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F. ASHWORTH ET AL

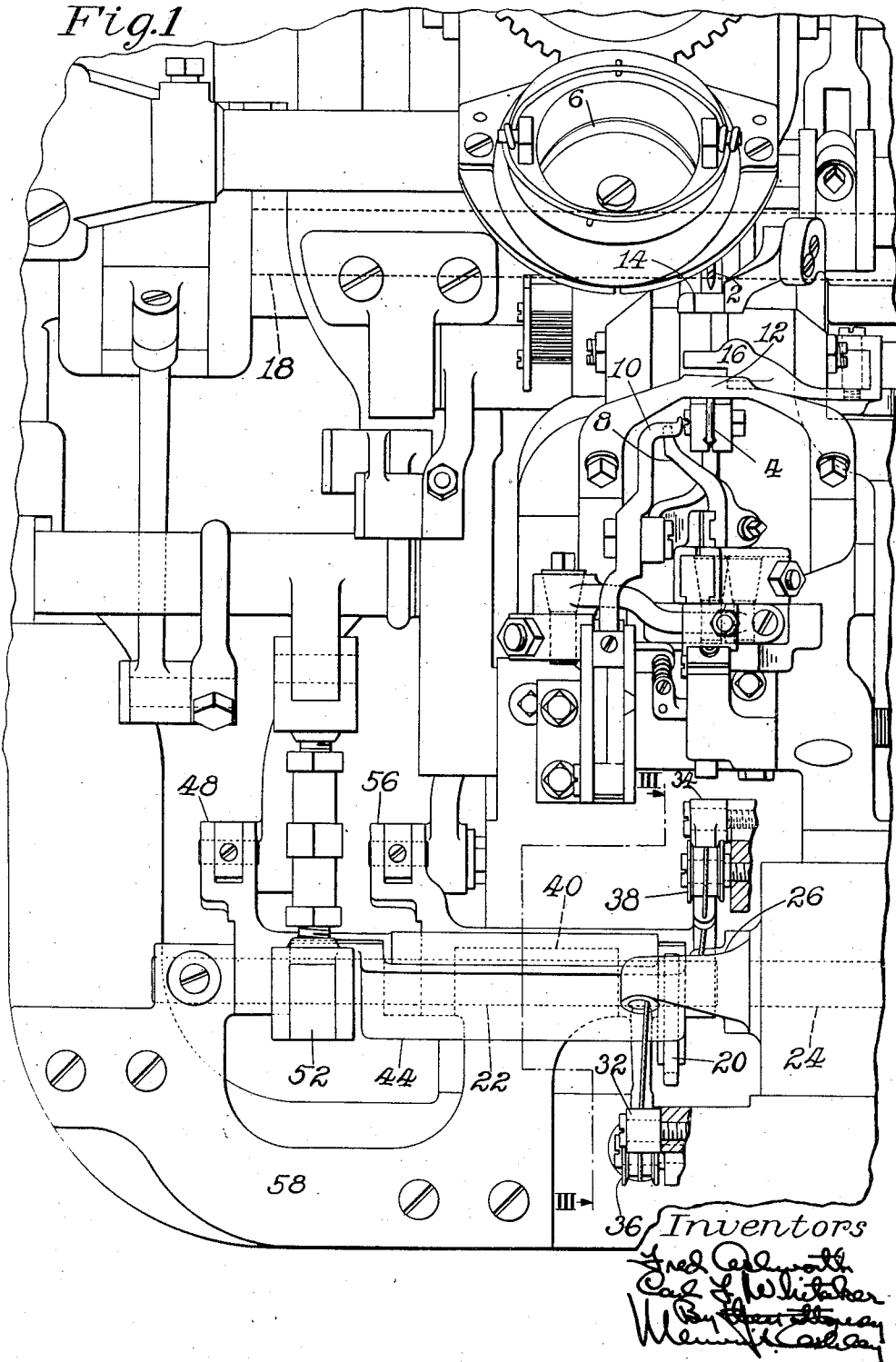
2,354,731

SHOE SEWING MACHINE

Original Filed Feb. 2, 1942

2 Sheets-Sheet 1

Fig. 1



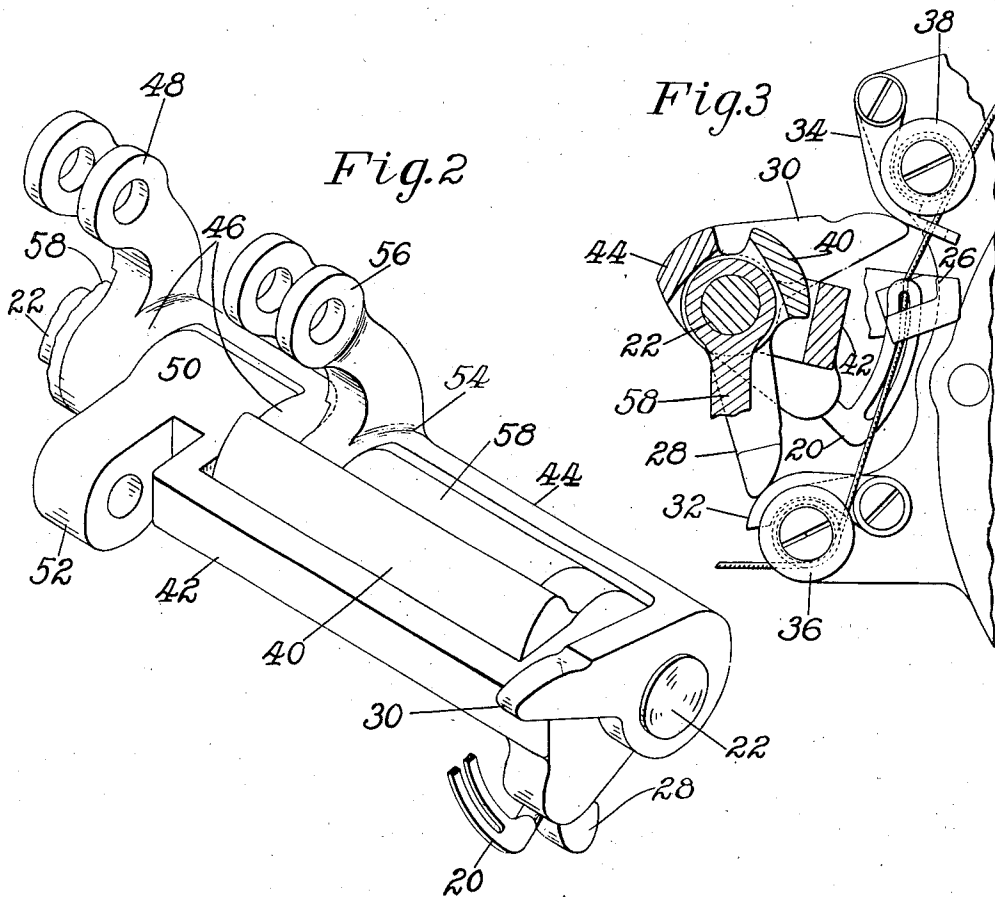
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SHOE SEWING MACHINE

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429,206. Divided and this application July 28,
1943, Serial No. 496,464

5 Claims. (Cl. 112—58)

The present invention relates to improvements in sewing thread pull-off and lock actuating mechanisms for shoe sewing machines and is herein illustrated as embodied in a high speed lockstitch sewing machine of the hooked needle type, as disclosed in the present inventors' United States Letters Patent No. 2,271,611 of February 3, 1942, and constructed and arranged to sew the outsole and welted upper of a Goodyear welt shoe.

In a machine of the patent, accurately measured lengths of thread are pulled off from a supply retained between a pair of thread locks and released when needed to form each stitch. The thread is pulled off by a pull-off arm acting between a pair of guides on a measuring arm the position of which is regulated by the thickness of the work being sewn. The locks are, for convenience of terminology, identified in the patent as to their location with respect to the pull-off, one being in front and the other being at the rear of the position of pull-off. The thread pull-off arm is actuated through a uniform motion during the sewing cycle, and, as soon as the thread is pulled off, the rear lock is closed and the front lock is opened only at the time in each sewing cycle when it is desired to utilize the measured thread in forming a stitch. The stitch being formed by the measured thread is then set against the rear lock, and the front lock is closed while the stitch-setting strain remains on the thread.

To provide a compact construction which is easily assembled and adjusted, in the patented machine, the locks and pull-off are actuated through concentric sleeve members rotatable above a single supporting shaft. Satisfactory operation of the locks and pull-off result, if the concentric sleeve members are kept well lubricated and accumulation between them of foreign materials is avoided. However, if the members are insufficiently lubricated or the movements of one affect those of the other in any way, the accuracy of thread measurement, stitch formation and location at which the stitches are set will produce adverse results in the seams inserted by the machine.

