March 31, 1964 W. F. MAVES 3,126,853

APPARATUS FOR AND METHOD OF APPLYING ORNAMENTAL STITCHING TO SHOES OR THE LIKE

Filed July 26, 1961 4 Sheets-Sheet 1

Fig. 1.

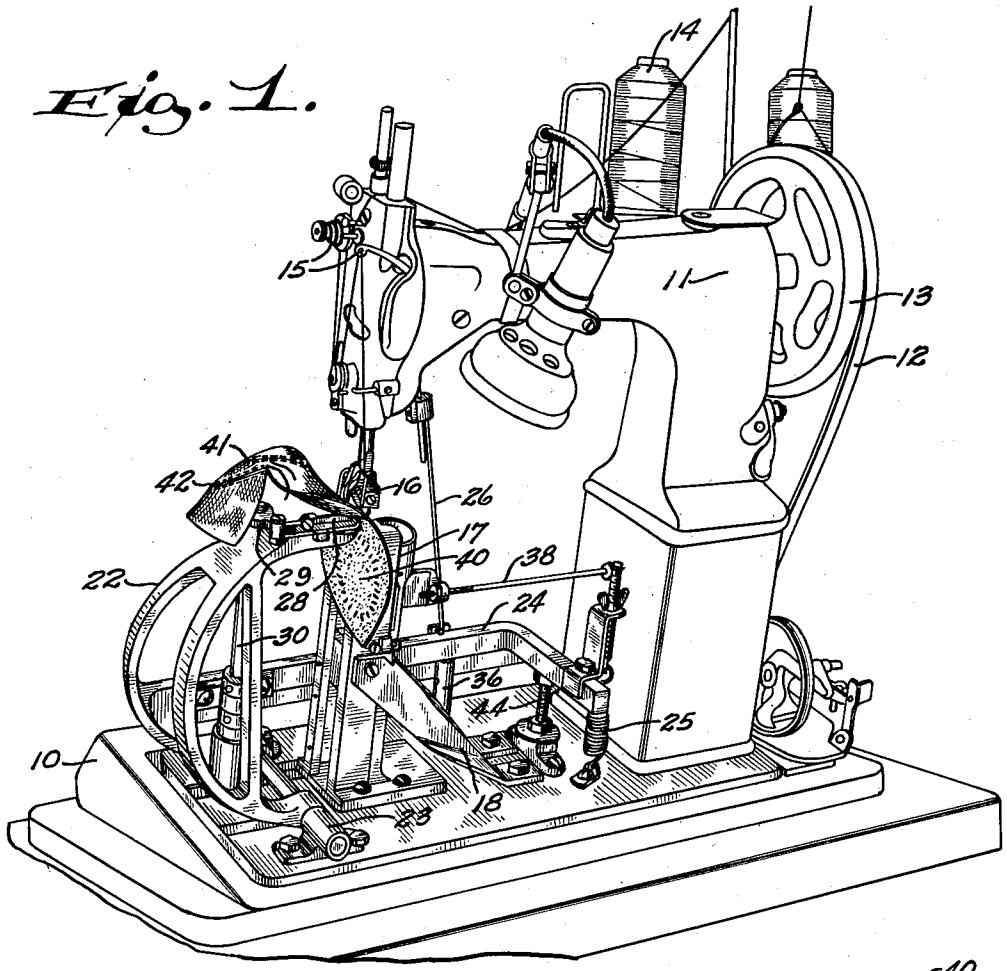



Fig. 4.

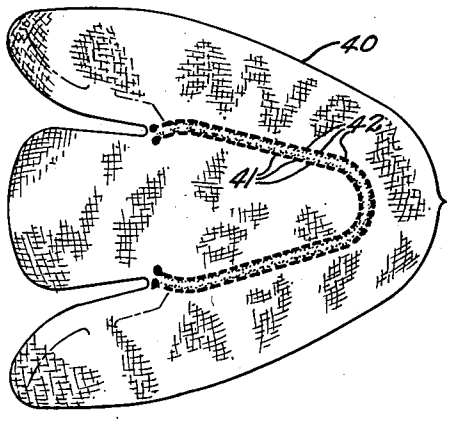



Fig. 5.

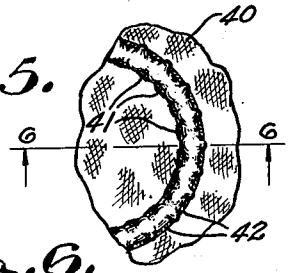
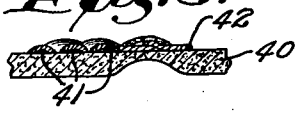



Fig. 6.




INVENTOR.
WALTER F. MAVES
BY Morsell & Morsell
ATTORNEYS.

