

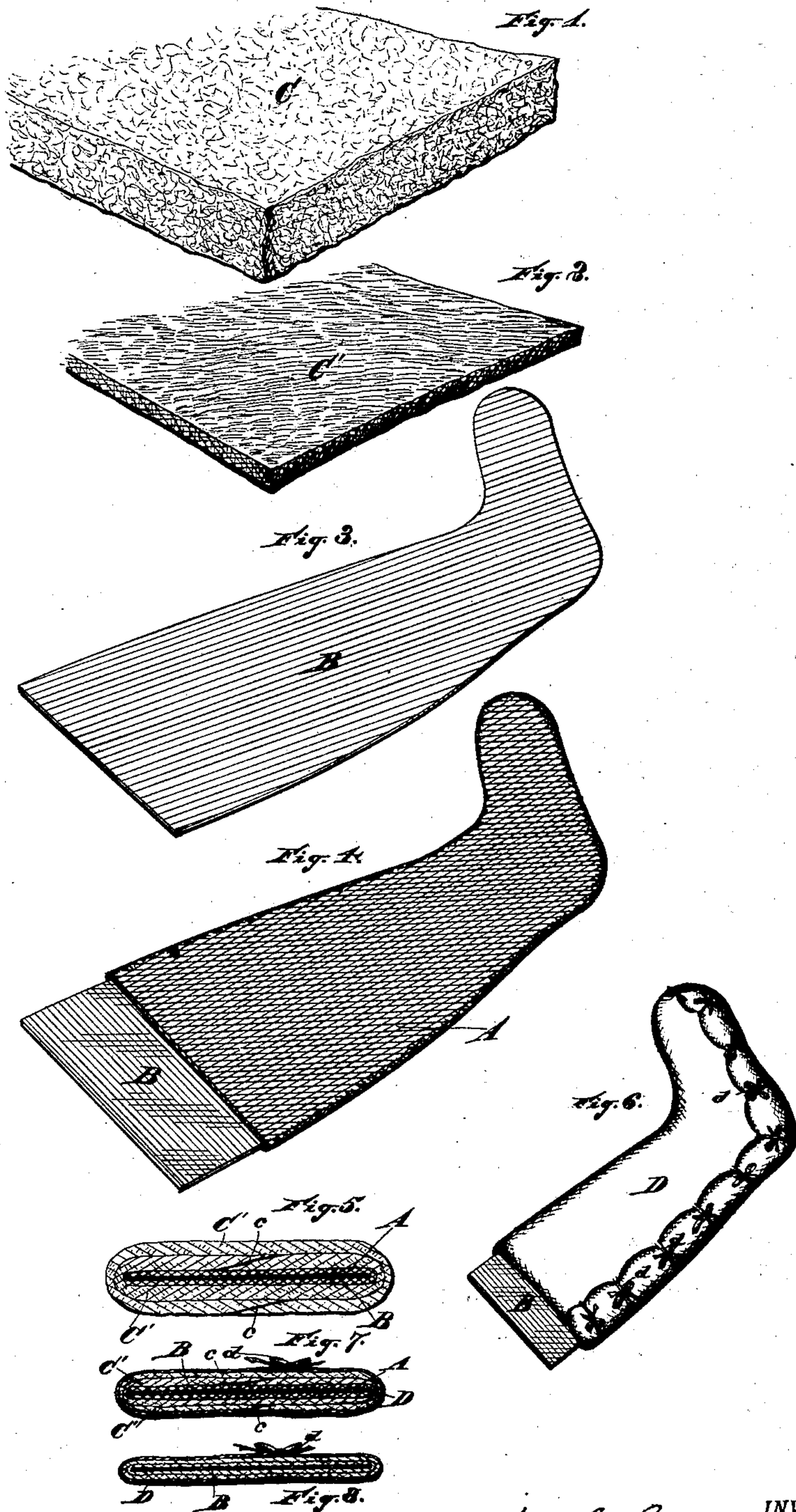
(No Model.)

S. G. ALEXANDER.

PROCESS OF MAKING COMBINED KNIT AND FELT BOOTS.

No. 318,342.

Patented May 19, 1885.



