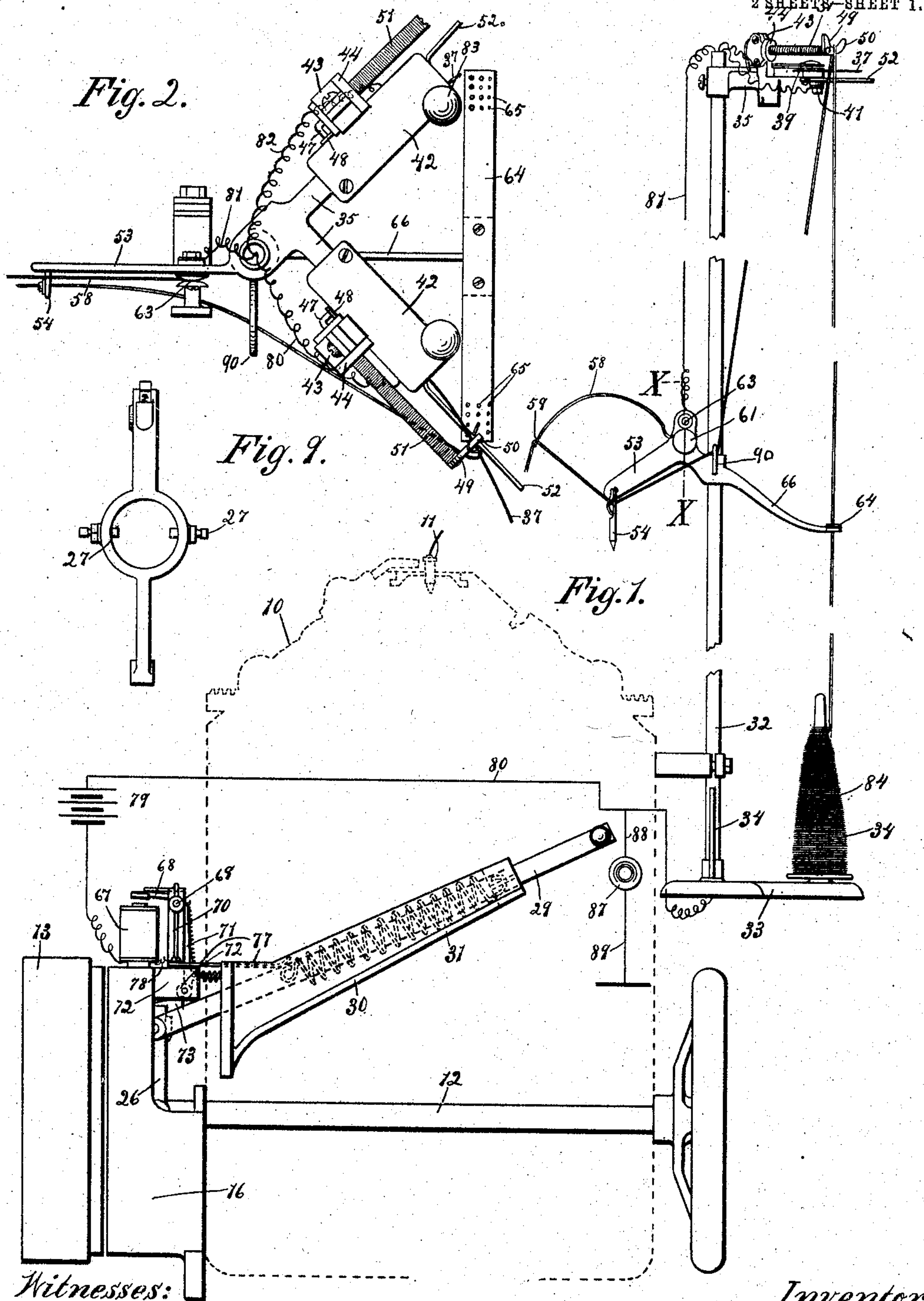


No. 781,287.

PATENTED JAN. 31, 1905.

