

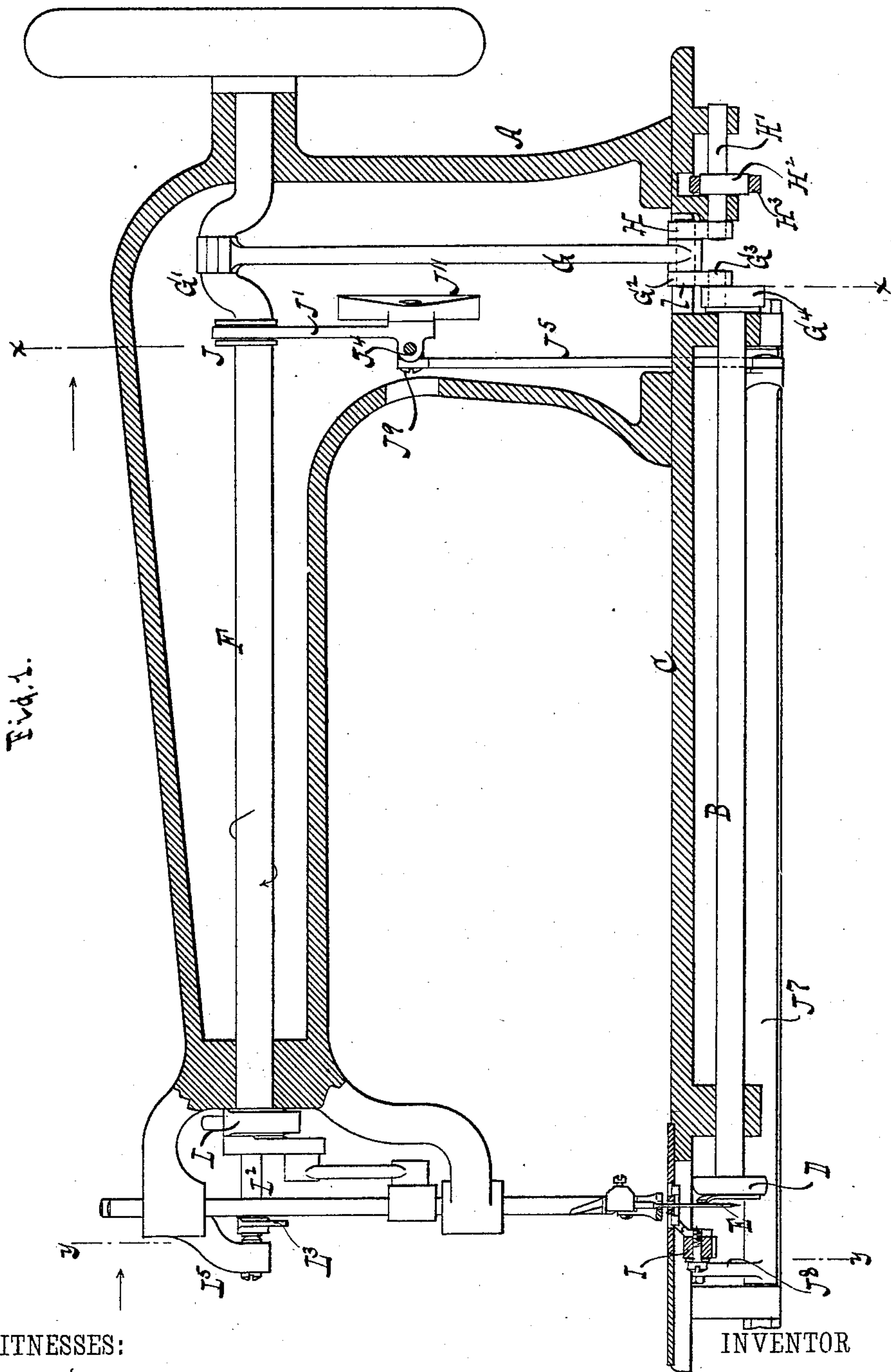
(Model.)

4 Sheets—Sheet 1.

A. BOECHER.  
SEWING MACHINE.

No. 300,199.

Patented June 10, 1884.



WITNESSES:

*Otto Hufeland*  
*William Miller*

INVENTOR

*Adam Boecher*  
BY *Van Santvoord & Hauff*  
his ATTORNEYS

(Model.)

