

W. A. MACK.
SEWING MACHINE.
APPLICATION FILED NOV. 3, 1900.

Patented May 6, 1913.

7 SHEETS—SHEET 1.

1,060,689.

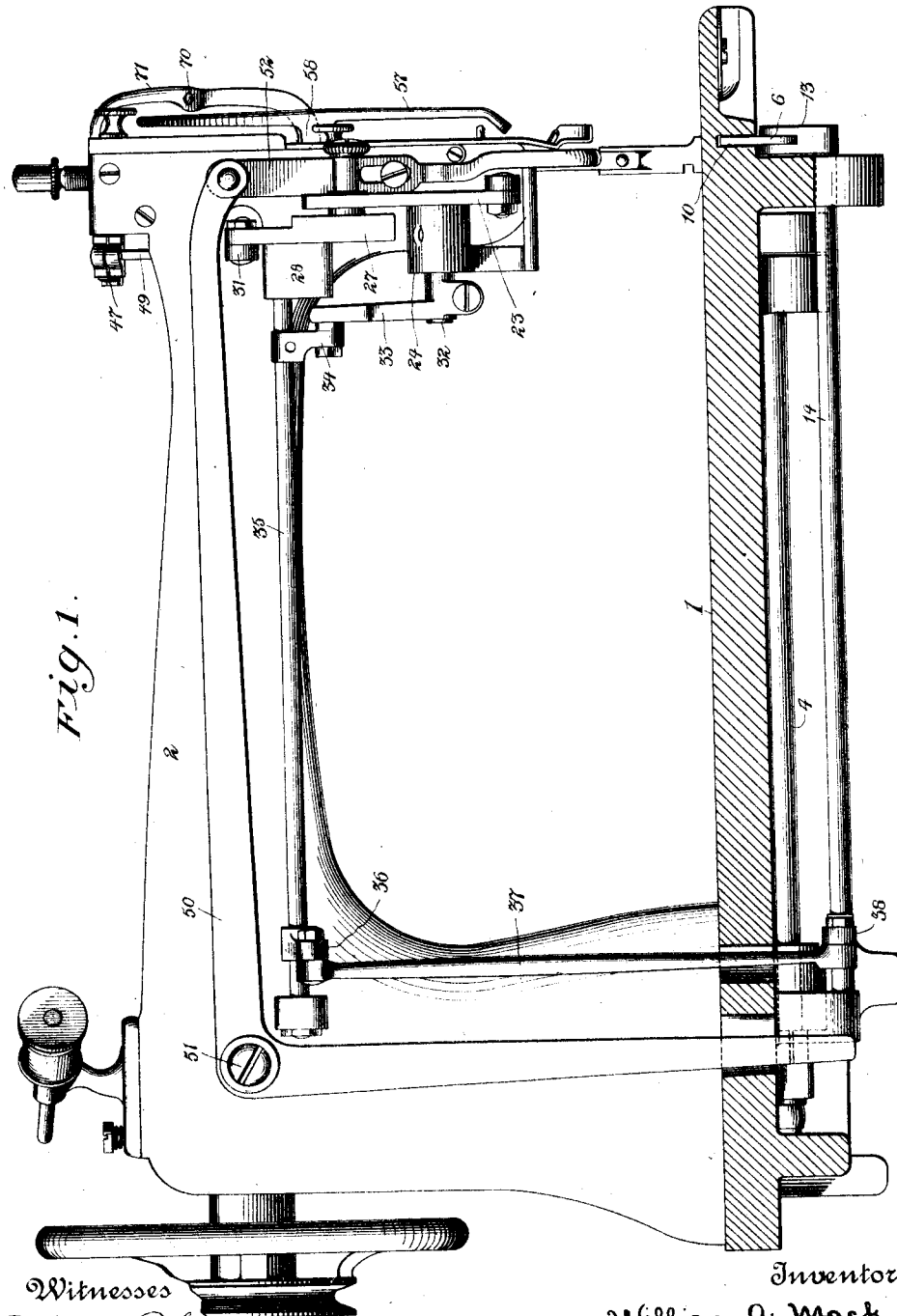


Fig. 1.

Witnesses
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Geo. W. Taylor

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By *Chas. F. Dane* Attorney

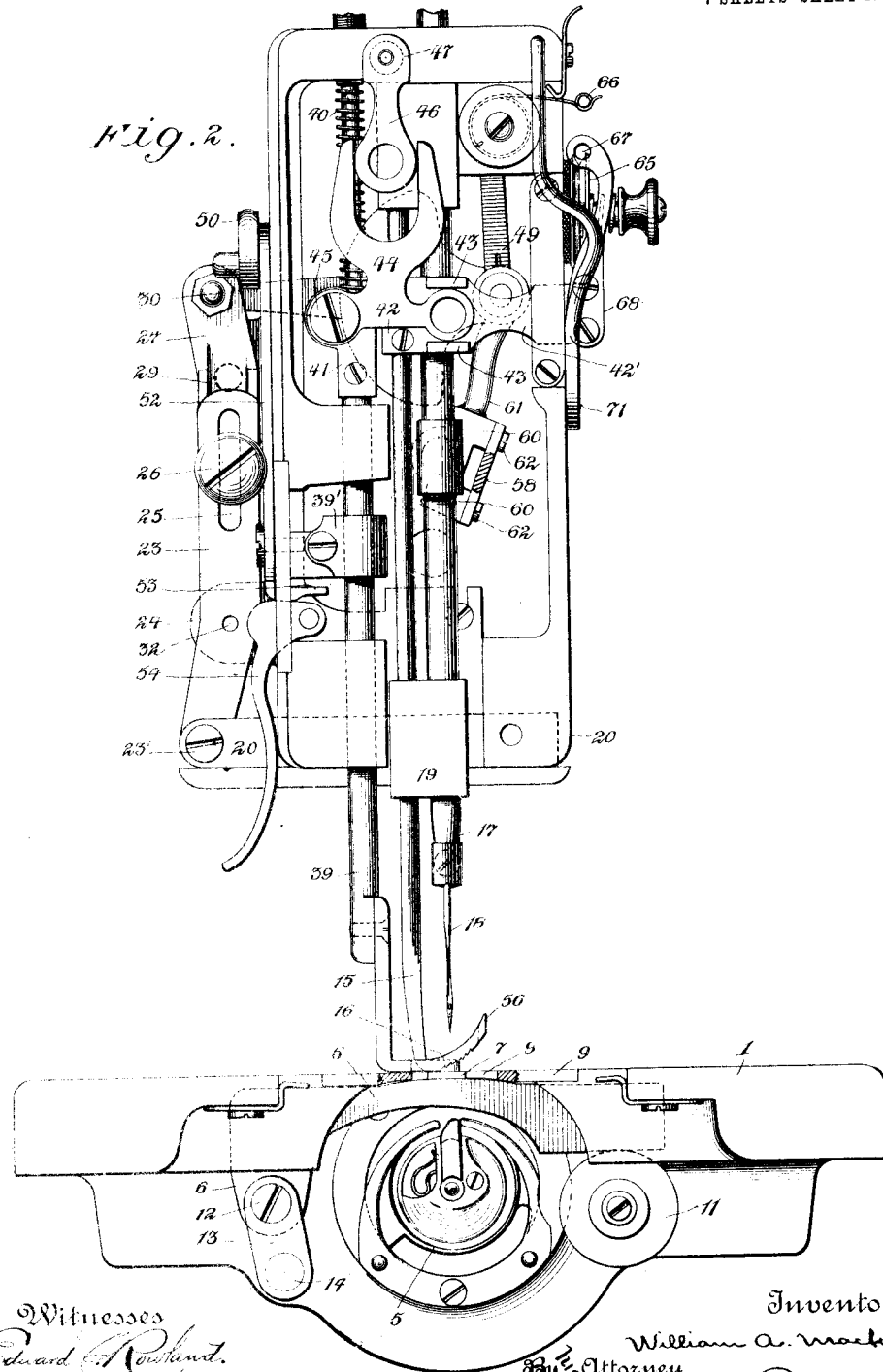
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7 SHEETS—SHEET 2.