March 31, 1964 W. F. MAVES 3,126,853

APPARATUS FOR AND METHOD OF APPLYING ORNAMENTAL STITCHING TO SHOES OR THE LIKE

Filed July 26, 1961 4 Sheets-Sheet 2

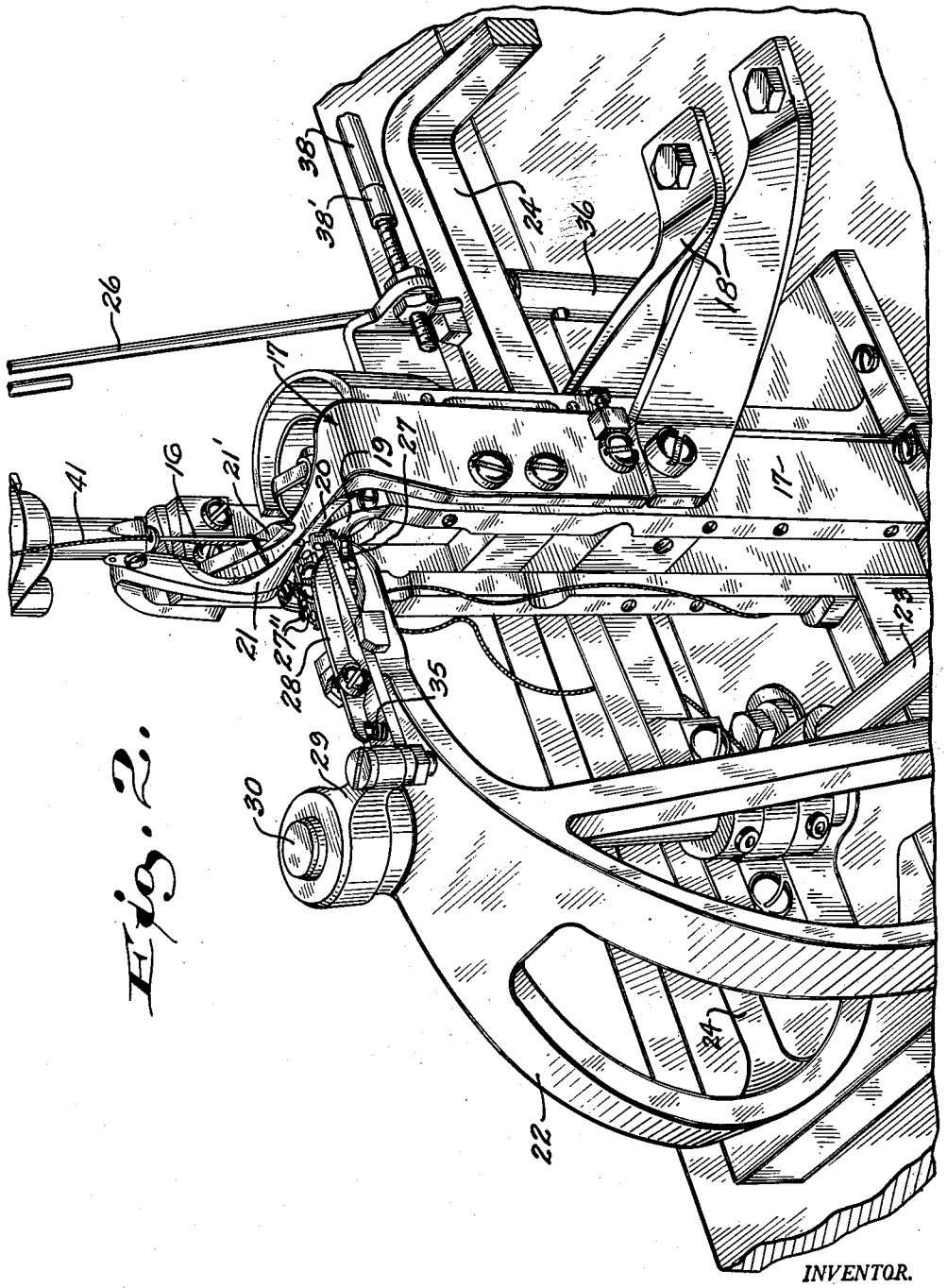



Fig. 2.

INVENTOR.
WALTER F. MAVES
BY Morsell & Morsell
ATTORNEYS.

