

G. W. COPELAND.  
Process of Lasting the Uppers of Boots and Shoes.

No. 219,224.

Patented Sept. 2, 1879.

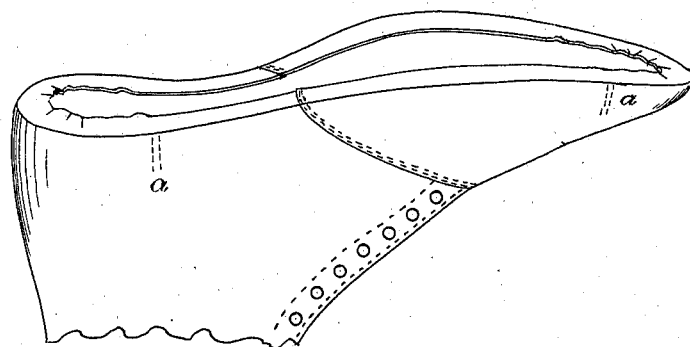


Fig. 1.

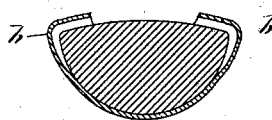


Fig. 3.

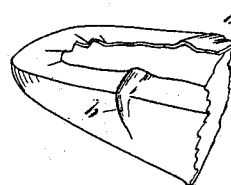


Fig. 4.

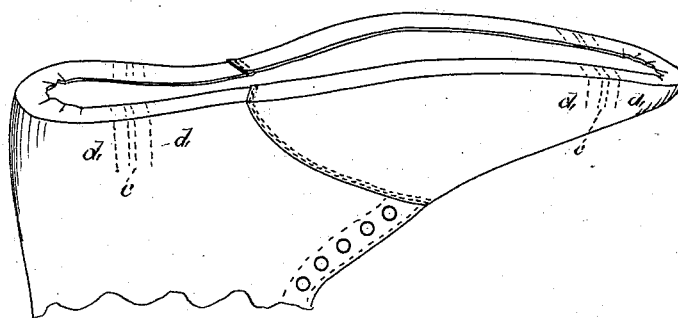


Fig. 2.

WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PROCESSES OF LASTING THE UPPERS OF BOOTS AND SHOES.

Specification forming part of Letters Patent No. **219,224**, dated September 2, 1879; application filed  
December 16, 1878.

### *To all whom it may concern:*

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

In the operation of lasting the uppers of boots and shoes by organized machinery which combines side-lasting mechanism with toe and heel lasting devices, there is generally a section between the side-lasting mechanism and the toe and heel lasting devices which is not directly operated upon by either. Take, for instance, the Patents Nos. 197,607, granted November 27, 1877, and Reissue 8,138, granted March 26, 1878, to the Copeland Lasting Machine Company. In both these machines there is shown side-lasting mechanism which operates to automatically adjust the upper along the sides of the last, and to automatically fold the margin along the sides upon the surface of the insole; also, toe and heel lasting mechanism which adjust the upper to the surface of the last at the toe and heel and fold the margin of the upper upon the insole; but in these machines, as well as in all the other organized lasting-machines with which I am acquainted, that portion of the upper which lies between the devices which side-last and the devices which last the toe and heel, comprising a very narrow portion of the upper at each end of the side-lasting devices near the toe and heel, is not operated upon by either the side-lasting or the toe or heel lasting contrivance.

The toe and heel lasting mechanism may abut against the respective ends of the side-lasting devices, and in fact so nearly approach them that very narrow portions of the upper are untouched; but I have ascertained, after attempting to so nicely adjust the construction and operation of these side and end lasting appliances that they shall work conjointly with hardly appreciable space between their adjacent edges, that it is very difficult to prevent the puckering or wrinkling of the upper upon the last between them during the process of lasting, particularly along the separating-line at the toe, and that in order to avoid this defect it is necessary to follow sub-

stantially the following process, whereby that portion of the upper along said separating-lines which divide the toe and heel from the side lasting devices not directly operated upon by either may, alike with the remainder of the upper, be subjected to the manipulations of lasting devices which need not act conjointly or form parts of the same organized machine.

The steps in the process are substantially these: The insole and upper having been properly placed upon the last in the customary way, the same is put into a machine having side-lasting devices like those described in the patents referred to, or employing any of the known appliances for adjusting the upper to the under and side surfaces of a last, and for folding the margin of the upper along the sides upon the surface of the insole, when the margin thus folded is secured to the insole.

For the performance of the side lasting, it is desirable to employ devices that shall last as much of the upper as possible, leaving unlasted only such portions of the toe and heel, or at the toe only, (as in some instances the heel part can be fitted and secured without directly operating upon that portion of the upper along the dividing-line between the side and heel lasting mechanisms,) as cannot be perfectly adjusted thereby. The side-lasting mechanism is next removed from the sides of the last. The remaining portion of the upper at the toe, and, when necessary, at the heel, is then adjusted to the end of the last, and the margin folded upon the insole by mechanism such as described in said patents for lasting the toe or heel, or otherwise known, with this modification, that the portion of the upper acted upon by these devices must include the portion adjacent to each edge of the side-lasting devices which, as above stated, is not directly operated upon when the side and toe and heel lasting devices are operated in the customary way, as well as so much of the upper already lasted by the direct action of the side-lasting mechanism extending from the said separating-line as shall be necessary to perfectly adjust the remaining unfitted portion of the upper to the last—that is, the toe, and, when necessary, the heel, lasting mechanism, instead of operating only

upon that portion of the upper left unlaced by the side-lasting devices, by lapping upon the said lasted portion of the upper also operate additionally upon a section of the upper previously lasted by the side-lasting mechanism, as well as upon the intermediary section heretofore not directly operated upon by either.

