

No. 634,970.

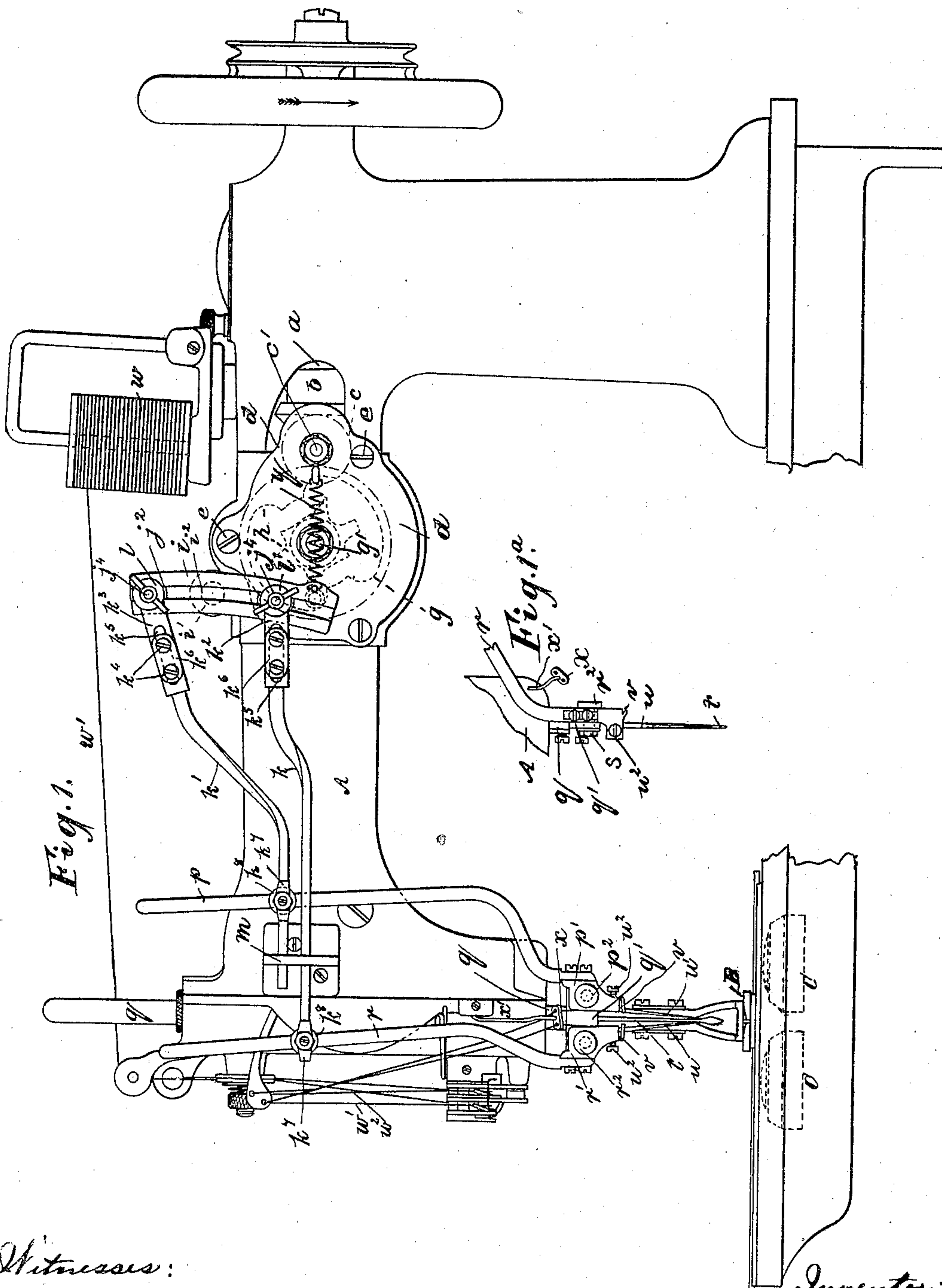
Patented Oct. 17, 1899.

J. WALKER.
HEMSTITCH SEWING MACHINE.

(Application filed Aug. 15, 1896.)