March 31, 1964 W. F. MAVES 3,126,853

APPARATUS FOR AND METHOD OF APPLYING ORNAMENTAL STITCHING TO SHOES OR THE LIKE

Filed July 26, 1961 4 Sheets-Sheet 3

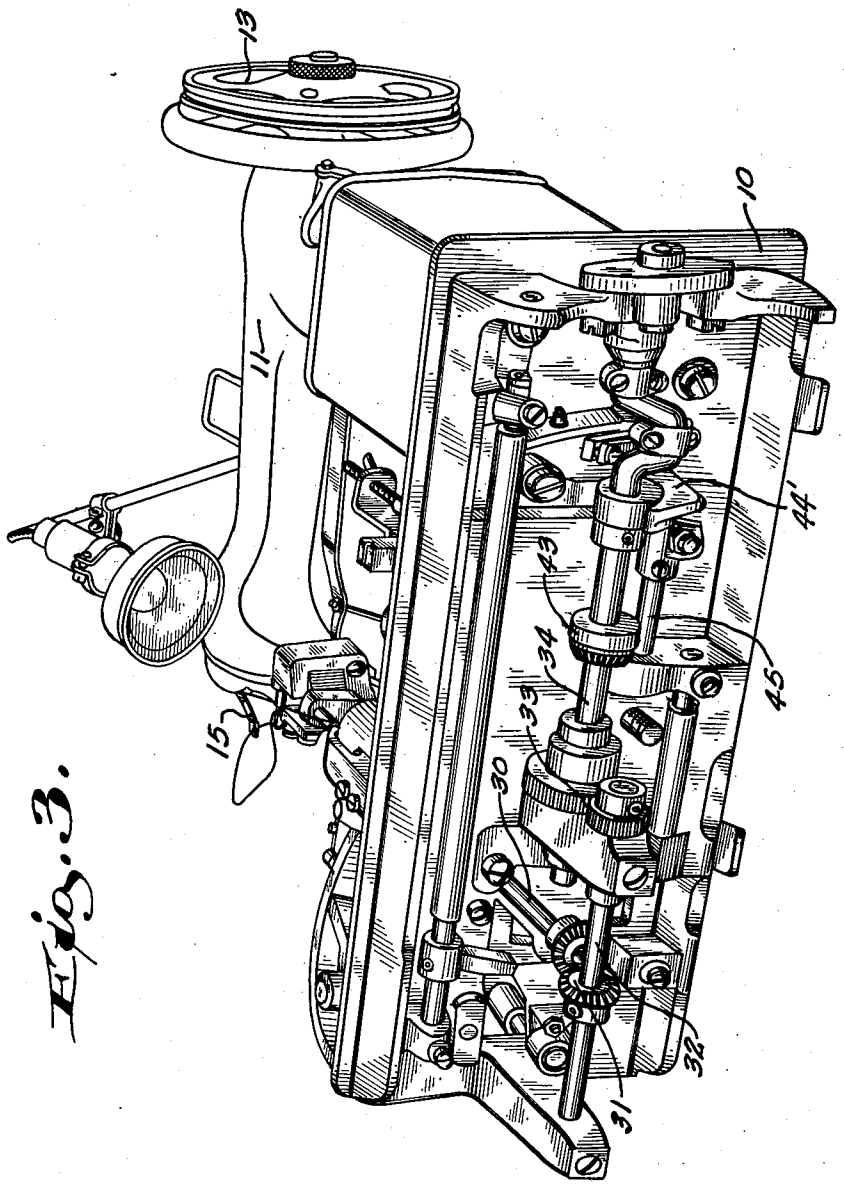



Fig. 3.

*INVENTOR.*
WALTER F. MAVES
BY Morsell & Morsell
ATTORNEYS.

