

Dec. 16, 1930.

P. W. HATFIELD

1,785,412

LABEL SEWING MACHINE

Original Filed Feb. 4, 1924

6 Sheets-Sheet 1

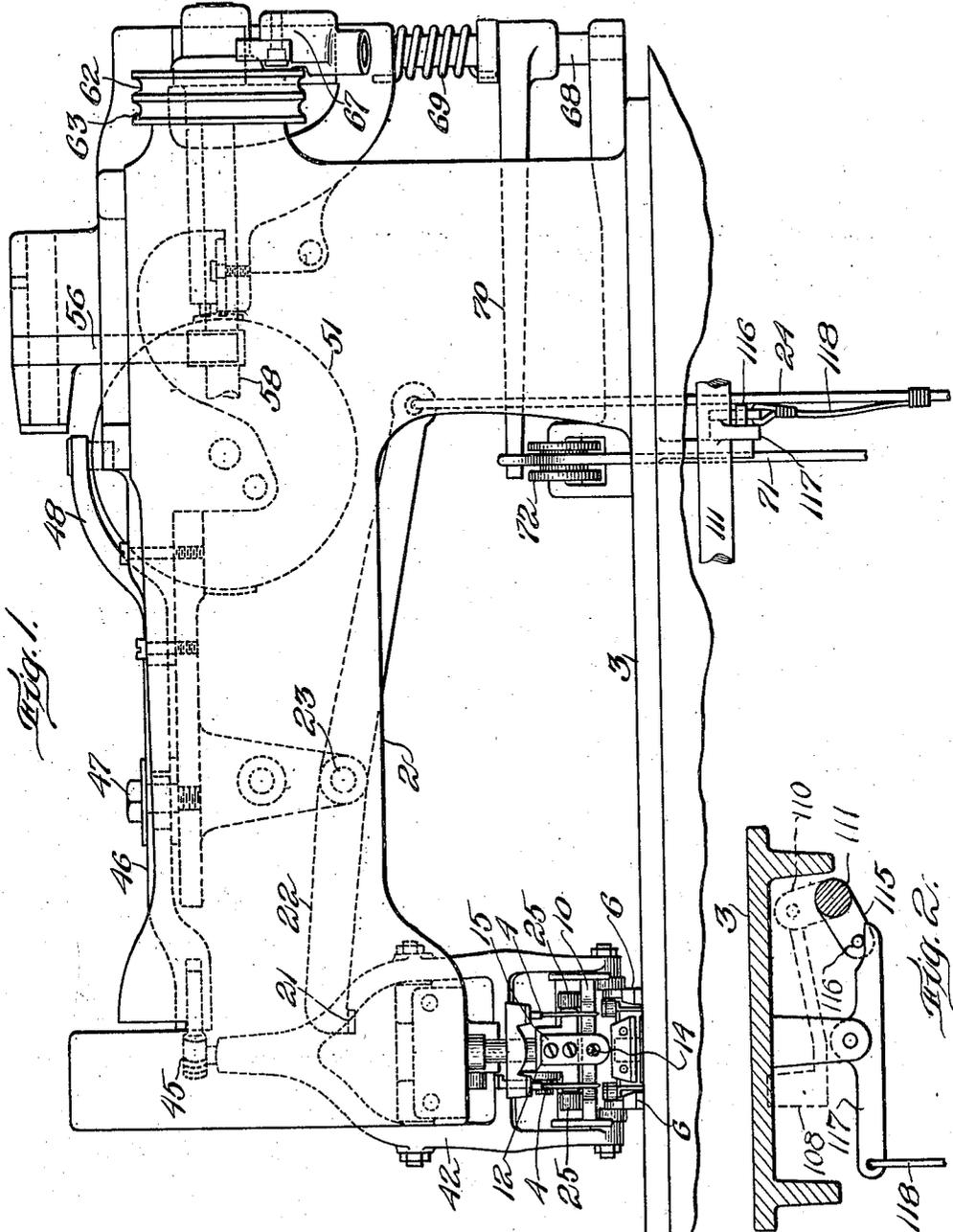


Fig. 1.

Fig. 2.

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Fig. 3.

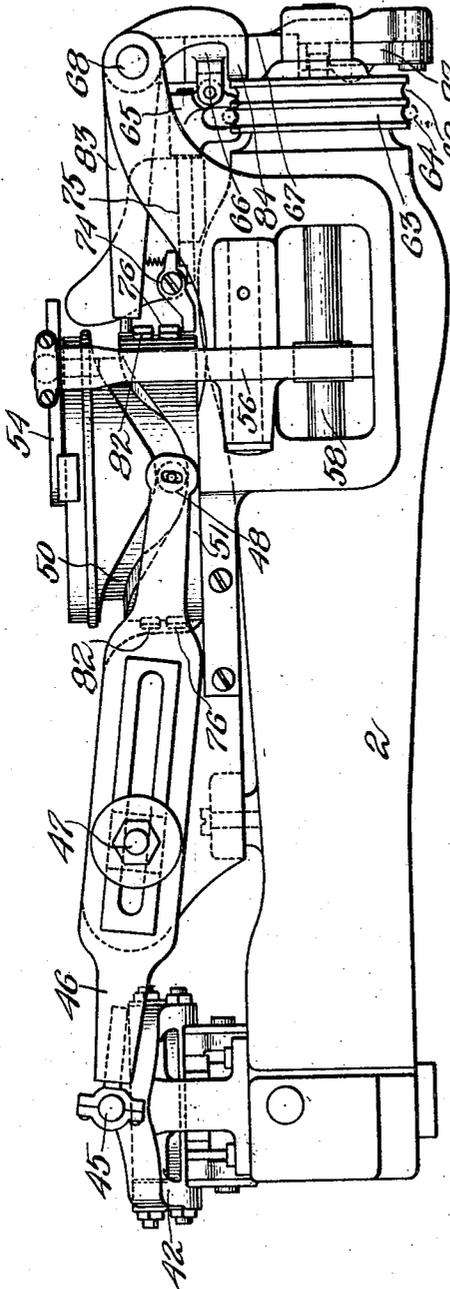


Fig. 4.

