

No. 836,691.

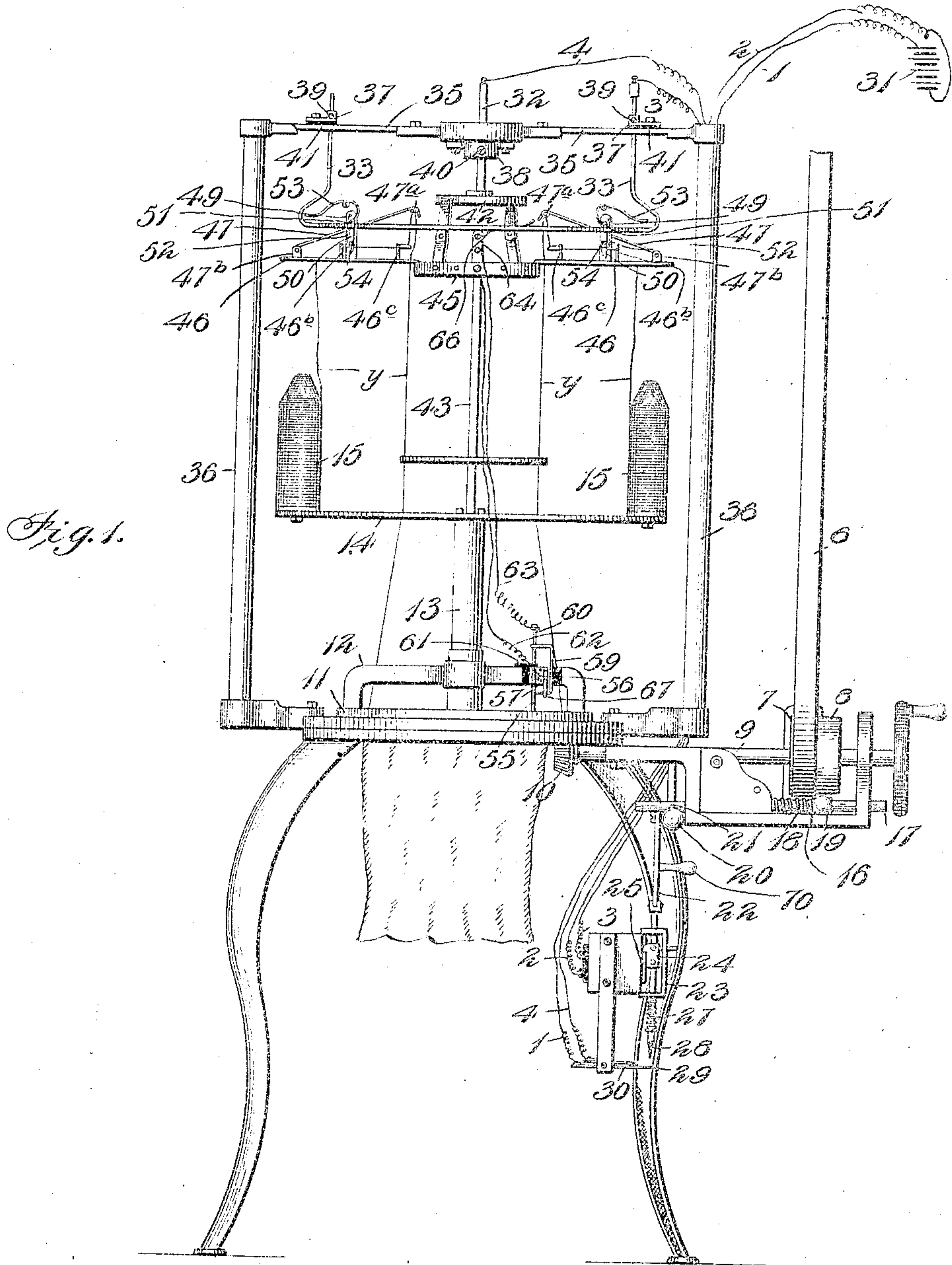
PATENTED NOV. 27, 1906.

E. H. LUDWIG.

STOP DEVICE FOR CIRCULAR KNITTING MACHINES.

