

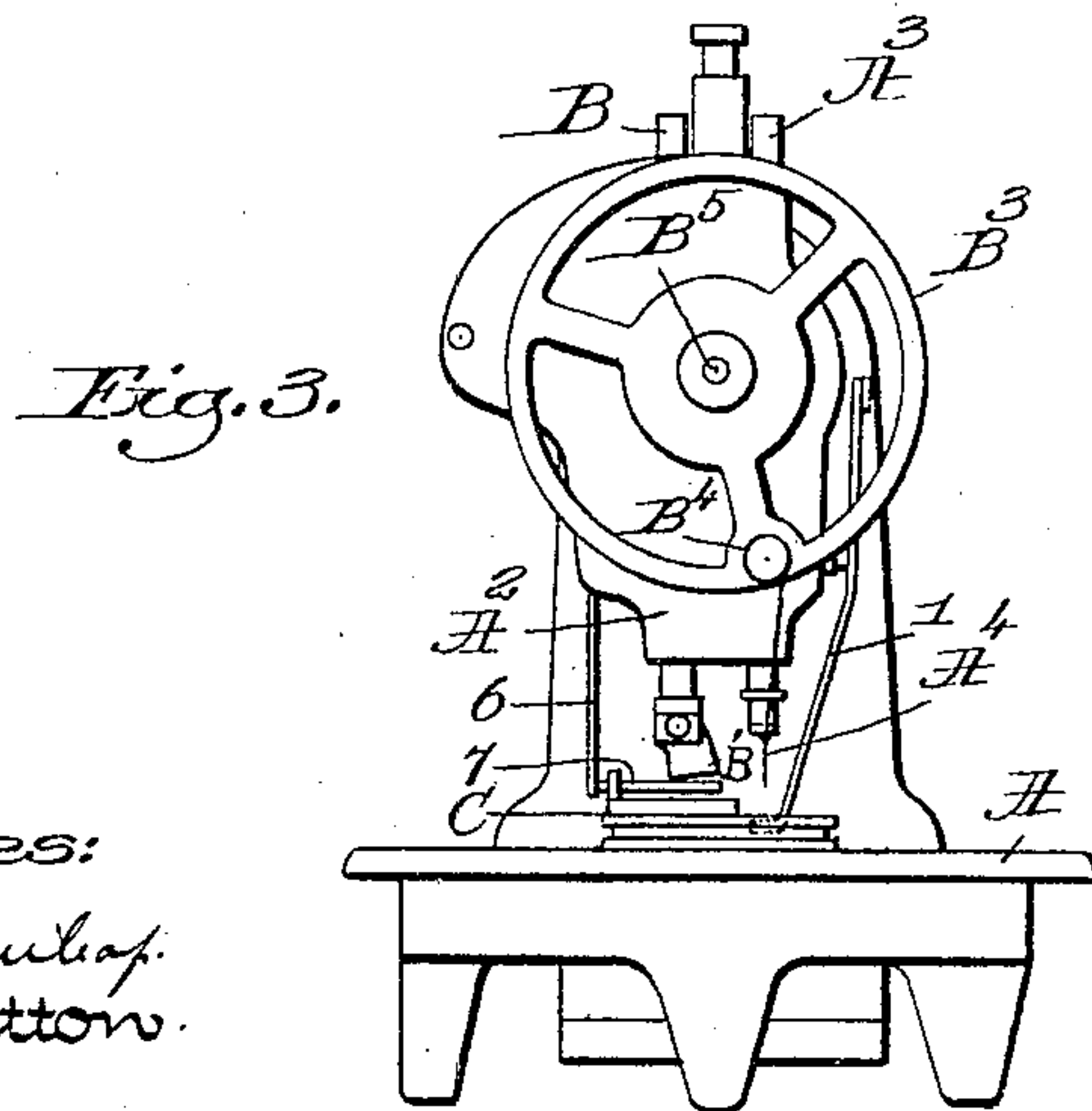
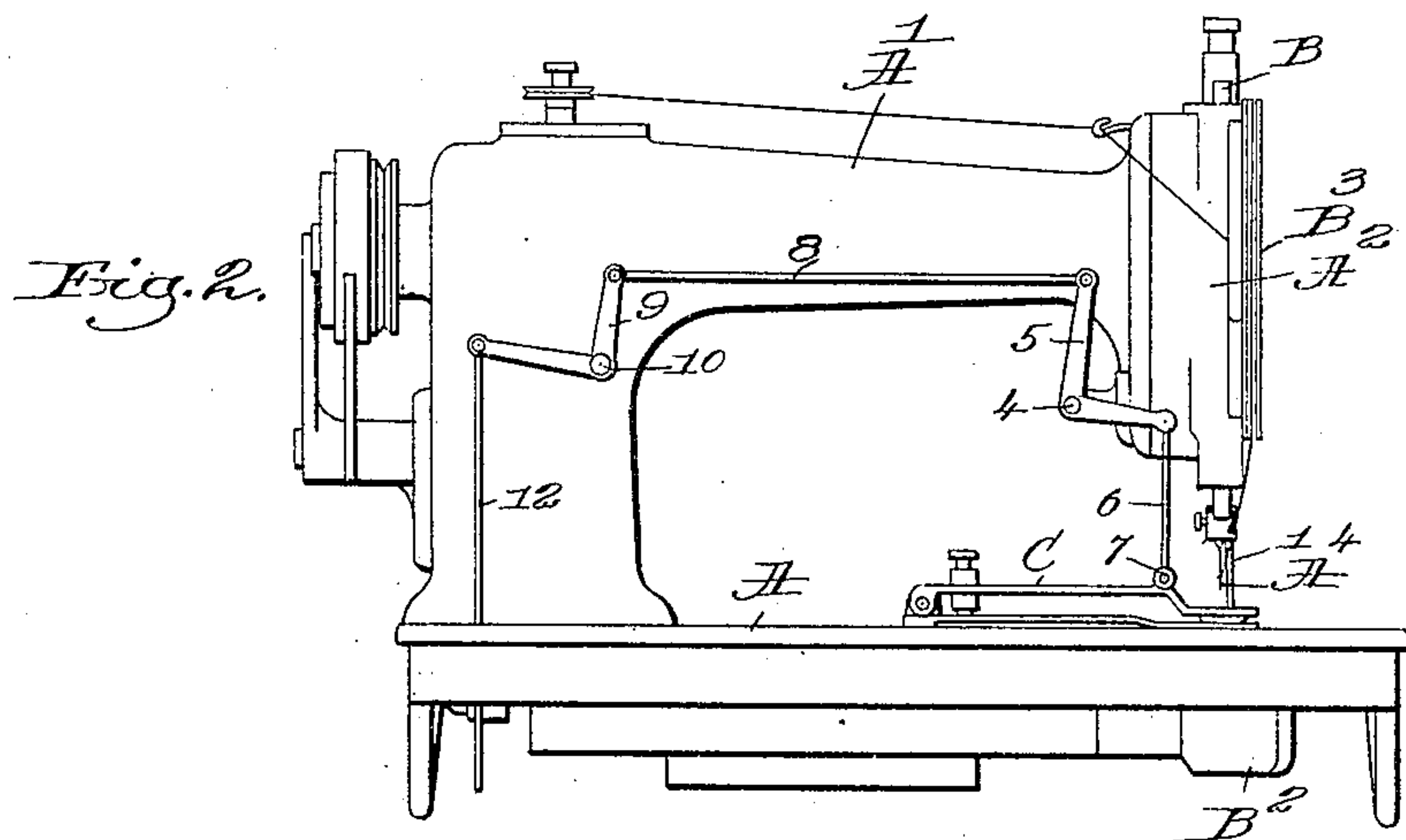
