(No Model.)

3 Sheets—Sheet 1.

L. SCHULTZ.

QUILTING MACHINE.

No. 351,468. Patented Oct. 26, 1886.

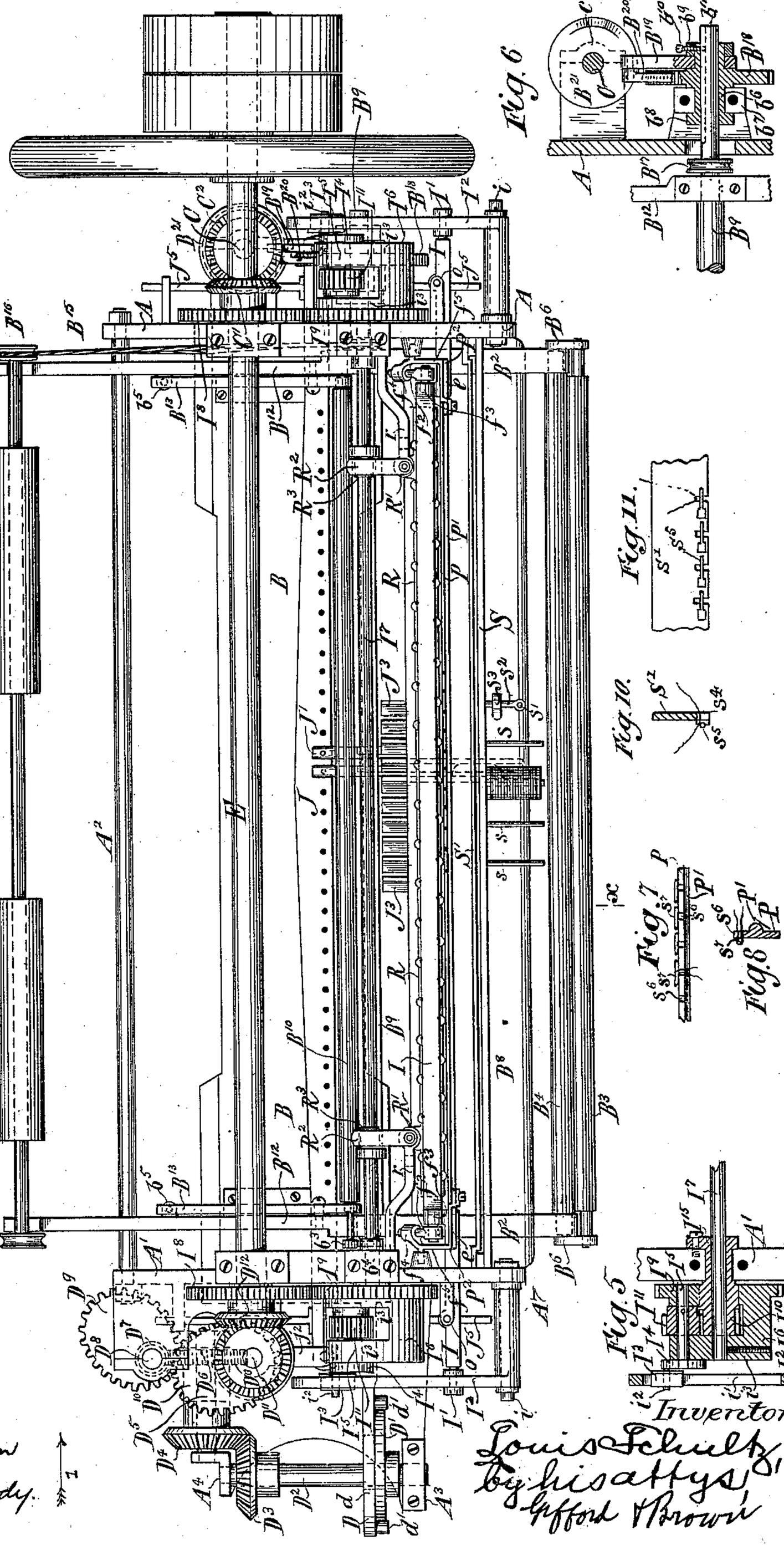

Fig. 1.

Fig. 6.

Fig. 11.

Fig. 10.

Fig. 7.

Fig. 8.

Fig. 5.

Witnesses
Geo Wadman
Richard J. Cody.

