METHOD OF SEWING A FOOT WEAR CONSTRUCTION

Fig 12

Fig 13

Fig 15

Fig 15A
Method of Sewing a Foot Wear Construction

Fig. 17A

Fig. 16

Fig. 17

Fig. 18

Fig. 18A

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METHOD OF SEWING A FOOTWEAR CONSTRUCTION

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This invention relates to footwear constructions and a method of manufacturing the same.

More particularly, in one form, this invention relates to a method of stitching together leather or synthetic material in a shoe construction. The invention further relates to a novel method of crimping or gathering a first piece of leather or similar material in order to reduce its peripheral length so as to coincide with the smaller peripheral length of a second piece of material to which the first piece is to be joined. This invention further relates to footwear constructions in which the upper is brought together with and secured to an insole or lower portion in edge-abutting relationship.

Such a footwear construction has presented the problem, first, of reducing the much greater perimeter or peripheral length of the upper piece down to coincide with the smaller peripheral length of the outer edge of the insole piece so that the two can be joined together, and second, to conveniently secure the pieces together by machine in abutting edge-to-edge relation without any overlapping of the upper piece over the insole piece, or of the insole over the upper, or of the upper itself. Such overlapping is undesirable, creating lumps in the shoe when the sole is attached to the insole, and, if the sole is cemented to the insole as is customary in the art, hindering an even distribution of the cement resulting in an imperfect bond.

Heretofore, in the manufacture of a footwear construction of this type, it has been necessary to subject the upper to a lasting operation wherein the upper is pulled over a wood last or form in the usual manner, underlying or overlapping the insole and fastened to the last or insole by tacks, staples, cement, clips or binding wires. If the upper was-inseamed to the insole, the resulting footwear construction was then subjected to the usual in-seam-trimming operation to remove the surplus material of the upper and insole around the bottom of the footwear construction. The lasted construction was then prepared for receiving an outsole by being skived and leveled as flat as possible on the bottom thereof by pounding or leveling operation, whereby the bottom was smoothed of bumps and irregularities, and followed by a roughening of the overlasted marginal portions of the upper in the usual manner to create a cement-retaining texture on the surface thereof.

The present invention provides a method of stitching whereby the lower edge of a shoe upper is crimped or gathered to bring it to the proper peripheral size for joining to the insole.

The present invention further provides a shoe construction in which an upper portion having a lower peripheral edge length greater than that of an insole portion is secured in abutting edge-to-edge relation to the insole without overlapping of the pieces upon each other or upon themselves.

Broadly, the present invention comprises a novel method of stitching comprising forming adjacent stitches, each stitch being formed by passing a first thread through an aperture in the material to be sewn and forming a loop of that thread extending beyond the material and enclosing the second thread.

In one form of my invention, wherein first and second elements of material are to be stitched together, the first thread is passed successively through the first and second elements while in superposed face-to-face relationship, and the loops of the first thread are caused to extend beyond the second element of material and the enclosed second thread. The first element is then pulled apart from the second causing the loops of the first thread to be drawn against the second thread whereby the first thread will extend between the elements in substantially parallel strands. As a further modification, the two elements of material are folded back upon each other so as to be in inverse superposed face-to-face relationship wherein the faces in contact are opposite to those that were in contact when the stitch was formed, and whereby the substantially parallel strands of the first thread wrap over the edges of the two elements. The two elements are secured together in this position by means of a line of conventional stitching through the two elements and parallel to the wrapped edges thereof. Preferably, the spacing between the individual stitches and the location of this line of stitching coincide with the spacing and location of the apertures through which the first thread was passed.

Other objects of the present invention will become apparent upon reading the following detailed description and referring to the accompanying drawings which form a material part of this disclosure.

In the drawings:

FIGURE 1 is a front and partial side perspective view of the needle and bobbin thread mechanism on the sewing machine used to produce a stitched material, shown in section, embodying the present invention.

FIGURE 2 is a side perspective view of a bobbin case and bobbin with the bobbin withdrawn to show the bobbin thread passing under the bobbin tension spring.

