2 Sheets—Sheet 1.

G. W. COPELAND.

Process of Lasting Boots and Shoes.

No. 211,459. **Patented Jan. 21, 1879.**

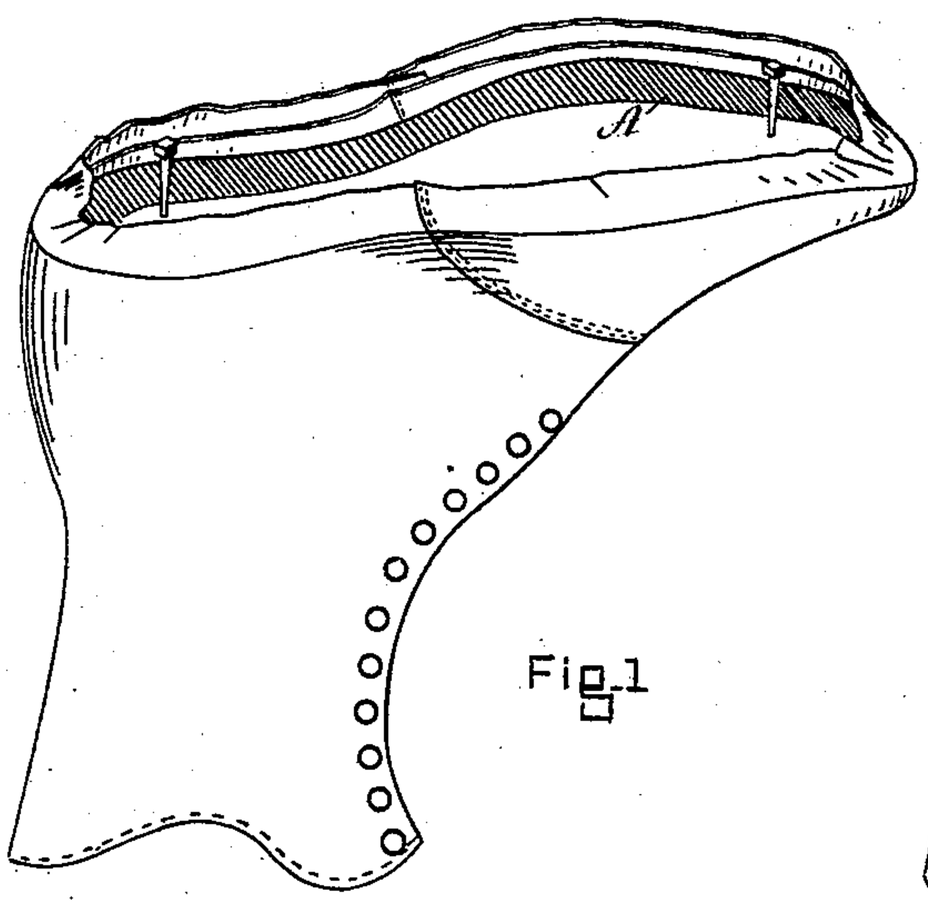

Fig. 1.