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Louis Schultz
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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 3

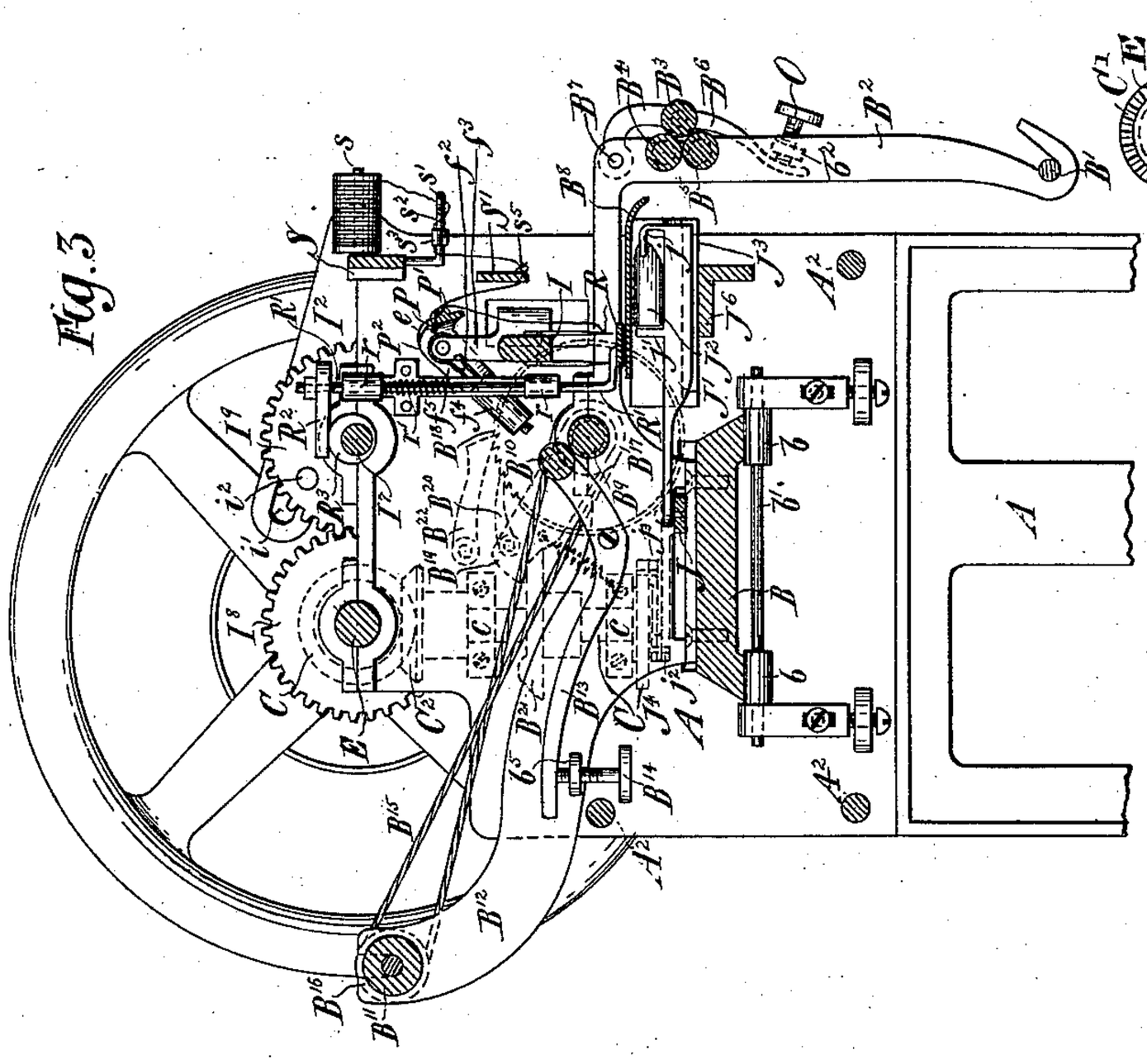

Fig. 15.

