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D. P. HAY

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SHOE SEWING MACHINE

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Fig. 1

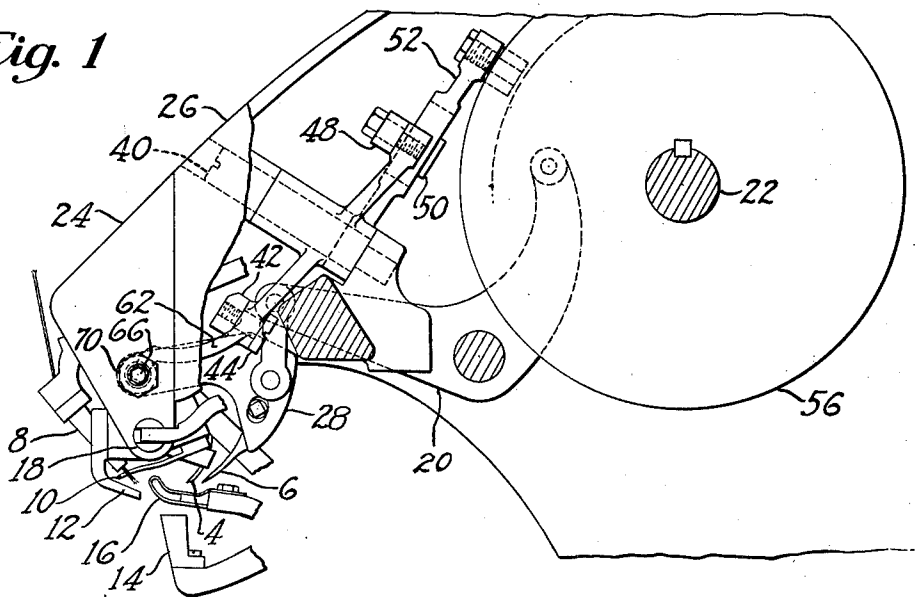
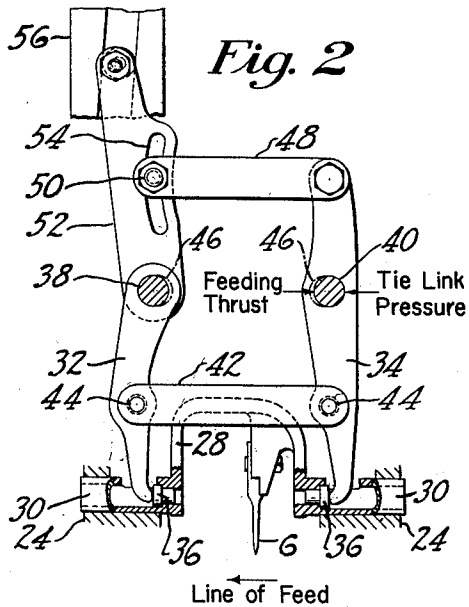
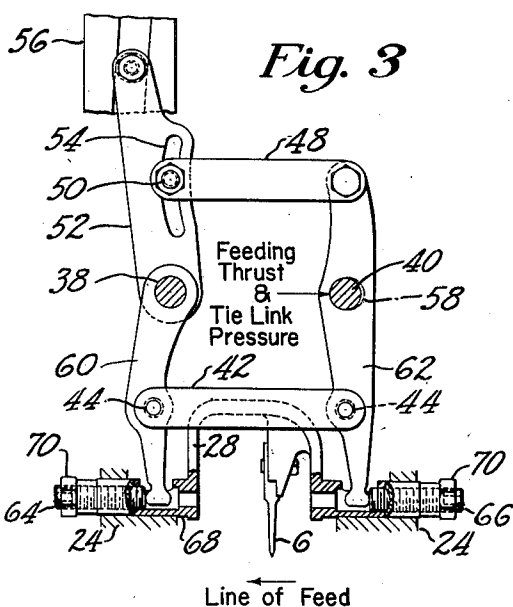


Fig. 2



Line of Feed

Fig. 3



Line of Feed

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SHOE SEWING MACHINE

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4 Claims. (Cl. 112—48)

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The present invention relates to improvements in shoe inseam sewing machines of the type disclosed in United States Letters Patent No. 1,971,575, granted August 28, 1934, upon application of A. R. Morrill.

