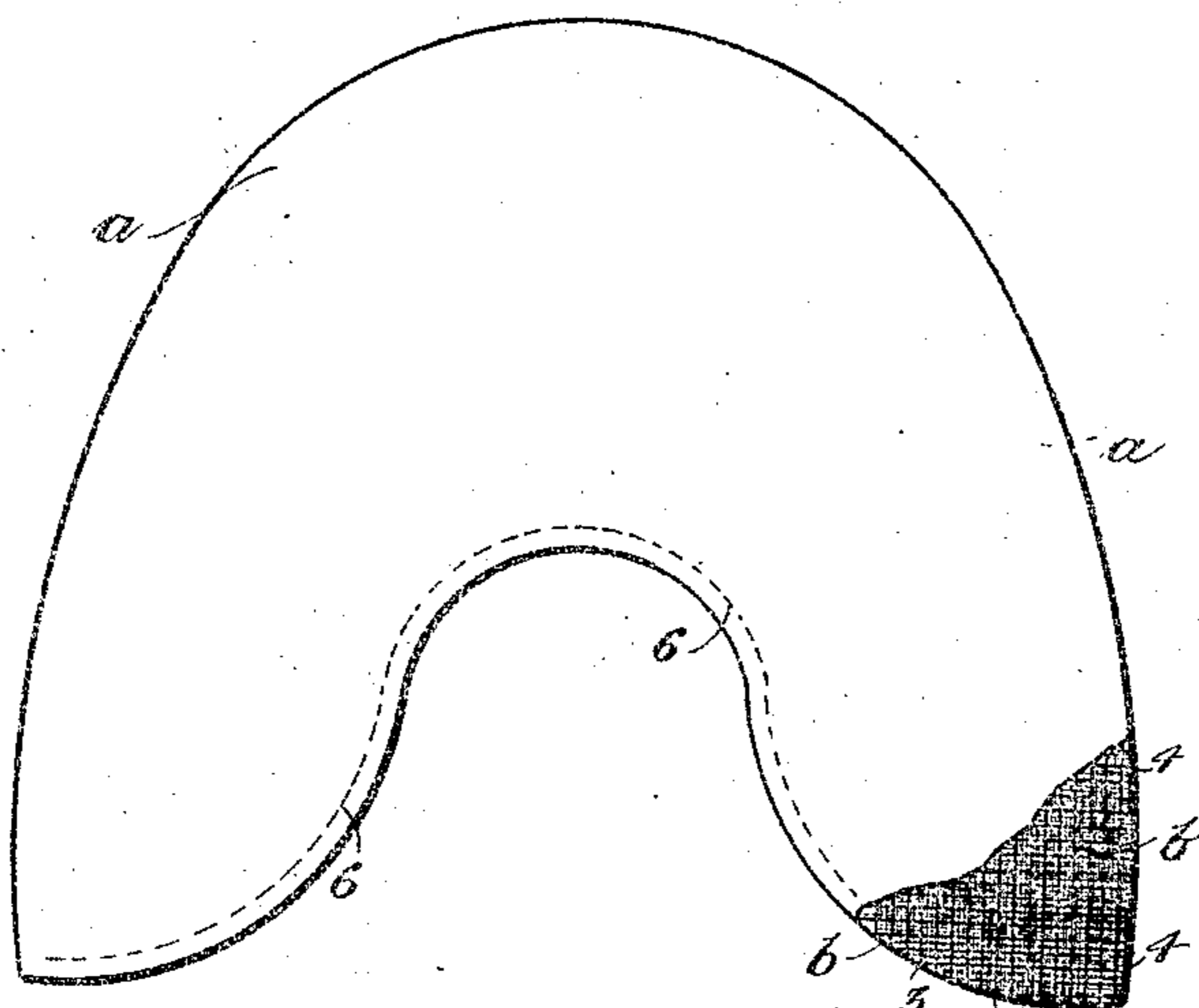


Fig. 4.

