

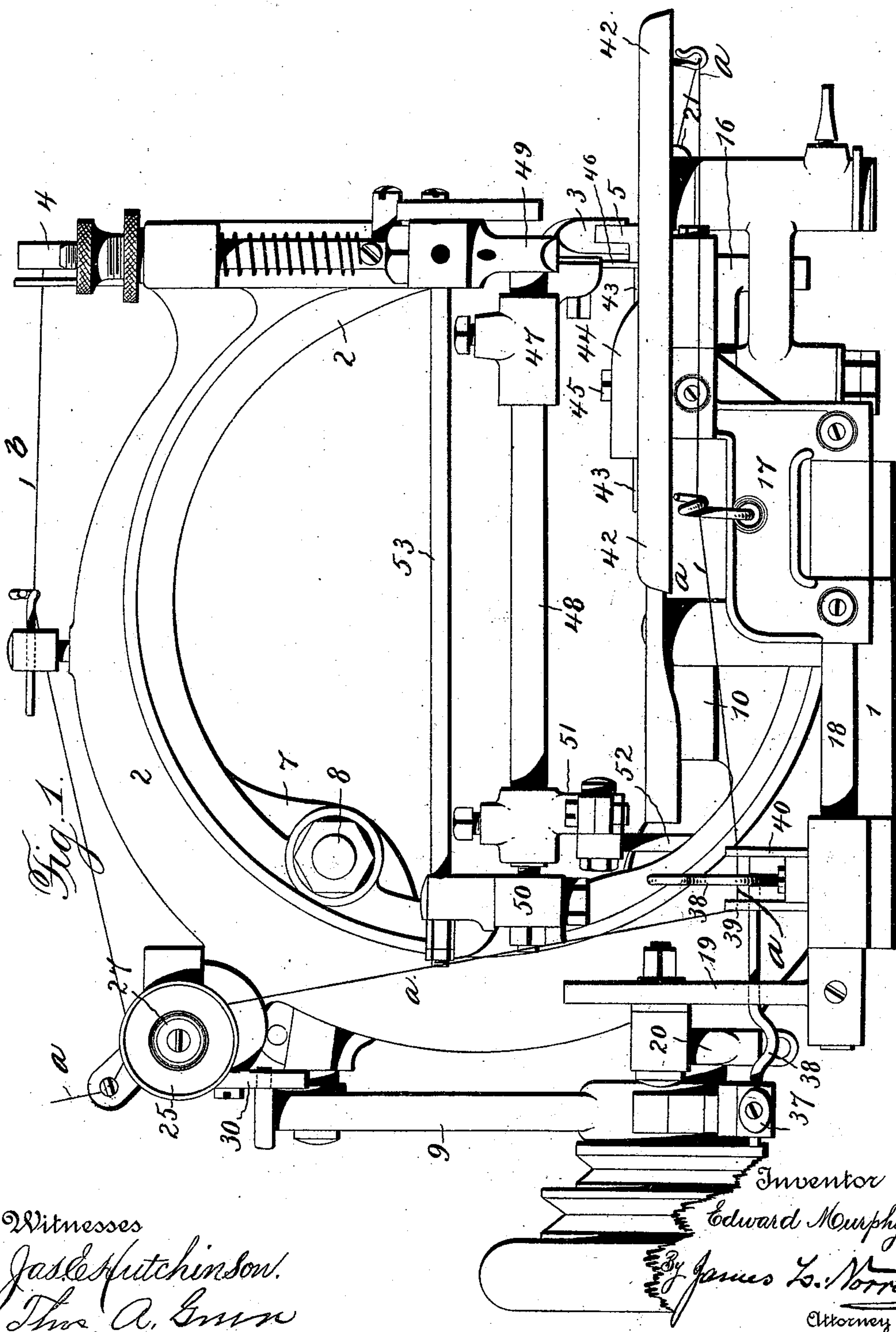
(No Model.)

3 Sheets—Sheet 1.

E. MURPHY.  
SEWING MACHINE.

No. 554,626.

Patented Feb. 11, 1896.