APPLICATION FILED JAN. 29, 1906.

3 SHEETS—SHEET 1



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Witnesses

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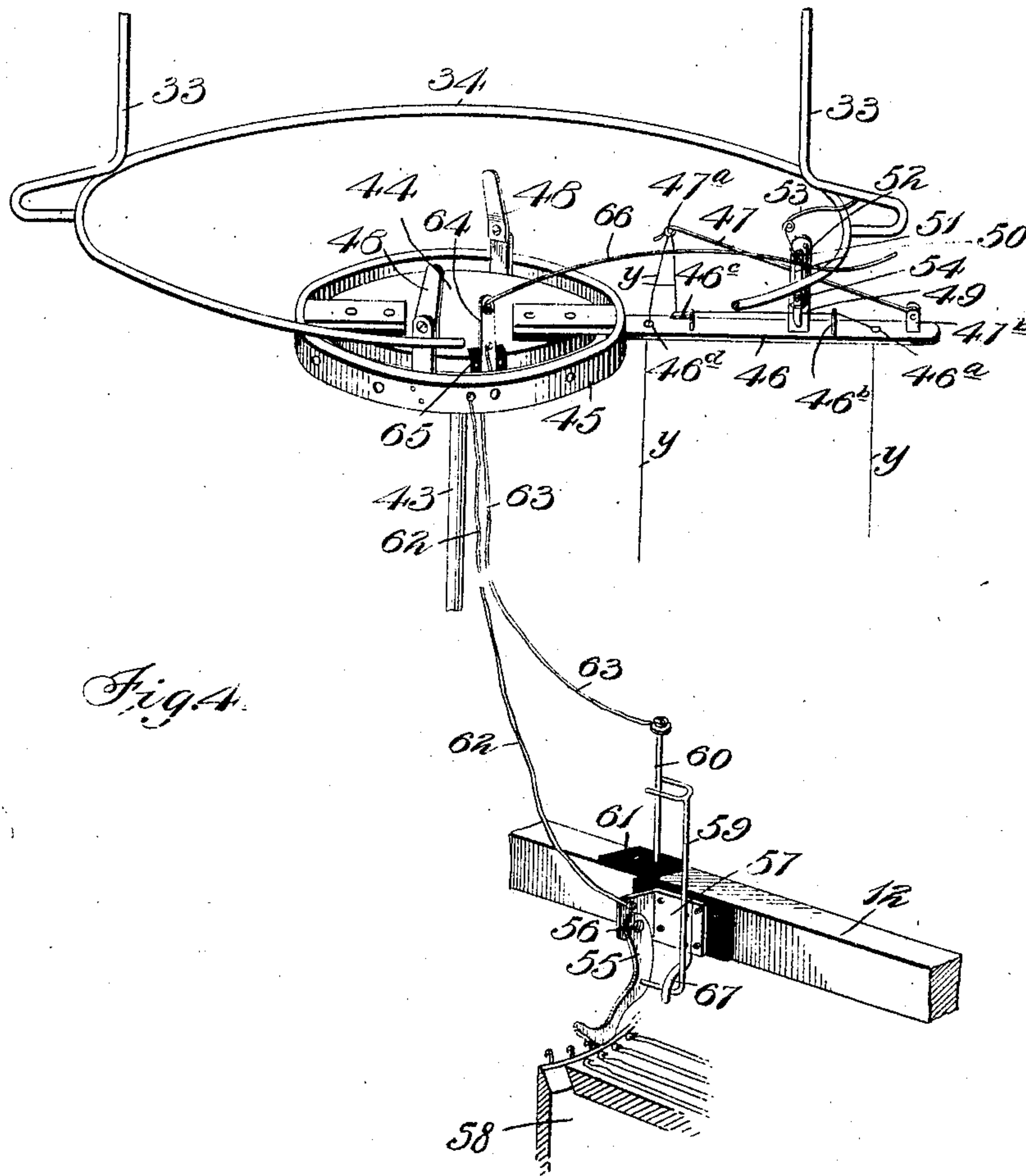


Fig. 4.

