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2,901,993

MACHINES FOR MAKING SHOES

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2 Sheets-Sheet 1

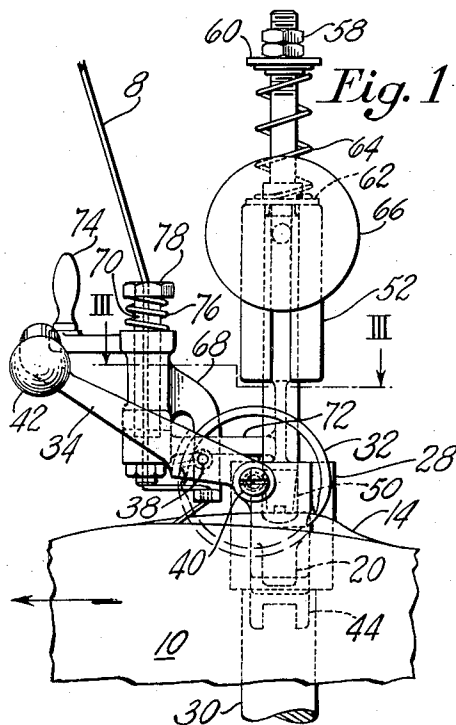


Fig. 1

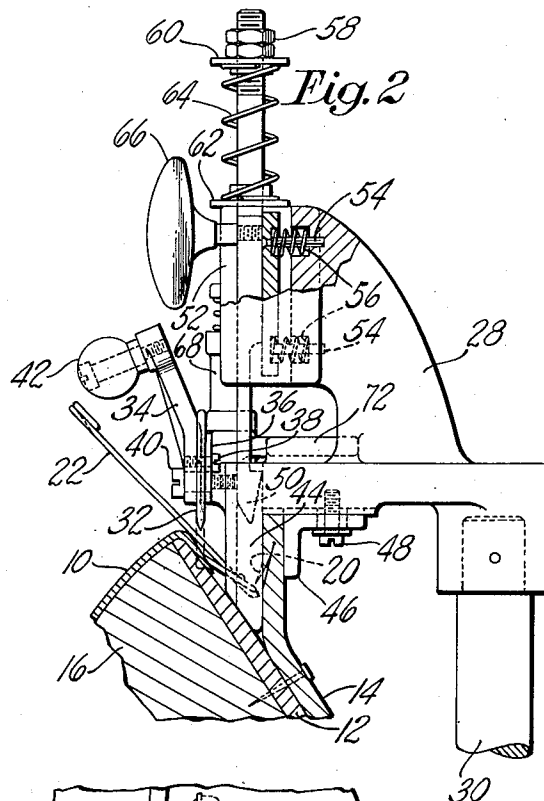
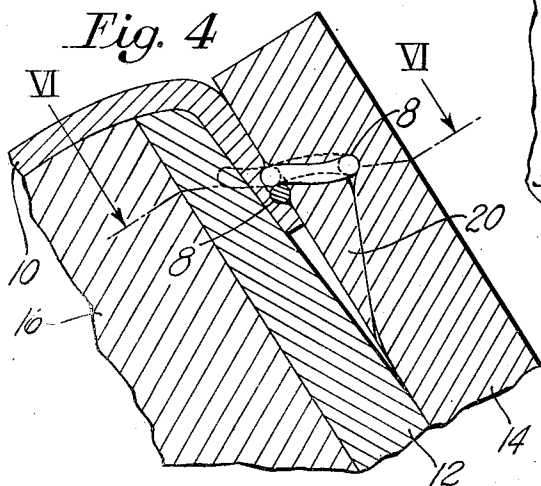
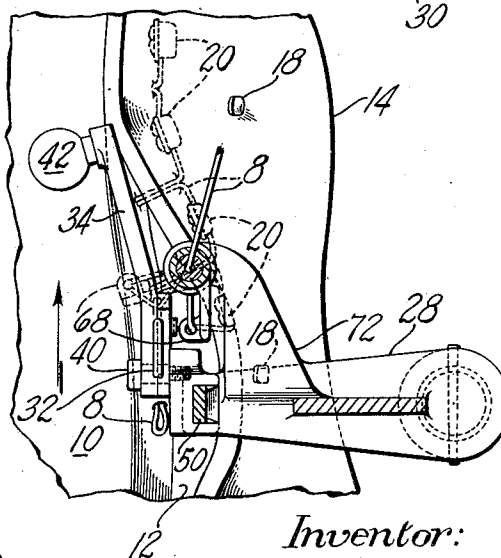


Fig. 2



Fig. 5

Fig. 3



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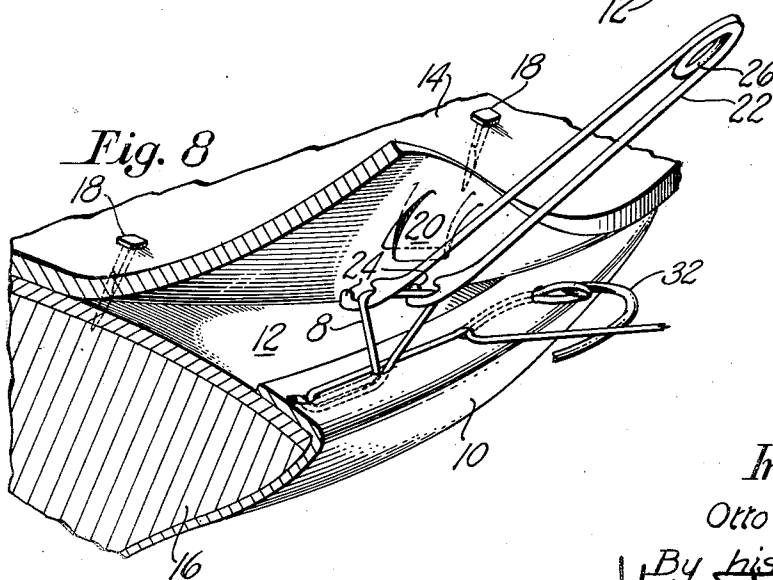
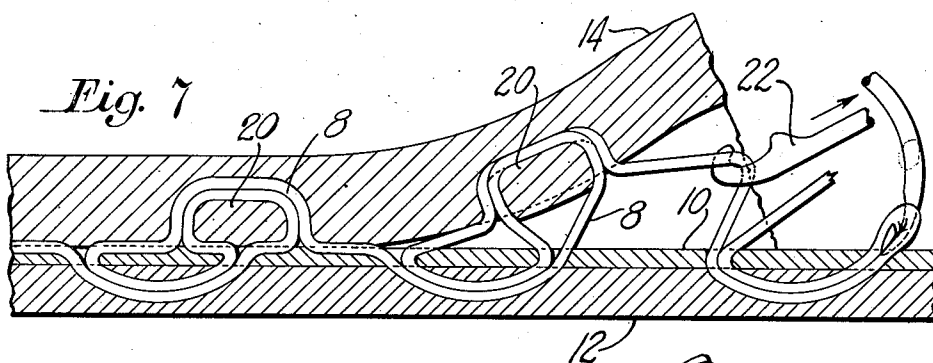
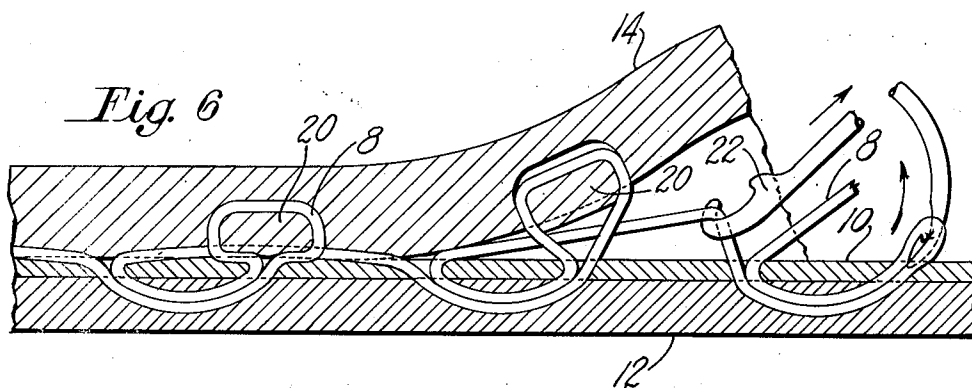
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2 Sheets-Sheet 2



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MACHINES FOR MAKING SHOES

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3 Claims. (Cl. 112—33)

The present invention relates to machines for use in the manufacture of shoes, in which improved thread seams may be inserted with a commercially acceptable facility.

Numerous types of seams and machines for inserting them have been devised heretofore, for the purpose of connecting the bottom parts of shoes with their uppers, and in most cases it has been found desirable to conceal the threads in the seams inserted, either to improve the appearance of the shoes or to protect the threads in the seams from the deteriorating action of moisture, wear or other destructive factors. It is, accordingly, an object of the invention to provide a novel form of machine for inserting an improved thread seam, which machine is particularly well adapted for sewing together a shoe upper and a sole superposed on the upper with a single thread. To do this the thread is carried double through the opposed surfaces of one part of the shoe, emerges from the same surface of that part, and is passed around an integral tongue in the other part to form a concealed stitch.

The machine of the invention includes a curved needle which enters the flat-lasted margin of a shoe upper in order that it may emerge on the same side of the upper through which it enters, and a guide on the machine deflects the sole from the upper to enable the upper to be engaged by the needle to the exclusion of the sole. Preferably, the machine is equipped with a cutter for forming an elongated tongue in the deflected margin of the sole opposite the point of needle entry into the upper, each loop of thread being carried through the upper and spread conveniently about the tongue in the sole.

These and other features of the invention consist in novel and improved devices, combinations and arrangements of parts, the construction of which is claimed hereinafter and the advantages to be obtained from which will readily be understood from the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a view in front elevation of the head of a machine embodying the features of the present invention, together with a portion of a shoe being operated upon by the machine;

Fig. 2 is a view in right side elevation, partly broken away and shown in section, of the machine and shoe illustrated in Fig. 1;

Fig. 3 is a sectional plan view on an enlarged scale of the machine taken along the line III—III of Fig. 1;

Fig. 4 is a further enlarged sectional view of a portion of a shoe formed with an improved seam inserted by the machine;

Fig. 5 is a detail view on an enlarged scale of a tongue cutting knife shown in Fig. 2;

Fig. 6 is a sectional view on an enlarged scale of a seam illustrating the process of insertion and taken along the line VI—VI of Fig. 4;

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Fig. 7 is a sectional view similar to that illustrated in Fig. 6, showing a modified form of a seam capable of being inserted by the machine; and

Fig. 8 is a perspective view on a slightly reduced scale showing a portion of the shoe being operated upon by the machine of the invention, and illustrating the manner in which a loop of thread is engaged with a tongue cut from the sole of the shoe.

As illustrated in the drawings, a machine is provided to secure together the parts of a flat-lasted shoe, a single thread, indicated at 8, being formed into a series of loops passing through and emerging from one of the shoe parts and being engaged with integral tongues cut from the other part along an opposed surface thereof to provide a continuous seam. The seam is inserted in such a way that when the thread is tightened it will be concealed.

The shoe operated upon is constructed with an upper 10, an insole 12, and an outsole 14. After assembly the marginal portion of the upper 10 is tensioned successively along the shoe and is brought into conformity with a last 16 (Figs. 2 and 4). While tensioning the upper it is overlapped with and temporarily secured in flat-lasted relation to the marginal portion of the insole 12. The outsole is then attached along its central portion in superposed relation to the insole by one or more tacks 18 (see Fig. 8) driven into the tread surface of the last 16.

In order to provide a commercially acceptable seam with concealed stitches which may be inserted conveniently by machine, the seam is formed by carrying loops of thread through the overlapping margins of the upper and insole. To anchor the thread loops they are passed around elongated integral tongues 20 cut from the outsole 14. The tongues 20 are cut in such manner that they anchor the thread loops securely, the thread intersecting both the opposed surfaces of the insole and outsole while passing through the marginal portion of the upper. To insure effective attachment, the tongues are formed in the outsole directly opposite to the point in the upper from which each thread loop is withdrawn. To assist in the operation of the machine the marginal portions of the outsole are deflected from the upper opposite the sewing point so that the thread may be manipulated properly.

Two forms of seam are illustrated in Figs. 6 and 7 of the drawings. In the first form (Fig. 6) the thread 8 is carried double through the upper and insole to provide single loops passing around the tongues 20 of the outsole 14. The stitches are inserted and tightened progressively by engaging the thread within the space between the deflected marginal portions of the outsole and the insole. To assist in formation of the stitches a novel loop spreader and tongue inserter 22 is provided in hairpin form, the ends being enlarged and notched at 24 and the central portion provided with a circular spring 26 tending to separate the ends. The notched ends are arranged when pressed together to enter a loop of thread as illustrated in Fig. 8 and to hold it in spread position for convenient insertion of the corresponding tongue 20 of the outsole. After insertion of a tongue 20 the loop of thread in the next succeeding thread loop is carried through the upper and insole, as shown in Figs. 6 to 8, inclusive. It is then possible to reach into the space between the diverging outsole and upper with one of the notched ends of the inserter 22, as illustrated in Figs. 6 and 7, to tighten the stitch provided by the previous loop and inserted tongue. Thereafter, the newly formed thread loop is withdrawn and spread in the same manner to such an extent that the next succeeding tongue may be inserted therein.

In the form of stitch illustrated in Fig. 7, instead of inserting a tongue 20 into each single loop, two loops of

thread 8 are spread for the insertion of each tongue. Not only is the loop of thread 8, which is withdrawn from the upper brought into surrounding relation to a tongue, but also a secondary loop connecting successive stitches is held on the inserter 22 in parallel relation to the one previously indicated as being carried through the work, both loops of thread passing around a single tongue 20 in the outsole. In this way a more secure fastening is obtained with a single thread, although the difficulty of tightening each stitch may be increased somewhat. However, with certain types of work the benefit of the secure stitch more than offsets the difficulty in tightening it with two parallel loops instead of a single one in each stitch. In any event, considering the compressibility of most leather materials and the many forms of equivalent elastic synthetic material, the seam is susceptible for permanent attachment of such parts in the manner outlined under a wide range of conditions. When the stitches are tightened the opposed surfaces of the parts are brought tightly together, the threads when tensioned being embedded therein, as illustrated in Fig. 4.

The machine for uniting the outsole to a flat-lasted shoe upper and insole by the improved seam in the manner above set forth is illustrated more particularly in Figs. 1 to 3, inclusive. The machine is constructed with a main frame 28 supported at the upper end of a rod 30 formed at its lower end with a pedestal or similar flared mounting (not shown). The main frame carries suitable elemental forms of stitch-forming devices, including an oscillating curved hook needle 32 arranged to penetrate the lasted marginal portions of the upper 10 and also the insole 12 and to emerge from the same sides of the upper and insole through which it enters.

To actuate the needle it is secured within a curved groove at one side of an arm 34 by a plate 36 (see Fig. 2), a clamp screw 38 passing loosely through the plate and into threaded engagement with the arm 34. The arm 34 is rotatable about a shoulder screw 40 threaded into the frame 28 in a horizontal position and the outer end of the arm carries a knob 42 for convenient manual operation, the needle being secured to the arm in concentric relation to the shoulder screw 40.

As has been stated, the outsole 14 opposite the point of sewing operation is deflected to provide free space for the needle, so that the needle may engage the upper to the exclusion of the outsole. To these ends, as shown in Fig. 2, a portion of the frame 28 is shown extending downwardly to form a hollow guide 44 arranged to engage the shoe opposite the point of needle operation as the shoe is presented to the needle. At its lower end the guide 44 is beveled to fit the angle of the insole 12 while the outsole is deflected by the guide into a vertical position. To prevent escape of the sole margin after being deflected by the guide 44, the tread surface of the outsole is engaged by an angle plate 46 adjustably secured to an under surface of the main frame 28 by a screw 48 passing through a slot in the angle plate and into threaded engagement with the frame. After each penetrating stroke of the needle the loop withdrawn is engaged by the tongue inserter 22 to complete the formation of the stitch.

To cut each tongue in alinement with the point at which the needle operates by withdrawal of a loop of thread, the outsole deflecting guide 44 has a vertical passage, in which is mounted a reciprocating knife 50, the lower end of the knife being formed with an upwardly and rearwardly inclined U-shaped blade. When the blade is raised and pressed rearwardly its U-shaped edge engages the outsole to cut a tongue 20 at the proper location.

The upper end of the knife is in the form of a rectangular bar slidably mounted in a spring pressed carrier 52. The carrier 52 is mounted for yielding horizontal movement on a pair of pins 54, each secured at one end to the

carrier and slidably mounted in openings in the main frame 28. The carrier and the frame are counterbored to receive compression springs 56 acting to force the carrier and the knife bar forwardly away from cutting position. When the blade of the knife is lowered and the carrier pressed rearwardly, it is then raised while engaging the outsole to form a tongue by movement along the surface of the sole engaged by the guide 44.

To retain the tongue cutting knife in raised inoperative position, the upper end of the cutter bar is turned to a cylindrical shape with threads to receive checknuts 58 acting against a washer 60 between which and a washer 62 resting on the frame 28 is a compression spring 64 surrounding the bar. To actuate the bar and carrier the bar has a horizontal threaded opening engaged by the threaded shank of a handle 66. When the handle is forced downwardly the spring 64 is compressed and when pressed rearwardly the carrier is moved correspondingly to engage the edge of the knife with the outsole of a shoe, the angle plate 46 providing a backing against which the cutting takes place.

Co-operating with the needle 32 after it emerges from an upper is a simple and effective form of looper 68 rotatably mounted on a hollow shaft 70 fixed to an arm 72 projecting to the left of the main frame 28. The looper 68 extends downwardly from a hub surrounding the shaft 70 and a short crank handle 74 extends from the hub of the looper. The thread 8 is guided through the hollow shaft 70 and through an eye at the lower end of the looper, the arrangement being such that when the looper is rotated while the needle is in full depth penetrating position, as shown by the broken lines of Fig. 1, the thread will be laid in the needle hook. To assist looping, the looper is frictionally retained in position by a compression spring 76 confined between a nut 78 on the shaft and the hub of the looper. After each stitch is inserted the shoe is carried in the direction of the arrow in Figs. 1 and 3 to bring it into position for the insertion of the next stitch.

Certain novel features herein disclosed form the subject matter of a divisional application for United States Letters Patent, Serial No. 770,803, filed October 30, 1958 relating to Seams, Shoes and Methods of Making Same, Incorporating Flat Lasted Work.

The nature and scope of the invention having been indicated, what is claimed is:

1. A shoe sewing machine for uniting an outsole mounted on a flat lasted shoe upper, said machine having a main frame, stitch-forming devices including a curved needle mounted in the frame to penetrate the lasted margin of the upper and to emerge from the same side of the upper through which it entered, and means for actuating the needle, in combination with a guide means on the frame for engaging the shoe as it is presented to the needle and beveled at its shoe-engaging end for deflecting the outsole from the upper opposite the point of needle penetration to insure engagement of the upper by the needle to the exclusion of the outsole.

2. A shoe sewing machine for uniting an outsole mounted on a flat lasted shoe upper, said machine having a main frame, stitch-forming devices including a curved needle mounted in the frame to penetrate the lasted margin of the upper and to emerge from the same side of the upper through which it entered, and means for actuating the needle, in combination with a guide means on the frame for engaging the shoe as it is presented to the needle and beveled at its shoe-engaging end for deflecting the outsole from the upper opposite the point of needle penetration to insure engagement of the upper by the needle to the exclusion of the outsole, and a cutter means mounted in the frame for movement along that surface of the outsole engaged by the guide means to form an elongated tongue in the deflected margin of the outsole opposite the point of needle operation on the upper.

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3. A shoe sewing machine for uniting an outsole mounted on a flat lasted shoe upper, said machine having a main frame, stitch-forming devices including a curved hook needle mounted in the frame to penetrate the lasted margin of the upper and to emerge from the same side of the upper through which it entered, a looper, and means for actuating the needle and looper, in combination with a guide means on the frame for engaging the shoe as it is presented to the needle and beveled at its shoe-engaging end for deflecting the outsole from the upper opposite the point of needle penetration to insure engagement of the upper by the needle to the exclusion of the outsole, and cutter means mounted in the frame for movement along that surface of the outsole engaged by the guide means to form an elongated tongue in the deflected mar-

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gin of the outsole opposite the point of needle operation on the upper, said needle looper being mounted for movement on the frame about the hook end of the needle after emerging from the upper.

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