Witnesses  
Jas. Hutchinson.  
Thos. A. Green

Inventor  
Edward Murphy  
By James L. Norris  
Attorney

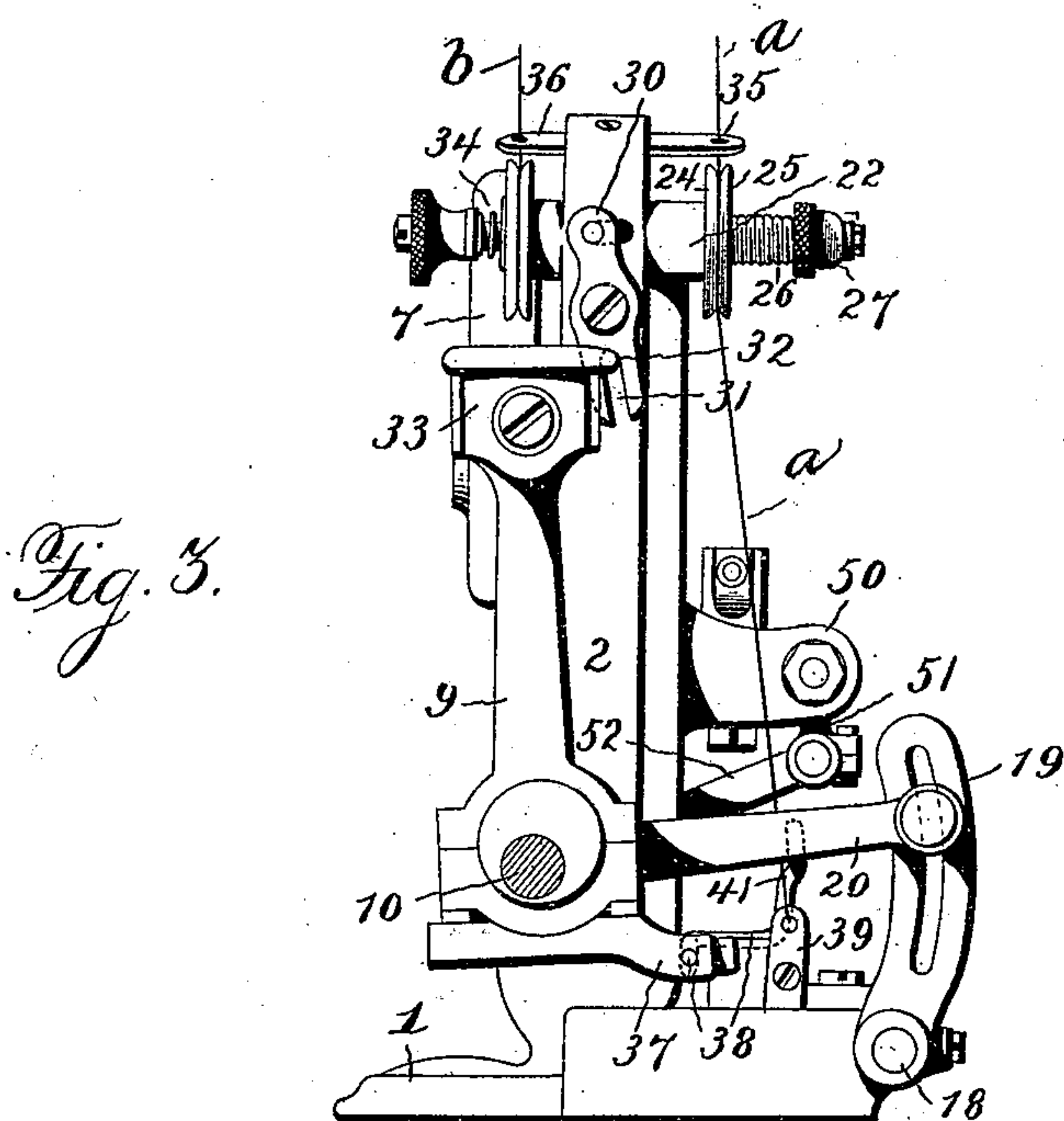
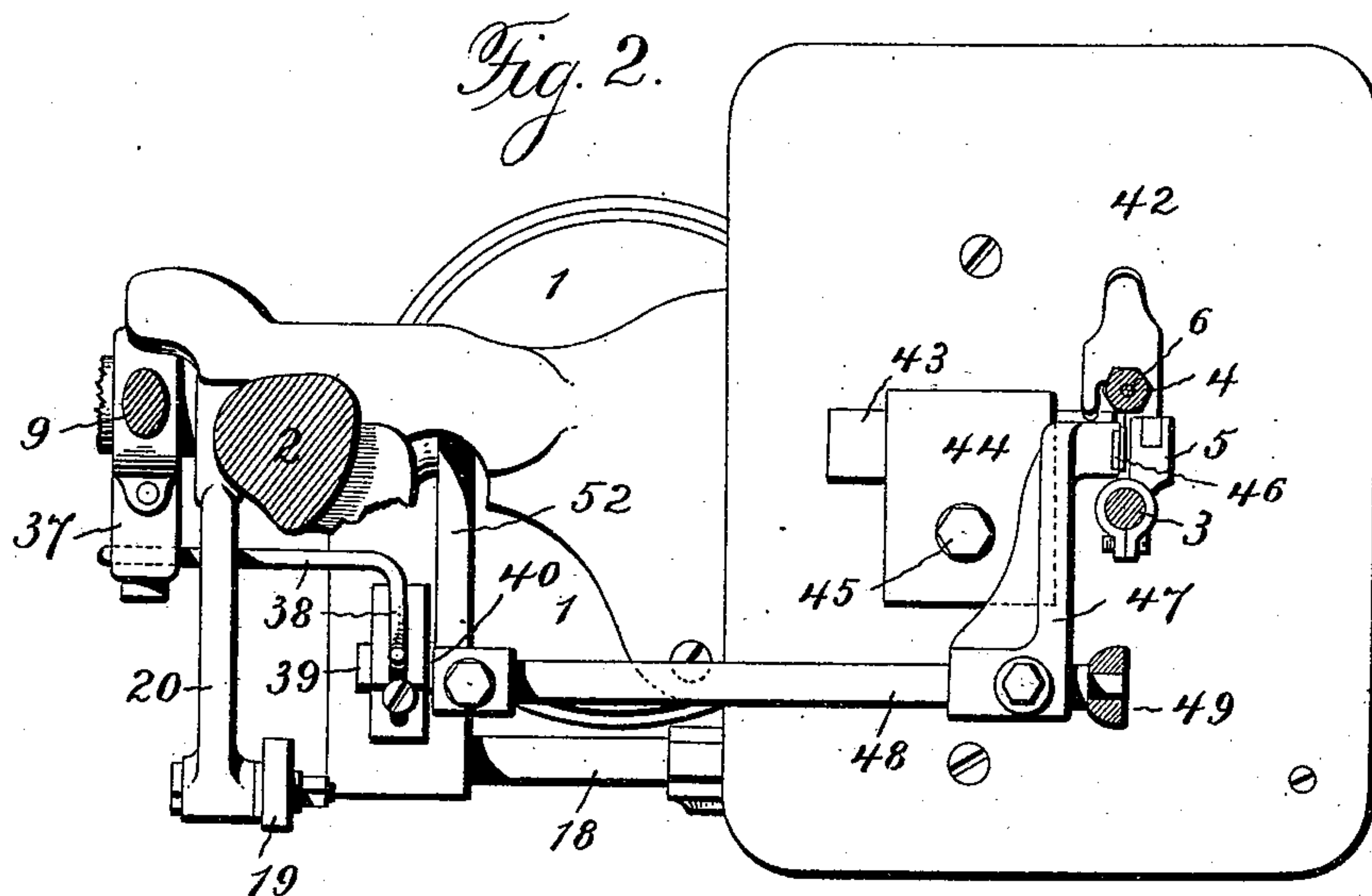