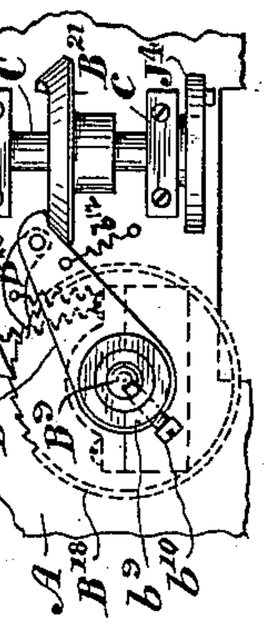

Fig. 2

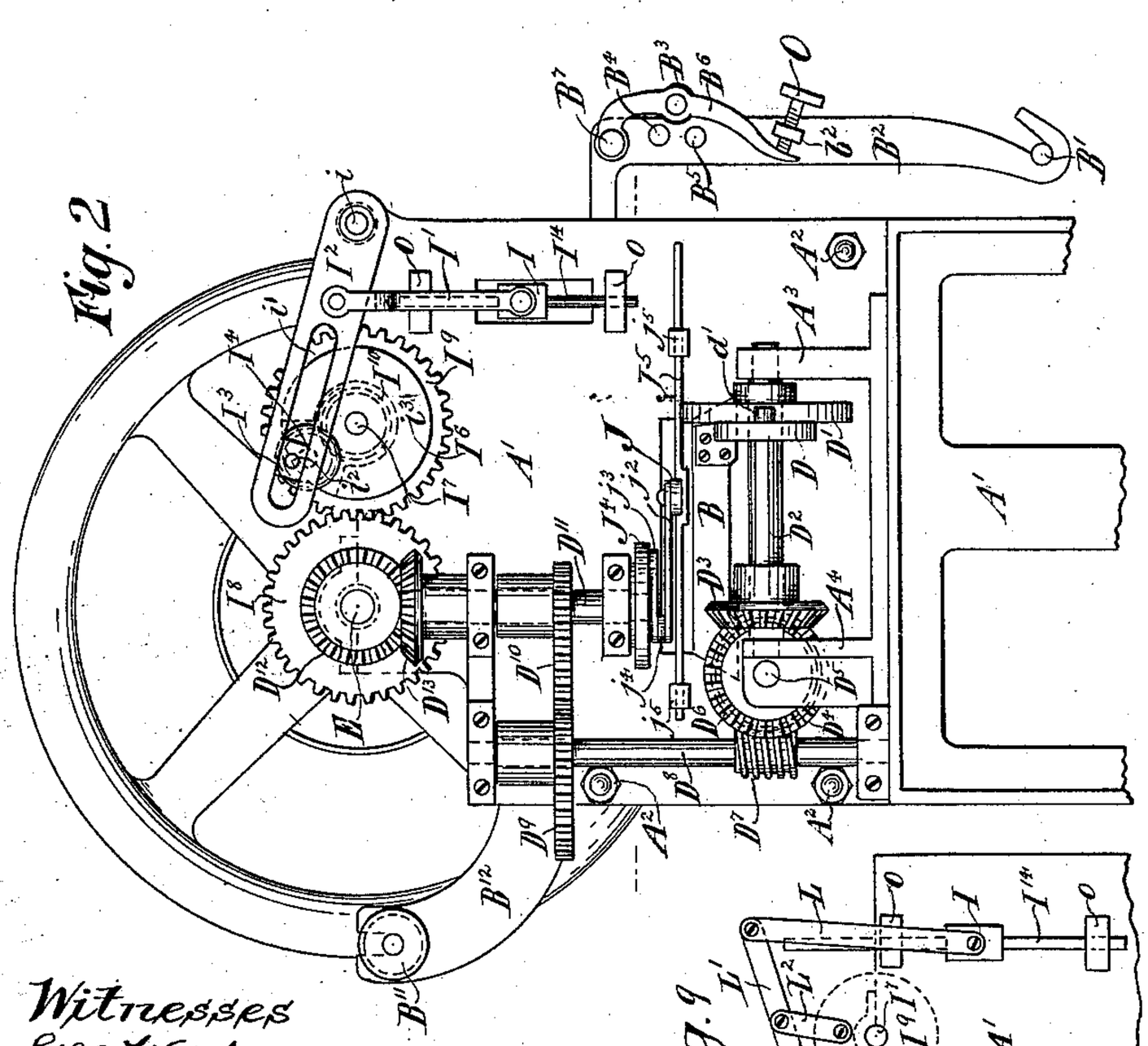

Fig. 4

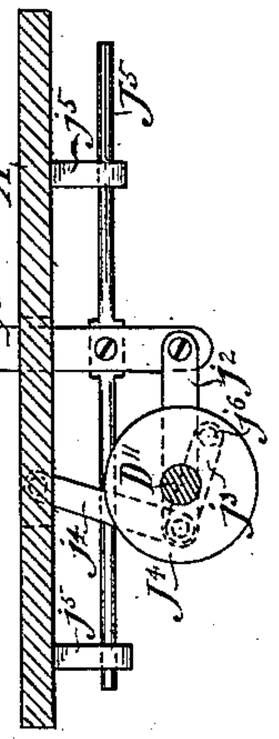

Fig. 9

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(No Model.) 3 Sheets—Sheet 3.

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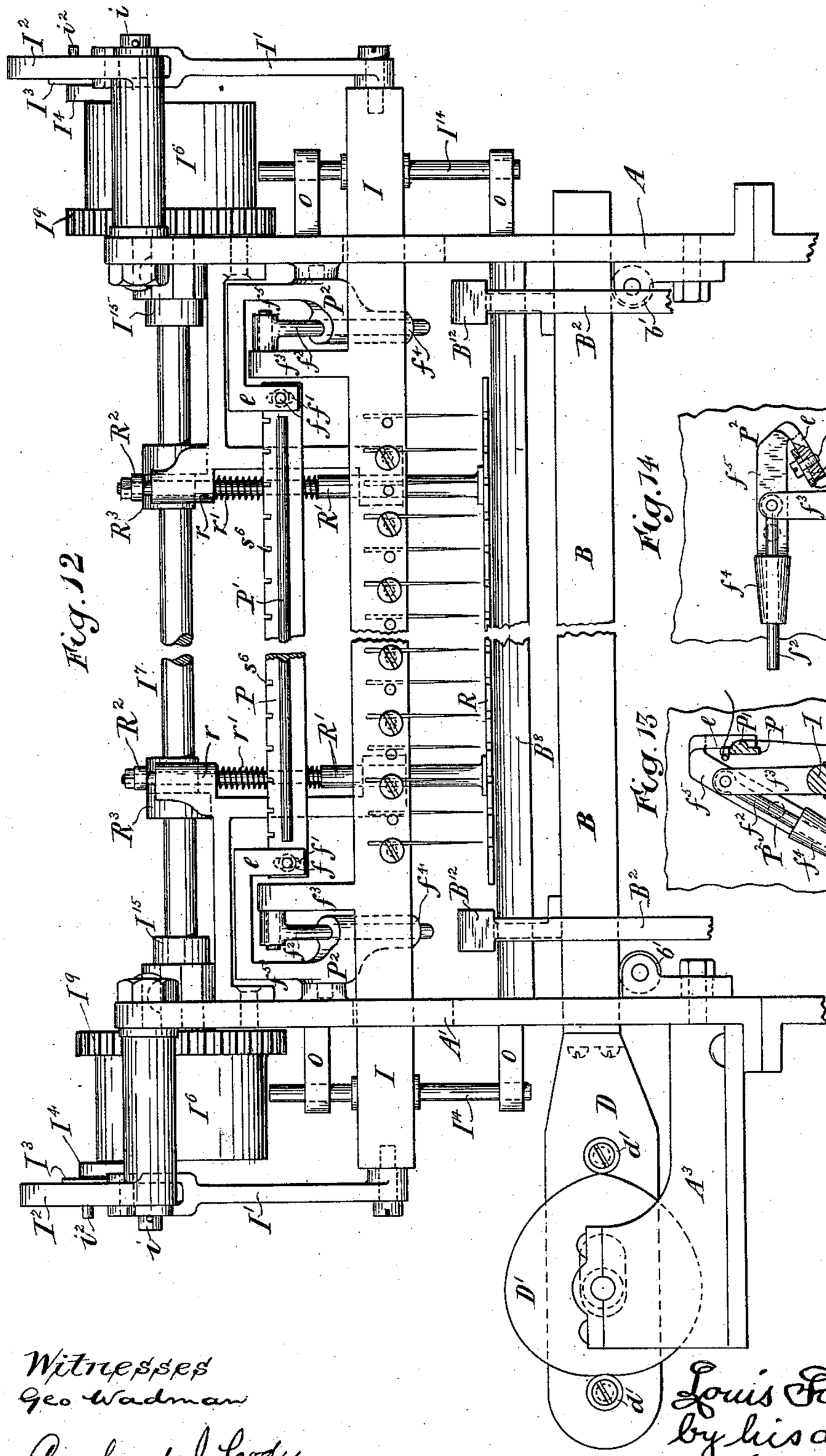

Fig. 12

Fig. 14

Fig. 13

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UNITED STATES PATENT OFFICE.

LOUIS SCHULTZ, OF NEW YORK, N. Y.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 351,468, dated October 26, 1886.

Application filed January 28, 1886. Serial No. 190,056. (No model.)

To all whom it may concern:

Be it known that I, LOUIS SCHULTZ, of New York, in the State of New York, have invented a certain new and useful Improvement in Quilting-Machines, of which the following is a specification.

I will describe in detail a quilting-machine embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a plan or top view of a quilting-machine embodying my improvement. Fig. 2 is an end view thereof, looking in the direction of the arrow 1, Fig. 1. Fig. 3 is a transverse vertical section of the machine, looking in the same direction and taken on the dotted line *x x*. Fig. 4 is a plan or top view of certain parts of the shuttle-driving mechanism. Fig. 5 is a horizontal section of a portion of the mechanism for actuating the needle-bar. Fig. 6 is a horizontal section showing certain portions of the feed-operating mechanism. Fig. 7 is a top view of a portion of the take-up bar. Fig. 8 is a transverse section of the same. Fig. 9 is a view of a means of actuating the needle-bar of modified form, as the same appears at one end of the machine. Fig. 10 is a transverse section of a guide-bar for the needle-thread. Fig. 11 is a side view of a portion of the same. Fig. 12 is a front elevation of a quilting-machine, embodying my improvement, on an enlarged scale, certain portions being broken away to save space and certain other portions being removed to disclose parts which would otherwise be concealed. Fig. 13 is a view, partly in section, of certain portions of the take-up mechanism. Fig. 14 is a view of similar parts shown in a different position to that they occupy in Fig. 13. Fig. 15 is an end view of a portion of the feed mechanism.

Similar letters of reference designate corresponding parts in all the figures.

A A′ designate the main upright portions of the frame of the machine. They are rigidly secured together by cross-bars A^2, here shown as three in number.