(No Model.)

4 Sheets—Sheet 1.



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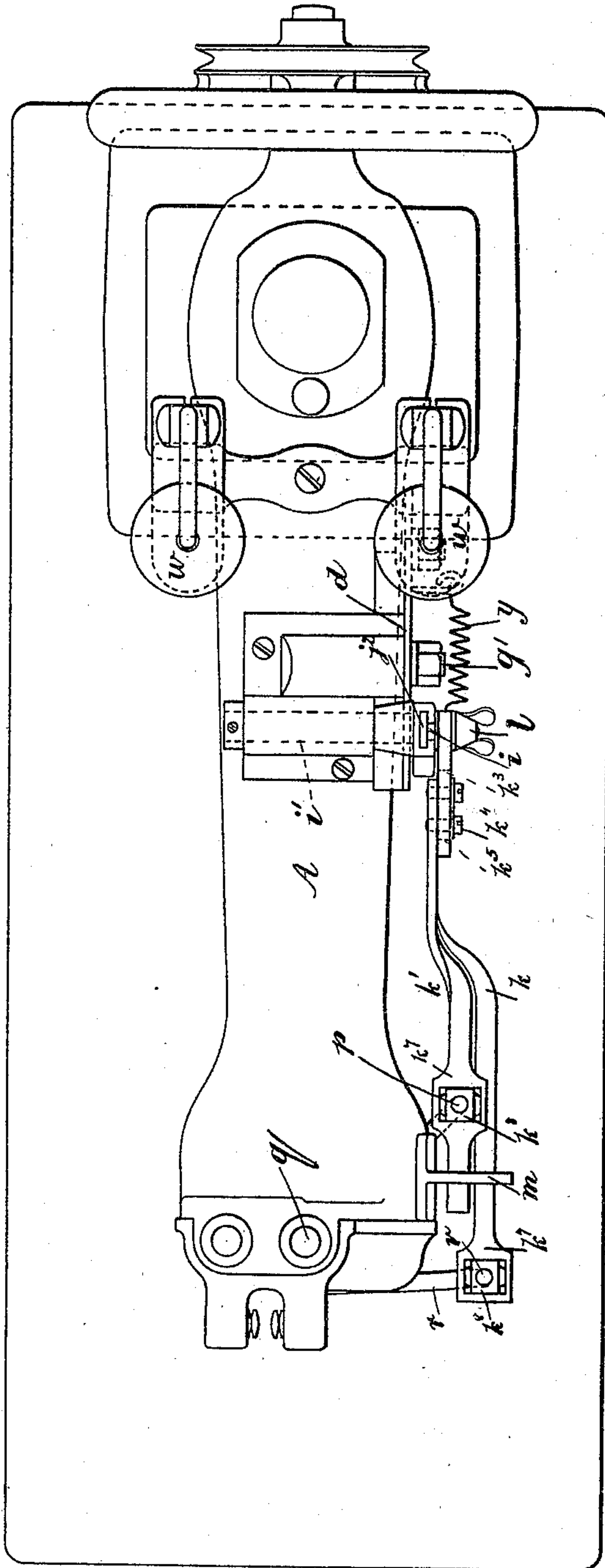
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Fig. 2.