The machine of the above-identified patent is provided with stitch-forming devices actuated to secure a continuous and uninterrupted feed of the work. These devices include work penetrating instruments consisting of a curved hook needle and a curved awl engaging the work alternately and moving independently on separate feed slides. The needle and awl feed slides are similar to each other and to those disclosed in United States Letters Patent No. 1,929,993, granted August 8, 1933, upon application of A. R. Morrill. The feed slides comprise carriers having integral aligned studs mounted for reciprocation along the line of work feed in cheek plates secured to the frame of the machine. To actuate the carriers, they are engaged at their ends by two pairs of connected levers mounted on independent pivot shafts, each pair of levers being connected by a tie link. One of the levers is actuated at a point at the opposite side of its fulcrum from the point of connection to the tie link and an actuating cam lever mounted on the fulcrum for the other of the pair of levers is connected to the actuated lever of the pair by a feed link.

To provide accurate feeding movements of the needle and awl, it is necessary to reduce the lost motion between and the yielding action in the operating parts to a minimum. For this purpose, it is the practice to provide a series of buttons of graded thicknesses for insertion between the ends of each pair of carrier reciprocating levers and the carrier studs so that no excessive looseness will occur particularly in the connections between the tie links and the levers or in the fulcrums for the levers. However, it has been found that on account of the arrangement of parts referred to, some yielding action and inaccuracy of feed occur in the reciprocating movements of the needle and awl carriers due to the thrust of the feed link on the fulcrum of the actuated carrier lever. Such thrust acts in a reverse direction from the pressure on the fulcrum of that lever exerted by the tie link. Thus, lost motion in the fulcrum of that lever allows the feed link to move the lever a short distance in one direction without imparting movement to the feed carrier and the pressure exerted by the tie link causes it to move idly in the reverse direction.

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The principal object of the invention is to overcome the difficulty above described and to provide a more rigid feeding mechanism for a work penetrating and feeding device in a machine of the type referred to. In the application of one embodiment of the invention to a shoe inseam sewing machine lost motion reducing means is provided, in which the tie link of a carrier actuating pair of substantially parallel levers exerts pressure on the fulcrum on one of the levers in the same direction as that of the feed link thrust on said fulcrum. In this way, there is less liability of yielding idle action in the carrier actuating levers and particularly between the levers and their fulcrums. Also convenient means is readily applicable to such arrangement for adjusting the pressure exerted on the fulcrum and levers themselves by the tie link. This feature of the invention enables further improvements in the machine through which effective adjustable alinement may be obtained between the needle and awl to insure entry of the needle into the perforations formed by the awl and by which convenient accessibility to the alinement adjusting parts is obtainable.

These and other features of the invention consisting of certain constructions, combinations and arrangements of parts hereinafter described and claimed will be more clearly understood from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a partially sectional view in side elevation of a portion of a shoe sewing machine embodying the features of the present invention;

Fig. 2 is a detail view looking from the upper front of the machine showing awl feeding mechanism similar to that in the machine of the prior patents; and

Fig. 3 is a similar view of the awl feeding mechanism illustrated in Fig. 1.

Except as hereinafter described, the shoe machine illustrated in the drawings is similar in construction and in mode of operation to that of the patents above-identified. The machine is constructed for operation in sewing the upper and welt to the insole of a welt shoe and is provided with the usual work penetrating, stitch forming and work feeding devices comprising a curved hook needle 4, a curved awl 5 cooperating therewith, a looper 8, a thread arm 10, a channel guide 12, a back rest 14, and a welt guide 16. These devices are arranged and actuated to secure a continuous and even feed of the work, the needle being mounted on a feed slide 18 while the awl is mounted on a second separate slide.

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The awl is oscillated toward and from the work through mechanisms including a cam lever 20 and a cam on a main sewing shaft 22.

