

No. 762,543.

PATENTED JUNE 14, 1904.

R. L. LYONS.

THREAD CUTTING DEVICE FOR SEWING MACHINES.

APPLICATION FILED MAY 12, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

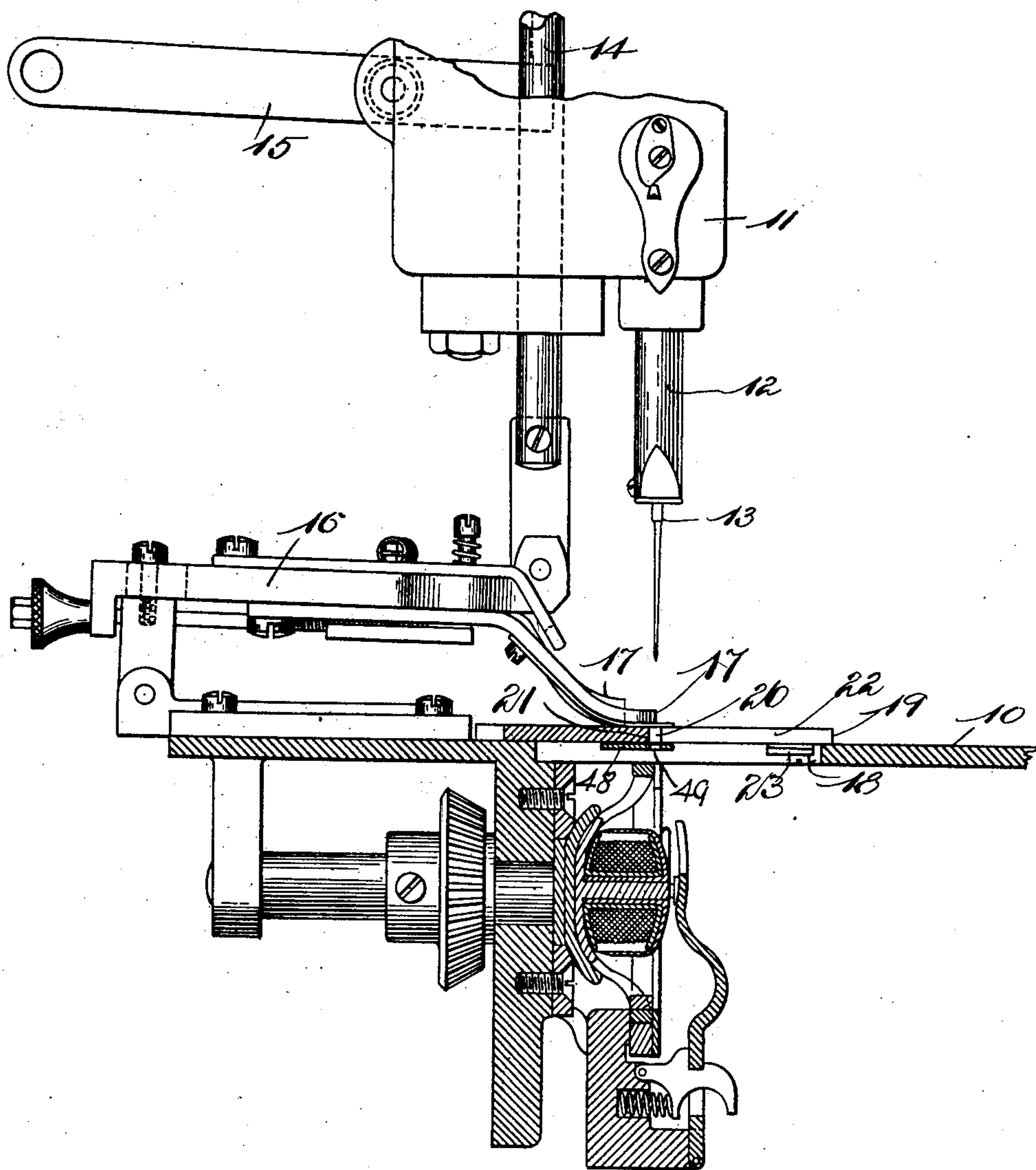


Fig. 1.

Witnesses:
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B. A. L. Kent.