U. G. LEE.
ELECTRICAL STOP MOTION.
APPLICATION FILED FEB. 28, 1902.

2 SHEETS-SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

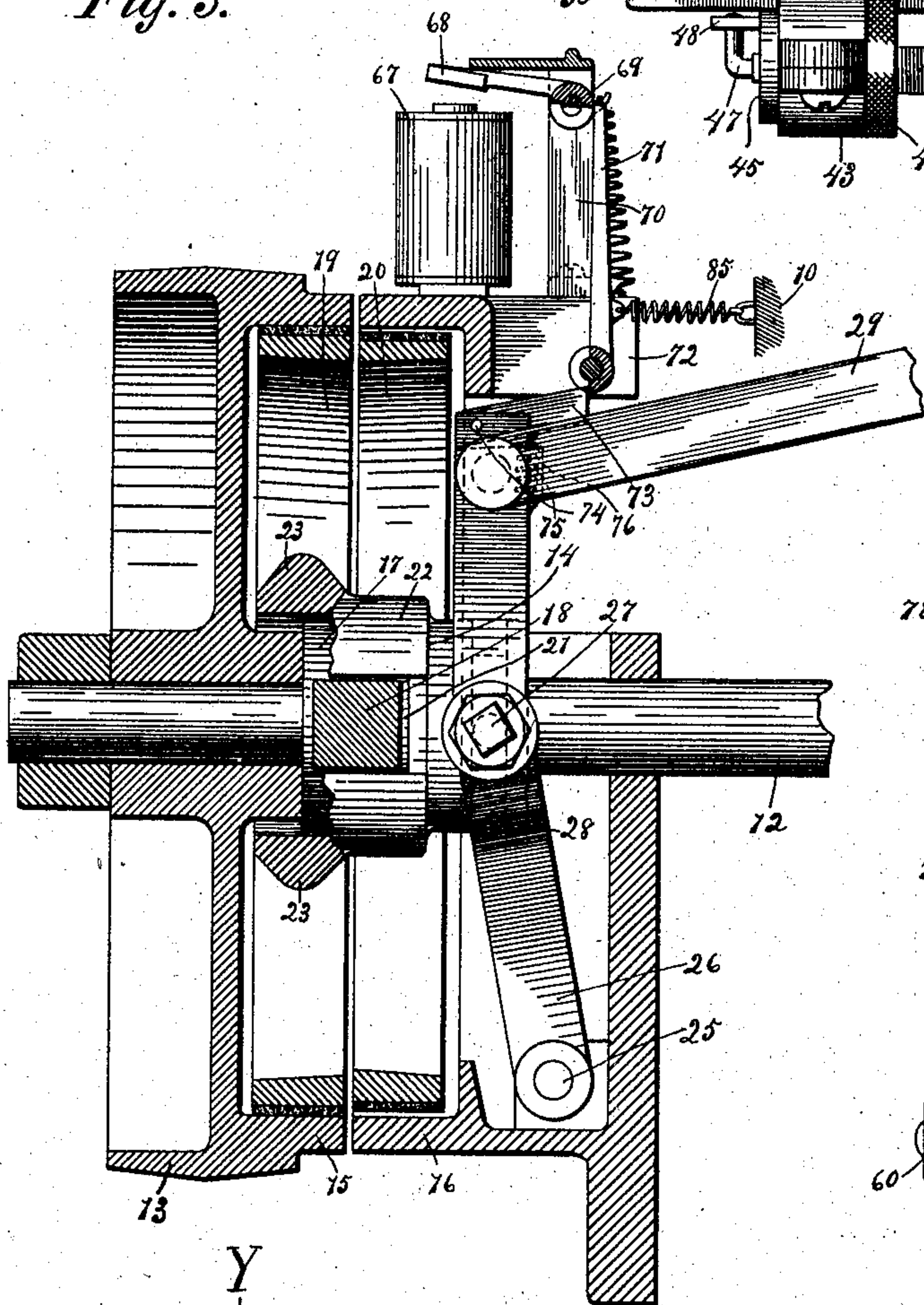


Fig. 4.