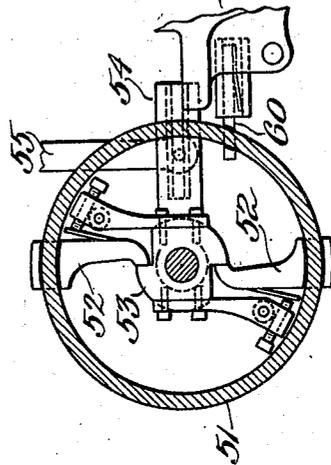
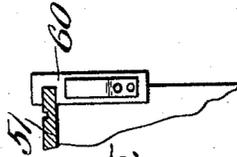


Fig. 5.



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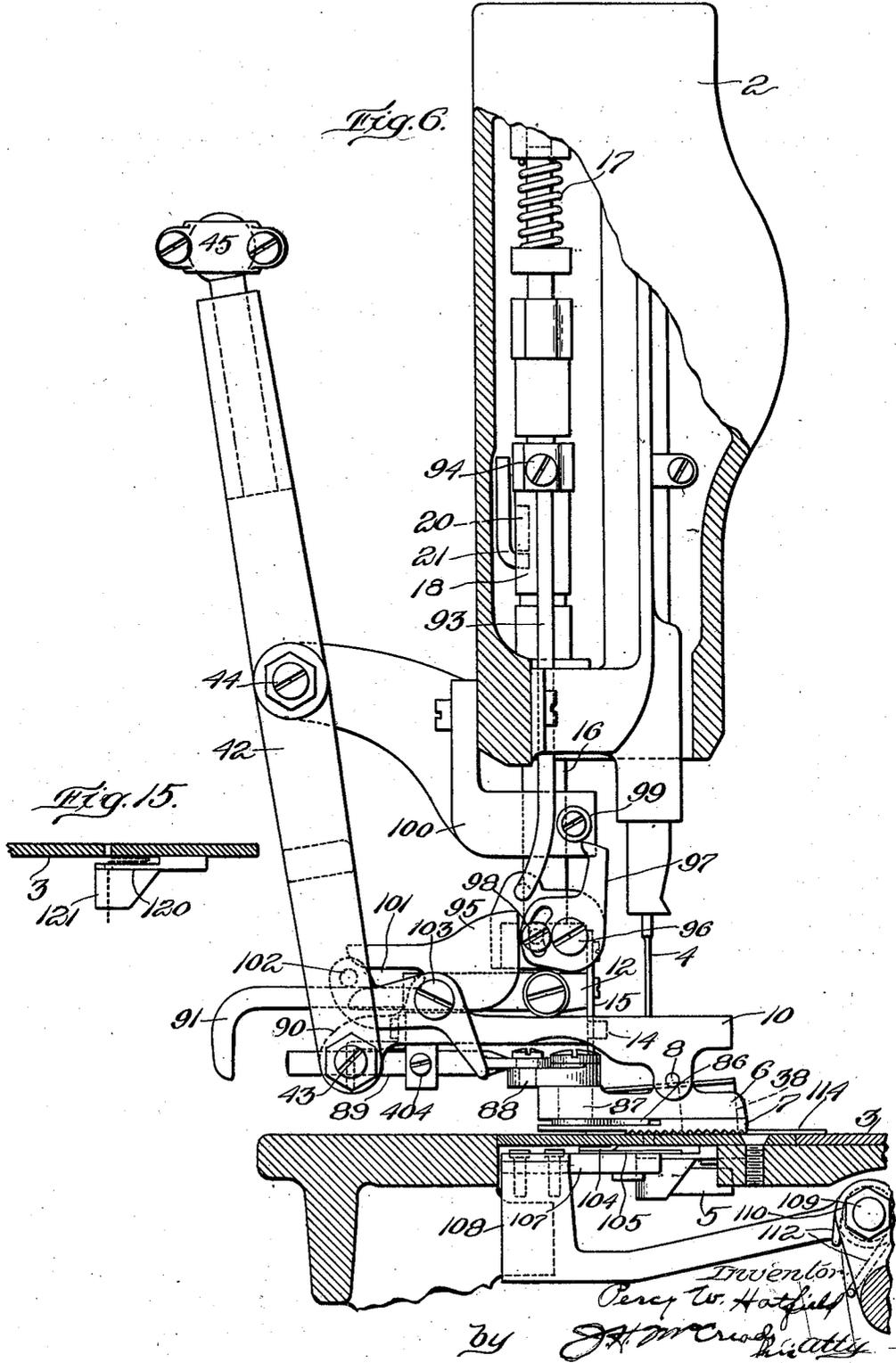
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Original Filed Feb. 4, 1924

