

(No Model.)

2 Sheets—Sheet 1.

B. FISCHER.
SEWING MACHINE.

No. 466,559.

Patented Jan. 5, 1892.

Fig.1.

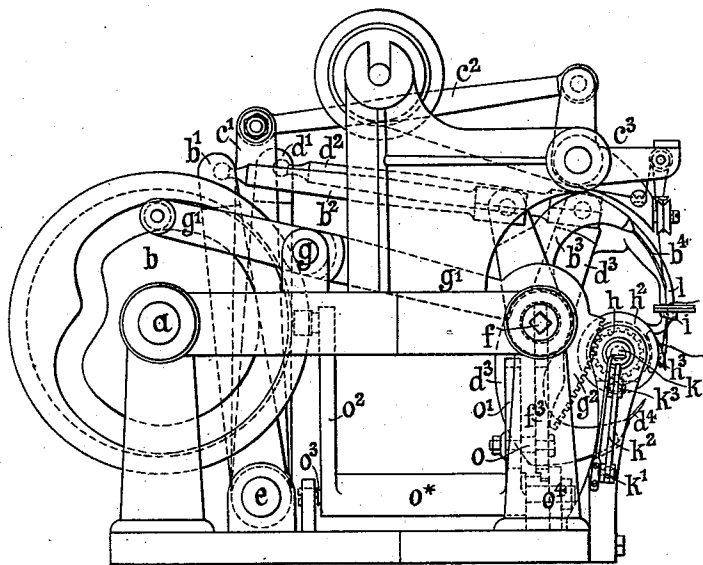
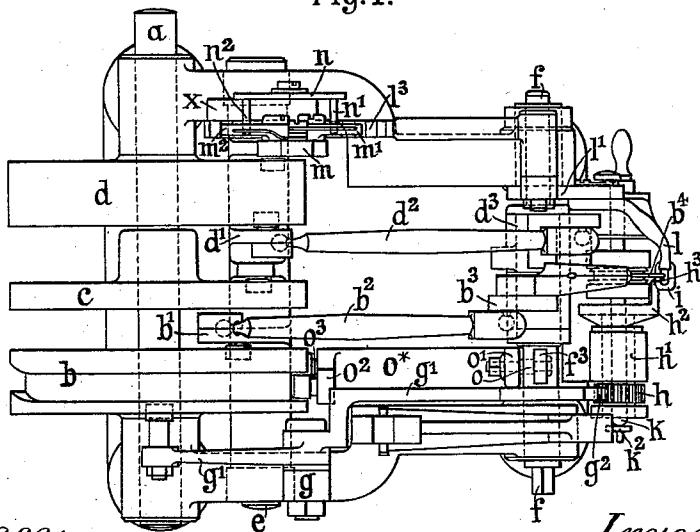


Fig.4.



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BENNO FISCHER, OF STUTTGART, ASSIGNOR TO HIMSELF AND KEATS MASCHINEN GESELLSCHAFT, OF FRANKFORT-ON-THE-MAIN, GERMANY.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,559, dated January 5, 1892.

Application filed September 14, 1891. Serial No. 405,710. (No model.)

To all whom it may concern:

Be it known that I, BENNO FISCHER, of Stuttgart, in the Kingdom of Württemberg, German Empire, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

The subject of the present invention is a two-thread sewing-machine especially adapted for the sewing of boot and shoe soles, in which a curved eye-pointed needle and a curved awl, operating in conjunction, are loosely mounted on a common shaft, the needle entering the leather from above and the awl from below, and in which a loop-holder plays in a circular path around a locking-thread bobbin arranged beneath the throat-plate to throw the loop of needle-thread around and over the said bobbin.

One object of this invention is to provide for placing the stitches, by means of the curved needle, right against the upper, and at the same time to provide a good seam on the welt by means of the bobbin or locking-thread.

Another object is to protect the needle-thread which forms part of the seam in the welt and the sole from unnecessary friction in the needle-hole while the loop is being thrown by the looper around and over the bobbin.

The improvement consists in certain combinations hereinafter described and claimed, whereby the above objects are attained.

In the accompanying drawings, Figure 1 is an elevation of one side, and Fig. 2 an elevation of the other side, of a machine embodying my invention. Fig. 3 is a view of the machine from the operator's position. Fig. 4 is a plan view, and Figs. 5, 6, and 7 are detached views, of details in which the operations of the essential parts are visible. Figs. 8 and 9 are side views of the principal operating parts, illustrating a modification of the machine.

