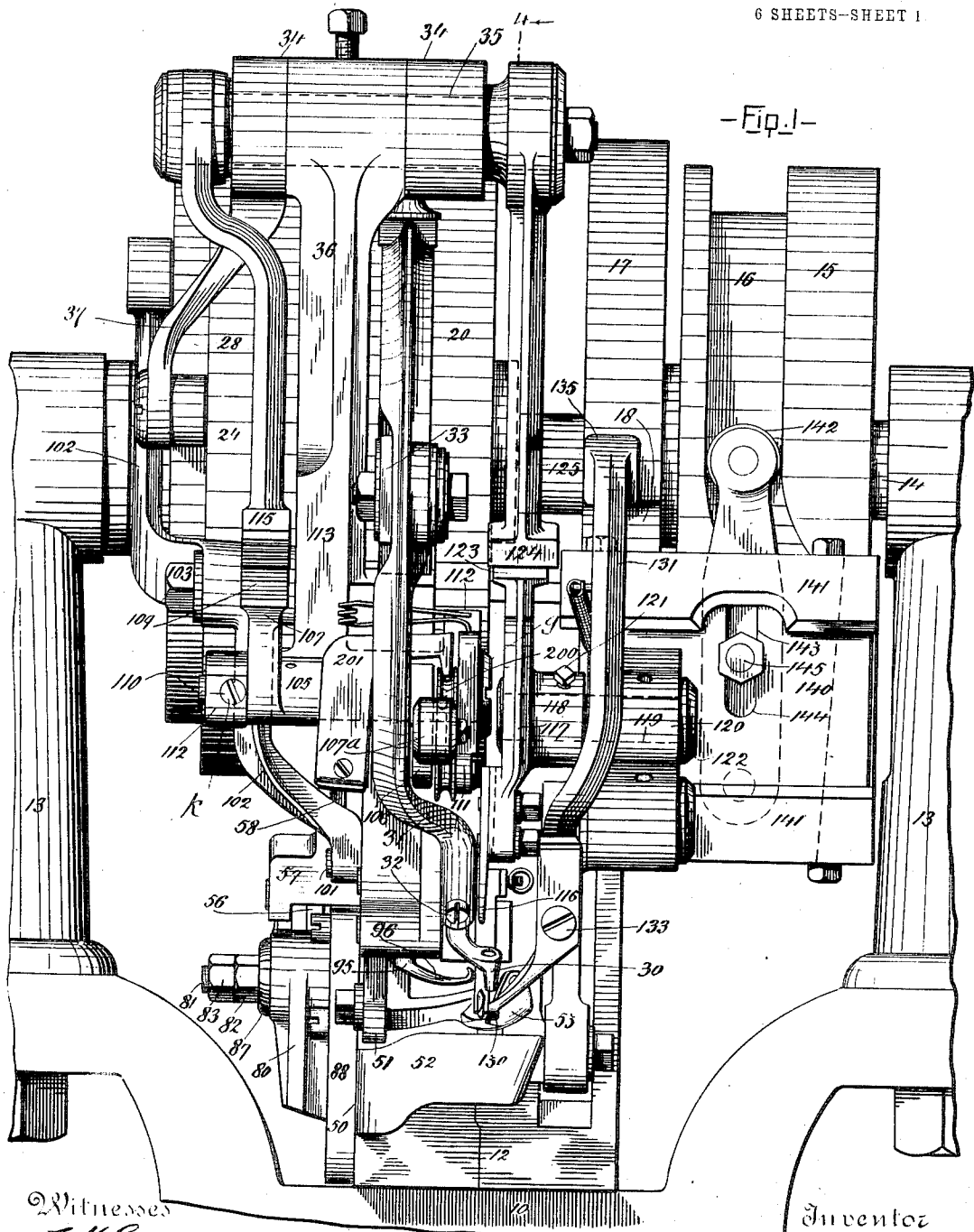


F. J. FREESE.
SEWING MACHINE.
APPLICATION FILED FEB. 9, 1899.

1,030,512.

Patented June 25, 1912.

6 SHEETS-SHEET 1



Witnesses
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Inventor
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 By *his* Attorney
John W. Mann