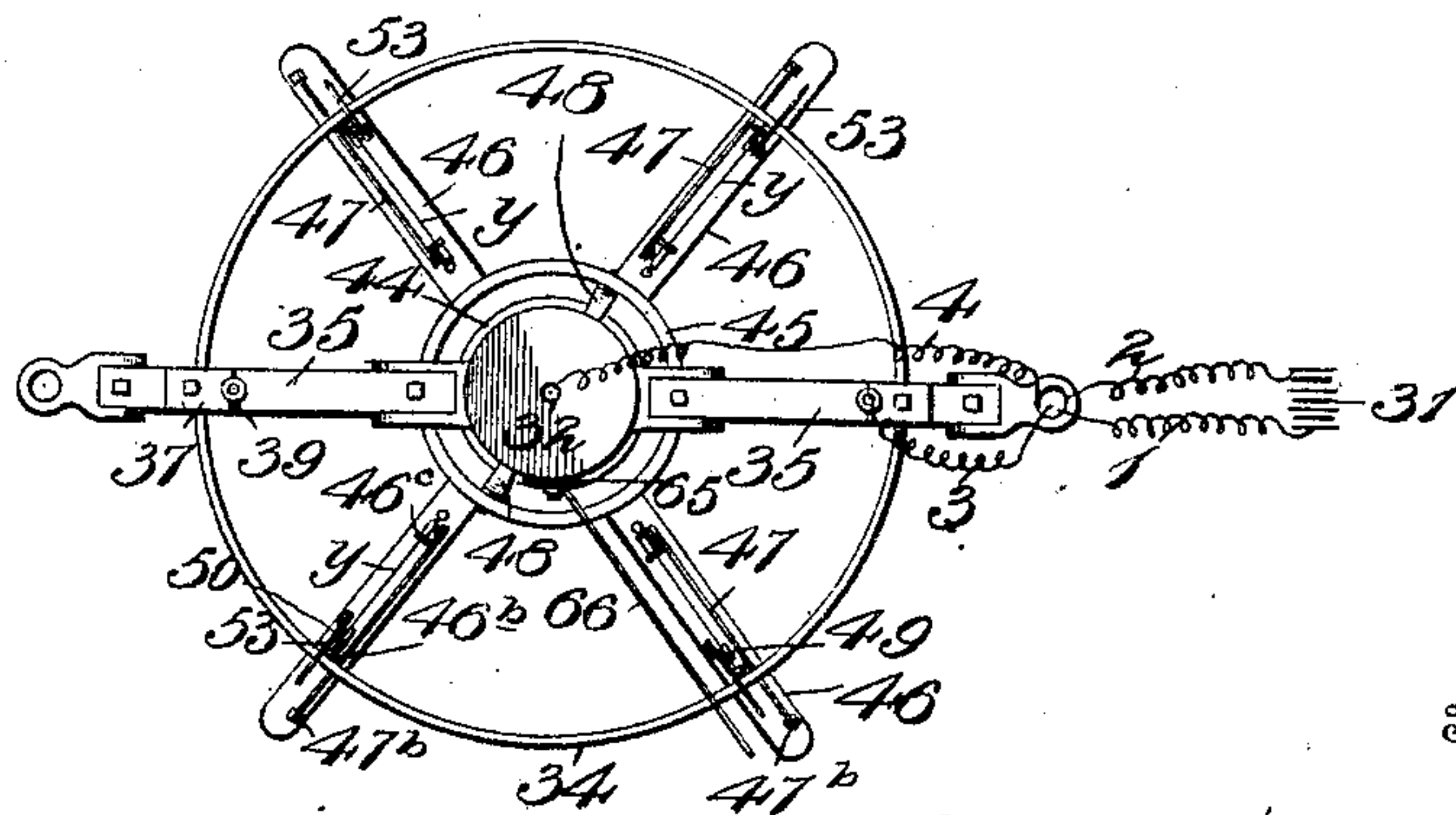


Fig. 2.