FIGURE 3 is a partial sectioned view, along the line of stitching, of two pieces of material stitched according to the present invention showing loops of needle thread extending beyond the stitched materials and enclosing the bobbin thread.

FIGURE 4 is a perspective, partial sectioned view of two pieces of material stitched according to the present invention with a portion broken away along the line of stitching to show, in section, the construction of the stitch wherein loops of needle thread extend beyond the stitched materials and enclose the bobbin thread.

FIGURE 5 is a perspective, partial sectioned view of two pieces of material stitched according to the present invention, as shown in FIG. 4, with a portion broken away in section along the line of stitching to show the strands of needle thread extending between the pieces when they are pulled apart from face-to-face contact.

FIGURE 6 is a partial perspective view of two pieces of material stitched according to the present invention, as shown in FIGS. 4 and 5, showing, in the right-portion, the two pieces extended into edge-abutting relationship with the strands of needle thread extending across the line of edge abutment, and showing, in the left-portion, the two pieces placed in opposite face-to-face contact by the strands of needle thread wrapped over the edges of the pieces.

FIGURE 7 is a perspective, partial sectional view of two pieces of material stitched according to the present invention, as illustrated in FIGS. 4, 5 and 6, showing the two pieces secured in opposite face-to-face contact by a line of stitching near the edges of the pieces.

FIGURE 8 is a plan view showing an upper blank forming the upper of the footwear construction of the present invention.

FIGURE 9 is a partial perspective view of the upper part of a footwear construction, formed from the blank illustrated in FIG. 8, with a portion broken away in section, showing an edge portion turned outwardly and
folded upon itself and stitched according to an embodiment of the present invention.

FIGURE 10 is a partial perspective view of the upper part of a footwear construction of the present invention, stitched as shown in FIGURE 9, and having the edge portion folded inwardly upon itself and showing the strands of needle thread extending over the folded portion.

FIGURE 11 is a partial perspective view of the footwear construction illustrated in FIG. 10, showing the folded edge portion secured to the upper by a line of stitching.

FIGURE 12 is a partial perspective view of the toe and vamp portions of the upper blank illustrated in FIG. 8, showing the piece turned inside-out and the slot therein stitched according to the present invention.

FIGURE 13 is a partial perspective view of a footwear construction, as illustrated in FIG. 12, showing the piece turned right-side out with the stitched slot secured shut by a line of stitching near the edge thereof.

FIGURE 14 is a plan view showing a one-piece lower blank, the blank serving to form the insole of the completed footwear construction of this invention.

FIGURE 15 is a perspective view of the upper blank of FIGURE 1 formed into a footwear construction according to the present invention.

FIGURE 15A is a cross-sectional view taken along the line 15A—15A of FIG. 15.

FIGURE 16 is a perspective view of a footwear construction according to the present invention showing the lower or insole partially attached to the upper.

FIGURE 17 is an elevational view from above of the footwear construction illustrated in FIG. 16, with the insole in complete attachment thereto and with the sides of the upper pulled slightly apart to show more clearly the construction.

FIGURE 17A is a partial sectional view along the line 17A—17A of FIGURE 17, showing the construction with the sides of the upper in normal position.

FIGURE 18 is a partial perspective view of the toe portion of the footwear construction illustrated in FIG. 16, showing the insole partially attached thereto.

FIGURE 18A is a partial sectional view along the line 18A—18A of FIGURE 18, and showing in outline the position of the outsole in the completed construction.

FIGURE 1 shows a single piece of material 10, for example leather, passing over throat plate 101 and being stitched with a specially modified lock-stitch according to one feature of this invention.

