PROCESS FOR MAKING WELT SHOES

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PROCESS FOR MAKING WELT SHOES

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This invention relates to an improved method of manufacturing welt shoes. More particularly, the invention is directed to an improved method of making welted shoes, wherein separate and unattached welt, insole and upper members are simultaneously secured by a line of stitching interposed beneath a single sewing operation.

Pre-welted shoes made by securing a welt to the margin of the upper member prior to lastin are known in the art. Illustrative of such pre-welted shoes is the disclosure of British Patent No. 405,626, dated February 2, 1934, which describes a method of making pre-welted shoes, wherein the welt and upper members are initially secured together. The individual parts are first temporarily fastened by the use of tacks preparatory to inserting preliminary tacking stitches. After the welt and upper are secured with the aid of tacks, the insole is sewn to the welt-upper unit by a line of securing stitches. Thus, by the method set forth in the British patent, fitting and tacking operations are necessitated and an additional securing operation is required to attach the insole. In view of the number of steps involved, including the preliminary securing steps, the cost of manufacture of shoes made in accordance with the disclosure of the aforesaid patent is inherently high, and accordingly, the process has not achieved commercial success.

It is, therefore, an object of this invention to provide a novel method of forming welt shoes by uniting separate and unattached welt, upper and insole pieces during a single sewing operation prior to the lastin of the shoe parts.

Another object of the invention is to provide an improved method whereby separate and unattached welt, upper and insole members may be united and secured in alignment by a line of stitching formed during a single sewing operation while the shoe parts are maintained in an inverted position with the marginal edges thereof in alignment.

Still further object of the invention is to provide an improved method of forming welt shoes by (1) superposing the corresponding portions of an unattached preformed upper member and an unattached preformed insole having the edges thereof in alignment with the edge of a welt strip section, and (2) inserting a line of securing stitches a spaced distance from the edges thereof around the preformed members and through the shoe components while bringing the insole section into firm contact with the shoe parts to be joined.

A still further object of the invention is to provide an improved method of forming welted shoes wherein a separate and unattached welt strip, upper member and insole member are secured together in superposed relation with the edges in alignment by a single line of stitching which extends entirely around the marginal edge of the insole member and which has been inserted within laid sawn parts and the edges intertwined to provide a welt or recce, a filler is inserted therein prior to application of an outsole member.

The invention also resides in certain novel method steps which facilitate the carrying out of the foregoing objects and which contribute both to the versatility of performance and to its ease of operation, as well as to its desirability.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of portions of the head of a sewing machine, showing a shoe welt, insole and upper member in superposed relation and having the edges thereat of aligned and positioned beneath the raised presser foot of the sewing machine;

Fig. 2 is a perspective view of an improved work-supporting plate for a shoe sewing machine, wherein is provided a welt slot, through which a welt strip passes, a needle aperture, and also a channel or groove in the welt strip which serves as a non-confining guide means;

Fig. 3 is a cross-section taken on line 3—3 of Fig. 1;

Fig. 4 is a cross-section taken on line 4—4 of Fig. 1, except the presser foot has been shown in lowered position;

Fig. 5 is a perspective view of a welt, insole and upper member provided with an open toe and heel, which have been secured by a line of stitching;

Fig. 6 is a bottom view of the shoe component shown in Fig. 5;

Fig. 7 is a perspective view of a shoe component formed of a welt, insole and upper member provided with closed heel and toe portions;

Fig. 8 is a bottom view of the shoe component shown in Fig. 7;

Fig. 9 is an exploded view disclosing the shoe components in Fig. 5, with a last inserted therein, and indicating the assembly of a heel seat, filler and shank;

Fig. 10 is a cross-sectional view of the assembled shoe indicated in Fig. 9 taken across the heel section; and

Fig. 11 is a cross-sectional view of the assembled shoe indicated in Fig. 9 taken across the forward portion of the shoe, to which an outer sole has been secured.