When a curved needle is adopted for sewing leather, the leather must first be pierced to allow of its entrance; but when a curved needle, operating in conjunction with a bobbin beneath the throat-plate, is employed for sewing other materials this is not necessary. In the latter case, of course, the looper is placed in such a position that it can readily

enter the loop thrown out by the needle; but in the first case the placing of the looper in such a position as to take up the loop is out of the question, because the awl has to operate (under the throat-plate *i*) in the needle-path. The bobbin must therefore be placed backward far enough from the needle *b*⁴ and the awl *d*⁴ to allow to these instruments full and uninterrupted freedom of action. On the other hand a looper *h*² is placed on the same axis as the bobbin and is provided with a hook *h*³, which enters the loop thrown out by the needle beneath the throat-plate (see Fig. 6) and travels sufficiently far with the loop on it round the bobbin as is necessary to allow the bobbin to pass through the loop, and the loop-holder then recedes. It will be seen that it makes a partial and not a complete rotation.

The object to be attained by the operation in concert of the curved needle *b*⁴ and the curved awl *d*⁴, normally located, respectively, over and under the throat-plate and operating independently of each other in a common curve, with a shuttle and the oscillating looper *h*² *h*³ under the throat-plate, is to sew a seam in the welt of the boot, which is for the purpose placed on the throat-plate *i* sole uppermost, and which seam is to be as close as possible to the upper and show the clean locking-thread on the welt. For driving these parts to effect the feeding of the work and the automatic temporary pressure of the presser-foot on the leather at the time of entry of the awl from below the hereinafter-described mechanism is employed.

Located near the back of the machine in bearings is a driving-shaft *a*, having mounted on it the cams *b c d*. The cam *b* is provided on its inner side with a cam-groove, into which the bowl on the arm *b*¹, mounted loosely on the shaft *e*, takes. The upper end of this lever *b*¹ is connected through a rod *b*² to the needle-bar head *b*³, mounted loosely on the shaft *f* and carrying the curved needle. (See Figs. 5, 6, and 7.) Into a groove in the cam *d* takes the bowl of a lever *d*¹, mounted loosely on the shaft *e* and connected by a rod *d*² with the awl-bar head on the axle *f* and carrying the bent or curved awl *d*⁴.

By means of the above-described combina-

tion of parts—viz., needle, awl, and cams on revolving shaft *a*—the needle and awl will be made to alternately rise and fall in the same curved path. The connecting-rods *b*² and *d*² are provided, as shown, with ball-and-socket joints at their ends to allow of the endwise movement of the shaft *f* for feeding the work. In the groove on the other side of the disk-cam *b* works the bowl on the end of a double-armed lever *g*¹, pivoted to the base of the machine and carrying at its end a toothed segment *g*². This segment engages with a spur-wheel *h*, mounted on the hollow axle *h*¹ of the looper, situated beneath the throat-plate *i*.

15 This looper operates in the following manner: When the needle on its ascent throws out the loop, the hook *h*³ seizes the loop (see Fig. 1) and throws it over the bobbin or shuttle, Fig. 7, after which it returns for a fresh one, Fig. 20 6, the motion of the looper being an oscillatory one. As this throwing of the loop over the bobbin or shuttle is done while the needle is withdrawn from the work, there is no drawing down of the thread through the needle-hole in the sole and welt while the needle is in the said hole, and consequently the thread is protected from unnecessary friction in the said hole.

The movable portion of the bobbin or shuttle-holder is (to provide the necessary tension of the shuttle-thread) pressed by means of the pin *k* by a spring-pressed lever *k*², pivoted at *k*¹. Connected also with the lever *k*² is a pressure-pin *k*³, which is held against the cam-face on the boss of the looper. Thus as the looper is driven the lever *k*² is pressed back against its spring, and thereby the bobbin is free from pressure while the loop is being thrown over it.

40 The presser-foot *l* is carried on a bent arm *l*¹, mounted loosely on the shaft *f* and having a spring *l*², which presses the foot onto the work. Pivoted to the arm *l*¹ is a ratchet *l*³, guided in its movements by a pin passing through a slot therein and projecting from a bracket *x* of the machine.

A lever *m*, carrying a bowl entering the groove in the outer side of the disk-cam *d*, carries on its upper end two spring-pressed

50 pawls *m*¹ *m*², which can, through two pins *n*¹ *n*² in an adjustable plate *n* on the fixed part *x*, be so adjusted as not to engage the ratchet *l*³, and consequently the presser-foot *l* is only under the pressure of the spring *l*². The plate

55 *n* can also be so adjusted as to guide the pawl *m*¹ over the pin *n*¹ on the forward movement of the lever *m* by means of the disk-cam *d*, and, as shown at Fig. 2, take into a tooth of the ratchet *l*³, thereby preventing a withdrawal of the presser-foot, and thus making a slip of the work during the piercing operation impossible. On the return of the lever *m* by means of the disk-cam *d* the pawl *m*¹ is again lifted by the pin *n*¹, while the other