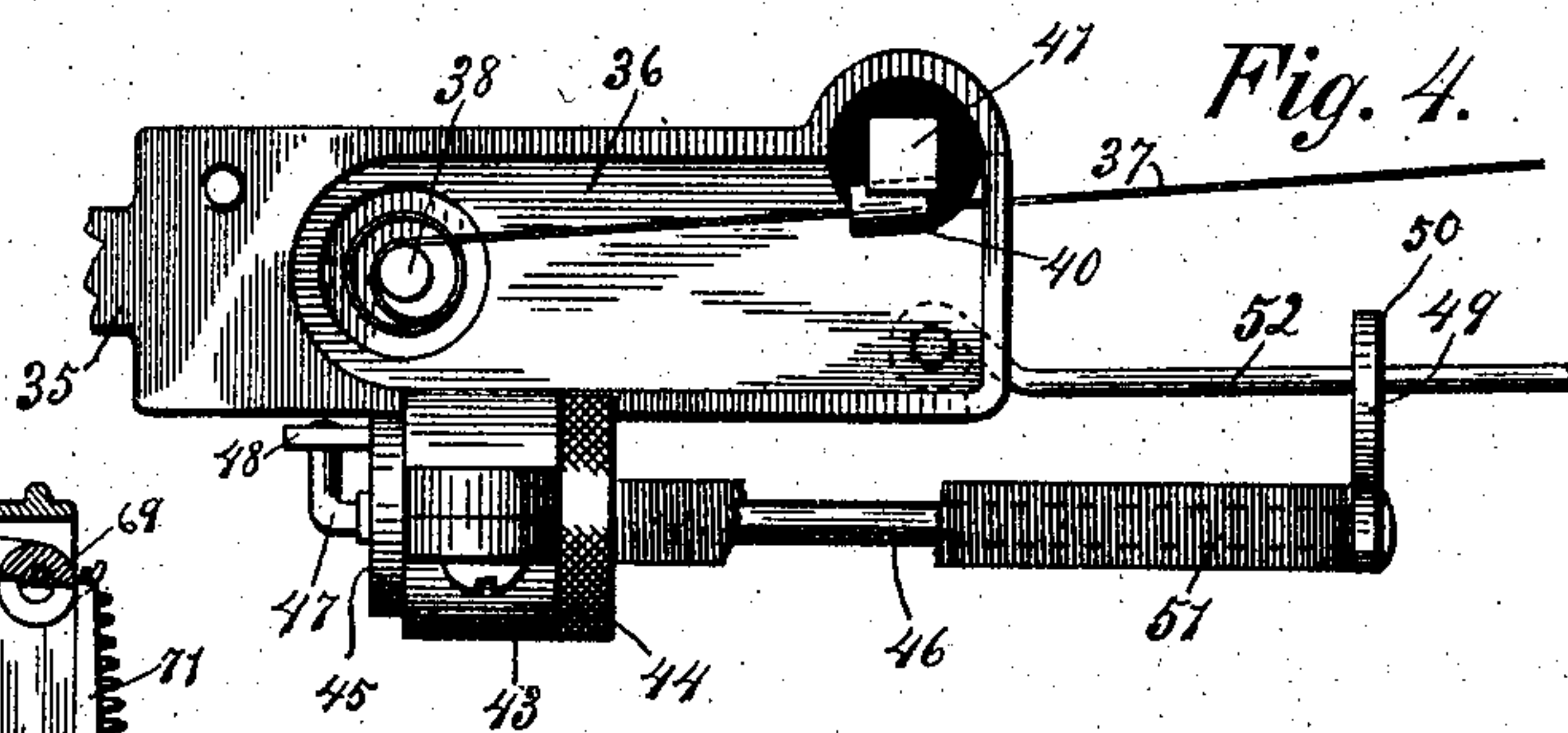


Fig. 5.