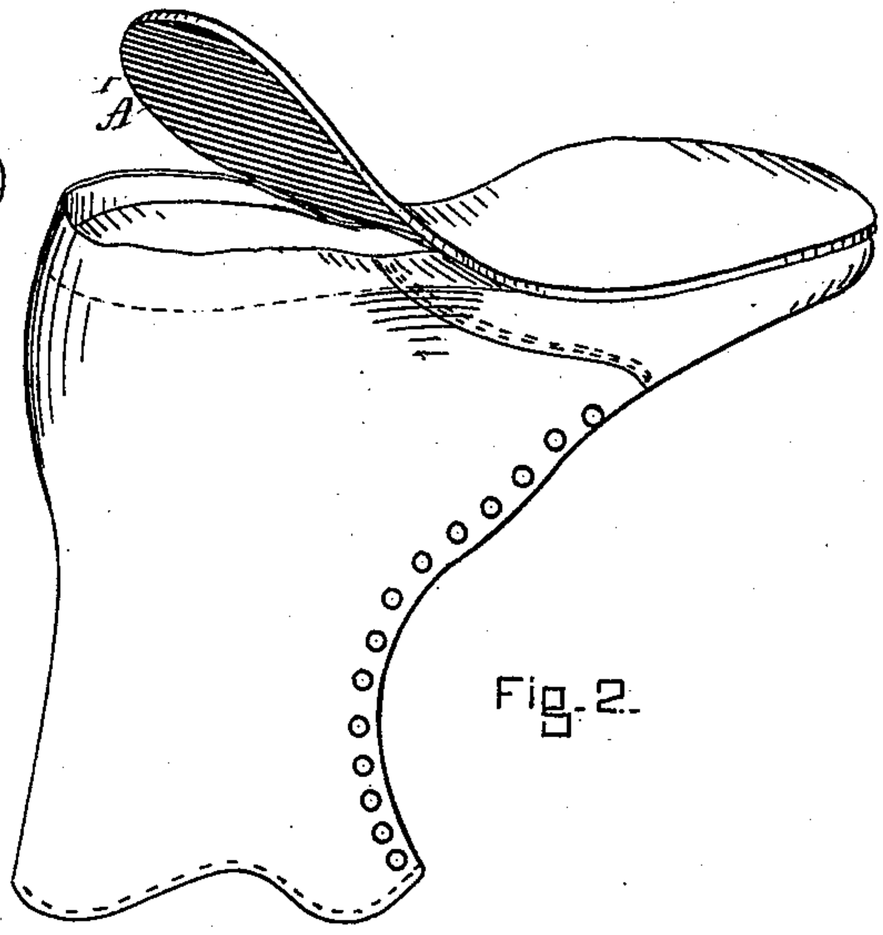

Fig. 2.

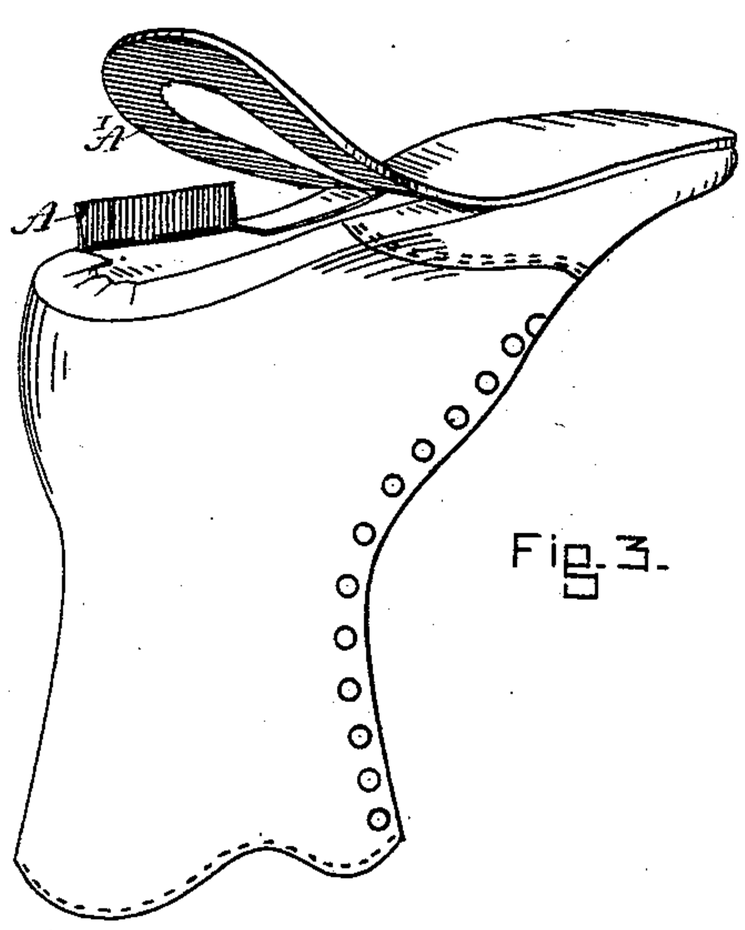

Fig. 3.