Needle thread 11 passes between tension discs 12 and through thread take-up lever 13 and needle 14 and extending through material 10 in a loop 15 and, after concatenation, in a loop 16a around bobbin thread 16. I have found that if the tensions on both the needle thread 11 and the bobbin thread 16 are increased to a very great extent, that this method of stitching will provide the material 10 with a plurality of relatively minute, contiguous, substantially uniform gathers or crimps. This crimping or gathering of material 10 between the adjacent stitches causes material 10 to bend or curve in the manner shown with the bobbin thread 16 being in tension and held securely against the concave surface of material 10 by loops 16a of needle thread 11 also under tension. In the conventional sewing machine illustrated in FIGURE 1, tension on the needle thread 11 is increased by rotating tension adjustment knob 17 in a clockwise direction. Material 10 is worked across throat plate 101 in a conventional manner by a feed dog means, for example as shown in Machine Sewing, Singer Sewing Machine Co., New York, 1965 ed.

FIGURE 2 shows bobbin thread 16 wound on bobbin 18 and passing under bobbin tension spring 19 on bobbin case 20. In the conventional sewing machine illustrated, tension on bobbin thread 16 is increased by rotating bobbin tension screw 21 in a clockwise direction.

I have found that this specially modified lock-stitch will be created when both the needle thread and bobbin thread are of the same weight and thickness. However, it is desirable when stitching a piece of material according to the method described above to have the bobbin thread be of a slightly heavier grade than the needle thread to avoid breakage in constructing the stitch.

With this method of stitching, I control the extent of crimping by varying the size of the spacing between adjacent stitches. A larger spacing between the individual stitches will result in a greater degree of crimping; conversely, reducing the spacing between the individual stitches will result in a lesser degree of crimping. Spacing between individual stitches is effected by suitable adjustment of the usual stitch regulator found on commonly available sewing machines. As an additional feature of this method of stitching, I may use an elastic or stretchable thread as either the needle thread or the bobbin thread or both, thereby imparting to the stitched material a degree of stretchability. As a further feature, the needle thread or bobbin thread, or both, may be extensible or non-extensible cord, lace or tape.

FIGURE 3 shows another aspect of my invention wherein a first piece of material 22 and a second piece of material 23 are stitched together with a specially modified lock-stitch. Then tension on bobbin thread 16a is maintained in its position of very tight adjustment, but the tension on needle thread 11a is reduced below that used to create the conventional lock-stitch. This tensioning adjustment will cause the needle thread 11a to penetrate both the first piece 22 and the second piece 23 and cause needle thread 11a to extend beyond second piece 23 in loops 24 substantially free of tension which, after concatenation, enclose bobbin thread 16a, also substantially free of tension. The improved and advantages of having the needle thread extend beyond the second piece 23 in loops 24 will be more fully explained as follows.

Referring to FIGURE 4, a first piece of material 22 and a second piece of material 23, each for example having a finished or smoother surface 25 and a rougher surface 26, are stitched together in the manner described above by being placed in superposed face-to-face, edge-aligned relation. In the embodiment shown, the pieces 22 and 23 have their finished surfaces 25 in face-to-face contact prior to stitching. It will be understood, of course, that pieces 22 and 23 may be reversed so that the finished surface 26 of piece 22 in superposed face-to-face contact with finished surface 25 of piece 23, depending upon the construction to be achieved.

Referring to FIGURE 5, first piece 22 and second piece 23 are pulled apart from face-to-face contact, causing loops 24 of needle thread 11a to be drawn up tight against bobbin thread 16a, whereby strands 27 of needle thread 11a extend between first piece 22 and second piece 23. It will be appreciated that by suitably decreasing the tension on needle thread 11a, as by rotating tension-adjustment knob 17 of FIGURE 1 in a counterclockwise direction, the length of the loops 24 of needle thread 11a extending beyond the second piece 23 can be increased. Conversely, an increase in tension on needle thread 11a will reduce the size of the loops 24 of needle thread 11a extending beyond the second piece 23. It is thus seen that it is the tension adjustment on needle thread 11a, and consequently the size of loops 24, that control the distance of separation of first piece 22 from second piece 23 when pulled apart from face-to-face contact as shown in FIGURE 5.