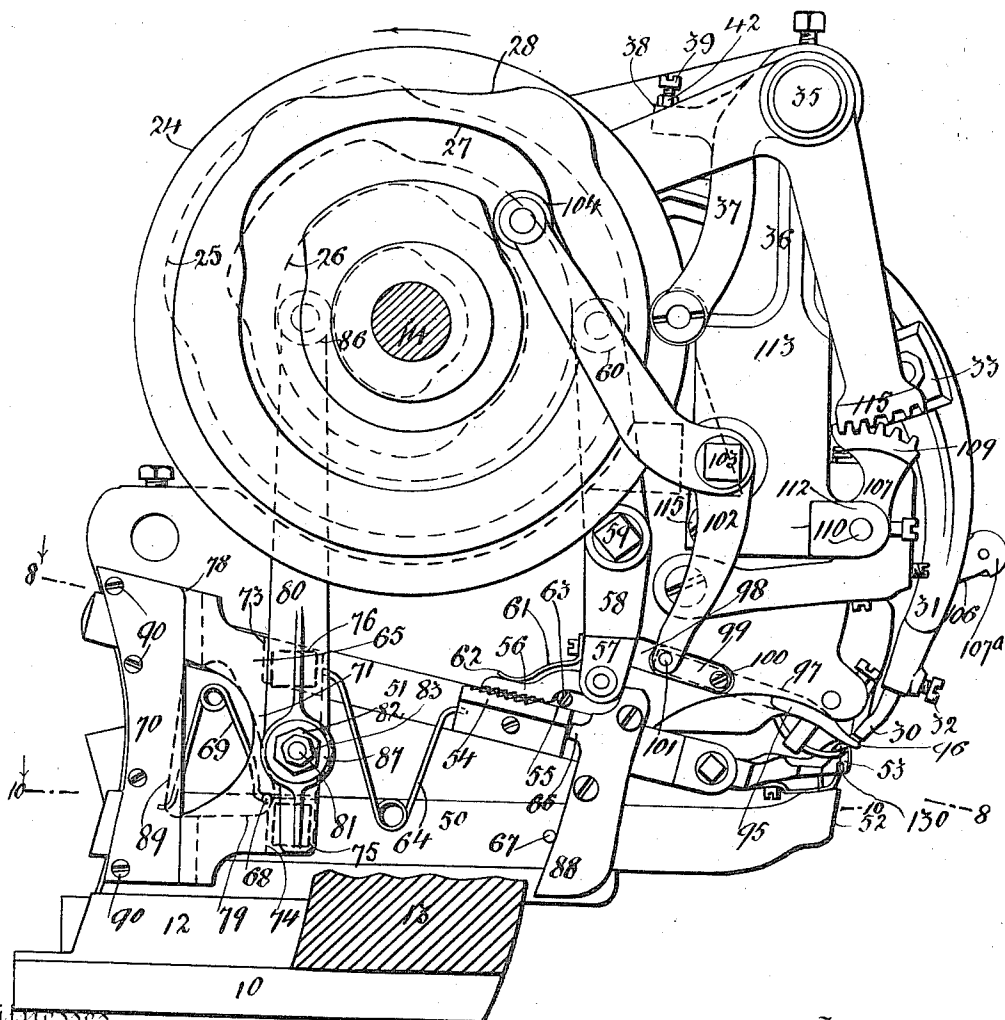
1,030,512.

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6 SHEETS-SHEET 2.

-Fig 2



Witnesses
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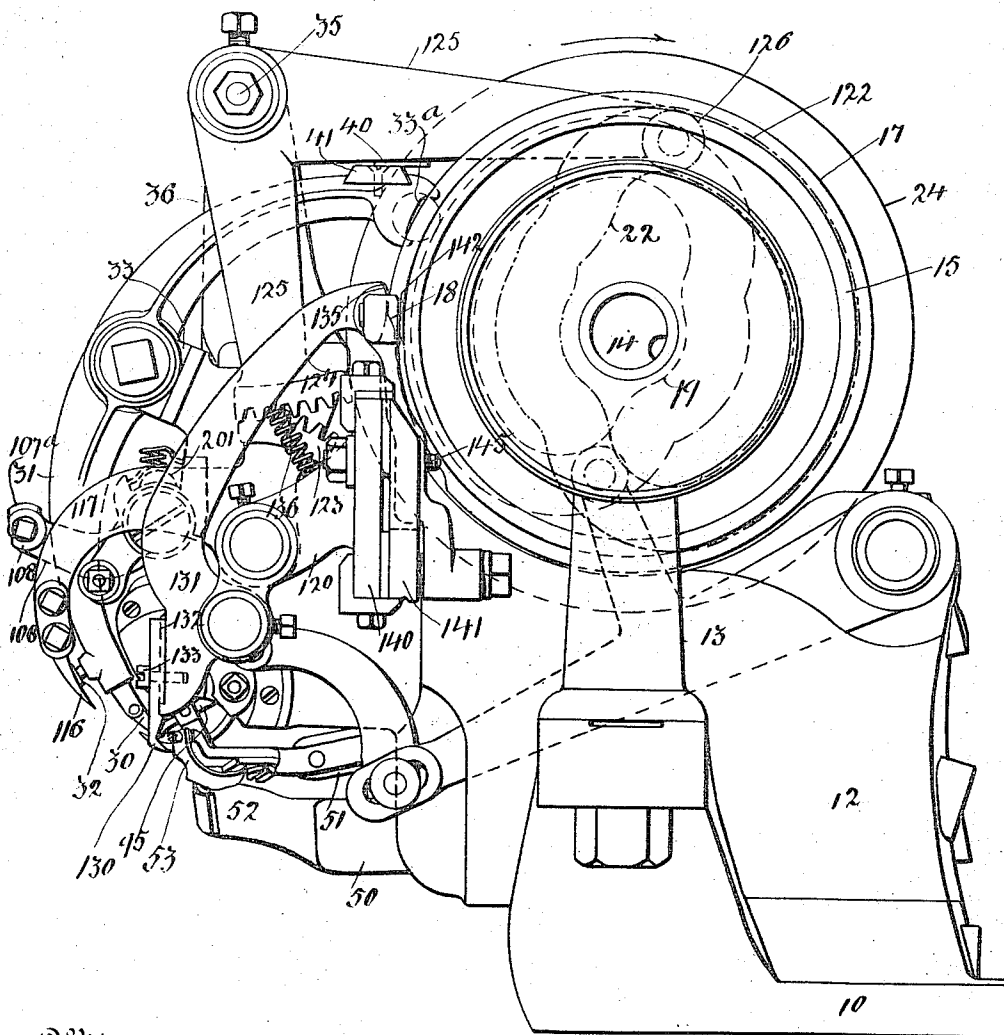
F. J. FREESE.
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6 SHEETS—SHEET 3.