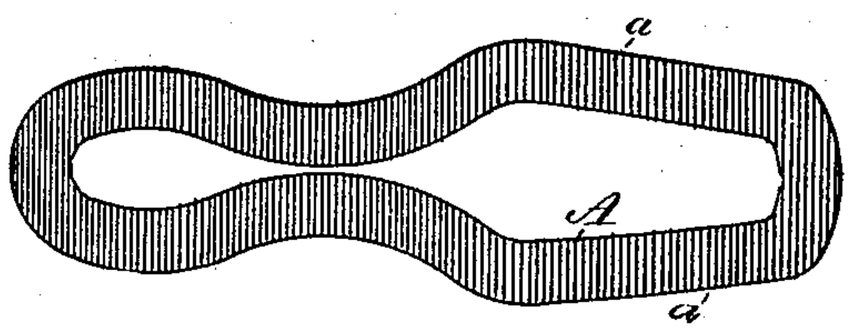

Fig. 4.

WITNESSES:

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INVENTOR:

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2 Sheets—Sheet 2.

G. W. COPELAND.

Process of Lasting Boots and Shoes

No. 211,459 **Patented Jan. 21, 1879.**

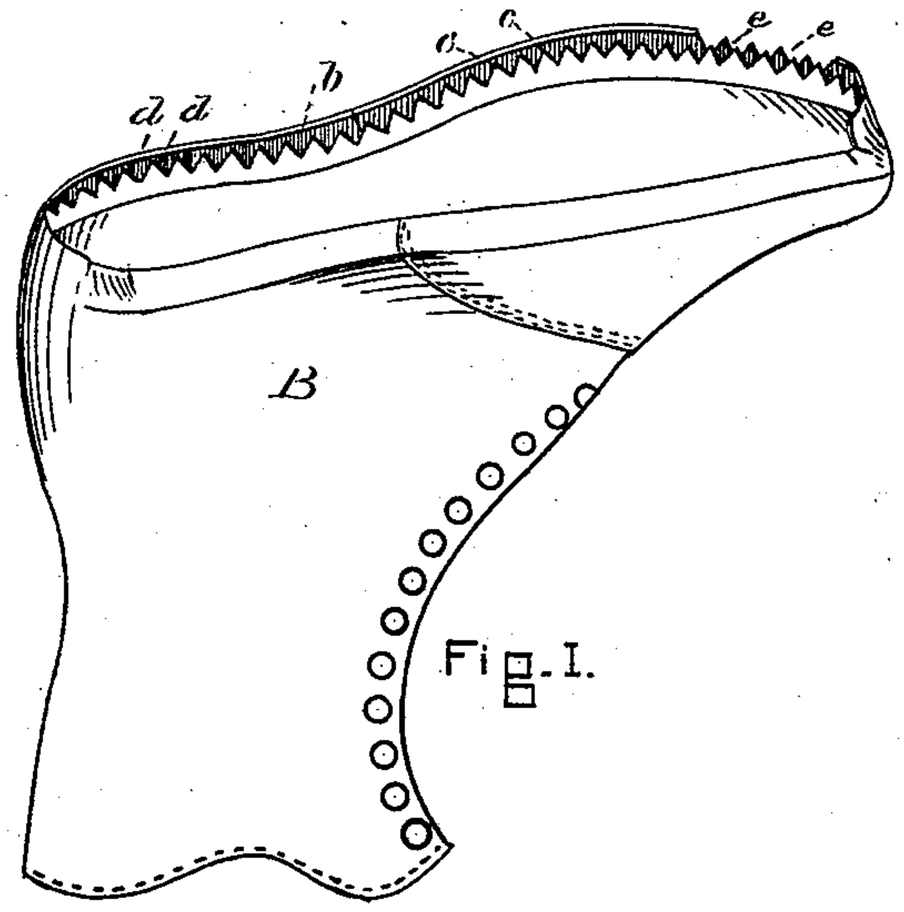

Fig. 1.

