

June 22, 1937.

S. A. DOBYNE

2,084,838

SEWING MACHINE

Filed March 4, 1931

4 Sheets-Sheet 1

Fig. 1.

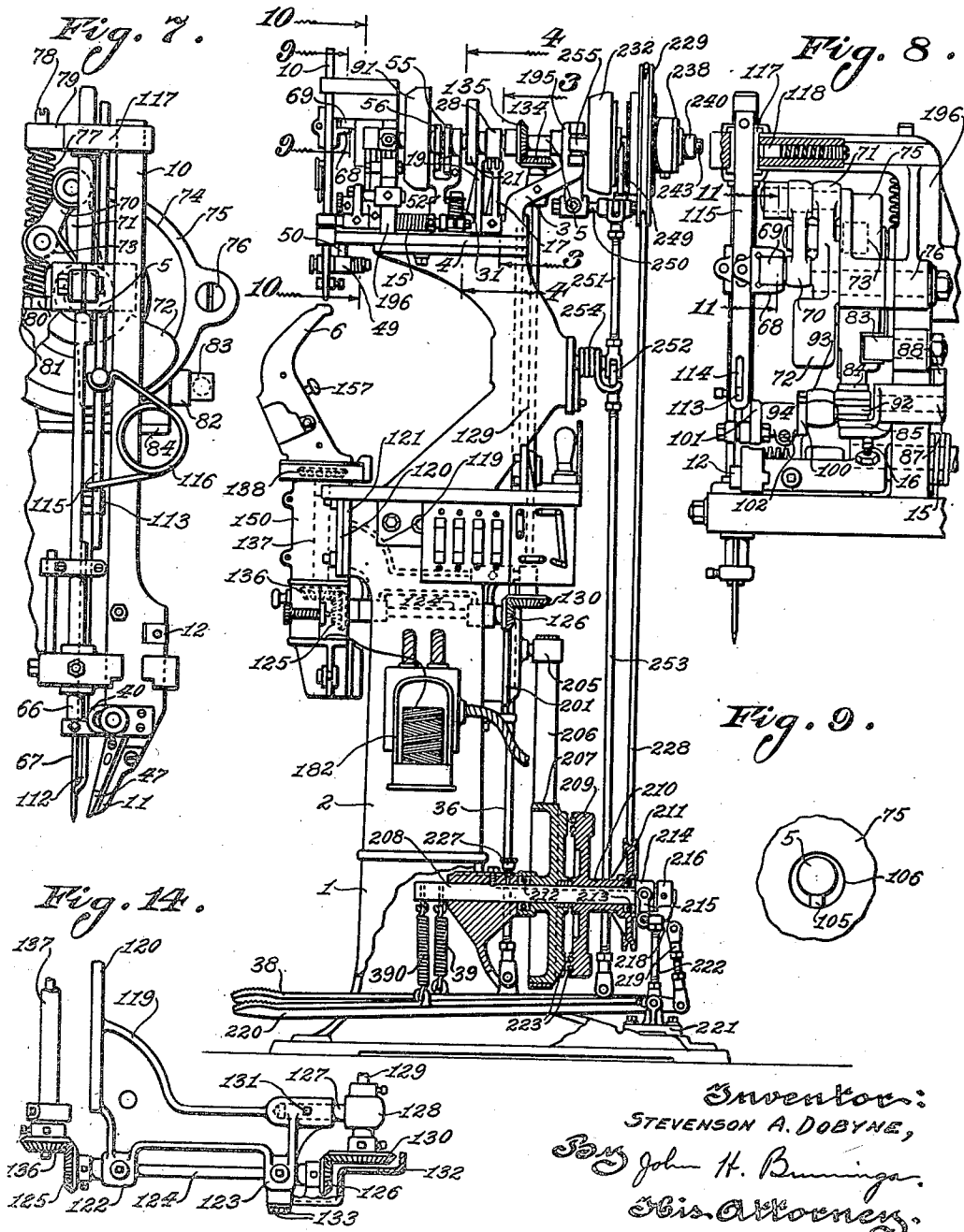


Fig. 9.

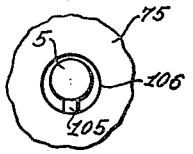
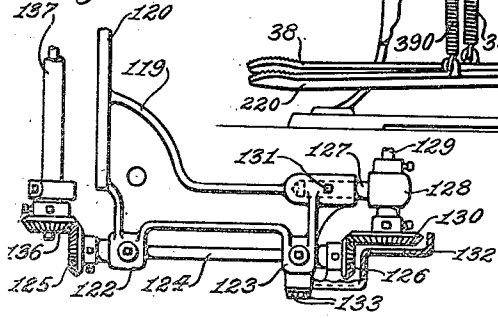


Fig. 14.



Inventor:
STEVENSON A. DOBYNE,
By John H. Jennings,
His Attorney.

June 22, 1937.

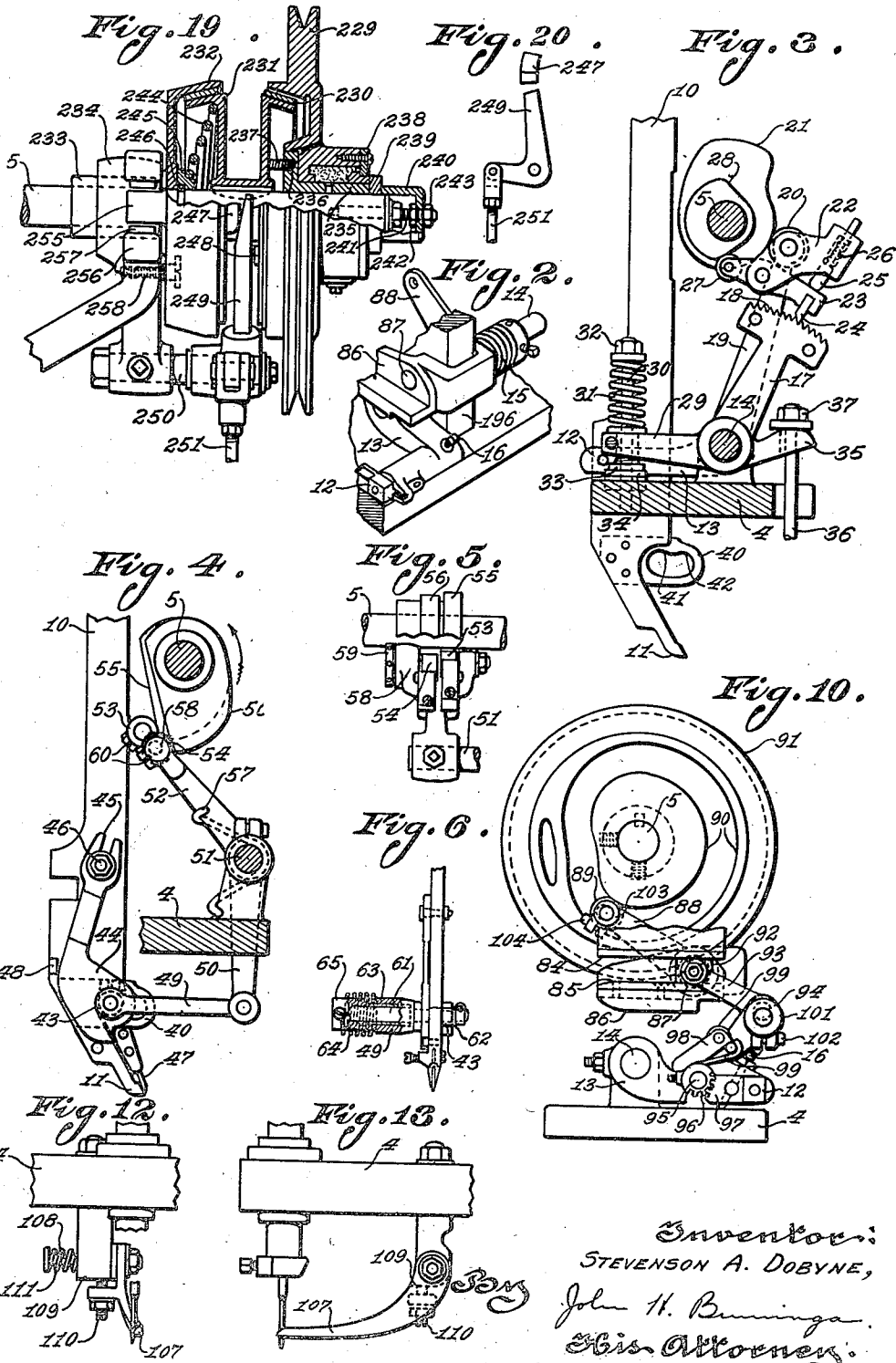
S. A. DOBYNE

2,084,838

SEWING MACHINE

Filed March 4, 1931

4 Sheets-Sheet 2



Inventor:
STEVENSON A. DOBYNE,
John H. Bunnings,
His Attorney.

June 22, 1937.

S. A. DOBYNE

2,084,838

SEWING MACHINE

Filed March 4, 1931

4 Sheets-Sheet 3

Fig. 11.

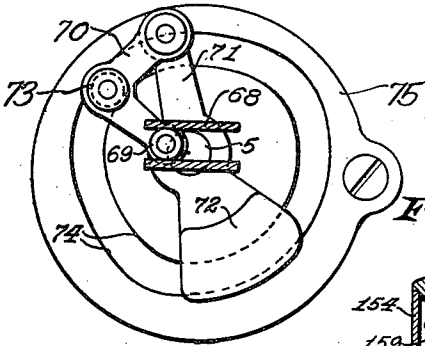


Fig. 15.

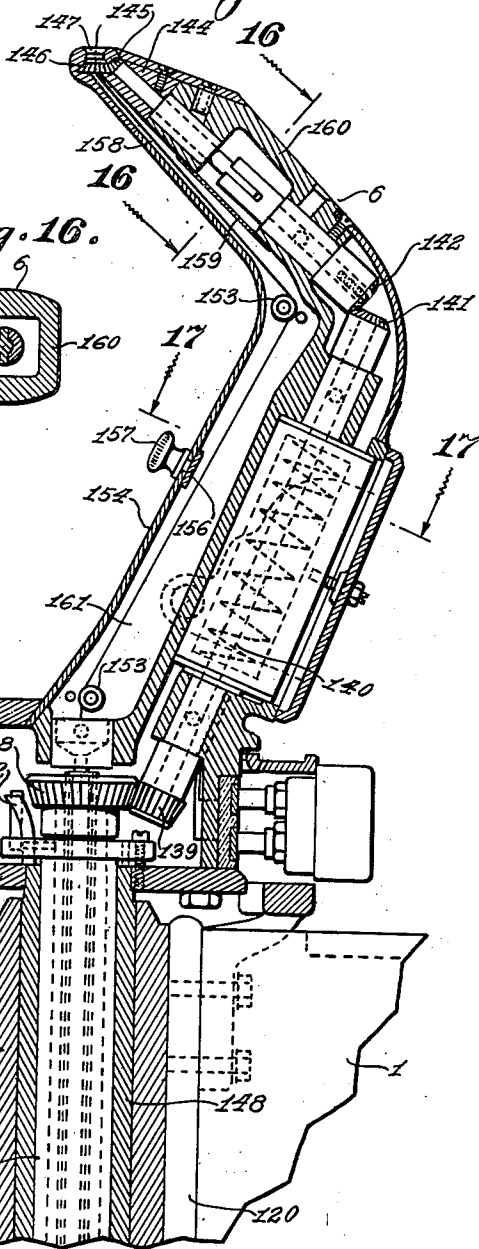


Fig. 16.

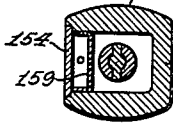
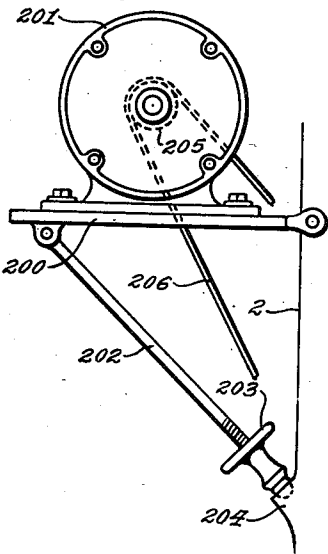


Fig. 17.



Inventor:
STEVENSON A. DOBYNE,
By John H. Bunnings,
His Attorney.

June 22, 1937.

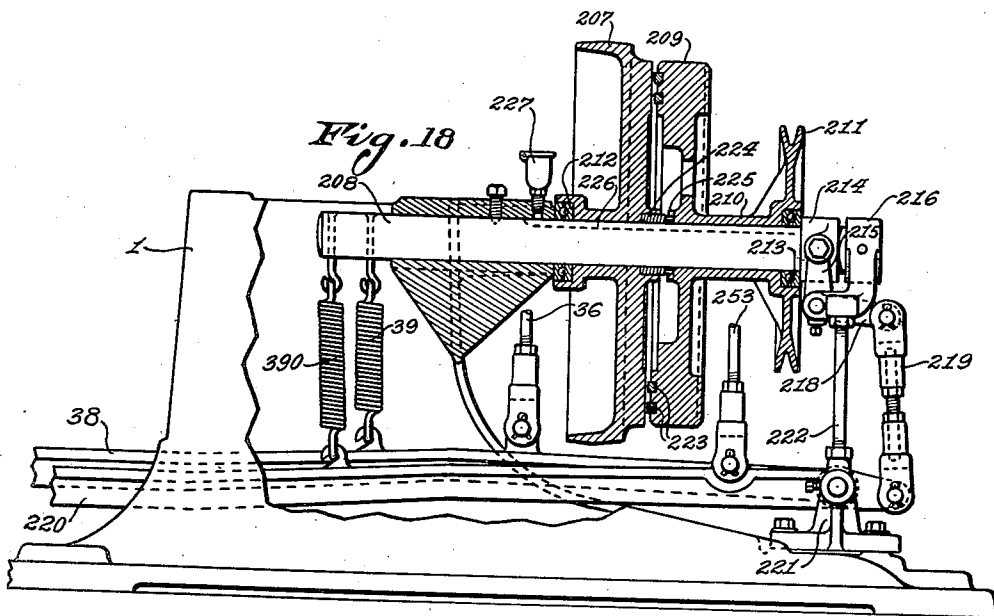
S. A. DOBYNE

2,084,838

SEWING MACHINE

Filed March 4, 1931

4 Sheets-Sheet 4



Inventor:
STEVENSON A. DOBYNE,
By John H. Brunning,
His Attorney

UNITED STATES PATENT OFFICE

2,084,838

SEWING MACHINE

Stevenson A. Dobyne, St. Louis, Mo., assignor to
Champion Shoe Machinery Company, St. Louis,
Mo., a corporation of Missouri

Application March 4, 1931, Serial No. 519,931

24 Claims. (Cl. 112-34)

This invention relates to sewing machines, and more particularly to a machine of the McKay type. Such a machine, as is well-known, is usually provided with a horn, the tip of which is provided with a whirl arranged to wrap the thread around a barbed needle. A presser foot feeding mechanism and thread measuring mechanism are provided in order to adapt the machine to different thicknesses of work.

Some of the objects of this invention are to provide novel presser foot operating mechanism, novel work feeding mechanism, novel needle operating mechanism, novel thread measuring mechanism, a novel needle gauge, a novel cast off, a horn construction, means for preventing the thread from coming into contact with the moving parts within the horn, and novel driving mechanism.

Another object is to improve the machine as to its construction and operation, so as to improve its efficiency and render the same economical to manufacture.

Further objects will appear from the detail description taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of a machine embodying this invention;

Figure 2 is an enlarged detail showing the presser foot operating mechanism;

Figure 3 is a section on the line 3-3, Figure 1, also of the presser foot mechanism;

Figure 4 is a section on the line 4-4, Figure 1, showing the feeding mechanism;

Figure 5 is a detail elevation of Figure 4;

Figure 6 is a further detail elevation of Figure 4;

Figure 7 is a detail front elevation of Figure 1, showing the needle operating mechanism;

Figure 8 is a detail side elevation of Figure 7;

Figure 9 is a detail section on the line 9-9 of Figure 1;

Figure 10 is a section on the line 10-10 of Figure 1, showing part of the mechanism in elevation;

Figure 11 is a section on the line 11-11, Figure 8;

Figures 12 and 13 are detail elevations showing the needle gauge;

Figure 14 is a detail of the horn bracket;

Figure 15 is a longitudinal vertical section through the horn;

Figure 16 is a section on the line 16-16, Figure 15;

Figure 17 is a side elevation of the motor support;

Figure 18 is an enlarged vertical section showing the driving mechanism;

Figure 19 is an enlarged section of the clutch and brake at the top of the machine head; and

Figure 20 is a detail of Figure 19.

Referring to Figure 1, 1 designates a base on which is mounted a column 2 and on which in turn is mounted a machine head 3, having a base 4, provided with bearing brackets 195 and 196, and carrying a shaft 5. The horn is generally shown at 6.

Presser foot operating mechanism

Referring to Figures 1, 2, 3, and 7, guided for vertical movement in the machine head is a presser foot bar 10, having at its lower end a presser foot 11. The presser foot bar has a guideway slidably engaged by a block 12, on an arm 13, fixed to a shaft 14, journalled in bracket 196. A spring 15 encircles shaft 14 and is connected at one end with the shaft with its other end bearing against the base 4 of the head, so as to normally tend to move the presser foot down. The lower position of the presser foot is determined by an adjustable set screw 16 at the end of the arm 13, engaging the base 4.

Fixed to the shaft 14 is an arm 17 carrying ratchet teeth 18, which are inclined, as shown. Loosely mounted on the shaft 14 is an arm 19 provided with a cam roll 20, engaging a cam 21 on the shaft 5. Pivoted on or fixed to the arm 19, are a series of levers 23, having pawls 24, arranged to engage the ratchet and held thereagainst by plungers 25, guided in the extension 22 and under the action of springs 26. The other ends of the levers are provided with rolls 27, engaging a cam 28 arranged along side of the cam 21 and also fixed to the shaft 5.

Fixed to the arm 19 is an arm 29, perforated to pass loosely over a shank 30, mounted on the base 4 and encircled by a spring 31, bearing at one end against a washer over the arm 29 and at its other end against a washer tensioned by a nut 32. Threaded into the end of the arm 29 is an adjustable abutment 33 arranged to bear against stops in the form of leather washers 34. The arm 17 has fixed thereto an arm 35, perforated or forked to receive the upper end of a bar 36 provided with a washer and a nut 37, and connected at its lower end with a treadle 38, pivoted in the base 1 and held in raised position by a spring 39.

The mechanism described and shown operates to intermittently raise the presser foot a

predetermined distance during the operation of the machine and while the work is being fed, and thereafter to release it in order to not only clamp the work against the horn, but also to provide an abutment or support while the stitch is being set. As previously stated, the spring 15 operates to hold the presser foot in its lowest position determined, however, by the adjustment of the set screw 16. Assuming the pawls 24 be in a position to engage the ratchet teeth 18 under the tension of the springs 26, the cam 21 will operate to move the arms 19 and 17 clockwise, Figure 3, so as to raise the presser foot a definite amount in order to permit the work to be fed. The pawl is, however, disengaged by the cam 28 in order to release the presser foot so as to enable it to accommodate itself to the work. Upon release of the arm 19, it will be returned by its spring 31 with the abutment 33 striking against the bumpers 34 and the position of this arm and, accordingly, the position of the pawl with reference to the ratchet teeth can be controlled by adjustment of this abutment for the arm, it being understood that the position of the lever 17 is determined by set screw 16. Now, at the time that the stitch is set, the work is raised from the surface of the horn tip and it must be supported at that time in an upward direction by the presser foot. Usually a locking device is employed to lock the presser foot at this period. In accordance with this invention, however, the springs 26 are made strong enough and the angle of the ratchet teeth is such that there will be interposed a sufficient resistance against the raising of the presser foot during the setting of the stitch, so that a separate locking device can be eliminated. It will be understood that the presser foot may be raised at any time by the depression of the treadle 38 which acts through the arm 35 to rotate shaft 14.

The sequence of operations in forming the stitch is as follows; the needle having penetrated the work and engaged the thread is raised out of the work. The presser foot 11, is then lifted. At the same time, or slightly before, the feed point 47 engages the work and is moved laterally to feed the work. During the interval that the presser foot is raised the needle reaches the top of its stroke and exerts a pull on the thread. This is an upward pull on the thread and effects preliminary setting of the stitch and at the same time measures a length of thread for the next stitch. This pull forces the work upwardly against the presser foot which is supported by the pawl 24, as described above. The needle pauses at the top of the stroke and during this pause the cam 28, releases the presser foot which drops down upon the work, forcing it against the horn and at the same time giving the thread the final pull to finally set the stitch. As soon as the presser foot 11, has been released to re-engage the work the needle descends again making the succeeding stitch.

In accordance with this invention, therefore, the pawl and ratchet of the mechanism is constructed and engages to sustain the presser foot during the setting of the stitch; these elements being relatively tensioned to prevent retrograde movement of these elements. A cam is provided for moving the ratchet and pawl while engaged, while a separate cam is provided for disengaging the pawl from the ratchet.

Feeding mechanism

Referring to Figures 1, 3, 4, 5, and 6, attached

to the presser foot is a guide cam 40, having an inclined guiding portion 41 and a horizontal guiding portion 42. Travelling in this guide is a roll 43, mounted on a lever 44, having a fork 45, pivoted and sliding on a stud 46 on the presser foot bar 10. The other end of the lever carries a feed point 47, arranged to lie within the grooved end of the presser foot, while the lever 44 is positioned by a stop 48 on the presser foot bar.

The lever 44 is connected by a link 49 with an arm 50 on a shaft 51, mounted in a suitable bearing on the base 4, and having an arm 52 provided with cam rolls 53 and 54, engaging cams 55 and 56, fixed to the shaft 5. A spring 57 encircling the shaft 51 moves the rolls toward the cam and tends to hold the lever 44 in engagement with the stop 48. The roll 53 is fixed in position on the arm 52; however, the roll 54 is eccentrically mounted on a short shaft 58 in the arm, which is provided with a head 59 engageable by a wrench, so the position of the roll may be adjusted on the arm towards and from the cam 56. The arm is split, as shown at 60, and provided with a clamping screw, so that the shaft 58 may be locked as adjusted.

The connection between the lever 44 and the link 49, Figure 6, comprises a shank 61 on which is mounted the roll 43, while a washer 62 bears against the guide 40. The link 49 is provided with a bushing 63, while a spring 64 bears at one end against a head 65 on the shank and at its other end against the link 49. The construction is such as to take up all play while permitting sliding of the cam roll in the guide to perform its function.

In the operation of feeding, it will be noted that there is imparted to the feed point first a piercing movement while the roll 43 moves down the inclined part 41 of the guide, and thereafter a feeding movement while this roll moves along the horizontal part of the guide. Now, the work piercing movement must be constant irrespective of the length of the stitch, while the feeding movement must be variable in accordance with the length of the stitch. In accordance with this invention, these movements are accomplished through the medium of two cams 55 and 56, operating on two rolls 53 and 54, mounted, however, on a single arm 52. Since the piercing movement should be invariable, the roll 53 need not be adjustably mounted on its arm. In order, however, to secure an adjustable feed, the roll 54 is mounted for adjustment on its arm towards and from its cam, so as to secure either minimum, maximum, or any intermediate movement; it being noted that the position of the lever 44 is determined by the stop 48. By, therefore, adjusting the roll 54, the idle movement between the cam 56 and the cam roll 54 can be adjusted to suit requirements.

In accordance with this invention, therefore, a work feeding element 47 is connected with an actuated element 52 for moving the same, and actuators in the form of cams 55 and 56 cooperate with the actuated element to impart thereto work penetrating and feeding movements; while means is provided for adjusting cooperation of one of these actuators with the actuated element by adjusting the point of engagement of that element with one of these cams. The support provided by the presser foot bar has a guide 40, while an element 44 pivoted on that support has a part 43 movable along this guide; this guide being shaped to impart work penetrating and work feeding movements to this point.

Needle operating mechanism

Referring to Figures 1, 7, 8, and 11, a needle bar 66 is guided for vertical movement in suitable bearings in the head 3 and carries at its lower end a hooked needle 67 arranged to cooperate with a whirl within the horn tip. This needle bar has a cross head 68 within which slides a block 69 on one arm of a bell crank lever 70, the other arm of which is pivoted on an arm 71, fixed to the shaft 5 and provided with a counter-balance 72. The intermediate point of the bell crank lever has a roll 73 engaging a cam groove 74 in a cam plate 75, pivoted at 76 on the head 3. A spring 77 encircles a plunger 78, slidable in a lug 79 on the head 3 and engages against a nut 80 on the plunger bearing against a shoulder 81 on the cam plate 75, so as to normally hold a lug 82 on the cam plate against a stop 83 on the head 3.

Rotation of the shaft 5 will carry the arm 71 and the bell crank lever 70 with it, so as to reciprocate the needle bar. The cam 74 is, however, so constructed that the needle bar and its needle will be at rest at the upper and lower limit of travel during a considerable arc of movement of the shaft 5. There will thus be a pause at the upward stroke to allow the presser foot to force the shoe down on the horn tip and thus assist in setting the stitch while the needle is stationary; and there will be a pause at the bottom of the stroke to allow the whirl to rotate around the needle while its bar is again stationary. With this construction the needle stops and starts without shock. The counter weight 72 serves to balance the arm 71 and the bell crank lever 70, so as to facilitate smoothness of operation and to avoid vibration.

In accordance with this invention, the fastener inserting element, which in this particular machine is in the form of a needle, has actuating mechanism including a crank 71 and means operating to cause the fastener inserting element to pause at the end of its travel. This means is intermediate the crank and the element, and is in the form of a connection between the crank and the element together with a controlling device adapted to vary the operation of the fastener inserting element by the crank. The connection between the crank and the element is in the form of a lever 70, pivoted to the crank and having a sliding connection with the element, while the controlling of the connection is secured by a cam 74 engaging this lever.

It will be noted that the crank 71 together with the arm 70 forms a compound crank whose crank pin 69 moves at a variable eccentricity with reference to the shaft 5. This eccentricity is controlled by the cam 74.

Thread measuring mechanism

In a machine of this type, the needle is used to measure the thread for varying thicknesses of work. This is accomplished in accordance with this invention by varying the upward stroke of the needle in accordance with the thickness of the work, while the lower position of the needle is maintained constant in order that the needle may always be in the correct position to permit the whirl to wrap the thread into the barb. Mechanism is, therefore, provided for imparting a variable stroke to the needle in its upward position only.

Referring to Figures 1, 7, 8, 9, and 10, the cam plate 75 has attached thereto a hardened plate 84, positioned opposite a similar hardened plate

85, on an arm 86, fixed to a shaft 87, and which has fixed thereto an arm 88 provided with a roll 89 engaging a cam 90 in a cam wheel 91 on the shaft 5. Between these two hardened plates is arranged to slide a block 92 connected by a link 93 with an arm 94 pivoted on a stub shaft 95 on the base 4. This shaft also has a toothed part 96, cooperating with a corresponding toothed part 97 on the block 92, mounted on the arm 13. The toothed part 96 has an arm 98 lying over the arm 94. A spring 99 encircles the shaft 95 and connects the arms 94 and 98 yieldingly, so as to normally hold them in engagement while permitting yield therebetween.

The joint between the arm 94 and the link 93 is formed by an eccentric 100, (see Fig. 8) the shank of which is mounted in the arm 94 and is provided with a knurled head 101 to permit adjustment. The end of the arm 94 is split and provided with a clamping screw 102. The cam roll 89 is also mounted eccentrically in the arm 88 and adjustable by a knurled head 103, while the end of the arm is again split and provided with a clamping screw 104. As seen in Figure 9, the shaft 5 has a nib 105 working in a recess 106 in the cam plate 75.

It will be seen that the block 92 is interconnected with the presser foot so as to move to the left, Figure 10, as the presser foot is raised in accordance with the thickness of the work. In doing so, it moves away from the pivots 76 and 87 (Figs. 7 and 2) for the cam plate 75 and the arm 86, respectively, so that the cam 90 will operate through member 86 to raise the cam plate 75 in accordance with the position of head 92, whose position is determined by the thickness of the work. Let us assume now that the presser foot has been raised by the work so as to position the block 92 between the plates 84 and 85. During the down stroke of the needle the cam 90 will be inactive so as to not shift the cam plate with the result that the same is not positioned by the stops 82 and 83, so that the needle will move to the predetermined and fixed lower limit of its travel. During the up stroke of the needle, however, the cam 90 will come into play so as to move the arm 86 clockwise or upwardly thereby shifting the cam plate 75, in order to cause the needle at its upper limit to assume a position in accordance with the thickness of the work in order to measure out thread corresponding to that thickness. During the down stroke of the needle, however, the arm 86 will again move back so that the needle can again reach the fixed lower limit of its travel. In order to insure this action, the nib 105 is so positioned that as the needle moves down, the nib will move in the recess so as to positively return the cam plate 75 against the stop 83 thereby supplementing the action of the spring 77.

It will be noted that the arrangement shown in Figure 11 provides that by cooperation between the cam 74 and the bell crank 70 the needle bar is actuated by the roll 89 in the same manner as if this were a crank on the shaft 5, except that the length of the crank arm is variable during a revolution so as to provide a pause at the upper and lower ends of the stroke of the needle bar.

The effect of shifting the cam plate 75 on its pivot 76 is to elevate the cam 74 with reference to the shaft 5. This movement of the cam will have the effect of lengthening the up stroke and shortening the down stroke of the needle bar. In other words the range of movement of the needle bar is shifted upwardly with reference to

the shaft 5. Now the mechanism illustrated in Figure 10 is designed to accomplish the shift of the cam plate 75 to effect this result. In its normal position the slide block 92 is substantially in alignment with the pivot 87 of the arms 86 and 88. In this position of the slide block 92 the effect of the cam 90 will be simply to rock the arm 86 upwardly at a certain point of each revolution. This will have no effect on the plate 84 or the cam plate 75 because the block 92 is still in alignment with the pivot 87. When, however, the presser foot is raised above its normal position by an extra thickness of the work, the plate 12 is elevated and this acts to rotate the shaft 95 which in turn acts to shift the slide block 92 to the left, Figure 10, along the plate 85. With the slide block 92 in its shifted position it is displaced from alignment with the pivot 87 and will now partake of the elevating movement of the plate 85 and transmit the same to the plate 84 and the cam plate 75. This elevating movement occurs during each up stroke of the needle bar, while the plate 85 is returned to its normal position on the down stroke of the needle bar. It will be seen, therefore, that the effect of this action is to lengthen the up stroke of the needle bar, while the down stroke is retained constant. The amount of change of the up stroke is proportional to the shift of the slide block 92 which in turn is proportional to the excess thickness of the work.

It has been noted that the arms 94 and 98 are connected yieldingly through the spring 99. This permits the presser foot to raise at the proper time in the cycle of operations even if the cam 90 should be active at that time to cause the block 92 to become gripped between the plates 84 and 85; for the spring 99 will yield at that time, while as soon as the pressure has been relieved, the block 92 can slide to its required position. In order to adjust the machine for special work requiring extra long stitches, the head 101 is turned so as to shift the block 92, in order to cause the upper limit of the needle stroke to be increased while thereafter the increase will be in accordance with the thickness of the work. The adjustment of the knurled head 103 provides an extra means for initially adjusting the machine, or in order to suit conditions which may be encountered.

In accordance with this invention, therefore, where the needle operates to measure the thread required, a work engaging element, such as the presser foot, has cooperating therewith mechanism controlled by that element for adjusting the retracting stroke of the needle, particularly where the needle cooperates with the horn provided with the whirl. The needle or fastener inserting element is moved by an actuator 71 through a connection 70, while means is provided, controlled by the work engaging element, adapted to control that connection to vary the retracting stroke of the fastener inserting element. This mechanism includes an operator 86-103, a connector 92 adjustable by the work engaging element relative to the operator, and means for controlling the actuating mechanism from the connector. Also included in the line of connections is the shiftable cam plate 75, which is shifted by the mechanism just described to vary the stroke of the fastener inserting element. Means 105 is also provided for positively returning the cam. The work engaging element is yieldingly connected with the connector 92 through the spring 99, while means 100 is also provided for adjusting the connection between the work engaging element and the connector.

Needle gauge and cast off

Referring to Figures 12 and 13, 107 designates a needle gauge which is pivoted on a shank 108 on a lug 109 on the base 4. It is held in adjusted position by a set screw 110 and frictionally by a spring 111 encircling the shank. With this construction not only is the needle gauge positioned, but it may be moved out of the way and held frictionally in that position while the set screw 110 provides means for accurately adjusting its position with respect to the needle.

Referring to Figures 7 and 8, the cast off 112 is guided in the needle bar 66 and has at its top a block 113 engaging a slot 114 in a slide 115 guided in a cross head 68 and the top guide of the needle bar. Between this block and slide is a spring 116. The slide 115 is guided between opposite gibs 117, one of which is engaged by a spring pressed plunger 118. The operation of this cast off will be obvious from the above description; the slot 114 provides for limited movement of the cast off with respect to the slide 115, while the latter is frictionally held by the spring pressed plunger 118.

Horn construction

Referring to Figures 1, 14 to 16, inclusive, it will be noted that the column 2, as usual, is hollow. Arranged within this column is a bracket 119 having a web 120, the right face, Figure 14, of which is arranged so that it may be positioned against and bolted to the machined face of a similar web 121. This bracket has bearings 122 and 123 for a shaft 124, provided with bevel gears 125 and 126. Arranged in this bracket is a socket in which is arranged to be positioned a shank 127 of a bearing 128 for a vertical shaft 129, provided with a bevel gear 130 arranged to mesh with the gear 126. The bearing 128 is arranged to be clamped in position by a set screw 131. A guard 132 is clamped on the bracket by screws 133.

The shaft 129 extends upwardly and is provided with a bevel gear 134 meshing with a bevel gear 135 on the shaft 5. The bevel gear 125 meshes with a bevel gear 136 fixed to a hollow shaft 137 extending through the horn and provided at its top with a bevel gear 138. The gear 138 meshes with a gear 139 on a shaft 140 provided at its other end with a gear 141 meshing with a gear 142 on a shaft 143 coupled with a shaft 144 provided with a gear 145 meshing with a gear 146 on the whirl 147 in the horn tip.

The shaft 137 is guided in the horn spindle 148 which is mounted on roller bearings 149. This spindle is in turn mounted in the horn bearing bracket 150 bolted against the flange 120 of the bracket 119. Mounted on the horn spindle 148 is a base 151 for the horn 6. A lubricating duct 152 provides for the emission of oil to the horn spindle. Arranged within the horn are rollers 153 over which the thread passes. A cover 154 pivoted at 155 is provided with a latching device 156 controlled by a knurled head 157. The cover along the horn tip is provided with a groove 158 to permit passage of the thread therethrough, and a plate 159 keeps the thread out of contact with the coupled shaft sections 143 and 144.

Driving mechanism

Referring to Figures 1 and 17 to 20 inclusive, the column 2 has pivoted thereon a bracket 200, on which is mounted a motor 201. This bracket has hinged thereto at its outer end a bar 202 threaded into a hand-wheel 203, whose end has 75

a ball and socket connection with a lug 204 on the column. The motor has a pulley 205 connected by a belt 206 with a pulley 207. By rotation of the hand-wheel 203 the belt may be tightened and loosened, as desired. The hand-wheel can be entirely disengaged from its socket so as to permit the bracket 200 to drop against the side of the column in order to conserve space during shipment.

10 Referring now to Figures 1 and 18, the pulley 207 is loosely mounted on a shaft 208 fixed in the base 1. Opposed to this pulley is a fly-wheel 209 having an extended hub 210, which also forms the hub of a belt pulley 211. Suitable thrust bearings 212 and 213 are provided. Bearing against the thrust bearing and arranged to slide on a shaft 208 is a collar 214, connected with a fork 215 of the bell crank lever, pivoted on a bracket 216 secured to the shaft 208. The other arm 218 of the bell crank lever is connected by an adjustable link 219 to a treadle 220 mounted on a bracket 221, (on which is also mounted the treadle 38). The brackets 216 and 221 are connected by an adjustable strut 222. The face of the pulley 207 is machined, while the face of the fly-wheel is provided with suitable inserts 223 of leather or the like. Imposed between the pulley and the fly-wheel are springs 224 engaging a thrust ring 225 of suitable anti-friction material, such as graphite compositions, and which bears against the hub on the fly-wheel. The shaft 208 is provided with a groove 226 adapted to receive a suitable packing while a lubricant cup 227 connects with this groove. The treadle 220 is held raised by a spring 390.

The fly-wheel 209 is normally held disengaged from the pulley 207 by the springs 224, so that this fly-wheel will be at rest. Upon depression of the treadle 220, however, this fly-wheel is caused to engage the pulley so as to move therewith. Now, this fly-wheel will accumulate energy as it has considerable inertia. It will also be noted that the ratio of leverage between the lever arm of the treadle to the left of its pivot, Figure 22, is high as compared to the leverage to the right of its pivot. This enables a slow engagement and disengagement to be secured; accordingly, by slowly engaging the fly-wheel with the pulley, not only is this fly-wheel enabled to pick up speed slowly, but on account of the high ratio of leverage, previously referred to, any desired slip may be secured, so that the fly-wheel may be driven at a variable speed on account of slippage. As this fly-wheel stores energy, even after the treadle is released, the stored energy will insure that the operations of the mechanism driven by the pulley 211 will be completed.

20 Referring now to Figures 1, 19 and 20, the pulley 211 is connected by a belt 228 with a pulley 229, loose on the shaft 5. This pulley has a cone face cooperating with the faced cone 230 of a double cone element splined on the shaft 5. The other cone element 231 cooperates with a corresponding cone 232 providing a braking surface. The hub 233 of cone 232 extends through a bearing 234 and in turn provides a bearing for the shaft 5.

The pulley 229 is mounted on a bushing 235 on the shaft 5, and this bushing is provided with a flange 236, carrying springs 237 bearing against the cone element 230. A ring 238 on the hub of the pulley 229 bears against a shoulder on the hub 235. A washer 239 on the shaft 5 has bearing thereagainst a cup 240 through which passes a

stud 241 provided with nuts 242 and 243. A spring 244 engaging the cone element 231 bears against a thrust ring 245, which in turn bears against a ring 246 seated in a groove on the shaft 5.

The cone element 231 is provided with a wedged lug 247, while passing through the cone element 230 and attached to the flange 236 is an abutment 248 having a ground face and positioned approximate the wedge 247. A clutch shifter 249 is provided with a wedged tip arranged to engage the wedge 247 while the opposite face of the shifter is arranged to bear against the abutment 248, the tip of which is rounded. This clutch shifter is in the form of a bell crank lever pivoted at 250 on the head 3 and connected by an adjustable link 251 with a similar bell crank lever 252 pivoted on the column 2 and connected by a link 253 with the treadle 220. A spring 254 on the bell crank lever 252 operates to throw the shifter into disengaging position.

The brake element 232 is provided with a lug 255, arranged to ride between lugs 256 on the bracket of the bearing 234. Each of these lugs 256 is provided with a suitable bumper 257. The brake element 232 is provided with an arcuate slot through which passes a screw 258 threaded into the bearing bracket 234.

When the clutch shifter 249 is disengaged from the wedge 247, the spring 244, (which is stronger than the spring 237), will move the cone 230 into engagement with the pulley 229, while the cone 231 will be moved out of engagement with the clutch surface 232, thereby connecting the pulley 229 with the shaft 5. When the clutch shifter is released, it will move into the path of the wedge 247, thereby moving the connected cones back so as to disengage the cone 230 from the pulley and engage the cone 231 to the brake element 232, in order to bring the shaft to rest in a predetermined position.

It will be seen that this clutch shifter will be engaged on its opposite side by the abutment 248, which sustains the shifter against lateral movement. By adjustment of the nuts 242 and 243, this abutment may be shifted to take up for wear or provide for initial adjustment.

As previously described, the brake element 232 is not fixed, but is permitted limited rotative movement. Now, upon engagement of the cone 231 with the brake element, the latter will move therewith, so as to cause the lug 255 to strike against the lower bumper 257. This striking action will cause the lug 255 to rebound until again arrested by the upper bumper. This is an advantageous feature for the following reason. If the brake element 232 were rigid, the wedge 247 would become so firmly wedged against the clutch shifter as to render the disengagement of the clutch shifter difficult. The rebound provided, however, causes the brake element 232 to move backwards thereby slightly disengaging the wedge 247 from the clutch shifter, so that the latter will be substantially free, and this after the rotation of the shaft has stopped. On account of the inertia of the parts, it is only necessary to provide for slight play between the lug 255 and the bumpers; indeed, a small fraction of an inch is sufficient. These bumpers may be of any suitable material, such as, metal or fibre.

The mechanism described is of particular utility in a machine of this character. Not only does the combination of a clutch and brake on the top shaft with the variable speed friction clutch, including a fly-wheel, provide means whereby the

operations may be controlled, but particularly so in performing the operations for which the machine is designed. In sewing around the toe of a shoe, (particularly in repair work), it is desirable that the operator be enabled to slow down the machine so that he may keep the stitching in the groove or channel provided in the outsole. It is also necessary to slow down the machine when sewing along the shank of a high arched lady's shoe, and particularly as the stitching is finished along the shank. Now, it usually happens that just previous to stopping the machine, it is running at a very low rate of speed; accordingly, if the operator takes his foot off the clutch pedal when the stitch is only partially completed, the complete stoppage would not secure the finished work. In accordance with this invention, however, momentum is stored in the fly-wheel so that the stitching mechanism shaft will continue to revolve and complete the stitch. While there is a rebound, as previously described, this rebound is not sufficient to disturb the final position of the parts; accordingly, the machine is stopped with the parts in the position where the stitch has been fully completed.