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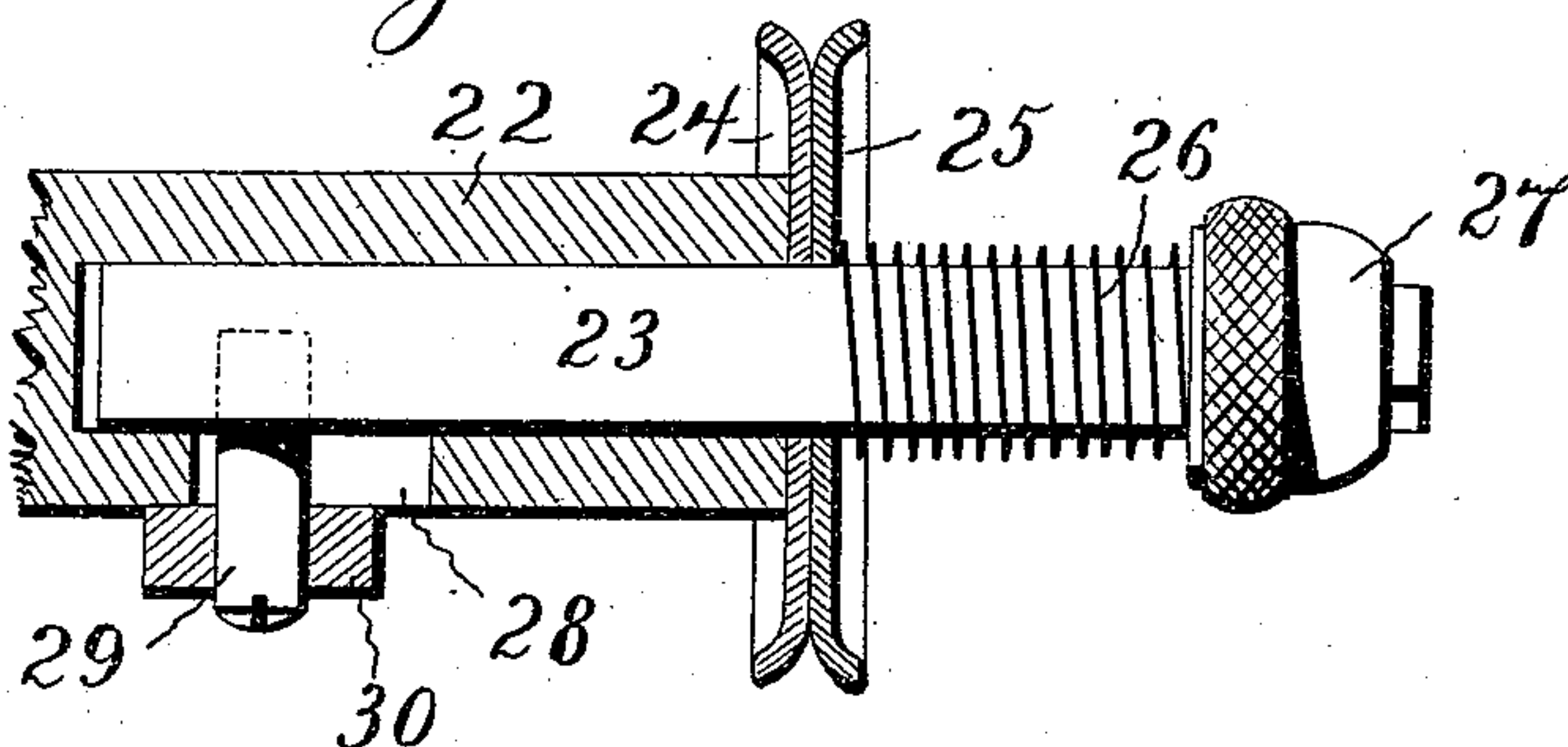
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SEWING MACHINE.