Fig. 2.



Witnesses
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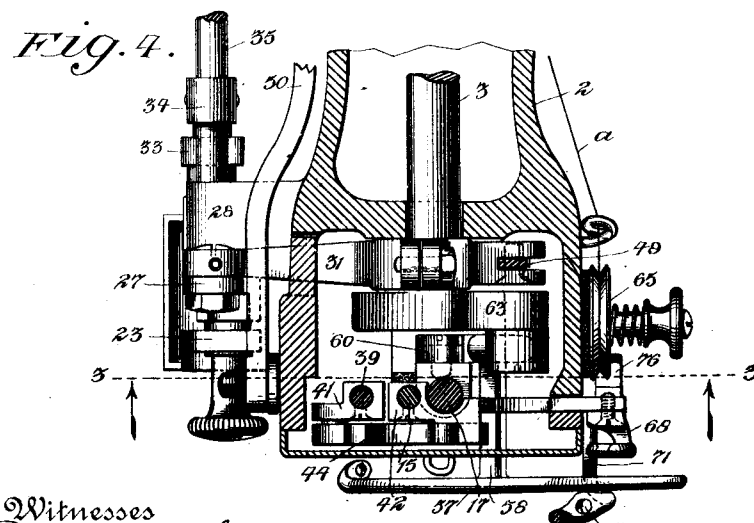
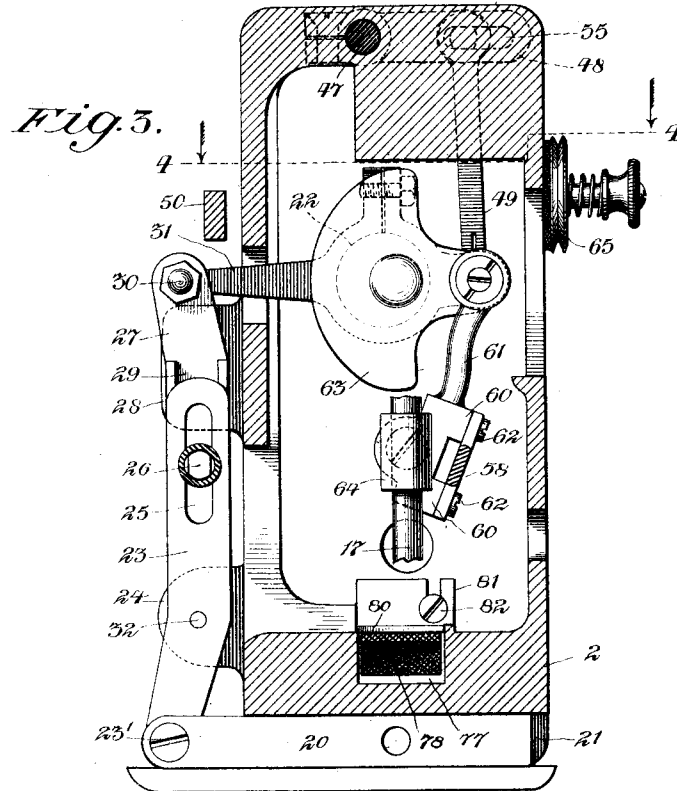
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7 SHEETS—SHEET 3.



Witnesses
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7 SHEETS—SHEET 4.

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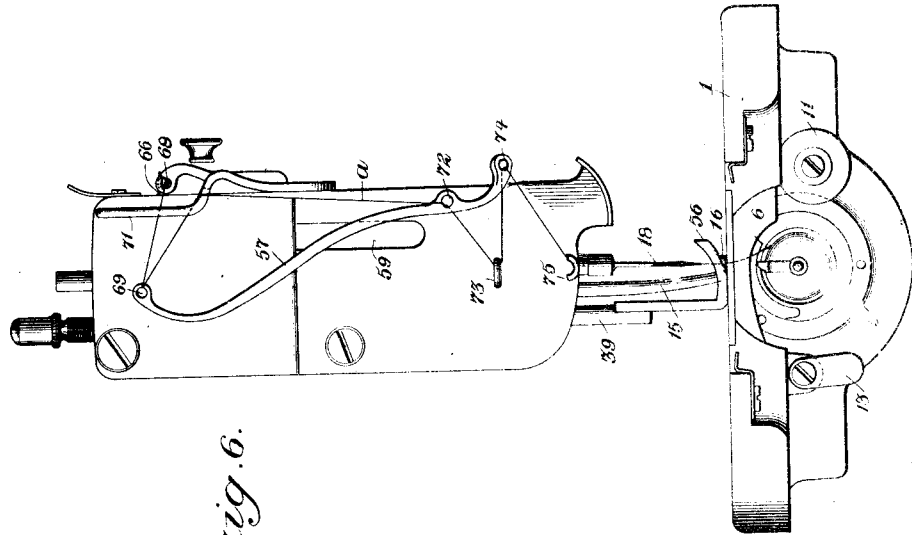


Fig. 6.

