

Oct. 16, 1928.

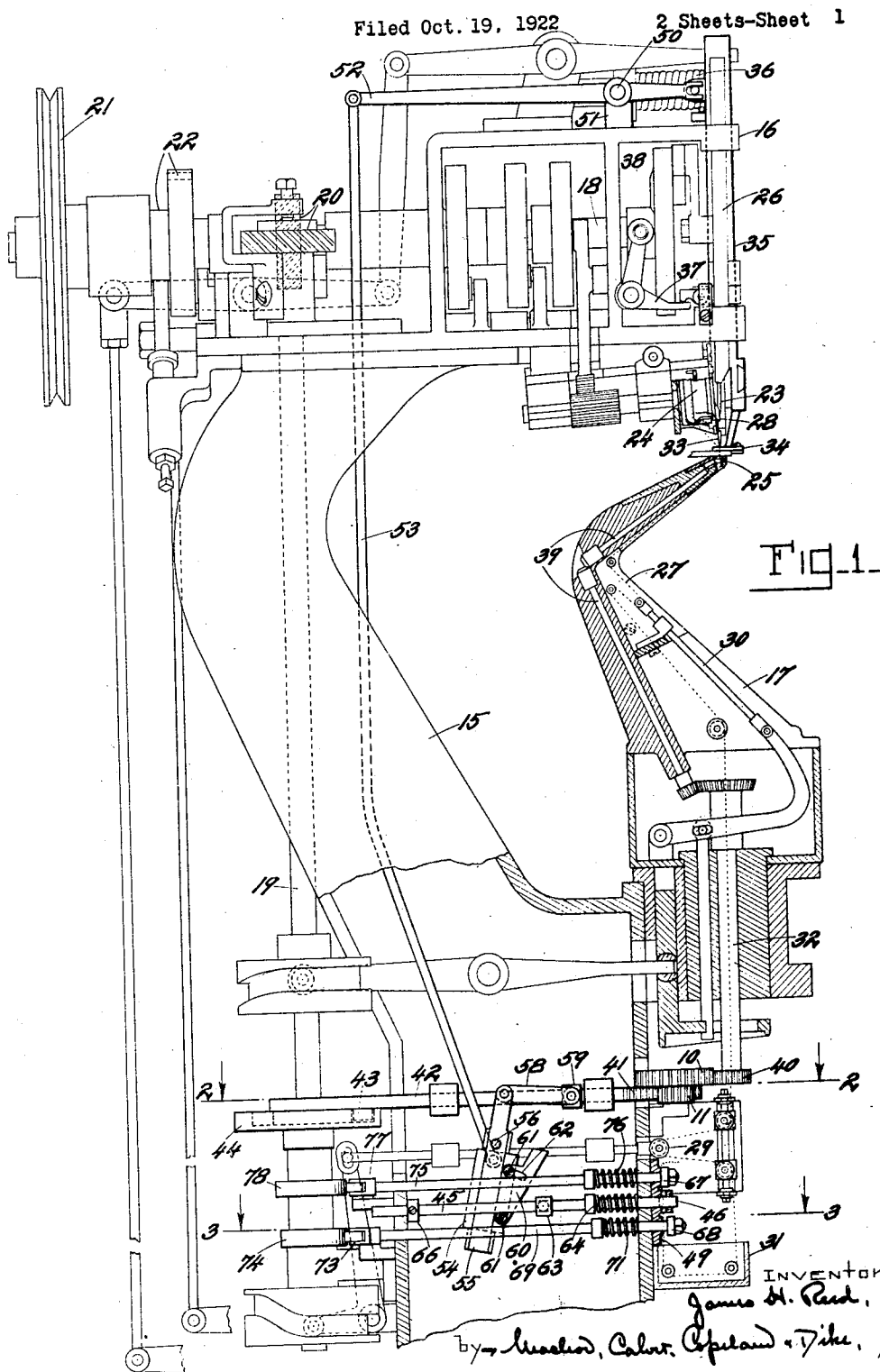
1,688,057

J. H. REED

THREAD MEASURING MECHANISM FOR SEWING MACHINES

Filed Oct. 19, 1922

2 Sheets-Sheet 1



Oct. 16, 1928.

