

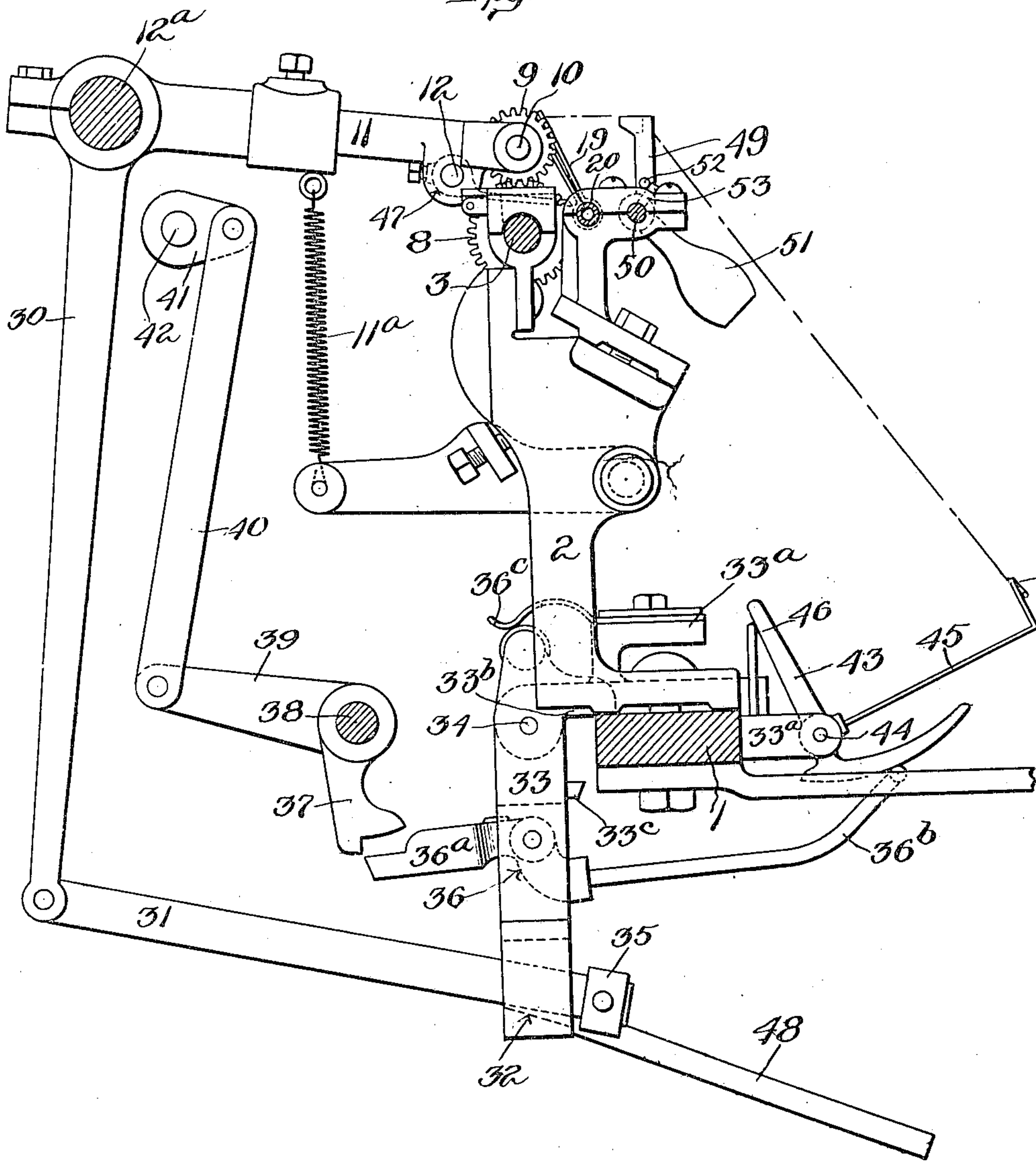
No. 831,564.

PATENTED SEPT. 25, 1906.

J. O. McKEAN.  
WINDING MACHINE.  
APPLICATION FILED DEC. 19, 1903.

6 SHEETS—SHEET 1.

*Fig. 1.*



Witnesses:

Robert Cushman  
Joseph T. Brennan

Inventor:

John O. McKean  
by Roberts & Mitchell,  
Attorneys.