March 31, 1964 W. F. MAVES 3,126,853

APPARATUS FOR AND METHOD OF APPLYING ORNAMENTAL STITCHING TO SHOES OR THE LIKE

Filed July 26, 1961 4 Sheets-Sheet 4

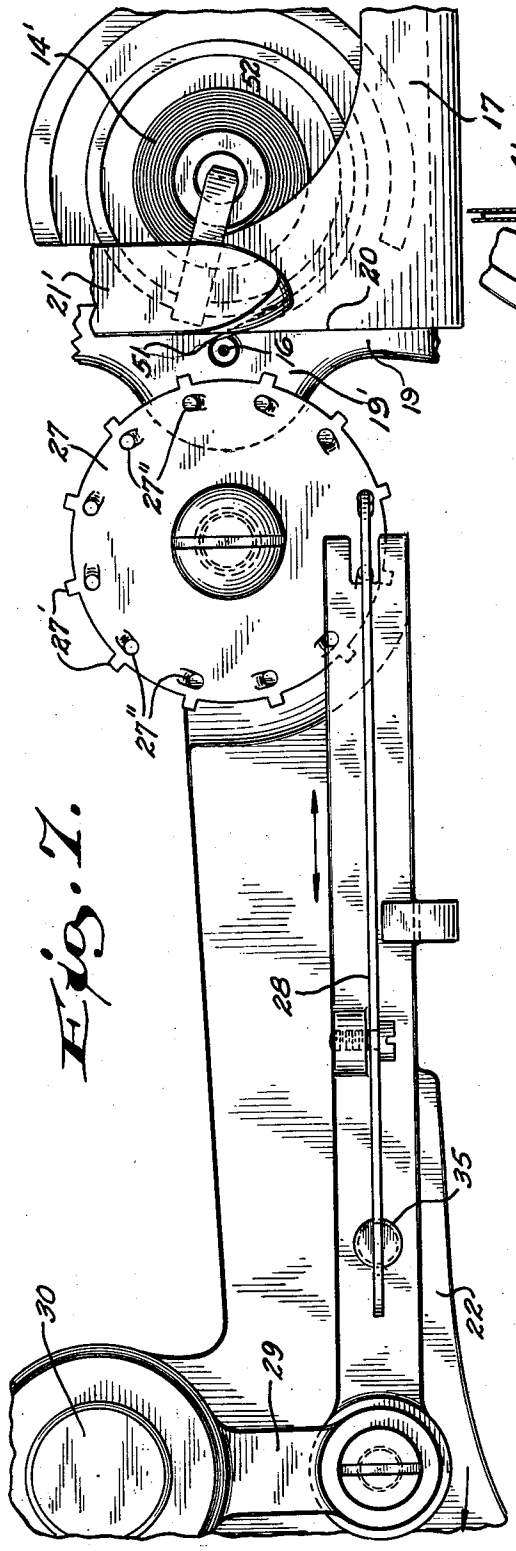


Fig. 7.

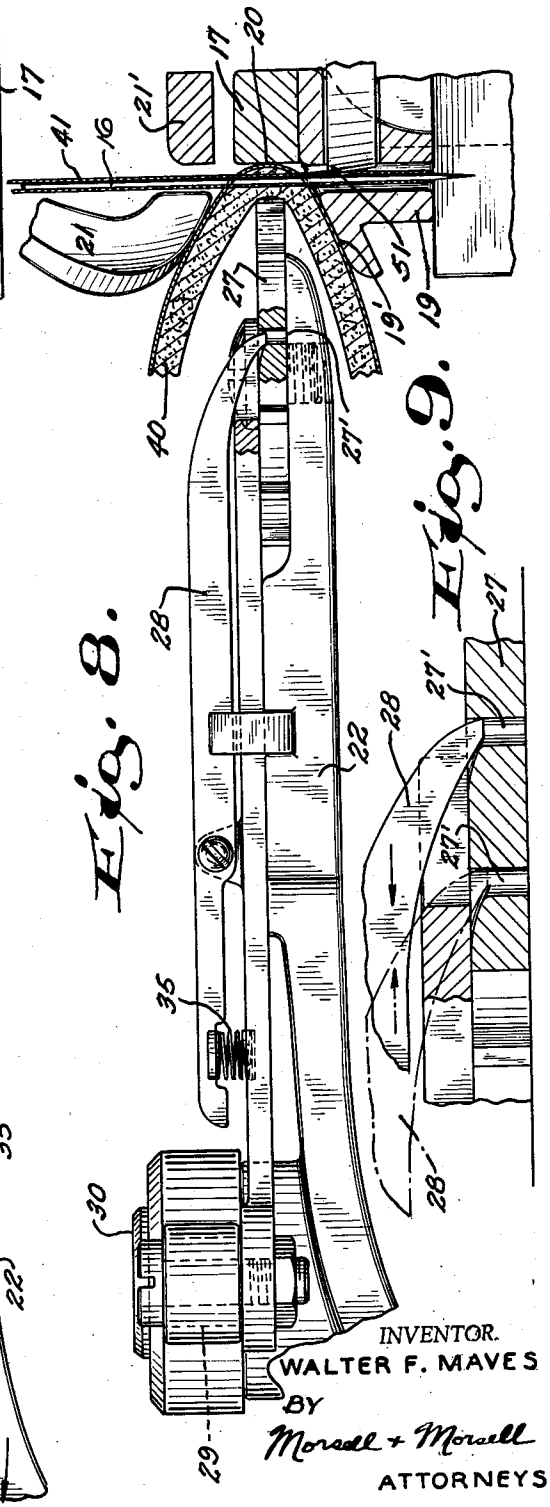


Fig. 8.



Fig. 9.

INVENTOR.
WALTER F. MAVES
BY
Morsell + Morsell
ATTORNEYS.

United States Patent Office 3,126,853 Patented Mar. 31, 1964



3,126,853

# APPARATUS FOR AND METHOD OF APPLYING ORNAMENTAL STITCHING TO SHOES OR THE LIKE

Walter F. Maves, Edgerton, Wis., assignor to Nunn-Bush Shoe Company, Milwaukee, Wis., a corporation of Wisconsin

Filed July 26, 1961, Ser. No. 126,967
7 Claims. (Cl. 112—421)

This invention relates to improvements in apparatus for the method of applying ornamental stitching to shoes or the like.