1,688,057

J. H. REED

THREAD MEASURING MECHANISM FOR SEWING MACHINES

Filed Oct. 19, 1922

2 Sheets-Sheet 2

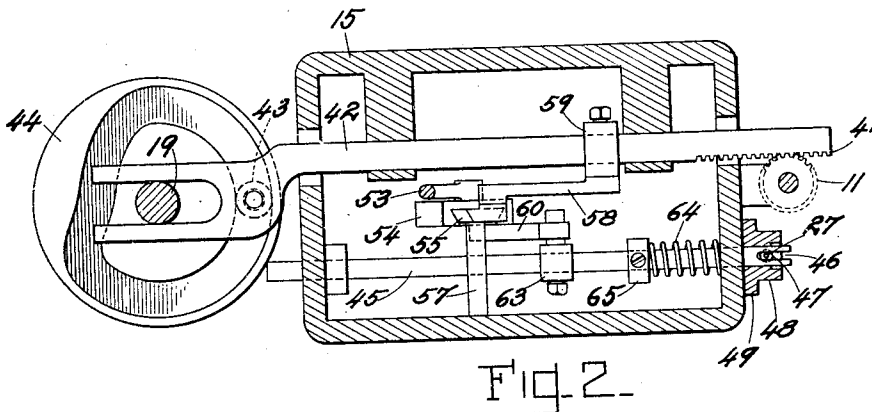


Fig. 2.

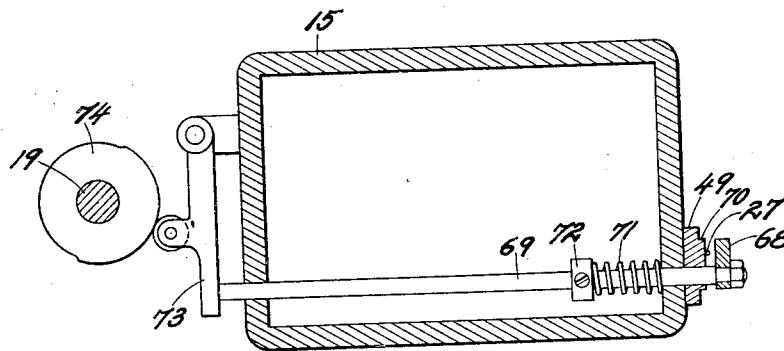


Fig. 3.

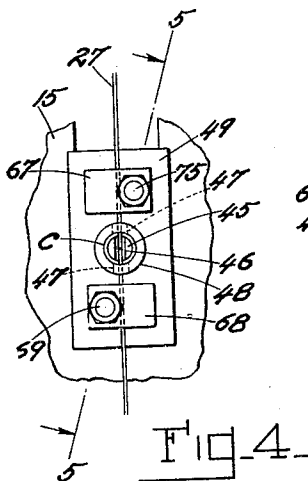


Fig. 4.

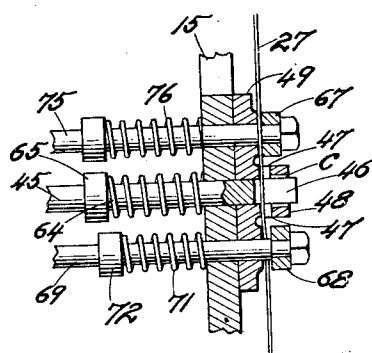


Fig. 5.

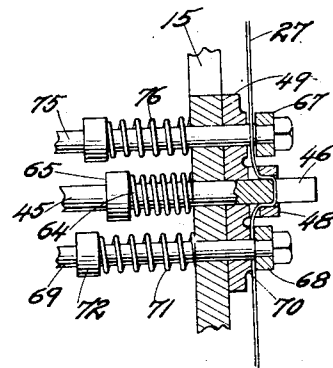


Fig. 6.

INVENTOR:

James H. Reed.