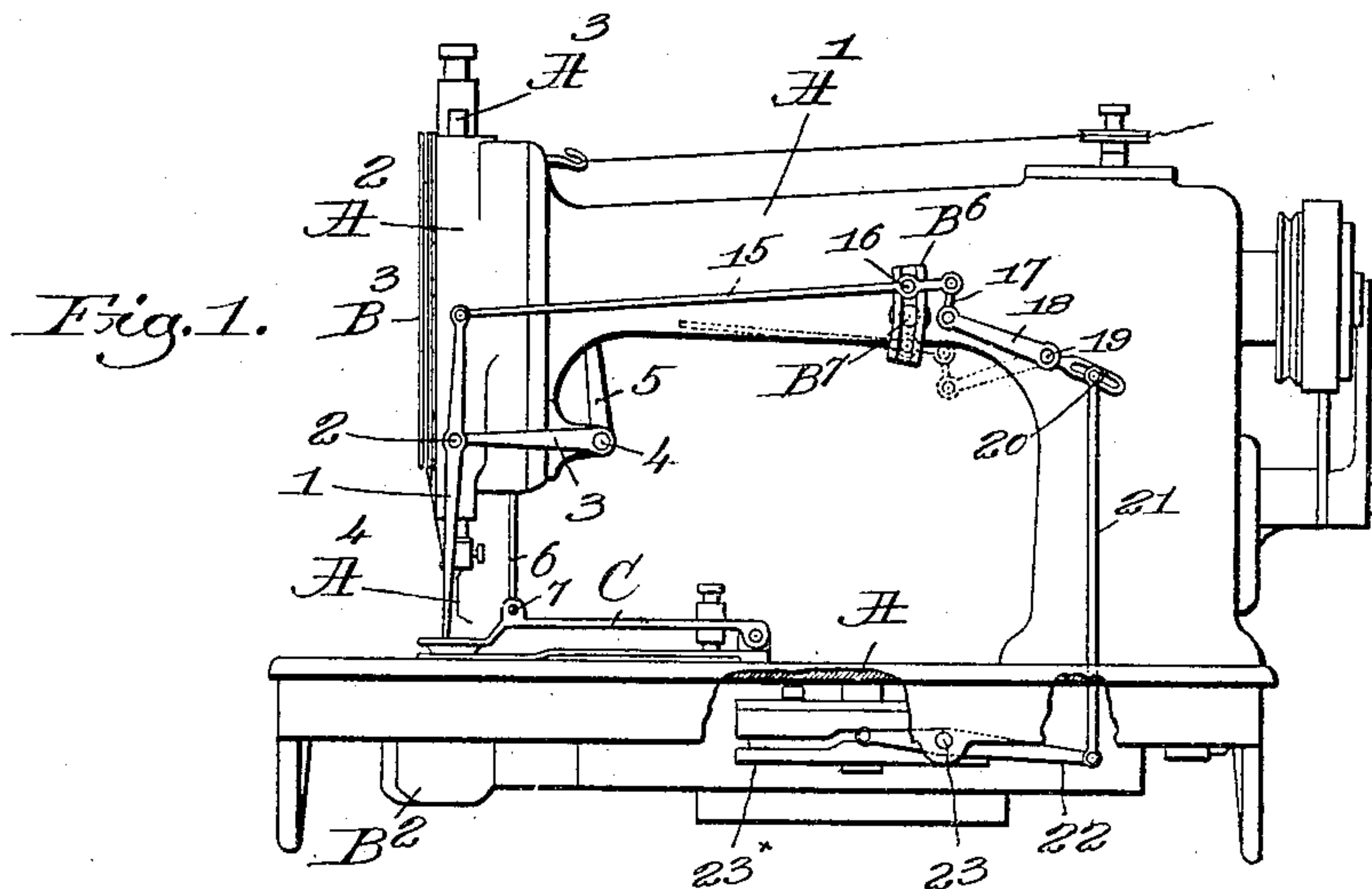
No. 809,052.