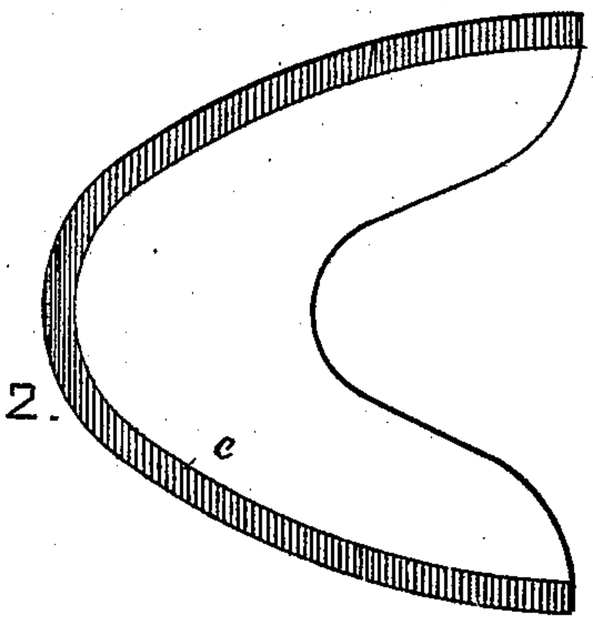

Fig. 2.

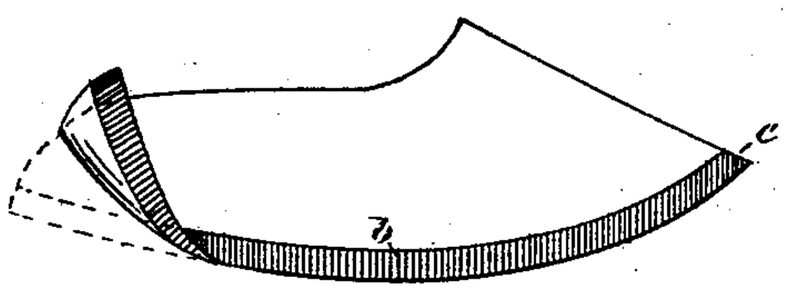

Fig 3

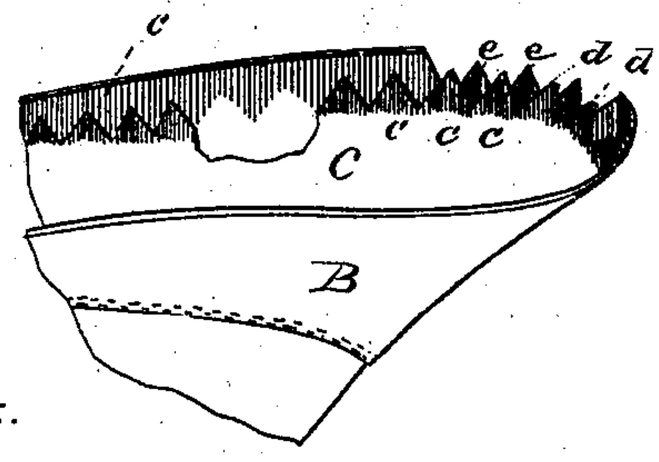

Fig. 4.