Inventor:
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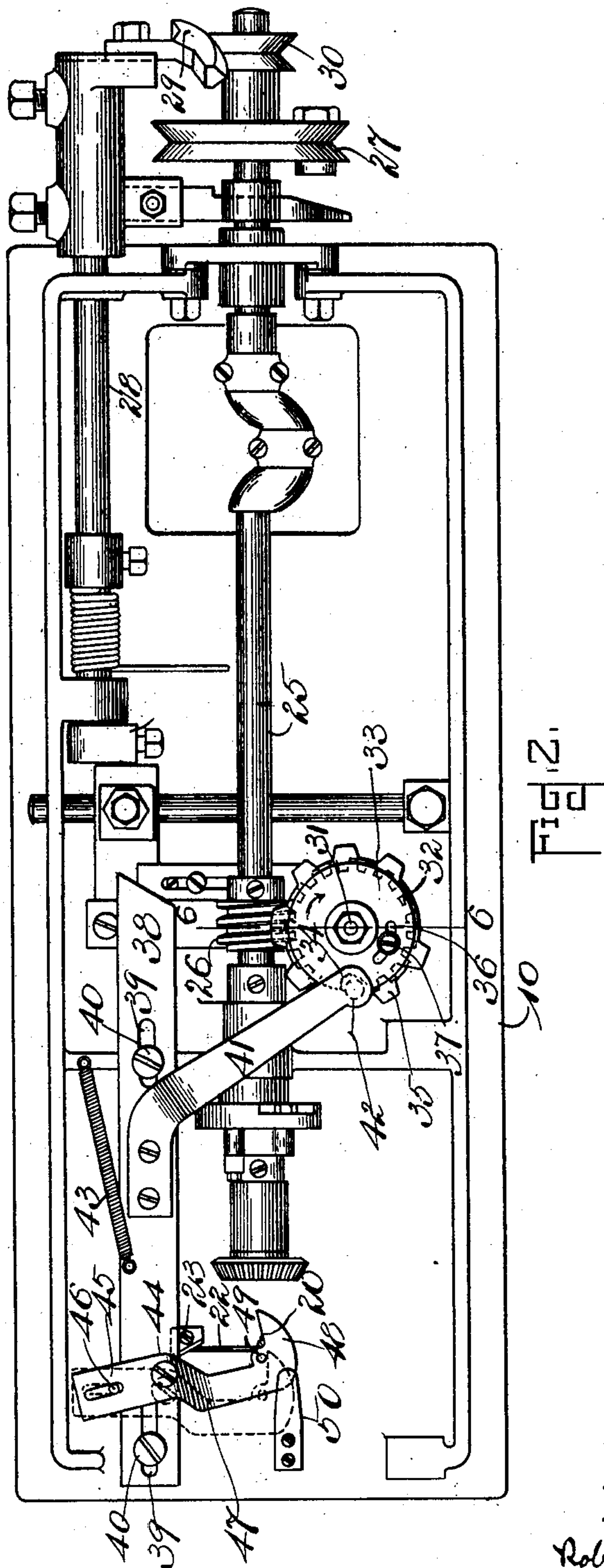
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