PATENTED JAN. 2, 1906.

W. E. GOODYEAR.
BUTTONHOLE STITCHING MACHINE.

APPLICATION FILED NOV. 4, 1904.

2 SHEETS—SHEET 1.



Witnesses:
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S. Wm. Lutton.

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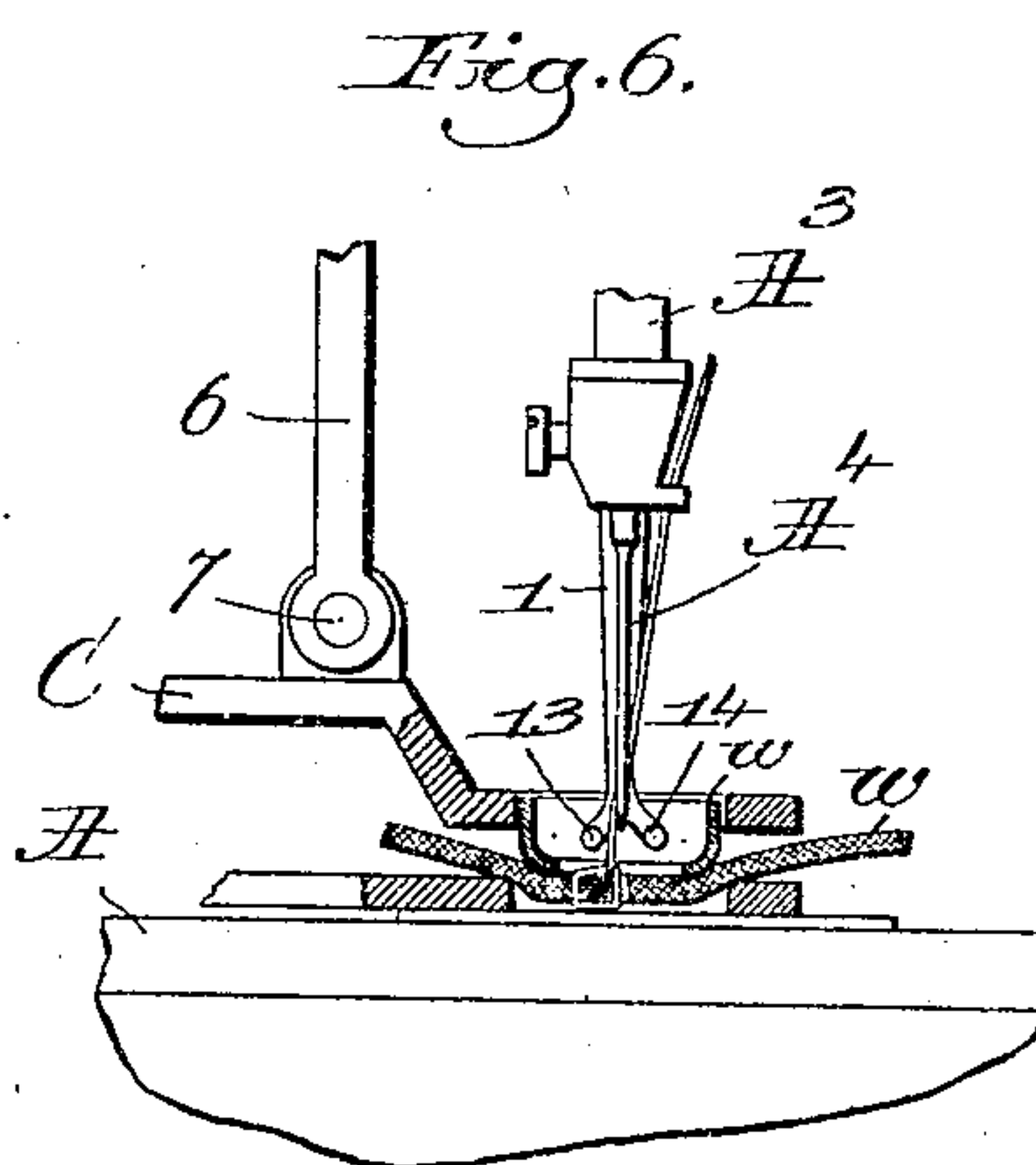
