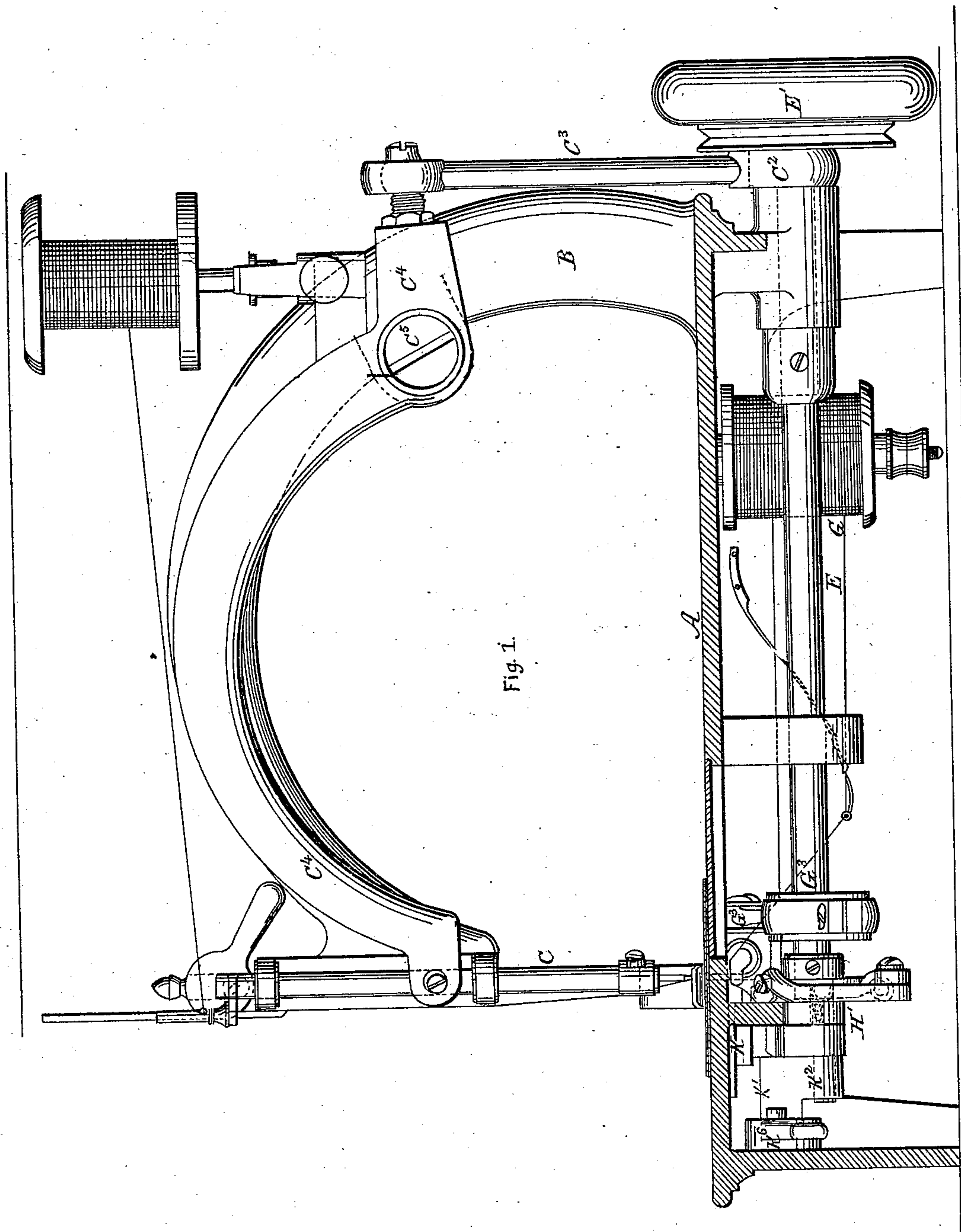


J. HAYES.  
Sewing Machine

No. 55,029.

Patented May 22, 1866.