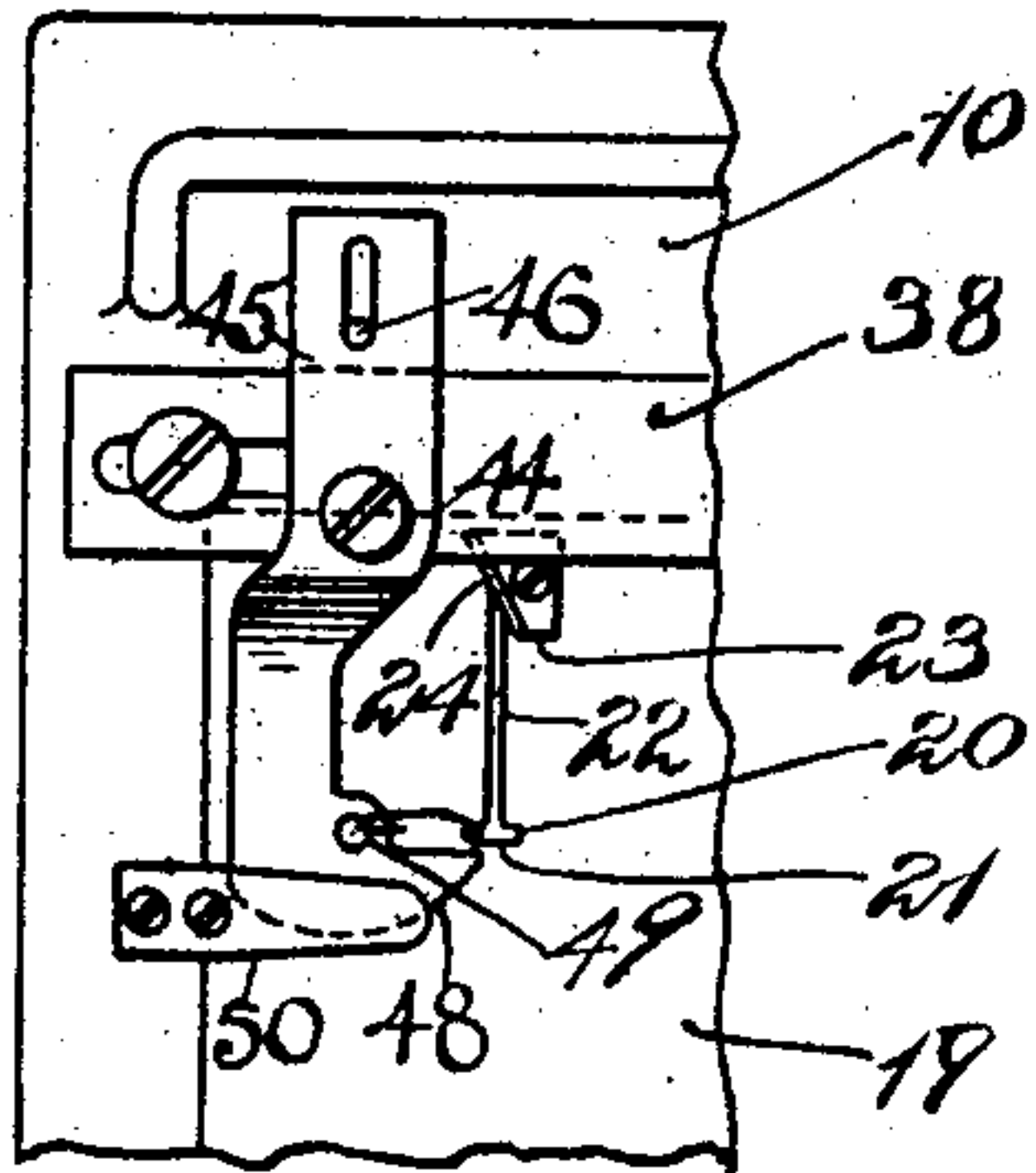


Fig. 3.

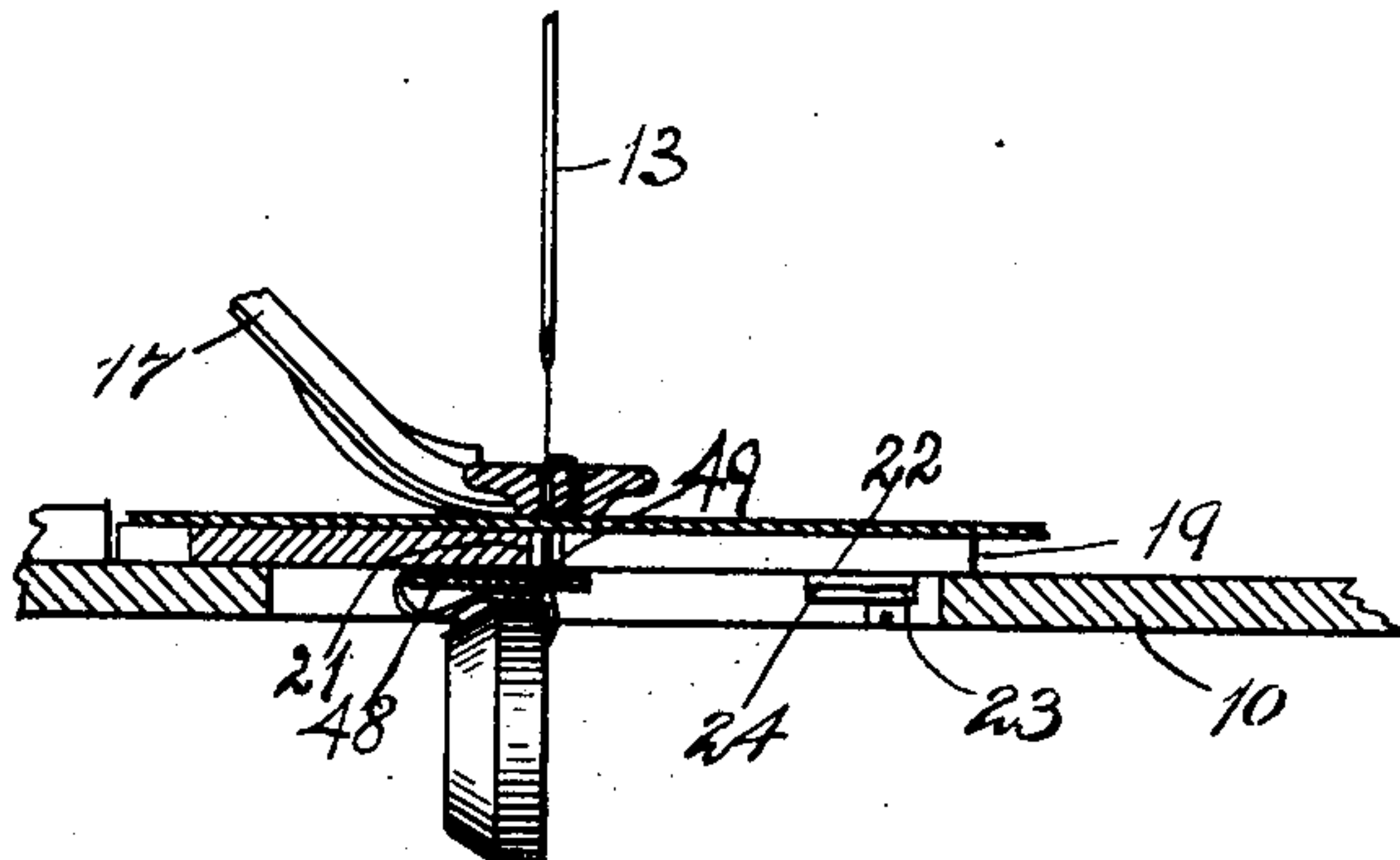


Fig. 4.