No. 831,564.

PATENTED SEPT. 25, 1906.

J. O. McKEAN.  
WINDING MACHINE.  
APPLICATION FILED DEC. 19, 1903.

5 SHEETS—SHEET 2.

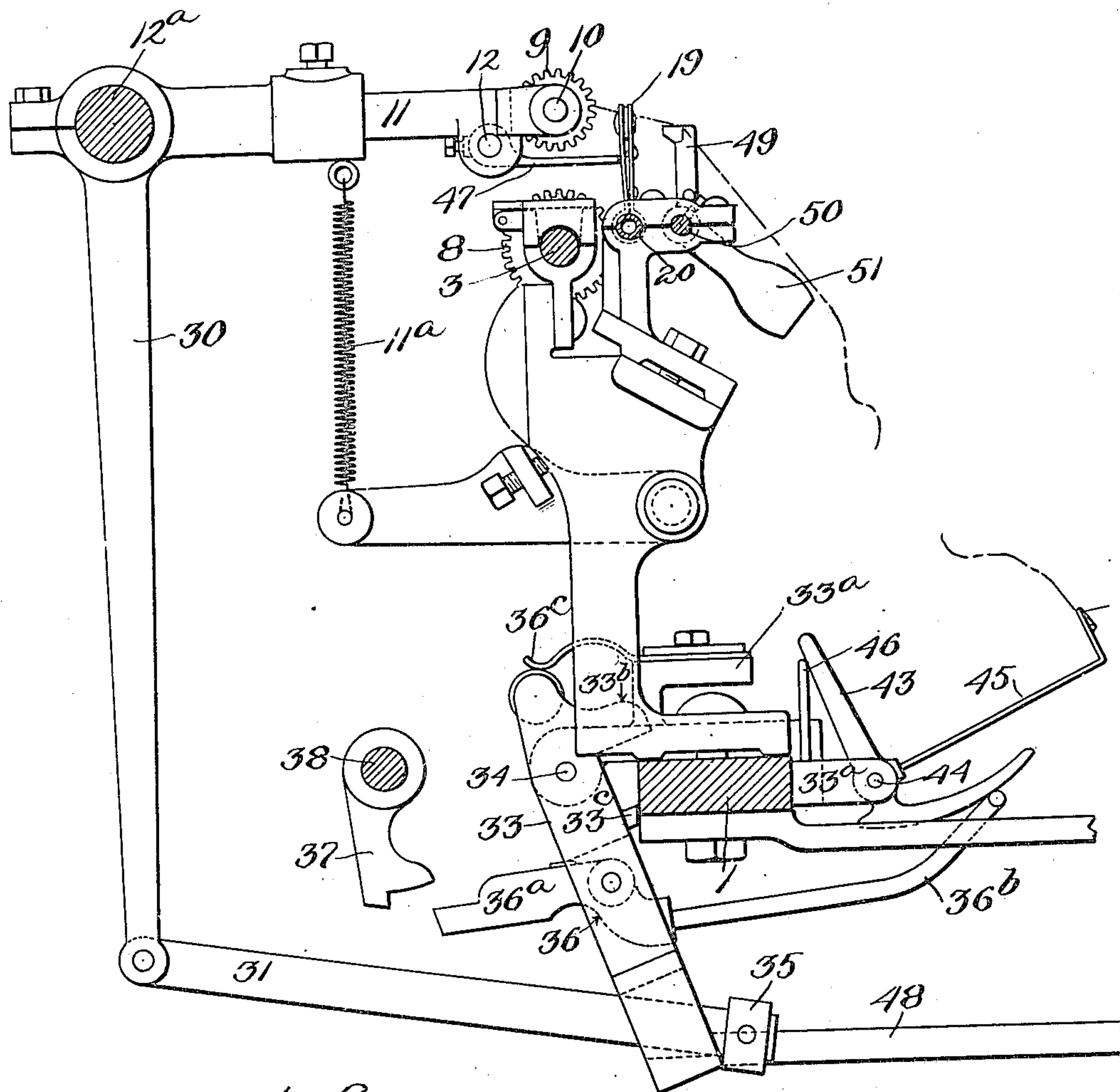


Fig. 2.