Witnesses:

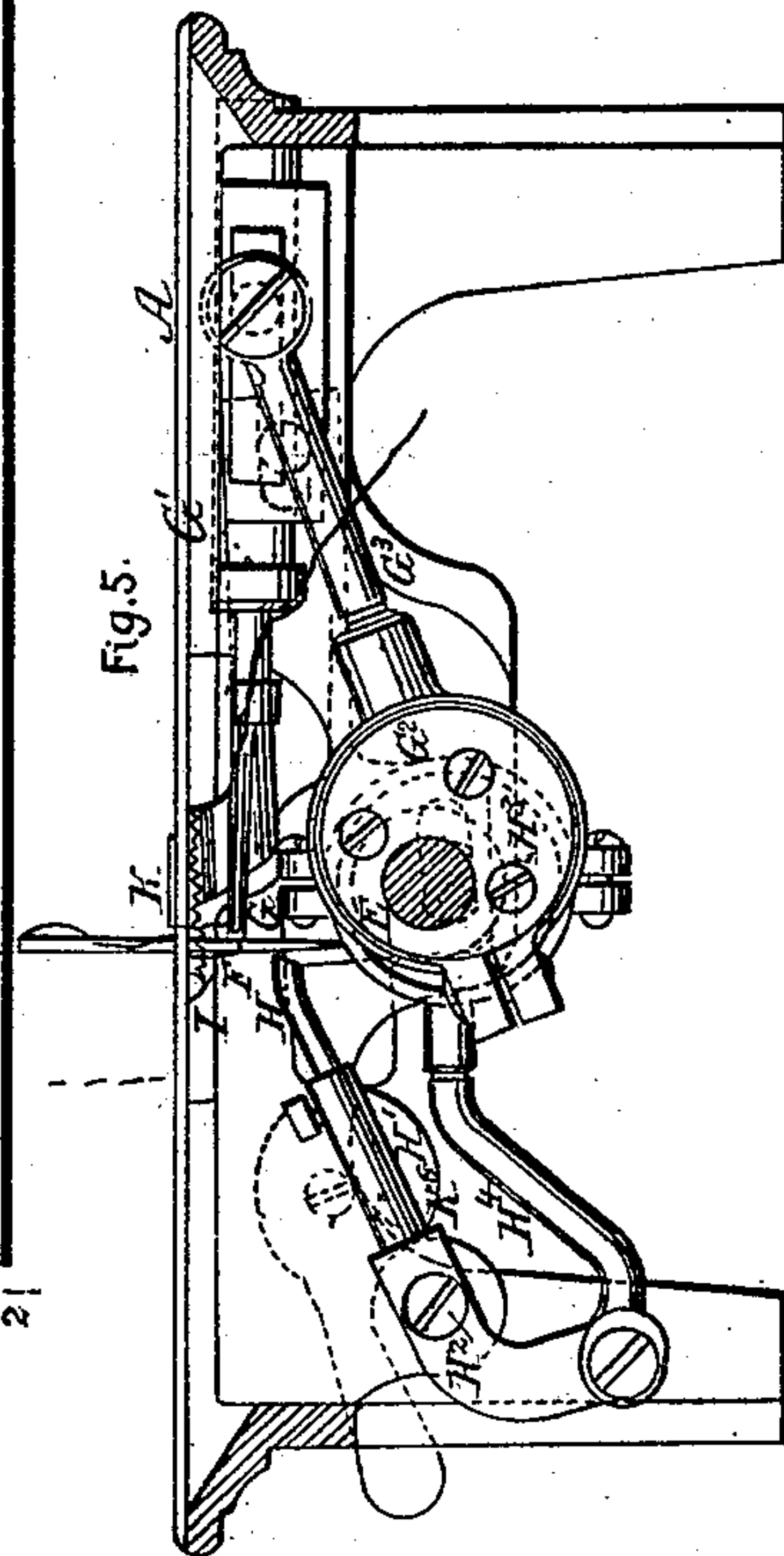
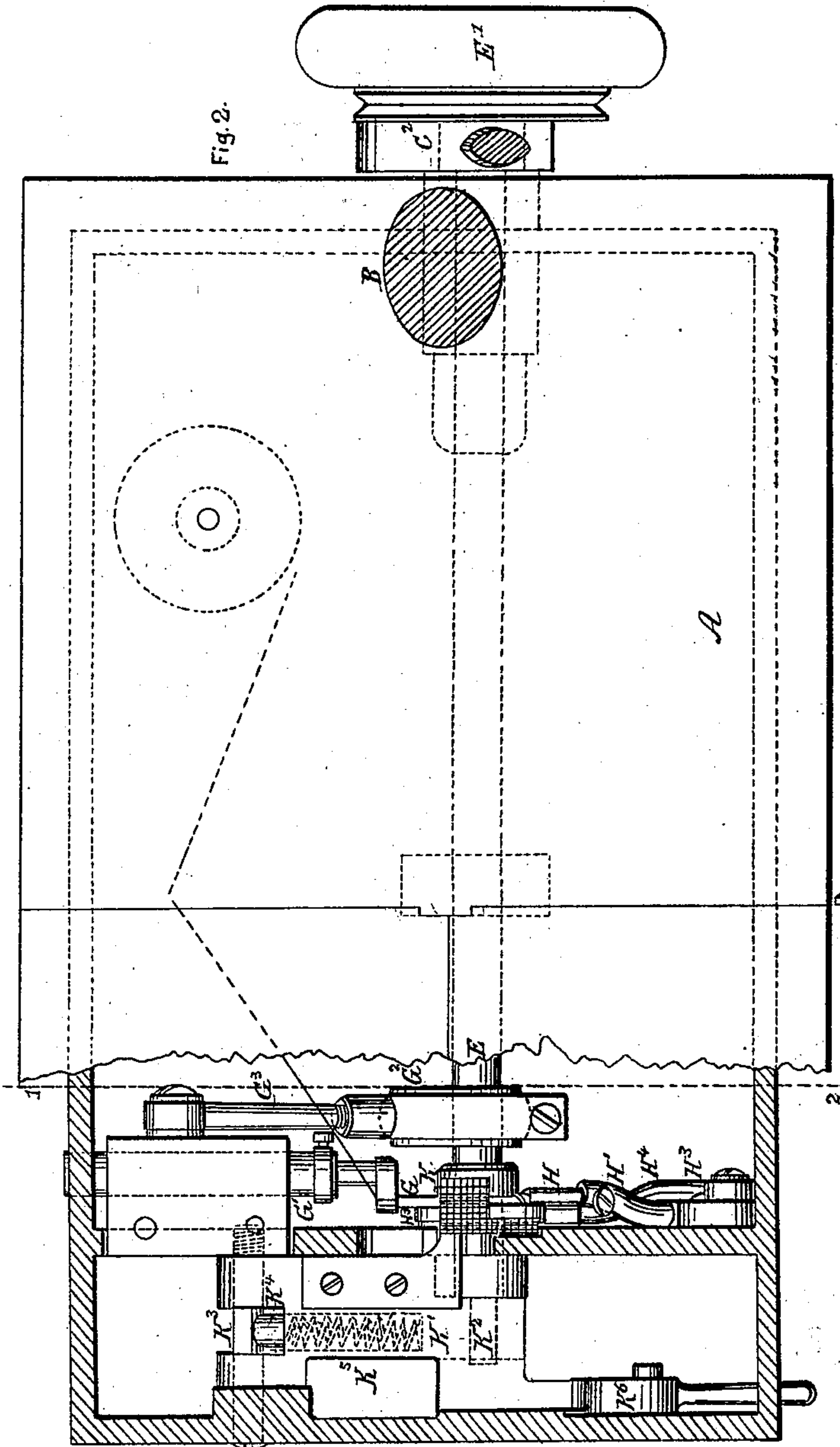
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