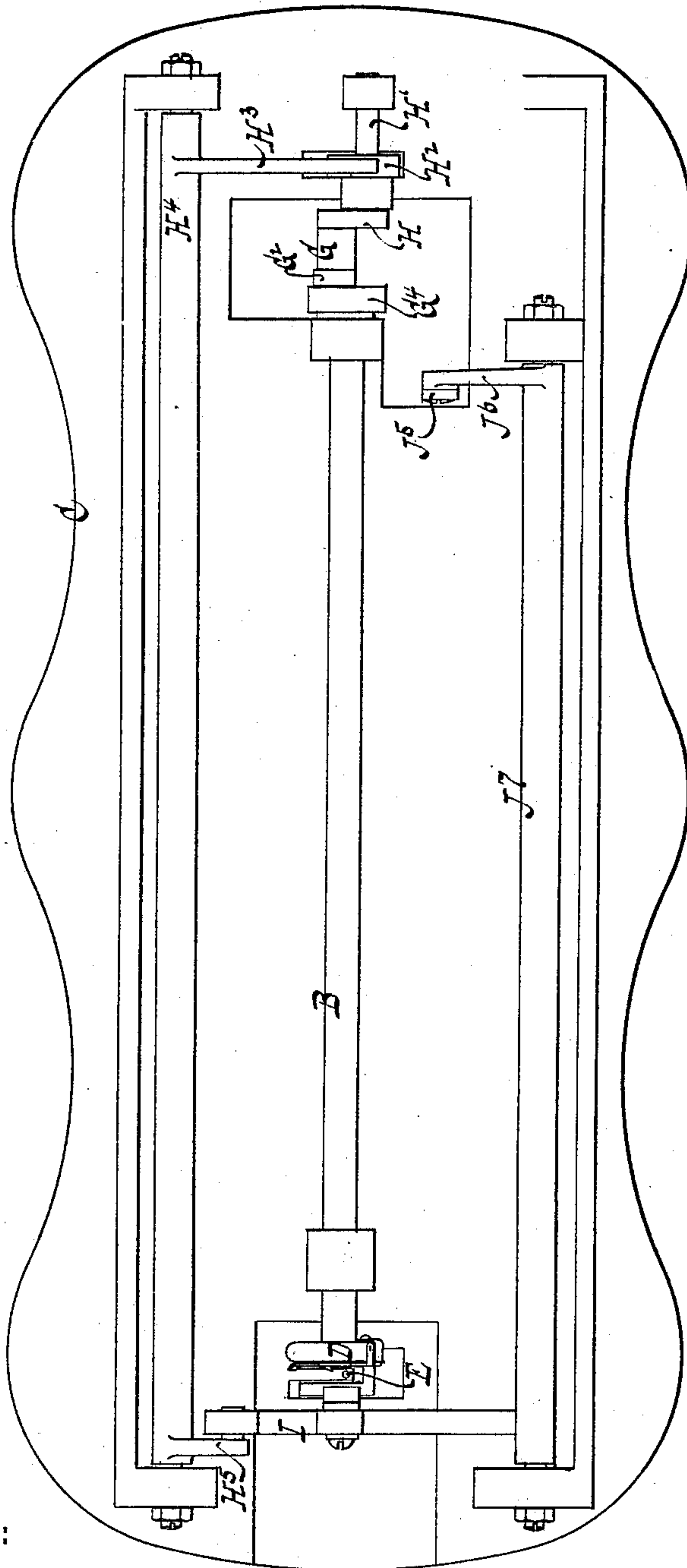
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Fig. 2.



