(No Model.)

3 Sheets—Sheet 1.

D. H. COLES.

SEWING MACHINE.

No. 308,750. Patented Dec. 2, 1884.

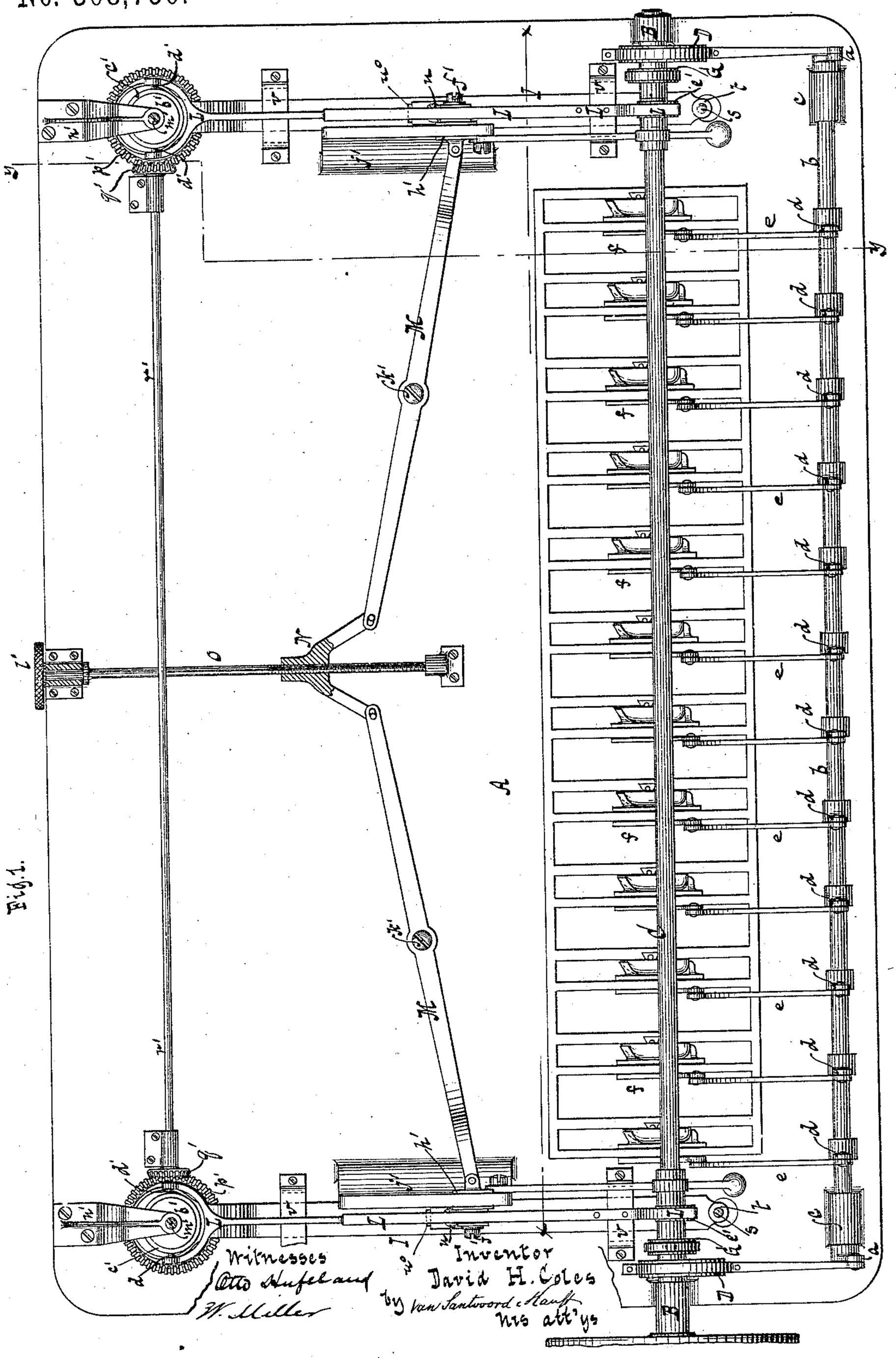

Fig. 1.

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(No Model.)