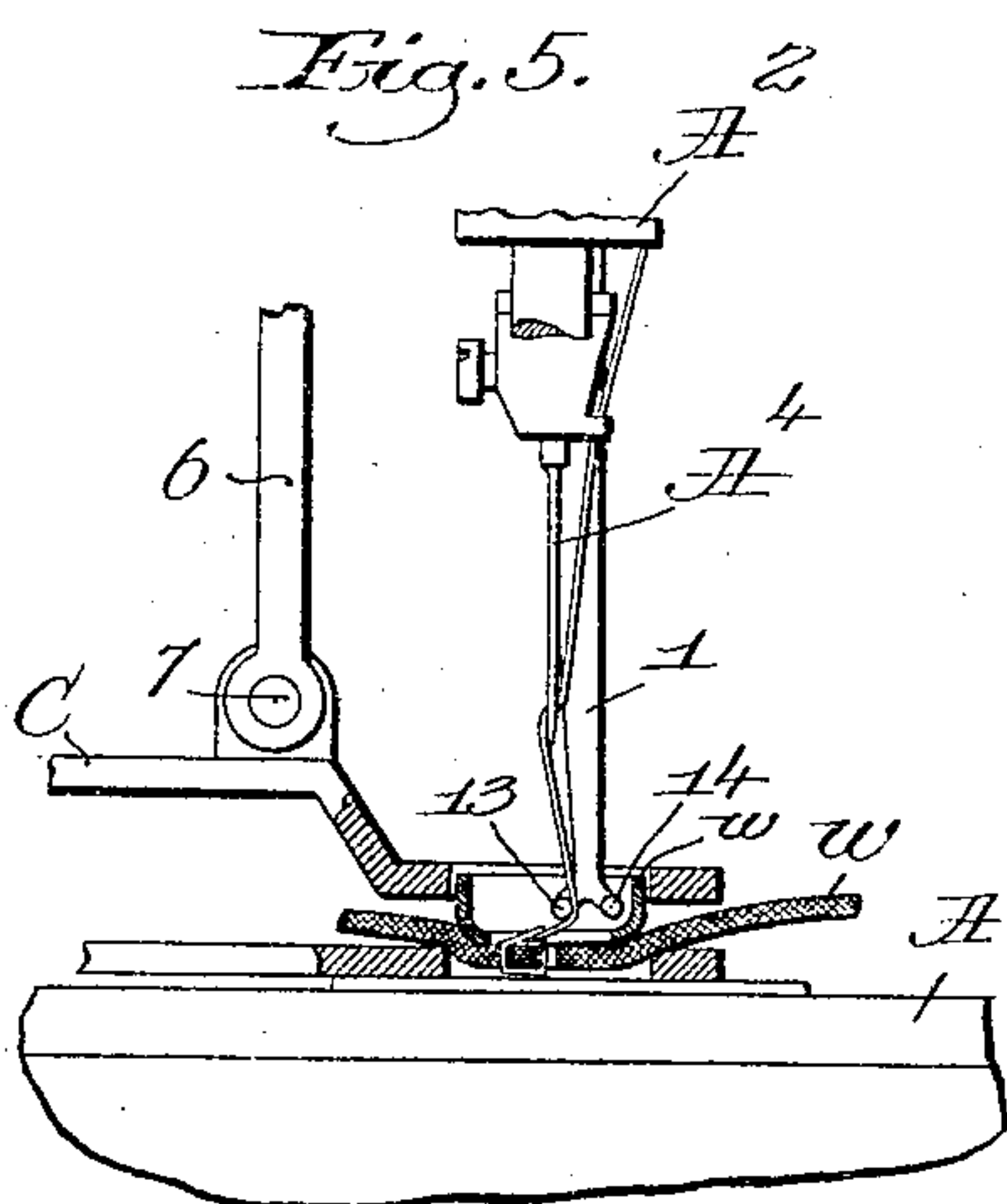
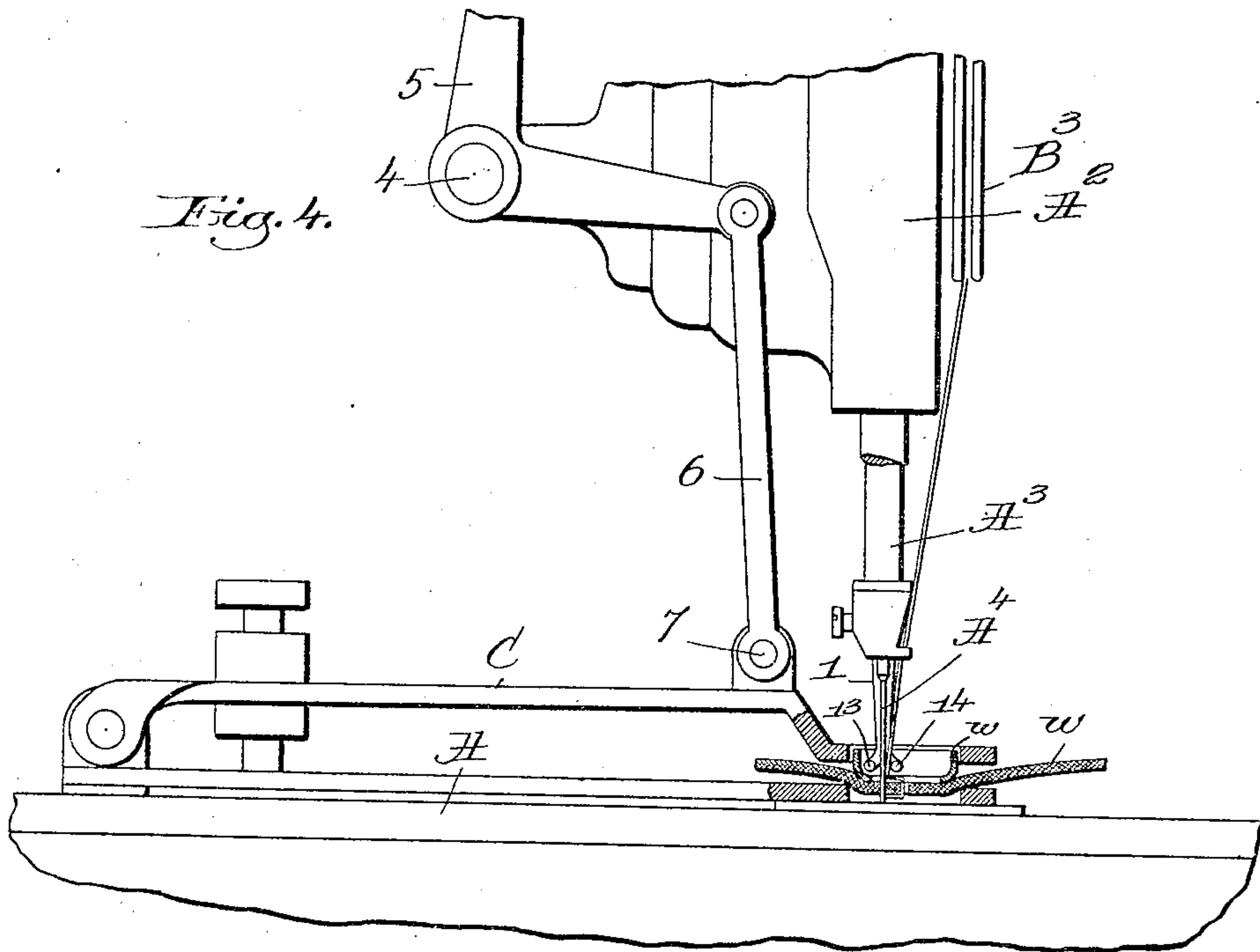
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UNITED STATES PATENT OFFICE.