Heretofore, on men's shoes having that type of ornamental stitching on the upper wherein both the upper and lower threads are visible and provide a distinctive welt appearance, or so-called "surface" stitching, the stitching operation has always been done by hand on the last. This is a difficult and time-consuming job and requires the use of curved needles and considerable skill and experience. With this in mind, a general object of the present invention is to provide a unique apparatus and method whereby an unskilled worker can perform the job off of the last, the machine being adapted to perform the operation many times faster than the most skilled human worker can accomplish it by hand on a last.

A further object of the invention is to provide a unique method wherein the upper leather is bent on the intended stitch line and held in such a position that a straight needle can pass straight through near the apex of the fold and come out on the same side that it entered, i.e. the grain side.

A more specific object of the present invention is to provide a "surface" stitch sewing machine which is provided with novel, cooperaitng means for automatically positioning, bending at said novel angle, holding the workpiece at said angle, applying the stitching, and continuously advancing the workpiece under the needle, it being merely necessary for an unskilled operator to guide the work to insure that the stitching follows the intended pattern on the material.

A further object is to provide a specialized, "surface" stitching machine as described, which is adapted to be assembled on and integrated with a conventional sewing machine, thus simplifying the assembly and minimizing the cost of manufacture.

Still further objects of the present invention are to provide apparatus which is simple to operate, durable and long lasting, and well adapted for its intended purposes.

With the above and other objects in view, the invention consists of the improved apparatus for and method of applying ornamental stitching to shoes, and all of its parts, combinations, and steps as set forth in the following specification and claims, and all equivalents thereof.

In the accompanying drawings, illustrating the preferred form of the invention, wherein like reference numerals designate the same parts in all of the views:

FIG. 1 is a perspective view of the improved sewing machine with a workpiece in position thereon;

FIG. 2 is a partial perspective view of the machine showing the work holding and feeding mechanisms;

FIG. 3 is a perspecitve view of the underside of the base, showing the drive assemblage;

FIG. 4 is a top plan view of a portion of a shoe upper having ornamental "surface" stitching thereon;

FIG. 5 is an enlarged fragmentary top view of a shoe upper having "surface" stitching;

FIG. 6 is a transverse sectional view through the shoe upper illustrated in FIG. 5;

FIG. 7 is a fragmentary top view of the holding and stitching mechanism;



FIG. 8 is a view principally in side elevation of the mechanism of FIG. 7, parts being shown in vertical section, and the workpiece being in operating position and shown in section; and

FIG. 9 is a fragmentary view of the work advancing wheel in part section and showing two positions of pawl movement.

Referring now more particularly to the drawings, it will be seen that the specialized sewing machine comprising the present invention is generally similar in design and basic construction to conventional sewing machines, including a base **10**, head **11**, drive belt **12**, balance wheel **13**, upper and lower thread bobbins **14** (FIG. 1) and **14'** (FIG. 7), thread guides and tension members **15**, a depending, vertically movable needle **16**, and an upright, work-supporting post **17** positioned directly beneath said needle, said post being rigidly supported by braces **18**. As in all conventional machines of this type, the needle **16** is reciprocatably driven by a motor (located under the table and drivably connected to the machine through the belt **12**), and as said needle carries a loop of the upper thread **41** through the material, said loop is caught by the hook **51** of a lower wheel **52** which carries the lower thread **42** from the lower bobbin **14'** (see FIGS. 7 and 8) to be interlocked therewith, as is well known. As mentioned, the improved structure comprising the present invention, and hereinafter described, is adapted to be built onto and integrated with a conventional sewing machine and consequently those members of the machine which are well known, such as the assemblage operatively connecting said needle **16** to the drive mechanism and the other functional members within the head **11**, will not be described in detail herein. It is to be understood, further, that many of the components of the illustrated machine could be of slightly different design than those shown, and the improved structure hereinafter described is by no means limited to use in a basic machine of the exact design and construction shown in the drawings.

Heretofore, "surface" stitching, wherein the upper and lower threads are both visible on the top surface of the material and which provides a distinctive and attractive welt appearance (FIGS. 4, 5 and 6), has always been done by hand on the last. In order to obtain such a stitch on a machine it was a novel concept of the present invention to fold or bend the material at such an angle (considering the nature of the material) on the intended stitch line that it is possible to pass a straight needle, such as the upper needle of a machine, through the material just within the apex of the fold, the needle passing through the grain side of the leather but not through the flesh side thereof. For ordinary leather it is preferred that this angle be an acute angle (see **40**, FIG. 8), but for very thick materials it might be an obtuse angle. In any event it is usually substantially less than 180°. As will be hereinafter seen, the novel structure comprising the present invention is designed not only to automatically position the workpiece in said angular arrangement and position relative to the needle, but to continuously feed the material under the needle in the correct relative position, thus requiring only that the operator guide said workpiece so that the stitching follows the desired pattern thereon.