B designates a carriage upon which the work to be quilted is supported and carried along. This carriage rests upon rollers *b*, arranged at the portions A A′ of the frame and journaled therein, as here shown, upon axles *b′*. The carriage may be moved to and fro or from side to side of the machine upon these rollers. This motion is for imparting a lateral or sidewise movement to the goods, for reasons subsequently to be explained. The goods to be quilted are rolled upon a delivery-roller, B′, whose journals rest in suitable bearings in downwardly-extending arm-like portions B^2 of the carriage at the front of the machine. From this roller the goods pass between tension-rollers B^3 B^4 B^5, the rollers B^4 B^5 being journaled in suitable bearings in the portions B^2 of the carriage. The roller B^3 is arranged intermediate of the rollers B^4 B^5, or, in other words, so that it may bear against both said rollers. It is journaled in levers B^6, arranged one upon the outside of each of the portions B^2 of the carriage. These levers are loosely hung near one of their ends, as here shown upon screws B^7, and have their lower ends extending slightly rearward. Adjusting devices O (here shown as screws working in tapped holes in lugs b^2 upon the portions B^2 of the carriage) are adapted to bear upon the levers B^6, near the lower ends of the latter. By adjusting these screws the roller B^3 may be made to act with more or less pressure upon the rollers B^4 B^5, and the tension upon the goods increased or decreased. After leaving the rollers B^3 B^4 B^5 the goods pass over a work-plate, B^8, extending between the portions A A′ of the frame and rigidly secured thereto at both ends. From the work-plate the goods pass between feed-rollers B^9 B^{10}, and from thence to a take-up roller, B^{11}. The feed-roller B^9 is journaled in bracket-like portions B^{12} of the carriage B, which, as here shown, are integral with the portions B^2 thereof, and extend fore and aft of the machine and over the work-plate B^8. The roller B^9 is geared to the roller B^{10} by gear-wheels b^3 b^4, arranged one upon the end of each of the rollers outside the portion B^{12} of the carriage and adjacent to the portion A′ of the frame. By this means motion imparted to the roller B^9 will be transmitted to the roller B^{10}. The roller B^{10} is journaled in levers B^{13}, fulcrumed one upon each of the portions B^{12} of the carriage. Adjusting devices B^{14} (here shown as screws working in tapped holes in lugs b^5 upon the bracket-like portions B^{12} of the carriage) bear against the free ends of said

levers. By adjusting these screws the rollers B^{10} may be brought nearer to or farther from the roller B^9, and the pressure upon the goods increased or decreased. The take-up roller B^{11} is journaled in suitable bearings in the outer extremities of the bracket-like portions B^{12} of the carriage, and has motion imparted to it by means of a belt, B^{15}, passing over a pulley, B^{16}, on said roller, and another pulley, B^{17}, on the roller B^9, so that the roller B^9 and the take-up roller rotate in unison. In this machine the goods have a lateral motion, or from side to side of the machine, in which motion there occurs a dwell. They have also a forward motion in which there occurs a dwell. These motions are practically intermittent. The lateral motion is imparted to the goods by the carriage B, but they receive the forward motion in the following manner: The feed-roller B^9 extends outside the portion A of the frame through a suitable aperture therein. Its outer portion or neck, b^{11}, extends loosely through a hub, b^6, forming portion of a ratchet-wheel, B^{18}. This hub extends upon both sides of the ratchet-wheel. The side thereof near the portion A of the frame is journaled in bearings b^7 upon an extension of said portion of the frame, and is provided with a flange, b^8, outside said bearing. This flange prevents movement of the ratchet-wheel lengthwise of the neck of the roller in one direction. The portion of said hub on the opposite side of the ratchet-wheel has loosely hung upon it a pawl-carrier, B^{19}. Beyond the pawl-carrier a ring or collar, b^9, surrounds the hub. A screw, b^{10}, working in tapped holes in the collar b^9 and in the hub, secures the collar to the hub. This collar prevents the pawl-carrier B^{19} from moving off from the hub. In the neck b^{11} of the roller B^9 is a longitudinal slot, into which extends loosely the inner end of the screw b^{10}. It will therefore be seen that rotary motion imparted to the ratchet-wheel will be communicated to the roller B^9, and that the said roller may move lengthwise in the ratchet-wheel and in its bearings, or, in other words, may follow the side-to-side movements of the carriage B, in which it is journaled.

The pawl-carrier B^{19} bears upon it near its free end a pawl, B^{20}, adapted to engage with the ratchet-wheel. The pawl-carrier rests normally upon a horizontally-arranged cam-wheel, B^{21}, rigidly mounted upon a vertical shaft, C, journaled in bearings *c*, extending from the portion A of the frame and receiving motion from a bevel gear-wheel, C′, mounted upon the main shaft E of the machine, and meshing into another bevel gear-wheel, C^2, on the shaft C. The shape of the cam-wheel B^{21} is such that at each revolution it imparts an up-and-down rocking motion to the pawl-carrier B^{19}, which causes the pawl B^{20} to rotate the ratchet-wheel a distance equal to the length of one tooth on said wheel. A spring, b^{12}, secured at one end to the pawl-carrier B^{19} and at the other end to an extension on the portion A of the frame, serves to keep said pawl-carrier in contact with the cam-wheel B^{21}. A locking-pawl, B^{22}, hung loosely upon the portion A of the frame, bears upon the ratchet-wheel and operates to prevent back motion of the ratchet-wheel. Owing to the positions which the pawls B^{20} and B^{22} occupy they are adapted to operate by gravity, but springs may be used to facilitate their engagement with the ratchet-wheel.