Referring to FIGURE 6, right-portions thereof, first piece 22 and second piece 23 are shown pulled apart from face-to-face contact and placed in edge-abutting relation with strands 27 of the needle thread 11a extending across
the line of edge abutment and joining the two pieces together. It will be noted that in the embodiment illustrated in the right-portion of FIGURE 6, the tension adjustment on needle thread 11a and consequently the length of strands 27, is such that when first piece 22 and second piece 23 are pulled apart from face-to-face contact, the lengths of unfinished surfaces 37 of the two pieces 22 and 23 to be positioned in edge-abutting relation with little or no spacing between the edges of the two pieces. It will of course be appreciated that by extending the length of strands 27, any desired spacing between pieces 22 and 23 can be achieved.

In one aspect of this method of stitching, pieces 22 and 23 may remain in the position shown in the right-portion of FIGURE 6; in another aspect of this method of stitching, referring to the left-portion of FIGURE 6, pieces 22 and 23 are fully overlapped so that their rough or unfinished surfaces 26 are in face-to-face contact. It is preferred that the strands 27 of needle thread 11a be tautly drawn over the edges 28 of pieces 22 and 23.

FIGURE 7 shows the first piece 22 and the second piece 23 secured in superposed face-to-face relationship by a line of normal lock-stitch sewing 29 near the edge of the upper and lower portions of the two pieces 22 and 23 respectively parallel thereto. Preferably, the stitch spacing and stitch location of the line of stitching 29 coincide with those utilized in the stitching with needle thread 11a in order to give the appearance of the two pieces 22 and 23 having been sewn together by hand or by an overedge or overlapping machine stitch.

In the description of my invention, above, it is to be understood that the terms needle thread and bobbin thread have been utilized for convenience and clarity as illustrative of a first thread and a second thread in the broader sense. For example, the stitching above-described can be made with the bobbin thread as the first thread extending through and beyond the stitched material in a loop and enclosing the needle thread as the second thread. This is accomplished by making the tension on the needle thread very tight and reducing the tension on the bobbin thread below that used to create the conventional lock-stitch.

FIGURES 8 through 18 illustrate footwear constructions, defined as including shoes, boots, slippers and the like, according to the present invention.

FIGURE 8 shows upper blank 30 forming the upper of the footwear construction of the present invention. Upper blank 30 has a heel portion 31 and toe portion 32; it has an upper edge 33 and a lower edge 34; slot 35 extends from upper edge 33 into toe portion 32. In the embodiment shown, upper blank 30 is of leather having a finished surface 36 and a rough or unfinished surface 37.

FIGURE 9 shows a partially formed shoe construction from upper blank 30. Upper edge 33 of blank 30 is folded in an outwardly manner whereby the finished surface 36 is in face-to-face contact with a like surface of a lower portion of blank 30. When folded in this manner, upper edge 33 is stitched according to the present invention as illustrated in FIGURES 3–5. It will be seen that in this embodiment the needle thread 11a passes first through upper edge 33 and then through a lower part of blank 30, extending through in loops 24 and enclosing bobbin thread 16a. In the embodiment illustrated in FIGURE 9, upper edge 33 has been pulled apart slightly from surface face-to-face contact with the lower part of blank 30 whereby strands 27 of needle thread 11a extend therebetween.

FIGURE 10 shows upper blank 30 stitched as described above in conjunction with FIGURE 9, and with upper edge 33 now turned inwardly causing strands 27 of needle thread 11a to be wrapped over the folded portion.

FIGURE 11 illustrates how upper edge 33 of blank 30 is secured in face-to-face contact, with the corresponding unfinished surfaces 37 facing each other, by a line of normal lock-stitch sewing 29. It will, of course, be understood that, for the sake of clarity, the stitching has not been shown extending around the entire periphery; in practice, such stitching may extend for the entire length of the folded edge or only along desired portions thereof.

Referring to FIGURE 12, slot 35 in upper blank 30 is stitched according to the present invention by having opposite finished surfaces 36 placed in face-to-face contact and stitched with loops 24 of needle thread 11a extending beyond the unfinished surface 37 of the shoe material, and enclosing bobbin thread 16a. The illustration shows the side portions of the slot 35 pulled slightly apart so that strands 27 of needle thread 11a extend therebetween. In the embodiment shown, the stitching is made with the upper blank 30 turned inside out.