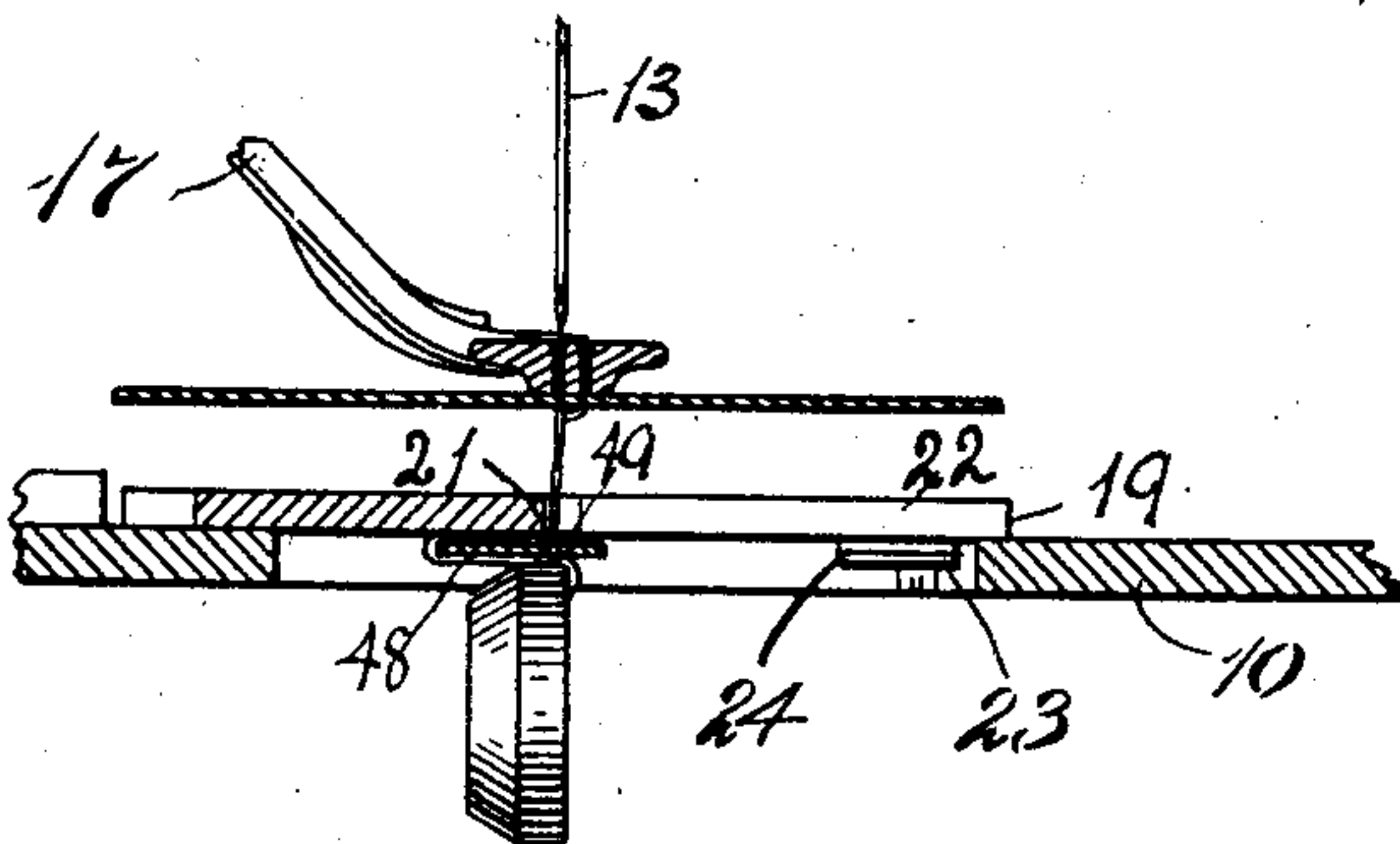


Fig. 5.