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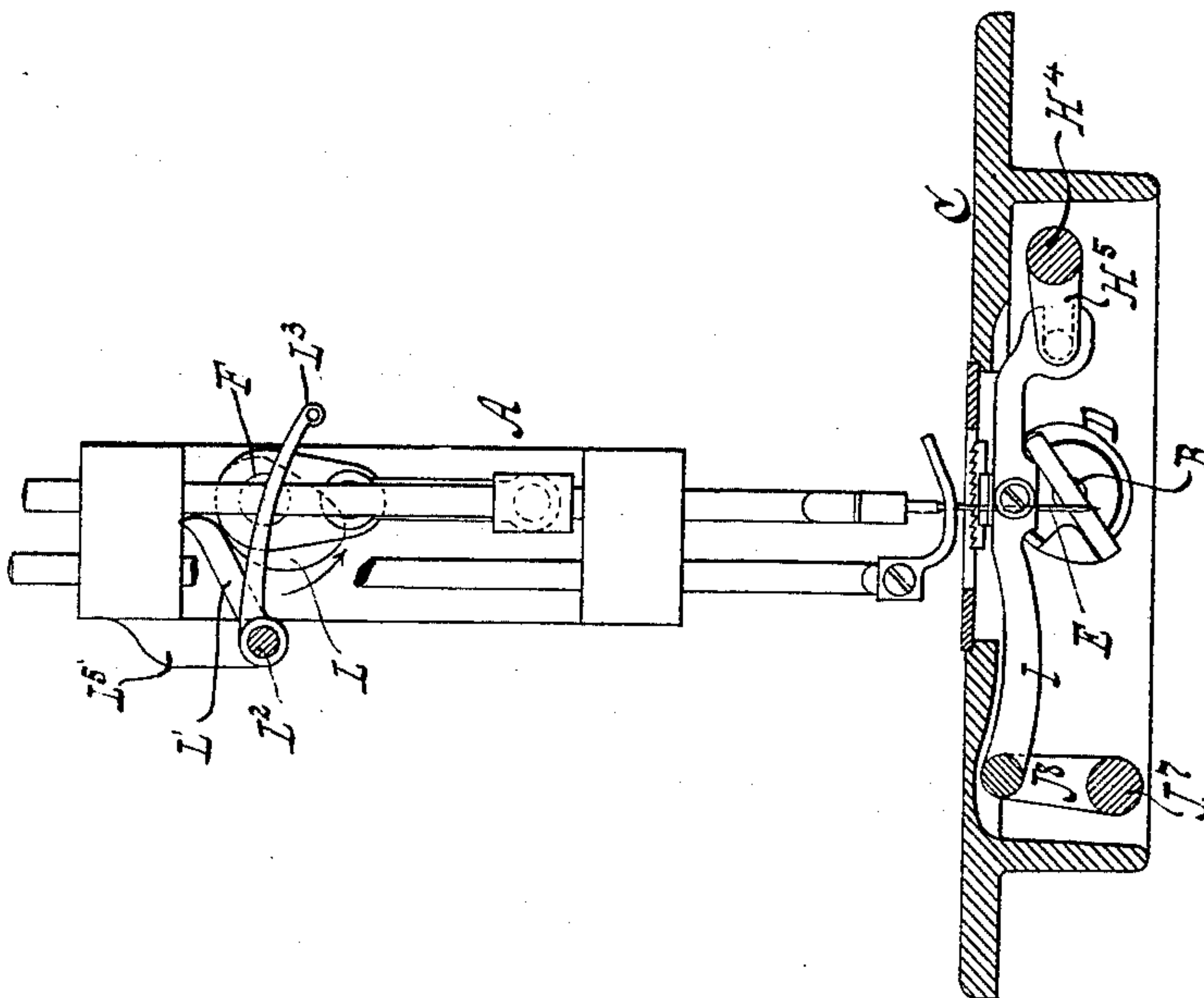
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A. BOECHER.  