While certain features of this invention are particularly applicable to a wax thread sewing machine of the McKay type, it will be understood that certain features are applicable to other forms and types of sewing machines and other forms and types of fastener inserting machines. It will furthermore be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations; that is contemplated by and is within the scope of the appended claims. It is furthermore to be understood that various changes may be made in details, within the scope of the appended claims, without departing from the spirit of this invention. It is, therefore, to be understood that this invention is not to be limited to the specific details shown and/or described.

Having thus described the invention what is claimed is:

1. A sewing machine comprising, a presser foot, pawl and ratchet mechanism, and means actuating said mechanism to raise the presser foot, the pawl and ratchet of said mechanism being constructed and arranged to sustain the raised presser foot against the pressure of the work thereon during the setting of the stitch.

2. A sewing machine comprising, a presser foot, pawl and ratchet mechanism, and means actuating said mechanism to raise the presser foot, the pawl and ratchet of said mechanism being constructed and relatively tensioned to prevent relative movement of said presser foot in a direction to raise the presser foot during the setting of the stitch.

3. A sewing machine comprising, a presser foot, and mechanism for raising the same including a pawl, a ratchet engaged thereby and a spring for engaging said pawl, said spring having sufficient tension to prevent relative movement of said pawl and said ratchet in a direction to raise the presser foot during the setting of the stitch.

4. A sewing machine comprising, a presser foot, and mechanism for raising the same including a pawl, a ratchet engaged thereby and means for disengaging said pawl from said ratchet, said pawl and ratchet being relatively tensioned to prevent relative movement there-

of in a direction to raise the presser foot during the setting of the stitch.

5. A sewing machine comprising, a presser foot, and mechanism for raising the same including a pawl, a ratchet engaged thereby, a cam for moving said pawl and ratchet collectively while engaged, and a cam for disengaging said pawl from said ratchet to limit such movement.

6. In a sewing machine, work feeding mechanism comprising, an actuated element, actuating cams cooperating successively with said element, and means variable to adjust the cooperation of one of said cams with said element.

7. In a sewing machine, work feeding mechanism comprising, an actuated element, cams cooperating with said element, and means for adjusting the point of engagement of said element with one of said cams.

8. A machine of the class described comprising, a fastener inserting element, and actuating mechanism therefor including, a crank, a member carried thereby having a crank pin engaging said element, and means controlling the relation between said crank and said member adapted to cause said element to pause at the end of its travel.

9. A machine of the class described comprising, a fastener inserting element, a crank, a connection member between said crank and said element, and a cam controlling said connection member adapted to vary the operation of said element by said crank.

10. A machine of the class described comprising, a fastener inserting element, a crank, a lever pivoted to said crank and having a sliding connection with said element, and a cam engaging said lever.

11. A machine of the character described comprising, a fastener inserting element, an actuator for said element, a connection between said actuator and said element, a cam controlling the operation of said connection a work engaging element, and means for shifting said cam adjustable by said work engaging element adapted to vary the retracting stroke of said fastener inserting element.

12. A machine of the character described comprising, a fastener inserting element, a crank, a connection between said crank and said element, a cam for controlling said connection, and means for shifting said cam.

13. A machine of the character described comprising, a fastener inserting element, a crank, a connection between said crank and said element, a cam for controlling said connection, an operating element, a work engaging element, and a connector between said operating element and said cam and adjustable by said work engaging element.

14. A machine of the character described comprising, a fastener inserting element, a crank, a connection between said crank and said element, a cam for controlling said connection, means for shifting said cam, and means for positively returning said cam.

15. A sewing machine having a needle, a needle gauge, means for yieldingly mounting said gauge for movement to operative and inoperative positions, and means for adjusting the location of said gauge in operative position.

16. A sewing machine having a needle bar, a cast-off guided for movement on said bar, a slide yieldingly connected with said cast-off, and means for frictionally retaining said slide.

17. A machine of the class described comprising, fastener inserting mechanism, a clutch adapted to stop said mechanism at the completion of the fastener inserting operation, and driving mechanism including an element of high inertia adapted to accumulate energy to insure completion of the fastener inserting operation and releasable from said first mechanism upon stopping.

18. A machine of the class described comprising, fastener inserting mechanism, a clutch adapted to stop said mechanism at the completion of the fastener inserting operation, and driving mechanism including a driving element and a driven element engageable frictionally with said driving element to secure a variable speed, said driven element being of high inertia to accumulate energy to insure completion of the fastener inserting operation and releasable from said first mechanism upon stopping.

19. In a machine of the character described, a needle bar, operating means therefor, a work-engaging element, separately actuated retracting mechanism adapted to control said operating means during retraction of said needle bar, and a variable connection between said retracting mechanism and said operating means controlled by said element.

20. In a machine of the character described, a needle bar, operating means therefor, a work-engaging element, separately actuated retracting mechanism having a constant cycle of operation adapted to control said operating means during retraction of said needle bar, and a variable connection between said retracting mechanism and said operating means controlled by said element.

21. In a machine of the class described, a fastener-inserting element, and actuating mechanism therefor including a rotating drive shaft, a compound crank having a crank pin rotating with said shaft and engaging said element, and means operating to vary the eccentricity of said pin so as to cause said element to vary its rate of movement.

22. In a machine of the class described, a fastener-inserting element, and actuating mechanism therefor including a rotating drive shaft, a compound crank having a crank pin rotating with said shaft and engaging said element, and means operating to vary the eccentricity of said pin so as to cause said element to pause at the end of its travel.

23. In a machine of the class described, a fastener-inserting element, and actuating mechanism therefor including a rotating drive shaft, a compound crank having a crank pin rotating with said shaft and engaging said element, and a cam-controlled connection between said shaft and said pin operating to vary the eccentricity of said pin so as to cause said element to vary its rate of movement.

24. In a machine of the class described, a fastener-inserting element, and actuating mechanism therefor including a rotating drive shaft, a compound crank having a crank pin rotating with said shaft and engaging said element, and a cam-controlled connection between said shaft and said pin operating to vary the eccentricity of said pin so as to cause said element to pause at the end of its travel.

STEVENSON A. DOBYNE. 35