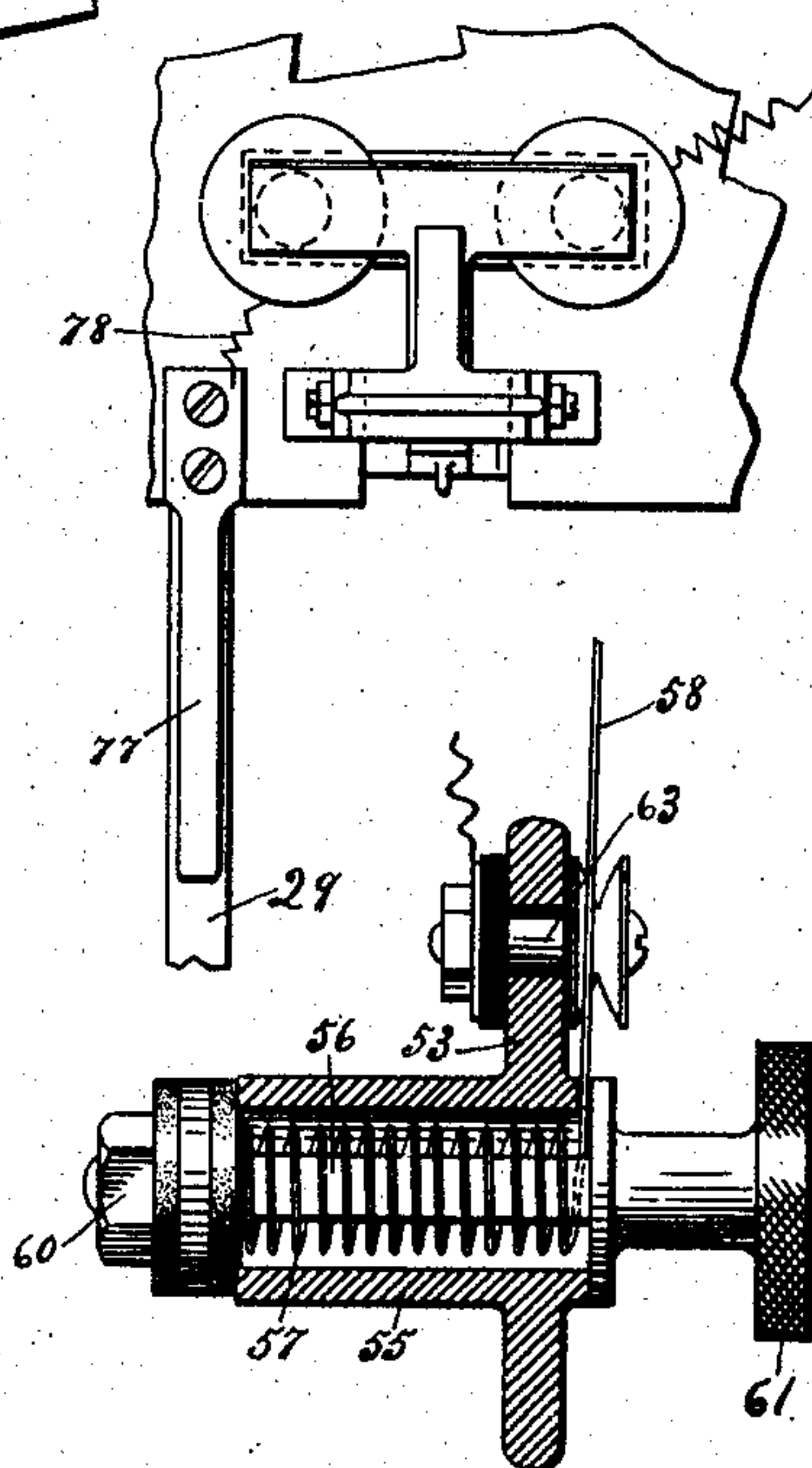


Fig. 6.

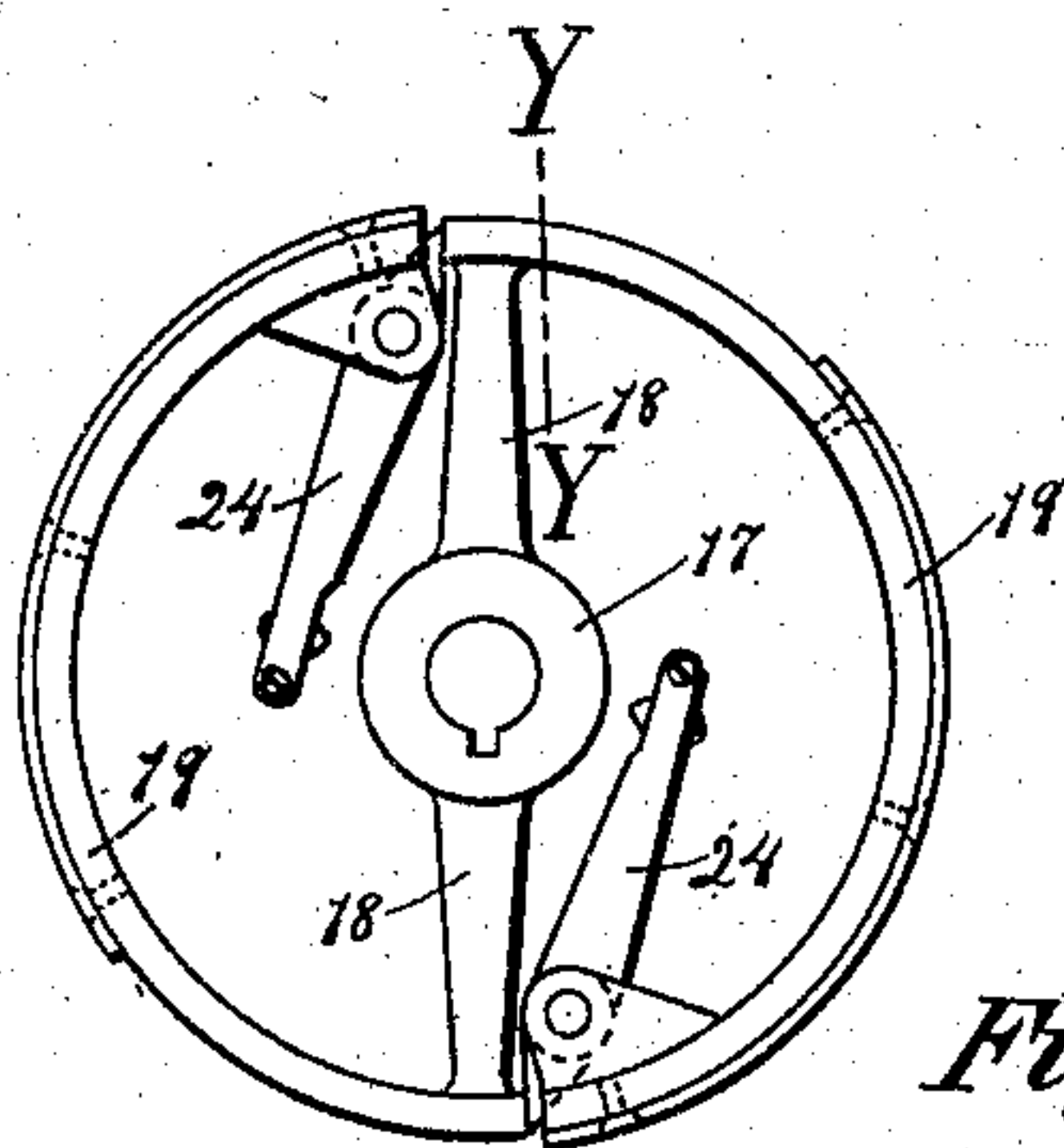


Fig. 7.

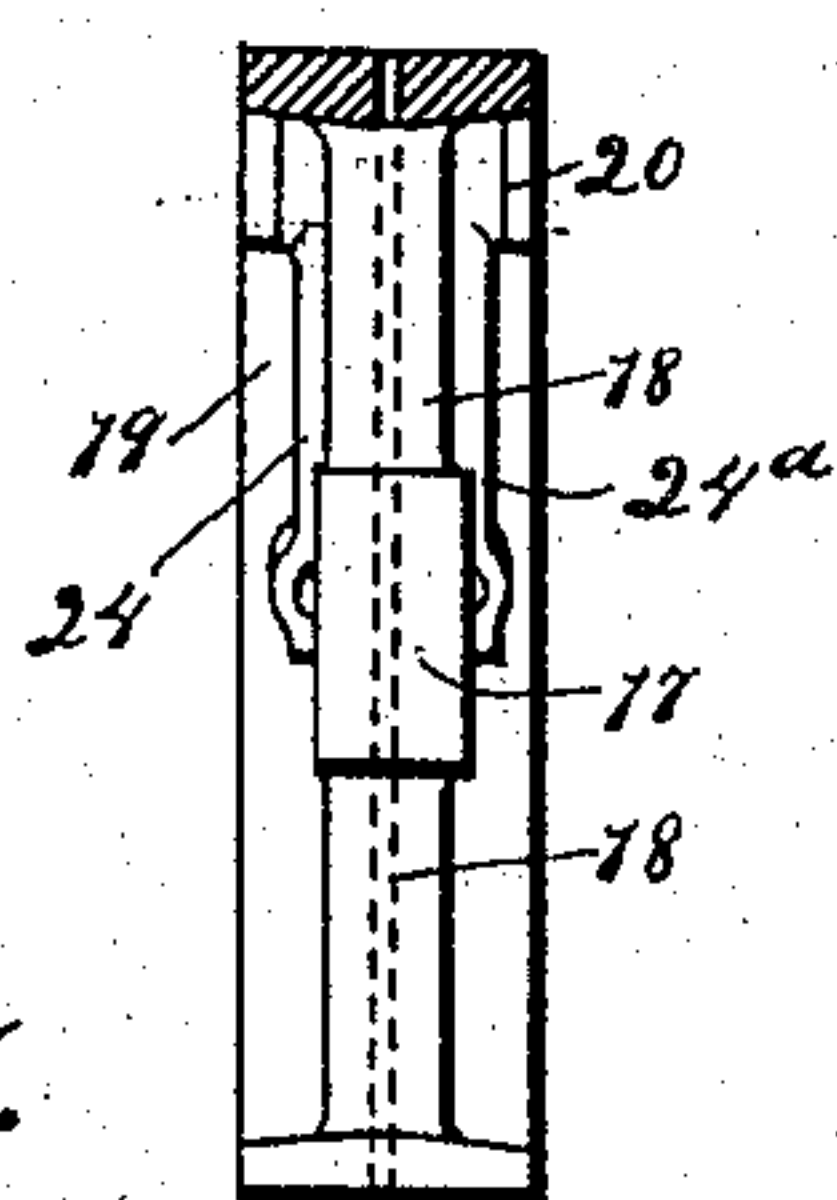


Fig. 8.