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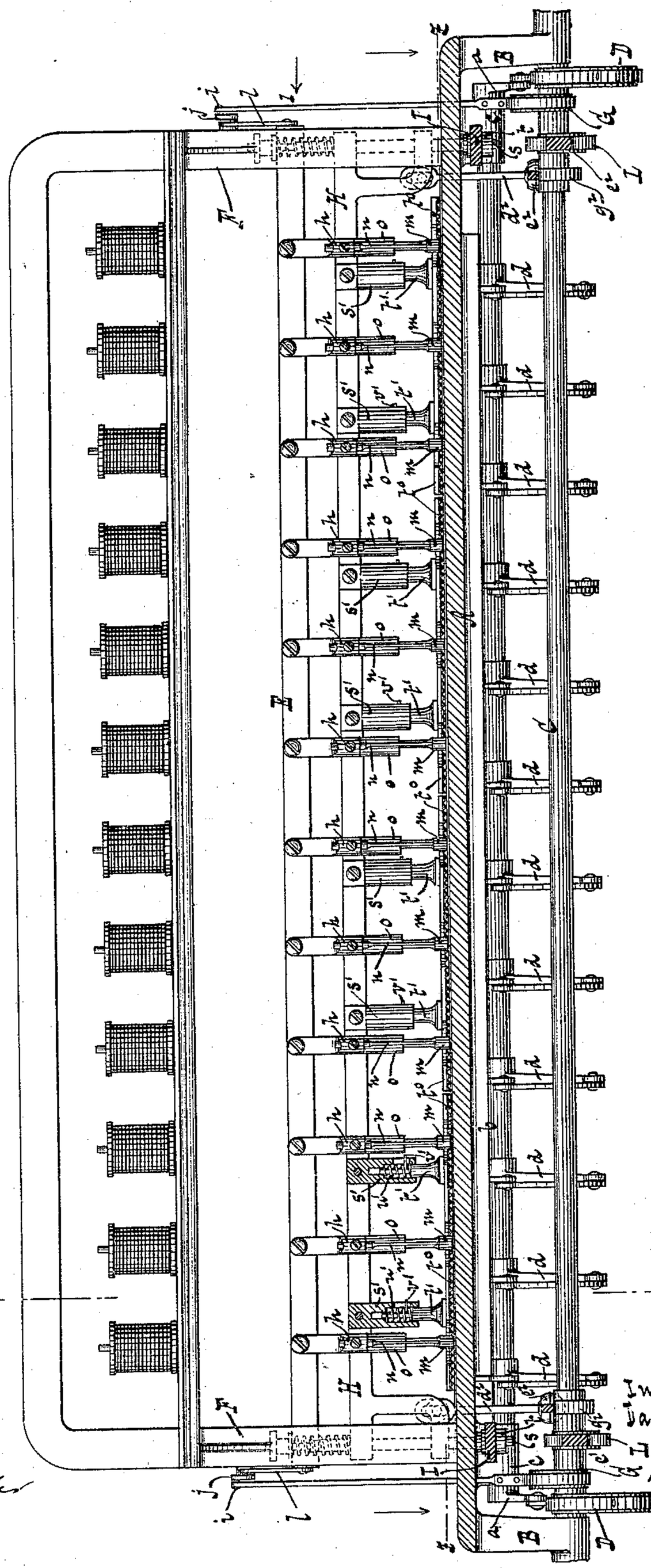

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(No Model.)

3 Sheets—Sheet 3.

D. H. COLES.

SEWING MACHINE.