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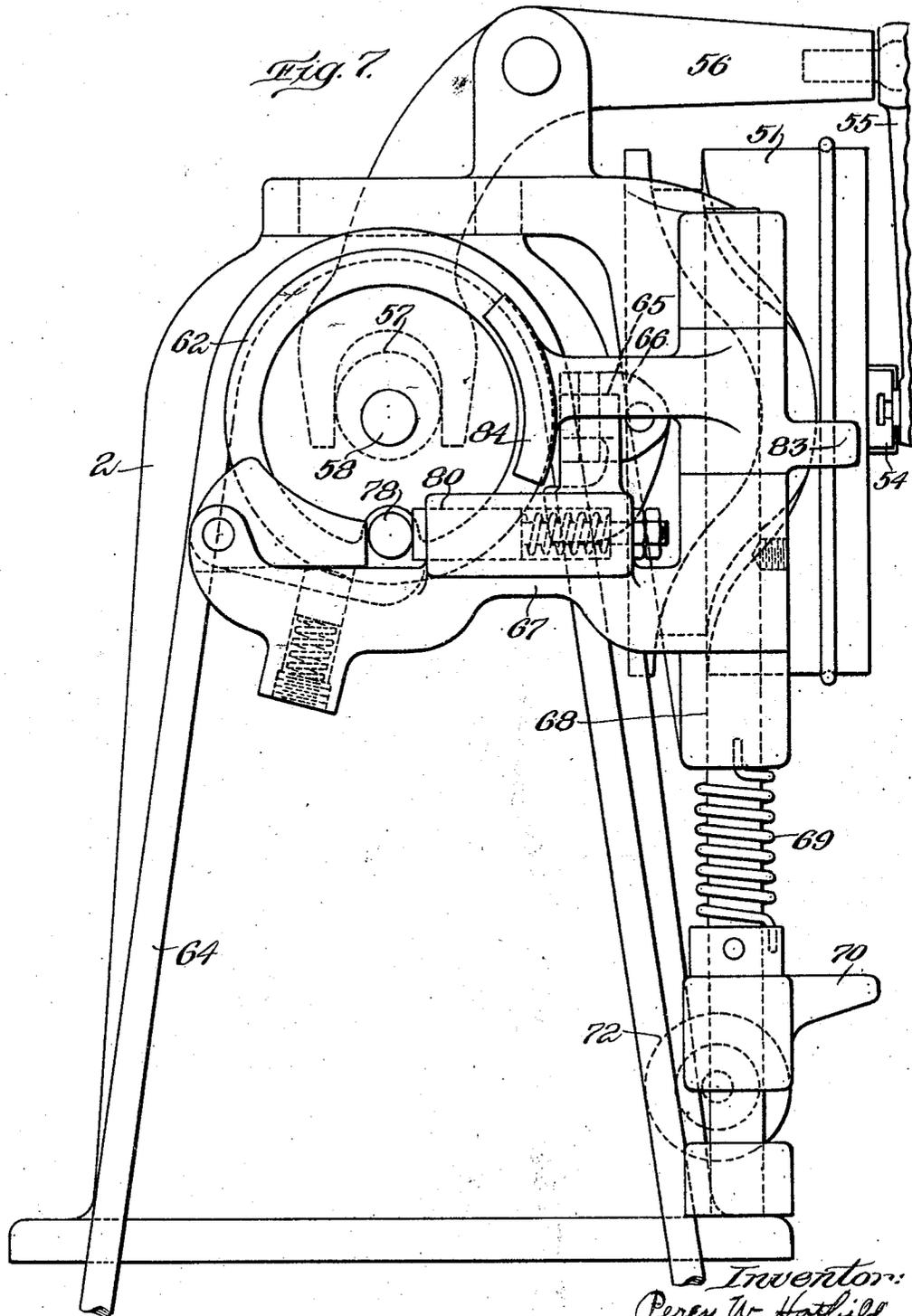
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LABEL SEWING MACHINE

Original Filed Feb. 4, 1924

6 Sheets-Sheet 4



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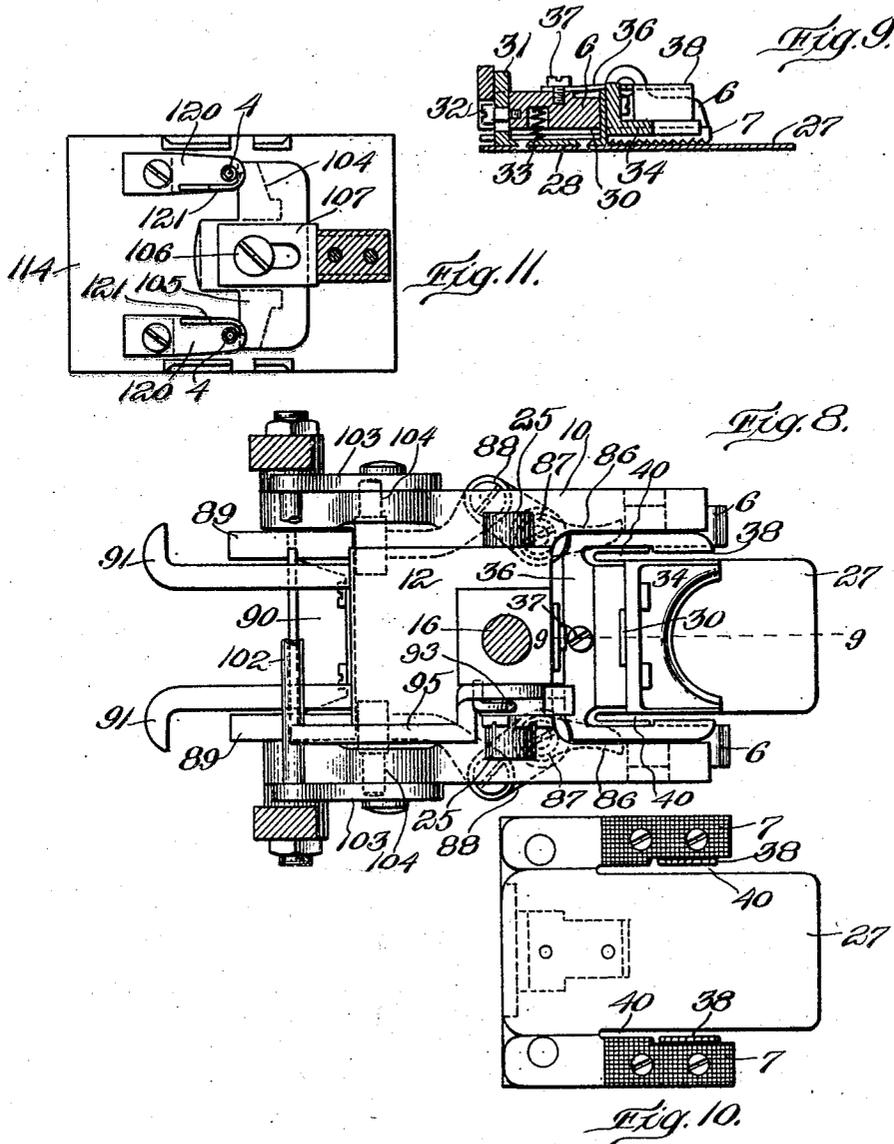
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LABEL SEWING MACHINE