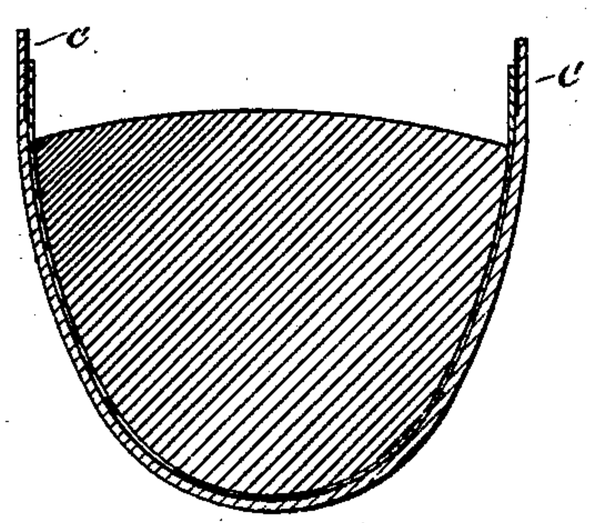

Fig. 5

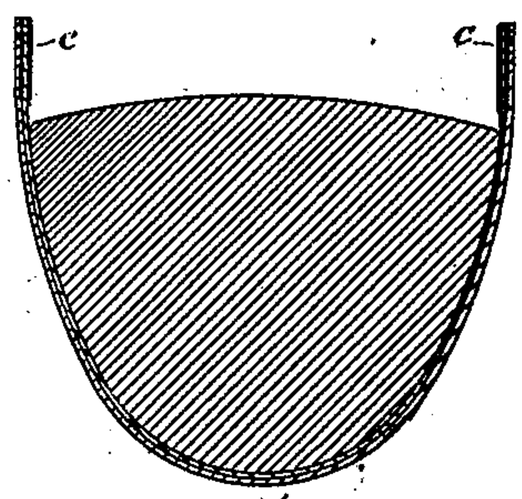

Fig. 6.

WITNESSES

Geo. F. Webber
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INVENTOR

Geo. W. Copeland.

UNITED STATES PATENT OFFICE.

GEORGE W. COPELAND, OF MALDEN, MASSACHUSETTS.

IMPROVEMENT IN PROCESSES OF LASTING BOOTS AND SHOES.

Specification forming part of Letters Patent No. **211,459**, dated January 21, 1879; application filed November 11, 1878.

To all whom it may concern:

Be it known that I, GEORGE W. COPELAND, of Malden, in the county of Middlesex, in the Commonwealth of Massachusetts, have invented an Improvement in Processes of Lasting Boots and Shoes, of which the following is a specification:

This invention consists in the following-described manipulations for automatically adjusting and clamping the upper, or upper and lining, upon the upper surface of the last; in the application of cement to either the surface of the insole or the inner edge of the upper, or upper and lining, or of the lining, and the folding and compressing of said edge or edges upon the last and insole in uniting it or them thereto, all of which will hereinafter be more fully described.

In the employment of this process various modifications have suggested themselves, all of which will be fully set forth.

In the drawing, Plate 1, Figure 1, is a perspective of an upper adjusted upon a last, with a portion of its edge folded and cemented to the insole and a portion unfolded. Fig. 2 is a perspective of an upper adjusted upon a last, showing the outsole as a uniting medium in fastening the edges of the upper upon the last when the outsole is cemented thereto. Fig. 3 is a perspective of an upper adjusted upon the last, showing the edge of the upper cemented to the surface of the insole, and a portion of the outsole cemented to the edge of the upper. Fig. 4 is a plan of an insole or outsole, showing a border of cement.

Plate 2, Fig. 1, is a perspective of an upper adjusted upon the surface of a last, with a portion of its edge folded thereon, and one side elevated to show the manner in which the lining or the lining and upper may be cut. Fig. 2 is a plan of a vamp or of a vamp-lining which has been prepared for the lasting process by having a coating of cement laid upon its surface adjacent to its lower edge. Fig. 3 is a view of a vamp or vamp-lining, showing the cement applied on both sides near the edge. Fig. 4 is a detail view, illustrating a modification of my invention. Figs. 4, 5, and 6 illustrate modifications of my invention.

It is important, in the process of lasting the uppers, or the uppers and linings, of boots and shoes, to provide an easy, efficient, and expeditious manner for uniting the edge of the upper or lining or the edges of the upper and lining, after it or they have been properly adjusted upon the last, to the insole.