Fig. 3



Witnesses
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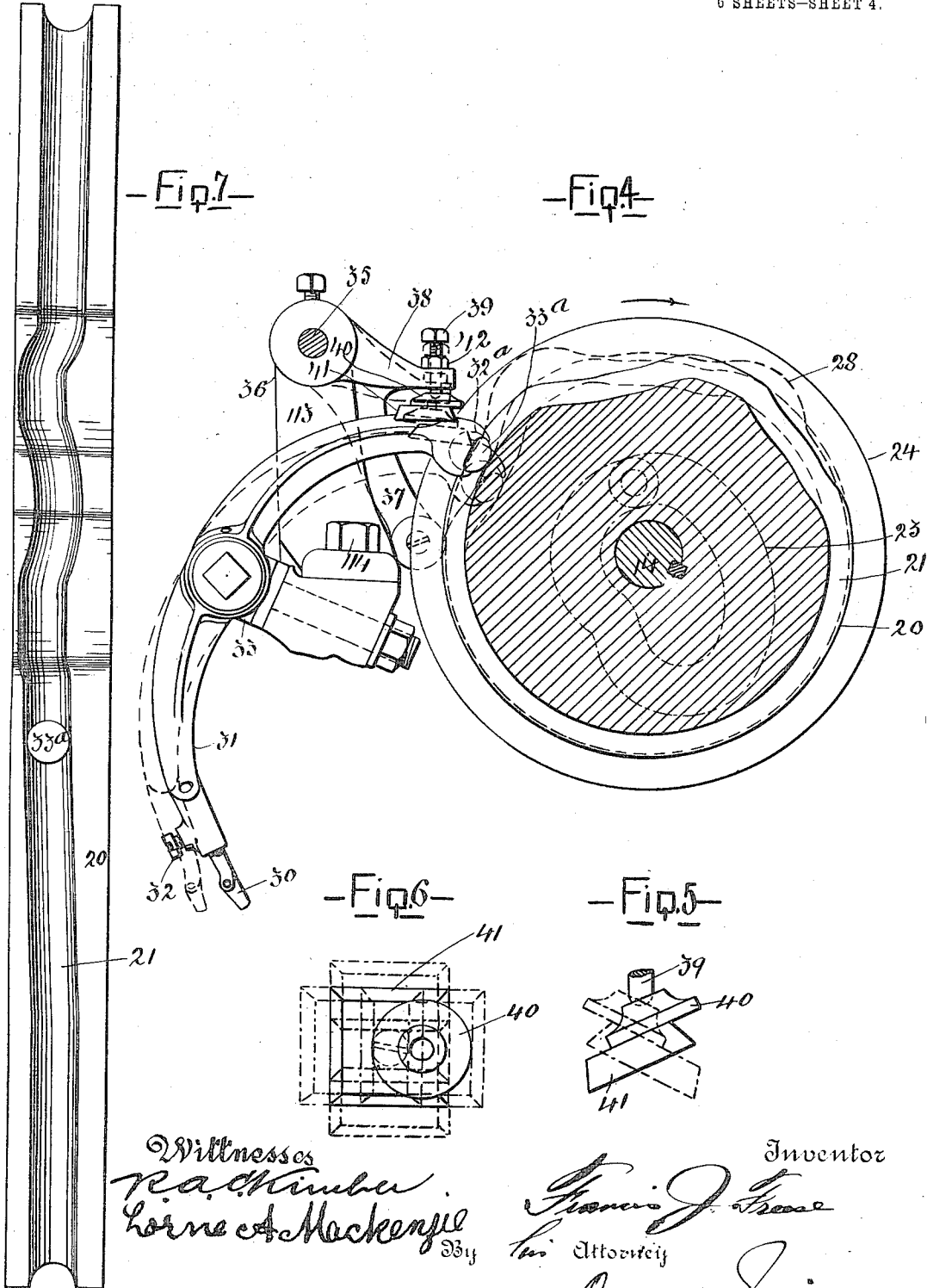
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F. J. FREESE.
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1,030,512.