Witnesses

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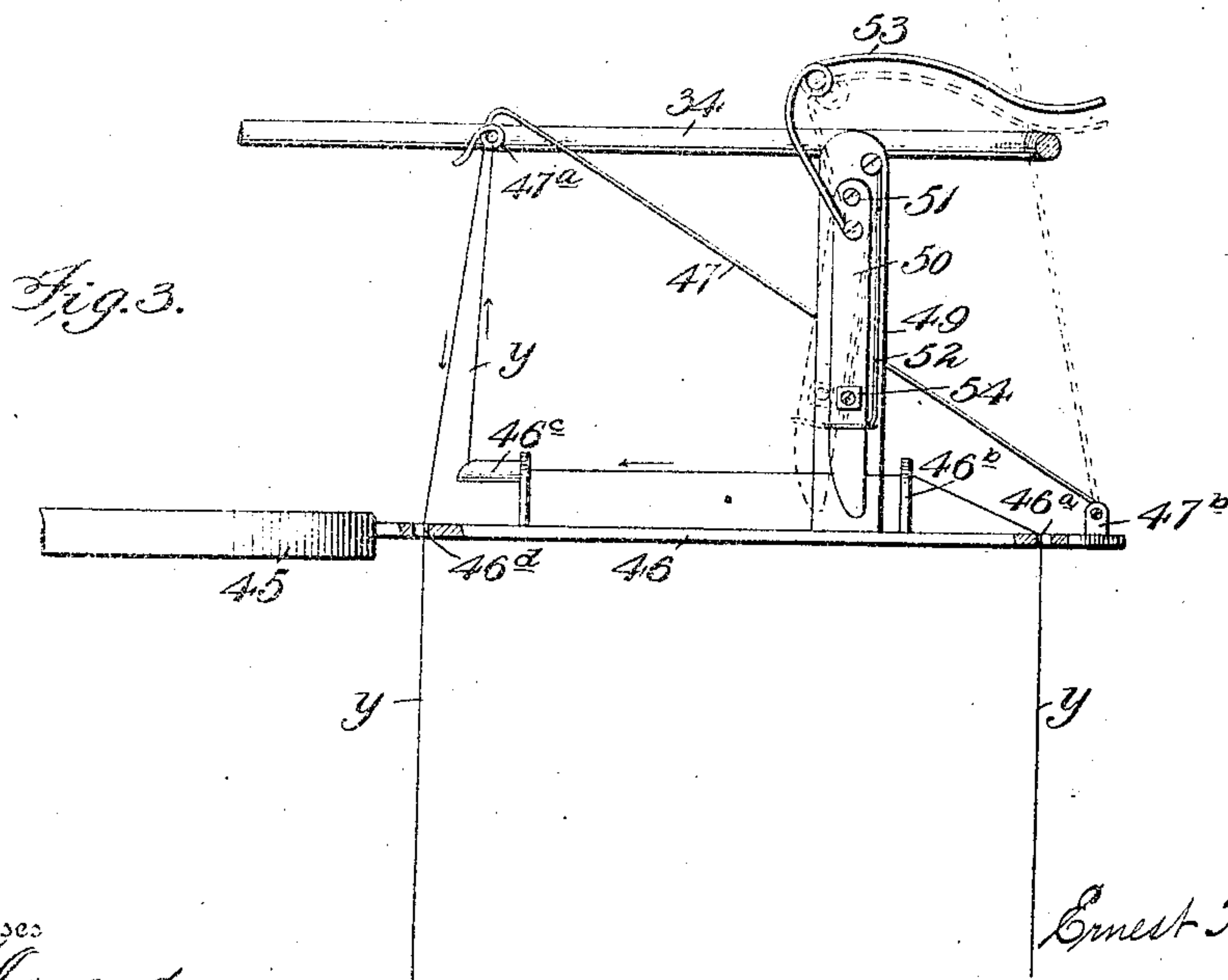