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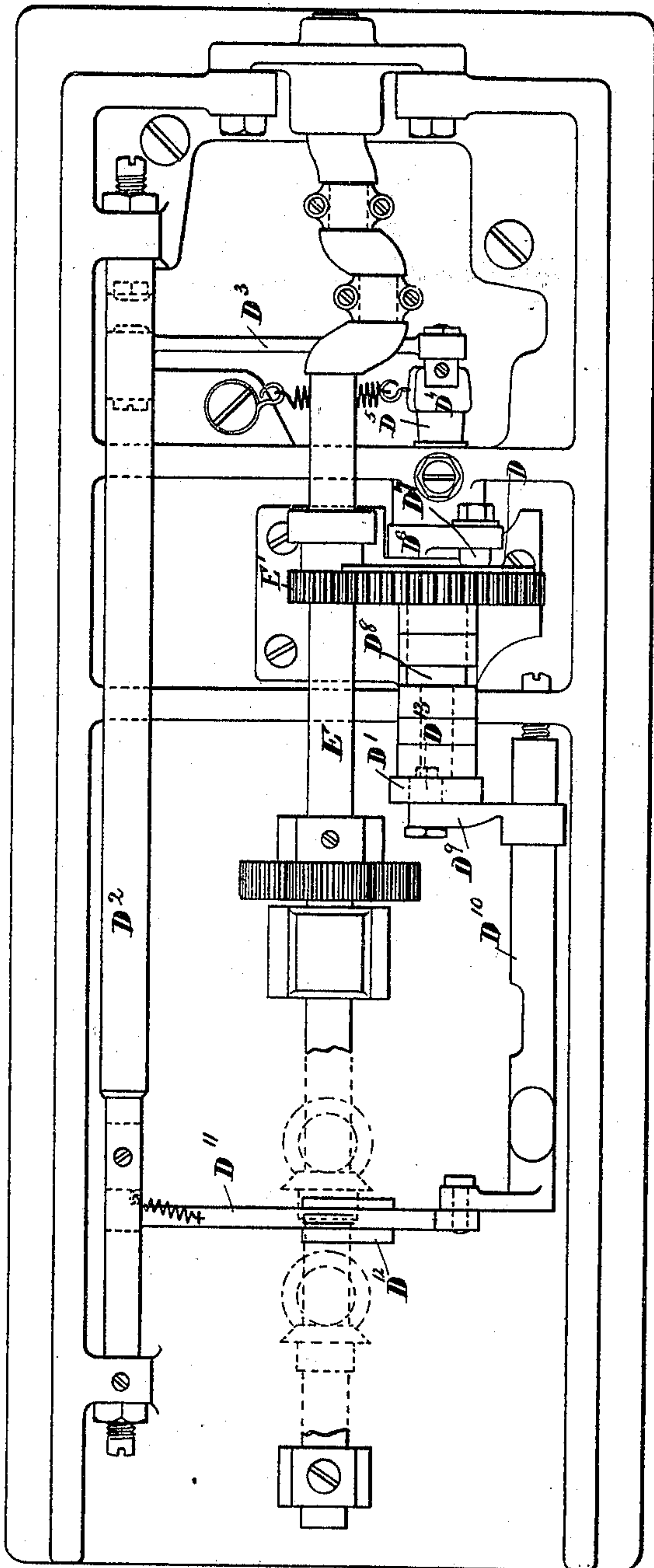
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH WALKER, OF BELFAST, IRELAND, ASSIGNOR TO HENRY FERGUSON
AND DUNCAN MACRAE, OF SAME PLACE.

HEMSTITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 634,970, dated October 17, 1899.

Application filed August 15, 1896. Serial No. 602,908. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH WALKER, mechanic, a subject of the Queen of Great Britain, and a resident of the city of Belfast, Ireland, have invented a Double-Hemstitch Sewing-Machine, of which the following is a specification.

My invention relates to a novel construction of sewing-machine for producing two distinct rows of hemstitching simultaneously in fabrics.

The invention is specially applicable to machines of the Wheeler & Wilson type with two rotating hooks, although it can be adapted to other forms of machine.

The features of novelty constituting the invention are pointed out in the claims.

In order that my said invention may be properly understood, I have hereunto appended four explanatory sheets of drawings, whereon—

Figure 1 is a side view of a Wheeler & Wilson machine fitted with my improvements. Fig. 1^a is a side view of the needles and accessory parts, Fig. 1. Fig. 1^b is a similar view thereof on a larger scale. Fig. 2 is a plan view of the machine. Fig. 3 is an inverted plan of the machine. Fig. 4 is an enlarged view of the needles and accessory parts. Fig. 5 is a detail view of the gearing and cam. Fig. 6 is a front view, and Fig. 6^a a side view, to an enlarged scale, of the spreader or spear. Fig. 7 is an enlarged diagram of the double hemstitch produced by the machine. Fig. 8 is a side view of a feed-plate cam. Fig. 9 is a side view of a cam for raising and lowering the feed-plate.