It will be seen that each time the ratchet-wheel is rotated the distance of one tooth a proportionate rotary motion is imparted to the roller B^9, whereby the goods are fed forward intermittently.

In the example of my improvement shown the machine is designed for sewing a pattern composed of sinuous or zigzag lines meeting, approaching, or crossing each other at different points upon the goods. It is for this reason that a sidewise as well as a forward movement is imparted to the goods when being sewed, for if with the forward feed of the goods is also combined a motion from side to side, each of the needles will sew a zigzag or sinuous line, and by certain arrangements of the needles the lines of the zigzag may be made to meet at their corners or cross each other, whereby a diamond or analogous shaped pattern will be produced. The goods being carried by the carriage B, if sidewise movement be imparted to the latter, lines of stitching in the direction of the width of the goods must necessarily be produced. The movement of the carriage is intermittent and simultaneous with the forward feed of the goods, both the forward feed and the sidewise movement occurring when the needles are raised out of the goods. As these two movements occur together, they result in producing lines of stitching which are angular or sinuous. Intermittent sidewise movement is imparted to the goods by the following mechanism:

D designates an arm rigid upon and forming portion of the carriage B. It extends for a distance beyond the portion A′ of the frame and at approximate right angles thereto. Near its outer end such arm is provided with a longitudinal slot, *d*. Upon one of the sides of the arm D two anti-friction rollers, *d*′, are mounted upon pins or studs. Between these rollers is arranged a cam, D′, rigidly mounted upon a horizontal shaft, D^2, extending at approximate right angles to the arm D and through the slot *d* therein. This shaft is journaled in bearings upon projecting portions A^3 A^4 of the frame.

Near one end the shaft has mounted upon it a bevel gear-wheel, D^3, which receives motion from another bevel gear-wheel, D^4, mounted upon a short shaft, D^5, extending at approximate right angles to the shaft D^2 and journaled in suitable bearings in the portion A^4 of the frame. Mounted upon the shaft D^5 is a worm-wheel, D^6, receiving motion from a worm, D^7, upon an upright shaft, D^8, jour-

naled in suitable bearings upon the main frame. An elliptical gear-wheel, D^9, is rigidly mounted upon the shaft D^8 near its upper end. Motion is imparted to this elliptical gear-wheel by another elliptical gear-wheel, D^{10}, mounted rigidly upon a short upright shaft, D^{11}, journaled in suitable bearings on the main frame. Motion is imparted to the shaft D^{11} by means of a bevel gear-wheel, D^{12}, mounted upon the main shaft E and meshing with another bevel gear-wheel, D^{13}, upon the upper end of the shaft D^{11}. The arrangement of the elliptical gear-wheels D^9 D^{10} upon their respective shafts is such that a variable rotary motion will be imparted to the shaft D^8, which through the intermediate mechanism described will be transmitted to the cam D′ upon the shaft D^2. The cam D′ is heart-shaped. It will therefore during one half of a rotation act against one of the rollers d', and during the other half rotation upon the other roller. It consequently operates to move the carriage B to and fro, and because the rotary motion of the cam D′ is made to consist of alternate accelerations and dwells, or, in other words, is practically intermittent, owing to the use of the elliptical gear-wheels D^9 D^{10}, it imparts an intermittent movement to the carriage.

Having thus described the manner in which the goods are fed and moved along, I will now describe the needle-operating mechanism.

I designates the needle-bar, here shown as provided with two rows of needles, the needles of one row being arranged intermediate of the needles of the other row. Such arrangement of the needles is, however, not essential. The needle-bar extends from side to side of the machine and has vertical motion imparted to it by means of links I′, pivotally connected near one of their ends to the outer ends of the needle-bar beyond the portions A A′ of the frame. These links are also pivotally connected to rocking levers I^2, loosely hung near one of their ends upon pins or studs i, extending from the portions A A′ of the frame. In these levers are longitudinal slots i'. Slide-blocks I^3 are arranged and adapted to slide to and fro in the slots i'. These slide-blocks are mounted upon crank-pins i^2, extending from the sides of disks I^4, which are rigidly mounted upon short shafts I^5, near one of the ends of the latter.