While this invention is susceptible of various modifications and constructions, we have shown in the drawings and will here describe in detail the preferred embodiment. It is to be understood that we do not intend to limit the invention by such disclosure and we aim to cover all modifications and alternative steps falling within the scope and spirit of the invention as defined in the appended claims.

In forming shoes by our improved method, a separate and unattached preformed upper member 10 is positioned above a welt strip 12 with the edges of the separate preformed upper member 10 and welt strip 12 in alignment. Preferably the inside heel breast marginal portion of a preformed upper is initially superposed relative to the portion of the welt strip adjacent to its extremity. Inasmuch as the ends of the welt strip are overlapped during a subsequent sewing operation, the end of the welt strip in contact with the separate preformed upper may be skived or feathered, as shown by reference numeral 15, prior to the above positioning operation, although, if desirable, this step may be carried out subsequent to the sewing operation.

The upper member 10 and welt strip 12 are arranged with the finished or outside of the welt in contact with and underlaying the finished or outside of the upper member. By the use in the term, by the use in the term "upper member" we mean to define the shoe upper pieces which are conventionally made up in a fitting room. Such upper members are cut to a desired configuration, depending upon the style and size of the shoe being made, and may comprise closed or open toe and closed or open heel portions. Additionally the upper member may be provided with a stitched edging 14, counter 16, lining 18, heel stay 24, box toe 16, vamp and other features normally employed in shoe structure. The material from which the upper member 10 is formed may be leather, textile, plastic, or other web material conventionally employed, and the surface which forms the exterior of the shoe may be plain or decorated in any suitable manner.

A preformed insole member 26 is laid over the superimposed preformed upper member 10 and welt strip 12 with the marginal edge of the insole member 26 positioned in corresponding relation to the inner heel breast position of the upper member 10. The preformed insole member 26 is positioned on the upper member 10 with the corresponding edges in alignment and with the finished side, i.e., the inside, in contact with the unfinished side of the upper member. The insole member 26 is preferably formed of soft flexible leather, although other flexible web materials, such as textiles and the like, may be employed and the insole member 26 has a substantially flat form as is indicated in Fig. 1. By arranging the
separate and unattached shoe pieces 10, 12 and 26 in the manner described, an assembly is provided, as shown in Fig. 4, for guiding the welt strip 12 and the superposed marginal edges of the shoe parts, with the insole 26 and upper member 10 in register and superposed relative to a portion of the welt strip 12 adjacent to the end thereof with the edges of the welt strip in agreement with the edges of the insole and upper member.

The separate and unattached shoe pieces 10, 12 and 26, after having been assembled in the above defined manner and treated together as a component by a line of stitching 27 passing through the welt strip a spaced distance from the outside edge thereof and through the preformed insole 26 and preformed upper member 10, the lines 5, 10, 15, and lines 20 to 25 pass through all three of the pieces throughout the extent of said line of stitching, as the line is inserted about the marginal edges of the shoe unit, since certain portions of the upper member, i.e., the heel and toe portions, may be omitted and therefore left free of stitching depending upon the style and type of shoe being constructed, as will be later explained.

It is apparent that the insertion of a line of stitches through and a spaced distance from the edges of the welt strip 12 and other pieces to be united presents a difficult task, because of the skillful operators who must be fed in superposed position with the edges thereof aligned to the sewing area where the members are compressed and the stitches are inserted. The maintenance of separate and unattached pieces in superposed relation with the edges thereof in alignment is complicated by the fact that the line of stitching follows a path of reverse curvature and the degree of curvature changes in accordance with the location of the shoe portions being united. The curvature is greatest at the heel and toe portions of the shoe unit where the greatest difficulty is encountered in properly maintaining the superposed and unattached pieces in aligned position as the assembly of pieces passes into the sewing area.

