April 16, 1946. K. A. STRITTER 2,398,475

SHOE SEWING MACHINE

Original Filed Jan. 8, 1943

Fig. 1

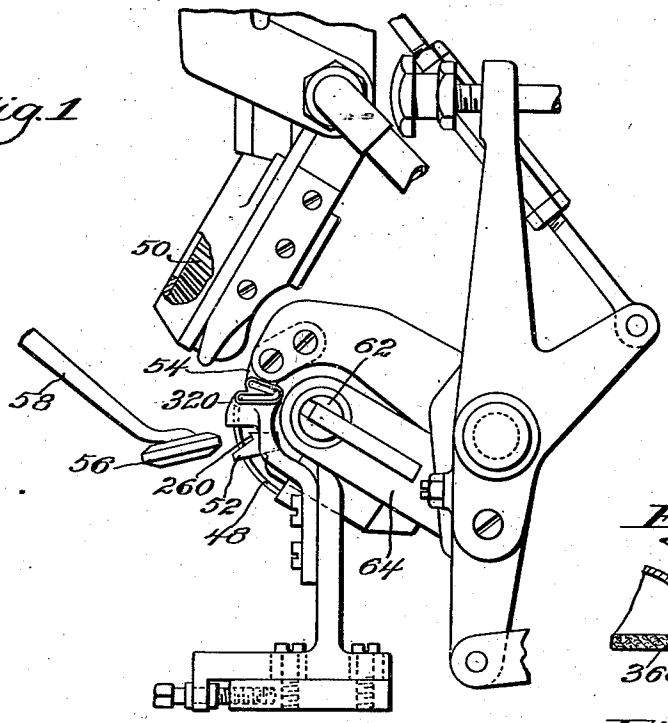


Fig. 5

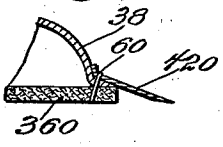


Fig. 2

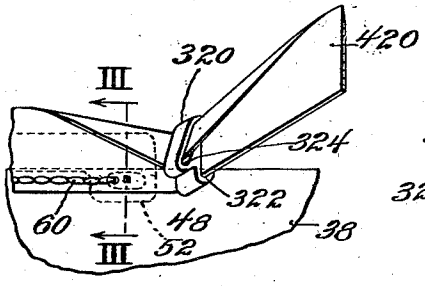


Fig. 4



Fig. 6

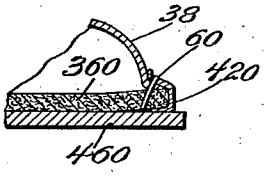


Fig. 7

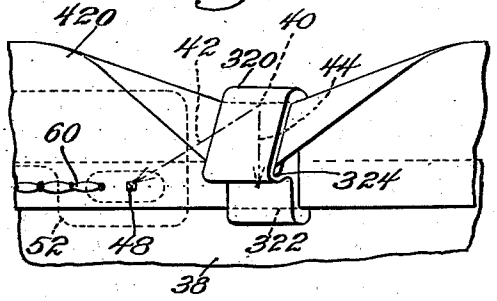
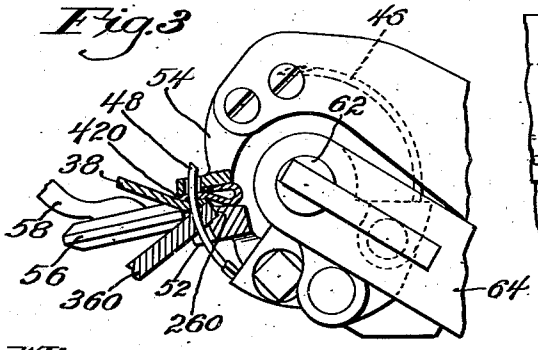


Fig. 3



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Patented Apr. 16, 1946 2,398,475

UNITED STATES PATENT OFFICE

2,398,475

SHOE SEWING MACHINE

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Original application January 8, 1943, Serial No. 471,644. Divided and this application July 10, 1944, Serial No. 544,158

6 Claims. (Cl. 112—52)

This invention relates primarily to improvements in binding strip guides for curved hook needle sewing machines of the type disclosed in United States Letters Patent No. 2,221,320, granted November 12, 1940, upon an application of Fred Ashworth, particularly when arranged for uniting the upper, sole and a sole binding strip for a platform type shoe but, in certain of its aspects, the invention is applicable to advantage in sewing machines other than those having curved hook needles, and to strip guides of more general usage. In its illustrated form, the invention is disclosed as embodied in a machine similar to that of inventor's copending application Serial No. 471,644, filed January 8, 1943 (now United States Letters Patent No. 2,359,803, granted October 10, 1944), from which the present application has been divided.