The objects of the present invention are, in general, to simplify and improve the actuating mechanisms of a shoe outsole sewing machine in a manner to insure accurate formation of stitches and to insure uniformity in which the stitches thus formed are set in the substance of the work operated upon where the machine is operated at high or moderate speeds and, particularly, to

avoid undesirable results from the difficulties above enumerated.

To these ends, a feature of the present invention comprises the use in a sewing machine having a sewing thread pull-off and a pair of locks between which the pull-off operates, of a pair of thread-lock actuating members rotatably mounted on a stationary cross shaft and so constructed that their bearing points will be separately supported on the cross shaft to render each of said members free to oscillate without imparting pressure radially of the shaft to the others of said members. Preferably, also, a member for actuating the pull-off is also separately rotatably mounted on the cross shaft, thus avoiding any possibility of movement of one of the members by another or interference with proper movements of any of the members. In the form disclosed herein, the lock actuating members are provided with cams which act to clamp the thread and lock it against movement in either direction, and the bearings for the pull-off and lock actuating members are formed by separate, spaced connecting struts and, in the particular construction illustrated, one of the lock members is provided with triplicate bearings in order to enable connecting struts to bridge the other members while maintaining suitable support on the cross shaft.

Other features of the invention consist in the devices, combinations, and arrangements of parts hereinafter described and claimed, the advantages of which will readily be understood from the following description taken in connection with the accompanying drawings illustrating one embodiment of the invention.

In the drawings,

Fig. 1 is a view in front elevation of a part of an outsole shoe sewing machine embodying the features of the present invention;

Fig. 2 is a perspective view of the sewing thread lock and pull-off actuating members; and

Fig. 3 is a sectional view of the same parts taken along the line III—III of Fig. 1, illustrating the manner of operation of the locks and the pull-off.

The machine illustrated in the drawings is of the type disclosed in prior United States Letters Patent of Ashworth No. 1,169,909 of February 1, 1916, No. 1,824,063 of September 22, 1931, and No. 2,015,654 of October 1, 1935, as well as in Patent No. 2,271,611, above referred to and is of the same construction and mode of operation as that illustrated and described in inventors' application Serial No. 429,206 filed Feb-

bruary 2, 1942, of which the present application is a division. The machine is equipped with a curved hook needle 2, a curved awl 4, a thread case 6 mounted within a shuttle or loop taker, needle threading mechanism including a looper 8 and a thread finger 10, a work support 12, a presser foot 14, back gage 16 and other stitch forming devices similar to those of the above patents, except as hereinafter pointed out. The general arrangement of the machine is as usual, with the sewing shaft 18 located behind and above the point of operation of the stitch forming devices and substantially parallel to the line of the seam formed thereby.

The work is fed in the illustrated machine, as in the machine of Patents Nos. 1,824,063 and 2,271,611, by the movement of the work support and presser foot while clamping the work. During clamping engagement of the presser foot with the work, a measured amount of needle thread corresponding to the thickness of the work as determined by the presser foot is pulled off from the supply, the thread after measurement being locked against further movement towards or away from the supply until each stitch is set in the work.

Like the machine of Patent No. 2,271,611, the illustrated machine has a pull-off actuating mechanism including a curved slotted arm 20 (see Figs. 2 and 3) rotatably mounted on a shaft 22 in alignment with a thread measuring shaft 24 connected with the presser foot 14. The arm 20 acts between a pair of guides on a measuring arm 26 to draw off a supply of needle thread sufficient for each stitch. Also rotatably mounted on the shaft 22 are a pair of thread lock actuating arms 28 and 30. These arms are formed with cam surfaces at their extremities which cooperate with shoes 32 and 34 for clamping the thread at either side of the pull-off against thread guide rolls 36 and 38, respectively. The pull-off and thread-lock arms of the machine in the patent last referred to are secured to the shaft and to concentric sleeves, one inside the other on the shaft 22. During rotation of the shaft to actuate the pull-off arm corresponding to the arm 20, there is a tendency for radial pressure of the concentric sleeves to impart slight rotary movements to each other and to the shaft within the range of inherent looseness and the ability to yield in the connected mechanism so as to interfere with proper operation of the thread locks or to open one of the locks temporarily when it should be closed.