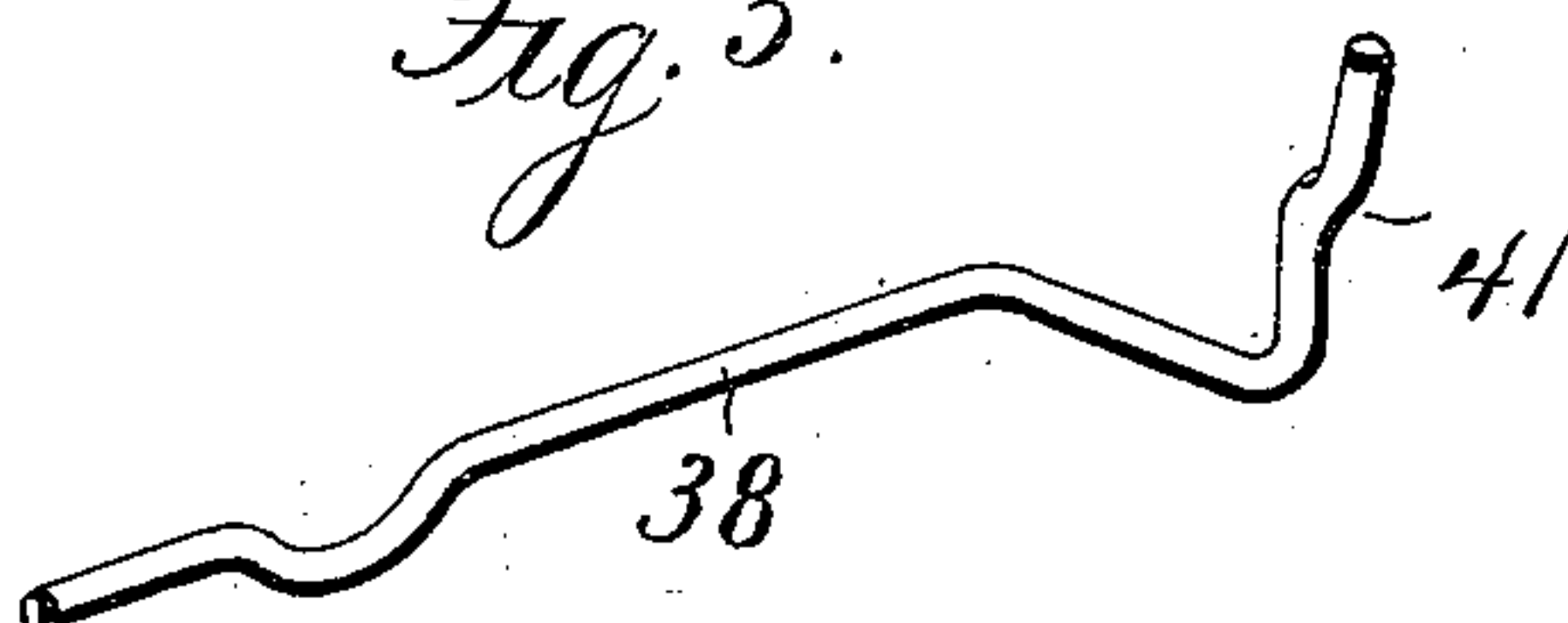
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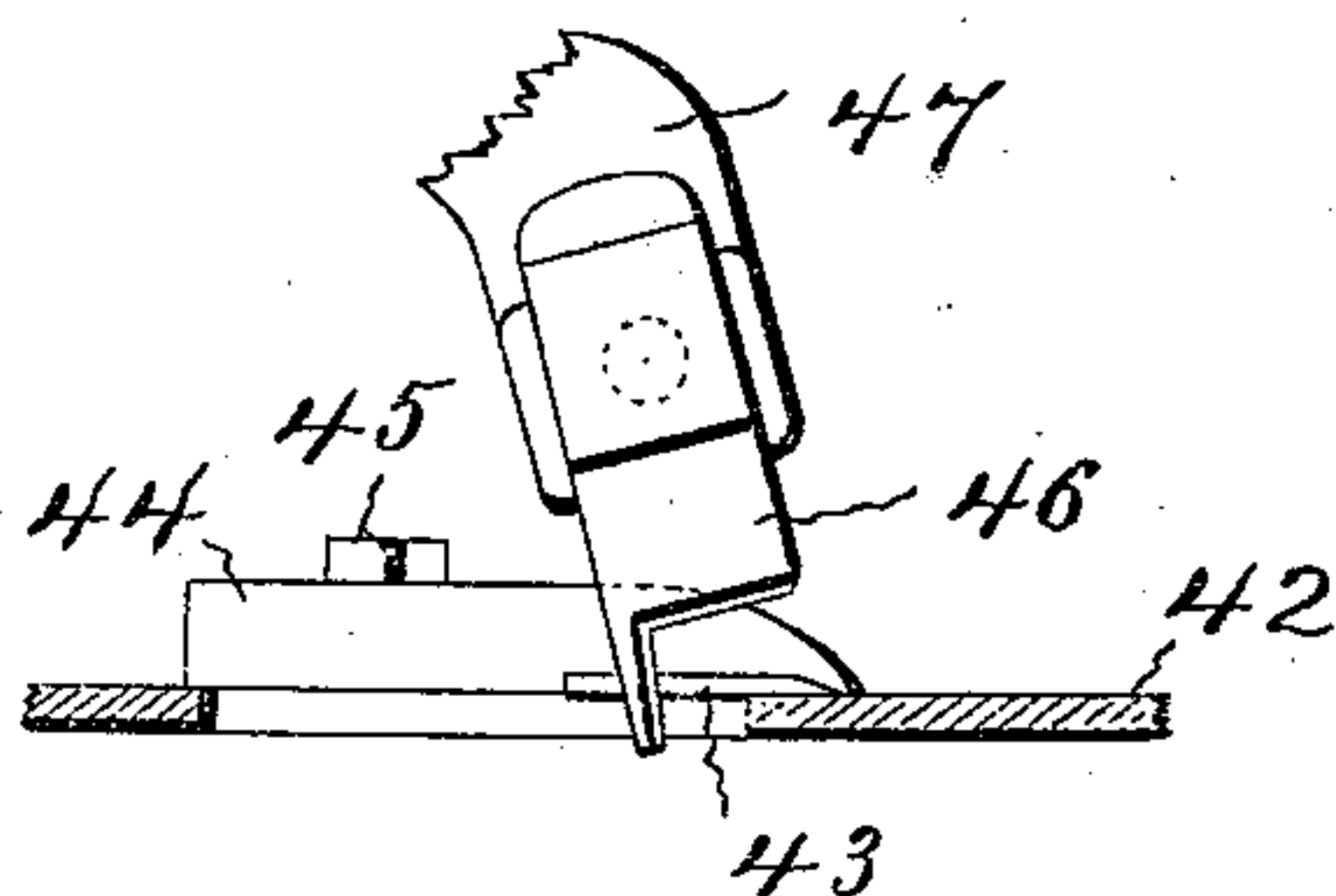
*Fig. 4.*