Referring to FIGURE 13, the completed stitching of slot 35 is shown with the material of upper blank 30 being turned right-side out and having the edge portions of slot 35 placed in superposed unfinished-surface 37 face-to-face contact and secured thereto by a line of normal lock-stitching 29 whereby strands 27 of needle thread 11a extend over the edges 38. It is to be understood that the line of normal lock-stitching 29 may be omitted and the tension on needle thread 11a so adjusted that edges 38 are disposed in substantially edge-abutting relation with strands 27 of needle thread 11a holding the edges in such position.

FIGURE 14 shows one-piece lower blank 39 having a toe portion 40 and a heel portion 41. In the illustration shown, lower blank 39 has a finished or smooth surface 42 and an unfinished or rougher surface 43. Lower blank 39 has an outer edge 44 which is to be joined with lower edge 34 of upper blank 30 to form the footwear construction of the present invention. For convenience in aligning the parts in forming the footwear construction, upper blank 30 and lower blank 39 are provided with mating points 45. A major problem in forming a footwear construction wherein an upper is joined to a lower or insole is the reduction of the outer perimeter of the upper in order to effect its joiner to the relatively smaller perimeter of the lower. In the embodiment of the invention illustrated herein, the perimeter of lower edge 34 of upper blank 30 must be reduced in order to effect its proper joiner or attachment to the insole with a matching of mating points 45 on upper blank 30 with those along the smaller perimeter of outer edge 44 of lower blank 39.

Henceforward, in the manufacture of a footwear construction of this type, it has been necessary to subject the upper to a lasting operation wherein the upper is pulled over a wood last or form in the usual manner, underlying or overlapping the insole and fastened to the last or insole by tacks, staples, cement, clips or binding wires. If the upper was inseed to the insole, the resulting foot wear construction was then subjected to the usual inseatrimming operation to remove the surplus material of the upper and insole around the bottom of the footwear construction. The lasted construction was then prepared for receiving an outsole by being skived and leveled as flat as possible on the bottom thereof by a pounding or leveling operation, whereby the bottom was smoothed of bumps and irregularities, and followed by a roughening of the overlapped marginal portions of the upper in the usual manner to create a cement-retaining texture on the surface thereof.

The footwear construction provided by the present invention brings about a substantial saving in labor and material by eliminating the lasting operation for securing the upper to the insole, by eliminating the skiving, pounding, leveling and roughening operations and by eliminating the need for the usual inseatrimming
operations whereby there is effected an economy of leather usage by as much as ¼-inch around the periphery of the lower edge of the upper.

Referring to FIGURE 15, the lower edge 34 of upper blank 30 is crimped, e.g. by the specially modified lock-stitch of the present invention as described above and illustrated in FIGURE 1. This stitching along lower edge 34 produces a plurality of relatively minute substantially uniform gathers or crimps 46. Depending upon the particular footwear design and upon the desired reduction in the perimeter of lower edge 34, the crimping may be disposed substantially along the entire periphery of lower edge 34 or only at selected portions thereof, for example at the toe and heel portions. The heel portions 31 of upper 30 are secured together by any convenient means, for example by the method of stitching disclosed above and illustrated in FIGURES 4–7.

For example, using a Singer model 18–2 lock-stitch sewing machine set for a stitch spacing of ¼-inch and using needle thread of about ¾-inch diameter and bobbin thread of about ½-inch diameter, a leather upper blank 30 of about ¾-inch thickness was crimped in this manner along lower edge 34. The perimeter of lower edge 34 prior to crimping was 2½ inches; after crimping, it was 1½ inches, corresponding with the perimeter of outer edge 44 of lower blank or insole 39.

The location and construction of the crimping stitching is shown more clearly in FIGURE 15A, wherein needle thread 11 extends through the material of upper 30 and the lower edge 34 and extends in tightly-drawn loops 15 around bobbin thread 16. In this crimped condition, upper 30 may conveniently be slipped onto a wooden last or similar form to place it in condition for attachment to an insole or sole portion. No hand pulling or tensioning or tightening of either needle thread 11 or bobbin thread 16 is required to effect a snug fit of the upper upon the last.

