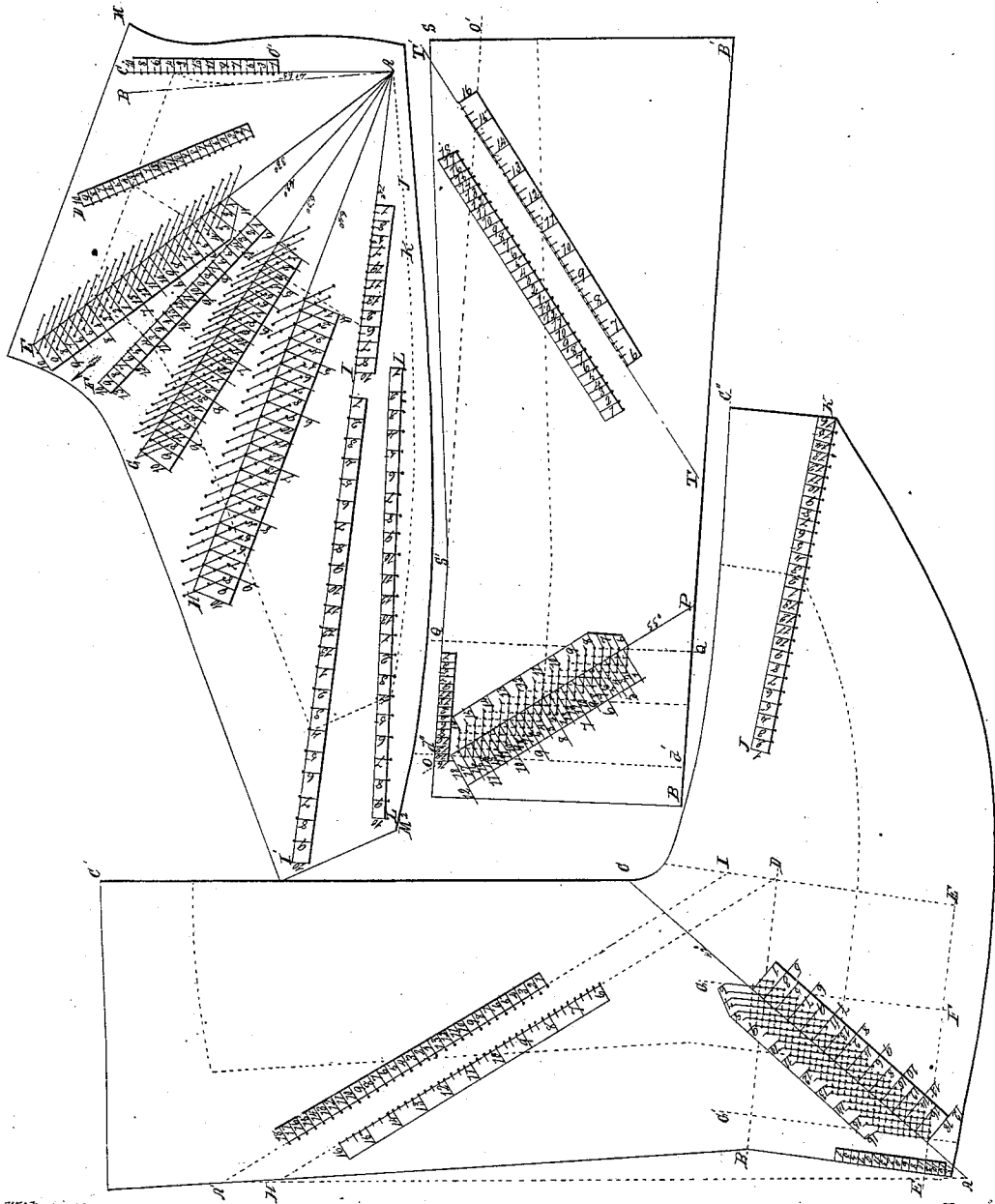


Burdett & Still,

Boot Pattern,

Nº 25947.

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Witnesses.

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UNITED STATES PATENT OFFICE.

SAMUEL F. BURDETT, OF KEOKUK, IOWA, AND HENRY STILL, OF LEAVENWORTH, KANSAS.

SCALE FOR CUTTING BOOTS AND SHOES.

Specification of Letters Patent No. 25,947, dated November 1, 1859.