Referring to the drawings, the same reference letters and figures wherever repeated indicate the same or similar parts.

In carrying out my invention I fit on the usual horizontal driving-shaft *a* of the machine a bevel-wheel *b*, (see also Fig. 5,) which gears with a bevel-wheel *c*, carried on a stud *c'*, secured to the cover-plate *d*, which latter is held in place by screws *e*. Secured to the bevel-wheel *c* and revolving with it on the stud *c'* is a spur-pinion *f*, which gears with the spur-teeth of the cam-wheel *g*, revolving on the stud *g'*. In Fig. 1 the pitch-lines of the gear-wheels are indicated.

Cast in one with or secured to the wheel *g* is a cam *h*, which is of a peculiar shape, as

shown at Fig. 5. It is made with two corresponding narrow projections *h'* and two corresponding broad projections *h*², also with two corresponding slight protuberances *h*³. The projections *h'* and *h*² although not of the same breadth are of the same length. The action of the cam will be hereinafter described.

A double lever *i*, turning on a pivot *i'*, has a pin *j* at its lower end which is actuated by the cam *h*. The pin *j* has a friction-roller on it. The lever *i* is grooved at *i*², and in this groove are two slides *j*² *j*³, having pins *j*⁴ projecting from them to which are secured the end pieces *k*² *k*³ of two connecting-rods *k* *k'*. The slides *j*² *j*³ can be clamped in any desired position in the lever-groove by means of the butterfly-nuts *l* *l'*. The connecting-rods *k* *k'* pass through guide-openings made in a guide-bracket *m*, secured to the arm A of the machine. As will be seen, the rods *k* *k'* are jointed to their end pieces *k*² *k*³ by adjustable couplings, consisting of two screws *k*⁴, which are passed through a washer *k*⁶, then through a slot *k*⁵ in the end pieces, and are entered in holes in the ends of the rods. On slackening the screws the length of the rods can be adjusted lengthwise, and when adjusted the parts can be securely clamped together again by tightening up the screws *k*⁴.

y is a spring which is secured to the lower end of the lever at its one end and to the plate *d* at its other end.

Each connecting-rod is enlarged at *k*⁷ and carries in this enlargement a roller *k*⁸, having a hole bored vertically through it. Passed through the hole in the roller of the connecting-rod *k* is a vibrating bar *p*, whose lower end is screwed to a clamp *p'*, secured by a pivot-pin *p*² to a cross-piece *q'*, (see also Figs. 1^a and 4,) attached to the lower end of the needle-bar *q*, which reciprocates—i. e., it moves down and up in a straight line—carrying the needles. In the same manner there is passed through the roller of the connecting-rod *k* a vibrating bar *r*, whose lower end is screwed to a clamp *r'*, secured by a pivot-pin *r*² to the cross-piece *q'*. The clamps are capable of lateral adjustment in slots *s* (indicated in dotted lines at Fig. 4) in cross-piece *q'*, through which their pivot-pins pass. The pivot-pins are clamped in the adjusted position in the slots by means of nuts *s'*, Fig. 1^a, at the back.

Fitted in the center of the cross-piece q' is a spear or spreader t , which has a spear-point t' , as shown at Figs. 6 and 6^a, and also a longitudinal slot t^2 in it transverse to the feed of the machine (or two grooves, one at each side) for the reception of the needles when they are brought together.

u u' are two needles which are secured, respectively, in the clamps r' p' .

u^2 are pinching-screws for clamping the needles in position when adjusted.

The needles are side by side transversely to the feed of the machine and not in the direction of the feed of the machine.

v are bent wire guides for the threads before passing to the needles.

w are the spools, and w' w^2 the two threads.

x is a guide through which the threads pass before going to the guides v . This guide x consists of a plate with two thread-holes in it and which is secured to the arm A by a wire x' .

B is the presser-foot.

The dotted lines at C represent two Wheeler & Wilson rotary hooks or other suitable form of rotary hooks or shuttles.