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UNITED STATES PATENT OFFICE.

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ELECTRICAL STOP-MOTION.

SPECIFICATION forming part of Letters Patent No. 781,287, dated January 31, 1905.

Application filed February 28, 1902. Serial No. 96,111.

To all whom it may concern:

Be it known that I, ULYSSES G. LEE, a citizen of the United States, and a resident of Madison, county of Lake, and State of Ohio, have invented certain new and useful Improvements in Electrical Stop-Motions, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates to an electrically-controlled stop-motion for knitting, spinning, spooling, winding, and other machines of a similar character and which is so organized that the breaking of the thread or yarn or the presence of a knot therein will effect the immediate stopping of the machine.

The invention consists of the arrangement and combination of parts hereinafter particularly described, and designated in the appended claims, and is illustrated in the accompanying drawings, in which—

Figure 1 illustrates the complete mechanism, comprising the clutch, electrical circuit, and circuit-closers in connection with a knitting-machine, the outline of the latter being shown in dotted lines. Fig. 2 is a plan view of the standard upon which are mounted the means controlled by the thread and designed to close the electric circuit, so as to release the clutch coupling the driving-pulley with the driving-shaft of the machine. Fig. 3 is a diametrical section, on an enlarged scale, through the driving-pulley, the clutch, and the brake-sleeve and showing the disposition of the electromagnet through the medium of which the clutch is released. Fig. 4 relates to a detail of the mechanism shown in Fig. 2. Fig. 5 is a detail of the electromagnet seen in Fig. 3 and its armature. Fig. 6 is a section on the line X X of Fig. 1. Fig. 7 is a face view of the combined clutch and brake. Fig. 8 is a section on the line Y Y of Fig. 7, and Fig. 9 is a detail of the yoke for actuating the clutch and brake-shoes.

In the drawings I have shown the invention applied to a knitting-machine 10, the outline of the end of the latter being indicated by dotted lines and the usual thread or yarn carrier by 11, although it will be understood

that it is applicable to any other machine in which a thread or yarn is used in connection therewith, such as winding, spinning, spooling machines, &c.

The driving-shaft 12, connected up with the operating parts for actuating the thread-carrier, cam, needles, &c., has mounted thereon at one end a loose driving-pulley 13, to which power is transmitted for operating the machine and which is coupled to the shaft 12 by a clutch 14, so arranged as to rotate with the shaft, but being capable of longitudinal movement relatively thereto. The clutch mechanism is provided with means which when the clutch is thrown out of action engage a braking sleeve or surface in order to arrest the motion of the machine when necessary. To this end the pulley 13, as shown in Fig. 3, is provided with an inner annular flange 15, and secured to and projecting outwardly from the frame of the machine is a similar flange or sleeve 16, which registers with the flange of the pulley. Located in the space between the flanges 15 and 16 and keyed to the shaft 12, so as to turn therewith, is a sleeve or hub 17, from the opposite sides of which project spokes or arms 18, the outer end of each of which is provided with a pair of parallel sectional rims or shoes 19 and 20, curved so as to conform generally to the inner faces of the flanges 15 and 16. The shoes 19 and 20 are preferably made integral with the spokes 18, and each pair thereof extends from the side of its spoke 18 opposite to the side from which the other pair of shoes extends from the other spoke.

Sliding on the hub 17 of the clutch and provided with slots 21 to receive the spokes 18 is a sleeve 22, having rounded bosses 23, adapted to engage the inner ends of the levers 24, one of which is pivoted near or at the free end of each of the shoes 19, and similar levers 24^a, similarly located with reference to the shoes 20, the outer ends of the levers bearing against the spokes 18, so that when the inner ends thereof are moved outwardly the shoes will be expanded, the shoes being sufficiently elastic to permit of such expansion.

Pivoted at 25 back of the sleeve 16 is a yoke

26, provided with inwardly-extending pins 27, engaging an annular recess 28 in the sleeve 22. A sliding clutch-operating bar 29 is supported by a bracket 30, secured to the frame of the machine, and is forced normally outward by a spring 31, connected to the bracket near its free end and to the bar 29 at some point between the point of attachment to the bracket and the inner end thereof, so as to separate the clutch when released. The function of the bar 29 is to throw the clutch into engagement with the driving-pulley 13, the uncoupling of the same being accomplished in a manner to be hereinafter explained.