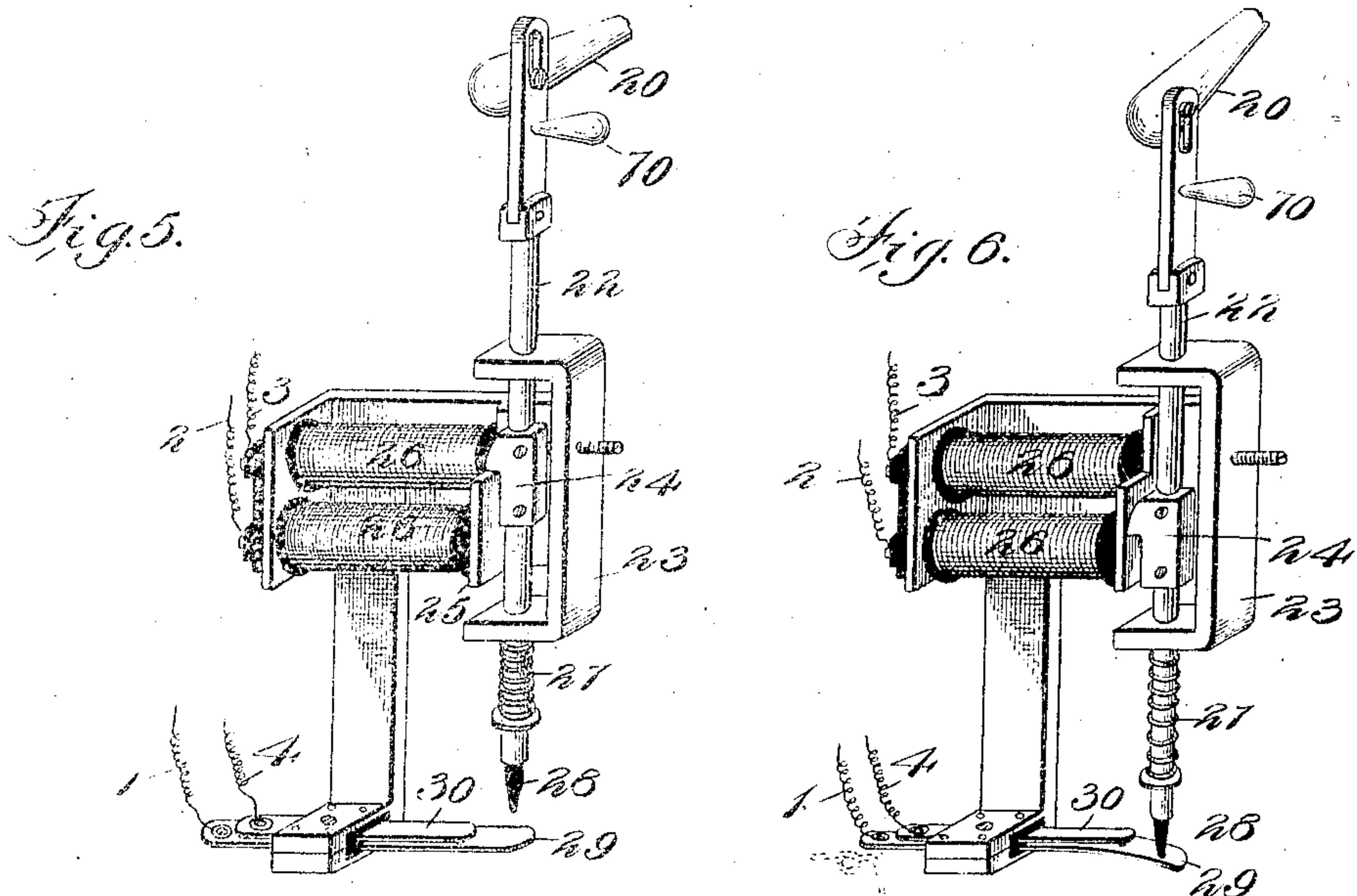
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3 SHEETS—SHEET 3



Witnesses

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UNITED STATES PATENT OFFICE.

ERNEST H. LUDWIG, OF MANITOWOC, WISCONSIN.

STOP DEVICE FOR CIRCULAR-KNITTING MACHINES.

No. 836,691.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed January 29, 1906. Serial No. 298,415.

To all whom it may concern:

Be it known that I, ERNEST H. LUDWIG, a citizen of the United States, residing at Manitowoc, in the county of Manitowoc and State of Wisconsin, have invented new and useful Improvements in Stop Devices for Circular-Knitting Machines, of which the following is a specification.

This invention is an electric stop device for use on a circular-knitting machine.

The object of the invention is to produce new and improved means for stopping the machine when any one of the threads breaks or when the yarn runs off the bobbin and to effect the stoppage before the end of the yarn is all knitted up.

A further object of the invention is to form a knot device which will stop the machine when a big knot or other imperfection in the yarn occurs, the stoppage being effected without breaking the yarn either at the knot or at the needle.

A further object of the invention is to furnish means for stopping the machine when any imperfection occurs in the fabric or when disarrangement of a needle happens or if a latch or a needle should break or imperfect work results from any other cause.

The stop devices are such that in any case the machine will be stopped immediately before any damage is done either to the goods or to the machine.

In the accompanying drawings the invention is shown applied to a machine in which the entire upper part of the machine with the bobbin-carrier revolves; but the invention may also be applied to machines having a fixed bobbin-support and in which the needle-cylinder and the fabric revolve.

In the accompanying drawings, Figure 1 is a side elevation of a machine provided with the invention. Fig. 2 is a top view thereof. Fig. 3 is an enlarged detail illustrating the break device and also the knot device and the means whereby the circuit is closed by either of said devices. Fig. 4 is an enlarged detail in perspective, illustrating the circuit-closing attachment, which acts when an imperfect fabric is produced from a needle breaking or otherwise. Figs. 5 and 6 are enlarged details of the electrically-operated latch for controlling the belt-shifting device by means of which the machine is started or stopped.

Referring particularly to Fig. 1, 6 indicates the driving-belt, 7 the fast pulley, and 8 the

loose pulley on the driving-shaft 9, which has a pinion 10, which drives the cam plate or ring 11, carrying the arch 12, which supports the central standard 13, on which the bobbin-carrier 14 is mounted, so that the bobbins 15 revolve with the machine. The belt-shifter 16 is carried by a sliding rod 17 and serves to shift the belt 6 from the fast to the loose pulley. It is operated in one direction to stop the machine by a coil-spring 18 and in the other direction to start the machine by a hand-lever 19. The rod 17 is controlled by a latch consisting of a lever 20, having a projection arranged to engage in a notch 21 in the rod when said rod is thrown in to shift the belt onto the fast pulley. The lever 20 is pivotally connected to a rod 22, which is movable up and down in a bracket 23, attached to the frame of the machine, and this rod carries a latch 24, which engages over a swinging armature 25, arranged to be actuated by the electromagnets 26. A spring 27, coiled around the rod under the bracket, tends to force said rod down, and thereby release the latch to allow the belt-shifter to stop the machine. At its lower end the rod 27 carries an insulating-point 28, arranged to strike one leaf 29 of a circuit opener or switch, the other leaf of which is indicated at 30. The magnets and circuit-closer are supported by brackets on the frame of the machine. The purpose of the switch is to open the circuit as soon as the machine is stopped.

A battery or other source of current is indicated at 31, connected on one side by wire 1 to the leaf 29 of the switch and on the other side by a wire 2 to one end of the magnet-coil. The leaf 30 of the switch is connected by a wire 4 to a central post 32, and the other end of the magnet-coil is connected by a wire 3 to a rod 33, which supports and is connected to a copper or other conducting-ring 34. The post 32 and ring 34 are concentric with the axis of rotation of the machine, and they are supported by a cross-piece 35, mounted upon hollow standards 36, resting upon the bed-plate of the machine. The wires referred to may conveniently be passed through one of said standards, as shown. The rods 32 and 33 are capable of necessary vertical adjustment by means of brackets 37 and 38, having set-screws 39 and 40, the brackets being supported on the cross-piece 35. Insulation is shown at 41. At the lower end of the post 32 is a metal disk 42.