With particular reference now to the new structure as illustrated in FIGS. 2, 7, and 8 of the drawings, it will be seen that a narrow, horizontal plate, or work-supporting shelf **19**, having a downwardly inclined lip **19'** (see FIG. 9), is mounted near the upper end of the aforementioned work-supporting post **17**, and there being an inner vertical abutment shoulder **20** on said plate designed to function as a stop gauge for the fold edge of the workpiece during the sewing operation, as will be described.

Also rigidly mounted on said post 17, and projecting outwardly over said work table 19, is a forked member 21—21', between the arms of which the needle is adapted to pass, and having a hold-down arm 21 designed to function in cooperation with said angular work shelf 19' to maintain the leather workpiece bent at an acute angle and in the correct position relative to the needle. Said hold-down arm 21 has its lower surface curved upwardly so that an acute angle is provided between the undersurface of said arm 21 and the angled shelf portion 19'.

As illustrated in FIGS. 1 and 2, pivotally mounted on the outer end of the base 10 is a generally semi-circular arm assemblage 22, hereinafter referred to as the "horn," which extends upwardly and inwardly in an arc, the upper end of said horn normally being spaced forwardly slightly relative to the upper end of the post 17. The lower portion of said horn is bifurcated and is rotatably mounted on a transverse bar 23 attached to the base 10.

Rigidly secured to said pivotal horn 22 and extending inwardly therefrom is a horizontal arm 24 having an inner end portion which is bent laterally at a right angle and connected to the base by a coil spring 25 (FIG. 1), said arm normally resting on a stop post 36 projecting upwardly a predetermined distance from the base. A rod 26 is secured to and extends upwardly from said horizontal arm member 24 and has its upper end operatively connected to the conventional presser foot-lifter mechanism in the head. When it is desired to mount or remove a workpiece from the machine, as will be hereinafter described, said arm 24 can be raised against the tension of the spring 25, thereby causing the horn 22 to pivot about its axis 23 and away from the post 17, the spring 25 returning said horn to its inner, closed position when the lifter mechanism is released.

Extending between the upper portion of the work-supporting post 17 and the vertical portion of the head 11 is an elongated rod 38. By adjusting the length of said rod, through the threaded connection 38', the lateral position of the top surface of the work-supporting post 17 relative to the needle can be varied slightly, said rod actually deflecting the upper portion of the post. Thus, it is possible to make fine adjustments of sewing hook to needle.

As is best shown in FIGS. 2, 7, 8, and 9, a horizontally disposed, serrated wheel 27, having feed projections 27', hereinafter called the "feed wheel," is rotatably mounted on and extends beyond the inner end of the horn 22, adjacent said work table 19. When the horn is in its innermost position, said feed wheel is designed to bear within the fold of a leather workpiece 40 positioned on said work shelf (FIG. 8) and to continuously move the same along the work shelf 19' and shoulder 20 and under the needle, as will be seen.

Also carried on the inner end of the horn 22, immediately above said feed wheel 27, is a spring-mounted pawl 28 which is positioned so that its free end releasably engages in one of a number of apertures 27'' spaced around said feed wheel adjacent its periphery. The opposite end of said pawl is connected to a horizontally movable lever 29 mounted on the upper end of a vertically-disposed, oscillating shaft 30 which is designed to turn said feed wheel 27 through said pawl and lever action. The lower end of said shaft 30 is connected through a gear and cam arrangement as at 31 in FIG. 3, to a shaft 32, which in turn is geared as at 33 to the main drive shaft 34 in the machine base, said shaft 34 being drivably associated with the motor as in conventional sewing machines.

Through its gear and cam connection to the drive shaft 34 said vertical shaft 30 is caused to oscillate and the lever 29 on the upper end thereof is driven in a short, horizontal stroke toward and away from the feed wheel 27 on the horn inner end. As said lever 29 moves, the pawl 28 connected thereto engages and drives the feed wheel about its axis of rotation, said pawl engaging in consecutive apertures 27'' on said wheel, and thus providing a ratchet arrangement for rotatably driving said wheel. The pawl outer end is held under spring tension by the compression spring 35 so as to insure that the opposite, wheel-engaging end normally firmly engages within said apertures 27'', but permitting said pawl to withdraw from said apertures against the spring tension on the return stroke of the lever. The result is that when the machine is in operation, the workpiece 40 is clamped between the feed wheel 27 and the shoulder 20 and is continuously driven along said work table by the ratchet wheel assemblage through the connection of the latter with the oscillating shaft 30, which is drivingly associated with the drive shaft 34 in the base of the machine.