Various means have been employed for this purpose. The most common is the use of tacks and pegs. The method of securing by tacks and pegs, however, is objectionable, in that it takes considerable time to properly place and drive the same, and in that the tacks and pegs remain in the shoe and are liable to work through the insole. Stitches sewed crosswise from edge to edge across the bottom of the last have also been used as a uniting medium.

While the upper or uppers and lining were adjusted upon the surface of the last by hand, these methods of securing it upon the insole answered comparatively well.

The machines lately invented, particularly those using the girth principle, automatically adjust and clamp the upper or upper and lining upon the surface of the last, and fold the edges upon the bottom of the last or upon the insole with rapidity and precision, thereby effecting a great saving in time over the hand manipulation, and doing what has been considered to be the most difficult part of the process of lasting to perform by machinery.

This improvement, however, cannot attain its greatest efficiency by the employment of these old methods of fastening the edge of the upper, and in order to get the full value of this improvement I have devised the within-described process and the manipulations necessary in preparing the upper for the same.

Before describing my process, I would mention that it is necessary either to so cut and fit the lining and upper that the edge of the upper shall project beyond the edge of the lining, or shall in some manner come in contact with the surface of the insole when folded thereon by removing portions of the lining for that purpose; or the edges of the lining and upper may be united by cement, or by stitches, before the lasting process; or in some instances the lining and upper may be united along the edge by cement during the lasting process.

The cement employed in the process may be applied to the surface of the insole adjacent to its edge, as shown at *a*, Fig. 4, Plate 1, or upon

any portion thereof, during the lasting process; or the insole may be furnished with cement applied thereto immediately before the lasting process; or the insole may have its surface covered with a coating of cement, which may be allowed to dry thereon, in which case it will be necessary to moisten the cement during the lasting process. An insole as last prepared may be an improved article of manufacture. Instead of applying the cement to the surface of the insole before or during the process of lasting, the cement may be applied to the inner surface of the upper and lining (or to the lining when the upper has been united thereto) before the lasting process; and in the figures illustrated in Plate 2 the uppers and linings are shown with the cement thus applied.

In Fig. 1, Plate 2, is shown an upper, B, having its edge *b* covered upon its inner surface with the layer of cement *c*. In Fig. 4, the inner surface of the lining C and of the upper B is shown coated with cement *c*. In Fig. 6, the lining is shown extending to the edge of the upper, and a coating, *c*, of cement is shown upon the inner surface of the lining. In Fig. 5, the upper extends beyond the edge of the lining, and is united thereto by the cement *c*. This cement may be applied during the lasting process or before the same, as may be desired.

In some instances the vamp and vamp-lining, or the quarter and quarter-lining, or either, may be provided upon either or both surfaces adjacent to the edge with a coating of cement.

Figs. 2 and 3 illustrate a vamp thus prepared. In Fig. 1, Plate 2, a lining is shown provided with serrations *d*. The lining is thus prepared in order that the inner surface of the upper along the edge may come in contact with the surface of the insole in the lasting process. In lieu of serrating the edge, other portions thereof of any desirable shape may be removed, or openings may be made in the lining adjacent to the edge, in order that the inner surface of the upper may be united directly to the insole.

This preparation of the lining and upper is very desirable when that portion of the edge of the upper which is folded upon the last is very narrow, or that portion of the edge of the lining and upper which is folded upon the insole in the process of lasting is of the same width.

The edge of the upper may be serrated, as shown at *e*, in some instances; and when the edge of the lining is also serrated, it is desirable that the points shall project from between the points in the upper's edge, substantially as shown in Figs. 1 and 4, Plate 2.