Witnesses:  
C. J. Woodberry  
Joseph T. Brennan

Inventor:  
John O. McKean  
By Roberts & Mitchell,  
Attorneys.

No. 831,564.

PATENTED SEPT. 25, 1906.

J. O. McKEAN.  
WINDING MACHINE.  
APPLICATION FILED DEC. 19, 1903..

5 SHEETS—SHEET 3.

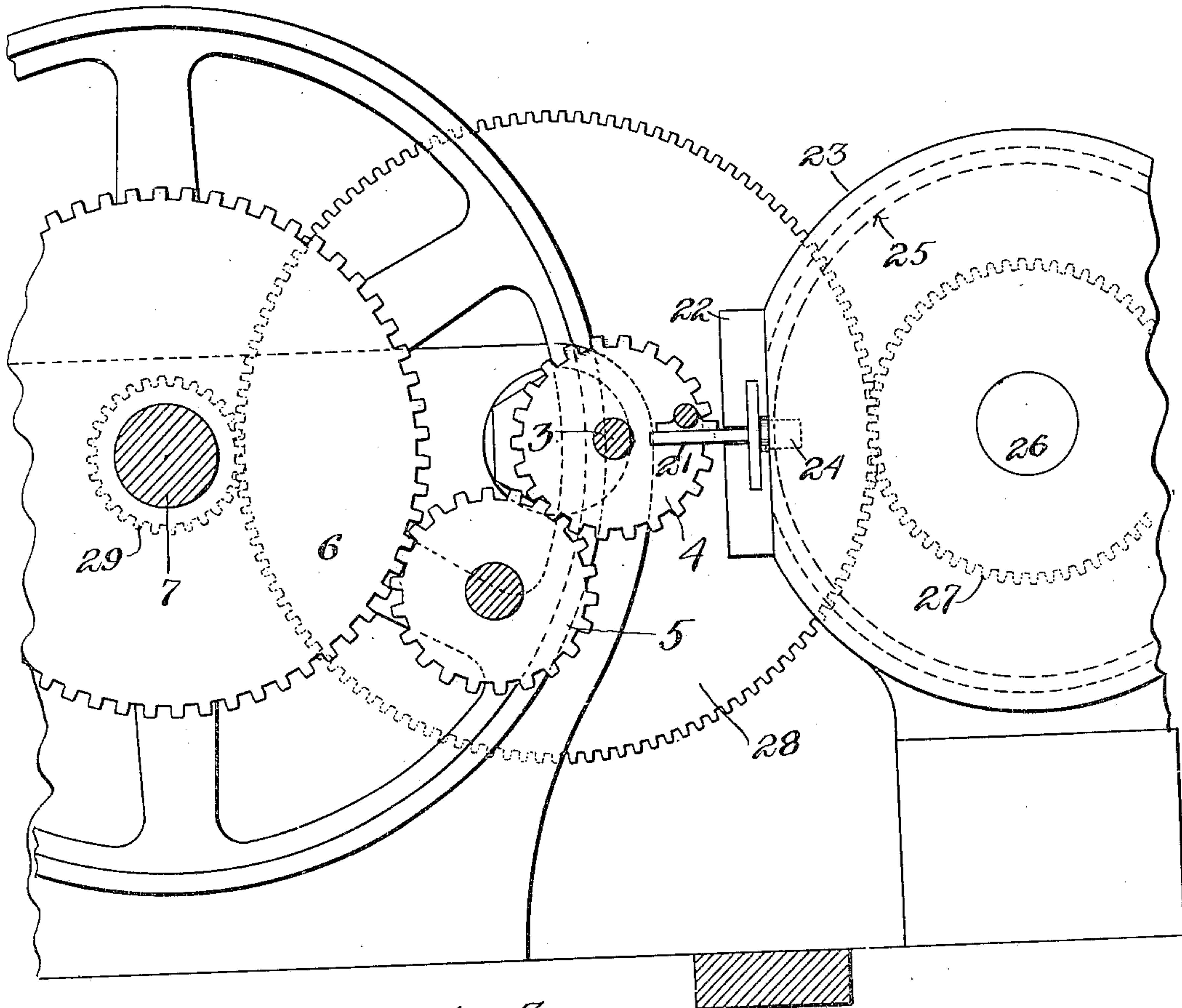


Fig. 3.