In order to prevent interference between the pull-off arm and to insure proper operation of the locks in the illustrated machine, the pull-off arm 20 and lock actuating arms 28 and 30 are constructed and arranged to oscillate on the cross shaft 22 in such a way that no pressure radially of the shaft will be transferred from one arm to another. Instead of mounting the pull-off arm directly on the shaft 22 and the lock actuating arms on sleeves supported one inside of the other as in the patented machine, all of the arms of the present machine are rotatable directly on the shaft 22 and are connected with their actuating mechanisms by means of struts 40, 42 and 44 running along the shaft, some of which are spaced radially of each other on the shaft 22 and some of which are spaced angularly about the shaft so as to be entirely independent one from the other.

The strut 40 connects the pull-off arm with

an integrally formed yoke 46 acting as a bearing member for the pull-off actuating arm 40 extending from the yoke and having a connecting strut portion. Between the bearing portions of the yoke 46 is a second bearing member 50 having an arm 52 for operating the lock actuating arm 28. The strut 44 connects the lock actuating arm 30 with a bearing member 54 having an operating arm 56. The lock actuating arm 28 thus has triplicate bearings directly on the shaft 22 and the pull-off and other lock actuating arms 30 and 20 have double bearings spaced along the shaft so that actuation of any of the arms will not affect any of the others. The cross shaft 22 itself is fixed in a bracket 58 secured to the frame of the machine having two shaft supporting bosses, one at the right end of the shaft 22 and one at an intermediate position between the bearing members connected by the struts.

The nature and scope of the invention having been indicated and a particular embodiment of the invention having been described, what is claimed is:

1. A shoe sewing machine having, in combination, stitch forming devices, a sewing shaft, a stationary cross shaft, a sewing thread pull-off, a pair of thread locks between which the pull-off operates, thread lock actuating members on said cross shaft, sewing shaft operated mechanisms connected with the lock actuating members at points spaced along said cross shaft from the lock actuating portions of said members, and bearing means for supporting separately from each other the lock actuating members on said cross shaft to render each of said members free to oscillate on said cross shaft without imparting pressure radially of the shaft to the others of said members.

2. A shoe sewing machine having, in combination, stitch forming devices, a sewing shaft, a stationary cross shaft, a sewing thread pull-off member on the cross shaft, a pair of thread locks between which the pull-off operates including thread lock actuating members on said cross shaft, sewing shaft operated mechanisms connected with the lock actuating and pull-off members at points spaced along the cross shaft from the lock actuating and thread engaging portions of said members, and bearing means on the pull-off and lock actuating members for supporting separately said members on said cross shaft to render each of said members free to oscillate on said cross shaft without imparting pressure radially of the shaft to another of said members.

3. A shoe sewing machine having, in combination, stitch forming devices, a sewing shaft, a stationary cross shaft, a sewing thread pull-off member on the cross shaft, a pair of thread locks between which the pull-off operates including thread lock actuating members on said cross shaft, sewing shaft operated mechanisms connected with the lock actuating and pull-off members at points spaced along the cross shaft from the lock actuating and thread engaging portions of said members, and multiple bearings for said pull-off and lock actuating members spaced along said cross shaft from the lock actuating and thread engaging portions of said members for supporting said members on said shaft to prevent radial pressure on any of said bearings from changing the positions of the other members.

4. A sewing machine having, in combination,

stitch forming devices, a sewing shaft, a stationary cross shaft, a sewing thread pull-off member on said cross shaft, a pair of thread locks between which the pull-off operates, members including cams on said cross shaft for actuating the locks, sewing shaft operated mechanisms connected with the pull-off and lock actuating members at points spaced along said cross shaft from the cams and thread engaging portion of said members, and spaced multiple bearings for said pull-off and lock actuating members having separate spaced connecting struts to prevent radial pressure on any of said bearings from being imparted to the others.

5. A sewing machine having, in combination, stitch forming devices, a sewing shaft, a stationary cross shaft, a sewing thread pull-off member on said cross shaft, a pair of thread locks

between which the pull-off operates, members including cams on said cross shaft for actuating the locks, sewing shaft operated mechanisms connected with the pull-off and lock actuating members at points spaced along said cross shaft from the cams and thread engaging portion of said members, pairs of spaced bearings for the pull-off and one of the lock actuating members, a strut connecting each pair of bearings to prevent radial pressure on any of said pair of bearings from being imparted to the other pair of bearings, and triplicate bearings for the other lock actuating member having struts connected therebetween and spaced about said shaft radially from the other struts.

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