Patented June 25, 1912.

6 SHEETS—SHEET 4.



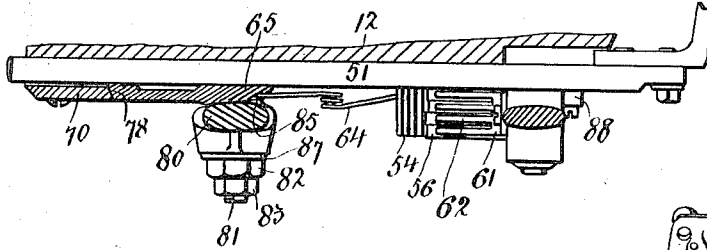
F. J. FREESE.
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1,030,512.

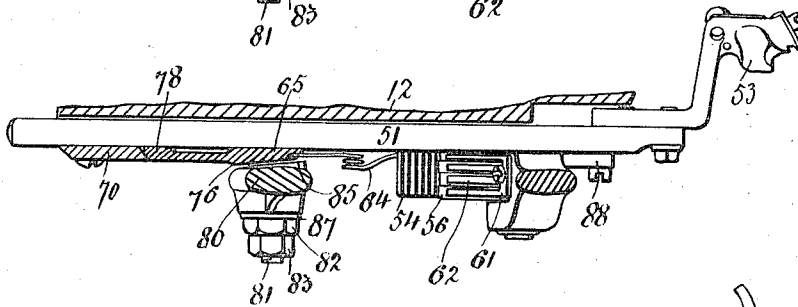
Patented June 25, 1912

6 SHEETS--SHEET 5.

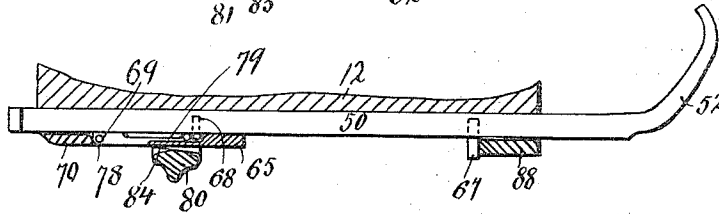
-Fig 8-



-Fig 9-



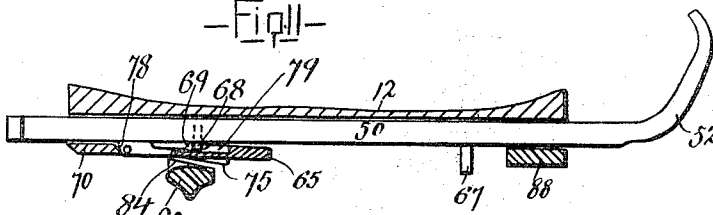
-Fig 10-



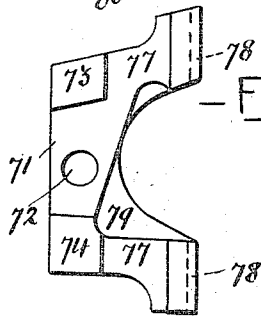
-Fig 14-



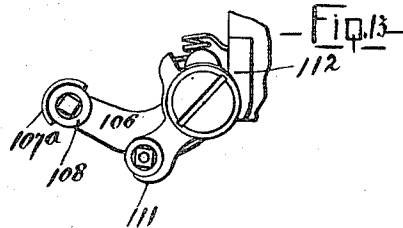
-Fig 11-



-Fig 12-



-Fig 13-



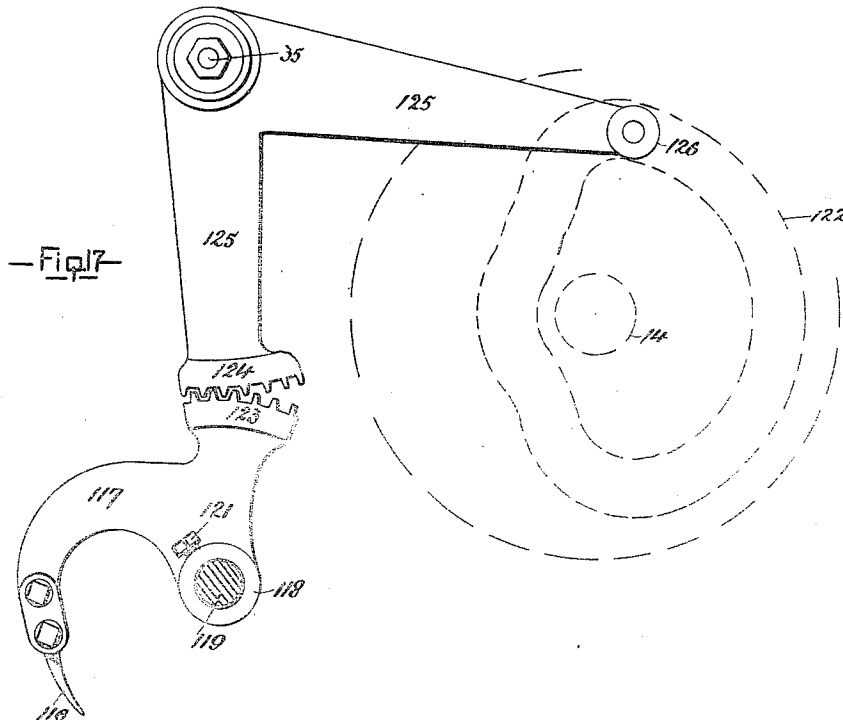
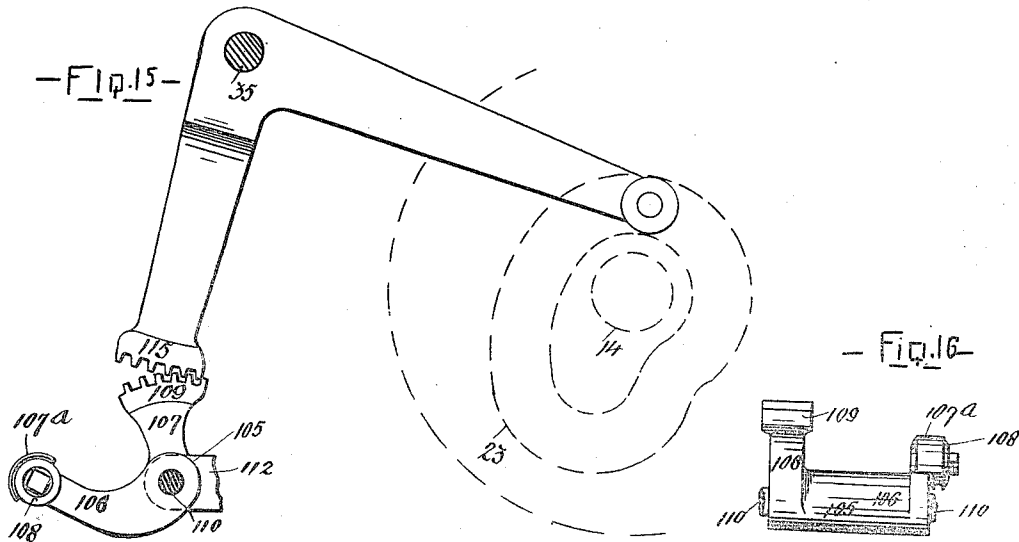
Witnesses
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F. J. FREESE.
SEWING MACHINE.
APPLICATION FILED FEB. 9, 1899.

1,030,512.

Patented June 25, 1912.
6 SHEETS—SHEET 6.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANCIS JOSEPH FREESE, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

1,030,512.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed February 9, 1899. Serial No. 705,134.

To all whom it may concern:

Be it known that I, FRANCIS JOSEPH FREESE, of the city of Montreal, Province of Quebec, Dominion of Canada, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

The present invention relates to an improvement in chain stitch sewing machines and more particularly chain stitch shoe sewing machines of the wax thread curved hook needle type.

The object of the present invention is to reorganize and improve sewing machines of this type, and the present invention consists in the devices and combinations of devices hereinafter described and claimed.

In the accompanying drawings illustrating the preferred form of my invention Figure 1 is a front elevation and Fig. 2 a side elevation looking at the left-hand side of Fig. 1 and Fig. 3 a side elevation looking at the right-hand side of Fig. 1 of my improved machine; Fig. 4 is a detail sectional view of the looper and its operating mechanism; Figs. 5 and 6 are detail views hereinafter referred to; Fig. 7 illustrates a development of the surface of the looper cam disk; Figs. 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 are details hereinafter referred to.

