2 Sheets—Sheet 1.

G. L. DuLANEY.

SEWING-MACHINE.

No. 169,682. Patented Nov. 9, 1875.

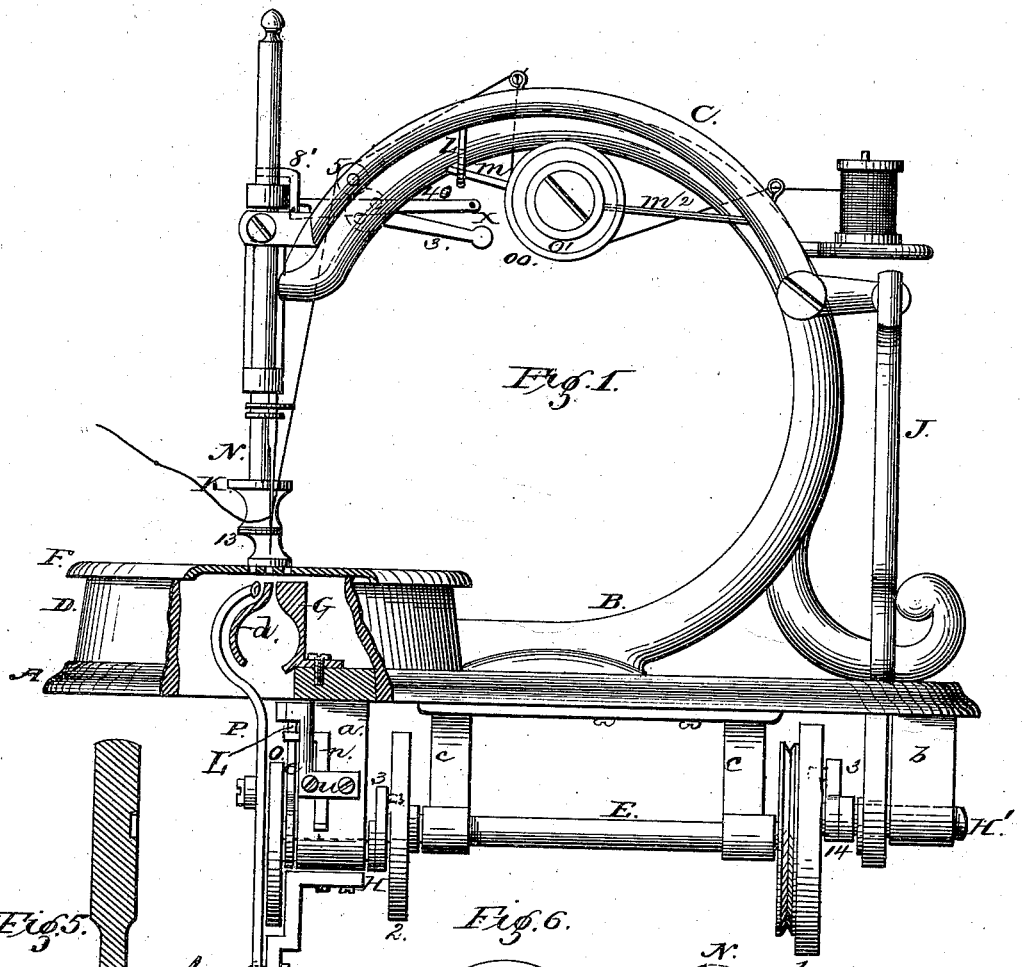

Fig. 1.

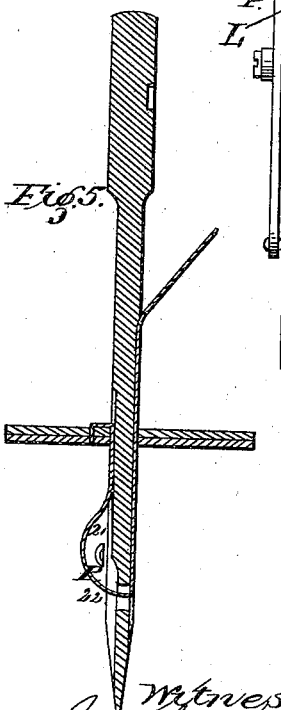

Fig. 5.

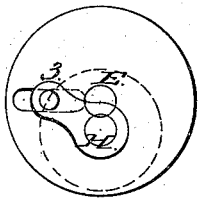

Fig. 6.

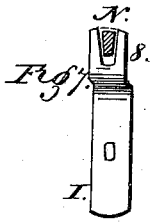

Fig. 7.

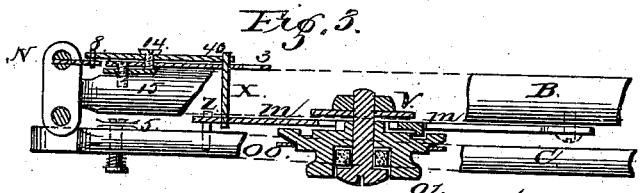

Fig. 3.

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SEWING-MACHINE.

No. 169,682. Patented Nov. 9, 1875.

Fig. 2.

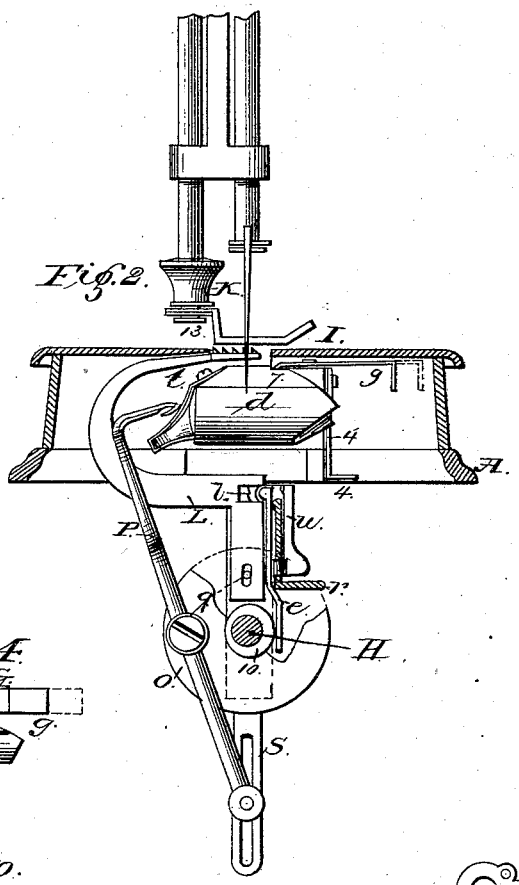

Fig. 8.

Fig. 4.

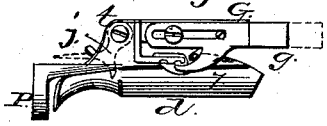

Fig. 10.

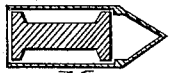

Fig. 9.

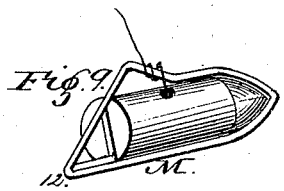

Fig. 11.

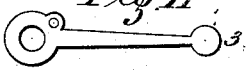

Fig. 12.

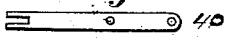

Fig. 13.

Fig. 14.

Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

GEORGE L. DU LANEY, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **169,682**, dated November 9, 1875; application filed June 2, 1875.

To all whom it may concern:

Be it known that I, GEORGE L. DU LANEY, of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and letters of reference marked thereon.

Figure 1 is a vertical side view or elevation of the machine, with a portion of the box-covering removed or broken away, showing a cross-section of the spool-case holder. Fig. 2 is an elevated cross-section or end view of the machine, showing the feeding mechanism, a portion of the disk being broken away for that purpose, and the relative positions of the spool-case holder and looping-hook. Fig. 3 shows a top view of the head of the machine, with a portion of the main arm and needle-arm broken away, showing a horizontal central view through the tension device and adjusting-levers. Fig. 4 is a bird's-eye view of the spool-case holder and looping devices. Fig. 5 is a longitudinal central view of the needle enlarged. Figs. 6, 7, 8, 9, 10, 11, 12, 13, and 14 are detail views of the several parts.

The nature of my improvements relate more particularly to the means and arrangement of parts for imparting to the needle and looping-hook, relatively to each other, a differential variable velocity; also, to the peculiar construction and arrangement of the spool-case holder; also, to the peculiar means for producing the ornamental cable-stitch and chain-stitch; also, to the peculiar construction and manner of securing the presser-foot to the bar; also, to the hard-rubber spool-case and spool or thread-guard; also, to the peculiarity of the groove in the needle; also, to a novel tension device.

The base-plate A is formed with a circular opening in its front end sufficiently large to admit of the free action of the part, as hereinafter specified. The main arm or standard B is secured to the bed-plate A by means of a large screw, which passes through the central portion of the bed-plate and enters the base of the arm. The needle-arm C is secured to the main arm by means of a screw formed with the journal-bearing in the usual manner. The box D is made in two parts, and of such size and shape as to conform to that of the open end of the bed-plate A, and has one side or half secured to the bed-plate by means of screws. The other side is secured in position by means of a joint or hinge, which is supplied to the rear of the parts, thus providing a convenient means of access to the working parts within the box. The cloth-plate F is also made in two parts, and is secured angularly in position on the box by means of screws. The main shaft E, to which are attached the slotted disks 1 and 2, is suspended by hangers *c c*, which are secured to the under side of the bed-plate A by means of screws. The independent short shafts or journals H H′ find their bearings in other and independent hangers *a b*, cast solidly to the under side of the bed-plate, and at such relative position to the main shaft as to bring one journal above and one below the line of the main shaft, said independent journals being severally provided with cranks and crank-pins 3 3, which pins severally engage the radial slots in the main disks 1 and 2, as shown more clearly in Fig. 6. These disks are so placed upon their shaft E that their slots radiate in the same direction; and as one short shaft, H, is below the shaft E, and the other, H′, is below said shaft, it follows that when the crank-pin, which works in the slot or groove of disk 1, is moving away from the axis of shaft E, and, therefore, causing an accelerated rising movement of the needle, the crank-pin of H is moving in its slot of disk 2 toward the axis of shaft E, and, therefore, causing a gradually-retarding movement of the looper, thus producing an alternate variable velocity to said independent journals. By this means the needle is withdrawn from the fabric with an accelerated movement, while that of the looping-hook is retarded, and vice versa. In this way the chafing of the thread against the needle, which would otherwise occur, is entirely obviated. The thread is also, by means of this variable motion, carried back over the heel of the spool-case, and out of the way of the point of the needle in its next descent, by the increased motion of the hook, after the needle has been

withdrawn from the fabric, and is in its turn retarded in its downward movement.

The journal H, which has its bearing in the end of the hanger *b*, is provided with an eccentric, 14, which actuates the needle-bar C by means of the connecting-rod J. The journal H, which passes through the end of the hanger *a*, is provided with a disk, O, which carries on its crank-pin the looping-hook P. As it rotates, the lower end of the hook, being provided with a screw and bearing, is supported and guided in its upward and downward movement by means of the slotted hanger *s*, which hanger is secured to the lower end of the stationary hanger *a*, as shown.

The feed-dog L is formed of a single piece of metal, and its upward half is curved in such shape as to carry it back of and out of the way of the spool-case holder *d*, and it is provided about its fulcrum with an elongated slot, which receives the fulcrum-screw 9, which secures it in position to the hanger *a*. The slot admits of its free upward and downward movement, as it is actuated by means of the eccentric 10, which is formed on the hub of the disk O as it is rotated. The means for effecting the forward and backward movements of the feed-dog L are provided for as follows: A receptacle or socket, *l*, is formed in the dog L at or near its center, which receives the bent end of the pendent lever *e*, the lower end of which bears against, and is actuated by, the eccentric 10 as it is rotated. The letter *r* indicates an adjustable elbow-shaped slide-fulcrum, against which the pendent lever plays, at any given point, as it is adjusted upward or downward to give the desired length of stitch, at the will of the operator. The letter *u* indicates a bracket, secured by means of screws to the hanger *a*, beneath which the slide-fulcrum plays. A yielding pressure may be provided beneath the slide by means of a spring. (Not shown in the drawings.) The upper end of the bracket *u* is provided with a horizontal projection, which extends at right angles across the feed-dog L, at or near its middle, such projection serving to support the feed-dog adjustably in position. A spring secures a proper bearing of the feed-dog and lever against the eccentric 10.

The spool-case holder is formed of two pieces of metal, and of such shape as is hereinafter described. The main portion of the concaved holder G, which forms the support for the outer jaw, is secured to the bed-plate *a*, in position relative to the needle and hook, by means of screws, which pass through the flange provided to the back of the holder for that purpose. (See Fig. 1.) The jaw *d* is formed from sheet-steel, in proper shape, and receives its proper form by being compressed in a die of suitable shape, and is secured in position by means of a screw, *t*, to the rear of the standard portion G. The jaw *d* is extended backward, as shown in Fig. 4, to a point beyond that traversed by the point of the hook which controls the loop of thread, as the latter is carried over and back of the spool to a point where the loop is released from the hook, as shown.

By reference to the illustration it will be seen that the backward projection of the jaw *d* is extended across the path of the hook at such an angle as will cause the loop of thread, as it is carried upward by the hook, to glide along the inclined edge of the jaw *d* to a point out of the way and beyond the path traversed by the hook in its passage around the spool-case holder, thus precluding the possibility of the hook engaging the loop of thread left at the heel of the spool-case, in case the hook fails to take the thread at the eye of the needle in the next succeeding stitch. The shield *j*, which is applied to the rear of the jaw *d*, as shown by the dotted lines, serves as an additional protection to the thread.

The spool-case M is made of hard rubber, and in its construction a rib or shoulder is formed at the conical part of its point, on the inside, to prevent the spool wedging in the cone, and is further provided with a thread-guard, 12, the rear end of which guard projects backward to a point that will bring it in such proximity to that of the inside projection of the spool-case holder as will prevent the loop of thread falling back and underneath the spool-case holder after being released from the looping-hook P. The guard is also continued upward to a point that will admit of its entering the aperture between the inner and outer jaws of the spool-case holder G, thus serving to keep the spool-case holder and thread-guard in proper position, and, at the same time, providing a ready means of adjusting more or less tension on the under thread by passing the thread more or less times around the guard. The spool-case is secured in position by means of the latch 4.

The presser-foot I is provided with a slot, 8, of V shape, at its rear end, as shown, Fig. 7, which shape corresponds to that of the end of the bar N, on which is mounted a solidly-fixed washer, 13, and an adjusting-nut, K. By this means a more perfect and ready adjustment is had, and any slack by wear or otherwise is readily taken up, which cannot be done when the sides of the slot are parallel to each other, as is the case in all other devices of a similar nature, as used heretofore, and for such parallel slot I make no claim. The foot I is secured in position by being passed back on the end of the bar N, and between the washer 13 and the nut K, the latter being then set down tightly upon the foot, thus securing it in position.

The peculiarity of my improved needle consists in providing the same with a shoulder-groove, 21 22. This construction insures a more perfect and positive loop being formed in the thread immediately opposite the shoulder in the bottom of the groove. The shoulder causes the thread to be thrown off from the needle just at the point where the hook enters the loop formed in the thread by the

withdrawal of the needle from the fabric, as shown in Fig. 5. By extending the groove above the shoulder, a ready means of protecting the thread against undue friction is provided, and the thread is thus allowed much more freedom of action than with needles as ordinarily constructed.

My improved tension device is constructed in the following manner: The disk O′ is formed of a circular piece of metal of any suitable diameter, the hub of which projects out sufficiently to admit of a ready and convenient means of turning the disk with the thumb and finger when threading the needle. The tension wheel or disk is secured to the hanger V, which is suspended beneath the main arm, by a screw formed with a journal-bearing, under the head of which is formed, in the disk, a cavity for the reception of a yielding pad or packing, against which the head of the screw is set down sufficiently to prevent any backward action of the disk during the backward motion of the clutch *m m*. The rim of the disk is formed with a feather-edge or bevel-flange, which, in conjunction with the metallic ring *o o*, which is pressed over the shoulder of the disk, forms a wedge-shaped channel around its circumference, which channel receives and feeds off the thread as the disk is rotated. On the back face of the disk is formed an annular groove, that receives the bent end of the gripe-lever *m m*, which lever, by the vibrating action of the needle-bar C and lifter *z*, causes the disk to rotate and feed off the thread with the proper degree of tension to the needle.