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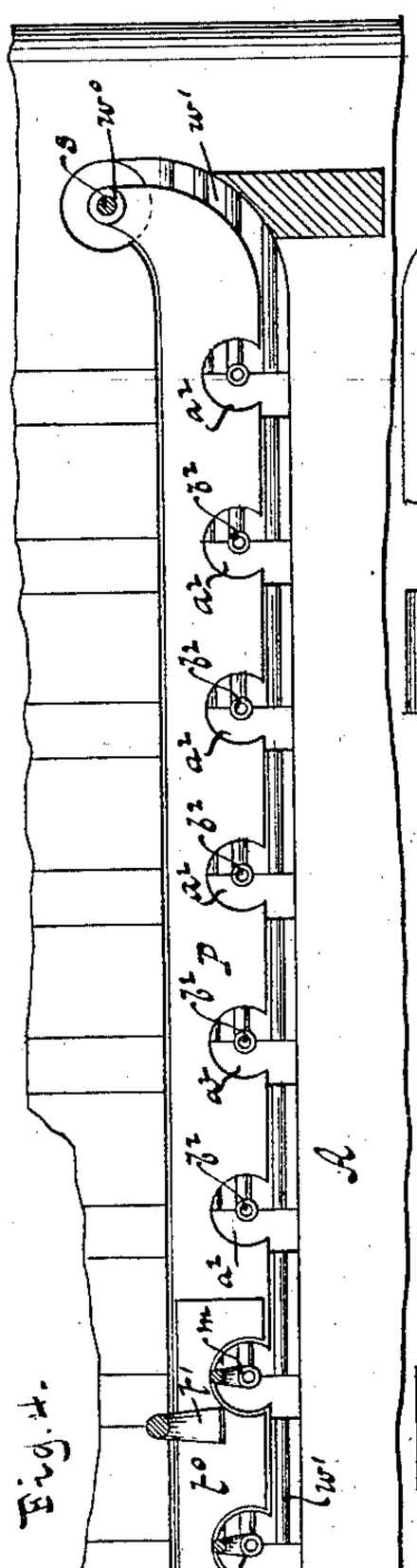

Fig. 4.

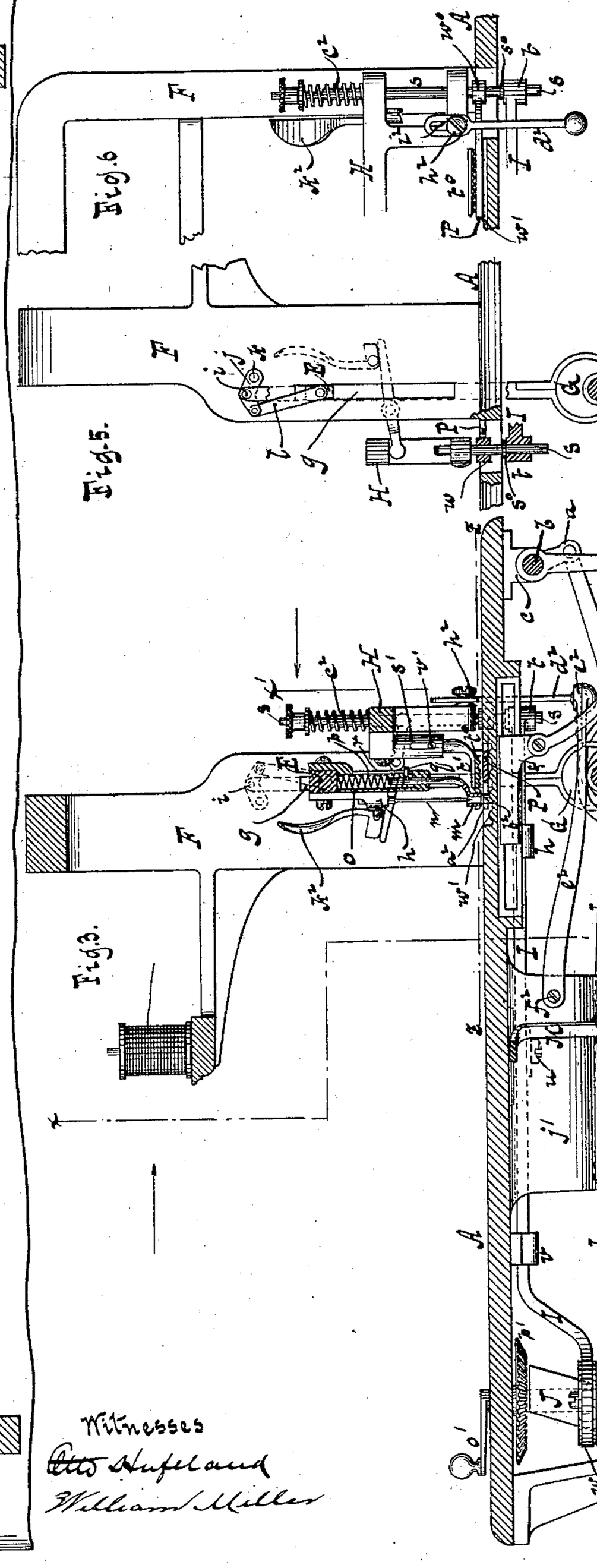

Fig. 5.