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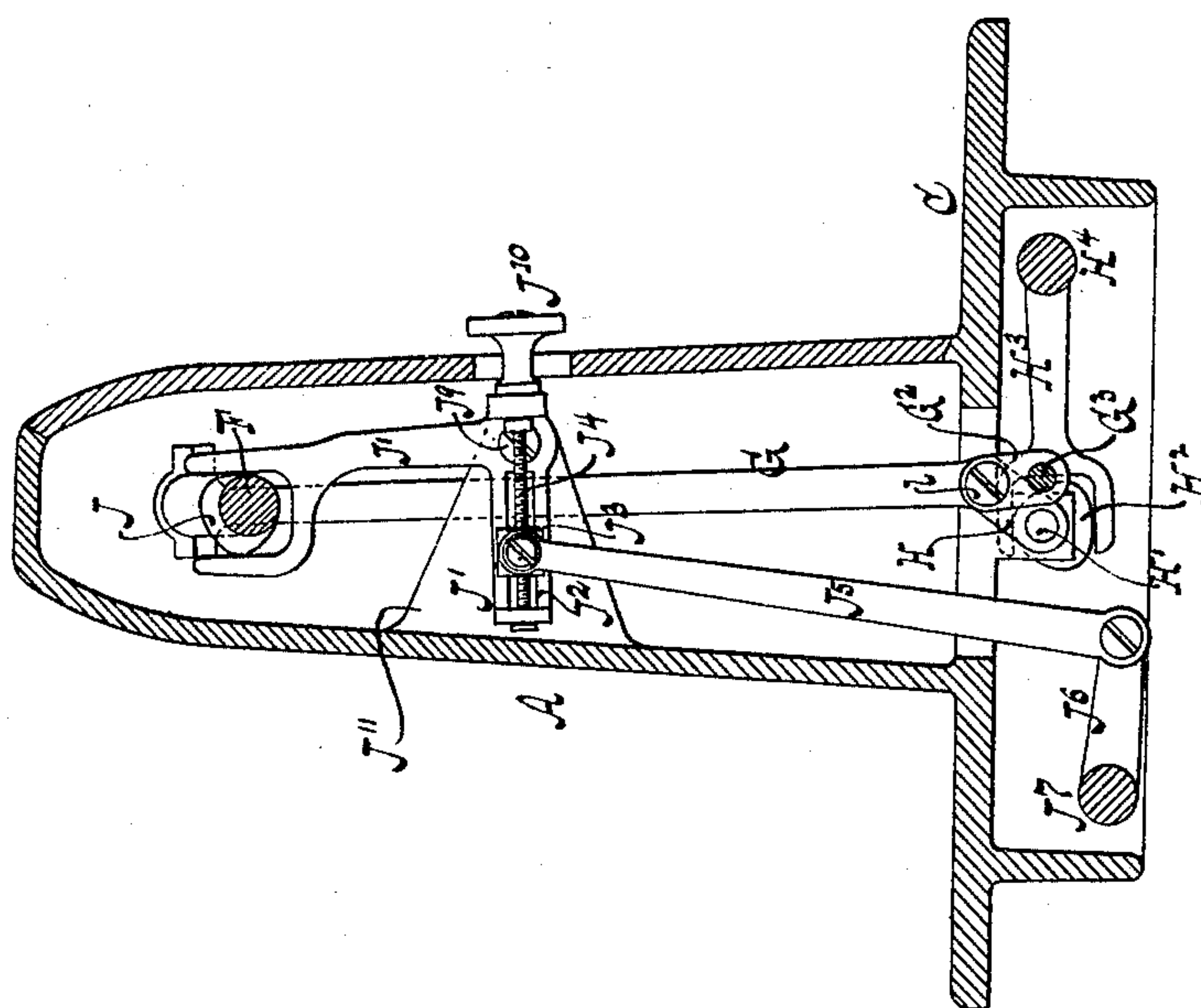
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Fig. 4.