Original Filed Feb. 4, 1924

6 Sheets-Sheet 5



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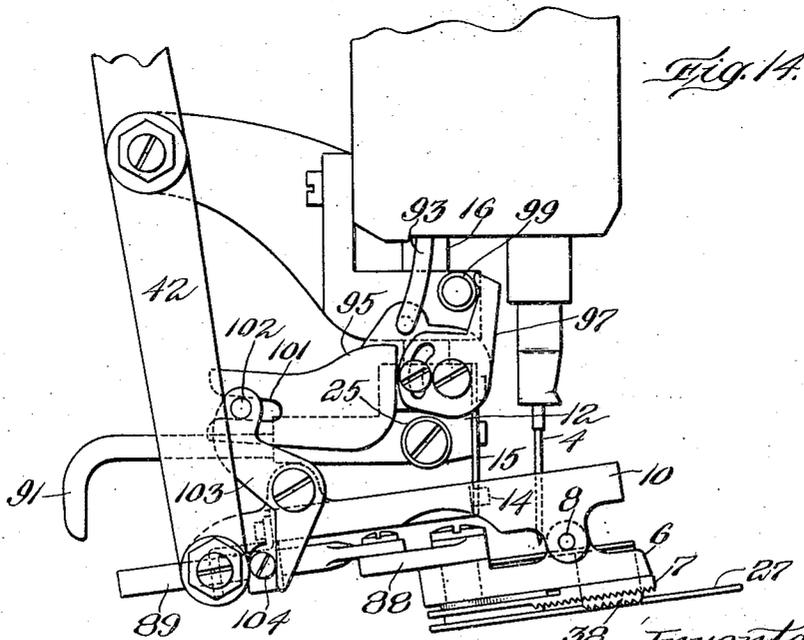
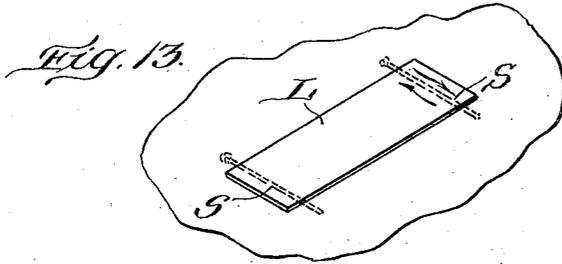
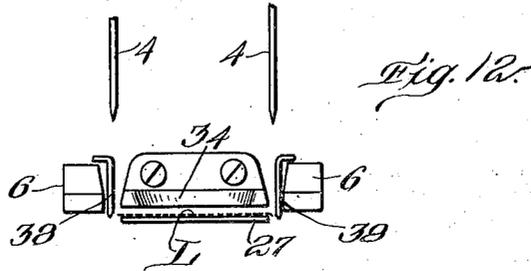
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LABEL SEWING MACHINE

Original Filed Feb. 4, 1924

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

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LABEL-SEWING MACHINE

Original application filed February 4, 1924, Serial No. 690,359. Divided and this application filed July 24, 1925. Serial No. 45,861.

This invention relates to sewing machines, and is especially concerned with machines designed to sew labels, patches, stays, reinforcements, and the like, on underwear or any sheet material. The invention will be herein disclosed as embodied in a machine designed especially for sewing labels on underwear, although it is contemplated that it may be used for other purposes, and the term "label", therefore, as used in this application is designed to include other work which the machine is adapted to operate on.

It has been a common practice heretofore to sew labels on underwear with a so-called "patch" sewing machine. Many manufacturers find such a machine objectionable, however, for the reason that it leaves too wide a margin between the line of stitching and the edge of the label. A more common practice, therefore, is to sew the labels on with the aid of an ordinary sewing machine, the work being guided by hand and all four edges being sewed down. This is a relatively slow operation, it requires a long time for an operator to become expert at it, and only certain types of operators are suited for this work. Furthermore, because the work is guided by hand, the results are not uniform, the lines of stitches in some cases not being parallel to the edges of the label, while at other times the stitching runs over the edge of the label instead of being stopped within the margin, as it should be. Frequently, mistakes made in sewing on the labels are of such a nature that the labels must be ripped off and the work done over.