Heretofore, it has been the practice to attach a sole binding strip for a platform type shoe in a straight needle sewing machine which has ample space for the location of a binding strip guide in advance of its sewing point, the platform sole being presented to the machine in flattened condition before being connected to the shoe upper. If the upper is connected to the sole of a shoe, however, before being presented to a sewing machine, thus giving shape to the shoe with a curvature along the shank of the sole, it is difficult to insert a satisfactory seam in a straight needle machine since the use of a straight needle restricts the movements of the shoe in presenting it to the machine, and the stitches of the seam frequently are formed in an irregular manner, particularly where heavy parts of non-uniform qualities are being operated upon.

For operating upon the marginal portion of a connected shoe upper and sole, a curved needle sewing machine is more effective than a straight needle machine, greater space being available in front of the sewing point for moving the shoe to present it properly to the stitch forming devices. A curved needle machine, however, as usually constructed, is subject to restrictions in the use of accessory devices, such as welt and binding strip guides, on account of the crowded relation and construction of the operating parts together with the bearings and support members for the parts close to the sewing point at either side thereof. The close relation and construction of the bearings and supports, which contribute to the rigidity of the parts and the uniformity of stitch formation, accordingly limit the application of additional equipment. With a straight needle machine, there is adequate space for the provision of a welt or binding strip guide and, for this reason, a straight needle machine has been the most practical heretofore employed for this type of work but with indifferent success on shoes the soles of which have been already connected to the uppers.

Further difficulties in the location of a strip guide on a curved needle machine are presented when an attempt is made to sew a shoe off the last with a supporting horn entering the ankle opening of the shoe. Due to further restrictions imposed by the horn on the movements of the shoe, the presence of a guide multiplies the difficulties met in curved needle machine construction.

A binding strip ordinarily employed for covering the edge of a sole is relatively wide as compared to a regular welt. When used to cover a loosely compressed fiber sole in a platform type of shoe, such a binding strip necessarily must also have extreme pliability in a widthwise direction as well as lengthwise to conform closely with the curvatures of the readily compressible sole edge in order to avoid distorting the edge, the sole already being bent upwardly along the shank of the shoe away from a plane passing through its tread surface to give the shoe its shape.

By reason of its pliability, it is impractical to guide a binding strip in the manner employed with an ordinary welt, by engaging both edges of the strip and confining it closely within an opening of an unyielding guide in advance of the sewing point. Also, in a curved needle machine having a shoe entering horn, on account of the relatively great width of a binding strip, there is no readily available space for a guide acting on the edge of the strip close to or at the sewing point.

If an attempt is made to guide a binding strip to the sewing point by confining both edges, there is a tendency for one edge of the strip to become compressed excessively or crumpled so as to permit the other edge to be drawn away from the adjacent confining surface in the guide. As a result, the strip will be sewed in crumpled relation to the shoe or will escape the seam entirely.

One object of the present invention is to adapt machines of the type referred to for use in sewing an inseam to secure together the upper, sole and a binding strip in the manufacture of a platform type shoe in which the binding strip may be directed accurately with one edge intersected by the stitches inserted without the necessity of confining both edges of the strip within the guide or of extending the guide to a position close to or at the sewing point.

Another object is to improve generally the construction and mode of operation of machines for sewing a binding or other strip to shoes not supported by a last.