In the drawings forming a part of this specification is illustrated, in Figure 1, an upper as lasted by organized machines, in which the intermediary sections between the side and toe and heel lasting mechanisms not directly acted upon are shown at *a*. The width of these sections, of course, depends upon the precision and skill with which the end and side lasting devices are adjusted to operate conjointly. At *b*, Figs. 1, 3, and 4, is shown the common effect resulting from the necessarily imperfect operation of the lasting devices upon these sections. The upper is shown as puffed or wrinkled, as the side-lasting mechanism tends to stretch the upper lengthwise of the last toward the toe and heel as it operates, and the toe and heel lasting devices operate to stretch the upper in a contrary direction, thereby creating this fullness between the respective mechanisms.

In Fig. 2 is shown an upper which is adjusted upon the last by the employment of the process herein described, showing at dotted lines *c* the sections which are not directly operated upon by the side-lasting or heel or toe lasting appliances in organized machines, and by the lines *d* the extent of lap of the toe and heel lasting devices upon that portion of the upper already lasted by the side-lasting appliances, or the lap of the side-lasting appliances upon that portion of the upper, if previously lasted by the toe and heel lasting appliances, the space between the lines *d* representing the extent of lap, and representing very nearly that section of the upper not directly operated upon in the present system of lasting by machinery.

It will therefore be seen that the process consists, first, in the adjustment of the upper to the sides of the last, and sometimes at the heel, in folding the margin of that portion of the upper thus adjusted upon the insole, and in securing the same thereto; second, the removal of the side-lasting devices from the sides of the last; third, the adjustment of the remaining unlaced portion or portions of the upper to the last, and the folding of the upper upon the insole by lasting appliances which shall overlap upon the portion previously lasted, and the securing of said margin to the insole.

By the use of this process, therefore, certain defects in the lasting of uppers by machines as at present organized and operated are overcome. It may also be mentioned that it renders that nice adjustment of the parts in organized machines upon which depends the possibility of securing even a fair result in lasting, and which demands that the toe and

heel and side lasting devices should conjointly operate so accurately as not to develop a puff between the respective devices unnecessary, thereby effecting a considerable saving in the cost of producing lasting machinery, simplifying the construction, and effecting a provision for automatic adjustment for varying lengths of last.

In practicing this process it is immaterial whether the ordinary side-lasting devices are extended so as to lap upon that section of the upper lasted by the toe and heel lasting devices as now organized, or whether the toe and heel lasting appliances are extended so as to lap upon those portions of the upper lasted by unextended side-lasting mechanism. The same result follows whichever adaptation is employed; and although I consider that it is desirable to first last the sides of the upper and then withdraw the side-lasting devices, in order that the toe-lasting appliances may be actuated and overlap the adjacent edges already lasted by the side-lasting mechanism, yet it is possible to actuate the toe and heel lasting devices alone, and finish the lasting of that portion of the upper and withdraw said lasting appliances before the side-lasting mechanism is operated, in which case, of course, the side-lasting devices would overlap upon the portions of the upper previously fitted by the toe or heel lasting devices, or both.

It will be noticed that the process of lasting herein described has, perhaps, an incidental resemblance to a practice of hand-lastors, who do a second time what they find was badly done at their first operation; but this is an incident of their operation. The place of repetition in their work is not determined in advance and the work systematically done twice every time; nor in hand-lasting, where the successive strains are applied to the leather at short distances apart, gaining a complete lasting enough only for the placing of a single tack, and repeating the strain at the time when and place where an imperfection is discovered, is there any such underlying principle of work as in this operation of mine. I group together, for the purposes of strain, adjacent sections of the upper. I apply the strain to fit the leather to the last section by section, carefully doing twice over the parts of each section adjacent to its boundaries. I propose to do this by organized mechanism already invented and patented, and it is this method of the use of the mechanism, not as was proposed when it was made originally, but in a new way, to avoid a defect of the old way, that constitutes the present improvement. In the old way the parts of the mechanism were brought successively to position, and there held till the other parts had been brought to their position, and the fastening was then performed. In this present method the parts of the mechanism are brought to position successively; but the fastening is done upon the section lasted by each part, and that part is taken out of work before another part is brought up to strain the next

adjacent section of the upper, and the work of this succeeding part of the mechanism is not confined to the completely unlasted portion of the upper, but extends to the adjacent area already lasted.

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

The improved process of lasting boots and shoes, consisting in folding or turning, by suitable lasting devices, of a section or sections of the upper over upon the insole, and in securing such section or sections thereto, then with-

drawing such devices, and folding or turning the remaining section or sections over upon the insole by other lasting devices in such manner that they overlap upon the edge of the surface of the adjacent section, so that the edge of one section adjacent to that of another section is twice strained to the last, once by each of the adjacently-operated straining mechanisms, substantially as and for the purposes set forth.

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Witnesses:

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