The present invention deals with the problems presented by these conditions, and it has for its general object to improve the construction of sewing machines with a view to substantially eliminating the skill now required in sewing on labels, producing better and more uniform results, and to devising a mechanism for performing this work more rapidly than prior machines. The invention is especially concerned with mechanism for severing the threads when the sewing operation has been completed.

In the rotary shuttle or so-called "vertical hook" type of sewing machine it has

proved impractical heretofore to use a cutter for the shuttle thread. At the same time this type of machine is more rapid than the oscillating hook lock stitch type, and it is one of the objects of this invention to overcome the objections that have been encountered heretofore in using a shuttle thread cutter with a vertical hook lock stitch sewing machine.

The various features of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a front elevation of the more important parts of a sewing machine embodying this invention;

Fig. 2 is a side view, partly in vertical cross section, showing part of the operating mechanism for one of the thread cutters;

Fig. 3 is a plan view of the machine shown in Fig. 1;

Fig. 4 is a rear view, partly in cross section, of a portion of the work feeding mechanism;

Fig. 5 is a fragmentary view of one of the parts shown in Fig. 4;

Fig. 6 is a view, partly in end elevation and partly in vertical cross section, showing the label holder and adjacent parts;

Fig. 7 is an end view showing a portion of the work feeding mechanism;

Fig. 8 is a plan view, partly in cross section, of the label holder and adjacent parts;

Fig. 9 is a cross sectional view on the line 9-9, Fig. 8;

Fig. 10 is a bottom view of the label holder;

Fig. 11 is a plan view of the device for cutting the shuttle thread and the parts located adjacent thereto;

Fig. 12 is a front diagrammatic view showing the relationship of the label holder to the needles and adjacent parts;

Fig. 13 is a perspective view showing a label sewed on a garment by this machine;

Fig. 14 is a side elevation of the label

holder and the parts immediately cooperating therewith; and

Fig. 15 is a side elevation showing the manner in which the thread is held after being severed.

The machine shown includes the usual arm 2, Fig. 1, rising from a work supporting table or plate 3. The sewing instrumentalities include two needles 4—4 spaced apart and two shuttles mounted below the plate 3 to cooperate with the respective needles. Associated with each shuttle is a rotary hook of the so-called "vertical" type which rotates in a horizontal plane, one of these shuttle and hook arrangements being indicated at 5 in Fig. 6. In its general features, and except for the differences hereinafter pointed out, this machine is constructed, arranged and operates like the usual commercial machines of the type indicated.

The machine includes a special presser foot which comprises a body 6, Figs. 6, 9 and 14, having two knurled or roughened plates 7—7 screwed to the lower side thereof. The body 6 is pivoted at 8 to a bracket 10, and this entire bracket, and the parts carried thereby, are suspended normally from a presser foot head 12. The connection between the parts 10 and 12 includes a stud 14 that extends forward from a portion of the bracket 10, and a plate 15 which is screwed to the front side of the head 12 and has a short slot therein to receive the stud 14, as best shown in Fig. 1. The presser foot head 12 is secured on the lower end of the usual presser foot shaft or post 16, Fig. 6, which is supported vertically in the head of the machine and is normally pressed downwardly by a spring 17. A sleeve 18 is mounted on the presser foot post 16 and arranged to have a limited sliding movement thereon, and this sleeve carries a lug 20 which is arranged to be engaged by a finger 21, Fig. 6, of a presser foot lifting lever 22, Fig. 1, which is fulcrumed on the machine frame at 23 and is connected by means of a rod or chain 24 with a presser foot lifting treadle, not shown. Consequently, by depressing the treadle the presser foot is lifted off the work, but when the treadle is released the presser foot is lowered into engagement with the work, partly due to the weight of the parts, and partly due to the pressure of the spring 17. The pressure of this spring is transmitted to the presser foot through two rolls 25—25 carried by the presser foot head 12 and arranged to bear on the bracket 10 when the presser foot is in its lowered or operative position, as shown in Fig. 6. The presser foot thus presses the garment to which the label is to be sewed against the work supporting table 3, and mechanism, hereinafter described, is provided to move this presser foot over the table for the purpose of giving the work the necessary feeding movement.

For the purpose of holding and positioning the label properly for attachment to the garment, a label holder is mounted on the presser foot 6. The construction of this holder is best shown in Figs. 8, 9 and 10. It comprises a horizontal plate 27 which lies between the knurled presser foot sections 7—7 and is riveted to a U-shaped bracket 28, Fig. 9. The upright arms 30 and 31 of this bracket are mounted in slots formed in the body 6 of the presser foot so that the plate can slide vertically with reference to the presser foot, this sliding movement being limited, however, by a screw 32, Fig. 9, which is secured in the presser foot 6 and projects through a slot formed in the member 31. A spring 33 interposed between the parts 6 and 28, tends to force the plate 27 downwardly. Mounted immediately above the plate 27 is a bracket 34 which is secured to the part 6 by screws. The label L is placed on the plate 27 and slipped under the bracket 34, while these two parts are held away from each other, or in their label receiving relationship, by the spring 33. The central portion of the bracket 34 is cut away, as clearly shown in Fig. 8, to facilitate the introduction of the label in this manner. The part 30 forms a back stop or gage for the label and prevents it from being positioned too far back in the label holder. As soon as the presser foot is lowered, in the manner above described, and the plate 27 comes into contact with the upper surface of the work supporting plate or table 3, the further downward movement of the presser foot head necessary to bring the presser foot firmly into engagement with the garment to which the label is to be attached, carries the bracket 34 down upon the label and clamps it firmly on the plate 27. This movement of the label holder relatively to the presser foot is permitted by the slidable connection between these parts as above described and by the spring 33. As soon as the presser foot is lifted again, the spring 33 moves the plate 27 downwardly with reference to the bracket 34, thus releasing the label.