FIGURES 16 and 17 show a footwear construction according to the present invention. Insole 47, formed of lower blank 39 is attached to upper 48, formed from upper blank 30 as described above and illustrated in FIGURES 8 and 15, by a line of stitching generally designated as 49. The insole 47 is attached in substantially edge-abutting relation to upper 48 in such a fashion that the line of edge-abutting lies substantially in a common plane with insole 47 and marginal, inwardly-turned flange portion 50 of upper 48, the usual stitching, a supply of bobbin thread, means to tension said bobbin thread, and a feed dog means to feed the blank material across the throat plate, adjusting the needle thread tension to a tension greater than that employed in sewing a normal lock-stitch and adjusting the bobbin thread tension to a tension greater than that employed in sewing the specially modified lock-stitch, said specially modified lock-stitch after sewing consisting of the bobbin thread being under tension and lying substantially flat along the surface of the leather and the needle thread being under tension and having loops penetrating through the leather and holding the bobbin thread tightly in said loops, and sewing a marginal edge portion of said blank with the said specially modified lock-stitch to thereby reduce its peripheral length.

In the footwear construction shown herein, finished surface 42 of insole 47 is placed in face-to-face edge-aligned relation with unfinished surface 37 of upper 48. The insole and upper are stitched in this position, with needle thread 11a extending in loops 23 beyond the material of upper 48 and enclosing bobbin thread 14a. As has been described above, insole 47 is then pulled apart from upper 48 whereby strands 27 of needle thread 11a extend between the pieces, which are then rotated into edge-to-edge abutting relation.

In another embodiment, not illustrated, an uncrimped upper blank 30 is joined in edge-abutting relationship to insole 47 by means of a double-needle lock-stitch sewing machine. The lower edge 34 of upper blank 30 is passed under a first, or for example the left-hand, needle and the outer edge 44 of insole 47 is concurrently passed under a second, or for example the right-hand, needle with the upper 30 and insole 47 being in edge-abutting relation with the line of edge-abutting tension means, whereby, when the upper blank 30 and insole 47 are brought together, the insole 47 is crimped in the periphery of the lower edge 34 of upper blank 30 is crimped or reduced in peripheral length while concurrently being joined to the outer edge 44 of insole 47 by strands of bobbin thread extending between the pieces.

FIGURE 18 shows outside 51 partially attached to the insole 47 and the upper 48. Outside 51 is secured in the usual manner as by means of a suitable cement. Because insole 47 is attached in substantially edge-abutting relation to upper 48 in such a fashion that the line of edge-abutting lies substantially in a common plane with insole 47 and marginal, inwardly-turned flange portion 50 of upper 48, the usual stitching, a supply of bobbin thread, means to tension said bobbin thread, and a feed dog means to feed the blank material across the throat plate, adjusting the needle thread tension to a tension greater than that employed in sewing a normal lock-stitch and adjusting the bobbin thread tension to a tension greater than that employed in sewing the specially modified lock-stitch, said specially modified lock-stitch after sewing consisting of the bobbin thread being under tension and lying substantially flat along the surface of the leather and the needle thread being under tension and having loops penetrating through the leather and holding the bobbin thread tightly in said loops, and sewing a marginal edge portion of said blank with the said specially modified lock-stitch to thereby reduce its peripheral length.

In the footwear construction shown herein, finished surface 42 of insole 47 is placed in face-to-face edge-aligned relation with unfinished surface 37 of upper 48. The insole and upper are stitched in this position, with needle thread 11a extending in loops 23 beyond the material of upper 48 and enclosing bobbin thread 14a. As has been described above, insole 47 is then pulled apart from upper 48 whereby strands 27 of needle thread 11a extend between the pieces, which are then rotated into edge-to-edge abutting relation.