The shafts I^5 are journaled in side portions, i^3, of hollow cylindrical shells or cases I^6, near the peripheries of the latter. The shells or cases I^6 are rigidly mounted upon a shaft, I^7, extending from side to side of the machine. Rotary motion is imparted to the shells or cases I^6 by means of gear-wheels I^8, mounted upon the main shaft E and meshing with gear-wheels I^9, arranged upon and forming portion of the shells or cases I^6. It will therefore be seen that the shells or cases I^6 rotate in unison. Within the shells or cases I^6 are gear-wheels I^{10}, rigidly mounted upon the sleeves I^{15}, surrounding the shaft I^7 and constituting bearings for said shaft. These sleeves are rigidly secured to the portions A A′ of the frame, as shown, by bolts or screws passing through flanges on the sleeves abutting against the inner sides of the portions A A′ of the frame. Neither the sleeves nor the gear-wheels I^{10}, mounted upon them, rotate. The gear-wheels I^{10} mesh with gear-wheels I^{11}, rigidly mounted upon the shafts I^5. As the shells or cases I^6 are rotated they not only carry with them in their rotation the shafts I^5, but an independent rotary motion is imparted to the shafts I^5, and consequently the disks I^4, by means of the gear-wheels I^{10} I^{11}. The combined movement is such that the crank-pins i^2 will travel in elliptical paths about the axis of the shells or cases I^6, and will consequently vary the up-and-down motion transmitted to the levers I^2 in such manner that a "dwell" will occur in the movement of the needle-bar at the time when the needle-bar is in its lowermost position, or when the needles are down. This dwell is for the purpose of affording time for the shuttles to pass through the loops of needle-threads and lock the stitches. As soon as this has occurred a rapid up-and-down motion will be communicated to the levers I^2 and the needle-bar by the crank-pins i^2, whereby the needles will be withdrawn from and returned to the goods quickly. Guide-rods I^{14}, arranged vertically upon and affixed to the needle-bar, act to prevent lengthwise movement of the needle-bar.

In the example of my improvement shown in Fig. 9 I have shown a different means for imparting vertical movement to the needle-bar from that previously described. Such means consist in a link, L, pivotally connected near one end with the needle-bar, and having a pivotal connection near its other end with one end of a link, L′, which latter link is loosely connected to a crank-pin, l, on the bevel gear-wheel D^{12}. About midway in the length of the link L′ the same has pivotally connected to it one end of a link, L^2, the other end of which is loosely connected to a crank-pin on the gear-wheel I^9, which in this example of my improvement is arranged in a somewhat lower plane than the gear-wheel I^8. As the gear-wheels rotate the motion transmitted through the links to the needle-bar is such that a dwell will occur in the movement of the needle-bar when the same is at the lowest point in its downward movement.

J designates a bar extending from side to side of the machine by which the shuttle-drivers, as J′, are actuated to move shuttles, as J^2, through the loops of the needle-threads. The shuttles J^2 slide in shuttle-races, as J^3, mounted upon a transversely-extending bar, J^6. I have shown but one of the shuttles and shuttle-drivers, but it is to be understood that their numbers will correspond with the number of needles employed. This shuttle-driver J′ has its rear end affixed to the bar J by means of a pin or screw. The shuttle-drivers will there-

fore follow the bar J in its movements toward and from the front of the machine. The driver slides in its shuttle-race J^3 lengthwise of the latter and carries with it the shuttle, the shuttle being retained thereon by means of a curved finger, j, and a projection, j', upon the upper side of the shuttle-carrier, or in any well-known or convenient manner.

Backward-and forward-motion is imparted to the bar J by means of links j^2, pivotally connected near one of their ends to said bar. Near the other of the ends of these links they are pivotally connected to one of the ends of links j^3 and one of the ends of links j^4 by means of pins or pivots extending through suitable holes in all the links. The links j^3 are connected near their other ends with crank-pins j^6 on crank-disks J^4, rigidly mounted one upon the lower end of the shaft C and the other upon the lower end of the shaft D^{11}. The other ends of the links j^4 have pivotal connections with the frame of the machine. I have shown an edge view of one part of this mechanism in Fig. 2, and another edge view of another part in dotted outline in Fig. 3. Fig. 4 is a plan or top view of the part shown in Fig. 2. I have not shown a plan of that part shown in Fig. 3, but it is in all respects like that shown in Fig. 4.

It will be readily seen that by properly proportioning the links j^2, j^3, and j^4 relatively to each other the movement of the bar J may be such that a dwell will occur at a predetermined point. This dwell in my improvement occurs when the needles are moving upwardly or when the bar J is in its most forward position, and is for the purpose of affording opportunity for tightening the loops of needle-threads about the shuttle-threads. When the loops have been so tightened, the shuttles are withdrawn and again returned quickly. Rods J^5 upon the bar J, extending laterally therefrom and through guides j^5 on the frame of the machine, operate to prevent lengthwise movement of the bar J.