WILLIAM ED. GOODYEAR, OF BOSTON, MASSACHUSETTS.

BUTTONHOLE-STITCHING MACHINE.

No. 809,052.

Specification of Letters Patent.

Patented Jan. 2, 1906.

Application filed November 4, 1904. Serial No. 231,347.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD GOODYEAR, a subject of the King of Great Britain, but now residing in Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Buttonhole-Stitching Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object to improve that class of buttonhole or overedge stitching machine employing an eye-pointed needle and a complementary device of the nature of a rotary shuttle or loop-taker carrying a second thread to thereby enable the so-called "purl" of the stitch or the points of crossing of the threads shown on the face of the goods and used in making the stitch to be brought to the edge rather than to show between the edge and the point where the depth-stitch is made in the work back of the edge.

In United States Patent No. 749,437, granted to me January 12, 1904, I employed a take-up to which I imparted variable movements, the take-up for one stitch serving to draw a longer loop than at another stitch, and so by the difference in the length of the loop drawn I drew the thread of the depth-stitch to the edge, leaving the purl at the edge.

In accordance with my invention I have devised a novel purl-controller or device having a prong or projection by the side of which the needle passes in making each stitch, said purl-controller being thereafter moved so that said prong or projection acting on the needle-thread between its point and the work will draw the bight of the under thread to the edge of the buttonhole, thereby leaving the purl at the edge. I have combined with said purl-controller means for moving the same toward the edge being overstitched after making the depth-stitch and while the needle is out of the work, the device being shown as movable in a substantially horizontal plane close to the exposed face of the work, the device entering, preferably, the throat extended between the work and the needle after it has risen from making the depth-stitch, and in some classes of work good results are obtained by letting the device have enough movement to also act upon the thread between the needle and work after the needle rises from the edge stitch, the de-

vice as herein shown having a movement from the point where the depth-stitch is made to a point between the edges being overstitched.

My device, which I shall hereinafter designate as a "purl-controller," may be embodied in connection with any of the well-known buttonhole-stitching machines either of the class represented in my former patent or in the Wheeler & Wilson form of machine, so that the particular stitch-forming mechanism is in a measure non-essential so long as the complementary stitch-forming device co-acting with the needle-thread passes the second thread entirely through the loop of needle-thread.

Figure 1, in front elevation, shows a sewing machine of usual construction with my improvements added. Fig. 2 is a rear side elevation of the same. Fig. 3 is a left-hand end elevation showing a form of buttonhole-cutter that may be used, and Figs. 4, 5, and 6 are enlarged sectional details of part of the machine with the purl-controller in different positions.

Referring to the drawings, A represents the bed or work-support; A', the usual overhanging arm; A², the head in which moves the needle-bar A³, having the usual eye-pointed needle A⁴; B, the usual bar provided at its lower end with a buttonhole-cutter B', while B² indicates conventionally the lower-thread mechanism containing any usual shuttle or loop-taker to coact with the thread of the eye-pointed needle in making the stitch.

As stated, the construction of the parts so far referred to, as well as the tension mechanism, are and may be as usual and substantially as represented in my former patent illustrating a type of Wheeler & Wilson machine, and hence it is not herein necessary to illustrate in detail the complementary stitch-forming means coacting with the needle.