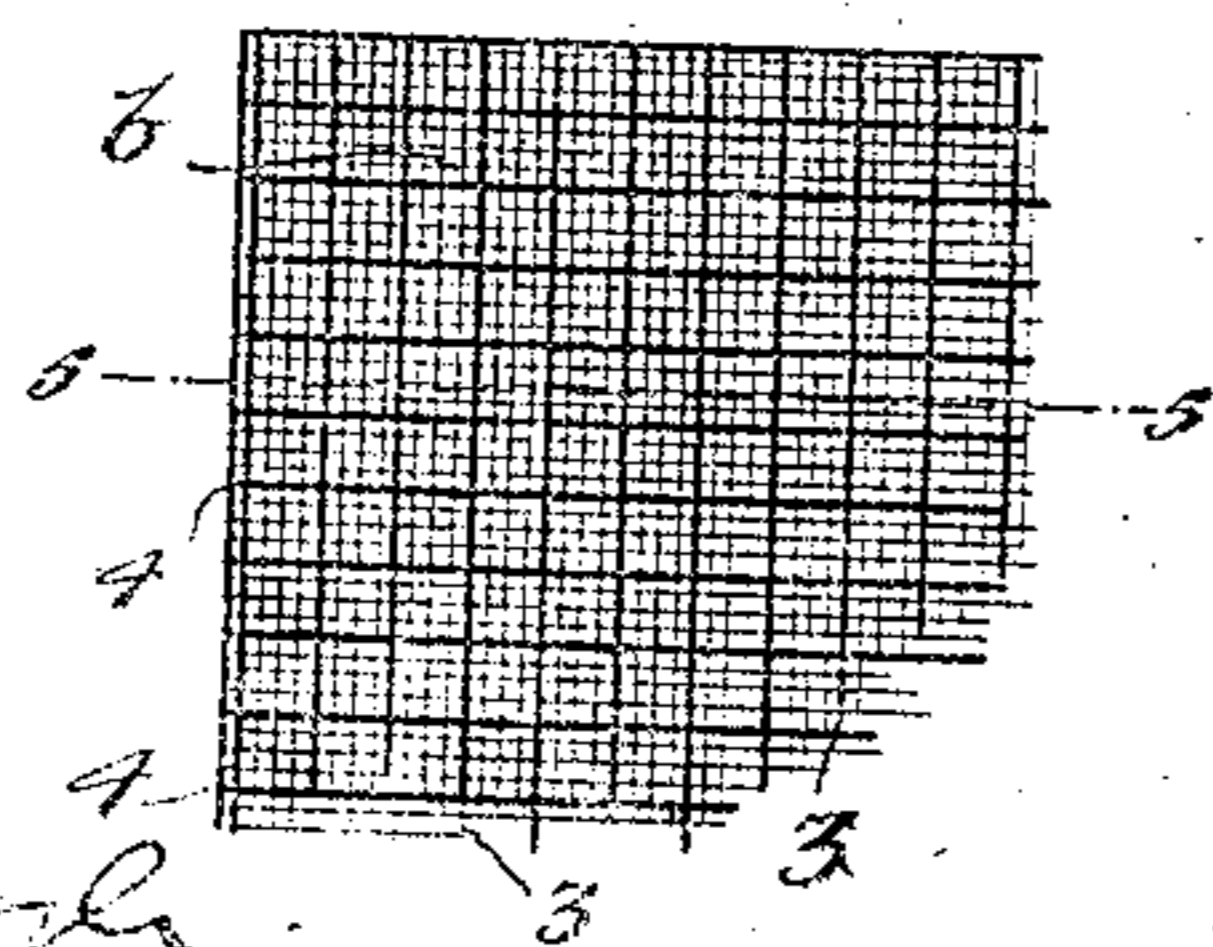


Fig. 5.



Witnesses

H. J. ...
C. H. Osterman

331

Inventor

Z. S. Blackadar

Wright, Brown, Quincy & May

Attorneys

UNITED STATES PATENT OFFICE.

ZEBINA S. BLACKADAR, OF WHITMAN, MASSACHUSETTS, ASSIGNOR OF ONE-FOURTH TO ARTHUR C. FOLSOM AND ONE-FOURTH TO CHARLES O. EMERSON, BOTH OF BROCKTON, MASSACHUSETTS.