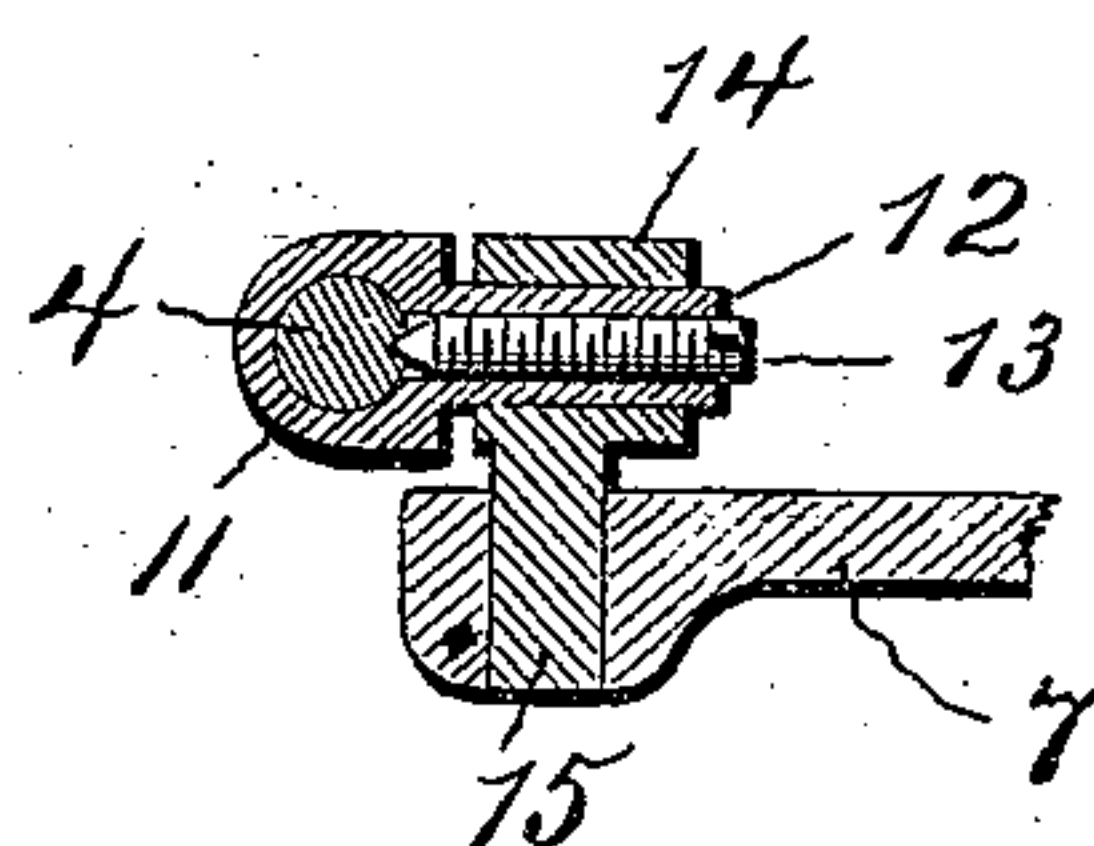
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