In order to make possible the rapid insertion of the stitches through the unattached pieces to be secured by relatively unskilled operators and to prevent the manufacture of rejected shoe units, we have provided an improved sewing machine attachment which serves to guide the welt strip into a selected position beneath the presser foot in the sewing area. Thus, by employing our improved sewing attachment to position the welt strip continuously relative to the line of stitches as they are inserted, the operator's attention can be directed to maintaining the alignment of the separate and unattached pieces in superposed relation with the edges thereof in alignment with each other and with the edge of the welt strip 12.

The improved sewing machine attachment which is shown in Figs. 1 to 4, inclusive, comprises a unitary work supporting plate 50 which serves both as a supporting means for the shoe pieces while the stitches are being inserted therein and as a means for guiding the welt strip 12 to, but not confining said strip in, a predetermined position within the sewing area. The work supporting plate 50 is shown in Figs. 1, 3 and 4 attached to a conventional sewing machine which is adapted for sewing a welt strip to an unattached upper member.

The work supporting and welt guide plate is described and claimed in applicants' co-pending application Serial No. 57,544, filed October 2, 1948, which matured into Patent No. 2,610,597 on September 16, 1952, of which this application is a continuation-in-part.

By way of example, the mechanism of a Puritan shoe sewed as employed to illustrate the type of sewing device which may be utilized in practicing our method, although other types of sewing devices may be used. The stitch-forming mechanism of the sewing machine includes an awl 52 which is reciprocated by a crossbar 54 in which it is mounted, a needle threading looper 56, and a reciprocating hooked straight-shank needle 58, which, together with the needle of conventional construction, actuates the proper timed relation by connections to conventional sewing machine elements which form no part of the present invention.

Reference to Fig. 6 indicates a presser foot, which, when depressed into its lowered position, as best shown in Fig. 4, is biased by spring means (not shown) to compress the shoe pieces between the bottom of the foot and the work supporting plate 50 in the sewing area or zone. The platen 62 of presser foot 60 is formed relatively narrow in order to facilitate sewing closely adjacent to the aligned edges of the superposed welt strip 12, upper member 10 and the insole 26 and superposed relative to the edges of the superposed shoe parts, labor and material are saved, since the need for trimming is eliminated. The type of presser foot conventionally employed to sew shoe vamps has been elongated forming a unitary presser foot 60 with the platen surface, i.e., the presser foot bottom, which is in contact with the material is approximately 0.625 of an inch long and 0.3125 of an inch wide with an elongated portion 62 from a unitary presser foot bottom 60 through the sides thereof. Thus, with the platen side aligned with the edges of the shoe material, the center of the line of stitches through the shoe pieces will be inserted approximately 0.6 of an inch from the aligned edge of the shoe pieces.

The unitary work supporting plate 50 is of general rectangular shape, having a substantially flat upper body surface 51 and one end thereof formed with a reduced neck portion 64. The plate 50 is securely supported in a substantially horizontal position on a vertical standard 66 by the use of longitudinally extending dovetail grooves 68 and 70 located on the bottom thereof which coat with cooperating surfaces on the upper inside portion of the shoe parts of walls 72 and 74 of standard 66. A bolt 76, having the shape of the groove 68, is secured in the bottom or aperture 78 of wall 74 and is secured in thread-equipped aperture 80 of wall 72. Rotation of bolt 76 serves to tighten the cooperating surfaces of walls 72 and 74 against the dovetail grooves 68 and 70 to maintain the unitary supporting plate 50 in place.