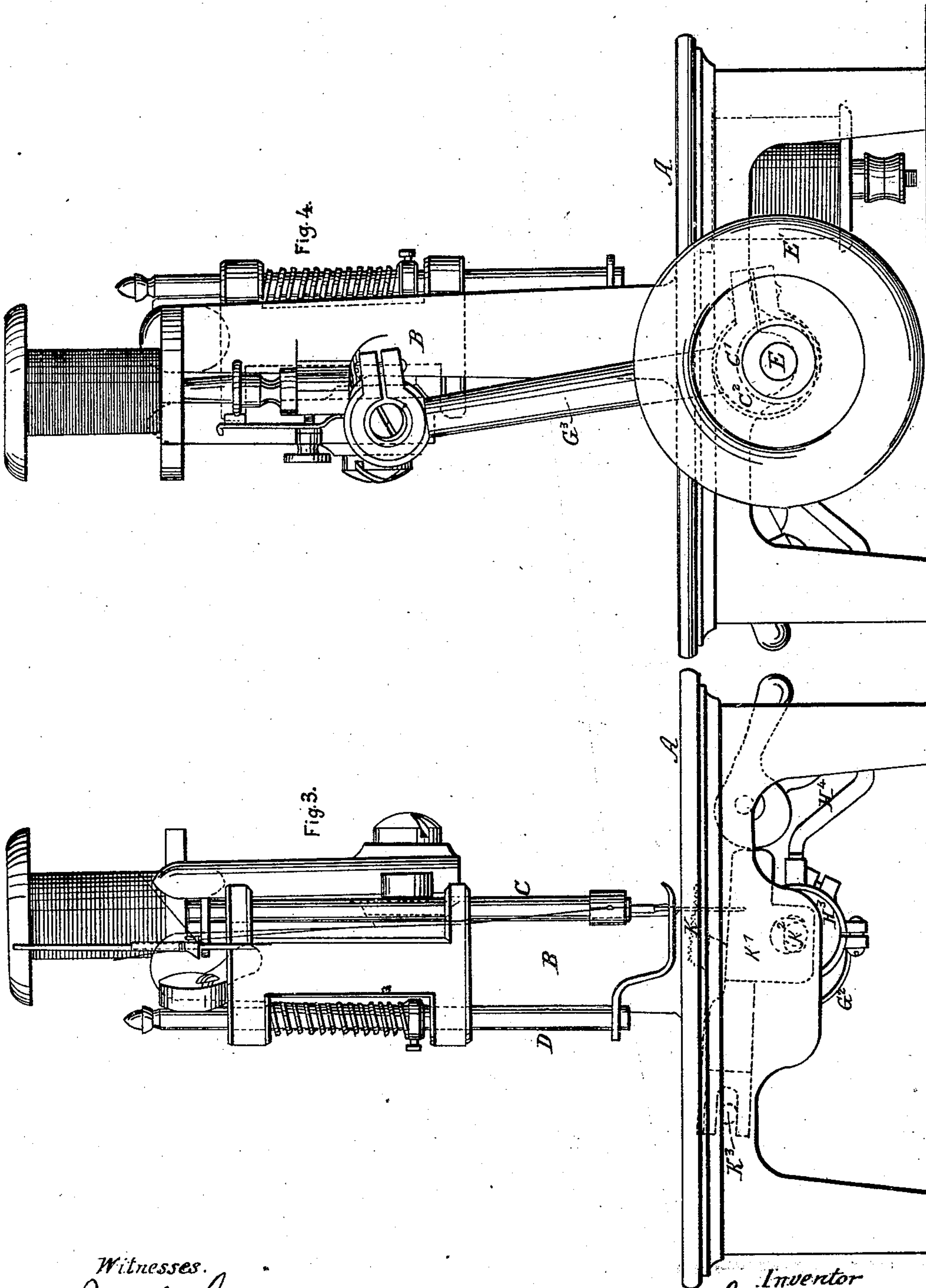
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# UNITED STATES PATENT OFFICE.