In order to gage the endwise position of the label in the holder a U-shaped spring member 36 is secured to the presser foot 6 by a screw 37 and this member is provided with two down-turned ends 38—38, Figs. 8, 9 and 12, which are located at opposite sides of the bracket 34 where they serve to gage the positions of the ends of the label when it is inserted in the label holder. The lower edges of these gages 38—38 are toothed or roughened, as shown in Fig. 10, and they bear on the garment to which the label is to be stitched and assist the presser foot in feeding the work.

It will be observed from an inspection of Figs. 8 and 10 that the body of the presser foot is notched deeply to receive the label

holder and that the label holder is not as wide as the cut-out or notched portion, so that two deep slots 40—40 are provided in the presser foot at opposite sides of the label holder. These slots receive the needles 4—4.

For the purpose of feeding the presser foot and label holder past the needles, a lever 42, Figs. 1, 3 and 6, is pivoted at 43 to the rearward end of the bracket 10 and is fulcrumed at 44. The upper end of this lever is connected through a ball joint 45 with a feed lever 46 which is fulcrumed on the machine frame at 47. This fulcrum is adjustable to vary the throw or total feeding movement of the presser foot as may be desired for labels of different widths. At its rearward end the feed lever 46 carries a roll 48 which runs in a groove 50 formed in a feed cam 51. The cam is mounted on a stub shaft and is rotated step by step by a ratchet clutch mechanism of a form commonly used in sewing machines and which is best shown in Fig. 4. This mechanism comprises clutch arms 52—52 that grip the rim of the cam 51 and bear against a central hub member 53 having an arm 54 projecting therefrom. This arm is connected by a link 55, Figs. 4 and 7, with a bell crank lever 56 having a forked end which straddles an eccentric 57, Fig. 7, secured fast on the main cam shaft 58 of the machine. The mechanism thus imparts an oscillating movement to the arms 52—52, causing them to grip the rim of the cam 51 as they are moved forward and to release the rim and slip on it as they move in the opposite direction. The length of each movement thus imparted to the cam, and consequently to the presser foot, may be varied by adjusting the link 55 in the arm 54, and this adjustment thus varies the length of the stitch. The machine makes a single stitch for each revolution of the cam shaft 58. A part 60, Fig. 4, grips the rim of the cam 51 upon each backward movement of the parts 52—52 and prevents the cam from rotating in a reverse direction. The cam 51 is double and makes half a revolution in each cycle of the machine.

Due to the shape of the cam path 50 in the cam 51, and to the manner in which the machine is automatically stopped, the machine is operative, when once started, to feed the work forward far enough to carry the label entirely past the sewing instrumentalities and then backward again, so that the machine makes a double line of stitches across each end of the label, as indicated at S in Fig. 13. The cam 51 also is provided with a dwell at the beginning and end of the feeding movement so that when the machine is first started it will make two superposed stitches before any feeding movement of the work begins, and at the completion of the sewing or stitching operation it will again pause while the stitching mechanism contin-

ues to operate so that two more superposed stitches will be made at the end of each seam. These superposed stitches form, in effect, a knot and effectually prevent the thread from ravelling.

In order to start and stop the machine it is provided with fast and loose pulleys 62 and 63, respectively, Figs. 1, 3 and 7, and the driving belt 64 is engaged by a belt shipper 65 which is pivotally connected to a part 66, Figs. 3 and 7, carried by an arm 67 which is secured on an upright rock shaft 68. A spring 69 encircles this shaft and is fastened to it at one end and to a stationary bracket at its opposite end so that it tends to rotate the shaft in a counter-clockwise direction, Fig. 3. It may be moved in the opposite direction, however, by means of an arm 70 having a cord or chain 71, Fig. 1, connected thereto and running over a pulley 72 to a foot treadle, not shown. When this foot treadle is depressed it swings the arm 67 outwardly away from the face of the pulley 62 and operates through the belt shipper 65 to move the belt or band 64 on to the fast pulley 62. This starts the machine into operation, and the belt shipper is held in this position by a spring pressed latch 74, Fig. 3, which engages a notch in the end of a rod 75 that projects from the belt shipper 65. When the machine has completed its cycle of operations, either one of two lugs 76—76, Fig. 3, mounted on the cam 51, engages the latch 74 and trips it out of engagement with the rod 75. Thereupon, the spring 69 swings the arm 67 inwardly toward the face of the pulley 62, and shifts the belt 64 on to the loose pulley. This arm carries a spring pressed block 77 which is engaged by a pin 78, Fig. 7, that projects from the pulley 62, and such engagement slows down the movement of the pulley very substantially before the pin 78 strikes the spring pressed plunger 80 and positively stops the machine. When the starting treadle is again depressed the arm 67 is swung outwardly, as above described, thus carrying the plunger 80 out of contact with the stop pin 78, this action taking place at substantially the same time that the belt is shifted from the loose to the fast pulley.

At substantially the same time that the latch 74 is tripped by the lug 76, another lug 82 carried by the cam 51 engages one end of a bell crank lever 83. This lever has a brake 84 formed on its opposite end arranged to engage the surface of the fast pulley 62 to reduce the speed of the machine before the pin 78 strikes the spring pressed member 77.