The reduced neck portion 64 of the unitary work supporting plate 50 is provided with a welt groove 82 extending transversely of the reduced end portion 64 which is formed by a wall or abutment 84 and an oppositely opposed shortened wall or abutment 86 formed by narrow ridge 88 which is located adjacent to the outer end of the reduced part 64. The ridge 88 is preferably flattened and is located in substantially the same plane as the upper body surface 51 of the work supporting plate 50. A welt slot 90 is positioned adjacent to the leading edge of welt groove 82 and is formed by extensions of abutments 84 and 86, respectively, and by bridge member 98 which extends between ridge 88 and the body portion of plate 50. The walls or abutments 84 and 86 are spaced a distance apart slightly greater than the width of the welt strip to be sewn and the opening between the under surface of bridge member 98 and the leading edge of the groove 82 is such that the thickness of the welt strip 12 in order that the strip may freely pass through the slot 90 and slide in the groove 82 without binding. The leading edge of the bottom of welt groove 82 is progressively decreases in depth to the central portion of needle aperture 106, at which point the depth of the groove remains constant over the remainder portion thereof. Prior to the superposing and aligning the edges of the separate welt strip 12, upper member 10 and insole 26, as described above, the end of the welt strip feeding from a welt supply (not shown) positioned below the sewing mechanism is passed through welt slot 90 over the leading edge of the groove 82 with the finished side facing in an upward direction. After aligning the edges of the superposed shoe pieces at the inner heel build position, or at any other suitable starting position, the presser foot 60 is released to compress the pieces beneath the platen 62, as shown in Fig. 4, within the sewing area.

The manner of uniting the shoe pieces by stitching is dependent upon the type and style of shoe being constructed. Figs. 5, 6 and 9 illustrate the continuous line of stitching inserted through the parts of an open toe and heel shoe. In the preforming of the upper member 10 for such a shoe, which is superposed relative to the inside tip position 28 across the toe to the outside tip position 30 and from the inside heel breast position 32, which is also the outside heel breast position 34. Thus, in sewing the edges of the superposed welt strip 12, through the marginal edges of the superposed welt strip 12, upper member 10 and insole 26 to the outside tip position 28. The line of stitching then is continued around the curvature of the toe through only the welt strip 12 and insole 26 to the outside tip position 30. From this point the line of stitching continues through
5 the welt strip, upper member and insole until the outside heel position 34 is reached. The line of stitching then continues from the outside heel heel position 34 around the curvature of the heel to the inside heel position 32 passing through only the welt strip and insole member.

As an alternative sewing procedure for closed toe and heel shoes, this improved method of forming welt shoes comprises a relationship curve followed in Fig. 8 that a continuous line of stitching may be inserted throughout all three aligned shoe members entirely around the marginal edge of the aligned shoe members which includes the upper member as well as the welt strip and insole member. However, the starting position of the line of stitches may be selected to best supplement the skill of the operator. When the aligned shoe members are secured by a continuous line of stitching, the line of stitches 36, 38, 40 and 42 in the insole member may be eliminated. In addition, the securing of the shoe parts by a continuous line of stitching about the entire periphery of the inner sole has the advantage that, upon the inserting of the last during the slip-lasting operation, the upper is conformed to the last and the pulling over of the upper in a separate operation is dispensed with.

It will be apparent that a shoe upper provided with cut-out sections at the heel and toe portions as shown in Figs. 5 and 9 will have a plurality of edge portions to be stitched during the sewing operation. When an upper member is employed which utilizes a closed heel and toe structure, the upper will have but a single edge portion to be secured to the inner sole and to the welt strip. The term "upper member" appearing in the claim is intended to cover upper members having open toe and heel structure and also upper members having closed toe and heel structure thus presenting but a single edge to be secured to the inner sole and welt strip throughout the circumference of the shoe.