The illustrated embodiment of my invention comprises a reorganization of the well-known Goodyear welt and turn sewing machine. The frame of the machine consists of a base 10, a central web portion 12, and pedestals 13 for supporting the main shaft 14 upon which the cam disks are mounted in the usual manner. The needle is a curved hook needle mounted in the usual needle segment supported and operated in the usual manner. The looper 30 is mounted in the lower end of the looper lever 31 being adjustably secured therein by the set screw 32. This lever is pivotally mounted upon the swivel pin 33 mounted in the usual manner in the front of the web 12. The upper end of the looper lever is provided with a socket 32 which receives and rotatably holds therein a ball 33^a which engages the cam groove 21 of the cam disk 20 mounted on the main shaft 14 of the machine. The upper side of the upper end of the looper lever 31 is provided with a plane

surface 41 upon which the plate 40 rests. 55 The plate 40 is provided upon its upper side with a central spherical depression which is engaged by the spherical end of a screw 39 adjustably secured by means of a set nut 42 in one arm of the bell crank lever 38 which will be hereinafter referred to as the auxiliary looper lever. The auxiliary looper lever 38 is pivotally supported upon the spindle 35 secured in the bracket 36 projected upwardly from the upper part 65 of the front of the web 12 to which it is secured by bolts 114. The auxiliary looper lever 38 is provided with a second arm 37 which carries upon its end a cam roll adapted to bear upon the cam surface 28 of the cam disk 24 mounted on the main shaft 14 of the machine. The above described arrangement and the shapes of the cam path 21 and cam surface 28 are such that the looper, after the needle has advanced 75 through the materials, passes around the needle to lay the thread in the hook thereof, making slightly more than a complete encircling movement of the needle and terminating its encircling movement in the rear and slightly to the right of the needle as it stands in its forward position, then moving to the left as the needle withdraws to lay the thread over the thread finger in which position it stands until the needle 85 again penetrates the materials and reaches its forward position, when it moves slightly forward during the retracting stroke of the thread finger and then encircles the needle as before. The shape of the cam path 21 90 and the cam surface 28 are such that the motions of the looper are positive, the arm 38 of the auxiliary looper lever falling as the looper lever 31 falls and holding the plate 40 in engagement with the plate 41 95 of the looper lever 31, and remaining in engagement therewith during the lateral motions of the looper lever, the changes in inclination of the surface of the plate 41 caused by the lateral oscillations of the 100 looper lever 31 being compensated for by the sliding of the plates 40 and 41, as illustrated diagrammatically, and with exaggeration so as to show this operation clearly, in Figs. 5 and 6. It is to be noted in this 105 connection that by providing extended areas of metal for engagement with each other at this point the wear of the surfaces upon

each other is reduced to a minimum and adequate lubrication is secured and preserved, the pressure between the parts being insufficient to squeeze out the lubricant.

5 It is also to be observed that while the spherical end of the screw 39, which engages the screw cavity of the upper surface of the plate 40, may wear during the operation of the machine, that such wear may be
10 taken up by a slight adjustment of the screw 39 in the end of the arm 38 of the auxiliary looper lever without destroying the accuracy of the relative movements of the looper lever and the auxiliary looper
15 lever.

Heretofore the looper lever of sewing machines of this general type have usually been operated by the cam surface in coöperation with a spring which acted to hold the upper
20 end of the looper lever against its cam. This construction entailed the disadvantages that the speed of the machine was limited by the speed of action of the spring, the cam rolls of the looper lever failing to follow the contour of its cam in case the speed
25 of the machine was so great that the spring would not have time to act to hold the rolls against the cam, resulting in what is known as "jumping" of the lever, that is, in the
30 cam rolls leaving the cam surface during a part of the revolution of the cam; and in the further objectionable mode of operation, resulting from the use of the spring, necessarily a strong one, tending to resist the
35 movement of the lever by the cam in riding up an incline, whereby the spring was required to be stretched by the cam entailing the consumption of an unnecessary amount of power which was without useful result;
40 whereas, in the machine of the applicant's invention the inner end of the looper lever is always maintained in contact with its cam path without any possibility of "jumping" or the requirement of the consumption of
45 power for the useless stretching of a spring.

I am aware that positive motion loopers have been attempted to be constructed before my invention, but a particularly useful feature of my invention resides in the fact
50 that by this comparatively slight addition to the existing inseam sewing machines of this type a positive motion looper is produced without material change in the construction, organization and mode of operation of
55 the machine.

The thread finger 96 having the shank 95 is mounted in a slot in the web 12 of the machine inclined downwardly, having its operative end movable toward and from the
60 needle and located on the left-hand side thereof, as viewed in front elevation, just below the looper in its forward position, so that the looper after having made its encircling movement around the needle upon moving
65 to the left lays the thread in the hook of the

thread finger. To the shank 95 of the thread finger is pivoted at 100 the link 99 in turn pivoted at its other end by the screw 101 to the lower end of the thread finger operating lever 102 pivoted at 103 upon the lower portion 113 of the bracket 36, hereinbefore referred to, the opposite end of which lever 102 carries a cam roll which engages a cam path 104 in the cam disk 24 hereinbefore referred to. The above described arrangement is such that the thread finger operates to receive, while standing in its forward position, a bight of the thread extending from the last needle hole to the looper, and then after the needle has advanced to its forward position to move rearwardly to form slack thread between the looper and the work before the looper encircles the needle and then when the needle begins its retracting movement to move rapidly forward giving up its thread to the needle on one side while the take-up, as hereinafter described, gives up thread on the other side of the bight of thread drawn back by the needle. I am enabled in this way to dispense with the pivotal support for the thread finger of a well-known Goodyear welt and turn machine which enables me to carry the operating instrumentalities back farther than in such machine, thereby enabling the machine to sew shoes having a higher instep with greater ease and facility.