By Messrs. Calvin Copeland & Tice.

Attys

UNITED STATES PATENT OFFICE.

JAMES H. REED, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

THREAD-MEASURING MECHANISM FOR SEWING MACHINES.

Application filed October 19, 1922. Serial No. 595,580.

This invention relates to thread measuring mechanism for sewing machines.

The invention has for its object to provide improved mechanism for drawing from a source of supply an amount of thread necessary for the formation of each successive stitch, said mechanism being controlled by the thickness of the work and operating to measure the thread accurately in accordance with such thickness and to control the same in a reliable manner.

The more particular objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of one form and application thereof illustrated in the accompanying drawings. It will be understood, however, that the particular embodiment of the invention shown has been chosen for illustrative purposes merely, and that the invention, as defined by the claims hereunto appended, is by no means limited to the particular construction and application shown, but may assume other forms and be used in connection with machines of other types without departure from its spirit and scope.

In said drawings:

Fig. 1 is a side elevation, partly in section, of a substantially complete shoe sewing machine embodying the invention.

Fig. 2 is a horizontal section, taken substantially on the line 2—2 of Fig. 1, the take-up and the upper thread clamp being omitted.

Fig. 3 is a section, taken substantially on the line 3—3 of Fig. 1, of the lower thread clamp and its operating mechanism.

Figure 4 is a detail front elevation of the thread pull-off and the thread clamps.

Figure 5 is a detail section, taken substantially on the line 5—5, Figure 4, but showing the thread throughout.

Figure 6 is a similar view showing the parts in a different position.

While the invention may be used in connection with sewing machines of other types it is herein shown as applied to a shoe sewing machine of the character described in my prior application for Letters Patent filed March 10, 1922, Serial No. 542,666. Said machine comprises a standard or base 15 supporting a head frame 16 at its top, and below said head frame, in the front of the machine,

a rotatable horn 17 for supporting the work.

The various instrumentalities of the machine receive their several operative movements from a main shaft 18 journaled in the head, and a vertical shaft 19, journaled in said head and in the upright 15. The shaft 19 is operatively connected by gears 20 with the main shaft 18 to which power is applied through a loose pulley 21 capable of being connected with said main shaft through a suitable clutch and stop mechanism 22. The particular stop mechanism herein shown is covered by another application, filed October 14, 1922, Serial No. 594,458, and will not be described in detail herein, as any suitable type of clutch or stop mechanism, many of which are well known, may be employed. The stitch forming instrumentalities comprise a vertically reciprocating needle 23 and a discoidal shuttle 24 carried by the head above the work, and a whirl or looper 25 located in the horn below the work. The needle 23 is straight and barbed and is carried by a needle bar 26 which is reciprocated by suitable connections with the main shaft 18. The whirl 25, which is operated by mechanism hereinafter described, is adapted, when the needle is moved downwardly through the work, to place a loop of cop thread 27 in the open barb thereof. The needle then rises, carrying the loop with it, said loop being taken from the needle by a hook 28 on the shuttle 24 and cast over said shuttle. The shuttle 24 is operated by suitable mechanism connected with the main shaft 18, said shuttle and shuttle mechanism, as herein shown, being of the type covered by other applications filed, respectively, October 14, 1922, Serial No. 594,457, and October 18, 1922, Serial No. 595,266. In addition to the stitch forming instrumentalities above described, there is provided at the base of the machine a main or stitch forming takeup 29, whose function it is to draw the needle loop over the shuttle 24 and down upon the work after the shuttle has been passed therethrough, and a stitch setter 30, located in the horn, to set the stitch. The cop or needle thread 27 is drawn from a suitable source of supply (not shown) by the pull-off hereinafter described, thence passes through a wax pot 31, and thence leads successively to the takeup 29, through a hollow shaft 32 journaled in the base of the horn, to the stitch setter 30, and finally