Rotatable with the central standard 13 is a

staff 43, which has at the top a head 44, surrounding which is a metal ring 45, carried by said head. Projecting radially from this ring 45 are metal arms 46, which have guides for the yarn and which carry the break and knot devices. These arms correspond in position and number to the bobbins and more or less may be used accordingly.

The stop device for a break is shown in detail in Fig. 3. The yarn y is drawn from the bobbin through a guide-hole 46^a in the arm 46 and thence through a guide-hole in an upright 46^b on the arm, then through a tension device 46^c, thence through a loop 47^a at the inner end of a spring-arm 47, and thence through a guide-hole 46^d down to the needles. The spring-arm 47 consists of a piece of wire which is fastened at its outer end to a lug 47^b on the end of the arm 46, so that it tends to lift or swing up, being normally prevented by the tension of the yarn. It should be stated that the ring 45 carries metal spring-fingers 48, which bear against the rim of the disk 42, so that said ring and the arms 46 are charged from the wire 4. The ring 34 is charged from the wire 3 and is located in such position above the arm 46 that when the yarn breaks or the end runs off the bobbin the released tension allows the wire 47 to spring up and come in contact with the ring 34, as shown in dotted lines in Fig. 3, thereby closing the circuit.

The knot device is also shown in Fig. 3 and consists of a finger 49, projecting from the arm 46 and having pivoted thereto at 51 a swinging finger 50, which carries a wire 53, bent so as to normally project above the ring 34. A spring 52 is hooked around the finger 50 and fastened to the finger 49, and a screw 54 serves to adjust the distance of the lower end of the finger 50 from the finger 49. The yarn y runs between the fingers 49 and 50, and the device is so set that normally the yarn will cause no movement of the swinging finger; but in case a knot or large imperfection in the yarn reaches said finger it will swing the same inwardly, as shown in dotted lines in Fig. 3, thereby bringing the wire 53 in contact with the ring 34, which also closes the circuit.

The stop device for imperfect fabric resulting from broken needle or other cause is specifically shown in Fig. 4. A swinging foot 55 is pivoted at 56 to a bracket 57, secured to the arch 12 in proper position to travel over the fabric on the rim of the cylinder 58. This foot carries a bent fork 59, the branches of which embrace therebetween a post 60, supported upon a piece of insulation 61 on the arch 12. The foot is pressed to contact with the fabric by a spring 67. The bracket and foot are connected by a wire 62 to the ring 45, and the post 60 is connected by a wire 63 to a metal piece 64, set in a block of insulation 65 on the head 44, and this piece 64

carries an outwardly extending wire brush or strip 66, the outer end of which rests in wiping contact upon the ring 34. In case of a hole or drop-stitch in the fabric the foot 55 will drop into the hole, causing one arm of the fork 59 to come in contact with the post 60, thereby closing the circuit and stopping the machine. If a needle should break or get out of order, the work in the machine will bunch up at such place, and when the foot 55 runs over such spot it will lift the same and throw the other arm of the fork 59 in contact with the post 60, thereby closing the circuit.

The switch at 29 and 30 is, as said before, closed when the latch is lifted and when the machine is going. When the circuit is closed by any one of the stop devices above described, the magnet attracts the armature 25, thereby releasing the latch 24 and allowing the rod 22 to drop in consequence of the spring 27. This releases the latch and allows the spring 18 to throw the belt-shifter and shift the belt to the loose pulley. When the rod 22 drops, its lower point 28 strikes the leaf 29, and thereby opens the circuit at the switch, and the circuit remains open until the rod and latch are again lifted, which may conveniently be done by a handle 70, projecting from the rod.

I claim—

1. An electrically-operated stop device for circular-knitting machines, having a normally open electric circuit, two contact devices connected respectively to opposite sides of the circuit, one of said devices being relatively fixed, and the other being rotatable with the rotary parts of the machine and normally held out of contact with the said device by the tension of the yarn and arranged to close the contact when the tension is interrupted, and means actuated by the closure of the contact to stop the machine.