In another embodiment, not illustrated, an uncrimped upper blank 30 is joined in edge-abutting relationship to insole 47 by means of a double-needle lock-stitch sewing machine. The lower edge 34 of upper blank 30 is passed under a first, or for example the left-hand, needle and the outer edge 44 of insole 47 is concurrently passed under a second, or for example the right-hand, needle with the upper 30 and insole 47 being in edge-abutting relation with the line of edge-abutting tension means, whereby, when the upper blank 30 and insole 47 are brought together, the insole 47 is crimped in the periphery of the lower edge 34 of upper blank 30 is crimped or reduced in peripheral length while concurrently being joined to the outer edge 44 of insole 47 by strands of bobbin thread extending between the pieces.

FIGURE 18 shows outside 51 partially attached to the insole 47 and the upper 48. Outside 51 is secured in the usual manner as by means of a suitable cement. Because insole 47 is attached in substantially edge-abutting relation to upper 48 in such a fashion that the line of edge-abutting lies substantially in a common plane with insole 47 and marginal, inwardly-turned flange portion 50 of upper 48, the usual stitching, a supply of bobbin thread, means to tension said bobbin thread, and a feed dog means to feed the blank material across the throat plate, adjusting the needle thread tension to a tension greater than that employed in sewing a normal lock-stitch and adjusting the bobbin thread tension to a tension greater than that employed in sewing the specially modified lock-stitch, said specially modified lock-stitch after sewing consisting of the bobbin thread being under tension and lying substantially flat along the surface of the leather and the needle thread being under tension and having loops penetrating through the leather and holding the bobbin thread tightly in said loops, and sewing a marginal edge portion of said blank with the said specially modified lock-stitch to thereby reduce its peripheral length.

In the footwear construction shown herein, finished surface 42 of insole 47 is placed in face-to-face edge-aligned relation with unfinished surface 37 of upper 48. The insole and upper are stitched in this position, with needle thread 11a extending in loops 23 beyond the material of upper 48 and enclosing bobbin thread 14a. As has been described above, insole 47 is then pulled apart from upper 48 whereby strands 27 of needle thread 11a extend between the pieces, which are then rotated into edge-to-edge abutting relation.

In another embodiment, not illustrated, an uncrimped upper blank 30 is joined in edge-abutting relationship to insole 47 by means of a double-needle lock-stitch sewing machine. The lower edge 34 of upper blank 30 is passed under a first, or for example the left-hand, needle and the outer edge 44 of insole 47 is concurrently passed under a second, or for example the right-hand, needle with the upper 30 and insole 47 being in edge-abutting relation with the line of edge-abutting tension means, whereby, when the upper blank 30 and insole 47 are brought together, the insole 47 is crimped in the periphery of the lower edge 34 of upper blank 30 is crimped or reduced in peripheral length while concurrently being joined to the outer edge 44 of insole 47 by strands of bobbin thread extending between the pieces.

FIGURE 18 shows outside 51 partially attached to the insole 47 and the upper 48. Outside 51 is secured in the usual manner as by means of a suitable cement. Because insole 47 is attached in substantially edge-abutting relation to upper 48 in such a fashion that the line of edge-abutting lies substantially in a common plane with insole 47 and marginal, inwardly-turned flange portion 50 of upper 48, the usual stitching, a supply of bobbin thread, means to tension said bobbin thread, and a feed dog means to feed the blank material across the throat plate, adjusting the needle thread tension to a tension greater than that employed in sewing a normal lock-stitch and adjusting the bobbin thread tension to a tension greater than that employed in sewing the specially modified lock-stitch, said specially modified lock-stitch after sewing consisting of the bobbin thread being under tension and lying substantially flat along the surface of the leather and the needle thread being under tension and having loops penetrating through the leather and holding the bobbin thread tightly in said loops, and sewing a marginal edge portion of said blank with the said specially modified lock-stitch to thereby reduce its peripheral length.
said specially modified lock-stitch after sewing consisting of the bobbin thread being under tension and lying substantially flat along the surface of the leather and the needle thread being under tension and having loops penetrating through the leather and holding the bobbin thread tightly in said loops, and sewing the lower marginal edge portion of said blank with the said specially modified lock-stitch to thereby reduce its peripheral length, whereby a shoe upper is made which is adapted for placement on a last and joiner to a sole.