To all whom it may concern:

Be it known that we, SAMUEL F. BURDETT, of the city of Keokuk, county of Lee, and State of Iowa, and HENRY STILL, of the city of Leavenworth, county of Leavenworth, Territory of Kansas, have invented a new and useful Improvement on Scales for Cutting Boots and Shoes; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawing, forming a part of this specification.

To enable others skilled in the art to make and use our invention we will proceed to describe its construction and operation in the accompanying drawing of a gaiter pattern, No. 1 AL.

From a point upon the drawing designated by (A,) which point represents the extreme lower corner of the heel—draw a perpendicular line to (B,) which forms the direct line of the heel, or back seam of a shoe. Then draw a line at an angle of $4^{\circ} 60'$ to the right of said perpendicular line A, B, intersecting point A, (line A to C,) which forms the line of “spring or curve of back seam.” Then draw a line at an angle of 33° to the left of said perpendicular line intersecting with (A,) (line A to E) which forms the angle of average ankle measures. Then draw line at an angle of 42° to the left of said perpendicular line intersecting with point A, (line A to F) which gives the angle of average heel measures. Then draw a line at an angle of 52° left of said perpendicular line intersecting with said point A, (line A, to G,) which forms the angle of average instep measures. Then draw a line at an angle of 64° to the left of said perpendicular line intersecting with said point A, (line A, to H,) which gives the angle of average ball measures. Then at an angle of $78^{\circ} 60'$ to the left of said perpendicular line draw a line intersecting said point A, (line A to I, I,) which gives the line whereon to obtain the length of shoe. These several angles give the correct lines of ankle, heel, instep, ball and toe measures, they running from these several parts of the foot to the extreme lower corner of the heel. From a point $1 \frac{7}{8}$ inches from A, on line to C, and to a point $4 \frac{3}{16}$ inches on same line from A, we divide the intermediate space into 22 equal parts, the first point C' giving us the height of back seam

of child's 1's and the latter the height of woman's 10's, average sizes, and to the intermediate points we apply the several sizes between the said child's 1's and woman's 10's; and the space formed by a point $3 \frac{3}{8}$ inches from A, on line to E, and $7 \frac{3}{8}$ inches we divide into the same number of parts (22) and number then seriatim from 1's to 10's as aforesaid; they being the average height of the shoes front and also the average widths of ankles and for the purpose of designating the measure of the different sizes at the ankle we affix in inches the amount they cut upon the outside of the column designating the sizes: as for instance, the average size 13 measures 7 inches, and marked 7 inches; ever remembering the scale represents but one half the shoe, and at the ankle therefore but one half the width of the ankle; and the space formed between a point $3 \frac{1}{4}$ inches from A, on line to F, and a point $6 \frac{15}{16}$ inches from A, we divide into the same number of parts, 22, which represents (each part) one third of an inch; and also the average sizes of heel measures, of the different lengths of feet, without which no graduate scale can be perfect. The numbers representing “sizes” we place nearest the dots, the inches upon the article as aforesaid in ankle measure; and the space between a point $3 \frac{5}{16}$ inches from A, on line to G, and $7 \frac{1}{2}$ inches from A, we divide into the same number of parts, (22) which gives the average instep measures of said several sizes: to which in like manner as at heel and ankle we affix the several numbers of sizes, and upon the outside of said sizes, affix the number of inches they cut; as for instance a child's 4's cuts 5 inches, and marked 5; which by the way we find to be the precise average size, and so throughout the whole measures; and the space formed between a point $3 \frac{15}{16}$ inches from A, on the line to H, and a point 9 inches from A, we divide also into the same number of parts (22) by which we obtain an average “ball” measure for the said several sizes of feet, and to which we affix the figures showing the sizes with the number of inches they cut as aforesaid in the case of the instep, ankle, &c., and the space formed by a point $5 \frac{1}{4}$ inches from A, on the line to I, I, and $12 \frac{15}{16}$ inches we divide into the same number of parts which produces the different lengths or “sizes” of shoe, between 1's

and 10's; and the space formed between a point 2 1/8 inches from A, on line to I, and 4 7/8 inches on same line we divide into the like number of parts: which gives us the terminus of the "lace" of said sizes; and the space between a point 2 1/2 inches from A on the line to D, (which line we obtain by dividing the space between the points C, and E equally or in two equal parts) and 5 1/2 inches on same line we divide into the same number of parts (22) which gives us the commencement or starting point of said "lace." This process gives us only the average measures of the different parts of the foot, ankle, heel, instep and ball, and to be able to produce any other required size or measure upon these several parts we proceed in the following manner:

To obtain the power of increase and decrease of the ankle measure, we draw lines from the line A, E, to the line A, C, bisecting the points of average sizes already marked upon said lines for heights of front of shoe, and back seam; and from each point on line A, E, measure spaces of one-fourth of an inch (1/4 in.) on either or rather both sides, and upon the lines drawn from line A, E, to A, C. Those upon the right side of said mean line A, E, showing a decrease from said average size of 1/2 inch and those upon the left side showing an increase of 1/2 inch each dot or space of 1/4 inch, making as in the drawing an increasing and decreasing power of two inches on each average size; and upon the instep measure to produce the same result, proceed as follows: From the average size No. 1 on line A, to G, draw a line toward the point of J, on base line about two inches and extend above bisecting point 13, about the same distance. This gives the line of increase and decrease upon that size; then make dots upon said line of increase and decrease 1/4 of an inch apart above and below said mean average number 1, as many as desirable, which gives an increasing and decreasing power in cutting of one-half of an inch per dot as in the ankle measure, and upon the remaining number of sizes of instep measure, draw a line bisecting each one and parallel with the one drawn from 1 to J, then add the dots as before (1/4 of an inch apart). Proceed in a similar manner with the ball measure, by drawing a line from K, on base line bisecting point 1 on line A, H, and making dots 1/4 of an inch apart above and below said average number 1, on said line 1, K; and thus continue drawing lines bisecting each point or size and parallel with said line 1, K, and place the dots of increase and decrease of 1/4 of an inch on the same as before. To obtain the width of toe of the said different "sizes" or length of foot, as in the line L, L make a point at a right angle 1 1/2 inches below I', and 15/16 of an

inch below I, and draw a line from one point thus made to the other, and divide into the same number of parts as in the above line I, I', at such an angle as may suit the taste,—it being immaterial, the length of shoe being governed by the line I, I'.

The outline is to be formed so as to follow the general figure of the foot, and preserve the figures of measurement, but the bottom should have an easy full sweep from the point K, to M², so as to preserve the actual measurement of the ball, and the spring or "lasting" quality of the shoe. This completes the manner of constructing this scale and the necessary alteration to adapt it to any other shoe or boot is obvious to one conversant with the art. We proceed now to describe the manner of using it by cutting a gaiter of any size, say length of shoe size 4, ankle 8 inches, heel 11 1/3, instep 8 1/4, and ball 8 inches, which is a correct average size in all respects of a 4 in length; and for a test this can be cut out of paper, laying the scale upon a piece and marking through the holes corresponding to the dots in the drawing, "A," and "B," which gives the upright line of the heel; then in No. 4 (woman's sizes) of line of "back-seam," (A, C); then in 4 of lace, (line A, D); then in 4 in ankle (line A, E); then in 4 in heel, (line A, F); then in 4 of instep, (line A, G); then in 4 of ball measure (line A, H) which in all these parts—ankle, heel, instep, and ball—it will be observed by the figures indicating inches that they cut the amount required; then mark in 4 length of toe or shoe (line A, I'); then in 4 width of toe, (line L, L), and lastly in 4 for bottom of lace, (line A, I). This completes the marking. Now draw the scale upward so that the bottom shall touch the mark made for width of toe and the mark made through heel, or A, keeping the point A directly above the mark made through it, and draw a line from one mark to the other; next draw a line from length of toe to width of toe, L to I; then move the scale downward so as to strike a line with the top edge from length of toe to ball, and instep measures; then place the Δ opposite the heel measure so as to strike the instep and ankle measures and mark accordingly; then with top of scale draw line from ankle to "back seam"—(not the mark "B") but in line A, C; next draw faint line from A, to B with top of scale; then place the top back corner of scale M even with the mark made for height of back seam which will cross the line made for top of gaiter upon that mark 4; and move the scale so as to intersect the line from A, to B, or the direct back line of heel, and mark accordingly; this gives the "spring or curve" of back seam; then move the scale upward so that it shall touch the bottom line and the direct line of the heel at about the

center and draw a line so as to give the rounding of the heel at the bottom as in the example; lastly draw a line for the "lace" from the 4 in top to 4 in the bottom line. This completes a pattern for the said shoe size 4, angle 8 in., heel $11\frac{1}{3}$, instep $8\frac{1}{4}$ in., ball 8 inches; and to cut this length of shoe, or "size" with any other measure of ankle, heel or instep or ball we employ the dotted marks of increase and decrease, remembering that the mean lines give the measures of the different parts of the shoe in inches and the marks above and below, or to the left and right increase and decrease from that measure one-half of an inch each dot or mark. Say to cut an ankle of size 4, measuring $8\frac{1}{2}$ inches, instead of marking in the hole we did before we would mark in the first hole to the left but upon the line bisecting the average hole measuring 8 inches. Or should we wish to cut one measuring only 7 inches around the ankle of the same length, (4's,) we would prick through the second hole to the right of said mean or average hole, 8 inches; and so with the ball and instep, &c.; should we wish to cut a $7\frac{1}{2}$ inch ball instead of 8 inch, we would prick through the first hole below the 8 inch hole, or the average one. Or should the measure be 9 inches ball, then we would use the second hole above the 8 inch, but remembering always upon the same increasing or decreasing line bisecting the length of shoe, or size which the foot measures, as in the example 4's. This rule is the same with the instep.

To direct the eye more easily to the average or mean measures we draw from them to the outside of the decreasing dots and write or stamp the sizes thereon in figures, therefore the lines on which the figures are written are intended for the average measures and have no reference to the increasing or decreasing powers except when used in connection with the sizes of the shoe.

We omitted to mention in its order the method of employing the heel measure when other than average sizes are to be cut, though it may be unnecessary, the method being very obvious. Should we wish to cut a heel measuring $11\frac{1}{2}$ inches instead of $11\frac{1}{3}$ inches we would prick through the $11\frac{1}{3}$, and $11\frac{2}{3}$ marks and when cutting would divide the space thus made into equal parts. Or should the measure of the heel be $11\frac{1}{4}$ inches, we then would prick through the 11, and the $11\frac{1}{3}$ and then in working divide the space so as to give the proportion required, $11\frac{1}{4}$ inches. And so proceed with any other required measure.

We will now proceed to state the manner of constructing our boot scale and the application of our claim thereto as represented in the annexed drawings "No. 1B" and "No. 2B." From a perpendicular line A A'

draw a line at an angle of 8° (degrees) to the right of said line A A' (to point B, intersecting point A). Then from point B draw a line to intersect A'; this gives the side seam and its spring. Then at an angle of 42° (degrees) from said line A A' draw a line intersecting point A to point C; this gives the angle of average heel and instep measures combined. Next from said point B and at a right angle with line A, B, draw a line to point D; this gives a line of instep measure of 5 inches. Then draw a line parallel with line B, D, and $11\frac{1}{16}$ of an inch above point A, line E, E'; this gives a line of instep measure of 12 inches. Then divide the space between said points A, B, and E' D, into 28 equal parts, each representing the $\frac{1}{4}$ of an inch, being therefore an increase of instep measure of 7 inches from line E E', to line B, D. (Extend this some proportions of an inch above the line B, B, two numbers or one half of an inch, to accommodate the average measures which we will describe hereafter.) Then draw lines from said line A, B, to line E, D, upon said divisions so made, and the points of intersection of said instep lines with said angle of average heel and instep measures gives the average measures of heel and instep for all sizes of boots from child's 1's to men's 18's. (We here wish to say that average sizes adopted by us are such as we have found by actual measurement of thousands of different feet.) Now to produce the power of cutting the heel measure of any dimension with an instep measure of any other required size at one stroke, draw a line F G $1\frac{3}{4}$ inches to the left and parallel with line E D, which gives a heel measure of 6 inches; also draw another line F' G' $3\frac{3}{4}$ inches from and parallel with line E, D, which gives a heel measure of 16 inches, and the space between said lines thus drawn F, G, and F' G' being $2\frac{1}{8}$ inches, divide into 20 equal parts on each line B, D, and E, E', drawing lines from one to the other crossing the instep lines made as aforesaid and extending them above the line G, D, so as to cross the instep measures of less inches than 5, and below the said average line as many lines as desirable, and the points of intersection of these lines of heel measure with the lines of instep measures produce the amounts in inches designated in numbers upon each of said lines, and which we will explain in the instruction for using.