Fig. 3.

Fig. 2.

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UNITED STATES PATENT OFFICE.

DAVID H. COLES, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, A. G. DARWIN, OF GLEN RIDGE, NEW JERSEY, JAMES C. BEACH, OF BLOOMFIELD, NEW JERSEY, AND HENRY W. GUERNSEY, OF BROOKLYN, NEW YORK.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 308,750, dated December 2, 1884.

Application filed May 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID H. COLES, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates more especially to an improved mechanism for embroidering and quilting fabrics. The novel construction of this mechanism is pointed out in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 represents an inverted plan. Fig. 2 is a longitudinal vertical section in the plane *x x*, Figs. 1 and 3. Fig. 3 is a transverse vertical section in the plane *y y*, Figs. 1 and 2. Fig. 4 is a partial horizontal section in the plane *z z*, Figs. 2 and 3. Fig. 5 is a partial end view, looking in the direction of arrow 1, Fig. 2. Fig. 6 is a partial longitudinal vertical section in the plane *x' x'*, Fig. 3. Fig. 7 is an inverted plan of one of the feed-levers detached.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the work-plate, on the bottom surface of which are firmly secured two hangers, B B, which form the bearings for the main shaft C. On this shaft, near its ends, are mounted two eccentrics, D D, the straps of which connect with cranks *a a*, mounted on the ends of a rock-shaft, *b*, which has its bearings in boxes *c c*, secured to the under surface of the work-plate A. On this rock-shaft are firmly secured a series of arms, *d*, which connect by rods *e* with the shuttle devices *f*. (Best seen in Figs. 1 and 3.) These devices comprise the mechanism for driving the shuttles.

The mechanism for imparting motion to the needles consists of the following parts: E, Figs. 2, 3, and 5, is the needle-bar, which moves in slots *g* in standards F, which rise from the work-plate A. To this needle-bar are secured the needles *n* by means of clamps *h*. (Best seen in Fig. 3.) A reciprocating motion is imparted to the needle-bar by two eccentrics, G G, which are mounted on the main shaft C, and the straps of which connect by pivots *i* with levers *j*, which swing on pivots *k*, Fig. 5, and the outer ends of which connect by rods *l* with the needle-bar. With each of the needles is combined a presser-foot, *m*, the shank of which works in a tube, *o*, that is firmly secured to the needle-bar, Figs. 2 and 3. In this tube is contained a spring, *p*, which acts upon a pin, *q*, projecting from the side of the shank of the presser-foot *m* through a slot, *r*, in the rear side of the tube *o*. When the needle-bar descends, all the presser-feet are depressed upon the work by the springs *p*, while the needles penetrate through the work, and the presser-feet remain in this position until the needles have been raised out of the work, so that by the presser-feet the work is held down upon the work-plate and not permitted to follow the needles. When the needles have arrived in the position shown in Fig. 3, the lower ends of the slots *r* come in contact with the pins *q*, and the presser-feet are raised clear of the work, so as not to impede the feed motion.

The feed mechanism belongs to the class of universal feeds, and it consists of the following parts:

H is the feed-bar, which is guided on two pins, *s s*—one near each end of the work-plate A. These pins are stepped in eyes *t*, formed at the ends of the feed-levers I I, and they are provided with collars s^0, Figs. 5 and 6, which prevent them from slipping through said eyes, while they are free to turn in said eyes. The feed-levers pass through guides *v*, and they oscillate on pivots *u*, the guides and pivots being firmly secured to the work-plate, and in the feed-levers are slots u^0, (see Fig. 7;) so that they can slide as well as oscillate on their pivots, the guides *v* being of such a nature that they permit both the oscillating and the sliding motion. On the rear end of each feed-lever is formed an eye, *w*, which engages with a grooved disk, *a'*, said disk being made in two parts, which are secured together by screws or otherwise, Fig. 3, so that the eye can be introduced.