The awl 116 is mounted in the lower end of the awl lever 117 provided with the hub 118 secured to the spindle 119 rotatably mounted in a bearing in the projection 120 projected forward and downward from the feed slide 140, said spindle 119 being held from endwise movement in said bearing by the hub 118 upon one side of said bearing and the head of the spindle upon the other side of said bearing (see Figs. 3 and 17). The awl lever 117 is provided with an upwardly projected arm carrying a segmental pinion 123 which is engaged by a segmental gear 124 mounted on the lower end of the bell crank lever 125 pivotally supported upon the spindle 35 hereinbefore referred to. The bell crank lever 125 carries upon its rear end a cam roll 126 which engages the cam path 22 in the cam disk 20. The above described arrangement is such that after the retracting movement of the feed slide has taken place the awl is caused to engage the channel and feed over into the plane of the needle whereupon the awl is lifted out of the path of motion of the looper and the awl is moved back to its first position.

The above described awl mechanism forms no part of my invention but is described herein for the purpose of giving a description of the complete machine in which my invention is preferably embodied.

The feed slide 140 is mounted in the feed slide guides 141, the feed lever being ful-

crumed to the rear side of the lower guide 141 which is cut away above the fulcrum point to accommodate the lever and to enable it to be connected with the feed slide without a long intervening connection lying as it does close to the rear side of the feed slide. The upper end of the feed lever carries the cam roll 142 which engages the cam path 16 in the cam disk 15 mounted upon the main shaft 14 of the machine. The feed lever and feed slide are slotted and the bolt 145 secured to the feed slide has its ends projected into the slot in the feed lever. By adjusting the bolt 145 vertically the feed may be regulated. The above described arrangement operates in the usual manner to effect the feeding of the work and forms no part of my invention being illustrated and described herein for the purpose of illustrating the complete machine in which my invention is preferably embodied.

The channel guide 130 is mounted on the lower end of the channel guide lever 131, being provided with a tongue and groove connection with such lever and being secured in place by the set screw 13 so that the position of the channel guide may be adjusted vertically thereon. The channel guide lever is secured to the spindle 134 which is supported in a bearing in the projection 120 hereinbefore referred to below the bearing for the awl lever 117. The upper end of the channel guide lever 131 is provided with a surface 135 adapted to cooperate with the cam surface 18 of the cam disk 17. The channel guide lever 131 is held in contact with its cam by spring 136 secured at one end to the upper end of the channel guide lever and at the other end to the feed slide. The above described arrangement is such that at the beginning of the retracting movement of the feed slide the channel guide lever lifts slightly from the bottom of the channel and remains lifted therefrom during the retracting movement and until just before the awl enters the channel guide when it is again moved forward and engages the channel to support the work during the feed movement thereof. The take-up lever 106 is pivotally mounted upon a stud 110 secured in bearings 112 projected forward from the lower portion of the bracket 113 hereinbefore referred to (see Figs. 2, 3, 13, 15 and 16). Said take-up lever carries upon its outer end a thread truck 108 having a thread shield 107^a to prevent the accidental escape of the thread from the truck during the operation of the machine. Upon the right-hand side of the sleeve 105 which is supported by the stud 110 is mounted the arm 107 which carries upon its arm the segmental pinion 109 which engages the segmental gear 115 of the take-up operating lever 125 pivoted upon the stud 35 hereinbefore referred to. The rear arm of the take-

up operating lever 125 carries a cam roll 126 which engages a cam path 23 of the cam disk 20 hereinbefore referred to. The above described arrangement is such that when the needle begins its forward movement after having drawn a loop of thread through the material the take-up lever begins to rise, rising slowly during the first part of the forward motion of the needle and completing its retracting movement after the needle has penetrated the work to form the next stitch, then moving forward to give up thread to the thread finger during the retracting stroke of the latter and afterward giving up thread to the needle during the first part of its retracting stroke.