I have herein illustrated the take-up B³ as a continuously-rotating disk having a stud B⁴ and carried by the main actuating-shaft B⁵, extended through the overhanging arm and constructed with intermediate means, as usual, to operate the shuttle or loop-taker referred to.

The work-clamp C with but immaterial variations is substantially the same as in the patent referred to.

In the present drawings the overhanging arm is provided with a slotted segment B⁶, carried by a rock-shaft B⁷, that derives its

movement from suitable means. This segment is commonly used in many buttonhole-stitching machines for vibrating the needle-bar; but herein the movement of the segment is timed to the requirements of the purl-controller, as will be hereinafter described.

The purl-controller made the subject especially of this invention and marked 1 is pivoted at 2 on an arm 3, shown as secured to a rock-shaft 4, sustained in suitable bearings supported by the overhanging arm, said rock-shaft having secured to it (see Fig. 2) a bell-crank lever 5, the shorter arm of which, as herein shown, has connected with it a link or device 6, that is jointed at 7 to the work-clamp C. The upwardly-extended arm of the bell-crank lever 5 has jointed to it a rod 8, that in turn is connected with one arm of a bell-crank 9, having its fulcrum at 10, the opposite end of said bell-crank 9 having connected therewith a rod 12, that extends to a treadle by which when the work is to be removed from the work-holder the holder may be opened and at the same time the purl-controller may be lifted, so as not to be interfered with in any particular as the work is being inserted and removed from the clamp. The lower end of the purl-controller is represented as provided with a prong or projection 13 and also with an additional prong or projection 14 to be described. The prong or projection 13 is at the lower end of the controller, alongside of which the needle passes in its stitch-forming movement, and as the controller is moved the said prong or projection acts on the needle-thread extended between the points of the risen needle and the work and draws a bight of under thread to the edge of the buttonhole, thus leaving a bight of the under thread exposed at the face of the material in which the buttonhole is made, said bight extending to the edge of the buttonhole, thereby leaving the purl at the edge. The two prongs or projections 13 14, as shown, are separated, so as to leave a space or throat, and these prongs are so held when the needle is descending that the needle passes by whichever prong is active. The purl-controller must be automatically moved intermittently at right angles to the edge of the buttonhole being stitched, and the extent of movement of the acting end of the purl-controller must be capable of being varied according to variations in the depth of the stitch or the distance between the edge and the stitch back of the edge. To provide for this, I have connected with the upper end of the purl-controller a rod 15, having a stud 16, that enters the grooved way of the segment B⁶, and to the outer end of this rod I have jointed a connecting-link 17, that in turn is jointed to a regulating-lever 18, having its fulcrum at 19, said lever being shown as extended backwardly and slotted to receive a stud 20 of a link 21, jointed to a lever 22, piv-

oted at 23 and moved by a groove in a revolving cam 23^x. The lever 18 is common to Patent No. 749,437 and is moved automatically by the cam. The lever occupies a position to place the stud 16 in the upper end of the segment B⁶ above the longitudinal center of the rock-shaft B⁷, carrying the same when one side of the buttonhole is being stitched, and is moved to occupy a position in the lower end of said segment when the other side is being stitched.

It will be well to state that the work-clamp C herein shown is of the class that is moved intermittently both in the direction of the length of the buttonhole and shogged laterally to provide for the overedge-stitch at both sides of the buttonhole, the clamp having a longer shogging movement when the ends of the buttonhole are reached to provide for barring.

Referring now to the enlarged detail Fig. 4 it will be seen that the work W is held between the two members of the work-clamp and also that the upper member of the clamp has a sort of floating throat *w*, common to buttonhole-machines, that bears on the upper side of the material to retain the same in stitching position. In this Fig. 4 it will be seen that the needle has descended below the lower end of the controller and penetrated the work for the depth-stitch. In this condition it will be assumed that the loop of needle-thread will be entered by the complementary means coacting therewith, and thereafter the needle-bar and needle will be raised, the work-clamp will be shogged to the left from the position Fig. 4 into the position Fig. 5. As the take-up rises the loop of needle-thread below the work will be drawn up through the work and will take with it the shuttle-thread, and thereafter the movement of the purl-controller will be made, as described, to the right, as in Fig. 5, as the take-up is completing its final movement in setting the stitch, at which time the needle-thread will be engaged by the prong 13 and be drawn to one side, drawing the loop of the shuttle-thread to what is to be the edge of the buttonhole, (see Fig. 4,) leaving the needle-thread substantially straight at the edge and locking the loops formed in the shuttle-thread. Now for the next stitch the purl-controller, Fig. 5, will be moved back to the left to place the prong or projection 13 at the left-hand edge of the buttonhole-slit, (see Fig. 6,) and the needle will then descend for making what is called the "edge stitch," and the loop of needle-thread will be again entered by the second thread, and the needle-bar and needle will rise, taking with it through the action of the take-up the under thread, drawing the same substantially to the upper edge of the slit while the needle is in its elevated position, the take-up aiding in properly concatenating the stitches at this point. There-