3. In footwear construction, the method of joining first and second leather elements in edge-abutting relationship comprising
placing the said elements in superposed face-to-face edge-aligned relation on the throat plate of a lock-stitch sewing machine having an oscillating needle, a supply of thread to the needle, means to tension the said needle thread, a supply of bobbin thread, means to tension said bobbin thread, and a feed dog means to feed the said elements across the throat plate,
adjusting the bobbin thread tension at a sufficiently high tension and adjusting the needle thread tension at a sufficiently low tension to form a specially modified lock-stitch,
said specially modified lock-stitch after sewing consisting of the needle thread having loops substantially free of tension penetrating said superposed first and second elements and enclosing the bobbin thread, said bobbin thread being substantially free of tension,
sewing the said superposed first and second elements substantially parallel to and proximate to the aligned edges thereof with the specially modified lock-stitch, and
transversely to the line of said sewing spreading the stitched superposed blanks apart to the extent that the said loops of the needle thread are drawn upon the bobbin thread and the said elements are joined together in substantially edge-abutting relationship by strands of the needle thread.

4. In shoe construction, the method of joining upper and insole leather blanks in edge-abutting relationship comprising
placing the said blanks in superposed face-to-face edge-aligned relation on the throat plate of a lock-stitch sewing machine having an oscillating needle, a supply of thread to the needle, means to tension the said needle thread, a supply of bobbin thread, means to tension said bobbin thread, and a feed dog means to feed the said blanks across the throat plate,
adjusting the bobbin thread tension at a sufficiently high tension and adjusting the needle thread tension at a sufficiently low tension to form a specially modified lock-stitch,
said specially modified lock-stitch after sewing consisting of the needle thread having loops substantially free of tension penetrating said superposed blanks and enclosing the bobbin thread, said bobbin thread being substantially free of tension,
sewing the said superposed blanks substantially parallel to and proximate to the aligned edges thereof with the specially modified lock-stitch, and
transversely to the line of said sewing spreading the stitched superposed blanks apart to the extent that the said loops of the needle thread are drawn upon the bobbin thread and the said blanks are joined together in substantially edge-abutting relationship by strands of the needle thread.

5. In footwear construction, the method of joining first and second leather elements comprising
placing the said elements in superposed face-to-face edge-aligned relation on the throat plate of a lock-stitch sewing machine having an oscillating needle, a supply of thread to the needle means to tension the said needle thread, a supply of bobbin thread, means to tension said bobbin thread, and a feed dog means to feed the said elements across the throat plate,
adjusting the bobbin thread tension at a sufficiently high tension and adjusting the needle thread tension at a sufficiently low tension to form a specially modified lock-stitch,
said specially modified lock-stitch after sewing consisting of the needle thread having loops substantially free of tension penetrating said superposed first and second elements and enclosing the bobbin thread, said bobbin thread being substantially free of tension,
sewing the said superposed first and second elements substantially parallel to and proximate to the aligned edges thereof with the specially modified lock-stitch, and
transversely to the line of said sewing spreading the stitched superposed elements apart to the extent that the said loops of the needle thread are drawn upon the bobbin thread and the said elements are joined together by strands of the needle thread,
placing the stitched elements in superposed opposite face-to-face edge-aligned relation with the said strands of needle thread wrapped over the said aligned edges of the elements, and
securing the said elements in said superposed opposite face-to-face edge-aligned relation by a line of stitching substantially parallel to and proximate to the said aligned edges.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,291,085

December 13, 1966

David Levy

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 24, for "peripher" read -- peripheral --; line 47, before "pound-" insert -- a --; column 2, line 60, for "sectional" read -- sectioned --; column 3, line 69, for "Machine Sewing", in regular type, read -- Machine Sewing --, in italics; column 4, line 5, for "and" read -- or --; line 28, for "Then" read -- The --; column 7, line 55, after "47" strike out "to".

Signed and sealed this 19th day of September 1967.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents