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Sewing-Machines.

No. 143,027. Patented September 23, 1873.

Fig 1

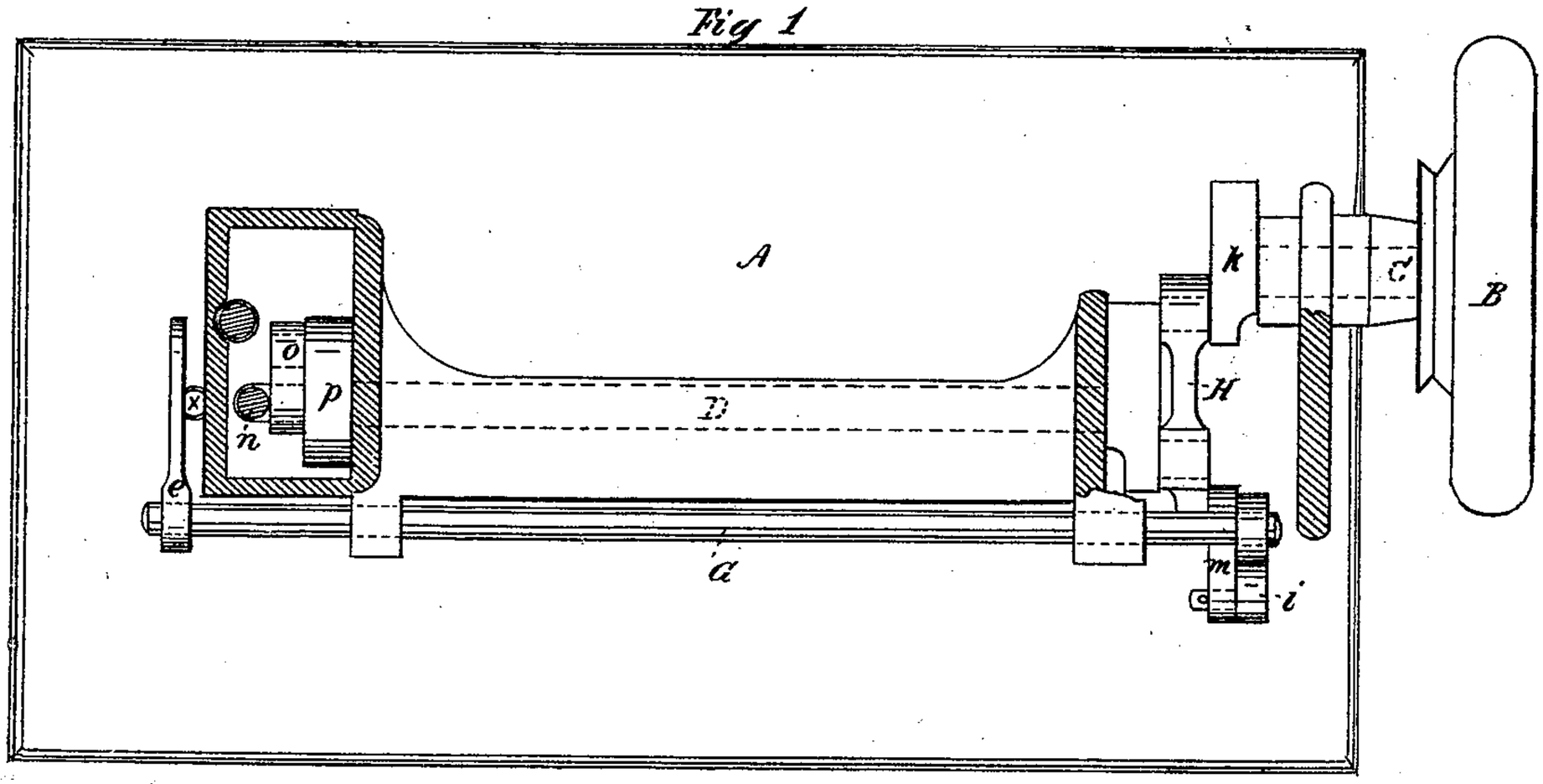
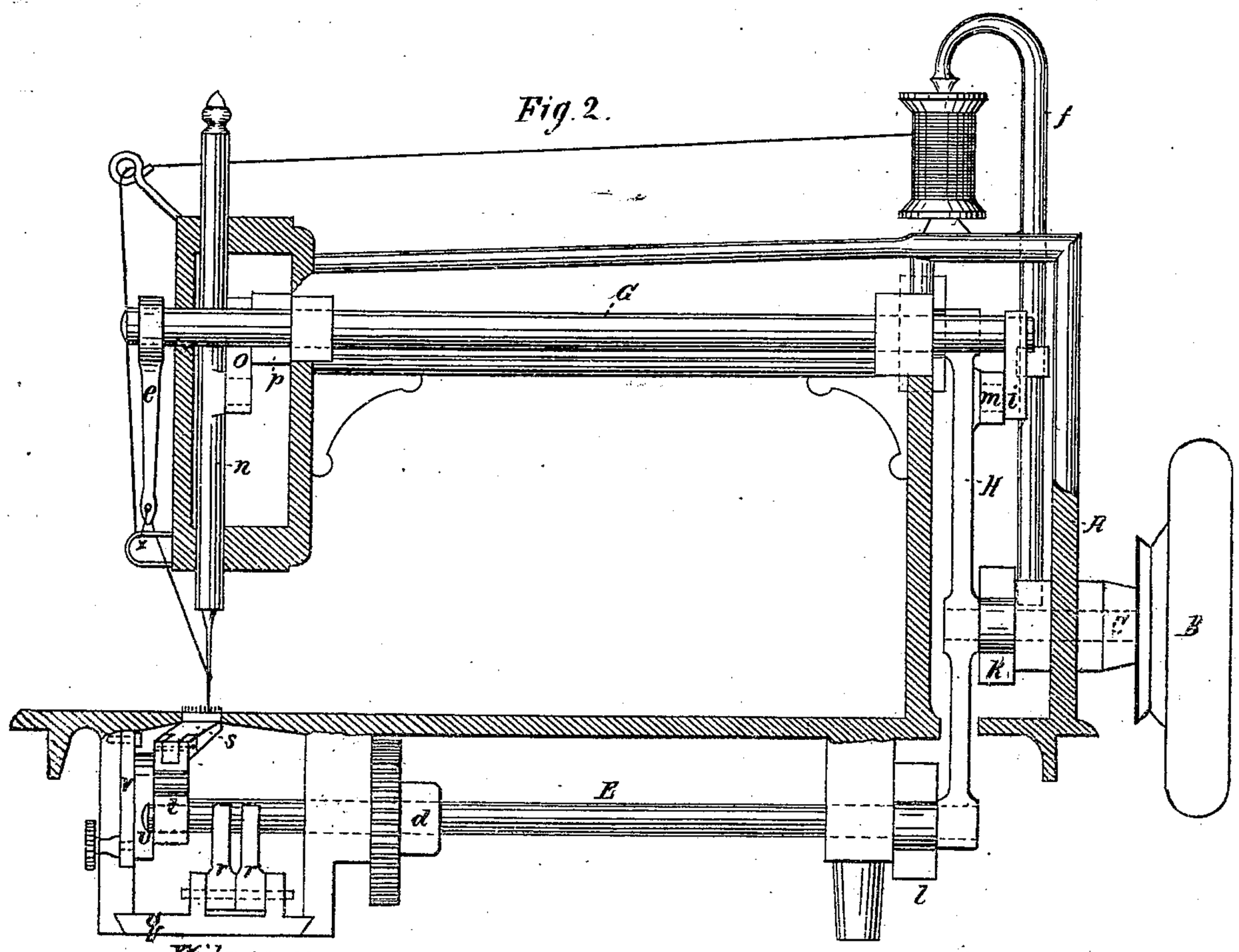


Fig. 2.



Witnesses.

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Fig 3

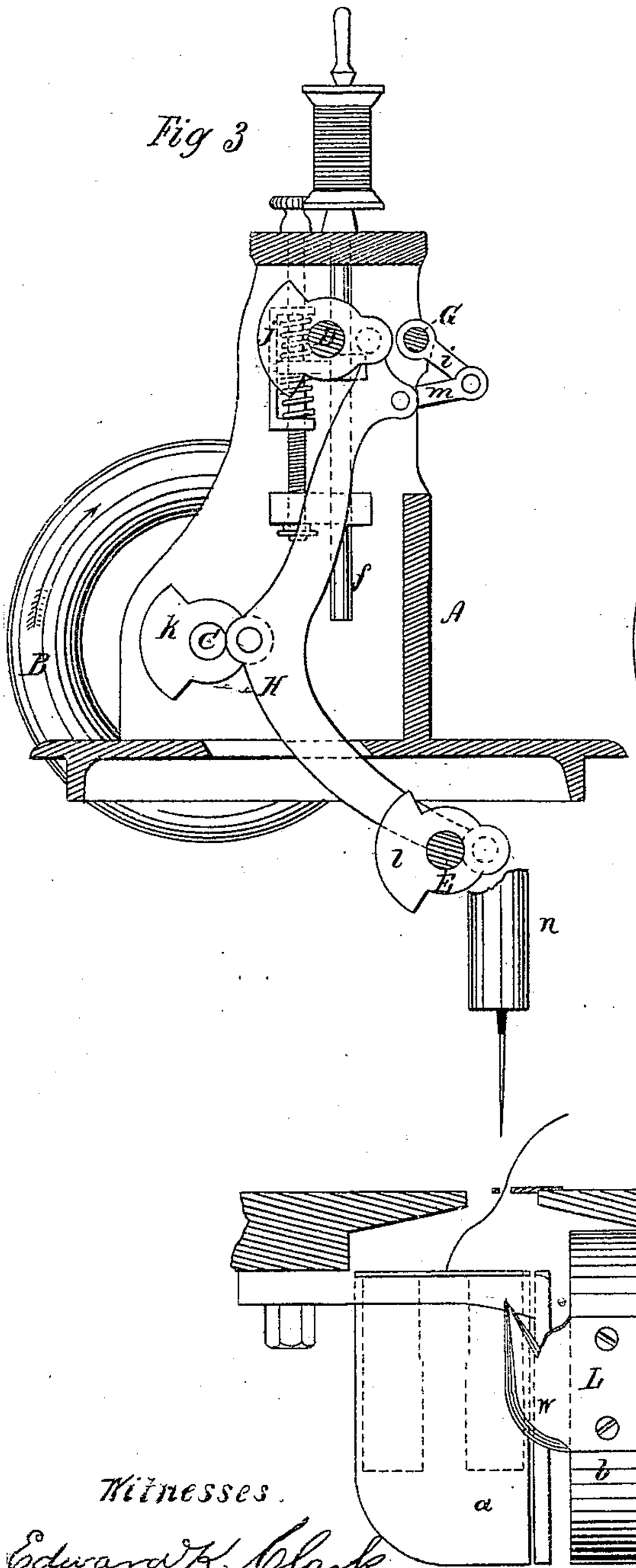

Fig 4

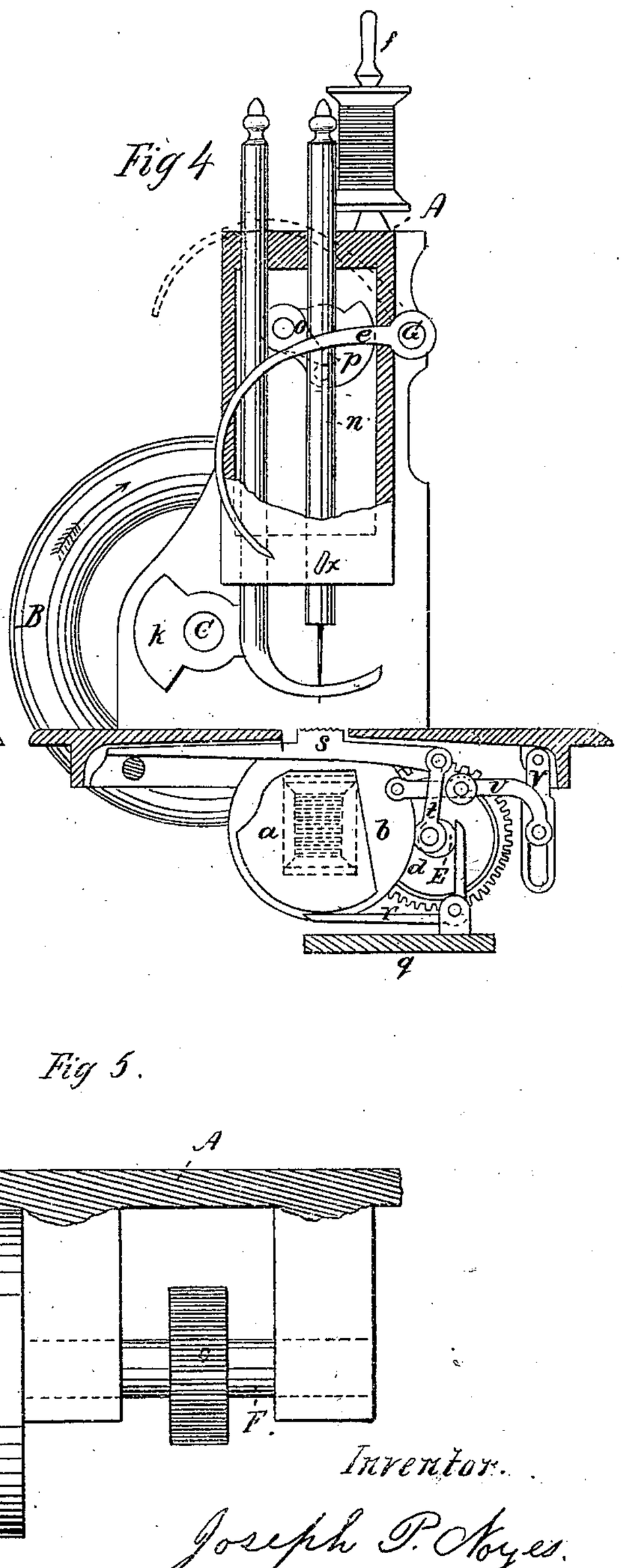

Fig 5.

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Fig 6.

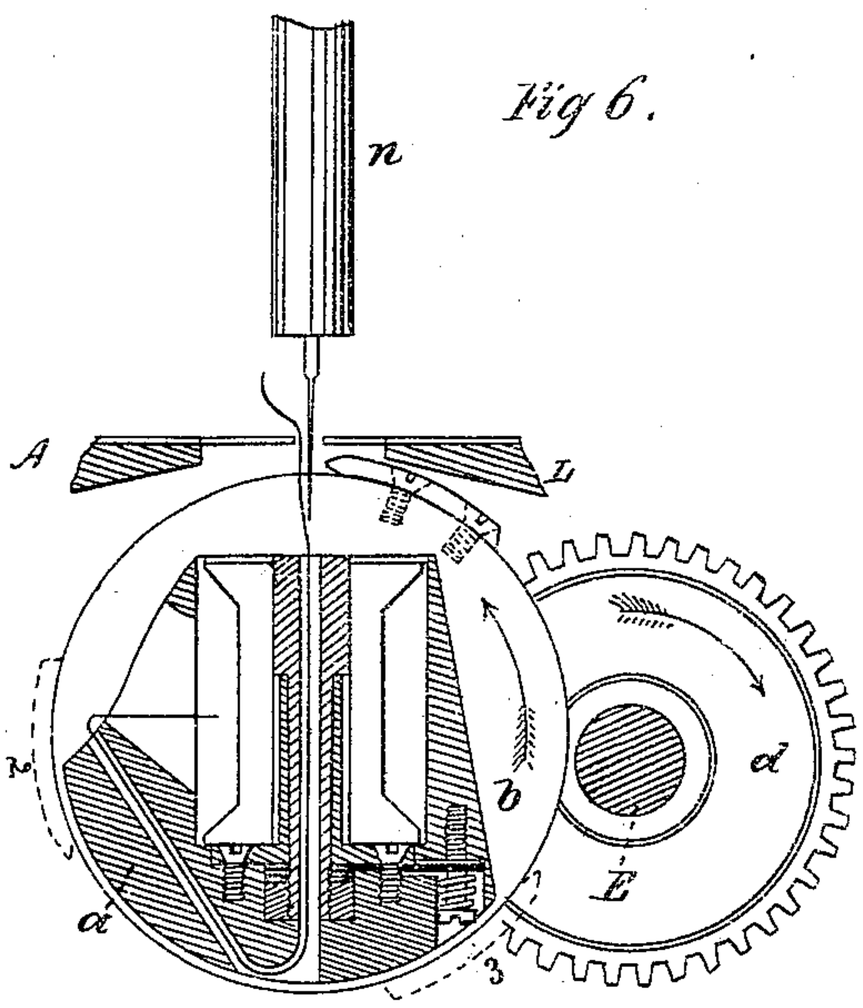


Fig 7.

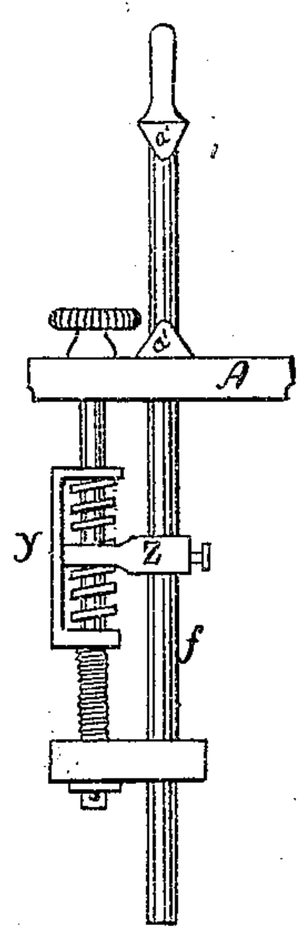
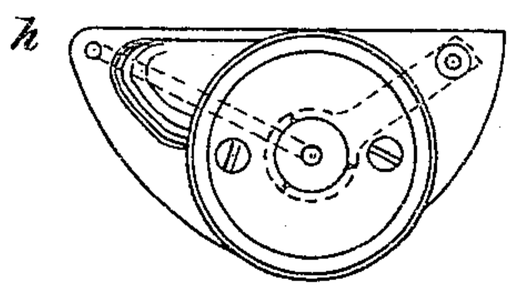


Fig 8.



Witnesses.

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C. A. Bench.

Inventor.

Joseph P. Noyes.

UNITED STATES PATENT OFFICE.

JOSEPH P. NOYES, OF BINGHAMTON, NEW YORK.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **143,027**, dated September 23, 1873; application filed September 5, 1872.

To all whom it may concern:

Be it known that I, JOSEPH P. NOYES, of Binghamton, in the county of Broome and State of New York, have invented certain Improvements in Sewing-Machines, of which the following is a specification:

The principal object of my invention is to produce a sewing-machine which shall make the stitch commonly known as the "lock" or "shuttle" stitch from two ordinary spools of thread.

My invention relates to the devices by which the loop of thread brought down by the rotating hook is allowed to pass under the cup holding the under thread without obstruction from the weight of the cup; said devices consisting of two bent levers similar to each other and located side by side, with one arm of each under the cup and supporting it and the other arms resting against a cam upon the lower revolving shaft of the machine.

In the accompanying drawings, Figure 1 is a plan of the machine with portions of the frame-work shown in section. Fig. 2 is a front elevation of the machine with part of the frame shown in section. Fig. 3 is a vertical transverse section, showing the parts which are at the right hand in Figs. 1 and 2. Fig. 4 is an elevation of that end of the machine which is at the left of the Figs. 1 and 2, with portions of the frame broken away and in section, and showing, also, some of the parts shown in Fig. 3. Fig. 5 is an elevation on an enlarged scale, showing the stitch-making mechanism more in detail, the position being as in Fig. 2. Fig. 6 is an enlarged view of the same parts as Fig. 5, in the same position as in Fig. 4, showing the thread-cup in section and the needle-cup brought down to the position at which the loop is taken by the rotating hook. Fig. 7 shows the parts of the upper tension in detail. Fig. 8 shows the thread-cup, viewed from the top, with the same portion to the right as in Figs. 4 and 6.

The machine belongs to that class in which the work is fed from the operator, instead of from right to left, and also to that class in which the upper thread-loop is carried around the whole mass of the under thread to make the stitch, instead of remaining stationary while the mass of under thread is being conveyed through it.

A is the frame of the machine. B is the balance-wheel, which also serves as driving-pulley. C is the shaft, upon which the wheel B is hung. D is the rotary shaft, whereby motion is given to the needle. E is the shaft below the table, which gives motion to the feed and rotating hook. F, Fig. 5, is a short shaft, carrying the rotating hook, upon which is a pinion, *c*, meshing into a spur-wheel, *d*, upon shaft E. G is a rock-shaft, carrying the "take-up" *e*, connected by the arm *i* and link *m* to the main connecting-rod H. H is the main connecting-rod, connecting the wrists of the cranks *j k l* upon the shafts C D E, respectively. *n* is the needle-bar, connected by the pitman *o* to the crank *p* upon the shaft D. *a* is the thread-cup, into which is put any ordinary spool of thread. *r r* are two bent levers, acting alternately as supports for the thread-cup *a*, and operated by a cam (of so slight eccentricity that it cannot be clearly shown in the drawing) formed upon the shaft E at the points where the shorter arms of the levers bear upon said shaft. *q* is a slide, to which the levers *r r* are pivoted, which may be drawn forward to allow of the removal of the thread-cup *a*. L is a rotating hook attached to the disk *b*, and revolving with the shaft F.

The feed consists of the feed-bar *s*, the link *t*, the roller, Fig. 4, which is upon the stud upon the arm *u*, and a small eccentric upon the shaft E.

The length of the stitch is varied by raising or lowering the arm *u* in the slotted support *v*, where it is retained by a thumb-screw upon the arm *u*.

Motion is given to the machine by revolving the wheel B toward the operator. The crank *k* in revolving carries with it, by means of the connection H, the cranks *j* and *l* in the same direction. The needle-bar is driven by a simple crank and pitman, the pitman being relatively short in order that the needle may remain near its highest point long enough for the take-up to pull up the stitch. When the needle has just passed its lowest point the rotating hook comes into position, as shown in Fig. 6, so as to take the loop and carry it around the thread-cup, the needle meanwhile completing its upward stroke. As the hook comes into the position shown by the dotted

outline at 2, Fig. 6, the thread rolls off the rounded corner *w*, Fig. 5, of the hook L and extends from near the point of the hook in the position of a double chord of the arc, through which the hook has traveled since taking the loop. While the loop thus forms a double chord it is sufficiently distended by the point of the hook to allow the angle *h*, Fig. 8, of the thread-cup to divide it, so that the further motion of the hook causes the loop to completely inclose the thread-cup, which is so tapered and rounded that, as soon as the thread is drawn upon by the take-up, it tends to slide up that side of the cup which is farthest from the revolving disk of the rotating hook, and thus to inclose the thread contained in and proceeding from the thread-cup, and so make the lock-stitch. But it is evident, in order to the success of this operation, that the thread must pass under the cup, and also be cast off from the hook. The thread is allowed to pass under the cup without obstruction from the weight of the cup (which is too great for even a very strong thread to overcome at a high speed) by the action of the levers *r r*, Figs. 2 and 4, upon which the cup is very nearly balanced. As the hook passes under the cup the lever, which is nearest the hook, is allowed by the cam upon the shaft E to drop down a little more than the thickness of the thread, and the inclined shape of the back part of the cup causes the thread to be drawn over the lever, while the cup is supported upon the other lever. By the time the hook has reached the position marked 3, Fig. 6, the first lever has resumed its position, the other lever has dropped down, and the point of the hook has turned so far upward that the thread slips off of its own accord, and, passing over the second lever, is pulled up by the take-up.

As the motion of the levers *r r* causes no sliding friction upon the cup, there is no oil needed at any point where it will soil the thread, which has been a serious objection to some of the devices heretofore made for a similar purpose.

In order to allow sufficient time for the take-up to pull up the stitch after it has left the hook at position 3, Fig. 6, and to allow the feed to act upon the cloth, and the needle to come through the cloth and prepare its loop for the hook, the hook is allowed to make another complete revolution without coming in contact with the thread, which is effected by the wheel *d*, Fig. 6, and pinion *c*, Fig. 5.

The take-up *e* has a swinging motion by means of the rock-shaft G, which is actuated by a link, *m*, and arm, *i*, from a pin upon the main connection H. Its upward limit of motion is shown by the dotted outline upon Fig. 4. It is shown upon the same figure nearly at its lowest limit, which limit is the staple *x*.

The tension of the upper thread is secured by the pressure of the conical points *a' a'* into the hole of the spool, which pressure is regulated by raising and lowering the little frame *y* with spiral springs, Fig. 7, increasing or diminishing the pressure on the arm *z* and rod *f* by means of the thumb-screw running through the frame *y*.

The tension of the lower thread is obtained by setting the spool firmly upon the head of the central spindle of the thread-cup, there being three small knife-like splines upon the spindle, Fig. 8, and by producing a slight friction upon the spindle by a flat spring acting upon a collar at the bottom of the spindle, and a small screw acting upon the spring, all of which is shown in detail in Figs. 6, 8.

The thread passes from the spool, through the long diagonal hole, shown in section at the left in Fig. 6, and in dotted outline in Fig. 8, to the bottom of the cup; thence through the hollow spindle to the top of the cup, and thence to the seam.

The upper thread passes from the spool, through a guide at the corner of the head-piece, Fig. 2, to the staple *x;* thence through a hole in the point of the take-up, and back through the staple *x* to the needle-eye.

The feed-bar *s* is supported at the back end by a pin inserted in the frame of the machine, and is kept constantly pressed forward and slightly downward by a small spring on the end of the bar. The front end of the feed-bar is supported by the link *t*, Fig. 4, which serves both as a link to communicate up-and-down motion from the eccentric on the shaft E, and as a lever, using the roller on the arm *u* as its fulcrum, to communicate backward-and-forward motion to the feed. The up-and-down motion remains always the same, while the backward-and-forward motion is varied by the adjustment of the height of the roller, as before specified.

The variation of angular position and the relative lengths of the two ends of the lever by its own motion operates to reduce the time occupied by the effective part of the feed-motion to about a quarter of the machine's revolution, and confine it to the time in which the feed-surface is nearly at its highest point.

There is a loosely-fitting frame-work about the thread-cup to prevent its displacement, which is partially shown in Fig. 5.

I claim—

The combination, with a rotating hook, of the spool-case and supporting-levers, or their equivalents, operating substantially as and for the purpose described.

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Witnesses:

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