after the clamp will be shogged again to the right into the position shown in Fig. 4. The second side of the buttonhole will be stitched in the manner provided for, the clamp occupying the proper positions, as is well understood. I have spoken of stitching over the edge. This would be strictly true if the buttonhole-slit were first cut; but it is immaterial in my invention whether or not the slit be cut before the stitching or after the stitching.

In the machine herein described the work-clamp has imparted to it the lateral movements to provide for making the depth-stitch of the required length; but it will be understood that either the needle-bar or clamp may be moved for this purpose, both being common in buttonhole-stitching machines, and either method may be used without departing from my invention. The prong 13 acts at every alternate thrust of the needle on the needle-thread used in stitching one side or half of the buttonhole, while the prong 14 acts in like manner on the needle-thread used along the other side or half of the buttonhole, the two prongs or projections rendering it unnecessary to partially revolve the purl-controller when the stitching is being carried from one to the other side or edge of the buttonhole, as would be necessary if the purl-controller had but one finger.

Believing myself the first to employ with the needle-thread a purl-controller of the class described adapted to act upon the needle-thread when the needle is nearly at its highest point and as the take-up is acting to draw up the loop of needle-thread to thereby cause the controller acting through the needle-thread to draw the bights of the shuttle-thread to what is to be the edge of the buttonhole, I do not desire to limit my invention to the particular construction shown for said controller, but intend to include within the scope of my invention any device capable of being moved and operating, as herein described, with relation to the purl-controller and whether provided with one or two prongs or projections.

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

1. In a sewing-machine having an eye-pointed needle, complementary stitch-forming means, a take-up and a work-holder, a purl-controller, and means for actuating the same to engage the needle-thread between the point of the needle and the work, and move the same to either side of the needle to thereby deflect the bights of under thread to the edge of the buttonhole thereby leaving the purl at the edge.

2. In a sewing-machine having an eye-pointed needle, complementary stitch-forming

means, a take-up, a work-holder, a purl-controller having two prongs with a space between through which the needle passes in making each stitch, said prongs acting on the needle-thread to draw the bights of the under thread to the edge of the buttonhole thereby leaving the purl at the edge.

3. In a sewing-machine having an eye-pointed needle, complementary stitch-forming means, a take-up, a work-holder, a pivotally-mounted purl-controller or deflector in addition to the take-up, the acting portion of such controller or deflector occupying a position near the surface of the work, and means to move the same at an angle to the length of the buttonhole to engage the needle-thread between the needle and work and deflect the bight of the under thread to the edge of the buttonhole leaving the purl at the edge.

4. In a sewing-machine having an eye-pointed needle, complementary stitch-forming means, a take-up, a work-holder, a purl-controller, means to move the same at right angles to the length of the buttonhole, and means to raise said controller away from the work to remove or replace the work.

5. In a sewing-machine having an eye-pointed needle, complementary stitch-forming means, a take-up, a work-holder, a purl-controller, means to move the same at right angles to the length of the buttonhole, and means to adjust the throw of said controller to the width of the overedge stitches.

6. In a sewing-machine having an eye-pointed needle, complementary stitch-forming means, a take-up, a work-holder, a purl-controller in addition to the take-up and having a prong or projection, means for moving said controller to act upon the needle-thread between the point of the needle and the work as described, and means to vary automatically the position of the controller with relation to one or the other side of the buttonhole-slit being overstitched to deflect the bight of the under thread to the edge of the buttonhole.

7. In a sewing-machine, having an eye-pointed needle, complementary stitch-forming means; a take-up, a work-holder, a purl-controller having needle-thread-engaging means, by the side of which the needle passes in making each stitch, and means to move said purl-controller to one or the other side of the needle that it may act on the needle-thread to draw the bight of the under thread to either edge of the buttonhole, thereby leaving the purl at the edge.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ED. GOODYEAR.

Witnesses:

GEO. W. GREGORY,
NORA H. COFFIN.