A very important feature of my invention consists of the "take-up" for taking up the slack of the needle-thread when the needles are moving upwardly, which I will now describe. P designates a rocking-bar arranged somewhat above and approximately parallel with the needle-bar. As shown, this bar consists of a flat piece or strip of metal provided upon one side with a longitudinal rib, P'. Near its ends the bar is connected to arms e of levers p^2, fulcrumed upon pins or studs rigid in the frame of the machine. The connection between the bar P and the levers p^2 is preferably adjustable vertically. A convenient means of effecting such an adjustment is by means of screws f, extending through vertical slots f' in the bar P, near the ends of the latter, and working in tapped holes in the levers P^2, as shown. By this means the bar P may be adjusted to a desired height. The levers P^2 rock upon their fulcra. They are caused so to rock by means of rods f^2, having a pivotal connection near one of their ends with upwardly-projecting arm-like portions f^3 upon the needle-bar. These rods extend into sockets f^4, formed upon arms f^5 of the levers P^2, and may slide freely to and fro in such sockets. The needle-bar in its up and down movements of course carries with it the rods f^2, which are thereby caused to slide to and fro in the sockets f^4, and therefore to rock the levers upon their fulcra. The levers, by being so rocked, cause the bar P not only to receive a bodily vertical movement, but also cause it to tilt or rock in such manner that when the needles have reached the lowest point in their downward movement the bar, which has followed them in their downward movement, will have assumed an approximately horizontal position, and the thread will have an abundance of slack to form the loop. On the other hand, when the needles have reached the highest point in their movements the bar P, which has also followed them in their upward movements taking up the slack, will have been tilted into an approximately vertical plane, thereby tightening the loop. This arrangement is very advantageous, because all the threads are tightened at once and uniformly. The rib P' on the bar P assists in causing the threads to be drawn tightly at the end of the stitch, because it elevates the thread above the surface of the bar P, and in so doing draws the thread.

Spools or reels (of which I have shown but one) supply needle-thread to the needles. This spool is mounted upon a pin or stud, s, extending from a cross-bar, S, arranged between the portions A A' of the frame and rigidly affixed thereto. The thread after leaving the spool passes through an eye, s', in an arm, s^2, extending downwardly and outwardly from the bar S. From thence it passes through a clip, s^3, upon the arm s^2, thence through a notch, s^4, in the under side of a bar, S', extending between the side portions of the frame and rigidly affixed thereto. The thread is retained in such notch by means of a slight spring, s^5, secured at one end to the bar S' and extending across the notch s^4. The thread may be slipped under this spring and into the notch. From the notch s^4 the thread passes into a notch, s^6, on the bar P, wherein it is retained by a spring, s^7, similar to the spring s^5. From thence it passes to the needle. This arrangement produces a very uniform tension on the thread.

A presser-bar, R, operates to hold the goods firmly when not being fed or moved along. This presser-bar extends beneath and approximately parallel with the needle-bar. It is provided at suitable intervals in its length with notches, through which the needles may pass. Posts R' extend upwardly from the presser-bar through guides r on the frame of the machine. Arms R^2 extend from the posts R' near the tops of the latter and are rigidly

affixed thereto. Cams R^3 on the shaft I^7 are adapted to be brought in contact with the arms R^2 during the rotation of said shaft, and thus elevate the presser-bar. The presser-bar is returned to a position to bear upon the goods by spring r', coiled about the posts R′, and bearing at one of their ends against shoulders on said posts and the other against the guides r.

It will be seen that by my improvement a continuous rotary motion is imparted to the shafts from which the needle-bar and shuttle-carrier are actuated, and that through the intermediate mechanism operated by said shafts dwells are caused to occur in the movements of the needles and shuttles.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the needle-bar I, of the link I′, lever I^2, block I^3, disk I^4, shaft I^5, upon which said disk is mounted, the gear-wheel I^{11}, also mounted on said shaft, the shell I^6, provided with the gear-wheel I^9, the shaft I^7, the sleeve I^{15}, the gear-wheel I^{10}, mounted on said sleeve, the shaft E, and the gear-wheel I^8, meshing with the gear-wheel I^9, substantially as specified.

2. The combination, with the shaft E, of the gear-wheels D^{12} D^{13}, the shaft D^{11}, the elliptical gear-wheels D^{10} D^9, the shaft D^8, the worm D^7, the worm-wheel D^6, the shaft D^5, the gear-wheels D^3 D^4, the shaft D^2, the cam D′, the rollers d', and the carriage B, substantially as specified.

3. The combination, with a needle-bar, as I, of a rocking take-up bar, as P, over which the thread passes, levers, as P^2, and rods f^2, connected to the needle-bar and sliding in the levers P^2, substantially as specified.

4. The combination, with a needle-bar, as I, of a take-up bar, as P, provided with the rib P′, levers, as P^2, and the rods f^2, substantially as specified.

5. The combination, with a needle-bar, as I, of a take-up bar, as P, provided with the slots f', levers, as p^2, and bolts f, securing the take-up bar to the levers, substantially as and for the purpose specified.

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