In the use of the improved sewing machine comprising the present invention, the horn 22 is first pivoted outwardly by the operator away from the post 17, and the workpiece 40 is bent and positioned on the work shelf 19' with the fold edge abutting the shoulder 20, said angular work shelf 19' and cooperating hold-down arm 21 maintaining said workpiece in the correct angular arrangement and position relative to the needle so that it can pass straight through, as shown in FIG. 8, and come out on the same (grain) side of the leather. The operator then swings the upper end of the horn inwardly to a position where the wheel 27 thereon bears against said workpiece and presses the same against the shoulder 20, the spring 25 maintaining said horn in the latter position. The sewing operation can then be commenced.

During operation an adjustable jumper push rod 44 (see FIG. 1), which is slidable up and down slightly from the position of FIG. 1, is actuated automatically to swing the horn slightly to thereby release the pressure exerted by the wheel 27 on the work as the needle enters the workpiece, the pressure being automatically reapplied as the needle withdraws from the workpiece. This prevents binding of the needle between the feed wheel 27 and the shoulder 20 which might cause thread breakage or other trouble. This action is brought about by the engagement of jumper cam 43 (see FIG. 3) with a cam follower 45 on a pivoted arm 44' which supports the rod 44 from below.

As mentioned, because the angular arrangement of the workpiece presents only the apex of the fold to the needle 16, the needle passes through the grain side of the leather but not through the flesh side. Moreover, because of the novel folded position of the material, it is actually the upper surface thereof which is the adjacent surface relative to the lower thread 42 as well as the upper thread 41, and, consequently, when the material is removed both the upper thread 41 and lower thread 42 are visible on the top surface (FIGS. 4, 5 and 6), thus providing a stitch pattern which is neat and attractive and which provides a distinctive appearance.

Heretofore, such ornamental "surface" stitching has been done entirely by hand on the last, which is time-consuming and which requires considerable skill and experience. With the present invention, on the other hand, it is not only possible to perform this delicate stitching job automatically, but the machine, with an unskilled operator, is adapted to perform the operation many times faster.

As will be seen from the foregoing description, the improved structure comprising the present invention provides a machine for rapidly applying "surface" stitching to leather shoe uppers 40, or the like, which machine includes means for automatically positioning, and holding the workpiece, for applying the stitching, and for continuously advancing the workpiece under the needle. Moreover, the structure is durable and long-lasting, is relatively inexpensive in design and construction, and is well adapted for its intended purposes.

The improved method, which involves the use of material having substantial thickness, comprises bending of the material to provide an apex, the sewing of a double line of stitching by use of a needle which travels through the material thickness just within the apex, the maintain-

ing of the material in such a bent angular relationship that both lines of stitching are on the same side of the material (such as the grain side when utilizing leather) with the two lines of stitching being connected below the surface of the grain side intermediate the thickness of the material so that there is no stitching which goes through to the flesh side, when leather is used. While the two portions of the workpiece are preferably at an acute angle, the exact angle may vary with the thickness of the material, it being important, however, when using a sewing machine that the angle be such as to permit the straight upper needle **16** to enter the grain side, in the case of leather, and come out on the same side (FIG. 8). While the method may be performed by hand, it is much more expeditious to perform it on a sewing machine because the novel concept of holding the leather in a predetermined bent condition adapts the method to the use of a sewing machine having a straight upper needle, it being an important part of the invention to hold the material at such an angle that said straight needle may pass through from the grain side, near the apex, and come out again on the grain side without piercing the flesh side.

If the invention is used in connection with a sewing machine of the type having an oscillating needle bar, which type is common in the shoe industry, and which serves to move the work through the machine due to the forward and backward movement of the needle, then member **27** does not have to be rotary. On such machine it suffices for member **27** or its equivalent to merely be a pressure member for pressing the work against the shoulder **20**, as shown in FIG. 8, and it is unnecessary to have the mechanism for rotating the pressure member as in the illustrated embodiment.

It is to be understood, of course, that various changes and modifications in the structure illustrated and hereinabove described will undoubtedly occur to those skilled in the art, and all of such changes or modifications are contemplated as may come within the scope of the following claims.