to the whirl 25. The work is fed over the horn as the stitching progresses by means of a suitable feed point 33, said feed point operating to advance the work between the formation of successive stitches, and while each stitch is being formed, said work is clamped to the horn by a presser foot 34 carried by a presser foot bar 35. The presser foot bar 35 is normally pressed downwardly by a strong spring 36, and is periodically lifted to permit the work to be fed by means of a bell-crank lever 37 which is actuated by a cam 38 on the main shaft 18. The whirl 25 is oscillated by means of intergeared shafts 39 the lowermost of which is geared to the shaft 32. The latter shaft carries at its lower end a pinion 40 which meshes with a gear 10 carrying a coaxial pinion 11. The pinion 11 cooperates with a rack 41 (see Figure 2) formed on a bar 42 guided in the base 15 and carrying at its rear end a cam roller 43 which cooperates with a cam 44 on the shaft 19.

Except in so far as they enter into combination with the mechanism hereinafter described, the parts above referred to specifically constitute no portion of the present invention and may be of any suitable form. They will, therefore, not be further described herein, as they are fully disclosed in my other applications above referred to, and the foregoing outline of their nature, arrangement, and function will be sufficient for a complete understanding of the invention herein claimed.

The thread pull-off comprises a rod 45 guided for longitudinal movement in the base 15 and having at its forward end a thread engaging notch 46 cooperating with stationary thread guides located respectively on opposite sides thereof. These thread guides, as shown, comprise aligned openings 47 in a boss 48 formed on a plate 49 secured to the base 15, said boss being suitably bored to receive and guide the end of the rod 45. Said rod 45 is normally held with the bottom of the notch 46 in alinement with the guide openings 47, as shown in Figure 5, by means of a spring 64 positioned between the front wall of the base 15 and a collar 65 fast on said rod, said spring tending to move said rod rearwardly to an extent determined by the engagement of a second collar 66 thereon with the rear wall of said base. Longitudinal movement of said rod 45 against the action of the spring 64 causes the bottom of the notch 46 to be moved out of alinement with the thread guides 47, as shown in Figure 6, thereby pulling off an amount of thread determined by the extent of such movement, the parts being suitably cut away, as indicated at C in Figures 4 and 5, to permit this movement without injury to the thread. The mechanism for so moving the rod 45 to an extent determined by the thickness of the work on the horn 27 is preferably substantially as follows.

Pivoted at 50, to a suitable bracket 51 on the top of the head 16, is a lever 52 connected at one end with the presser foot bar 35. The opposite end of said lever is connected by a link 53 with a slide 54 guided for longitudinal movement on a lever 55 pivoted at 56 to a support 57 on the base 15. The lever 55 is connected by a link 58 with a lug or collar 59 on the rack bar 42. Carried by the slide 54 is a plate 60, said plate being preferably adjustably secured to said slide, as by means of screws 61 one of which passes through an elongated slot 62 in said plate.

When the lever 55 is oscillated by its connection with the rack bar 42, the plate 60 will engage a lug or collar 63 on the rod 45 and move said rod an amount depending upon the position of the slide 54 on the lever 55 and the adjustment of the plate 60 on said slide. The position of the slide 54 on the lever 55 determines the effective amplitude of movement of the plate 60, and is automatically controlled, in accordance with the thickness of the work, by its connection with the presser foot. The adjustment of the plate 60 on the slide 54 determines the amount of lost motion between said plate and the collar 63, this adjustment being effected manually for the purpose of controlling the pull-off in accordance with the length of stitch or otherwise.

Located respectively at opposite sides of the pull-off are upper and lower thread clamps 67 and 68, the former being located between said pull-off and the source of thread supply, and the latter being located between said pull-off and the stitch forming mechanism. The clamp 68 comprises a block secured to a rod 69 guided for longitudinal movement in the base 15, said rod being normally forced rearwardly, to cause the block 68 to clamp the thread 27 against a fixed clamping member 70 on the plate 49, by means of a spring 71 interposed between the front wall of the base 15 and a collar 72 fast on the rod, said rod being moved in the opposite direction, to separate the clamping member 68 from the clamping member 70, by means of a lever 73 which engages the rear end of said rod, said lever being pivoted to the base 15 and being acted upon by a cam 74 on the shaft 19. The clamp 67 is precisely similar in construction and operation to the clamp 68, being carried by a rod 75 which is moved in one direction to close the clamp by a spring 76, and in the opposite direction to open the clamp by a lever 77 cooperating with a cam 78 on the shaft 19.