WITNESSES

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PROCESS OF MAKING COMBINED KNIT AND FELT BOOTS.

SPECIFICATION forming part of Letters Patent No. 318,342, dated May 19, 1885.

Application filed January 15, 1885. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL G. ALEXANDER, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Processes of Making Combined Knit and Felt Boots; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates more particularly to that part of the process by which the wool is incorporated with the knit or woven woolen stocking.

In the drawings, Figure 1 represents a thick bat of soft wool as it comes from the card. Fig. 2 represents the same bat after it has been partially felted down or hardened. Fig. 3 represents a flat form of zinc or other equivalent substance. Fig. 4 represents the flat form with a loosely-woven stocking in much enlarged form stretched over it. Fig. 5 is a cross-section of the same with two layers of the felted or hardened bat stretched over the same. Fig. 6 is a perspective view illustrating the same with a jacket fastened over the whole. Fig. 7 represents a section across the package shown in Fig. 6. Fig. 8 represents the package as it would appear after going through the felting process, whereby the felted sheets are incorporated with the knit or woven wool fabric.

It will be understood at the outset that the felted boot herein referred to is made by incorporating bats of wool with an enlarged stocking, felting the two together so as to thoroughly incorporate them, then fulling, and thereby reducing the article to the proper size for a boot, and finally finishing and shaping the boot over a suitable last or form, which gives to it its finished shape.

This invention pertains, first, to that part of the process by which the wool bats and the knitted or woven woolen stocking are incorporated together; and, secondly, to the entire process of making the finished boot, in which

the foregoing process enters as an elementary part.

In carrying out my invention, A represents a loosely knit or woven woolen stocking of greatly enlarged form which is to form the basis of the finished boot. It is quite important that this should be loosely knit or woven in order to leave very open meshes to facilitate the incorporation with it of the wool bat.

B is a flat form, preferably of zinc, although it may be made of galvanized iron or any other substance which will not be attacked by the heat, steam, or other elements of the felting bat, and which will not be injured by the jiggers in the process of felting.

C represents a loose, thick bat of wool as it comes from the card. This bat of wool is subsequently by the felting process felted down or hardened, so that it is no longer a bat of loose, fluffy, soft wool, but is a sheet of felted or hardened wool, C', of sufficient strength to meet the requirements of the remainder of the process.

D is a jacket, preferably of linen or cotton cloth, provided with tapes or other fastenings, d, for binding it over the materials upon the forms.

The form B is put into the stocking A, so that the stocking is thereby stretched over the form, the stocking having been preferably turned inside out, so that in the finished boot the stocking will be upon the exterior and the felting upon the interior, although this may be just the reverse; or, if desired, the felting might be applied to both sides of the stocking. The process will be described, however, only in connection with a boot which has the stocking as its outer surface and an interior lining of felt. Having turned the stocking inside out and stretched it over the form, I take a sheet of the hardened or felted bat C'. I lay upon this sheet the stocking and its form and fold over the edges of the sheet C' so as to completely cover the stocking. The sheet is drawn quite tight over the edges of the form, as shown in Fig. 5, so that at these edges the sheet will be considerably compressed, although care is taken not to tear the sheet by

drawing it too tight. The overlapping edges are scarfed, as shown at *c*, also in Fig. 5, so as to present a uniform thickness at all points. I then take another similar piece of the bat 5 C', and turning over the stocking I lay it upon the said sheet. This is in like manner stretched over the form upon the first layer of felt. It is made to draw as closely as possible at the edges of the form. Its edges are lapped 10 and scarfed, as above. I also usually either upon the first layer or the last layer of felt take off smaller pieces of the bat and stretch the said pieces over the parts which are to form the heel and toe piece and instep, so as 15 re-enforce or give additional thickness and strength to the boot at these points. Having thus stretched the felted sheet or sheets C' upon the form, as described, the whole is placed within the jacket D. This jacket is 20 very carefully adjusted into place, so as not to draw upon the felt at any point. It is then smoothed out and stretched over the form at every part carefully with the hands, and is then tightened very snugly by the tapes *d* or 25 secured by other suitable fastenings. It will be observed, as shown in Fig. 7, that the jacket has served to still further compress the felted bats at the edges of the form, while it has to a certain extent compressed the 30 whole package to more compact form than that shown in Fig. 5, without tearing the bats C' either at the edges or upon the faces of the form. The whole package is now placed in a jigger and the felting process is continued un- 35 til the bats C' are thoroughly incorporated with the stocking and with each other. The felting process having been completed, the form is removed from within the stocking, the whole is again turned, so that the stock- 40 ing shall be upon the outside and the felting upon the inside, (or it may be fulling and then turned.) It is then fulling until it is reduced to proper dimensions, and is then shaped up and given its finished form upon a suitable 45 last, which gives to it the shape of the finished boot.