What I claim is:

1. In a sewing machine for performing ornamental stitching on a piece of relatively thick material, said machine having an upper reciprocal needle and having lower sewing means for coaction with said upper needle, a work supporting shelf below said upper needle and having an opening through which said needle may pass to operative position with respect to said lower sewing means and having a shoulder, means for maintaining a piece of material in bent condition on said shelf, means engageable within the bend of the material for pressing its apex against said shoulder so that there is a thickness of material within said apex which is positioned below said upper needle so that said upper needle may enter one side of said material and come out on the same side whereby spaced lines of stitching are made which are visible on the same side of the material, and means timed with said needle for periodically relieveing the pressure exerted by said bend engaging means as the needle passes through.

2. In a sewing machine for performing ornamental stitching on a piece of relatively thick material, said machine having an upper reciprocal needle and having lower sewing means for coaction with said upper needle, a work supporting shelf below said upper needle and having an opening through which said needle may pass to operative position with respect to said lower sewing means and having a shoulder, means for maintaining a piece of material in bent condition on said shelf, a pivoted horn having an arm with rotatable pressure means engageable within the bend of the material and supported for rotation along the line of bend for pressing the apex of the material against said shoulder so that there is a thickness of material within said apex which is positioned below said upper needle so that said upper needle may enter one side of said material and means for causing rotation of said rotatable pressure means to advance the work and come out on the same side whereby spaced lines of stitching are made which are visible on the same side of the material longitudinally of the line of bend.



3. In a sewing machine for performing ornamental stitching on a piece of relatively thick material, said machine having an upper reciprocal needle and having lower sewing means for coaction with said upper needle, a work supporting shelf below said upper needle and having an opening through which said needle may pass to operative position with respect to said lower sewing means and having a shoulder, means for maintaining a piece of material in bent condition on said shelf, a pivoted horn having an arm with pressure means engageable within the bend of the material for pressing its apex against said shoulder so that there is a thickness of material within said apex which is positioned below said upper needle so that said upper needle may enter one side of said material and come out on the same side whereby spaced lines of stitching are made which are visible on the same side of the material, and means timed with said needle for periodically moving said horn to periodically relieve the pressure exerted by said pressure means on the arm of the horn as the needle passes through.

4. A method of performing ornamental stitching inwardly of the edges of a piece of relatively thick leather having a grain side and a flesh side comprising bending the material substantially short of doubling to provide a curved ridge portion projecting from the grain side, and sewing longitudinally of the ridge from said grain side straight through said curved portion intermediate the thickness of the material while the material is so held that no bent portions on the flesh side are in contact whereby the stitching enters the surface at said grain side on one side of the ridge and emerges from the same side of the material on the other side of the ridge without passing through the flesh side of the material, and causing the stitching to be sufficiently close to said convex side as to produce and hold a curved ridge without doubling the material.

5. A method of performing ornamental stitching inwardly of the edges of a piece of relatively thick material such as leather comprising bending the material substantially short of doubling to provide a curved ridge portion having a convex side and a concave side, and sewing longitudinally of said ridge while causing stitching to pass from said convex side straight through said curved portion intermediate the thickness of the material while the material is so held that no bent portions on the concave side are in contact whereby the stitching enters the surfaces at said convex side on one side of the ridge and emerges from the same side of the material on the other side of the ridge without passing through the opposite side of the material to produce spaced lines of stitching longitudinally of and on opposite sides of said ridge, and causing the stitching to be sufficiently close to said convex side as to produce and hold said curved ridge without doubling the material.

6. As a new article of manufacture a sheet of relatively thick flexible material such as leather displaced along a narrow line to provide an elongated low surface ridge of unbroken rounded cross section on one side which projects above the surface of the leather on said side a distance short of that which would double the displaced material, and there being a shallow groove of arcuate cross section on the opposite side, and ornamental stitching along each side of said ridge having connecting stitching passing intermediate the thickness of the material from one side of said ridge to the other without passing through the opposite side of the material and being sufficiently close to the side having the ridge to maintain said low ridge without doubling the material into two parallel thicknesses.

7. In a sewing machine for performing ornamental stitching on a piece of relatively thick material, said ma-

chine having an upper reciprocal needle, having lower sewing means for coaction with said upper needle, and having a shoulder, means for maintaining and supporting a piece of material in bent condition, means engageable within the bend of the material for pressing its apex against said shoulder so that there is a thickness of material within said apex which is positioned below said upper needle so that said upper needle may enter one side of said material and come out on the same side whereby spaced lines of stitching are made which are visible on the same side of the material, and means timed with said needle for periodically relieving the pressure



exerted by said bend-engaging means as the needle passes through.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 293,478 | Levy et al. | Feb. 12, 1884 |
| 1,521,853 | Augustine | Jan. 6, 1925 |
| 2,221,320 | Ashworth | Nov. 12, 1940 |
| 2,408,738 | Crawford | Oct. 8, 1946 |
| 2,489,489 | Heggie | Nov. 29, 1949 |
| 2,652,014 | Heggie | Sept. 15, 1953 |