65 pawl *m*² slides over the pin *n*² and takes into a tooth of the ratchet *l*³, so that on a further rearward movement of the lever *m* the ratchet

*l*³ also travels backward and the presser-foot is raised from the work to allow of the further feeding taking place. By regulating the fineness of the teeth of the ratchet *l*³ the operation of this automatic mechanism can be perfectly controlled, as the pawls, according to the size of teeth, will adapt their movements to the thickness of the material. The feeding of the work follows the piercing operation, for which purpose the awl, as well as the needle, are loosely mounted on the shaft *f* between the fast collar *f*¹ and the removable collar *f*², as shown in Fig. 5.

80 From the shaft *f* extends downward an arm *f*³, provided with a longitudinal slot, into which takes a bolt *o*. This bolt is secured adjustably in a slot in the lever-arm *o*¹ of a rock-shaft *o*², which is carried in bearings *o*³ *o*⁴ on the bed-plate. Another arm *o*² of the rock-shaft has a bowl taking into a groove cut in the disk-cam *b*, so that on rotating the disk at the proper time the feeding of the work by means of the awl shortly before its withdrawal is effected. By simply adjusting the bolt *o* in the arm *o*¹ the axle of *f*, with its awl and needle-bars, can have a shorter or longer endwise movement imparted to it, thus placing the regulation of the length of stitch completely under the control of the operator.

The above-described arrangement is also capable of sewing angular seams—i. e., sewing two pieces of material together by the corners at any desired angle. For this purpose the horizontal throat-plate is replaced by an angular plate and the presser-foot by a plate inclined at a reverse angle to the throat-plate and the locking mechanism for the presser-foot is thrown out of action.

105 Fig. 8 shows the fore part of the machine provided with this arrangement for sewing an angular seam. Here the horizontal throat-plate *i* is replaced by an inclined one *i*^{*}, while the arm *l*¹ carries an inclined presser-foot *l*^{*} in place of the horizontal one, the faces of the said presser-foot *l*^{*} and throat-plate *i*^{*} being at an angle to each other instead of parallel like those first described.

115 In sewing an angular seam the plate *n*, Fig. 2, is raised so as to prevent the pawls from engaging the teeth of the ratchet, and the arm *l*¹ on the shaft *f*, carrying the part *l*^{*}, is locked by the screw-collar *l*⁴, thus providing for a firm hold of the work. The two pieces of material, preferably first united by cement or glue, are held against the throat-plate, and the feed automatically takes place by means of the awl. By adjusting the arm *l*¹ on the shaft *f*, and consequently altering the position of the part *l*^{*}, the distance of the seam from the edge of the work can be determined. (See Fig. 9.) The adjustment must be made, however, to correspond with the thickness of the work. The chief object of this angular stitching is to stitch boxes, cases, and portmanteaus at their angles.

130 What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the throat-plate, of a curved eye-pointed needle normally above the said plate for carrying a thread through said plate, a curved awl normally below the said plate, a shaft upon which the said needle and awl are loosely mounted and about which they are arranged to move in the same circular path through the throat-plate and which shaft is itself longitudinally movable, a thread-bobbin arranged out of the path of the needle for carrying another thread, and a looper oscillating about said bobbin, substantially as set forth.

2. The combination, with the longitudinally-movable shaft f , the needle-bar head b^3 , and awl-bar head d^3 , fitted to oscillate on said shaft f , of the rotary driving-shaft a , the cams b and d on said driving-shaft, the rock-shaft o^* , having arms o' and o^2 between the said cam b and shaft f , the lever b' and the swivel-jointed connecting-rod b^2 between the said cam b and the needle-bar head, and the lever d' and swivel-jointed rod d^2 between the said cam d and the awl-bar head, whereby the oscillatory movement of the needle and awl

and the longitudinal movement of the said shaft f are provided for, all substantially as herein set forth.

3. The combination, with the shaft f , about which the needle and awl oscillate, and the rotary driving-shaft a , of the spring-pressed automatically-adjustable presser-foot arm l' , arranged to oscillate on said shaft f , the cam d on the said driving-shaft, the double ratchet l^3 , connected with said arm l' , the lever m , actuated by the said cam d , the two pawls m' and m^2 , carried by the said lever m , the adjustable plate n , and the two pins n' and n^2 , carried by said plate for throwing the pawls out of engagement with the ratchet, the whole operating, as herein described, for raising and lowering the presser-foot, as herein set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

BENNO FISCHER.

Witnesses:

MARTIN KÖRNER,
WILHELM WIESENHÜTTER.