The auxiliary take-up 111 is mounted in the usual position on the machine with relation to the take-up, being actuated by a spring in the usual way. Upon the right-hand end of the stud 110 is loosely mounted a thread truck 200 over which the thread passes to the auxiliary take-up, thence around the take-up to the looper and work. A thread clamp 201 pivotally mounted upon the web portion 12, as seen best in Fig. 2, is adapted to engage the thread lying below it on the thread truck 200. The sleeve 105 is provided with a cam surface adapted to cooperate with the thread clamp to cause it to forcibly engage the thread and hold the same during the latter part of the upward movement of the take-up. Thus, after the take-up has completed the first part of its upward motion the cam surface upon the hub 105 engages the thread clamp 201 and depresses the same causing its operative end to clamp and hold the thread passing over the thread truck 200 so that during the last part of the thread pulling stroke of the take-up the thread is locked and the strong stitch setting strain is exerted thereon by the take-up.

The welt guide 53, in case the machine is used for sewing welt shoes, is mounted on the forward end of the welt guide slide 51 mounted in a bearing in the side of the web portion of the machine. A rack 54 having a plane forward portion 55 is mounted upon the side of the welt guide slide. The teeth of the rack are adapted to be engaged by either one of a series of pawls 56 pivotally mounted at 57 on the lower end of a pawl lever 58 pivotally mounted at 59 upon the web portion 12 of the machine; said lever 58 carrying upon its upper end a cam roll 60 which engages a cam path 25 in the cam disk 24 mounted on the main shaft 14 of the machine. Springs 61 secured upon the side of the lever 58 normally tend to depress the pawls 56 to cause them to engage the teeth of the rack 54. A stud 63 mounted in the web portion 12 of the machine engages the pawls 56 upon their retracting motion and raises them out of engagement with the

teeth of the rack 54. A spring 64 engages at one end the clamping plate 65 while a projection 66 limits the forward movement of the welt guide slide. The back rest 52 projected forward from the back rest slide 50 is mounted in a bearing in the side of the web portion 12 of the machine in which it is adapted to slide, a pin 67 preventing its forward motion and a spring 69 acting upon a pin 68 of the slide and tending to move it forward. A retaining plate 70 secured by screws 90 to the web portion 12 of the machine holds the welt guide slide and back rest slide in their bearings in the web portion 12, and another plate 89 at the forward end secured to the web portion 12 holds the two slides above referred to in their bearings.

The welt guide slide and the back rest slide are adapted to be clamped and held in their proper positions during the operation of the machine by means of a clamping lever 80 pivoted at 81 to the web portion 12 of the machine, said lever having upon its upper end a cam roll 86 which engages a cam path 26 in the cam disk 24 hereinbefore referred to, by means of which the lever is oscillated. The lever 80 is provided with two wedges 85 and 84 adapted to cooperate respectively with two wedge surfaces 76 and 75 upon the clamping plate 65 opposite the welt rest slide and back rest slide. The clamping lever 80 operates through the means described in timed relation to the needle and other stitch forming instrumentalities to clamp and hold the welt guide and back rest in their proper relative positions to the work. It is to be noted in this connection that a very simple construction of mechanism for clamping and holding the welt guide and back rest slide in their proper positions is provided, one lever operating immediately to clamp and hold both slides with the interposition only of a clamping plate.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States:

1. A chain-stitch shoe sewing machine, having, in combination, a curved hook needle, an oscillating pivotally supported looper lever, an auxiliary looper lever having engagement with the looper lever

proper, and means for actuating the parts, substantially as described.

2. A chain-stitch shoe sewing machine, having, in combination, a curved hook needle, a looper, a thread finger mounted to move rectilinearly backward and forward in timed relation to the movements of the needle, said thread finger having its operating end extended forward and laterally under the eye of the looper, and means for actuating the parts, substantially as described.

3. A chain-stitch shoe sewing machine, having, in combination, a curved hook needle, a looper, a welt guide, a welt guide slide, a back rest, a back rest slide, springs for moving the slides forward, locking means for the slides comprising a clamping plate provided with wedge surfaces, a lever having wedges cooperating with said wedge surfaces on said clamping plate, and means for actuating the lever in timed cooperation with the needle to clamp and hold the slides in position and to release them, substantially as described.

4. In looper-mechanism for hooked-needle sewing machines, in combination, a looper, a looper carrier provided with a cam-follower, a universal-joint mounting for the said looper carrier on which the latter may swing in all directions, an actuating cam having radial grades and also transverse throws engaging the said cam-follower to traverse the delivery-eye of the looper in an orbital path around the needle, and a complementary cam in separate engagement with the looper carrier acting positively to restrain the latter from radial overthrow and to produce the return movement thereof.

5. A sewing machine, having, in combination, a hook-needle, an oscillating, pivotally supported looper lever carrying a looper, a cam for actuating said lever, an auxiliary looper lever for maintaining the looper lever proper in contact with its cam, and a cam for actuating said auxiliary lever.

In testimony whereof, I have affixed my signature, in presence of two witnesses.

FRANCIS JOSEPH FREESE.

Witnesses:

WILLIAM P. McFEAT,
FRED. J. SEARS.