During the sewing operation the shoe parts are inverted with the bottom side of the insole uppermost. Consequently, it will be noted that the operator can see only the edge of the welt strip with which the edge of the other shoe parts are aligned during the insertion of the line of stitches. The welt strip feeding through slot 90 from beneath the work support plate 50 into welt groove 82 is positioned by abutments 84 and 86 which form the sides thereof. During insertion of the line of stitches in the sewing area which progressively moves about the contour of the shoe, the marginal edges of the upper member 10 and insole 26 in the area to be sewn are maintained in a superposed relation to the welt strip with the edges thereof in alignment. Since the line of stitches passes about reverse curves, and also around the more abrupt curves of the heel and toe portions, it is necessary for the sewn portions leaving the sewing area beneath the plate 62 to move laterally either to the right or left, depending upon the specific portion of the shoe contour being sewn. By employing a shortened ridge 88, and providing a welt groove which progressively decreases in depth from the leading edge thereof rearwardly to the central portion of the needle aperture and then remains constant over the rearward portion thereof to the rearwardly positioned rounded edge, as described above, the welt strip after being sewn to the other shoe pieces will freely ride over the rearward portion of abutment 84 or pass over or around the end of ridge 88, thus facilitating the insertion of the line of stitching around the shoe parts. From the above discussion it will be evident that the welt slot and groove of the upper work plate 50 shown in Fig. 8 is designed to guide the welt strip from a supply roll beneath the sewing machine to the proper location within the sewing area, but does not serve to confine the welt strip, and the shoe parts united therewith, after the stitching operation. In view of the guiding, supporting but not confining action applied to the welt strip, an operator can readily follow the course of the superposed shoe parts and insert a line of stitching a spaced distance from the edges thereof through the marginal edges of the separate and unattached pieces.

After the welt strip, upper member and insole are sewed together, the shoe is lasted by inserting a last 44 into the interior of the assembled pieces. During the insertion of the last sufficient force is applied to engage the bottom of the last with the interior surface of the inner sole and to seat the marginal edge surrounding the bottom of the last with the interior portion of the upper member adjacent to the sewn margin of said upper which relieves the sewn edges to cause the outer edges of the assembled members to tend to assume an inturnd position. The outer edge of the welt strip is pulled up to form a wall or recessed portion 49 across the bottom of the shoe by the inturnd position of the sewn portions of the edge of the sewn members. A heel seat 47 is positioned in the heel portion of the recess and a filler 48 is then also inserted therein having a thickness substantially equal to the greatest depth of the recessed portion 49. The filler may be preformed, as indicated in Fig. 9, and comprise a resilient material, such as compounded and cemented cork granules or other resilient and flexible material. Alternatively, the filler may be cast in the recessed portion 49 and spreading therein as a compacted mixture of paste-like materials conventionally used for the purpose.

After the filler 48 has been inserted, a shank member 53 is placed along the shank of the shoe, as indicated in Fig. 9. An outsole member 55 is then applied to the shoe bottom and secured to the unfinished side of the welt 12 by a line of stitching 57 inserted around the edge of the welt a spaced distance from the edge thereof. The shoe heel is then applied, the parts trimmed, and the shoe finished in any suitable manner known to the art.

We claim:

A method of forming welt shoes comprising the steps of providing a separate and unattached substantially flat insole member, providing a separate and unattached upper member, superposing in continuous relation said separate insole and said separate upper upon the end portion of a welt strip in a sewing area with the corresponding portions of the edges of the said members in said sewing area in substantial alignment and with the finished side of the insole facing the inside of said upper, simultaneously inserting through said members a line of stitches in said sewing area about the margin of said insole, continuing the insertion of said line of stitches through said sewing area, progressively bringing together and guiding additional portions of said welt strip, insole and upper into said sewing area during the insertion of said line of stitches while progressively aligning within said area the edges of said parts to be sewn, said stitches being positioned spaced distance from the edges of said superposed members and extending entirely around the marginal edge of said insole, inserting a last within the interior of the sewn shoe parts to cause the upper to conform to the last and to cause the outer edges of the sewn members to tend to assume an inturnd position, pulling up the outer edge of said welt strip to inturn the sewn marginal edges of the welt, insole and upper, inserting a filler between the said inturnd edges in contact with the insole member, positioning a shank element on said filler which extends centrally from the heel portion along the shank of the shoe, applying an outsole member and securing said outsole member to the welt strip.

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