After the stitching operation has been completed it is desirable to sever the threads close to the work and an important feature of this invention resides in cutters for severing both the needle and shuttle threads. Referring to Figs. 6 and 8 it will be seen that the needle thread cutters 86—86 are mounted in slots

formed between the parts 6 and 7 of the presser foot and that they are arranged to swing across the portion of the slots 40—40 in which the needles are working at the end of the sewing operation. These cutters are mounted, respectively, on the lower ends of rock shafts 87—87 having arms 88—88 secured to the upper ends thereof. Curved rods 89—89 are pivoted to the respective arms 88—88 and are supported by a sheet metal bracket 90 which is secured to the rearward side of the bracket 10. As the presser foot is moved backwardly during the stitching operation, the ends of the rods 89—89 come in contact, respectively, with curved bars 91—91 and such contact moves the rods forward relatively to the presser foot, thus swinging the cutters 86—86 inwardly and setting these cutters in readiness for performing the cutting operation. The cutters remain in their inward positions while the presser foot is fed forward again and the stitching operation is completed.

When the presser foot is lifted to release the work the end 21 of the lever 22, previously referred to, first lifts the sleeve 18, Fig. 6, for a short distance before the presser foot post 16 is lifted. This post and the presser foot head are next lifted for an appreciable distance before the presser foot is lifted off the work, due to the lost motion connection provided between these parts. The thread cutting mechanism is operated while this lost motion between the sleeve 18 and presser foot is being taken up. For this purpose a heavy wire or small rod 93, Fig. 6, is secured to the sleeve 18 by a screw 94 and its lower end is bent at right angles and projects through a hole in a plate 95 which is pivoted on the presser foot head at 96. A dog 97 is adjustably secured to the plate 95 by means of a screw 98, and as the presser foot head is lifted the upper end of this dog engages a roll 99 which is secured on the side of a fixed bracket 100. This engagement results, as the presser foot head continues to rise, in tipping the plate 95 in a clockwise direction, Fig. 6, the rod or wire 93 yielding sufficiently to permit this movement. The rearward end of the plate 95 is slotted or forked, as shown at 101, to receive a rod 102 that connects two bell crank levers 103—103 which are pivoted on opposite sides of the bracket 10, as clearly shown in Figs. 6 and 8. The tipping of the plate 95 operates through the rod 102 to swing the levers 103—103 in a clockwise direction, Fig. 6, about their pivots and the lower ends of these levers engage studs 404 carried by the rods 89 and move these rods backwardly. This swings the cutters 86—86 outwardly across the slots 40—40 and causes them to sever the needle threads. Fig. 14 shows the parts after the cutting operation has been completed and the presser foot has been lifted substantially to the up-

per limit of its movement. As above stated, the cutting operation takes place before the presser foot has been lifted substantially so that the threads are cut very close to the work.

The same act of lifting the presser foot also is utilized to operate the mechanism for cutting and positioning the shuttle thread. Referring to Figs. 2, 6 and 11, the cutter is indicated at 104 and the movable element of the thread positioning device at 105. Both of these parts are adjustably secured by means of a screw 106, Fig. 11, to a bar 107 which is mounted on an arm 108. This arm is pivoted at 109, Fig. 6, on another arm 110 which is secured to a rock shaft 111, a spring 112 connecting the parts 110 and 108 in a manner readily understood from Fig. 6, to cause the spring to lift the arm 108 and hold the cutter 104 in engagement with the lower face of the removable section 114 of the table 3. Secured to the rock shaft 111 is an arm 115, Fig. 2, carrying a pin 116 which is arranged to be engaged by a lever 117 that is connected by a cord or chain 118 to the treadle rod 24, Fig. 1. Consequently, when the presser foot treadle is depressed to lift the presser foot, the connections just described will operate to move the cutter 104 and the part 105 forward, the cutter sweeping across the needle holes in the plate 114 and severing the shuttle threads at said holes. The part 114 serves as a shearing plate and cooperates with the cutter 104 in severing the threads.

The edge of the thread positioning plate 105 precedes the knife or cutter 104 during the cutting movement, so that it engages the threads between the shuttles and the work and draws off a certain length of each thread before the thread is severed by the cutter. The length of thread so engaged is pushed into a slot formed between the lower face of the plate 114 and the upper surface of a clip 120, Figs. 6 and 11, which carries the needle guard 121, it being understood, of course, that one of these combined clips and guards is provided for each needle. When the cutter 104 and the positioner 105 are withdrawn, the end portion of each shuttle thread is left in its respective clip in substantially the position into which it has been moved by the part 105. The thread need not be gripped or clamped in this position for the reason that there is no tendency to displace it until the machine is again started. The location of the end portion of each shuttle thread in a definite position after the cutting operation has been completed is of vital importance, however, in a vertical hook type of machine since without it, it is practically certain that when the machine is started again the shuttle thread will be caught by the hook and carried around with it so that the stitch will not be completed. By definitely locating the end portion of the shuttle thread any action of

this kind is avoided, and it is certain that a perfect stitch will be made immediately upon the resumption of operation of the machine. The invention thus overcomes completely the difficulties that have been experienced heretofore in using a shuttle thread cutter with this type of sewing mechanism.