REINFORCED LEATHER.

No. 891,454.

Specification of Letters Patent.

Patented June 23, 1908.

Application filed August 30, 1907. Serial No. 390,842.

To all whom it may concern:

Be it known that I, ZEBINA S. BLACKADAR, of Whitman, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Reinforced Leather, of which the following is a specification.

This invention relates to leather parts or pieces adapted for use in making boot and shoe uppers, and particularly to such leather parts and pieces as are provided with a glazed or enameled outer face, such as that possessed by ordinary so-called patent or enameled leather.

It is a well-known fact that the finished outer surface of patent leather is liable to crack after the leather is incorporated in a boot or shoe, the cracking being particularly noticeable in toe caps and other parts which are subjected to a considerable degree of tension in the operation of lasting the upper. This cracking is due to inequalities between the tensile-strength of the leather and of the ornamental coating or finish, the latter being liable to crack when put under a tension which stretches the leather.

My invention has for its object to render upper leather practically inextensible, so that when lasted in a boot or shoe, it will not stretch sufficiently to cause the cracking of its finished outer surface.

To this end the invention consists in a reinforced sheet or piece of leather having a finished outer face and a woven reinforcing layer intimately attached by a suitable adhesive to the inner or flesh face of the leather piece, said reinforcing layer being thin and flexible, and comprising metallic warp and weft strands, which render the reinforcing layer and the leather piece to which it is united, practically inextensible, thus obviating the annoyance, expense and loss involved by the cracking of the finished surface.

Of the accompanying drawings, forming a part of this specification—Figure 1 represents a side view of a leather toe cap embodying my invention. Fig. 2 represents a section on line 2—2 of Fig. 1. Fig. 3 represents a side view of a vamp constructed in accord-

ance with the invention, a portion of the leather piece being broken away to show the reinforcing layer. Fig. 4 represents a view of a fragment of the reinforcing layer on an enlarged scale. Fig. 5 represents a magnified sectional view of a fragment of the reinforcing layer, showing a modification.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a sheet or piece of leather, suitable for use in a boot or shoe upper, the said piece having a finished outer face 2, which may be provided by any of the well-known processes of producing so-called patent or enameled leather, or the said finished face may be of any suitable character, whether formed by the addition of a coating, which is adapted to be cured and made permanent by heat, as in the case of patent or enameled leather, or without such coating. To the back or flesh side of the piece *a* is intimately united a reinforcing layer *b*, which is composed of interwoven warp and weft threads or strands. The said fabric comprises metallic warp threads or strands 3 and metallic weft threads or strands 4. Said metallic strands are made of very finely drawn wire of copper or other suitable metal or alloy having sufficient tensile strength to collectively render the fabric practically inextensible in any direction. The size of the wire strands is such that the fabric in which they are included, is so thin and flexible that it does not interfere materially with the flexibility of the piece *a* and the operation of conforming the same to a last when the upper is being lasted. In practice the metal strands 3 and 4 are of about the same thickness as the strands or threads employed in making ordinary bolting cloth. The reinforcing layer *b* is intimately united with the leather piece *a* by means of glue, paste, cement or other suitable adhesive, applied to one or both of the contacting surfaces of the piece *a* and layer *b*, the contacting surface of the leather piece *a* being the inner or flesh side.

To adapt the reinforcing layer *b* for attachment by an adhesive to the leather piece *a*, I provide the reinforcing layer with a face

adapted to engage and adhere to the adhesive employed, said face being, in part at least, non-metallic; in other words, I construct the reinforcing layer *b* so that while it comprises a suitable number of metallic warp and weft strands to insure practical non-extensibility, the number of metal strands is not such as to prevent the firm adhesion of the reinforcing layer throughout practically its entire area to the leather piece. I prefer to provide the reinforcing layer with an adhesive-engaging surface by limiting the number of metallic warp and weft strands so that each set of strands is separated by a space of considerable width, the said spaces being filled with intermediate warp and weft strands of textile material, such as cotton or linen, the textile material employed being of such tensile strength that threads of which it is composed may be made very thin and slender, and practically of the same thickness as the metallic strands.