The needle and awl carriers are each provided with integral alined studs or shafts slidingly and rotatably mounted in cheek plates 24 secured at opposite sides of the main frame of the machine, indicated at 26. The mechanisms for reciprocating the needle and awl carriers along the line of work feed are quite similar and include other cam levers connected to the respective carriers.

The awl carrier only is hereinafter described in detail and consists of a yoke member 28, the alined studs 30 of which are hollow and have side openings to receive the lower ends of a pair of substantially parallel carrier reciprocating levers 32 and 34. In the machine disclosed in the patents, these levers are bent toward each other at their lower ends and engage the carrier inside the hollow studs and inside the space between their active ends. These openings are for convenience plugged by a pair of connection members in the form of buttons 36 having enlarged heads to hold them in place. To cause the levers 32 and 34 to act in unison while reciprocating the awl carrier they are fulcrumed respectively on shafts 38 and 40 mounted in the machine frame and between the fulcrum shafts and the points of action at the ends of the levers the levers are pivotally connected by a tie link 42 threadably receiving at its ends a pair of shoulder screws 44 passing through the levers. The arrangement is such in the patented machine that in reciprocating the awl carrier, the carrier is subject to compression between the actuating levers, and the tie link is subject to tension, causing the tie link to exert pressure at opposite outer sides of the fulcrum shafts 38 and 40. The result of the pressure on the fulcrum shafts is to bring the levers into positions with the greater clearances, as indicated by the broken lines 46, nearest each other between the fulcrum shafts.

To actuate the levers 32 and 34, the lever 34 has an arm extending rearwardly and upwardly beyond its fulcrum shaft 40 and this arm, at a point at the opposite side of its fulcrum shaft from the tie link, is pivotally connected with a feed link 48, in turn adjustably connected through a clamp bolt 50 with a cam lever 52, the clamp bolt when unclamped being movable within an arcuate slot 54 in the cam lever. The cam lever 52 is in turn actuated by a cam 56 on the main sewing shaft.

In actuating the needle carrier to feed the work, the thrust of the feed link 48 is exerted in an opposite direction diametrically of the fulcrum shaft 40 from the pressure of the tie link on the fulcrum shaft. Thus in the prior machine, the lever 34 is forced alternately in opposite directions against its fulcrum shaft during operation of the machine. After the machine has become somewhat worn and lost motion develops in the bearings, an appreciable movement will take place in the lever relatively to the fulcrum. For this reason the accuracy of the feeding movement imparted to the work by the awl may be affected adversely and difficulty may be encountered in bringing the perforation in the work formed by the awl into exact alinement with the needle path. In such case, the needle may be required to form its own perforation subjecting the needle to unnecessary strain.

According to the present invention, the feeding movements of the awl will be maintained uni-

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formly accurate regardless of looseness of the lever 34 on its fulcrum shaft 40 by lost motion reducing and adjusting means of unusually effective construction, the looseness of the lever 34 on its fulcrum being maintained uniformly at one side of the shaft 40 at all times opposite the fulcrum shaft 38, as indicated by clearance line 58 in Fig. 3. For this purpose, the lost motion reducing and adjusting means comprises connection members between the carrier reciprocating levers and the awl carrier arranged to impart compression to the tie link. The parallel levers indicated at 60 and 62 are accordingly bent outwardly from each other at their ends and engaged outside the space between their ends with a pair of adjusting setscrews 64 and 66 threaded into the hollow studs of the awl carrier. The awl carrier is indicated at 68 in the illustration of the improved construction, the buttons 36 being eliminated. The setscrews 64 and 66 engage the levers 60 and 62 closer to the points of action of the levers on the setscrews than the pivotal connections of the tie link with the levers. The same tie link 42 connected by shoulder screws 44 is employed and in other respects the improved construction is the same as the prior machine. The setscrews 64 and 66 are secured in adjusted position by check nuts 70. The setscrews are tightened against the levers 60 and 62 for close fitting engagement without excessive pressures.