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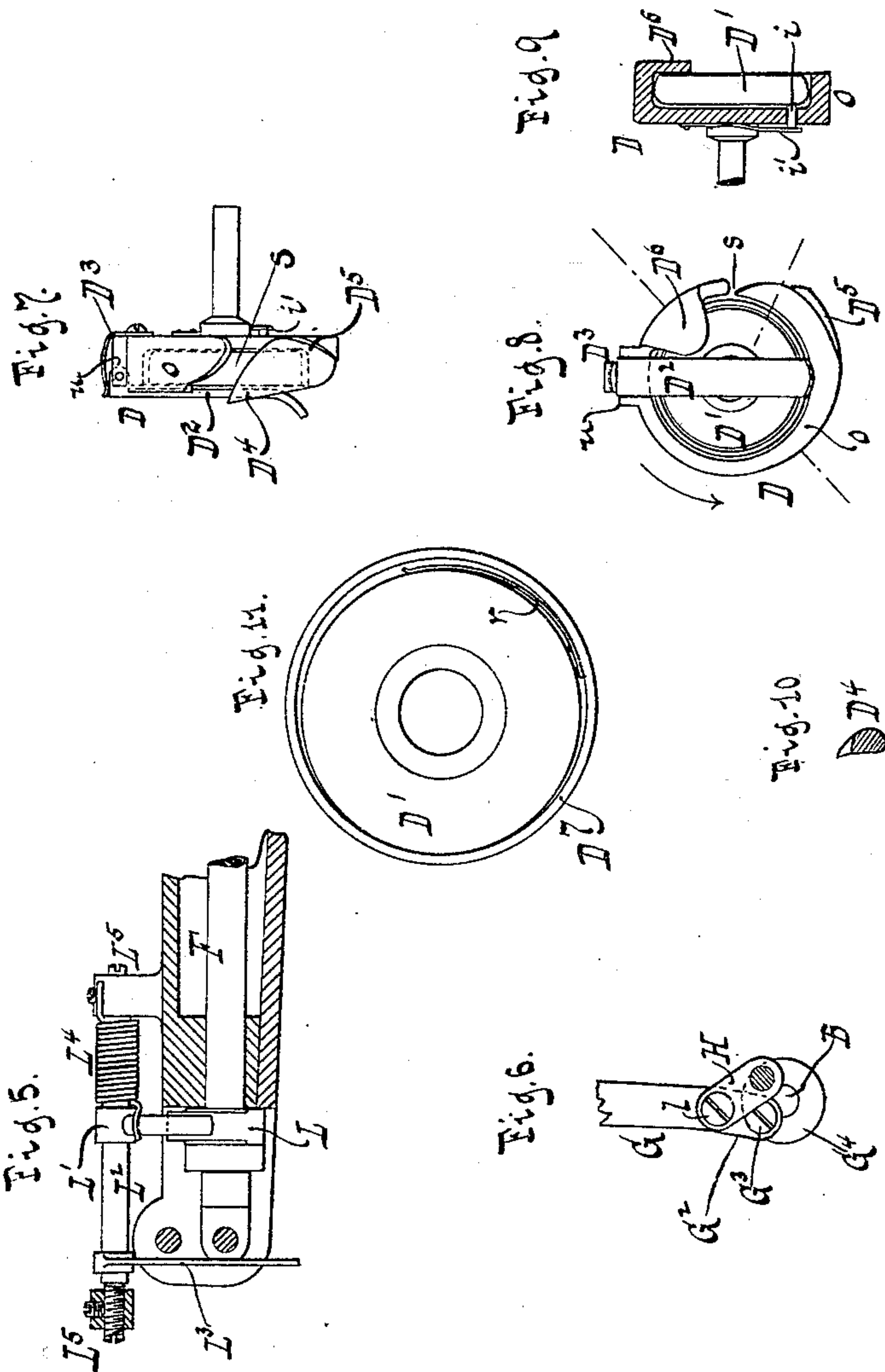
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4 Sheets—Sheet 4.