In Fig. 4 I show conventionally a fragment of the reinforcing layer, in which the relatively heavy intersecting lines represent the metallic warp and weft strands, while the intermediate lighter intersecting lines represent fine textile warp and weft threads interwoven to fill the spaces between the metallic strands. The textile material thus interwoven, presents a surface adapted to engage the adhesive employed, and insure a firm and intimate union between the reinforcing layer and the leather piece. The woven fabric may, however, be composed entirely of the metallic strands 3 and 4, which will be assembled more closely than the metallic strands shown in Fig. 4, the spaces or reticulations of the fabric being closed by a suitable filling composition 5 of such nature that it is adapted to form a tenacious body, in which the metallic strands are embedded, said body presenting a surface adapted to engage an adhesive. The filling composition 5 may be composed of rubber vulcanized after its application to the woven metallic fabric, or it may be of any other suitable material or composition. I desire to emphasize the fact that the reinforcing layer must be so thin and flexible that it will not materially affect the pliability and conformability of the leather piece, so that the latter may be lasted with practically the same ease and facility as a leather piece which is not thus reinforced, the reinforcing layer at the same time preventing the stretching of the leather piece and the consequent cracking of its finished surface.

The woven fabric of which the reinforcing piece is made, is characterized not only by non-extensibility, but also by imperviousness to the action of water. I am aware that it has been proposed to cement a layer of can-

vas or duck composed wholly of textile threads, to a piece of upper leather. This material, however, is not inextensible, particularly when moistened, the threads not being impervious to water. Moreover, any fabric composed wholly of textile material must necessarily be made of threads which are relatively thick and bulky, and constitute a fabric which imparts an undesirable increase to the thickness of the piece of which it forms a part, an objection which is entirely obviated by the employment of a fabric comprising metallic warp and weft threads.

The reinforcing layer *b* may be secured to the piece *a* by means additional to the adhesive employed, such means being, for example, a line of stitches 6, which may extend along one edge, as shown in Fig. 3, or along all the edges, as shown in Fig. 1.

The employment of the described inextensible thin and flexible reinforcing layer enables me to use a lighter and cheaper quality of leather for the piece *a* than would otherwise be possible, so that I am enabled to save expense, both in the cost of the leather and by avoiding the necessity of subsequently treating the finished boot or shoe to prevent cracks in its finished surface and the serious loss often occasioned by the necessity of entirely discarding a completed boot or shoe, owing to the cracking of the finished surface.

I desire it to be clearly understood that I do not limit myself to the employment of so-called patent or enameled leather, but may employ any leather having a finished outer surface in any way for use in a boot or shoe upper.

I claim:

1. A reinforced sheet or piece of leather having a finished outer face and a woven reinforcing layer intimately attached to its inner or flesh face, said layer being thin and flexible, and comprising metallic warp and weft strands whereby the reinforcing layer and the leather piece are rendered inextensible.

2. A reinforced sheet or piece of leather having a finished outer face and a thin and flexible woven reinforcing layer, comprising metallic warp and weft strands whereby the fabric of the reinforcing layer is rendered inextensible, said layer having a face adapted to engage an adhesive, and intimately united by said adhesive to the back or flesh side of the leather piece.

3. A reinforced sheet or piece of leather having a finished outer face and a thin and flexible woven reinforcing layer, comprising metallic warp and weft threads which render the fabric of the layer inextensible, and textile warp and weft threads alternating with the metallic threads, and forming a surface

adapted to engage an adhesive, the said layer being intimately united by said adhesive to the back or flesh side of the leather piece.

4. A reinforced sheet or piece of leather
5 having a finished outer face and a woven reinforcing layer intimately attached to its inner or flesh face, said layer being thin and flexible, and comprising metallic warp and weft strands whereby the reinforcing layer
10 and the leather piece are rendered inexten-

sible, the said leather piece and reinforcing layer being additionally united by marginal stitches.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ZEBINA S. BLACKADAR.

Witnesses:

C. F. BROWN,
ARTHUR H. BROWN.