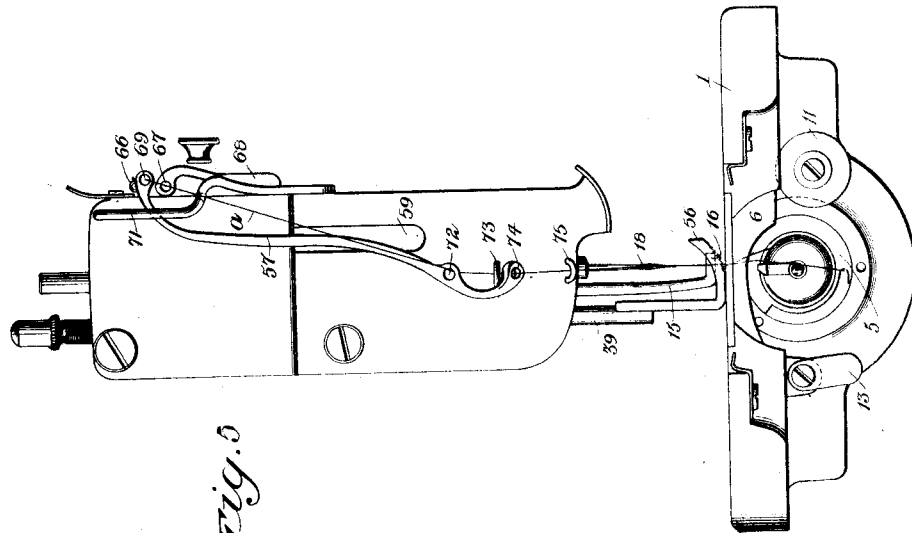


Fig. 5.

Witnesses
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7 SHEETS—SHEET 5.

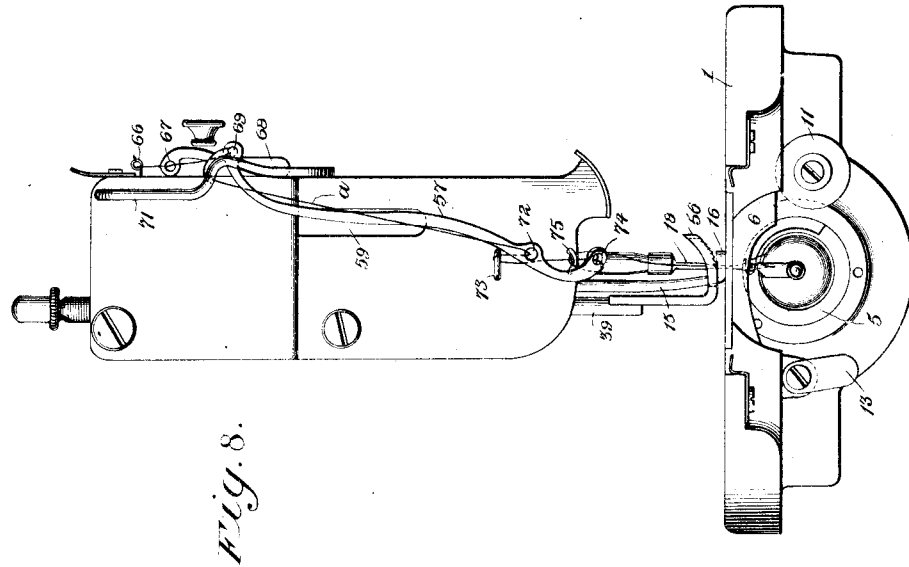


Fig. 8.

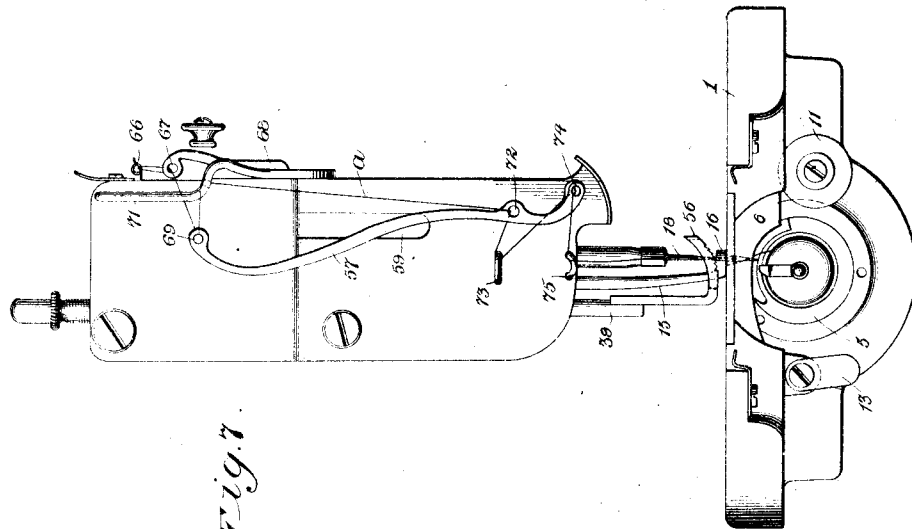


Fig. 7.