The length of stroke imparted to the feed-lever by the needle-bar is graduated in the following manner: To the main arm B is secured, by means of the screw 15, the adjusting-lever 3, to which is pivoted, by means of the fulcrum-screw 14, the graduating-lever 40. This lever engages, at its slotted end, with the stud or spur carried on the end of the yoke 8′, which is connected rigidly to the presser-bar N. At the opposite end of the lever 40 projects transversely a horizontal stud or spur, X, on which the clutch-lever *m* rests at any given point to which it is adjusted. Thus it will be observed that in the same proportion as the presser-bar N is effected upward or downward by the varying thickness of goods passing beneath the foot is the graduating-lever 40 and spur X effected; consequently, more or less motion is imparted to the clutch *m* and disk O″ by the needle-bar C, which causes more or less thread to be fed off to the needle to suit any thickness of goods. The degree of tension is fixed by adjusting the lever 3, which changes the relative position of the lever 40 up or down, to suit any length of stitch or thickness of goods. Once adjusted, no other changes are required, no matter how varied or irregular the thickness of goods.

The spring m^2 serves to keep the lever *m* in contact with the edges of the annular groove when being actuated by the bar C. Two small disks, 5, are provided at the end of the needle-bar, between which the thread passes to the eye of the needle, for the purpose of controlling, by a gently yielding pressure, the slack thread about the eye of the needle.

Figs. 11, 12, 13, and 14 show the parts 3, 40, 8, and *m m* detached.

A novel device is provided for producing what I call the "ornamental cable-stitch," and also the common chain-stitch, which is as follows: On the upper front edge of the jaw *d*, and just in advance of the path of the needle, is formed a nick, together with a small point, 7, which coact, in the formation of the loop, with the slotted thread-guard *g*, as hereinafter described.

The guard *g* is blanked from sheet-steel in the ordinary way, and is, in its construction, provided with a thumb-like projection, 6, extending out from the main body of the guard. The guard is secured adjustably, by means of a screw and pin, to the top face of the spool-case holder G, in such position as, when in action, to engage and retain the thread in loop form on the points 6 and 7, as shown in Fig. 4, as it is carried by the hook around the spool-case.

By this means the loop which has been formed in the thread is held at rest in such position as will insure the needle entering the same in its next descent, said loop being drawn up by the hook at the next succeeding stitch, and at the same time interlacing it with the under thread, thus forming the ornamental cable-stitch. The chain-stitch is made in the same way after removing the under thread from the spool-case. The thread-guard *g* is brought into action only when these two kinds of stitches are made, the guard being withdrawn, when the lock-stitch is being made, to the position shown by the dotted lines in Figs. 2 and 4.

I claim as follows:

1. The combination, with the main shaft E, and with the needle-operating mechanism and a looper, of the disks 1 and 2, provided with radial slots, the cranks and crank-pins 3 3, the shaft H′ above the shaft E, and the shaft H below it, or on the opposite side, as and for the purpose set forth.

2. The spool-case holder G, constructed as described, and provided with the jaw *d*, having a thread projection, 7, located on its upper edge at a point slightly in advance of the path of the needle, substantially as and for the purpose specified.

3. The shield or guard *j*, in combination with the jaw *d*, as shown, and for the purpose set forth.

4. In combination with the hard-rubber spool-case M, the spool-guard 12, constructed with the rearward extension, as shown, and applied to the spool-case, and operating as and for the purpose set forth.

5. A sewing-machine needle provided with a shoulder-groove, 21 22, substantially as shown, and for the purpose specified.

6. The combination, for joint operation, of the following devices, viz: the tension-wheel O′, ring O O, lever *m m*, spring m^2, lifter *z*, spur *x*, adjusting-lever 3, graduating-lever 40, and yoke 8′, these parts being constructed substantially as shown and set forth.

7. In a sewing-machine, the combination, with a thread-tension device adapted to feed out automatically the quantity of thread for a stitch, and with the needle, of the disks 5, when used for controlling the slack thread above the eye of the needle, as and for the purpose specified.

8. The adjustable slotted thread-guard *g*, in combination with the jaw *d*, provided with the point 6, substantially as described, and for the purpose set forth.

9. The combination of the wheel O′, lever *m* m^1, spring m^2, lifter *z*, spur *x*, adjusting-lever 3, graduating-lever 40, yoke 8, and bar N, the several parts being constructed substantially as and for the purpose specified.

10. The combination, with the feed-dog L, of the eccentric 10, the pendent lever *e*, adjustable fulcrum-slide *r*, and bracket *u*, substantially as set forth.

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Witnesses:

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