In the diagram Fig. 7, which shows the kind of stitch produced in the fabric, z is the under or shuttle thread, and z' the upper or needle thread. The left-hand view, Fig. 7, shows the under side of the cloth and the right-hand view the upper side. It is to be understood that these views do not show the material absolutely correct, as the open spaces are made by pushing aside the cross fibers, as usual, instead of by cutting some of them away, as is shown in the views.

The action of the machine is as follows: Presuming that the connecting-rods k k' and the clamps r' p' have been properly adjusted in position and the needles threaded, the driving-wheel is rotated in the direction of the arrow, whereupon the shaft a , through the bevel and spur gearing, revolves the wheel g in the direction of the arrow, Fig. 5, and causes the cam to impart a vibrating motion to the lever i , which in its turn, through the connecting-rods k k' , causes the bars r p to reciprocate at the same time toward each other and away from one another alternately. The oscillatory movement of the bars r p causes the clamps r' p' to oscillate on their pivots, and thereby alternately move the needles u u' close to the spear t , as at Fig. 1, and away from it, as shown in full lines at Fig. 4. The dotted and full lines, Fig. 4, show the extent of this lateral swinging movement of the needles u u' . It will be seen that the spear t is longer than the needles, and each time the needle-bar descends it penetrates the cloth and, according to the width of the spear-head t' , pushes aside to a greater or less extent the threads, so as to form the usual opening or space produced when doing "open-work" stitching. Now on referring to the diagram Fig. 7 the first stitch 1 of each needle is made when the needle-bar q is at its first downstroke and the pin j of the

lever i is traveling along one of the faces l of the cam h , (see Fig. 5,) the needles as a consequence being "open" or away from the spear, as shown in full lines at Fig. 4. By the time the needle-bar commences its next downstroke the pin j has reached the point h' of the cam, and the needles as a consequence are "closed," as shown in full lines at Fig. 1 and in dotted lines at Fig. 4, so that the spear, with its needles close beside it, penetrates the cloth at x , the cloth having in the meantime been fed forward by the feed mechanism this distance—i. e., the length of the stitch—and makes the open space. At the commencement of the succeeding ascent of the needle-bar the needles are opened under the action of the part 2 of the cam h to an extent sufficient to widen out the opening x in the cloth and also at the same time to permit the hooks C to lock the stitches 2 2 during the continued ascent of the needles after having cleared the cloth and also during their subsequent descent. The cloth is fed by the feed mechanism of the machine backward the partial length of a stitch, so that the next entry of the spear and needles is made at O, the pin j traveling over the point h^2 and the needles being closed. At the next succeeding ascent of the needles they are opened out under the action of the part 3 of the cam to an extent sufficient to widen out the opening O and also to permit the hooks to lock the stitches 3 3. The feed mechanism now feeds the cloth forward the length of one stitch, so that the next stitch takes place at 4 4, the pin j traveling over the point h^3 and moving along the next face l in order to recommence a new series of stitches.

It will be understood that one hook or shuttle 6 locks the stitches of one row and the other hook or shuttle locks the stitches of the other row. When the needles descend while away from the spreader, the loops are formed in position to be engaged by the respective hooks. When the needles are against the spreader during the descent, their motion away from the spreader at the first part of the ascent carries the loops where they will be engaged by the same hooks.

The feed and shuttle mechanism can be the same as that used on the ordinary Wheeler & Wilson machine. The feed mechanism is, however, adapted to give the proper forward feed movement to the feed-plate by means of cams D D', as shown at Figs. 8 and 9. D is the feed-cam, and D' the cam for raising and lowering the feed-plate at the proper times. The feed and shuttle mechanism is shown at Fig. 3, D² being the feed-shaft, D⁴ the feed-arm, D³ the rod for actuating the shaft D² from the arm D⁴, D⁵ the spindle, D⁶ the crank on the spindle, and D⁷ the cam-pin on the crank, which works in the groove D⁰ of the feed-cam D. E is the main driving-shaft for rotating the shuttles and which also drives by the pinion E' the cam-wheel D. Fitted on the opposite end of the spindle D⁸ of the

cam-wheel D is the cam D', upon the periphery of which runs the roller D¹³, secured to the crank D⁹ of the rock-shaft D¹⁰, which latter is connected by the feed-bar D¹¹ to the feed-shaft D². D¹² is the feed-plate.