The action of the setscrews 64, 66 is to cause the tie link to exert a pressure on the fulcrum shafts 38 and 40 for the respective levers against the inner sides of the fulcrum shafts, bringing the greater clearances at the outer sides of the shafts. Accordingly, the pressure exerted by the tie link on the fulcrum shafts is in the same direction as that of the feeding thrust of the feed link 48. Under these conditions the lever 62 maintains its relationship with the fulcrum shaft 40 at all times and no relative movements occur in opposite directions on the shaft. Furthermore, by the use of the adjustable setscrews 64 and 66 the perforation formed in the work by the awl may be lined up accurately with the needle path merely by unscrewing one setscrew and tightening the other. The set screws and check nuts thereon are conveniently accessible. The adjustment provided enables easy compensation for wear and is conducive to greater durability and quieter operation than obtainable from the prior constructions. Such form of adjustment is applicable to the needle as well as to the awl.

The invention having been described what is claimed is:

1. A shoe inseam sewing machine having work penetrating and feeding devices including a curved hook needle and a curved awl, a carrier for one of the work penetrating devices having alined mounting studs on which the awl oscillates, a pair of substantially parallel levers acting on the studs for reciprocating the carrier in the line of work feed, a tie link pivotally connecting the levers between their points of action and their respective fulcrums, a feed link connected to one of the levers at a point at the opposite side of its fulcrum from the tie link and a cam lever on the fulcrum for the other carrier reciprocating lever for actuating the feed link, in combination with lost motion reducing means secured to the carrier and engaged with the end of one of the levers outside the space between the levers and closer to the point of action of said one lever than

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the pivotal connection of the tie link on said lever for causing the tie link to exert a pressure on the fulcrum of the feed link connected lever in the same direction in which the feed link applies its thrust to said fulcrum.

2. A shoe inseam sewing machine having work penetrating and feeding devices including a curved hook needle and a curved awl, a carrier for one of the work penetrating devices having alined mounting studs on which the awl oscillates, a pair of substantially parallel levers acting on the studs for reciprocating the carrier in the line of work feed, a tie link pivotally connecting the levers between their points of action and their respective fulcrums, a feed link connected to one of the levers at a point at the opposite side of its fulcrum from the tie link and a cam lever on the fulcrum for the other carrier reciprocating lever for actuating the feed link, in combination with lost motion reducing means on the carrier located outside the space between the levers for causing the tie link to exert a pressure on the fulcrum of the feed link connected lever in the direction in which the feed link applies its thrust to said fulcrum comprising an adjustable member subjecting the tie link to lengthwise compression.

3. A shoe inseam sewing machine having work penetrating and feeding devices including a curved hook needle and a curved awl, a carrier for one of the work penetrating devices having alined mounting studs on which the awl oscillates, a pair of levers acting on the studs for reciprocating the carrier in the line of work feed, a tie link pivotally connecting the levers between their points of action and their respective fulcrums, a feed link connected to one of the levers at a point at the opposite side of its fulcrum from the tie link and a cam lever on the fulcrum for the other carrier reciprocating lever for actuating the feed link, in combination with lost motion reduc-

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ing means for causing the tie link to exert a pressure on the fulcrum of the feed link connected lever in the direction in which the feed link applies its thrust to said fulcrum comprising a set screw engaged by one of the pair of levers and threaded into the end of one of the studs for subjecting the tie link adjustably to lengthwise compression.

4. A shoe inseam sewing machine having work penetrating and feeding devices including a curved hook needle and a curved awl, a carrier for one of the work penetrating devices having alined mounting studs on which the awl oscillates, a pair of levers acting on the studs for reciprocating the carrier in the line of work feed, a tie link pivotally connecting the levers between their points of action and their respective fulcrums, a feed link connected to one of the levers at a point at the opposite side of its fulcrum from the tie link and a cam lever on the fulcrum for the other carrier reciprocating lever for actuating the feed link, in combination with lost motion reducing means for causing the tie link to exert a pressure on the fulcrum of the feed link connected lever in the direction in which the feed link applies its thrust to said fulcrum comprising a pair of set screws engaged by said levers and threaded into the ends of said studs for subjecting the tie link adjustably to lengthwise compression and for enabling the awl to be lined up with the needle to insure entry of the needle into each perforation formed by the awl.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,920,998	Morrill	Aug. 8, 1933