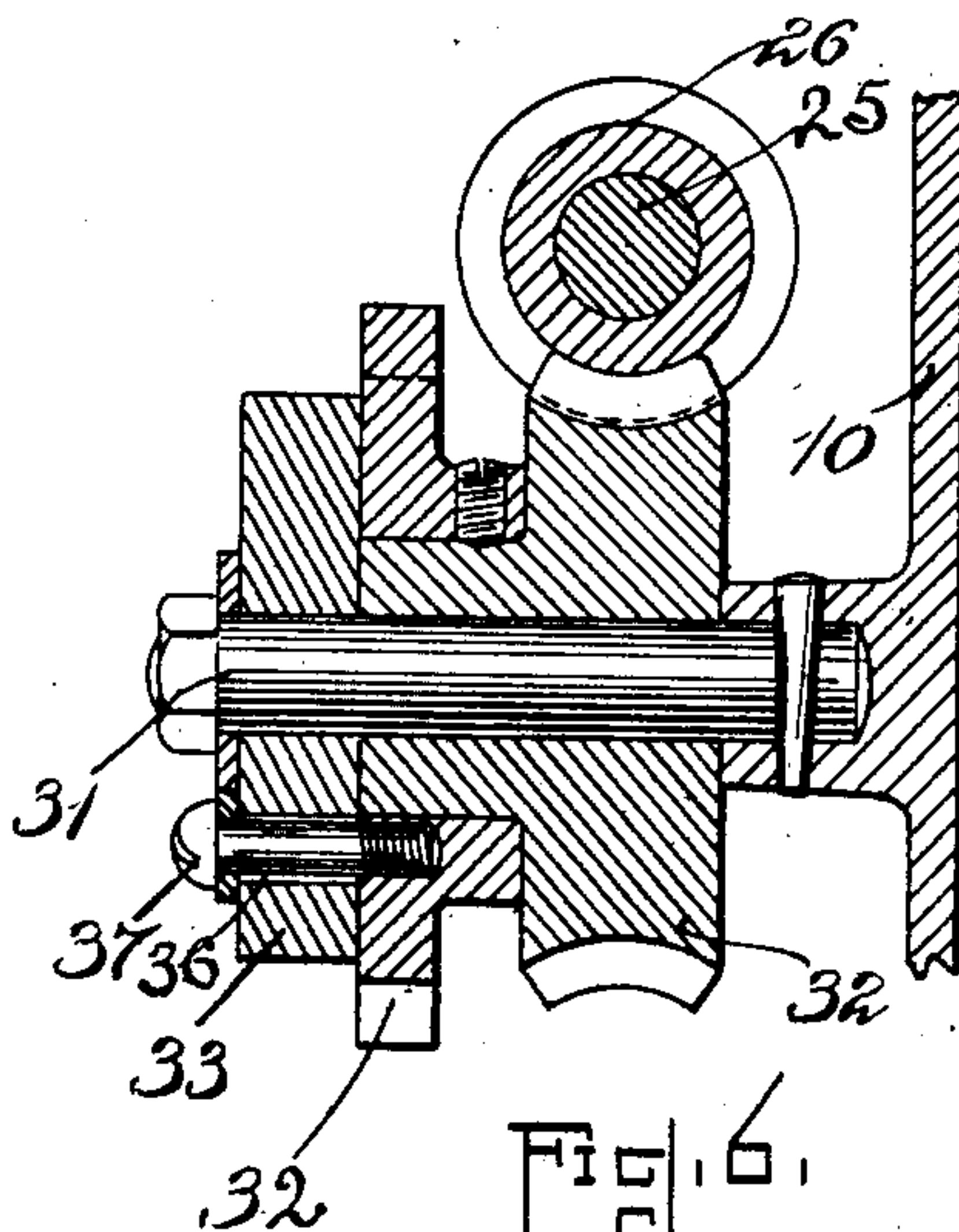


Fig. 6.

