2 Sheets—Sheet 1.

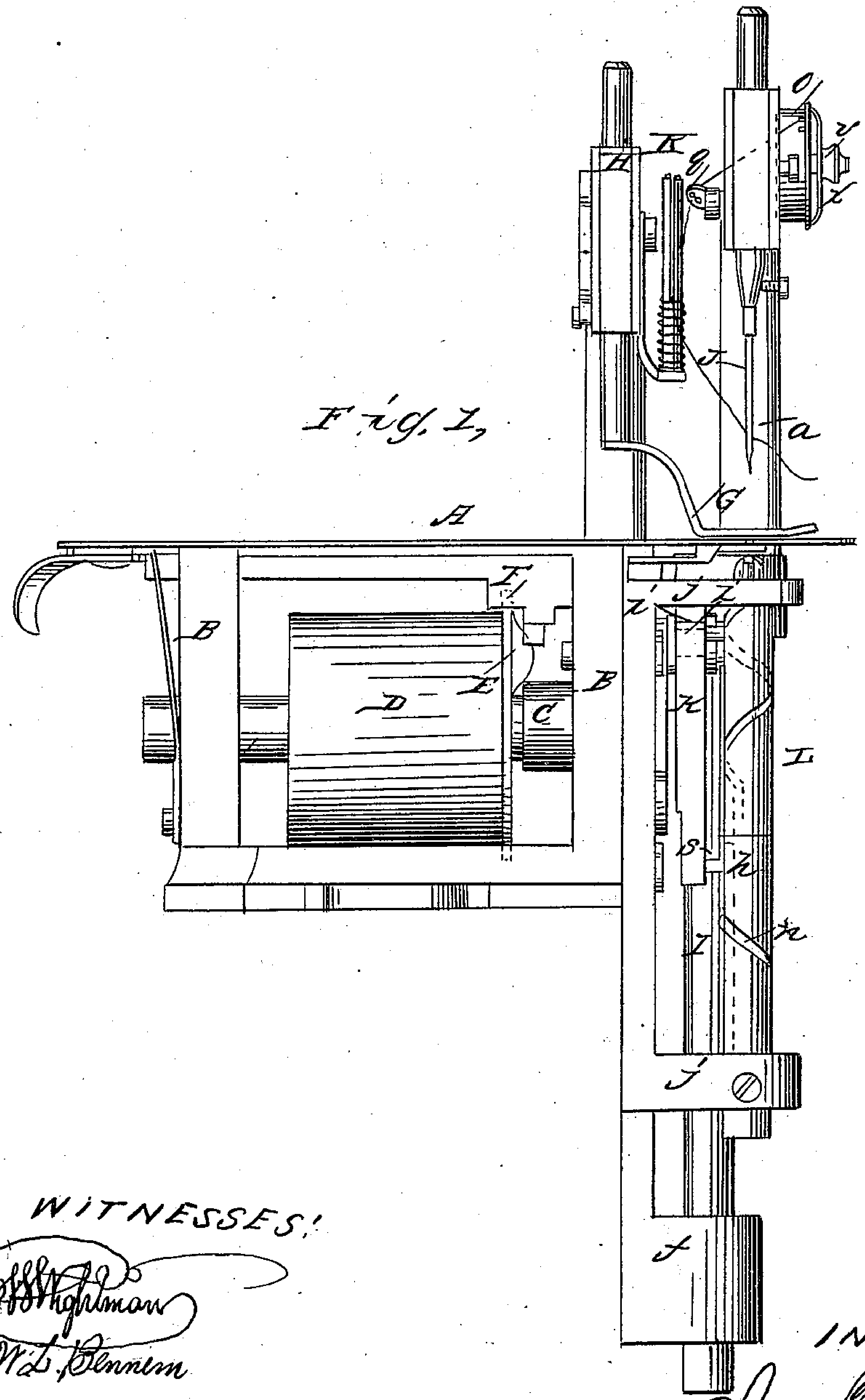
J. S. McCURDY.

Sewing Machine.

No. 24,395.

Patented June 14, 1859.

Fig. 1,



WITNESSES:

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INVENTOR:

James S. McCurdy

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

2 Sheets—Sheet 2.

J. S. McCURDY.

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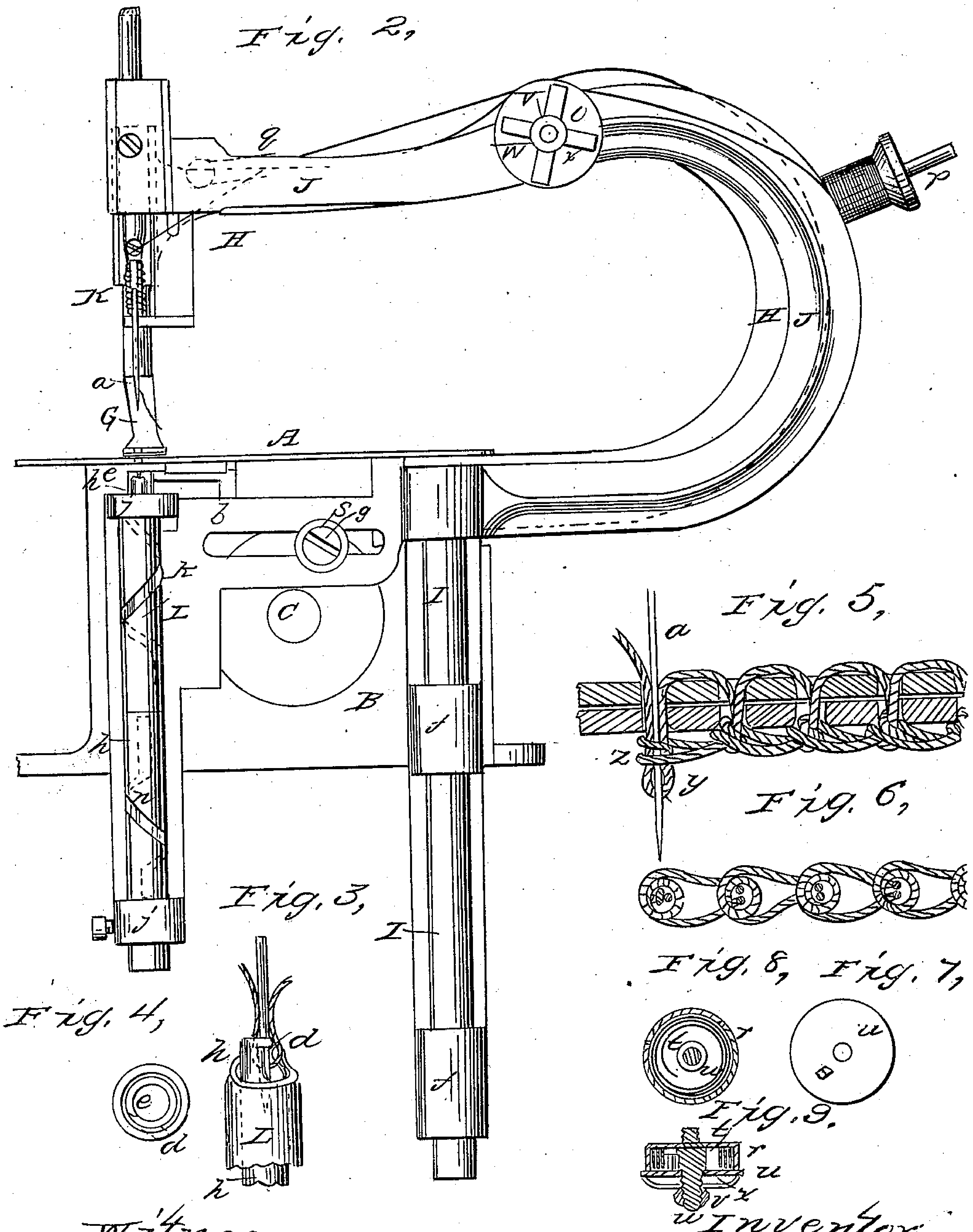
Fig. 2,

Fig. 3,

Fig. 4,

Fig. 5,

Fig. 6,

Fig. 8,

Fig. 7,

Fig. 9.

Witnesses;

Inventor:

James S. McCurdy

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

UNITED STATES PATENT OFFICE.

JAMES S. McCURDY, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **24,395**, dated June 14, 1859.

To all whom it may concern:

Be it known that I, JAMES S. McCURDY, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 represents a front elevation of a sewing-machine embodying my improvements, and Fig. 2 a side elevation of the same. Fig. 3 represents an elevation, on an enlarged scale, of the loopers, and Fig. 4 a top view of the same. Fig. 5 represents a section of some cloth connected by my stitch upon an enlarged scale; and Fig. 6 is a top view of so much of the stitch as is upon the lower side of the cloth, with the threads slack to show their relative positions more clearly. Figs. 7, 8, and 9 represent different views of the thread-tension device.

The object of my invention is to enable me to sew cloth or other materials with my improved single-thread interlooped stitch, as herein described.

The first part of my invention consists in combining a reciprocating needle, perforating the cloth from one side thereof and carrying a loop of needle-thread through it, with a pair of loopers, or their equivalents, upon the opposite side of the cloth, the combination as a whole operating in such manner that a complete coil of the thread of one loop is formed and tightened around the next loop carried through it by the needle.

The second part of my invention consists in combining and arranging two loopers with a reciprocating driver by means of a pair of pins on the driver and reversed helical grooves formed in the shafts of the loopers, so that the two loopers are caused to turn, as required, in opposite directions by the same movement of the driver.

The third part of my invention consists in imparting a supplementary movement to one of the loopers, while the other remains stationary, for the purpose of tightening the stitch.

The sewing-machine represented in the accompanying drawings embodies all my improvements. In it the table A, on which the cloth is supported, is sustained by a frame, B, which forms the bed-plate of the machine and supports its working parts.

Beneath the table is the driving-shaft C, which is fitted with a pulley, D, to which motion is imparted by a belt. The driving-shaft is fitted with a cam, E, which imparts suitable movements at suitable periods to the feeding-bar F, whose roughened extremity protrudes through an opening in the table and operates at suitable intervals to push the cloth, stitch by stitch, through the machine.

Above the table is the presser-foot G, which is supported by a stationary arm, H, secured to the frame of the machine. The needle *a*, by means of which the cloth is perforated and the loop of the needle-thread carried through, is secured to a bent arm, J, which, after extending backward above the table a sufficient distance to admit the work to be sewed, returns forward beneath the table, and has a slot, *b*, formed in it, in which a crank-pin, *g*, secured to the driving-shaft C, is received. This arm is guided in a vertical direction, or perpendicularly to the cloth on which the machine is operating, by means of a slide-bar, I, which slides in suitable guide-blocks, *f f*, secured to the frame B, so that as the driving-shaft revolves the arm is caused, by the operation of the crank-pin *g* in the slot *b*, to move up and down, thus causing the needle to work in a straight line. The needle in descending passes through a hole made in the table for the purpose. Immediately below this hole are the loopers *d e*, by means of which the loop of thread on the side of the cloth opposite to that from which the needle penetrates is properly held, and its thread coiled to receive the next loop. The loopers in the machine represented revolve in concentric circles and in opposite directions around the line of the needle-movement.

The inner looper, *e*, is formed upon the upper tubular extremity of a shaft, *h*, and consists of the hook *e* and a portion of the end of the tubular shaft, the remainder of the tubular end being cut away, as shown in the drawings. The outer looper, *d*, is formed upon the upper end of a tubular shaft, L, which revolves upon the shaft of the inner looper. It also has the form of a hook, whose point revolves as closely as possible around the body of the inner looper. The two looper-shafts are supported in an upright position by suitable boxes, *j j*, in which their shafts turn, so that the loopers revolve in a plane at right angles, or thereabout, to the line of travel pursued by the treadle, which in its descent enters within the circles described by the loopers in their revolution. The shaft of the outer looper has a helical groove, *m*, formed in its barrel, which is traversed by a pin, *i*, secured to the front end, *k*, of the part of the needle-arm J which is below the table. The shaft of the inner looper, *e*, has also a similar helical groove, *n*, formed in its barrel; which is traversed by a pin, *s*, secured to the same front end, *k*, of the needle-arm, which thus forms a driver, by whose vertical reciprocating movement each looper is caused to revolve alternately in opposite directions. The helical groove of one looper extends around its shaft in a direction opposite to that of the other looper, so that the loopers are caused to turn in opposite directions by the same movement of the driver. The lower ends of the helical grooves of each looper terminate in straight grooves, in which the pins of the driver traverse when the needle approaches and recedes from its lowest position. The upper end of the groove of the inner looper also terminates in a straight groove, so that this looper remains stationary when the needle approaches and recedes from its uppermost position; but the upper end of the groove of the outer looper is continued in a helical line, so that this looper continues to move and act upon the loop until the needle has attained its extreme upward position, whereby the stitch of thread previously formed is drawn tight.

The spool of thread with which the sewing is effected is supported upon a pin, *p*, secured in this machine to the arm H of the presser-foot. The thread is conducted from this spool to the thread-tension device O, and thence through a hole in a guide-arm *q*, and a slot in the spring-post K to the eye of the needle.

The thread-tension device consists of a barrel, *r*, and a spiral spring, *t*, within it. The spiral spring is made fast at its outer end to the barrel. Its inner end is made fast to a pin projecting into the barrel from a head or disk, *u*, which is perforated at its center to turn upon a spindle, *w*, secured in the center of the barrel. The disk is maintained in its position by means of a nut, *v*, secured upon the spindle *w*, and a star-formed spring, *x*, is inserted between the nut and the exterior face of the disk in such manner that the friction produced by its pressure maintains the disk in any position in which it may be turned by the fingers of the operator of the machine. The turning of the disk in one direction winds up the spiral spring, and consequently causes its outmost coil to bear with less force against the adjacent inner side of the barrel, while the turning of the disk in the opposite direction permits the spring to bear with greater force against the barrel.

The barrel has a series of slots formed in it, so that the thread may be introduced at one slot and be led around between the outermost coil of the spring and the barrel, and may be led out of the barrel at a second slot. Hence the part of the thread within the barrel is pressed against it with greater or less force by the spring, according to the position of the disk *u*, and the turning of the disk regulates the pressure, and consequently the tension.

As threads of different sizes require different mean tensions, several slots are made in the barrel, so that threads of different sizes may be subjected for a greater or less portion of their length to the pressure of the spring, and this arrangement enables the same thread-tension device to be used for threads of different sizes with a comparatively small change in the tension of the spring.

When this machine is in operation, the rotation of the driving-shaft causes the needle to move up and down, the loopers to revolve to and fro, and the feed device to perform its proper function. When the needle descends, it perforates the cloth lying upon the table, carries through it a loop of the needle-thread passed through the eye of the needle, and by its continued descent carries the loop downward through and below the plane of motion of the loopers. As the needle descends this loop, being choked at its neck in the cloth, spreads outward from the sides of the needle, as shown at Fig. 3.

The spread of the loop on one side of the needle is limited by the body of the inner looper, which is in close proximity to the needle. The spread of the loop on the other side of the needle is not limited by any obstacle; hence it bulges outward sufficiently to permit the points of the loopers to enter it as they are turned by the action of the driver *k* in its upward movement with the needle. The helical grooves of the loopers are of such form that as the needle commences to ascend the points of the loopers stand upon opposite sides of the loop bulging from it, and as the needle then continues to ascend, the two loopers, entering the loop from its opposite sides, distend it and coil it upon the body of the inner looper, *e*, around the line of motion pursued by the needle. When the needle descends to perforate the cloth for the next stitch, it then passes into the loop coiled upon the looper, and, as during this descent the motion of the loopers, which are now turned by the descent of the driver, is reversed, the coil upon the looper is delivered upon the needle and upon the loop of thread carried down thereby, as shown at *z*, Fig. 5. The needle then passes to its lowermost position, and again rises to have the loop of thread *y*, which it carries, formed into a coil for the next stitch. By a succession of these operations a succession of stitches is formed in such manner that the neck of each loop is encircled by a coil of the thread of the preceding loop, as shown at Figs. 5 and 6, so that a single-thread interlooped stitch is produced, which presents a much greater resistance to unraveling than any single-thread interlooped stitch heretofore in use.

Having thus described a machine embodying my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a reciprocating needle with a pair of loopers or their equivalent, the combination, as a whole, operating in such manner that each successive needle-loop is encircled by a tight coil of the thread of the preceding loop, substantially as described.

2. The combination and arrangement of two loopers, substantially such as herein described, with a driver operating substantially in the manner and for the purpose described.

3. Constructing and operating one of the loopers in such manner that a supplementary movement is imparted to it while the other is at rest, for the purpose of tightening the stitch.

In testimony whereof I have hereunto subscribed my name.

JAMES S. McCURDY.

Witnesses:
WM. H. TOWERS,
W. H. PLUMMER.