Through the center of the disk *a'* passes the cam-slide J, which in the example shown in the drawings consists of a square block fitted

in an oblique position upon a square shaft, K, so that it can slide on the same.

On the bottom end of the cam-slide J is secured a grooved collar, b', and into the groove of this collar is fitted a ring, c', from the opposite sides of which extend two pivots, d', which engage with one bifurcated end of a lever, L, the opposite end of which is also bifurcated and embraces a cam, e', mounted on the main shaft C. The lever L has its fulcrum on a pivot, f', Fig. 1, and it is provided with a slot, g', Fig. 3, in which the fulcrum can be moved so as to adjust the throw of the lever and the length of the stitches, as will be presently explained. The pivot f' is secured to a slide, h', which moves in a slot, i', formed in a bracket, j', secured to the work-plate, and each of the slides h' connects with a lever, M, (see Figs. 1 and 3,) which has its fulcrum on a pivot, k', secured in the work-plate. The inner ends of both levers M connect with a double-armed nut, N, Fig. 1, which travels on a screw-spindle, O, the bearings of which are in boxes secured to the work-plate, and which carries a finger-button, l', by means of which it can be turned. By turning this screw-spindle the pivots f' of the levers L are moved in or out, the throw imparted to the cam-slides J is increased or diminished, and thereby the feed motion, and consequently the length of the stitches, is regulated. The shafts K of the cam-slides J are stepped on center points, m', secured in hangers n', Figs. 1 and 3, and their upper ends have their bearings in the work-plate. One of said shafts extends up through the work-plate and carries a handle, o', by means of which it can be turned, and this motion is transmitted to the other shaft K by bevel-wheels p' q' and an intermediate horizontal shaft, r'. (See Fig. 1.) By turning the shafts K, with the cam-slides J, the direction of the feed motion is changed; or, in other words, a universal feed motion is obtained, such as described in Reissued Letters Patent No. 5,177, granted to John L. Coles and myself, December 10, 1872.

I do not want to confine myself in this present application to the precise universal feed mechanism shown in the drawings and described in the foregoing specification, since other well-known universal feed mechanism might be connected with the feed-bar H, and with the parts which will be presently described.

On the feed-bar H are firmly secured a series of tubular sockets, s', into which are fitted the shanks of the presser-feet t', and which contain springs u', Fig. 2, which allow the presser-feet to accommodate themselves to the varying thickness of the work.

In the shanks of the presser-feet are secured pins v', which project through slots in the sockets s' and prevent the presser-feet from dropping out. In the example represented by the drawings eight presser-feet are shown, which are connected in pairs by foot-plates t^0, roughened on their under surfaces; but, if desired, each presser-foot may be provided with its own separate foot-plate; or three or more feet may be connected to a common foot-plate. In practice I find the arrangement shown in the drawings to give a satisfactory result.

The object of making the foot-plate of the presser-feet in sections is to allow the same to accommodate itself to the uneven surface of the work, which could not be accomplished if all the presser-feet were connected to one and the same foot-plate extending throughout the entire length of the work-plate.

Beneath the foot-plates of the presser-feet, in a recess, w', formed in the work-plate, is situated a smooth plate, P, which is provided with eyes w^0 at its ends, through which pass the pins s s, so that said plate partakes of the motion imparted to the pins and to the feed-bar H by the universal feed mechanism. The bottom of the recess w' is corrugated, as shown in Figs. 2 and 3, so that the plate P moves thereon with the least possible friction, and said plate is provided with openings a^2, which embrace the needle-throats b^2, and which are sufficiently large to permit the plate to move in either direction, according to the action of the universal feed mechanism. The feed-bar H is held down by the action of springs c^2, placed upon the pins s s, and on the feed-bar, near its ends, are secured rods d^2, the lower ball-shaped ends of which engage with hemispherical sockets formed on levers e^2, which swing on pivots f^2, secured in the brackets j', and which are exposed to the action of cams g^2, mounted on the main shaft C.

The connection of the rods d^2 with the feed-bar H is effected by screws h^2, which pass through slots i^2, so that the feed-bar, together with the presser-feet, can be raised clear of the work whenever it is desired, while during the time the machine is in operation the screws h^2 occupy the lowest portions of the slots i^2, so that for each revolution of the main shaft the presser-feet are raised, in order to permit the correct action of the feed mechanism.