Witnesses
Edward A. Rawland.
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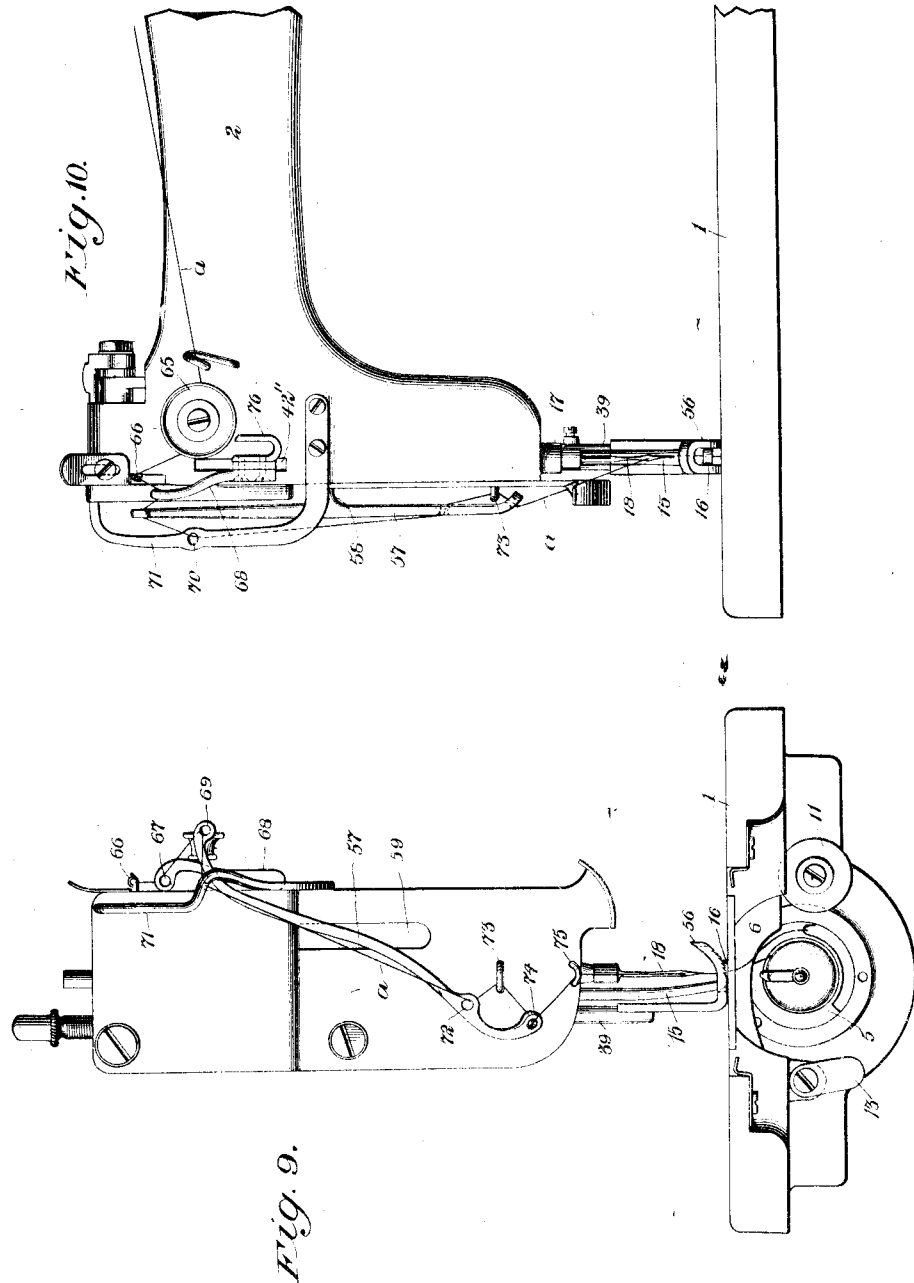
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1,060,689.

Patented May 6, 1913.

7 SHEETS—SHEET 6.



Witnesses
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1,060,689.

Patented May 6, 1913.

7 SHEETS—SHEET 7.

Fig. 12

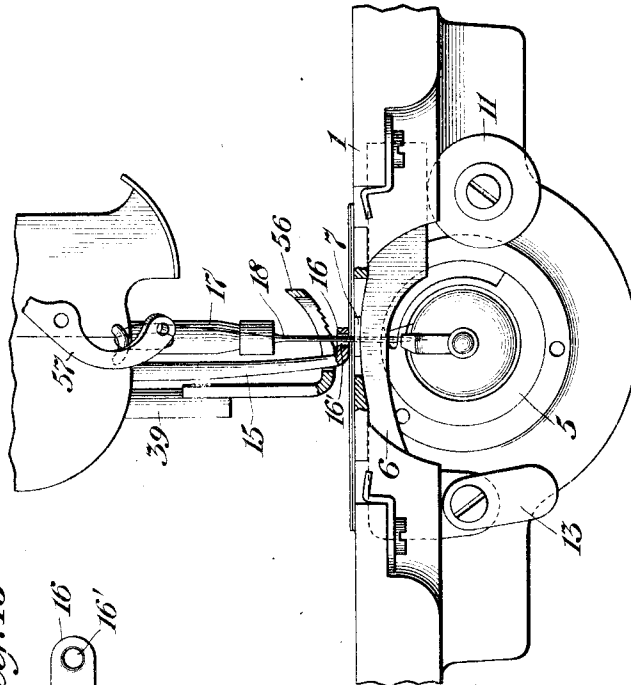


Fig. 13

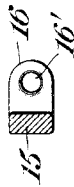
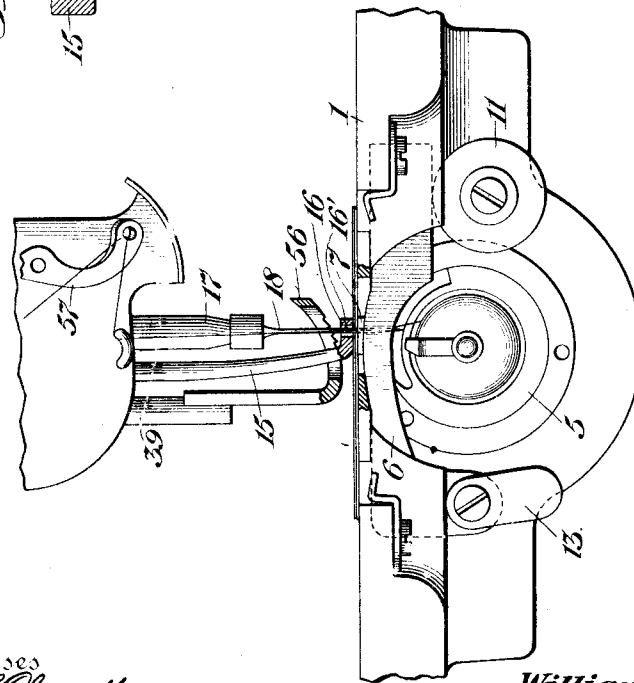


Fig. 11



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UNITED STATES PATENT OFFICE.

WILLIAM A. MACK, OF CLEVELAND, OHIO, ASSIGNOR TO STANDARD SEWING MACHINE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

SEWING-MACHINE.

1,060,689.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed November 3, 1900. Serial No. 35,395.

To all whom it may concern:

Be it known that I, WILLIAM A. MACK, a citizen of the United States, and a resident of Cleveland, Cuyahoga county, State of Ohio, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

This invention comprises improvements in certain parts of the feeding and thread controlling mechanism of the machine, and has particular reference to that class of sewing machines, termed "needle-feed" machines, although not limited in all its features thereto.

One of the objects of my present invention is to provide an improved feeding mechanism by which two strips of material of the same length and adapted to be stitched together may be so fed in unison as to insure both ends coming out even at the end of the sewing operation.

In a machine employing only one feed, whether an upper or lower one, where one strip or piece of goods moves in contact with a stationary surface and the other strip is engaged by the feed, that strip against which the feed acts is caused to gather or wrinkle to a greater or less extent by reason of the forward action of the feed against the same and the drag produced on the upper or opposite strip by the presser-foot or other stationary surface against which it is held in contact, thus necessarily causing one strip to become shorter than the other during the sewing operation and so preventing their ends finishing or coming out even.

In accordance with my present invention, I combine with a needle feed mechanism embracing a lower horizontally moving feed member, an upper feed member or helper-bar for coöperating with the said lower feed member to grip the two strips of material between the same and act in combination with the needle in moving or feeding said strips in unison. A mechanism operatively connecting said helper-bar and the presser-bar operates to lower the former into gripping engagement with the work and, simultaneously with such engagement, raise the presser from its holding engagement with the work so as to permit the latter being moved or fed without any drag or strain thereon. At the end of the feeding move-

ment the presser is again lowered into engagement with the work to hold the same while the helper-bar is raised and moved backward with the other members of the feeding mechanism to their starting position. In such manner, the two strips of material to be stitched together being firmly gripped at all times during the sewing operation, and, during the feeding movement being freed from any drag or strain thereon, insures the feeding together of two strips in almost absolute unison.

Another object of this invention is to improve the take-up mechanism so as to render it positive and efficient in operation, and also automatically adjustable in its action to conform to the different lengths of stitch.

Take-up devices are usually driven from the driving shaft of the machine through the medium of grooved cams or other intermediate mechanisms which, after becoming worn, creates more or less noise and friction and also renders the take-up less efficient and regular in its action. In accordance with my invention, a take-up device, consisting of a lever arm arranged to operate on the front side of the face-plate, is rigidly connected with the ordinary needle-bar pitman which transmits movement from the rotating crank on the driving shaft to the vertically movable needle-bar. The take-up, as thus supported, is operated by said pitman to receive a compound vertical and vibratory movement and cause its ends, through openings in which the thread is passed, to move in a direction toward and away from certain stationary thread guides so as to properly handle and control the thread in the formation of stitches. A take-up thus supported and actuated will necessarily be both regular and positive in its operation.

A further and important feature of the invention is the adjustment of the take-up and feed. As well understood, the distance of movement of the feed determines the length of stitch, and, according as the stitch is longer or shorter, a greater or less amount of thread is required for the same. Consequently, by adjusting the horizontal throw of the feeding members, one of which is the needle-bar, the movement of the needle-bar pitman will also be thereby changed and so regulate the action of the connected take-up to conform to the changed or adjusted movement of the feed. The invention also

includes various other improvements in the sewing mechanism, all of which will be fully set forth in the following detailed description, in which reference is made to the accompanying drawings forming part of this specification.

Referring to the drawings: Figure 1 is a side elevation of a sewing machine embodying my invention, with the bed-plate in section. Fig. 2 is an enlarged front end elevation of the same with the face-plate removed. Fig. 3 is a vertical section through the front end of the machine arm, taken on line 3—3 of Fig. 4, also showing a portion of the needle-bar. Fig. 4 is a horizontal section through the front end of the machine arm, taken on line 4—4 of Fig. 3. Figs. 5, 6, 7, 8, and 9 are front end elevations of the machine showing the different positions assumed by the take-up and feeding devices during the formation of a stitch, and Fig. 10 is a side elevation of the front end of the machine, showing the side opposite that shown in Fig. 1, and with the parts in the position shown in Fig. 5. Figs. 11 and 12 are enlarged detail views of the work-engaging portions of the feed mechanism, partly in section, and corresponding in position with that of Figs. 7 and 8 respectively.

In said drawings, the sewing machine head or frame comprising the bed-plate 1 and the overhanging arm 2, the upper or main driving shaft 3 supported in bearings in said arm, the lower shuttle driving shaft 4 supported in bearings on the under side of the bed-plate and driven from the upper shaft through the medium of operative connections, and the rotary shuttle 5 driven from said lower shaft 4 through the medium of an intermediate shuttle-driver, are all substantially as found in the "Standard" sewing machine upon which, in the present instance, I have applied my improvements.

The lower member of my improved feeding mechanism consists of a horizontally reciprocating feed-bar 6 having a projection or dog 7 on its upper surface which projects through an elongated slot 8 in the throat-plate 9 so as to engage with the under side of the work. This feed-bar 6 adjacent to its opposite ends is supported and guided within a groove 10 in the under side of the bed-plate as clearly shown in Fig. 1, the same resting at one end upon a roll 11 attached to the front end of the bed-plate, and at its opposite end being pivotally connected at 12 with a short crank-arm 13 on the front end of a rock-shaft 14 from which it receives its longitudinal movement. The two upper members of the feeding mechanism, consisting of the helper-bar 15 having a foot 16 cooperating with the projection 7 of the lower feed member in gripping the

work or material interposed between the same, and the needle-bar 17 carrying the needle 18 for entering the work, are both loosely supported in bearings in the upper end of the machine arm and adjacent to their lower end passed through a block or gate 19, which latter is pivotally connected with a horizontally reciprocating bar 20 from which the helper and needle bars receive their lateral or feeding movement. This bar 20 is supported to slide within a seat 21 in the lower end of the machine arm, as clearly shown in Fig. 3, and is operated from a cam or eccentric 22 on the upper driving shaft 3 in a manner as follows: A lever 23, mounted on a short shaft 32 which is journaled in a lug 24 on one side of the machine arm, is pivotally connected at its lower end with the outer projecting end of the bar 20 at 23', and adjacent to its upper end is provided with an elongated slot 25 in which a stud 26 is adjustably supported. A second lever-27, pivotally supported in a lug 28 on the machine arm in a position above the said lower lever 23, is provided with a face-groove 29 on its lower arm having a sliding block therein which connects with the inner end of said stud 26 on the lever 23, and at its upper end is pivotally connected at 30 with the outer end of a reciprocating rod 31 which is connected with and driven by the said cam or eccentric 22 on the driving shaft. By such arrangement of parts, reciprocating movement is communicated to the bar 20 from the driving shaft 3, and by adjusting the pivot connection or stud 26 back and forth in the slot 25 the length of movement of said bar 20 and thereby the lateral throw of the helper and needle bars may be regulated.

As a means for operating the lower feed bar 6 in unison with the upper feed members, the shaft 32 which carries the said lower lever 23 is extended through the supporting lug 24 and provided on its rear end with an arm 33 rigidly connected therewith, as shown in Fig. 1. The end of this arm 33 is bifurcated and engages with a roll or block carried by an arm 34 of a rock-shaft 35, which latter is mounted in bearings adjacent to the opposite ends of the machine and provided at its rear end with a second arm 36 which connects, through the medium of a pitman 37, with an arm 38 located on the said lower rock-shaft 14, which latter is mounted in bearings on the under side of the bed-plate and provided with the arm 13 at its front end connecting with the feed bar 6, as before described. When the lever 23 is operated from the driving shaft to receive a vibrating movement, its rigidly connected arm 33 is likewise operated and communicates a rocking movement to the lower shaft 14 through the me-

diuum of the connections as described and so causes the arm 13 at the front end of said shaft to vibrate and so give the feed bar 6 its horizontal reciprocating movement. The upper and lower members of the feed being thus operated from the driving shaft through the medium of the said lever 23, it will be understood that the one adjustment of the latter caused by the shifting of the stud 26 will regulate the horizontal throw of both said upper and lower feed members and cause them to always move in unison whatever their length of throw may be.

The presser-bar 39 is held, in the usual manner, with a normal downward pressure by means of a coiled spring 40 which has a bearing at one end against the upper inner wall of the machine arm and at its opposite end against a block 41 secured on said presser-bar, as clearly shown in Fig. 2. A block 42 is secured in rigid connection with the helper-bar 15 in position opposite the said block 41 on the presser and is provided with two forwardly projecting lugs 43 43 on its face side located one above the other. A three-armed lever 44 is arranged with one arm having a pivotal connection with the presser-bar block 41 by means of a pivot-screw 45, another arm extending loosely between the said lugs on the helper-bar block 42, and its third arm being bifurcated and embracing the lower end of an arm 46 which is secured on the end of a short shaft 47 journaled in bearings in the upper front end of the machine arm 2. This shaft 47, as most clearly shown in Figs. 1 and 3, extends through the arm 2 and is provided at its rear end with a second rigidly connected arm 48, which latter connects with the inner end of the eccentric rod 31 through the medium of a pitman 49. In the operation of the machine, the inner end of the eccentric rod 31 receives a vertical or up and down movement which communicates a rocking movement to the shaft 47 through the medium of the connections referred to, and so causes a laterally swinging or vibrating movement to the lower end of the arm 46 at the front end of said rock-shaft which operates the lever 44 in a manner as will hereinafter be described.

The presser-bar 39 and helper-bar 15 being operatively connected through the medium of the lever 44 in the manner described, it will be understood that the presser-bar spring 40 serves to exert a yielding downward pressure upon the helper-bar as well as the presser-bar, vertical movement of either one or both of said bars being permitted by the sliding connection of the upper bifurcated end of the lever 44 with the said vibrating arm 46 as shown. In order to raise the helper and presser bars for the purpose of releasing the work, the block 41 on the presser-bar is adapted to be en-

gaged by a suitable lifting-device in the usual manner, and, by reason of the lever 44 connecting with the blocks on both of said bars and being guided by the arm 46 which is rendered stationary by the stopping of the machine, the helper-bar is caused to be raised and lowered in unison with the presser-bar. Any suitable means might be employed for raising the presser and helper bars, one means, as herein shown, consisting of an elbow-lever 50 which is pivotally supported upon the side of the machine at 51 with one end having connection with a vertically movable plate 52 which is arranged to slide upon the outer wall of the machine arm and provided with a lower inwardly turned end 53 projecting through an opening in the arm into a position beneath the presser-bar block 39' so as to engage therewith, as clearly shown in Fig. 2, and the opposite end of said elbow lever extending downward through an opening in the bed-plate into a position beneath the latter to be operated by any suitable actuating means. The ordinary hand-operated lifting lever, indicated at 54, is also provided, the same as herein shown being adapted to engage with the inwardly turned end 53 of the plate 52 in raising the presser-bar.

In the operation of the machine as described, after the work has been placed under the regular presser-foot in the usual manner and the machine set in motion, the helper-bar moves downwardly from the position shown in Fig. 5 to that shown in Figs. 6 and 2 so as to grip the work between the same and the lower feed member 7, while simultaneously with such gripping of the work by the helper-bar, the presser-foot raises from engagement with the work to the position shown in Figs. 7 and 8 so as to permit said work being fed or carried forward by the feeding members without drag or strain thereon. Such action of the presser and helper bars is secured in a manner as follows: The lever 44 being rocked by the vibrating arm 46, when the helper-bar is lowered into gripping engagement with the work and becomes stationary, the said lever is caused to pivot or fulcrum between the lugs on the helper-bar block and so raise its opposite end and the connected presser-bar. Upon the return swing of said lever, when the presser reaches a position in engagement with the work, the lever will of course fulcrum upon the pivot-screw 45 in the presser-bar block and so raise the helper-bar. In this manner, one bar is caused to be brought into holding or gripping engagement with the work before the other rises therefrom, both of the same being in engagement with the work only as the lever 44 and its actuating arm 46 move past a central vertical line. To continue with the feeding operation of the parts,

after the work has been gripped between the upper and lower gripping members of the feed as described but before any forward movement of the same, the needle first descends through the work as shown in Figs. 7 and 11, passing through the needle opening 16' in the feed member 16, and, while in the work and during its movement to throw out the loop, is moved laterally with the said gripping members of the feeding mechanism and as a part of the latter to feed or carry the work forward. After the several members of the feeding mechanism have reached the limit of their feeding movement as shown in Figs. 8 and 12, the needle first rises from the work and the presser moves downward into engagement with the latter, while immediately following such engagement, the helper-bar, as before described, rises from its engagement with the work and is swung backward into position to be again lowered into gripping engagement with the work at the starting point of the feeding movement.

In order that the helper-bar may be adjusted to remain in engagement with the work a greater or less length of time according to the length of its lateral or feeding movement, or in other words, to remain in gripping relation to the lower member 7 of the feed according to the length of the horizontal feeding movement of the latter, I have provided the rear arm 48 on the upper rock-shaft 47 with an elongated slot 55 therein, as shown by dotted lines in Fig. 3, whereby the connecting end of the pitman 49 may be adjusted in a direction toward or away from the shaft 47 so as to vary the extent of the rocking movement of the latter and thereby the throw of its front arm 46, the throw of which latter, being greater or less, operates the lever 44 so as to hold the helper-bar in gripping position a greater or less length of time, as will be readily understood.