Witnesses:  
C. J. Woodberry  
Joseph T. Brennan.

Inventor:  
John O. McKean  
by Roberts & Mitchell,  
Attorneys.



No. 831,564.

PATENTED SEPT. 25, 1906.

J. O. McKEAN.  
WINDING MACHINE.  
APPLICATION FILED DEC. 19, 1903.

6 SHEETS—SHEET 4.

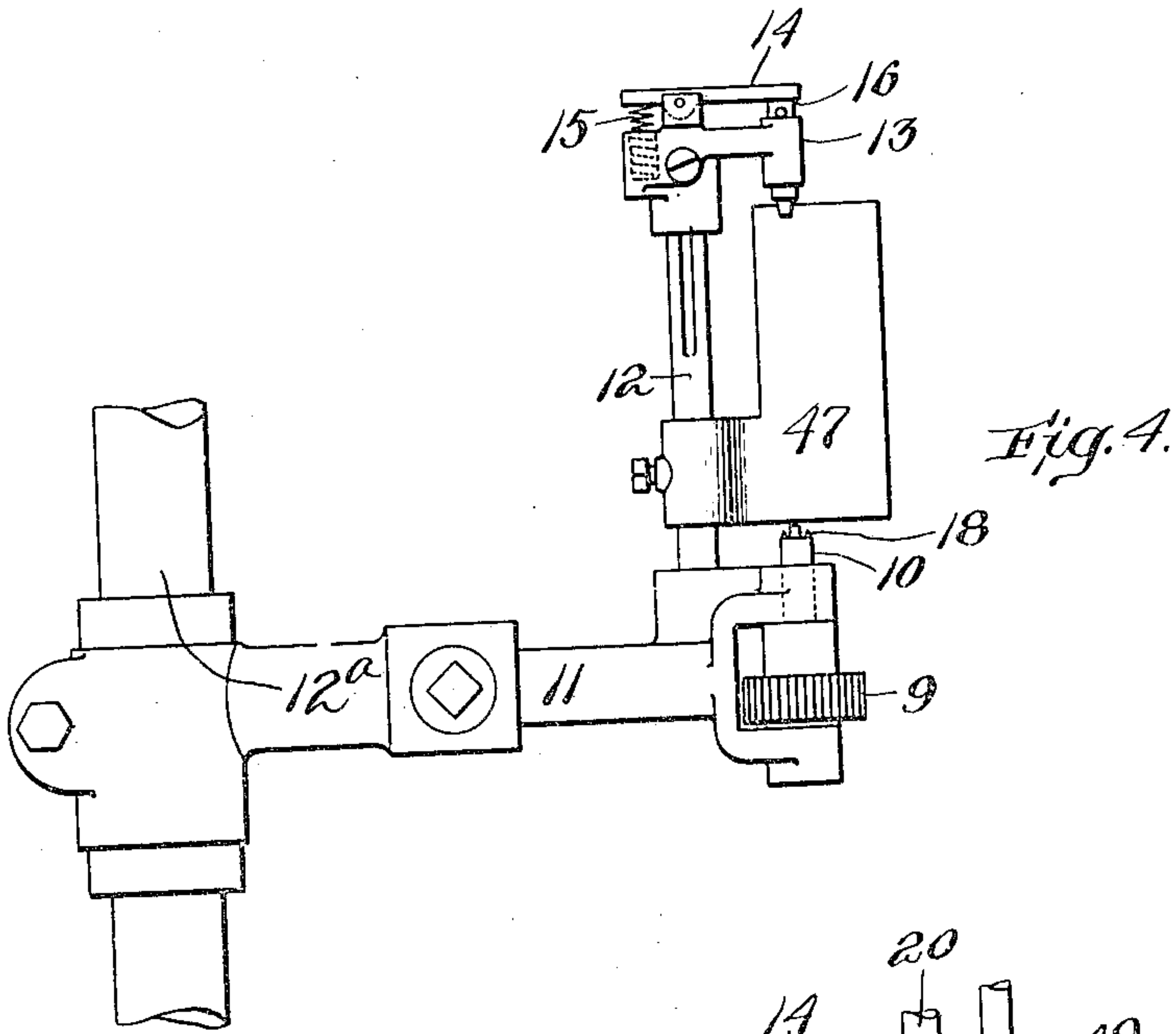


Fig. 4.