The width of calf is obtained by drawing a line from the point D, to H, intersecting the line A A' at H, and dividing the space between a point thereon $3\frac{3}{8}$ inches (which gives a calf measure of 6 inches when connected with the back of boot) and $8\frac{3}{8}$ inches (the same space being 5 inches) into ten (10) equal parts, which represent each

part, one inch; and the same may be divided into any other part of an inch, as in the drawing, of $1/4$; and to produce the proper proportions of top of boot or calf with the average measures as aforesaid of heel and instep we divide the same space 5 inches on line I, A, into 30 equal parts. To obtain the front line of scale intersect the point C, with line parallel with line A A' and from said point C, make such a curve to the right as will produce the general outline of a crimped vamp or boot front as from C, to C''.

To obtain the length, and width of toe, draw a line from D so as to intersect a line drawn from top of vamp downward to G $1\frac{1}{8}$ inches at a point 2 inches from said point D. This gives the length and width of toe of child's 1's, and at a point $8\frac{5}{8}$ inches from D, and $1\frac{3}{4}$ inches from said top line of vamp (C'') downward we obtain the width and length of toe of men's 16's. Then draw a line from one point so made to the other and divide the space between them into 28 equal parts which will be the length and width of toe of all sizes between the said 1's and 16's.

The figures upon the line A B are used to give the height of spring of seam of the several sizes, and are obtained in the following manner: Extend spaces above and below the line E E' of $1/8$ of an inch apart, and such a number as will express the amount of sizes employed. The line E, E' representing the proper spring of size 12, and each $1/8$ of an inch below increase two sizes, and each right above decreasing two sizes.

The outline of bottom of scale is obtained without any definite rule but the general contour of the "front" must be preserved, passing from the point representing the width of toe at largest size to the figure representing the bottom of side seam as from K, to A. This we believe is all that is necessary with figure No. 1B.

For No. 2B, (being the back of boot, proceed in the following manner: Draw perpendicular line O O' which represents direct line of seam. Then from the point O draw a line at an angle of 55° (degrees) to P, which gives the angle of average heel and instep measures combined as in the figure No. 1B. Then draw a line $3/16$ of an inch above point O and at a right angle with line O O', line P', P'', which gives an instep measure of 12 inches; also another line Q, Q', at right angle with said line O O' $1\frac{7}{8}$ inches above and parallel with said line P', P'', which gives an instep measure of $4\frac{1}{2}$ inches, the intermediate space between said points P'' Q, on line O O', and P' Q' on line R, R divide into 15 equal spaces, which gives an increase of instep measure from $4\frac{1}{2}$ inches to 12 inches.

These spaces may be divided into other portions of an inch but the above are sufficiently small to work plainly; then divide the space on line P' P'' between $3/8$ of an inch from line O, O', and 3 inches from said line O, O', into 20 equal parts, the first being the width of a heel measuring 16 inches and the last that of a heel measuring 6 inches; then draw lines intersecting the lines drawn for instep measures and as far above and below the angle of average measures of heel and instep as desirable. Next, for the purpose of obtaining the average heel and instep measures upon the line O, P, divide the same between the points of intersection of the lines Q, Q' and P' P'' into thirty equal parts which gives the average measures of all sizes between child's 1's and man's 18 combined. For back of scale line R, R, draw line parallel with line O, O', $4\frac{1}{2}$ inches therefrom, and from O' to the left to S, $13/16$ of an inch draw line to S' which gives the top of spring of calf or boot top. This may be altered to suit the requirements of any person making the same.

To obtain width of calf draw line from T to G' on line R, R, intersecting line S, S' $1/4$ of an inch below S and divide the space between a point $2\frac{1}{4}$ inches from T, and $7\frac{1}{4}$ inches into 10 equal parts and each of said 10 parts into other portions of an inch. This gives the calf measure in inches the first point measuring 6 inches and the last one 16 inches, and for a proportionate top for the regular average sizes divide the same space as above (5 inches) commencing the same distance from line R, R, into 30 equal parts each part representing the sizes from the said 1's to 18's. To obtain height of spring in this part of the boot proceed in the same manner as in scale No. 1B.

That the eye may obtain the sizes of average heel and instep measure we draw lines at right angles downward from said average line and upon each line write the proper number, as in the column 1 to 18 in both drawings No. 1B, and No. 2B, and upon the outside of said column of sizes we affix the instep measures as from 5 to 12 of each scale, and the heel measure represented by the heavy lines running up and down we affix the amount they cut in inches, as in columns 6 to 16 of each scale of heel measures. Remembering that all the intersections of any line of heel measure by the lines of instep measure cut the same width of heel, and all the intersections of any line of instep measure by a line of heel measure cut the same width of instep no matter how far to the right or left of said average lines as will be further explained when describing the manner of using.