I have now mentioned the various ways in which the cement may be applied in my process, either by application to the surface of the insole, or to the inner surface of the upper, or of the lining, or of both, adjacent to the edge. The cement which I use may be flour-paste. It may consist of a mixture of caoutchouc or india-rubber and naphtha; it may be a composition of fish-sounds, glycerine, and sugar, properly prepared; it may be a compound of glue, sugar, flour, and sulphate of copper, or any suitable mixture which has sufficient cohesive property to properly fasten the parts together, and which preferably should dry or set quickly when applied.

In practicing the process it is necessary to employ the following manipulations: The upper or upper and lining, having been prepared in either of the ways herein mentioned, is automatically adjusted and clamped to the upper surface of the last. The cement, if it has not been previously applied, is spread or deposited upon the surface of the insole, or upon the inner surface of the upper, or lining, or both, or, if previously applied, is moistened. The edge of the upper, or of the upper and lining, is then folded upon the surface of the insole in successive sections, preferably in this order: The edges are folded along the sides simultaneously, followed by the heel and toe either simultaneously or successively, and this folding may be accompanied by some degree of pressure, which may be continued until the cement has properly set. This, of course, will depend upon the nature of the cement employed in the fastening and the pliability of the upper.

It is important, in order to successfully use this invention, to carefully observe these three features in the process:

First, when a lining is used—and very few uppers are now prepared for the lasting process without a lining—it is necessary that the lining be united to the edge of the upper before the lasting process, or that the lining and upper be so shaped and fitted that a portion of the upper shall always project beyond the edge of the lining upon the surface of the insole when folded thereon, or that some provision be made by which the inner surface of the upper can come in direct contact with the surface of the insole, as without some such provision the upper cannot be securely fastened to the insole.

Second, the edge of the upper, or of the upper and lining, must be folded upon the surface of the insole after the remaining portion has been adjusted upon and clamped to the surface of the last by mechanism which operates in simultaneously folding the edges along the sides upon the insole, and in successively or simultaneously folding the edges of the toe and heel upon the same.

Third, the uniting of the upper, or of the upper and lining, to the insole should be done under pressure, and preferably by a pressure that shall advance inwardly from the edge of the insole along the upper surface of the folded edge of the upper to or beyond the extreme edge of the upper, and may then become stationary.

I am aware that the English Patent No. 13,931 of 1852, to Julian Bernard, describes

a method of using cement in what is called a "machine for mounting or lasting boots and shoes," in which the edge of the upper is united to the insole by cement. I am further aware that the English Patent No. 379 of the year 1857, to said Bernard, describes an "improved apparatus for mounting or drawing over the edges of the uppers of boots and shoes upon the insole," in which the use of glue or cement for the purpose of uniting the edge of the upper to the insole is also mentioned. But neither of these patents describes any process for automatically adjusting and firmly clamping the upper, or upper and lining, to the surface of the last for automatically folding the edges thereof upon the insole in successive sections, and for uniting the said edges by cement to the surface of the insole under pressure; nor do they refer to the peculiar manipulations which it is necessary to pursue through the process to successfully employ cement as a uniting medium.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. As a process for lasting the uppers of boots and shoes, the following manipulations in their order, namely: the adjustment upon the upper surface of the last of the upper or upper and lining, and the clamping of said upper along the edge of the last by automatic means; then the application of cement to the surface of the insole, or to the inner surface of the upper or upper and lining, or the moistening of cement, if previously applied thereto; and, finally, the folding of said upper or upper and lining upon the last along the sides, by means which compress the same upon the insole upon the bottom of the last.

2. An upper and lining prepared for the lasting process having portions of the lining only removed along the sides, in order that the inner surface of the upper shall come in contact with the surface of the insole in the lasting process, substantially as and for the purpose described.

3. In the process of lasting boots and shoes, a lined vamp prepared for cement lasting, with the margin of the upper projecting beyond the margin of the lining along the sides, substantially as described.

4. As an improved article of manufacture, an insole having its outer surface covered, or partially covered, with cement, substantially as and for the purposes described.

GEO. W. COPELAND.

Witnesses:
F. F. RAYMOND, 2d,
GEO. F. WALKER.