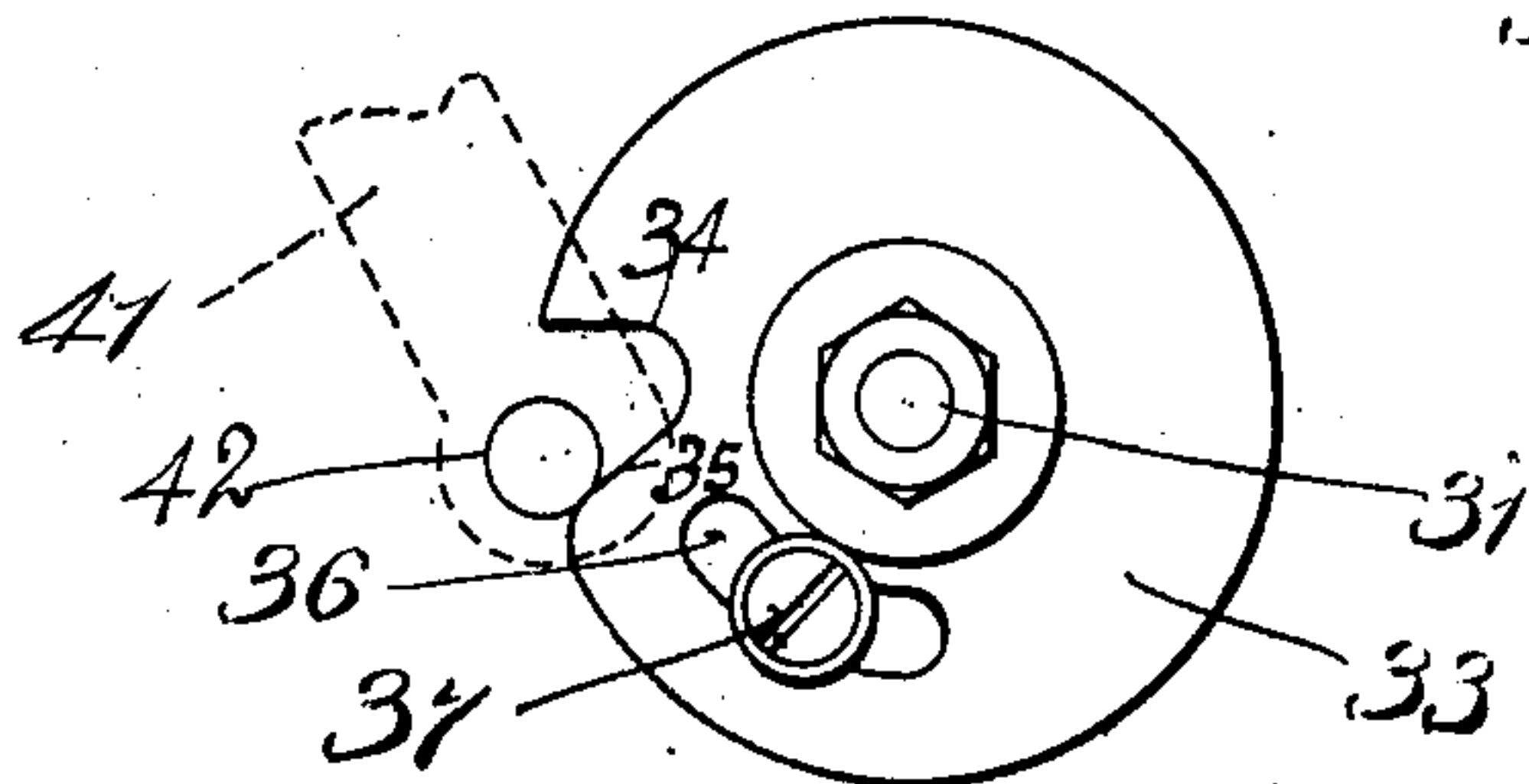


Fig. 7.

Witnesses:
Wm H. Varnum
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UNITED STATES PATENT OFFICE.

ROBERT L. LYONS, OF WALTHAM, MASSACHUSETTS, ASSIGNOR TO UNION
BUTTON SEWING MACHINE COMPANY, OF BOSTON, MASSACHUSETTS,
A CORPORATION OF MASSACHUSETTS.

THREAD-CUTTING DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 762,543, dated June 14, 1904.

Application filed May 12, 1903. Serial No. 156,798. (No model.)

To all whom it may concern:

Be it known that I, ROBERT L. LYONS, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Thread-Cutting Devices for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This present invention has reference to improvements in thread-cutting devices for sewing-machines.

The object of the invention is to sever both the needle-thread and the shuttle-thread after the completion of the sewing operation.

Another object of the invention is to secure the end of the needle-thread before the needle completes its first upward movement in the first of the series of stitches and to retain said end for a period thereafter.

Another object of the invention is to so construct a sewing-machine that the needle-thread is severed by the raising of the work at the completion of the sewing and whereby the shuttle-thread may be cut by the drawing forward of the work and at such a point that an end is left for the starting of the machine.

Another object of the invention is to improve the general construction of thread-cutting devices and thread-retaining devices for sewing-machines.

The invention consists in a throat-plate having a needle-hole and means operatively associated therewith for entering the last loop of the needle-thread and carrying a portion of the thread against the edge of said needle-hole combined with means to exert a strain on the thread to sever the same where it bears against the edge of the needle-hole.

The invention also consists in the peculiar construction of the throat-plate and in means for engaging the needle-thread to carry the same against the wall of the needle-hole.

The invention consists in the means for securing and retaining the needle-thread during the completion of the first stitch.

The invention also consists in such other peculiar features of construction or combination of parts as shall hereinafter be more fully de-

scribed in their preferred form, and pointed out in the claims.