Witnesses

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# UNITED STATES PATENT OFFICE.

EDWARD MURPHY, OF NEW YORK, N. Y.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 554,626, dated February 11, 1896.

Application filed July 13, 1895. Serial No. 555,888. (No model.)

*To all whom it may concern:*

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

This invention relates to that class of sewing-machines which are employed to form an elastic double-loop or chain stitch in the sewing of knit goods and elastic fabrics.

One of the principal objects of my improvements is to provide a simple, reliable, and positively-actuated take-up device to control the lower thread with certainty and in perfect accord with the movements of the looper, and yet so that the said lower thread will be sufficiently free to permit a very rapid running of the machine without liability to breakage of the thread from sudden strain.

It is a further purpose of my invention to provide an improved connection between the needle-bar and its actuating-arm, whereby the needle-bar may be caused to have a perfectly-vertical reciprocation without tendency to lateral oscillation or binding in its supports, and so that a suitable play will be afforded at the point of connection between the needle-bar and needle-arm.

The feed devices, the looper and their actuating mechanisms may be of the construction and character described in Letters Patent No. 525,227, granted to me August 28, 1894.

My present invention consists in the features of construction and novel combinations of parts in a double-chain stitch sewing-machine, as hereinafter set forth and claimed.

In the annexed drawings, illustrating the invention, Figure 1 is a side elevation of a sewing-machine embodying my improvements. Fig. 2 is a plan of the same, with parts in section. Fig. 3 is a rear end elevation of the machine, with parts broken away. Fig. 4 is a horizontally-sectional detail view of the positively-actuated intermittent tension for the lower thread. Fig. 5 is a detail view of the take-up for the lower thread. Fig. 6 is a detail view of the trimming mechanism. Fig. 7 is a sectional detail view of the device for connecting the vertically-reciprocating needle-bar and oscillatory needle-arm.

Referring to the several parts of the draw-

ings in detail, the numeral 1 designates a suitable frame or base supporting the usual overhanging arm or goose-neck 2, the forward end of which is provided with the usual guides for a vertically-movable presser-bar 3 and a vertically-reciprocating needle-bar 4. To the lower end of the presser-bar 3 is attached a presser-foot 5 of ordinary construction.