It will be observed that the sheet C as it comes from the card is very thick, loose, soft, and fluffy and has not sufficient strength to 50 admit of being folded over the form and brought closely up to its edges without either tearing the bat at the edges or more frequently along the faces of the form. The soft wool would therefore be left very thick along the 55 edges of the form. Now, when the second layer of this loose soft bat is applied to the first the difficulty is greatly increased, for the mass presents at this time a thickness of, say, six inches, more or less, and projects well out 60 beyond both edges of the form. If this is now placed within a jacket, and the jacket is tied as closely as possible, it will still be very thick, soft, and fluffy. If this should be subsequently placed in the jigger, the very first effect of the 65 felting process is to quickly reduce the thickness of the package. The jacket, which was

formerly tight, now stretches still farther out beyond the edges of the form B, and the soft fluffy bat of wool, having no strength or consistency, immediately crowds out over the 70 edge of the form, and so the space between the edge of the form and the edge of the jacket is filled with the wool, which here felts into a thick welt. The existence of this welt renders the production of a perfect boot impossible, 75 for either the welt must remain in the article or else it must be shaved off, thus cutting the fibers and weakening the product so as to sustain but little wear. The effect also of the wool being in this soft condition, so as not to 80 hold its own and to crowd off over the edge of the form, is to render the product of non-uniform thickness, more wool crowding off from some localities than from others, and with such liability it is apparent that no two boots would 85 be apt to be alike in quality. It is therefore of the greatest importance in the manufacture of a boot of this character, in which a woven or knitted wool stocking is incorporated with a surface of felt, that the wool, instead of be- 90 ing taken in its loose fluffy form as it is in the bat when it comes from the card, should be first reduced in thickness and made harder and stronger by first felting or hardening the carded bat in a jigger. 95

Heretofore stockings have been made by first providing a stocking of woolen yarn loosely knitted or woven and larger than the completed article is to be, after which bats of soft wool direct from the card are placed on 100 the inside of the stocking and then hardened in a jigger, the stocking being then shrunk to the desired size by fulling. Such, however, does not constitute my invention.

What I claim is—

1. In the manufacture of felted boots, in 105 which a knitted or woven wool stocking is incorporated with a layer of felt, the process herein described of incorporating said stocking and felt, which consists in first stretching 110 the stocking upon a flat form, and, second, applying to the said stocking one or more bats of wool which previous to their application are reduced in thickness and hardened and 115 strengthened by the felting process, then incasing and compressing the same by a jacket stretched snugly over the form, and finally submitting the said package thus made to the felting process in a jigger, substantially as set forth. 120

2. In the manufacture of boots in which there is combined a knit or woven woolen stocking and a surface of felt, the employment of a flat form within the stocking for stitching the latter and bats of wool which are first re- 125 duced in thickness and hardened and strengthened by the felting process, and subsequently applied to the stocking upon the flat form, substantially as described.

3. As a means for insuring a uniform layer 130 of felt upon the stocking, the combination, with the stocking in the process of manufac-

ture of the boot, of an interior flat form, one
or more layers of wool in the form of a bat
which has been previously reduced in thick-
ness, hardened, and strengthened in the felt-
5 ing process and subsequently applied to the
stocking, and a close-fitting jacket adjusted
over the whole before finally felting, substan-
tially as described.

In testimony whereof I sign this specifica-
tion in the presence of two witnesses.

SAMUEL G. ALEXANDER.

Witnesses:

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N. S. WRIGHT.