JAMES HAYES, OF BOW LANE, LONDON, ENGLAND.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 55,029, dated May 22, 1866.

*To all whom it may concern:*

Be it known that I, JAMES HAYES, of Bow Lane, in the city of London, machinist, have invented Improvements in Sewing-Machines; and I do hereby declare that the following is a full and exact description of my said invention.

The object of this invention is to simplify the construction of two-threaded chain-stitch sewing machines, and to enable them to work with great rapidity and certainty, the liability of missing the loop being removed.

In the accompanying drawings, Figure 1 shows the improved machine in side elevation, a portion of the stand being broken away to show the parts beneath the table. Fig. 2 is a sectional plan view, a portion of the table being broken away to show some of the working parts. Fig. 3 is a front elevation, and Fig. 4 a back elevation, of the machine, and Fig. 5 is a cross-section taken in the line 1 2 of Fig. 2.

A is the cast-iron table and frame. From the face of this table stands up the curved bracket-arm B, which carries at its forward end the guides for the needle-bar C and presser-bar D, as usual.

Below the table, and working in suitable bearings, is the longitudinal driving-shaft E. At its outer end this shaft is fitted with a driving-pulley and fly-wheel, E', and an eccentric, C', which is shown by dots at Fig. 4. The eccentric C' is embraced by the strap C<sup>2</sup> of the connecting-rod C<sup>3</sup>, which is coupled by a ball-and-socket joint to a rock-lever, C<sup>4</sup>, pivoted at C<sup>5</sup> to the bracket-arm B. At its forward end this rock-lever C<sup>4</sup> is jointed to the needle-bar C, and thus it imparts, through the action of the eccentric C', the requisite up-and-down motion to the vertical needle.