67 indicates an electromagnet, in the present instance disposed above the brake-sleeve 16 and the armature 68 of which is pivoted at 69 to a support 70, the pivoted end of the armature serving as a detent which when the electromagnet is deenergized projects into the path of the upper end of a lever 71, pivoted to a lug 72, projecting from the brake-sleeve 16, Fig. 3. The lower end of the lever 71 is normally in the path of a detent 73, pivoted at 74 at the upper end of the yoke 26, the said detent being held upwardly by an expansion-spring 75, seated in a cup 76 in the said yoke.

Secured to and insulated from the lug 72 of the brake-sleeve and projecting so as to have electrical contact with the bar 29 when the latter is pushed inwardly is a spring-plate 77, (see Fig. 1,) from the inner end of which a wire 78 leads to one of the coils of the electromagnet.

Secured by a clamp to the frame of the machine 10 is a standard 32, carrying at its lower end a plate 33, having one or more bobbin-pins 34. The upper end of the standard 32 is provided with a pair of arms 35, only one of which need be described, as they are in all respects the same. Such arm has a recess 36, in which is located a spring-finger 37, the inner end of which is coiled about and secured to a pin 38, set in the said recess, the outer end of the finger extending through a horizontal slot 39 and projecting beyond the end of the arm 35. The finger 37 may be provided with a contacting piece 40, although it is not essential, in order to insure a good connection with a binding-post 41, insulated from the arm 35, and a cover or cap 42 may be provided for the recess 36. Located at the side of the arm opposite to the side at which the binding-post 41 is secured is a bracket 43, in which is clamped a spool 44, provided with a tubular extension 45, extending parallel with the arm 35. Passing through the spool 44 and its tubular extension 45 is a spindle 46, the inner end 47 of which is bent at an angle so as to engage a stop 48, fixed in the bracket 43. The outer end of the spindle 46 is provided with a substantially V-shaped thread-guide 49, one leg, as 50, of which extends substantially horizontally and is turned up-

wardly at its outer end. A spiral spring 51 is coiled about the extension 45 of the spool 44, one of its ends being anchored to the spool and the other to the V-shaped thread-guide 49, and the tension of this spring may be adjusted by turning the spool 44 in the bracket 43, within which it is frictionally held. The spring 51 tends to throw the V-shaped thread-guide 49 upwardly and the bent end 47 of the spindle against the stop 48. Projecting from the under side of the arm 35 is a finger 52, which is arranged parallel to and below the spindle 46, so that the spring-finger 37 may oscillate between them.

Secured to the standard 32 between its ends is a bracket 53, at the outer end of which depends the usual thread-holder 54, which is designed to prevent the yarn or thread from slackening when the tension on the cord is removed by the movement of the thread or yarn carrier 11.

Seated in a sleeve 55, Fig. 6, projecting from the bracket 53, is a spindle 56. A spring 57 is coiled about the said spindle, one of its ends being anchored thereto, the other end projecting, as an arm 58, beyond the end of the bracket 50 and being provided with a loop 59, through which the thread passes. The spindle 56 is frictionally held by a nut 60 and provided with a thumb-nut 61, by which it may be turned to vary the tension of the spring. When the machine is in operation, the arm 58 is bent downwardly, as shown in Fig. 1, against the tension of the spring 57; but upon the breakage of the thread the unwinding of the spring causes the arm 55 to be thrown up, so as to make contact with a binding-post 63, which is carried by and insulated from the bracket 53.

One branch 80 of the circuit is led through the tubular standard 32 to the binding-post 41, the other passing through the coils of the electromagnet to the contact-piece 77. When the machine is in operation, the latter branch of the circuit is grounded in its frame through the arm 29, the former being broken at the binding-post 41. Upon contact of the spring-arm 37 with this binding-post the circuit is completed through the machine and the electromagnet is energized. A branch wire, as 81, leads to the binding-post 63, so that when the spring-arm 58 engages therewith the circuit is closed through the spring-arm to the machine. Another wire, 82, passes to the binding-post 83 of the arm 35 at the top of the standard 32 to put into electrical connection the mechanism located therein, the parts being the same in both arms, as has heretofore been stated.

A thread-gage or knot-detector is shown at 64 and comprises a bar provided with apertures 65 of different sizes and supported by an arm 66, secured to the standard 32. This thread-gage, through the medium of the thread which passes through one of the aper-

tures thereof, serves as a current-controller, in that when the movement of the thread is arrested by the engagement of a knot therein with the gage the tension due to the feeding of the thread to the needles of the machine will cause it to slide off the guide 49 and release the finger 52, so that the latter will close the circuit through the binding-post 41.