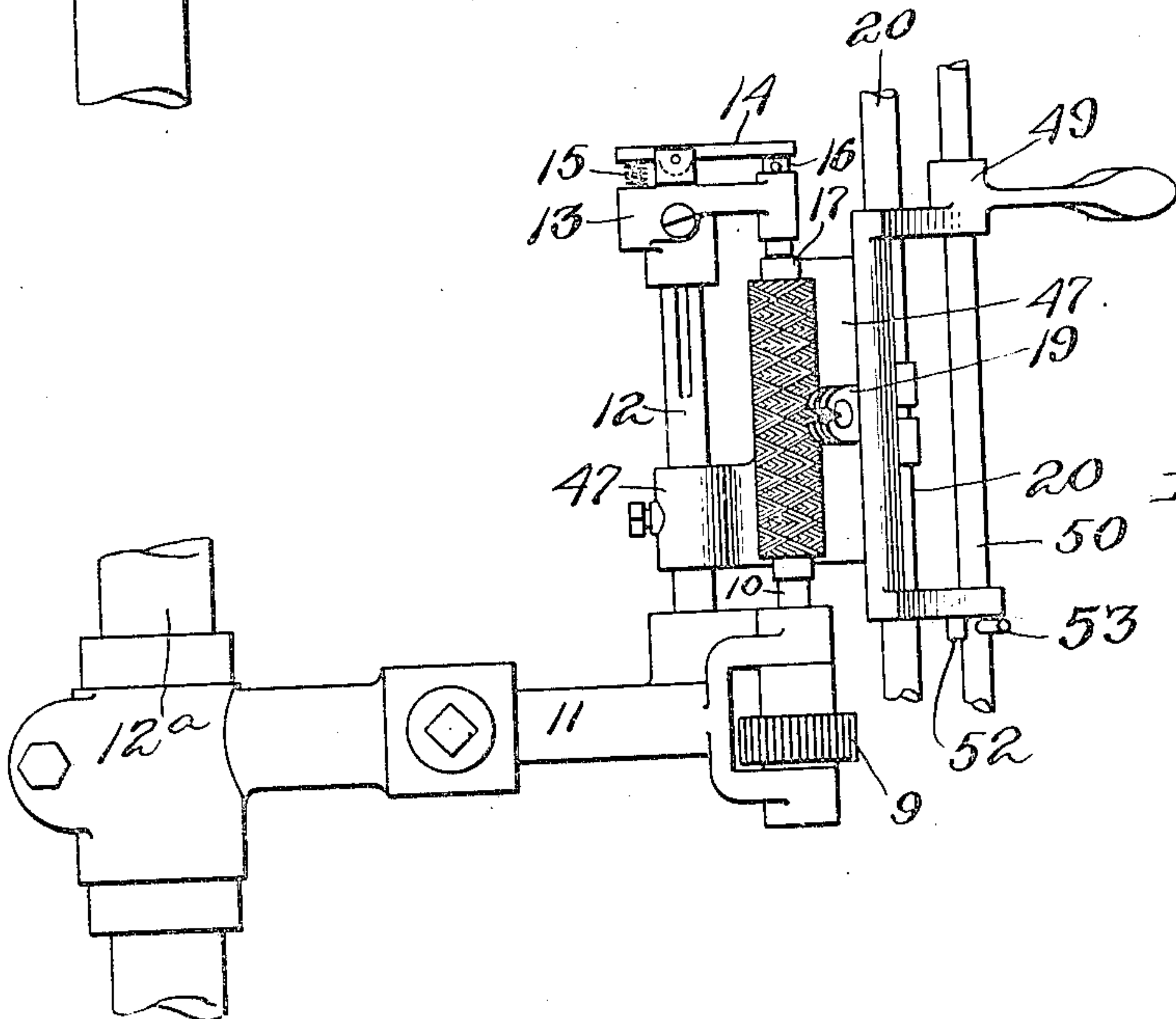


Fig. 5.

Witnesses:  
C. S. Woodberry  
Joseph T. Brennan.