The needle-bar 4 carries a needle 6 and is reciprocated vertically by means of an oscillatory needle arm or lever 7 fulcrumed to the rear portion of the goose-neck by a pivot 8, as usual. The needle arm or lever 7 is oscillated in the usual manner through a pitman 9 connecting with an eccentric on the main driving-shaft 10, that is journaled or supported in the frame of the machine in any suitable or ordinary manner.

In order that the needle-bar 4 may be caused to reciprocate in a true vertical path without liability to oscillation or binding in its guides, there is placed on the needle-bar a sleeve 11, having projecting from its rear side a wrist-pin 12, through which there is passed longitudinally a set-screw 13, the inner end of which bites into a notch or slight depression formed in the needle-bar, so as to hold the sleeve 11 firmly thereon. The wrist-pin 12 supports a longitudinally-sliding sleeve 14, from one side of which projects a wrist-pin 15, engaging an eye in the forward end of the oscillatory needle-arm 7, and by this simple construction a sufficient play is provided in the connections between the needle-bar and needle-arm to cause the needle-bar to have a perfectly true vertical movement without any tendency to wobbling or binding.

The feed devices employed in this machine may be of the same construction and character as described in my before-named patent, No. 525,227. As shown, the feed-dog carrying-bar 16 is connected with and reciprocated from a yoke 17, mounted on a rock-shaft 18, having on its rear end an upright slotted arm 19, that is adjustably connected with the outer end of a link 20, the inner end of which engages an eccentric on the driving-shaft 10, from which the feed is actuated.

A vibratory looper 21 may be employed of the character shown and described in my said former Patent No. 525,227, and is preferably operated from the shaft 10 by the mechanism



described in said patent and may be so arranged as to be conveniently swung in a horizontal plane to place its eye or point beyond or outside one edge of the work-plate to facilitate threading. As the needle 6 rises, the looper 21 moves inward into the loop of the needle-thread and laterally to one side of the path in which the needle traverses, and as the needle descends the looper moves outward and laterally to the opposite side of the needle-path for producing the required double-loop or chain stitch. The manner of mounting and operating the four-motion looper and its arrangement with relation to a four-motion feed are fully described in my aforesaid former patent.

On the rear portion of the goose-neck 2 is supported a transversely-arranged sleeve 22, from within one end of which is extended a laterally-projecting and longitudinally-reciprocating spindle 23, having two parallel arranged tension-disks 24 and 25 loosely mounted thereon. The spindle 23 is surrounded outside the tension-disks by a spirally-coiled spring 26, held in place by a nut 27 on the outer end of the spindle, the said nut forming a bearing for one end of the spring 26, that bears at its other end against the outermost tension-disk.

In the rear side of the transversely-arranged sleeve 22 is an opening 28 for passage of a pin or stud 29, connecting the reciprocating spindle 23 with the upper end of a two-armed lever 30, fulcrumed to the rear of the goose-neck at a point below the sleeve 22 thereon. The lower arm of the lever 30 is provided with a longitudinal slot 31, loosely engaging a pin 32, carried on the cap or head 33 of the pitman 9 that connects with the main drive-shaft. Through the movements of the pitman 9 in actuating the needle-arm 7 an intermittent oscillation is imparted through the pin-and-slot connection to the lever 30, which in turn reciprocates the spindle 23 and attached nut 27, so as to cause the spring-pressed outer disk 25 to exert, with the inner stationary disk 24, an intermittent tension upon the lower or looper thread, *a*, that is passed between said disks. For the upper or needle thread, *b*, there may be arranged on one end of the sleeve 22 or elsewhere a tension device 34 of any suitable kind. Above the tension devices for the lower and upper threads are arranged guides 35 and 36, through which the said threads are passed from their respective spools.

It is important that the slack in the lower thread, caused by receding movements of the looper, should be taken up promptly and with certainty through positively-actuated mechanism operating in unison with the looper movements and so that the looper-thread will not be subjected to sudden or undue strain even when the machine is operated at a high speed. For this purpose there is preferably connected with the lower end of the pitman 9 a laterally-projecting arm 37, that partakes of the movements of the eccentric from which

the pitman is actuated. On the outer end of the arm 37 there is carried a take-up 38, consisting of a rod that is first extended in a forward direction, then outward from its forward portion, and then upward on the outer side of the path of the looper-thread *a*, the said looper-thread being carried downward from the intermittent tension-disks 24 and 25 and through thread eyes or guides 39 and 40 placed on opposite sides of the outward laterally-projecting arm of the said take-up and above the path in which it moves. The said take-up 38 is thus arranged to operate below and at the outer side of the path of the looper-thread.

Instead of being carried by and operated from an arm supported by the pitman 9 the take-up might obviously be carried by an arm actuated from an eccentric on the main shaft other than the eccentric that operates the pitman, but the construction shown is preferable for compactness and simplicity of arrangement.