The thread feeding from one of the bobbins, as 84, passes through one of the apertures 65 of the thread-gage or knot-detector 64, depending upon the size of the yarn, and thence in front of the finger 52 and back of the spring contact-wire 37, then over the leg 50 of the thread-guide 49, and back behind the wire 37 again and down in front of the finger 52, the tension on the thread holding the spring 37 out of engagement with the binding-post 41. The thread is then led under a hook or guide 90 through the eye of the thread-holder 54, then through the eye 59, the spring-arm 58 being bent downwardly and the contact with the binding-post 63 broken, and is thence led to the thread or yarn carrier, from which it is fed to the needles of the machine.

The operation of the stop-motion is as follows: Assuming that there is a knot in the yarn of such size as not to pass through the aperture of the knot-detector, the tension on the yarn will immediately overcome the resistance of the spring 51 and the thread-guide will turn, permitting the thread to slip off the arm 50, thereby releasing the spring 37, which then closes the circuit through the binding-post 41. The circuit now being closed, the electromagnet is energized, thereby attracting the armature 68 and releasing the lever 71, whereupon the spring 31, overcoming the resistance of the spring 85, draws the bar 29 outwardly, thereby moving the bosses 23 out of engagement with the arms of the levers 24 and permitting the shoes 19 to contract and move out of engagement with the driving-pulley, the bosses then coming in contact with the levers 24^a, forcing the brake-shoes 20 into engagement with the brake-sleeve 16, so as to effectually brake the shaft 12 and instantly stop its rotation. The same result will follow in case the thread between the bobbin and the holder 54 breaks, the contact-arm 37 being thereby released, and also in case a break occurs in the thread after it leaves the holder 54, in the latter case the circuit being closed by contact of the released spring-arm 58 with the binding-post 63. As soon as the sliding bar 29, to which the clutch-operating mechanism is connected, is released by the closing of the circuit connection between it and the spring 77 is broken and the circuit thereby opened again and the battery thrown out of action. This is designed to prevent wasting of the battery during the time that either contact-arm 37 or 58 is in contact with its

companion binding-post. In order to start the machine again, it is only necessary to shove in the sliding bar 29, the brake-shoes 20 being thereby released and the clutch-shoes forced outwardly, so as to couple the shaft 12 and driving-pulley 13, the parts being held in such relation by the engagement again of the detent 73 with the lever 71. A spring 86 is provided for lifting the armature 68 when the electromagnet is deenergized, as is usual with such devices.

To permit of the machine being stopped at will, push-buttons 87 are provided at convenient points on the machine, connection being made with the conductor 80 by a branch wire 88 and another wire, as 89, which is grounded in the frame in the machine, or a separate circuit may be provided, if desired. The operation of the mechanism in connection with the push-button is in all respects the same as that heretofore described with reference to the contacting devices governed by the thread.

I claim as my invention—

1. In a stop-motion for knitting and like machines, in combination, an electric circuit, a thread-controlled circuit-controller in said circuit, a bracket, an oscillatable spindle mounted in the bracket, a thread-guide fixed to the spindle and guiding the thread across the path of the circuit-controller, a spring coiled about the spindle and having its ends anchored to the bracket and the guide, and a knot-detector located between the source of yarn-supply and the guide.

2. In a stop-motion for knitting and like machines, in combination, an electric circuit, a normally open circuit-controller in said circuit consisting of an oscillatable spring-arm, a yieldable thread-guide located on one side of the path of the controller, a rigid guide-arm located on the opposite side of such path, a knot-detector located between the source of yarn-supply and the thread-guide, and a thread-guide, leading the thread from the yieldable guide across the path of the controller and past the fixed guide-arm.

3. In a stop-motion for knitting and like machines, in combination, an electric circuit, a circuit-controller in said circuit consisting of an oscillating spring-arm, a bracket, an oscillatable spindle mounted in the bracket, a V-shaped thread-guide fixed to the stem and located beyond the circuit-controller, a spring coiled about the spindle and having its ends anchored to the bracket and the guide, a stop for maintaining the guide in operative position, a rigid arm parallel with the spindle and located at the opposite side of the path of the circuit-controller, the said rigid arm and thread-guide being designed to guide the yarn across the path of the circuit-breaker, and a knot-detector positioned between the source of yarn-supply and the thread-guide.

4. In an electrically-controlled stop-motion

for knitting and like machines, in combination,
an electric circuit, a spring circuit-closer, a
thread-gage interposed between the source of
yarn-supply and the circuit-closer, a spring-
5 supported thread-guide so located as to guide
the thread across the path of the circuit-closer,
the spring of the guide acting in opposition to

the thread-tension, and means controlled by
the electric circuit for stopping the machine.

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