The cams 74 and 78 are so designed and timed with respect to each other and the other working instrumentalities of the machine that when the pull-off is inactive the clamp 68 is open and the clamp 67 is closed, said clamp 67 serving as an anchor for the thread when the latter is acted upon by the take-up 29 and stitch setter 30. When the pull-off is operated, the clamp 68 is closed, thereby anchoring the

thread for the action of said pull-off, and the clamp 67 at the same time opened, thereby permitting said pull-off to draw the thread from the supply. Thereafter, as said pull-off is returned to normal position, the clamp 67 is again closed, and the clamp 68 opened to permit the thread drawn from the supply by said pull-off to be taken up and used by the stitch forming devices. The clamps 67 and 68 are thus operated alternatively, one being closed simultaneously with or just prior to the opening of the other, and vice versa, so that one or the other of said clamps is closed at all times, thereby exercising an uninterrupted control over the thread.

What I claim is:—

1. In a sewing machine, in combination, thread guiding means, a pull-off member co-operating therewith, a lever, means for actuating the same, a slide guided on said lever and arranged to actuate said pull-off member, a presser foot, a lever connected with said presser foot, and a link connecting said lever and slide whereby the movement imparted to the pull-off member by the slide is varied in accordance with the thickness of the work.

2. In a sewing machine, thread measuring mechanism comprising a pair of stationary thread guides, a pull-off member between said guides and having a thread engaging portion, a spring for holding said pull-off member with its thread engaging portion in alinement with said guides, a slide having means for moving said pull-off member in a direction transverse to the line connecting said guides, a lever on which said slide is guided, means for oscillating said lever, and a presser foot operatively connected with said slide, whereby the movement imparted to the pull-off member by the slide is varied in accordance with the thickness of the work.

3. In a sewing machine, in combination, stitch forming mechanism including a whirl and means for operating the same, including a cam shaft and connections between the cam shaft and whirl, thread measuring mechanism, and means operated by said connections for operating said thread measuring mechanism.

4. In a sewing machine, in combination, a horn, a presser-foot for clamping the work

upon said horn, stitch forming mechanism including a whirl in said horn, means for operating said whirl including a reciprocating bar at the base of said horn, a pull-off, a lever connected with said reciprocating bar for operation thereby, and a slide on said lever connected with said presser foot and provided with means for operating said pull-off.

5. In a sewing machine, thread measuring mechanism comprising a pull-off member, an actuator, a member movably mounted on said actuator and controlled as to its position thereon by the thickness of the work, and means adjustably mounted on said movable member for engaging and operating said pull-off member.

6. In a sewing machine, thread measuring mechanism comprising a pull-off member, a presser-foot, a lever, means for operating said lever, a slide on said lever, means for connecting said slide with said presser-foot, and an adjustable plate on said slide for engaging and operating said pull-off member.

7. A lockstitch shoe sewing machine including, in combination, a straight hook needle and a shuttle having provision for supplying a shuttle thread, both located on one side of the work, and on the other side of the work a rotatable horn pierced at its end for the passage of the needle, a looper carried by the tip of the horn and adapted to form a loop about the hook end of the needle, a presser foot to force the work against the horn, mechanism for drawing back a loop of needle thread and setting the stitch, a pull-off, means for operating the pull-off to draw thread from a source of supply, thread clamps located respectively on opposite sides of said pull-off, connections from the presser foot for controlling the amount of thread drawn from the supply by the pull-off for each stitch in accordance with the thickness of the work, and means for operating said thread clamps to clamp the thread between the pull-off and work while the pull-off is operating and to clamp the thread between the pull-off and the supply while the stitch setting mechanism is operating.

In testimony whereof I affix my signature.

JAMES H. REED.