By employing the upper and lower members of the feeding mechanism for gripping the work upon opposite sides and retaining such grip during the feeding movement and until the work is released, I am enabled to provide said feed members with smooth gripping surfaces whereby work or material of any character, such as soft kid leather for instance, may be fed without liability of being cut, marked, or otherwise damaged. Such feature is very important as will be obvious. The presser-foot is also provided with a smooth under surface for engagement with the work, but its upwardly inclined toe, indicated at 56, is formed with a roughened surface on its under side for the purpose of engaging any very abrupt seam or seams in the work and prevent the latter from sliding or being forced backward in the event of the needle

and helper-bar being raised or disengaged from the work at the time of such engagement, as would be liable to occur if the under surface of such upwardly turned or inclined toe presented a smooth surface.

My improved take-up, indicated at 57, consists of an arm which is arranged to operate on the front side of the face-plate and provided with a short rearwardly projecting extension 58 about midway between its ends which extends through an elongated slot 59 in said face-plate and is rigidly attached to lugs 60, 60, on the ordinary needle-bar pitman 61 by means of screws 62, 62, as clearly shown in Figs. 2 and 3. By such connection, the take-up arm 57 is carried and caused to operate as though an integral part of said pitman, and any suitable means, other than that shown and described, may therefore be employed for securing rigid connection between such parts. The said pitman 61 is pivotally connected at one end with the rotating crank 63 on the front end of the upper driving shaft 3 and at its opposite lower end with the block 64 on the vertically movable needle-bar 17, in the usual manner. By means of such connection, whereby one end of the pitman is moved in a circular path and the opposite end in a substantially vertical path, a compound vertical and lateral movement is given to said pitman which is communicated to the connected take-up arm in a manner as follows: The said take-up arm, being attached to the pitman adjacent to its point of connection with the needle-bar as clearly shown in Figs. 2 and 3, is caused to move in a substantially straight vertical path at its center or point of connection with the pitman and be rocked by the laterally moving action of the latter to give a vibrating movement to its opposite ends, which latter act upon the thread in a manner as will be described.

In threading the machine, the thread, indicated at *a*, is passed from the spool or other thread supply between the disks of an ordinary disk tension device 65 located upon the front side of the machine arm, as most clearly shown in Fig. 10. From this tension device, the thread is passed through the loop or eye of the ordinary slack thread controller or take-up spring 66, then through the eye 67 of a controller arm 68 to be hereinafter referred to, then through an eye 69 in the upper end of the take-up arm, then through an eye 70 in a stationary arm 71 which is secured upon the frame of the machine, and from thence down through an eye 72 near the lower end of the take-up arm, then through a stationary eye or staple 73 on the face-plate, then back through a second eye 74 in the lower end of the take-up arm, and then down through a second stationary eye 75 on the face-plate to the

needle, all as clearly shown in the drawings. In order to avoid confusion of terms, I will hereafter refer to the laterally stationary eyes 67, 70, 73, and 75, as "guides", in contradistinction to the eyes of the movable take-up. When the machine is threaded as described and set in motion, the action of the take-up is such that its opposite ends move to a position substantially in line with the adjacent guides on the machine arm at a time when the needle is at its highest point and the shuttle is in position to cast off the loop, as shown in Fig. 5, at which time the greatest amount of thread is required for passing around the shuttle. From such position, the take-up arm is rocked or operated to move its ends in a lateral direction away from the stationary guides, as shown in Fig. 6, so as to draw up and complete the stitch. After the stitch is drawn up and completed, and the needle has begun its descent as shown in said Fig. 6, the ends of the take-up arm are then moved backward toward the stationary guides so as to give down the necessary slack thread to the needle when entering the work, as indicated in Fig. 7, and for throwing out the loop to be entered by the shuttle, as shown in Fig. 8. From the latter position, which shows the eyes in the take-up below the adjacent stationary guides, the ends of the take-up are moved in the path of an arc, as indicated in Fig. 9, back to its starting position, as shown in Fig. 5, so as to gradually give down the necessary thread to the shuttle to be passed around the same in the manner indicated. The action of the take-up in thus moving at its opposite ends in a direction toward and away from the adjacent stationary thread guides serves to control the thread in giving down and taking up the same as required with great nicety, the movement of the take-up as given by the pitman 61 and the arrangement of the guides relative thereto being such as to cause the thread being drawn up quickly to complete the stitch, and given down slowly as required without producing undue slack.

I will now describe the automatic adjustment of the take-up to conform to the different lengths of stitch.

As well understood, a greater or less amount of thread is required according to the length of stitch, which latter is regulated by adjusting the horizontal movement of the feed. Therefore, by adjusting the lateral throw of the needle-bar, which forms one of the members of my improved feeding mechanism, the lateral movement of the connecting pitman 61 will also be thereby adjusted and so vary the movement of the connected take-up arm. For instance, if the lateral throw of the needle-bar is in-

creased to produce a greater length of stitch, such increased throw will so change the position or angle of the connected pitman and its take-up arm 57 as to cause the ends of the latter to move a greater distance from the adjacent guides when drawing off the thread from the spool so as to provide the desired increase. If the lateral throw of the needle-bar is decreased to provide a shorter stitch, such decrease will of course correspondingly lessen the throw of the take-up and so insure a less amount of thread being drawn from the spool. The ends of the take-up arm, in moving back toward the stationary guides, are always returned to the same determined position relative thereto, so as to give down the proper amount of thread, by reason of the needle-bar always returning to the same starting position, as it is understood that the lateral throw of the needle-bar, whether greater or less, is always from the same starting point. A greater or less amount of thread is also required according to the thickness of the work being operated upon. For instance, to produce the most desirable form of stitch, it is necessary that a sufficient length of thread be given down to enable the take-up to draw up the loop of the upper thread until the lock between the threads is at the center of the work. Hence it follows that the length of thread given down at each stitch should be greater or less according as to whether the work is thicker or thinner. As a simple and effective means for thus automatically regulating the length of thread given down at each stitch, the said controller arm 68, through the eye of which the thread is passed between the spring 66 and the upper end of the take-up arm 57 as before described, is attached to the end of an arm or extension 42' of the helper-bar block 42 which projects through a vertically elongated slot 42'' in the arm 2 as clearly shown in Figs. 2 and 10. By such arrangement and combination of parts, when a piece of work is inserted beneath the helper-bar, the thickness of such work will determine the proper position of the controller arm by reason of its connection with said helper-bar. Then, in the event of a seam or any other increased thickness in such work passing beneath the helper-bar, the latter will be raised thereby and so move the controller upward to give off enough additional length of thread to provide for such increased thickness of work. After the seam or increased thickness in the work has passed beneath the helper-bar, the latter of course lowers and so moves the controller back to its original position to give off the same amount of thread as before. When the controller is moved upward as described to provide for an increased thickness in the work, it also acts to relieve the strain on the slack thread

take-up spring 66 and insures the thread being sufficiently slack in the eye of the needle as the latter enters the work to prevent undue strain or breakage of the same.