The loop formed by the thread carried down by the vertical needle below the cloth to be sewed, and shown at F, Fig. 5, is taken up by an eye-pointed instrument termed the "looper," (marked G.) This looper is provided with a second eye, through which the thread from the bobbin G<sup>x</sup> passes, and thence to the eye at the point. Between these eyes is a groove to receive the looper-thread and keep it free of the vertical needle-thread. The looper is carried by the looper-bar G', which slides in a fixed guide below the table at right angles to the driving-shaft. The looper receives its motion from an eccentric, G<sup>2</sup>, on the shaft E,

which eccentric is surrounded by a metal strap connected by a coupling-rod, G<sup>3</sup>, with the looper-bar.

The eccentrics C' and G<sup>2</sup> are so timed that the needle is first caused to descend and pierce the cloth and carry down a loop of the thread which it has drawn from its bobbin, the tension of the thread being regulated in any well-known or approved way. As the needle rises and the loop begins to open the looper enters the loop of the needle-thread and carries the thread which it has taken from its bobbin. The needle then continues to rise, and in doing so it leaves its loop upon the stem of the looper.

The next operation is to secure the loop of the looper-thread. This is done by the hooked instrument H, which fits into a socket in one end of a cranked rock-lever, H', having its fulcrum at H<sup>2</sup>. This rock-lever receives motion from an eccentric, H<sup>3</sup>, on the shaft E, which eccentric is surrounded by a metal strap attached to a rod, H<sup>4</sup>, which connects it to the rock-lever H'. When the looper G, having received the loop of the vertical needle-thread, has commenced its return motion, the hooked instrument H will advance and catch up the loop of the looper-thread. It will then rise and lay the loop over a conical stud, I, fixed on the under face of the table, and near where the table is pierced, to allow the needle to descend after piercing the work.

The hooked instrument will hold the loop on the stud until the needle in its next descent has passed through the loop. The instrument H will then retire, leaving the loop of the looper on the stem of the needle. In this way the chain-stitch with two threads is certainly and rapidly formed, the needle-thread holding the loop formed by the looper, and the looper-thread holding the loop formed by the needle.

For feeding the cloth past the needle, so as to produce a succession of stitches, the feed-plate K is affixed to a carrier, K', which is operated by an eccentric-pin, K<sup>2</sup>, on the inner end of the shaft E. This eccentric-pin works in a slot cut in the carrier K' near its front end, and serves both to support and operate the carrier. The rear end of this carrier is forked to allow of its playing upon a fulcrum-pin, K<sup>3</sup>. Bearing against the side of this fulcrum-pin (see Fig. 2) is a loose plug, K<sup>4</sup>, fitted into the carrier and having behind it a coiled



spring,  $K^5$ , which keeps it in contact with the fulcrum-pin, and thus gives the carrier a tendency to recede from the pin. This tendency is, however, checked by an adjustable cam-shaped stop,  $K^6$ , which is operated by a handle with which it is provided. By means of this cam the carrier is set up to any required degree, so that the eccentric-pin  $K^2$  will, in rotating, press against the end of the slot in which it works, and thus drive forward the carrier, and with it the feed-plate, a distance equal to the length of stitch required. The rotation of the pin  $K^2$ , by reason of its working in an elongated slot of a width only about equal to the diameter of the pin, (see Fig. 5, where it is shown in dots,) will also give the rise and fall to the feed-plate, thus throwing it up into contact with the work (which at that time is pressed down by the presser-foot, as is well understood) to give it the traverse motion and lowering the feed-plate when it is to make its back motion.

From the above description it will be under-

stood that when the machine is once properly timed it will continue to act efficiently and almost noiselessly, all the motions being derived from eccentrics on the main shaft.

Having now set forth the nature of my invention and explained the manner of carrying it into effect, I wish it to be understood that I claim—

The stud I, in combination with the hooked instrument H, for opening and holding the loop of the looper-thread, in the manner herein represented and described.

In witness whereof I, the said JAMES HAYES, have hereunto set my hand and seal the 17th day of October, in the year of our Lord 1865.

JAMES HAYES. [L. S.]

Witnesses:

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