Having now described the manner of constructing scales No. 1B and No. 2B, we pro-

ceed to explain the mode of using. To cut any average size of boot front, place the scale No. 1B, upon the leather so that the crimped point or throat and the front of leg or shin shall be even with the same parts of the leather to be cut. Or for trial the same may be laid upon a piece of paper and the front outline (C' C C'') drawn. Then whatever may be the length of boot desired mark in the said average line (A, C,) corresponding to said length, so also in the calf and toe measures. As for instance should you wish to cut size No. 2, mark in the hole designated by Fig. 2 in the column representing sizes in the said average line A, C; then in the same number of calf, and same number of toe measure. This constitutes all the marking necessary for the front. Now move the scale so as to place the Fig. 2 in "spring" of side seam opposite the mark made through the measure of heel and instep in said average line and draw a line so as to cross the mark made through the calf measure following the outline of side seam of scale line A, B, A". Then place the toe, (point K,) upon the mark made for width and length of toe and draw line from top edge of vamp to intersect the line of side seam at the same point of heel and instep measure. This simple process completes the front. The back is cut in a similar manner. Place the back line R, R, upon the folded edge of the leather or piece of paper, and mark through No. 2 of average sizes in line O, P', and in same number of calf. Then place the scale so that number 2 of side spring shall be upon the mark made for heel and instep, and draw line to the top mark as with the front. Then move the scale to the right or upward (having the back line R, R, toward you) until the bottom edge shall be even with the said heel and instep mark; then draw line for bottom of heel. But supposing that instead of an average size we wish to cut an irregular or uncommon one, that is the number we have already cut (2's) measured 11 inches heel, and 8 inches instep, and we desire to cut the same heel with an instep of 8 1/2 inches instead of 8. We would simply prick in the second hole below the one we did but upon the same line of heel measure, or if less than 8 inches say 7 inches then in the second hole above the one we did but in the same heel line; or if we desired to retain the instep but increase the heel measure, say from 11 to 12 inches then we would keep upon the same instep line (8 in.) and prick through the hole of heel measures designated by the number 12. Or should we desire a smaller heel with same instep say 10 1/2 we would then prick through the hole at the intersection of said line 10 1/2 of heel measure with the instep of 8 inches.

The chief point to be remembered is that all the lines representing instep measures cut only the amount designated by the figures attached to them no matter which side of the average line, and that all the lines of heel measure cut but the amount designated upon them no matter whether above or below the said average line of heel and instep measures combined. There being a power of increase and decrease of 4 inches upon each heel line, and a power of increase and decrease of instep measure of 3 inches or more, any combination of these can readily be found upon the scale and at one stroke be marked except in cases where smaller portions of an inch is required than is set forth, in which case and to obtain which all that is necessary is to prick in the nearest measure above and below the amount desired and work between them when cutting, making the proper division.

When using inch measures instead of regular sizes, use in calf measure the column representing inches instead of sizes.

Having thus fully described the construction and manner of using our invention we now proceed to state our claim.

We are aware there are other devices in use of scales for cutting boots and shoes by means of arranged numbers but which do not constitute the novelty and perfection of this our device, and therefore we do not claim the device or arrangement of figures whereby a boot or shoe can be cut, nor do we limit the application of our claim to one kind of boot and shoe but by a simple and obvious change is applicable to all kinds.

What we do claim therefore and desire to secure by Letters Patent of the United States is:

1. The lines of average ankle, heel, instep, and ball measures running from the point "A" (in figure "No. 1A") or any other given point that will produce the same result, with the lines of increase and decrease intersecting them at such an angle and at such a distance from each other as will produce the purpose set forth.

2. We claim the device of so arranging the heel and instep measures as in figures No. 1B, No. 2B, that any required size of said heel and instep may be marked at one stroke; with or without the combination of the average measures of the same.

3. We claim the one third of an inch increase and decrease of average heel measures upon the different lengths of lasts, or such portions of an inch as will produce the same effect, substantially as herein set forth.

SAML. F. BURDETT.
HENRY STILL.

Attest:

S. A. DUKE,
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