Figure 1 represents an end elevation of parts of a sewing-machine, partially in section, illustrating the invention. Fig. 2 represents a bottom plan view of a machine illustrating the needle-thread-engaging device and the means for operating the same. Fig. 3 represents a bottom plan view of the throat-plate and the needle-thread-engaging device in the retracted position, showing the first end of the needle-thread as having been carried thereby to a distance laterally from the needle-hole and retained in this position by being frictionally held between the engaging device and the bottom of the throat-plate. Fig. 4 represents a sectional view of the throat-plate and portions related thereto, showing the thread-engaging device engaged in the last loop of the needle-thread, the needle being approximately at its upper limit of movement, the button clamp or presser bearing on the work. Fig. 5 represents a similar view, portions of the button-clamp being partially raised to release the work and to draw the needle-thread tightly over the lower edge of the needle-hole, the severing of the needle-thread being effected by the slight further upward movement of the button-clamp. Fig. 6 represents a cross-section of the drive-shaft and cam-gear on line 6 6, Fig. 2. Fig. 7 represents a plan view of a portion of the controller-cam, showing the position of the follower-pin at time of starting the machine.

Similar numbers of reference designate corresponding parts throughout.

As shown in the drawings, 10 represents the bed of a sewing-machine, of which 11 is the head, in which is mounted for operation in the usual manner the needle-bar 12, carrying the needle 13. Also movably mounted in said head is the lifter-bar 14 and its actuating-lever 15, adapted to be connected with any usual operating means, as a treadle. On the bed 10 is mounted a button-clamp 16, pivotally connected with the lifter-bar 14 and provided with the usual button holding or clamping arms 17 17, the construction of the but-

ton-clamp being such that upon the lifting of the bar 14 the upper portion of the button-clamp, with the arms 17 17 and any article held therein, also moves upward, said arms 5 acting in a degree as a presser when in the depressed position.

The bed 10 has the opening 18, above which is mounted on said bed the throat-plate or work-support 19, having the needle-hole 20, 10 having the lower straight edge 21 formed by the juncture of the vertical rear wall of the needle-hole with the horizontal under surface of the throat-plate. From the needle-hole extends forward the slot 22, and adjacent to 15 this slot, preferably on the under surface of the throat-plate, is secured the cutter-plate 23, the cutting edge 24 of which extends at an inclination to the slot and across the same.

At the under portion of the bed 10 is journaled the main drive-shaft 25, having the 20 worm 26 and furnished with the usual clutch driving mechanism 27, adapted to be shifted into and out of driving connection with said shaft by means of the usual shifter-rod 28, 25 movably mounted in bearings in the bed 10 and having a member 29 in engagement with the pulley 30 of the clutch mechanism.

Journaled on the shaft 31, secured in the bed-plate 10, is the gear 32, meshing with the 30 worm 26 of the shaft 25. Also rotatable on this shaft 31 is the cam 33, having a peripheral bearing-surface concentric with its axis and an eccentric recessed portion 34, having the inclined wall 35, this cam having also the 35 curved slot 36, whereby the same may be adjusted on the screw 37, secured in the gear 32, and by the tightening of said screw may be secured to said gear.

The slide 38 has the slots 39 39 working on the studs 40 40, secured in the plate 10. On 40 this slide 38 is fixed the inclined arm 41, which extends to the cam 33 and has the pin 42 working against the periphery of said cam during the greater portion of the sewing operation and designed to enter the recess 34 at 45 the completion of the sewing operation, the slide 38 being drawn in a direction to effect the contact of this pin 42 with the cam by the spring 43, secured to said slide and to the 50 plate 10.

Pivoted to the slide 38 is the arm 44, having the slotted portion 45 working on the pin 46, fixed in the plate 10, and the hook member 47, having the loop-engaging hook or finger 55 48 and the perforation 49, this hook member 47 being bent from the surface of the slide 38 toward the surface of the throat-plate 22, and a spring 50, fixed to the plate 10 and bearing against the surface of the hook 48 to press 60 this hook against the under surface of the throat-plate 22 or its equivalent.

In starting the machine the parts are in the positions shown in Figs. 2 and 7, the pin 42 bearing against the inclined surface 35 of the