If desired, a positive cam can be used instead of the cam h, working in conjunction with the spring y.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, in a sewing-machine, of a needle-bar with means for reciprocating it, a single spreader and two sidewise-movable thread-carrying needles on opposite sides of the spreader and carried by said bar, means giving said needles sidewise movement at suitable intervals, and means coöperating with the needles to form stitches.

2. The combination, in a sewing-machine, of a needle-bar with means for reciprocating it, a single spreader carried by the needle-bar, needle-clamps pivotally supported and reciprocated by said needle-bar, needles carried by said clamps on opposite sides of the spreader transversely of the feed of the machine, cam mechanism moving the needles at suitable intervals toward and from the spreader, and means coöperating with the needles to form stitches.

3. In a hemstitch sewing-machine, the combination of a needle-bar having a piercer, two movable needles, one on each side of the piercer; mechanism for operating said needles so that during the formation of the inner hemstitches the needles are placed convergingly toward the piercer, while during the formation of the outer hemstitches the needles are placed parallel with the piercer, and means coöperating with the needles to form stitches, substantially as set forth.

4. In a hemstitch sewing-machine, the combination of a needle-bar having a piercer, two movable needles, one on each side of the piercer; mechanism for operating said needles so that during the formation of the inner hemstitches the needles are placed convergingly toward the piercer, while during the formation of the outer hemstitches the needles are placed parallel with the piercer, means coöperating with the needles for forming stitches, and means operating at suitable times for feeding the fabric.

5. In a hemstitch sewing-machine, the combination of a needle-bar having a piercer, two movable needles, one on each side of the piercer; mechanism for operating said needles so that during the formation of the inner hemstitches the needles are placed convergingly toward the piercer, while during the formation of the outer hemstitches the needles are placed parallel with the piercer, means coöperating with the needles for forming stitches, and means operating at suitable times for feeding the fabric along the length of one stitch, then reversely a less distance, then along one stitch, as set forth.

6. The combination in a sewing-machine of the needle-bar a single spreader, needles movable toward and from said single spreader and side by side transversely of the feed of the machine, means for reciprocating said needle-bar, spreader and needles, two pivoted needle-clamps supporting the needles on opposite sides of said single spreader rods r, p, connecting-rods k, k', lever i, cam h for controlling lever i and through it the needles, and means coöperating with the needles to form stitches.

7. The combination, in a double-hemstitch sewing-machine having suitable driving mechanism, and suitable shuttles or hooks, of two reciprocating and sidewise-movable needles side by side transversely of the feed of the machine, means for reciprocating the needles, means for moving the needles sidewise at proper intervals, said latter means acting on the needles to keep them apart during their first reciprocation, together during downward movement and apart during upward movement of the second and third reciprocations, and means for feeding the cloth to be stitched forward a full stitch, back a partial stitch then forward a full stitch for successive stitches.

8. The combination, in a double-hemstitch sewing-machine, having suitable driving mechanism, and suitable shuttles or hooks, of two reciprocating and sidewise-movable needles side by side transversely of the feed of the machine, means for reciprocating the needles, cam h with several projections acting on the needles, through intermediate arms, holding the needles apart during the first reciprocation, together during the downward movement and apart during the upward movement of the second and third reciprocations, and means for feeding the cloth to be stitched forward a full stitch, back a partial stitch then forward a full stitch, for successive stitches.

9. The combination, in a double-hemstitch sewing-machine, having suitable driving mechanism, and suitable shuttles or hooks, of two reciprocating and sidewise-movable needles side by side transversely of the feed of the machine, a single spreader reciprocating with the needles and toward and from which the needles are movable, means holding the needles away from the spreader during the first reciprocation, against the spreader during the downward movements and away from the spreader during the upward movements of the second and third reciprocations, and means for feeding the cloth to be stitched forward a full stitch, back a partial stitch, then forward a full stitch, for successive stitches.

Signed at Belfast, county Antrim, Ireland, this 25th day of July, A. D. 1896.

JOSEPH WALKER.

Witnesses:

JOHN M. QUADE,
JOSEPH GLANCY.