In the illustrated embodiment of the invention, a curved hook needle sewing machine is employed having a work support, a shoe entering horn, an upper and sole presser on the horn, a back gage, and a binding strip guide so arranged that it will draw one edge of a strip led therethrough continuously toward the line of the seam in advance of the sewing point so as to enable the strip to be guided by one only of the edge confining surfaces within the guide. Such an arrangement avoids uncertain results obtained in attempting to confine both edges of the strip within the guide and insures a light, uniform guiding action on one edge of the strip with little or no tendency to crumple or compress the edge of the strip excessively. The stitch forming devices, acting only along the guided edge to feed the strip, increase the drawing effect of the guide on the strip and tend to move the strip in a widthwise direction more firmly against the edge confining surface of the guide. This feature of the invention is particularly adapted for use with a curved needle sewing machine but is advantageous also with other types of sewing machines including those employing a straight needle.

In the illustrated form of this feature, the means in the guide for drawing the strip comprises an off-center doubled-over portion of the guide which acts to exert a light, frictional drag on the strip commensurate with the rigidity of the strip, so that a suitable tension is imparted automatically to the material of the strip concentrated along a line extending in a direction oblique to the length of the strip between the bent portion of the guide and the sewing point as the work is being fed. In order to insure that one edge only of the strip will be engaged by the stitch forming devices of the illustrated machine, one arm of the doubled-over guide is made of suitable length to cause the portion of the strip being sewed to project beyond the remaining doubled-over portion in the guide, the remaining portion thereby being carried clear of the seam line. The guide of the illustrated machine also is arranged to direct the doubled-over portion of the strip through the space between the path of the needle and the center about which the carrier for the needle oscillates. By so doing, one edge of the strip may be led into overlapping relation to the edge of the upper on the shoe rather than into register with the edge of the upper, to provide a seam which is ornamental and visible after the strip is wrapped around the sole. Another advantage in employing a doubled-over portion on the guide is to deliver the strip in as compact condition as possible to the sewing point, thus occupying a minimum amount of space at a location where the operating and supporting parts of the machine are disposed in crowded relationship.

The invention will now be described with reference to the accompanying drawing, in which

Fig. 1 is a view in side elevation of a portion of a sewing machine in which the present invention is embodied;

Fig. 2 is a plan view of the binding strip guide and work support of the machine illustrated in Fig. 1;

Fig. 3 is a view in right side elevation and in section, as viewed along the line III—III in Fig. 2, of parts of the machine about the sewing point, taken during sewing operations;

Fig. 4 is a detail sectional view on an enlarged scale of the binding strip guide;

Fig. 5 is a fragmentary sectional view of a shoe upper, platform sole and binding strip assembly, the parts of which have been stitched together by the use of the machine embodying the invention;

Fig. 6 is a fragmentary sectional view showing a completed platform shoe embodying the assembly of parts illustrated in Fig. 5; and

Fig. 7 is a diagrammatic view on a still further enlarged scale, illustrating the drawing action of the guide on the binding strip while being fed through the machine.

The machine illustrated in the drawing is intended to operate in securing to a temporarily connected upper and a platform sole, a wrapping or edge binding strip for the construction of a platform shoe, such as is illustrated in Fig. 5, with the parts being operated upon unsupported by a last. In the shoe therein illustrated, the upper is indicated at **38**, the platform sole at **360**, and the binding strip at **420**. The platform sole **360** is composed of loosely compressed felt, or other similar material of well-known nature, and it is the practice, when such soles are used, to cover the edges and the exposed surfaces of the platform sole with such a binding strip, the binding strip being wrapped over the edge of the sole and secured by means of cement to the lower marginal portion of the sole as in Fig. 6. To complete the shoe, an outsole **460** is attached to the bottom of the shoe.

In order to operate most satisfactorily upon the edge of a sole having substantial thickness and irregular quality, such as a platform sole in a shoe, while being permanently connected to the upper of the shoe, it is usual to employ a curved hook needle sewing machine, inasmuch as the greatest clearances are provided in this type of machine directly in front of the sewing point for manipulation, tipping and turning movements of the shoe being operated upon. To support the parts at the sewing point where no last is utilized, it is preferable to employ a horn entering the ankle opening of the shoe and engaging the inner surfaces of the upper and sole adjacent the sewing point. Inasmuch as the binding strip **420** is substantially wider than a welt strip ordinarily employed in the manufacture of shoes, and may be of variable width, the use of a welt guide of ordinary construction may interfere with the proper presentation of the shoe to the machine while sewing and may obscure the operator's line of vision. Furthermore, the binding strip is relatively thin and unsuitable for the formation of a seam guiding groove along one edge as in an ordinary shoe welt. The pliability of the binding strip thus prevents handling the strip in the machine in the usual way by confining both edges of the strip to prevent its widthwise movement while being led to the sewing point. If an attempt is made to confine both edges of the strip in guiding it to the sewing point, there is a tendency for one or the other edge to become compressed excessively or crumpled so as to be sewn in crumpled or wrinkled relation to the shoe, or the strip may escape the seam entirely.

To enable a relatively thin, pliable and ungrooved wrapping or edge binding strip, such as that indicated at **420**, to be attached to the outer marginal surface of the upper **38** for an outer marginal edge surface covering of the platform

sole 360 with a single seam permanently connecting all of the parts, according to an embodiment of the present invention, the binding strip is led through a doubled-over strip guide 320, illustrated in Fig. 1, comprising a tube on the machine frame, folded over along its length to provide a U formation in cross section with the arms of the U of different lengths (see Fig. 4). Such a folded formation of the binding strip guiding tube adapts the tube to guide the strip in corresponding doubled-over condition against itself into position for attachment to the shoe and causes the guide to exert a widthwise drawing action on the strip automatically commensurate with the rigidity of the strip. With a relatively flexible strip being led through the guide, there will be a light frictional force applied to the strip in proportion to that required to bend the strip into the U shape of the guide. With a comparatively rigid strip, a much greater frictional force will be applied to the strip as the result of its being formed into a U shape.

The widthwise drawing action on the strip causes the strip to be brought with certainty toward the seam line to a uniform position against the lower longitudinal edge confining surface 322 of the guide with a force more or less proportional with the pressure exerted on the doubled-over portion of the guide by the strip in attempting to flatten out. In so doing, the upper doubled-over portion of the strip is drawn away slightly from the upper longitudinal edge confining surface 324 of the guide.

The action of the binding strip guide 320 to draw the strip in a widthwise direction is illustrated more or less diagrammatically in Fig. 7 with the guide located in advance of the sewing point and the center of frictional pressure indicated at 40 along the fold in the guide. With the center of frictional pressure at 40 during feeding movement of the work in the machine, tension will be imparted to the strip which is concentrated along an oblique line 42 between the fold in the guide and the sewing point as the work is fed. A component of this tension, acting widthwise of the strip, is indicated at 44 which maintains the edge of the strip which is led into the seam accurately and uniformly against the lower longitudinal edge confining surface 322 of the guide, thus insuring reliable control of the edge of the strip being operated upon regardless of flexibility or slight irregularities in width of the strip.

The stitch forming and work clamping devices of the illustrated machine comprise a curved hook needle 46, a curved work penetrating and feeding awl 48, a rotary shuttle 50, a work support 52, a presser foot 54, and a disk-shaped presser 56 rotatably mounted at the lower end of a rotatable work supporting horn 58, the presser acting upon the inner surfaces of the upper and sole and together with the work support and presser foot to confine and clamp the work in sewing position. The stitch forming devices are arranged to insert a lockstitch seam, illustrated at 60, the awl penetrating the work in advance of the point of needle operation and feeding the work into line with the needle during formation of each stitch. The machine is extremely rigidly constructed with a bearing stud 62 about which the curved needle and awl oscillate, supported in heavy, forwardly projecting frame members 64 extending parallel to each other at either side of the sewing point. The presence of the bearing stud and the frame members 64 results in a relatively crowded relationship of the parts around the sewing point and renders it difficult to locate the guide in addition to the presser 56. The doubled-over formation of the guide enables the upper doubled-over portion of the strip led through the guide to enter the space between the paths of the needle and awl and the axis of the stud 62 about which the carriers for the needle and awl oscillate without interfering otherwise in the operation of the machine. The operation of the machine is substantially the same as that of the Ashworth patent above identified.