cam-recess 34, the relative proportions of the 65 worm 26 and the gear 32 being such that upon the completion of a downward and a partial upward movement of the needle-bar the cam 33 will be rotated sufficiently to carry the inclined portion 35 of the recess 34 past the pin 70 42, so that the peripheral portion of this cam bears against said pin. At this starting-point the hook 48 is in the position shown in Fig. 2 of the drawings, the perforation 49 registering with the needle-hole. After the cloth has 75 been placed beneath the arms of the button-clamp a button is placed in said arms and adjusted. The shipper mechanism being now operated to cause the driving of the shaft 25, the needle-bar is moved downward in the usual 80 manner and by the usual connections. At its first downward movement the needle passes through the work and through the needle-hole 20 and the perforation 49 of the hook 48, carrying the cut end of the needle-thread below 85 the lower surface of said hook. The needle moves upward, exerting but very slight drawing action on its thread until it (the needle) has nearly reached the upward limit of its movement. Approximately at the time when 90 the upward movement of the needle has carried its point above the work, in this case above the button, the rotation of the shaft 25 and its worm 26 has caused the rotation of the gear 32 and its cam 33 to crowd the pin 42 95 outward by the action of the inclined surface 35 on the pin until the peripheral portion of the cam bears against the pin, thus forcing outward the slide 38 against the action of its spring 43 and causing the swinging of the 100 hook 48 to the position indicated in dotted lines in Fig. 2 and shown in full lines in Fig. 3, the cut end of the needle-thread extending through the perforation 49 being carried 105 along in this movement and a portion of this thread being frictionally engaged between the surface of the hook forming the wall of this perforation and the under surface of the throat-plate 22 or other surface corresponding thereto, the needle-thread then extending 110 from said perforation 49 to the needle-hole, as shown in Fig. 3. The sewing operation being continued for a certain number of rotations of the shaft 25, the cam 33 is caused to rotate thereby until the recess 34 is carried 115 around and brought opposite the pin 42. At this time the needle is on its upward movement of the last stitch, but has not reached a position to draw the last loop of its thread tight, and as the recess 34 is brought opposite the pin 42 the spring 43 is permitted to 120 act to move the slide 38 inward, the pin 42 at the same time entering the recess 34. This movement of the slide 38 causes the swinging of the hook member 44 on its pivot to enter 125 the hook or finger 48 in the loose loop of the needle-thread, as shown in Fig. 4. The latter part of the upward movement of the nee-

dle in making this last stitch now tends to draw the needle-thread closer, but not necessarily tight, about the finger 48.

Reference to Fig. 4 of the drawings, in which the looseness of the last loop of the needle-thread is purposely somewhat exaggerated to more clearly show the same, will show that a portion of such loop is bent around the lower rectangular edge at the rear of the needle-hole 21 and that a strain being put upon the thread to draw it tight over said edge this edge will act as a parter to sever the thread. The strain is preferably put upon the needle-thread by the lifting of the button-clamp in the usual course of removing the work therefrom, and the needle-thread is thus severed. At this time the shuttle-thread, carried and operated by any usual form of shuttle mechanism, as shown in Fig. 1, remains intact; but by the drawing forward of the work the shuttle-thread is drawn along the slot 22 in the throat-plate 19 until it is intercepted and severed by the cutter 23, extending across said slot. During this movement of the material toward the cutter 23 the cloth is drawn away from that portion of the needle-thread partially embracing the finger and still connected with the needle, so that a sufficiency of thread extends from the needle to restart the sewing.

I do not limit myself to the specific construction herein shown and described, as I am aware that other means than those shown may be substituted therefor. I am also aware that the cutter 23 may be formed in part with the throat-plate and that the rear edge of the needle-hole in said throat-plate may be furnished with a cutter-blade.

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

1. A thread-cutting device for sewing-machines comprising a throat-plate having a needle-hole the lower edge of which is angular, means for positively engaging the needle-thread below said edge, and a work-holder movably mounted above the work and adapted to lift the work away from the plate to strain the needle-thread over said angular edge.

2. In a sewing-machine, the combination with needle-operating mechanism including a main drive-shaft, and a work-support having a needle-hole, of a thread-nipping member movably mounted below the work-support and having a needle-hole, and means in driving relation with said main shaft for moving said

member laterally with respect to said needle-hole whereby the needle-hole of said member may be positioned to receive the needle on its first downward stroke and whereby said member may be subsequently moved to nip the needle-thread between the surface of said member and the under surface of the throat-plate.

3. In a sewing-machine, the combination with a throat-plate having a needle-hole, and a thread-nipping member movably mounted beneath the throat-plate and having a perforation, of means for positioning said member to bring the perforation into registration with the needle-hole prior to the first downward movement of the needle, and means for positively moving said member away from the path of the needle before the first complete upward movement of the needle.

4. In a sewing-machine the combination with the throat-plate 19 having the needle-hole 20 with its lower edge 21 and the slot 22 extending from the needle-hole, and the cutter 23 secured in line with said slot, of means for positively positioning a thread against the edge 21.

5. In a sewing-machine, the combination with a throat-plate having a needle-hole, a slide movably mounted beneath the throat-plate and adapted to be actuated in one direction by a spring, and a perforated member pivotally mounted on said slide and adapted to be moved thereby to register its perforation with the needle-hole of the throat-plate, of means for positively moving said slide to retract said member.

6. In a sewing-machine the combination with a throat-plate having the needle-hole 20 with its edge 21, of the slide 38 movably mounted below the throat-plate, the member 44 having the hook 48 pivotally mounted on the slide, the pin 46 with which the slotted portion of said member is engaged, the arm 41 fixed to said slide and having the pin 42, and the cam 33 having the recess 34 in engagement with said pin, said cam being rotatably mounted and driven substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT L. LYONS.

Witnesses:

C. W. HODGDON,
HENRY J. MILLER.