The feed-bar can be raised whenever it may be desirable by the hand-levers k^2, or by any other equivalent devices.

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

1. The combination of a work-plate, upper and lower feed-plates, two feed-levers pivoted under the work-plate adjacent to the ends, respectively, of the lower feed-plate, and connected with both feed-plates, a main shaft under the work-plate, connections for operating the feed-levers to move the feed-plates in any desired direction in a plane parallel to the surface of the work-plate, cams on the main shaft, and connections between the cams and the upper feed-plate for automatically and intermittently raising and lowering the upper feed-plate, substantially as described.

2. The combination of a work-plate, upper

and lower feed-plates, between which the work is held and carried, feed-levers supported horizontally beneath the work-plate and connected with the feed-plates, means for actuating the feed-levers to move the feed-plates in any desired direction in a plane parallel to the surface of the work-plate, a main shaft, a cam on the shaft, a pivoted lever acted on by the cam, and a rod connecting the lever with the upper feed-plate, to automatically and intermittently raise and lower said upper feed-plate, substantially as described.

3. The combination of the work-plate, the vertical guide-pins, the lower feed-plate arranged on the pins, the feed-bar loosely carried by said pins, the feed-levers connected with the pins, and mechanism for automatically and intermittently raising and lowering the feed-bar, substantially as described.

4. The combination of the work-plate, stitch-forming mechanism, the oscillating and sliding feed-levers, the vertical guide-pins supported by the levers, the upper and lower feed-plates arranged on the guide-pins, and means for automatically and intermittently raising and lowering the upper feed-plate, substantially as described.

5. The combination of the work-plate A, the feed-levers I beneath the same, the lower feed-plate, P, the rising and falling feed-bar H, the foot-plates t^0, secured to and rising and falling with the feed-bar, the vertical guide-pins *s*, carried by the feed-levers, and passing through the lower feed-plate and the feed-bar, and mechanism for operating the feed-levers, pins, feed-bar, and lower feed-plate, substantially as described.

6. The combination of a needle-bar carrying a series of needles, and mechanism, substantially such as described, for imparting to the needle-bar the required motion, with the feed-levers I at the opposite ends of the needle-bar, mechanism for imparting the required motion in any desired direction to the feed-levers, the pins *s*, carried by the feed-levers, the lower feed-plate, P, and the feed-bar H, with its foot-plates t^0.

7. The combination, in a sewing-machine, of a work-plate, a needle-bar carrying needles, a main shaft connected with the needle-bar for operating it, the pivoted feed-levers I at the opposite ends of the needle-bar, sliding fulcrums for the feed-levers, pivoted swinging levers connected with the movable fulcrums, a nut connecting the adjacent ends of the said pivoted levers, a screw-spindle engaging the nut for swinging said levers to adjust the fulcrums, feed devices connected with the feed-levers for feeding the work to the needles, and mechanism for operating the feed-levers, substantially as described.

8. The combination, substantially as hereinbefore described, of the feed-bar H, carrying the foot-plates t^0, the plate P, situated beneath the foot-plates, the pins *s*, which carry the feed-bar and the plate P, the feed-levers I, which carry the pins *s*, mechanism, substantially such as herein described, for imparting to the feed-levers the required motion in any desired direction, the springs c^2, for depressing the feed-bar and the levers e^2, cams g^2, and rods d^2, for raising the feed-bar at the required intervals.

9. The combination of a reciprocating needle-bar, and a presser-foot having a yielding connection therewith, with the work-plate, the upper and lower feed-plates, the oscillating and sliding feed-levers supported beneath the work-plate and connected with the feed-plates, a main shaft under the work-plate, and connections between the main shaft and the needle-bar, substantially as described.

10. The combination, substantially as hereinbefore described, of the feed-bar H, the foot-plates t^0, secured to the feed-bar, the plate P, situated beneath the foot-plates, mechanism, substantially such as herein described, for imparting the required motion to the feed-bar and to the plate P, the needle-bar carrying a series of needles and a corresponding series of strippers, and mechanism, substantially such as herein described, for imparting to the needle-bar and to the strippers the required motion.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

DAVID H. COLES. [L. S.]

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.