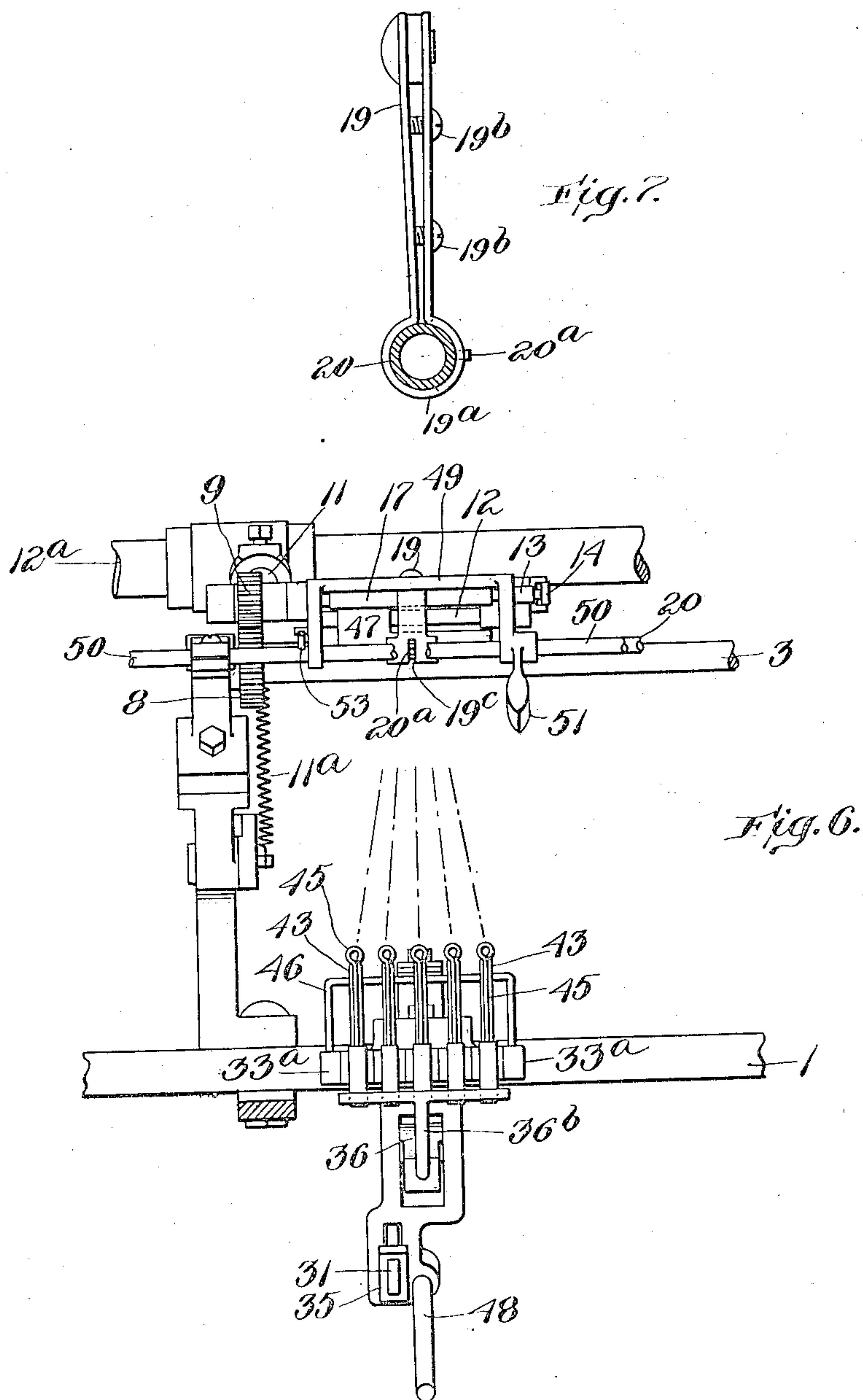
Inventor:  
John O. McKean  
by Roberts & Mitchell,  
attorneys.

No. 831,564.

PATENTED SEPT. 25, 1906.

J. O. McKEAN.  
WINDING MACHINE.  
APPLICATION FILED DEC. 19, 1903.

5 SHEETS—SHEET 5.



Witnesses:  
Grace E. Gibbons  
Cyril W. Ryan

Inventor:  
John O. McKean  
by Roberts & Mitchell  
Attorneys.