2. An electrically-operated stop device for circular-knitting machines, having an electric circuit containing a source of energy, a contact-ring connected to one side of the circuit, yarn-guides rotating with the machine and provided with springs connected to the other side of the circuit and engaged by the yarn and held out of contact with the ring by the tension thereof, and arranged to spring into contact when the tension is interrupted, and electrically-operated means to stop the machine when said contact occurs.

3. An electrically-operated stop device for circular-knitting machines, comprising a normally open electric circuit having a source of energy, and means actuated thereby to stop the machine when the circuit is closed, in combination with circuit-closing parts which comprise a ring connected to one side of the circuit, and yarn-guiding arms connected to the other side of the circuit and rotating with the bobbin-carrier in proximity to said ring, and having yielding parts en-

gaged by the yarn and retracted by the tension thereof and arranged to move to contact with the ring when the tension is interrupted.

4. In an electrically-operated stop device for circular-knitting machines, in combination, a normally open electric circuit having a source of energy, means actuated thereby to stop the machine when the circuit is closed, a contact-ring connected to one side of the circuit, and a plurality of yarn-guiding arms connected to the other side of the circuit and having yielding parts in proximity to the ring, each of said parts being engaged and held in retracted position by the yarn from one of the bobbins and adapted to advance to contact with the ring when the tension on the yarn is interrupted, the ring and arms being rotatable with respect to each other.

5. In an electrically-operated stop device for circular-knitting machines, in combination, a normally open electric circuit having a source of energy, means actuated thereby to stop the machine when the circuit is closed, a rotary bobbin-carrier having arms rotatable therewith and corresponding in number with the bobbins, each arm being provided with a movable contact part in the circuit and engaged by the yarn and operated by abnormal condition thereof, and a fixed contact-ring in the circuit and extending around the axis of said carrier in proximity to the arms, the said contact parts being constructed and arranged to strike the ring when operated.

6. In an electrically-operated stop device for circular-knitting machines, in combination, a normally open electric circuit having a source of energy, means actuated thereby to stop the machine when the circuit is closed, a rotary bobbin-carrier above the bed of the machine, guide-arms for the yarn, supported above the bobbins and rotating therewith, a tension device and a knot device carried by each arm and engaged by the yarn and connected to one side of the circuit, and a ring supported above the plane of rotation of said arms and connected to the other side of the circuit, the tension and knot devices having members extending toward and arranged to contact with the ring when the devices are actuated.

7. In an electrically-operated stop device for circular-knitting machines, in combination, a normally open electric circuit having a source of energy, means actuated thereby to stop the machine when the circuit is closed,

a rotary head having arms projecting therefrom and provided with guides for the yarn, a knot device on each arm comprising two fingers between which the yarn runs, one finger being pivoted to swing when struck by a knot and having an extending contact member connected to one side of the circuit, and a ring connected to the other side of the circuit and extending around the axis of the head and so located that the contact member will strike the same when the finger is swung.

8. In an electrical stop device for circular-knitting machines, in combination, a normally open electric circuit having a source of energy, means actuated thereby to stop the machine when the circuit is closed, a swinging foot which travels over the fabric beside the needles, a contact device carried by said foot and connected in one side of the circuit, and an opposite contact device connected in the other side of the circuit, one of the said connections including a conducting-ring and a brush which travels around the same.

9. In an electrical stop device for circular-knitting machines, in combination, a normally open electric circuit having a source of energy, means actuated thereby to stop the machine when the circuit is closed, a swinging foot which travels over the fabric beside the needles and having a contact device connected to one side of the circuit, and a cooperating contact device connected to the other side of the circuit, one of said devices having opposite points between which the other device is located, so that the circuit will be closed by swing of the foot in either direction.

10. In an electrical stop device for circular-knitting machines, the combination with a normally open electric circuit having a source of energy, and means actuated thereby to stop the machine when the circuit is closed, of a fixed conducting-ring extending around the axis of the machine and connected to one side of the circuit, and a plurality of circuit-closing stop devices of different kinds carried by the rotating parts of the machine and each having a contact-piece arranged to close upon the ring.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST H. LUDWIG.

Witnesses:

FRANK HOFFMAN,

ALMA E. KLINGHOLZ.