Since the binding strip is led through the guide in doubled-over relation, its outer edge is carried beneath the presser foot in this same relation, the presser foot engaging the outer marginal surface and holding the doubled-over portion of the strip against tendency to unfold, as illustrated in Fig. 3, until after the sewing point is passed. The upper doubled-over portion of the strip, however, is not as wide as the lower portion which is led into the seam so that, when the upper portion is carried clear of the needle path beneath the presser foot, it will be left unattached and free to unfold or straighten out after leaving the sewing point. After leaving the sewing point, the strip will appear substantially as indicated in Fig. 5. The unattached edge portion of the strip is then wrapped around the platform sole 360 and the shoe is completed by cementing the outsole 460 to the lower surface of the shoe.

To facilitate the presentation of the upper and platform sole assembly to the machine during the attachment of the strip, it is desirable to provide the work support 52 with an integral block back gage or shoulder 260. The back gage shoulder is of a vertical width to engage substantially the full thickness along the edge of the platform sole so that sufficient area of engagement with the sole may be presented and distortion of the sole edge prevented by the holding pressure of the presser 56.

Having thus described the invention, what is claimed is:

1. A sewing machine for uniting the edge portions of an upper, a platform sole, and a relatively thin ungrooved binding strip of a width and pliability to enable easy wrapping about the edge of the sole, having stitch forming devices including a needle, a work support, a shoe entering horn, a presser on the horn acting on the inner surfaces of the upper and sole, and a back gage, in combination with a guide including frictional tension means for drawing one edge of the wrapping strip in a widthwise direction toward the line of the seam in advance of the sewing point, to insure insertion of stitches with certainty at a uniform distance from the edge of the binding strip.

2. A sewing machine for uniting the edge portions of an upper, a platform sole, and a relatively thin ungrooved binding strip of a width and pliability to enable easy wrapping about the edge of the sole, having stitch forming devices including a curved hook needle, a work support, a shoe entering horn, a presser on the horn acting on the inner surfaces of the upper and sole, and a back gage, in combination with a guide having a doubled-over portion of less width than the main portion of the guide, mounted on the machine to cause the binding strip to be doubled and to enter the space between the needle path and the axis about which the needle oscillates.

3. A sewing machine for uniting the edge por-

tions of an upper, a platform sole, and a relatively thin ungrooved binding strip of a width and pliability to enable easy wrapping about the edge of the sole, having stitch forming devices including a work support, a presser foot and a back gage, in combination with a binding strip guide and means in the guide for drawing one edge of the strip in a widthwise direction with a force commensurate with the rigidity of the strip against an edge confining surface in the guide to insure accurate location of the stitches along the edge of the binding strip.

4. A sewing machine for uniting the edge portions of an upper, a platform sole, and a relatively thin ungrooved binding strip of a width and pliability to enable easy wrapping about the edge of the sole, having stitch forming devices including a work support, a presser foot and a back gage, in combination with a binding strip guide and means in the guide for drawing one edge of the strip in a widthwise direction with a force commensurate with the rigidity of the strip against an edge confining surface in the guide to insure accurate location of the stitches along the edge of the binding strip comprising an off-center doubled-over portion of the guide.

5. A sewing machine for uniting the edge portions of an upper, a platform sole, and a relatively thin ungrooved binding strip of a width and pliability to enable easy wrapping about the edge of the sole, having stitch forming devices including a needle, a work support, a presser foot and a back gage, in combination with a binding strip guide and means in the guide for drawing one edge of the strip with a force commensurate with the rigidity of the strip against an edge confining surface in the guide to insure accurate location of the stitches along the edge of the binding strip comprising an off-center doubled-over portion of the guide located to cause the binding strip to be doubled with the doubled-over edge of the strip lead clear of the needle path.

6. In a sewing machine for uniting the edge portions of an upper and a platform sole and securing a wrapping strip to the outer marginal surface of the upper, in combination, a work support for engagement with the outer marginal surface of a sole, a presser foot for engagement with the outer surface of a wrapping strip, stitch forming and work feeding devices including a needle movable through the portion of the work between said work support and said presser foot, a back gage for guiding the work by engagement with the edge of the sole, a presser arranged to act upon the inner surfaces of the upper and the sole to hold the edge of the sole against the back gage, and a guide constructed and arranged to lead the wrapping strip into position for the attachment of one marginal portion thereof to the upper and the sole, said guide being shaped in cross-section to confine the wrapping strip and being longitudinally folded upon itself with its lower longitudinal edge portion only projecting into position to lead the strip into the path of the needle.

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