In using this machine the operator inserts a label (which preferably has already had its ends folded under) into the label holder while this holder and the presser foot are in their raised positions, as shown in Fig. 14. She then releases the presser foot treadle to lower the presser foot into engagement with the garment which she has placed properly on the work supporting table. The operator next depresses the starting treadle, whereupon the sewing instrumentalities first tie a knot at the beginning of the seam, as above described, and then sew across the label and back, automatically, finishing by tying another knot. The machine stops automatically when the sewing of a label has been completed. The operator next depresses the presser foot treadle, thus lifting the presser foot, which action operates the cutters and causes them to sever both the needle and the shuttle threads. The cutters are positively actuated and consequently they are extremely reliable in operation. The operator next removes the work from the machine and repeats the operations above described.

It will now be appreciated that this invention substantially eliminates the requirement for skill in the label sewing operation. All that an operator is required to do is to place a label properly in the label holder, to locate the garment under the presser foot, and to operate two treadles. The feeding of the work, length of the seams, location of the seams on the label, and the cutting of the threads are all performed automatically, and are entirely out of the control of the operator.

While I have herein shown and described the best embodiment of my invention that I have so far devised, it will be evident that the invention may be embodied in other forms without departing from the spirit or scope thereof.

The present application is a division of my prior application Serial No. 690,359, filed February 4, 1924, the claims in the present case being confined to the thread cutting mechanism.

Having thus described my invention, what I desire to claim as new is:

1. In a label sewing machine, the combination of sewing instrumentalities adapted to stitch simultaneously across opposite ends of a label, said instrumentalities including two needles spaced apart and shuttles cooperating with said needles, means for holding the label and the work in operative relationship to said instrumentalities, mechanism cooperating with said means to feed the work and

the label past said instrumentalities, cutters operative to sever both the needle and shuttle threads, and a common actuating means for said cutters.

2. In a label sewing machine, the combination of sewing instrumentalities adapted to stitch simultaneously across opposite ends of a label, said instrumentalities including two needles spaced apart and shuttles cooperating with said needles, means for holding the label and the work in operative relationship to said instrumentalities, said means including a presser foot, mechanism cooperating with said means to feed the label and work past said instrumentalities, cutters for severing both the needle and shuttle threads close to the work, mechanism for lifting said presser foot, and connections between said presser foot lifting mechanism and cutters for operating the cutters.

3. In a machine of the character described, the combination of sewing instrumentalities including a needle and a shuttle cooperating with said needle, a cutter for severing the shuttle thread, a device arranged to engage the thread in advance of said cutter and between said cutter and the shuttle, a clip into which said device is arranged to carry the thread, said clip being operative to retain the thread independently of said device, and a single mechanism for operating said cutter and device.

4. In a machine of the character described, the combination of sewing instrumentalities including a needle and a shuttle cooperating with said needle, means including a presser foot for holding the work in operative relationship to said instrumentalities, operating mechanism for said presser foot, a cutter for severing the shuttle thread, a device arranged to engage the shuttle thread in advance of said cutter and between the point at which it is severed and the shuttle, a clip into which the thread is carried by said device, said clip being operative to retain the thread independently of said device, and connections for enabling said presser foot operating mechanism to operate both said cutter and device.

5. In a label sewing machine, the combination of sewing instrumentalities adapted to stitch simultaneously across opposite ends of a label, said instrumentalities including two needles spaced apart, means for holding the label and work in operative relationship to said instrumentalities, said means including a presser foot, cutters carried by said presser foot for severing both threads handled by said needles, mechanism for lifting said presser foot, and means arranged to be brought into operation by said mechanism for automatically operating said cutters to sever the threads before any substantial lifting movement of the presser foot has occurred.

6. In a label sewing machine, the combination of sewing instrumentalities adapted to

- stitch simultaneously across opposite ends of a label, said instrumentalities including two needles spaced apart, a holder for clamping the label in position for the sewing operation, said holder having slots for the passage of said needles and a part adjacent to said slots for bearing on the label between the needles, and cutters associated with said holder and mounted to move across said slots to sever the needle threads. 70
7. In a label sewing machine, the combination of sewing instrumentalities adapted to stitch simultaneously across opposite ends of a label, a presser foot for bearing on the work, a holder for the label associated with the presser foot and serving to support the label independently of the work while it is stitched to the work, cutters carried by said presser foot for severing the needle threads, and means for operating said cutters simultaneously. 75
8. In a label sewing machine, the combination of sewing instrumentalities adapted to stitch simultaneously across opposite ends of a label, a presser foot for bearing on the work, a holder for the label associated with the presser foot and serving to support the label independently of the work while it is stitched to the work, means for feeding said holder past said sewing instrumentalities, means for moving said holder transversely to said feeding movement, cutters associated with said presser foot for severing the needle threads, and means for utilizing said transverse movement of said holder to operate said cutters. 80
9. In a label sewing machine, the combination of sewing instrumentalities adapted to stitch simultaneously across opposite ends of a label, said instrumentalities including two needles spaced apart, a holder for clamping the label in position for the sewing operation, a presser foot associated with said holder and having parts located at opposite sides of the holder to engage the work, cutters pivoted in said presser foot for severing the needle threads, means for feeding said holder past said needles, and means for utilizing said feeding movement to position said cutters for the thread cutting operation. 85
10. In a label sewing machine, the combination of sewing instrumentalities adapted to stitch simultaneously across opposite ends of a label, a presser foot for bearing on the work, a holder for the label associated with the presser foot and serving to support the label independently of the work while it is stitched to the work, means for feeding said holder past said sewing instrumentalities, means for moving said holder transversely to said feeding movement, cutters associated with said presser foot for severing the needle threads, means for utilizing said feeding movement to position said cutters for the thread cutting operation, and additional means for giving said cutters their operative movement. 90
- In testimony whereof I have signed my name to this specification.
 PERCY W. HATFIELD. 95