5 The eye 67 in the controller arm 68, although vertically movable as and for the purpose set forth, is laterally stationary relative to the adjacent end of the take-up arm 57 in its action toward and away from
10 the same, as hereinbefore referred to.

As a simple means for securing the release of the tension on the upper thread when the work is to be removed, I have secured a second arm 76 on the outer end of
15 the helper-bar block extension 42', as shown in Fig. 10, the upper wedge-shaped end of which is adapted to be entered between the disks of the tension device to separate the same and release the thread when the
20 helper-bar is raised, in a manner as will be described. When the helper-bar is in its lowered position resting upon the lower feed member or upon the work, the connected tension release arm 76 is so far below the tension disks that when the helper
25 and presser bars are raised by their lifting device it will not enter between said disks. When the said helper-bar is raised, however, by the action of the lever 44 and
30 the machine is brought to a stop at such time, the said tension release arm 76 has been moved by the raising of said bar sufficiently nearer to the tension so that when the presser and helper bars are now raised
35 by their lifting device, the said arm 76 will be caused to enter between the tension disks and release the thread. The action of the needle-bar is so timed that it is always above and disengaged from the work when the
40 helper-bar is raised therefrom by the action of the said lever 44 as described. In this manner, the releasing of the upper thread is only secured when the several parts are in their proper position to permit of the removal
45 of the work, that is, with the needle and helper bars raised, as shown in Figs. 5 and 10.

The arm or casting 2 is provided with an oil recess or chamber 77 formed therein at
50 a point adjacent to the needle bar bearing block 19, as shown in Fig. 3, in which a suitable wick 78 is located with one end thereof, indicated at 79, projecting laterally over one edge of the oil chamber into contact
55 with the needle-bar so as to automatically lubricate the same. A plate or cover 80 closes the top of said chamber, the same being provided with an upturned flange 81 by which it is removably secured in position
60 by means of a screw 82.

Having thus set forth a practical embodiment of my invention, I do not wish to be understood as confining myself to the particular details of construction and combination of parts as set forth, as the same may

be more or less materially modified without departure from the spirit of my invention, for

What I claim and desire to secure by Letters Patent of the United States, is—

70. 1. In a sewing machine, a combined reciprocating and vibrating thread-carrying needle, two feed-members operative to engage and clamp the work therebetween and cooperating with said needle to effect the
75 feed of the work while the needle is in the work, and operating means for imparting work feeding movements to both said needle and feed-members.

80. 2. In a sewing machine, a combined reciprocating and vibrating thread-carrying needle, two feed-members operative to engage and clamp the work therebetween and cooperating with said needle to effect the
85 feed of the work while the needle is in the work, operating means for imparting work feeding movements to both said needle and feed-members, and adjusting means common to both said needle and feed-members for effecting a like adjustment of feed move-
90 ment to the same.

3. In a sewing machine, a feeding mechanism comprising a lower feed-member, an upper feed-member, a driving shaft, means including a device actuated from said shaft
95 for communicating a feeding movement to the feed-members, and means actuated from said device for moving the upper feed-member to and from its operative work gripping position.
100

4. In a sewing machine, a feeding mechanism comprising a lower feed-member, an upper feed-member, a driving shaft, means including a device actuated from said shaft
105 for communicating a feeding movement to the feed-members, means actuated from said device for moving the upper feed-member to and from its operative work gripping position, and adjusting means for regulating the time of engagement with the work of
110 the upper feed-member.

5. In a sewing machine, a feeding mechanism comprising a lower feed-member, an upper feed-member, means for communicating a feeding movement to said feed-
115 members, a lever for moving said upper feed-member vertically to and from its operative work gripping position relative to the lower feed-member, and adjusting means for regulating the extent of movement of
120 said lever and thereby the time of engagement with the work of the upper feed-member.

6. In a sewing machine, a feeding mechanism comprising a lower feed-member, an upper feed member, means for communicating a feeding movement to said feed-
members, a lever having operative connection with said upper feed-member to raise and lower the same, a rock-shaft having an

arm engaging with and operating said lever, means for operating said rock-shaft, and adjusting means for regulating the extent of movement of said rock-shaft and thereby the throw of the lever operated thereby.

7. In a sewing machine, the combination with the presser-bar, of a feeding mechanism comprising a lower feed-member, an upper feed-member, means for communicating a feeding movement to said feed members, means for exerting a yielding downward pressure to said presser-bar and the upper feed-member, means for alternately lowering and raising the presser-bar and upper feed-member to and from engagement with the work, and adjusting means for regulating the time of engagement with the work of said presser-bar and upper feed member according to the length of stitch.

8. In a sewing machine, the combination, of a feeding mechanism including the needle-bar and needle, a take-up movable relatively to said needle-bar and being operative to draw up and complete the stitch, means for operating said feeding mechanism and take-up, and a single adjusting means for regulating the action of said feeding mechanism and take-up.

9. In a sewing machine, the combination, of a feeding mechanism including the needle-bar and needle and a cooperating lower feed member, a take-up movable relatively to said needle-bar and being operative to draw up and complete the stitch, means for operating said feeding mechanism and take up, and a single adjusting means for regulating the action of said feeding mechanism and take-up.

10. In a sewing machine, the combination, of a feeding mechanism including the needle-bar and needle and cooperating upper

and lower feed members, a take-up movable relatively to said needle-bar and being operative to draw up and complete the stitch, means for operating said feeding mechanism and take-up, and a single adjusting means for regulating the action of said feeding mechanism and take-up.

11. In a sewing machine, the combination, of a feeding mechanism including a combined reciprocating and vibrating needle-bar, a take-up movable relatively to said needle-bar and being operatively connected with the latter and movable therewith, and means for adjusting the vibrating movement of said needle-bar and thereby the action of the take-up.

12. In a sewing machine, the combination, with a feeding mechanism including a combined reciprocating and vibrating needle-bar, and means for operating the latter including a rotary actuating device and a connecting pitman, of a take-up rigidly connected with said pitman to be movable therewith, and means for adjusting the lateral movement of said needle-bar and thereby the action of the take-up.

13. In a sewing machine, a feeding mechanism comprising a lower feed member and an upper feed member cooperative to engage and clamp the work therebetween, a driving shaft, means including a device actuated from said shaft for communicating a feeding movement to the feeding members, and means actuated from said device for moving the upper feed member to and from its work-clamping position relative to the lower feed member.

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Witnesses:

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W. C. WALKER.