It will be observed that the vertical arm of the take-up 38 is formed with a slight crook that provides a shoulder 41 on its inner side. In taking up the slack of the looper-thread the vertical arm of the take-up 38 moves downward, then inward, and engages the thread at or about the take-up shoulder 41. The inward movement of the shouldered take-up arm is then continued slightly and then changes to an upward movement, carrying the thread, meanwhile, upon the shoulder 41, thereby taking up the slack, and, finally, as the upward movement of the take-up still continues it is moved also outward so as to throw off the thread as it is required by the looper. In its operation upon the looper-thread the take-up 38 acts gradually and smoothly, without sudden strain that would be liable to snap the thread, and being positively actuated from the eccentric on the main shaft and in time movements with the looper it is obvious that the control of the lower thread will be always certain, regardless of the speed of the machine.

In work of the character for which this machine is more particularly designed it is desirable to provide shearing mechanism for trimming the surplus fabric beyond the line of stitching. To this end there is provided in the cloth-plate 42 a suitable recess for reception of a horizontally-arranged and stationary lower cutting-blade 43, that is removably secured in place by a clamping-plate 44 and nut 45, as shown. The upper and movable cutting-blade, 46, is arranged to oscillate in a vertical direction adjacent to the cutting-edge of the lower blade. This upper blade, 46, is adjustably supported on and carried by an arm 47, mounted on the forward end of a rock-shaft 48, journaled in bearings at 49 and 50 above the cloth plate or bed. One end of the rock-shaft 48 is provided with an arm 51, connected by a link or pitman 52 with an eccentric on the main drive-shaft from which the trimming mechanism is actuated in ac-



cord with the movements of the feeding and stitching devices. A brace-rod 53 may be arranged to connect the rock-shaft bearings 49 and 50 at the forward and rear ends of the goose-neck or overhanging frame-arm 2, so that the shearing mechanism may be made to operate with great steadiness and without straining the frame.

This machine is particularly adapted for factory work where great accuracy and high speed are required; but the machine is also desirable for family use. By reason of the simple and compact arrangement of its several parts and the consequent ability to shorten the various connecting-shafts and levers of the operating mechanisms, and the facility with which the several bearings and connections may be hardened, it will be obvious that the machine may be run at a very high speed without impairing its durability or efficiency.

What I claim as my invention is—

1. In a double-chain-stitch sewing-machine, the combination with the needle, the looper and the main driving-shaft, of a positively-actuated take-up, for the lower thread, consisting of an arm actuated from an eccentric on the main driving-shaft and a rod carried by said arm and extended therefrom forward, outward below and upward to the outside of the path of the lower thread, the said upward extended arm of the take-up being provided with a shoulder to engage the said thread, and thread-guides which determine the path of the thread located on opposite sides of the said take-up, substantially as described.

2. In a double-chain-stitch sewing-machine, the combination with the stitch-forming mechanism, and a pair of guides to determine the path of the lower thread, of a take-up for the lower thread consisting of a vibratory rod positively actuated from a moving part of the machine and extended outward and upward between the said thread-guides and below and to the outside of the path of the lower thread, the upward extended arm of said take-up rod being provided with a projection or shoulder and thereby adapted to act gradually and

smoothly on the lower thread to take up the slack at required intervals, substantially as described.

3. In a double-chain-stitch sewing-machine, the combination with the needle and looper and their operating mechanisms, of a positively-actuated take-up carried on the pitman of the needle-operating mechanism and consisting of a forward, outward and upward extended rod having on the inner side of its upward extended portion a shoulder adapted to engage the lower thread and take up the slack, and thread-guides located on opposite sides of the outward and upward extended portions of the take-up, substantially as described.

4. In a double-chain-stitch sewing-machine, the combination with the needle and looper and their operating mechanisms, of a positively-actuated intermittent tension device for the lower thread, and a positively-actuated take-up, for the said lower thread, carried on a portion of the needle-operating mechanism and comprising a forward, outward and upward extended rod or arm having a shoulder to engage and release the said lower thread at required intervals, and thread-guides located on opposite sides of the said take-up, substantially as described.

5. In a sewing-machine, the combination with a vertically-reciprocating needle-bar, and an oscillatory needle arm or lever having an eye in its forward end, of a sleeve mounted on the needle-bar and provided with a rearward projecting wrist-pin, a set-screw passed longitudinally through said wrist-pin to engage the needle-bar, and a sliding sleeve mounted on said rearward projecting wrist-pin and provided with a laterally-projecting wrist-pin engaging the eye in the forward end of the needle-arm, substantially as described.

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

EDWARD MURPHY.

Witnesses:

EZRA G. HALL,

EDWARD J. MALONEY.