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# UNITED STATES PATENT OFFICE.

ADAM BOECHER, OF NEW YORK, N. Y.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 300,199, dated June 10, 1884.

Application filed July 26, 1883. (Model.)

*To all whom it may concern:*

Be it known that I, ADAM BOECHER, 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.

My invention relates to that class of sewing-machines comprising a rotary reciprocating hook which operates to cast the loop of needle-thread about a bobbin within it; and my invention consists in the mechanical movement hereinafter described for operating from the needle-bar-operating shaft the hook and the feed mechanism.

This invention is illustrated in the accompanying drawings, in which Figure 1 represents a vertical longitudinal section. Fig. 2 is an inverted plan view. Fig. 3 is a vertical cross-section on the line *x x*, Fig. 1. Fig. 4 is a similar section on the line *y y*, Fig. 1. Figs. 5, 6, 7, 8, 9, 10, and 11 are detail views of parts.

Similar letters indicate similar parts.

The letter A designates the arm of a sewing-machine, rising from the bed-plate C in the usual manner; and B indicates a shaft carrying the hook D. The body of this hook is dish-shaped, it being substantially circular, and in it is inclosed a bobbin, D', about which is cast the loop of needle-thread in the operation of the hook, as presently explained. This bobbin D' is held in place by means of a hinged bar, D<sup>2</sup>, which extends across the plane open face of the hook-body diametrically, or nearly so, and is subjected to the action of a spring, D<sup>3</sup>, whereby it is held in a locking position, it being, moreover, curved outward or away from the body at the free end. At the point where the locking-bar D<sup>2</sup> is hinged to the hook-body, the latter is provided with a lug, *u*, to form an extended support for the bar. The hook-point D<sup>4</sup> is formed on one edge of a break or division, *s*, in the rim *o* of the body, and it projects laterally in a curved line toward and slightly beyond the plane of the open face of the body, while it is rounded in cross-section from the extremity to the junction thereof with the body. At a point inward from its extremity the hook-point D<sup>4</sup> is provided on the back with a heel or abutment, D<sup>5</sup>, which vanishes into the rim *o* of the

body, and opposite to the hook-point relatively to the break *s* such rim is provided with a lip, D<sup>6</sup>, projecting inwardly. Through the flat base of the hook-body D projects inwardly a bit, *i*, of round shape, which is at a point approximately opposite to the lip D<sup>6</sup>, and is attached to a supporting-spring, *i'*, whereby it is held slightly within or beyond the inner surface of the base under normal conditions. The hook D is arranged vertically next to the vertical plane of the needle E in an inward direction on the machine, as shown in Fig. 1, and in operation the hook-point D<sup>4</sup> advances to catch the loop of needle-thread in the descent of the needle, causing the loop to encompass the bobbin D' crosswise, and when the hook has moved a sufficient distance to allow the loop to clear the hook-point the motion of the hook is reversed and the needle ascends, while the loop is drawn off from the bobbin by the take-up acting on the needle-thread. As the loop of needle-thread passes over the bobbin D', it goes under the free end of the bobbin-holding bar D<sup>2</sup>, and, due to the curvature of such end of this bar, it is not liable to interfere with the movement of the loop.

By the arrangement of the hook-point D<sup>4</sup> to project beyond the open face of the hook-body, the latter may be set back from the needle a sufficient distance to leave a clear path for the needle, so that it is not liable to strike the hook. When in the advance of the hook-point D<sup>4</sup> the loop is received thereon, the outer portion of the loop lies against the heel D<sup>5</sup>, and is thereby held in the proper position to take its place on the bobbin D', while owing to the direction of the hook-point, as well as its rounded shape, it releases the loop at the required period with the utmost facility. The lip D<sup>6</sup> is located approximately at the point where the loop leaves or passes off from the bobbin D', and by its means the bobbin is prevented from being thrown out of the hook-body by the drawing action of the loop, it thus being auxiliary to the bobbin-holding bar. By the bit *i* the bobbin D' is held off or away from the base of the hook-body at the point where the loop passes onto the bobbin, and hence such bit tends to produce a clearing for the inner or under portion of the loop, thereby facilitating the initial engagement of the loop with the bobbin, while owing to its



shape, as well as its yielding condition, due to the spring  $i'$ , the bit is not liable to hinder the progress of the loop, the latter passing freely over it. The bobbin  $D'$  lies in a case,  $D'$ , which, like the hook-body, is dish-shaped, and which is provided on the inner surface of its rim with a tension-spring,  $r$ , acting on the edge or periphery of the bobbin, instead of on the thread, said rim of the case being also perforated for the outward passage of the thread. In the example shown the bobbin-holding bar  $D^2$  is hinged to swing in a plane at right angles to the open face of the hook-body; but such bar can also be hinged to swing in the plane of said face of the body, if desirable.

The hook-shaft  $B$  receives a rotary reciprocating motion for operating the hook from the needle-bar-operating shaft  $F$  by means of a pitman,  $G$ , one end of which connects with a crank,  $G'$ , on such operating-shaft, while its other or lower end connects by a link,  $G^2$ , with the pin  $G^3$  of a crank,  $G^4$ , on the hook-shaft. The function of the link  $G^2$  is to increase the motion of the crank  $G^4$ , and with it the hook-shaft, relatively to the motion of the pitman, and for this purpose the pitman is guided at the lower end by a swinging arm,  $H$ , to which it is connected by a pivot,  $l$ , serving also to connect the pitman to the link. The guide-arm  $H$  is fixed to a cam-shaft,  $H'$ , which thus shares the motion of the arm, and the cam  $H^2$  of this shaft acts on an arm,  $H^3$ , of a rock-shaft,  $H^4$ , which carries also a second arm,  $H^5$ , engaging with the feed-dog  $I$  in such a manner that a rising and falling motion is imparted to the feed-dog from the guide-arm  $H$  through the cam-shaft and rock-shaft, causing such arm to perform two functions. A forward and backward motion is imparted to the feed-dog  $I$ , to complete its action, from the needle-bar-operating shaft  $F$ , in the following manner:

To the shaft  $F$  is fixed the usual cam,  $J$ , (best seen in Fig. 3,) which acts on one arm of an elbow-lever,  $J'$ , having its other arms provided with a longitudinal slot,  $J^2$ , in which is arranged a nut,  $J^3$ , engaging with a thumb-screw,  $J^4$ , and connecting by a rod,  $J^5$ , with an arm,  $J^6$ , of a rock-shaft,  $J^7$ , this shaft carrying also a second arm,  $J^8$ , which connects with the feed-dog in the proper manner to produce the motion named in the revolution of the needle-bar-operating shaft—namely, through the elbow-lever and rock-shaft. The thumb-screw  $J^4$  turns in suitable lugs on the elbow-lever  $J'$ ; but it is stationary in a longitudinal direction, and by its means the nut  $J^3$  may be adjusted to a greater or less distance from the fulcrum  $J^9$  of the lever, whereby the motion of the connecting-rod  $J^5$  may be varied, to vary the throw of the feed-dog which regulates the length of the stitch. To facilitate access to the thumb-screw, its head  $J^{10}$  is extended outward through a suitable opening in the machine-arm. The fulcrum  $J^9$  of the elbow-lever is formed by a screw, which is driven into a projection,  $J^{11}$ , of the machine-arm through a suitable opening in the arm.

To the needle-bar-operating shaft  $F$  is fixed, near its forward end, which is exterior of the machine-arm, a cam,  $L$ , acting on an arm,  $L'$ , of a shaft,  $L^2$ , which engages the cam, and carries also the take-up lever  $L^3$ , and on which is coiled a return-spring,  $L^4$ , so that in the motion of said operating-shaft the cam acts on the shaft-arm to move the take-up shaft and lever in one direction, while the spring moves said parts in the opposite direction. The take-up shaft  $L^2$  is arranged on one side of the machine-arm parallel to the needle-bar-operating shaft  $F$  in lugs  $L^5$  of the arm. Another advantage of the rounded shape of the hook-point besides that herein described is that in case the needle in its descent should stick the hook it is deflected into the proper plane without injury to the hook or to itself.

Instead of the slot  $J^2$ , any other form of guide on the proper arm of the elbow-lever may be used for engagement with the screw-nut.

I make no claim in this application to any feature of the hook shown, as anything more than the details thereof will form the subject-matter for claims in my application filed November 13, 1883, Serial No. 111,701. Any other patentable features shown in this application, as well as in said application No. 111,701, but not claimed herein, I reserve the right to claim in said application No. 111,701.

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

1. The combination, substantially as hereinbefore described, with the needle-bar-operating shaft and hook-shaft, of the crank  $G^4$  on the hook shaft, the cam-shaft  $H'$  of the feed mechanism, the guide-arm  $H$ , for the pitman fixed to the cam-shaft, the rock-shaft  $H^4$ , provided with the arm  $H^3$ , acted on by the cam on shaft  $H'$ , the arm  $H^5$  of the rock-shaft, the feed-dog  $I$ , the pitman having the upper end connected to the needle-bar-operating shaft and the lower end connected to its said guide-arm, and the link connecting the lower end of the pitman to the crank of the hook-shaft.

2. The combination, substantially as herein described, with the needle-bar-operating shaft and hook-shaft, of the crank  $G^4$  on the hook-shaft, the cam-shaft  $H'$ , the guide-arm  $H$ , for the pitman fixed to the cam-shaft, the pitman having the upper end connected to the needle-bar-operating shaft and the lower end connected to its said guide-arm, the link connecting the lower end of the pitman to the crank of the hook-shaft, the rock-shafts  $H^4$   $J^7$ , the one connected to the needle-bar-operating shaft and the other to the cam-shaft, and the feed-dog  $I$ , connected to both rock-shafts.

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

ADAM BOECHER. [L. s.]

Witnesses:

CHAS. WAHLERS,  
WILLIAM MILLER.