# UNITED STATES PATENT OFFICE.

JOHN OLIPHANT McKEAN, OF WESTFIELD, MASSACHUSETTS, ASSIGNOR  
TO FOSTER MACHINE COMPANY, A CORPORATION OF MAINE.

## WINDING-MACHINE.

No. 831,564.

Specification of Letters Patent.

Patented Sept. 25, 1906.

Application filed December 19, 1903. Serial No. 185,778.

*To all whom it may concern:*

Be it known that I, JOHN OLIPHANT McKEAN, a citizen of the United States, and a resident of Westfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Winding-Machines, of which the following is a specification.

My invention relates to machines for winding thread or the like upon a spool or cop-tube; and the object of my invention is to provide an improved machine of this class.

In my improved winding-machine the cop is supported by a holder and rotated to wind the thread thereon, while the thread is laid onto the cop by a thread-guide carried by a traverser, to which it is frictionally connected so as to be movable toward and from the cop being wound. During the winding operation the frictional connection between the thread-guide and traverser allows the thread-guide to yield away from the cop as the latter grows in diameter. Thus any protuberance caused by defective winding or a knot will thrust the thread-guide more or less away from the cop, and the thread-guide will maintain that distant position until the cop grows sufficiently to reengage the thread-guide. In this way irregularities or protuberances on the surface of the cop being wound cannot cause irregular movements of the thread-guide, which would result in irregular winding.

In the best form of my invention the cop-holder is movable and comprises a spindle carrying a power-transmitting wheel driven by a power-transmitting wheel on a cop-driving shaft journaled in bearings on the frame of the machine, so that by moving the cop-holder the wheel carried by the spindle thereof may be thrown into and out of engagement with the driving-wheel on the shaft to stop or start the rotation of the cop. Means is also provided in connection with the movable cop-holder to shift the thread-guide away from the cop when the cop-holder is moved to disengage the two power-transmitting wheels, so that the cop will be accessible to the operator for the purpose of removal or for the purpose of repairing a broken thread and so that the moving thread-guide will not be in contact with the cop. Preferably, also, I combine an automatic stop-motion with the movable cop-holder which

acts to shift the cop-holder and stop the cop when the thread breaks.

Herein I have embodied my invention in a winding-machine of that class wherein a multiplicity of cops are wound at once, and, as is usual with this class of machine, a multiplicity of thread-guides are carried by a single traverser; but the cop of each thread-guide is carried by an independent cop-holder. When one of the cop-holders is moved to disengage its driving-gears and the thread-guide of that cop is shifted away from the cop by the means above referred to, the movements of the traverser and the thread-guide are not stopped, and in order to conveniently return the reciprocating thread-guide of the stopped cop to operative position against its cop when the said cop is started again I provide a movable thread-guide shifter by means of which the operator can, by hand, return the rapidly-reciprocating thread-guide of a stopped cop to position against said cop when the latter is started again.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of a portion of a winding-machine embodying one form of my invention. Fig. 2 is a similar view, but shows some of the parts in different positions. Fig. 3 illustrates the driving mechanism for the traverser and spool-driving shaft herein-after described. Fig. 4 is a plan view of the cop-holder detached. Fig. 5 is a similar view with a cop in position and showing also the thread-guide and thread-guide shifter hereinafter described. Fig. 6 is a side view, on a reduced scale, of the mechanism shown in Figs. 1 and 2. Fig. 7 is a detail hereinafter described.

Having reference to the drawings, 1 represents a cross-bar forming part of the frame of the machine, and on this cross-bar is mounted a series of standards, one of which is shown at 2. On standards 2 is journaled a cop-driving shaft 3, carrying at one end a gear 4, driven through an idler 5 by a gear 6, fast on the main shaft 7 of the machine. Shaft 3 also carries a gear 8, adapted to engage with a gear 9, fast on a spindle 10. Spindle 10 is part of cop-holder 11, mounted to swing on the axis of a cross-bar 12<sup>a</sup>, supported at its ends by the frame of the machine. Cop-holder 11 has fast to it one end of a laterally-projecting stud 12, on the outer end of which is adjustably fastened a head



13. To head 13 is pivoted a lever 14, one end of which is acted upon by a spring 15 and the other end of which bears against a short spindle 16, journaled in head 13. The two spindles 10 and 16 are in axial alinement and are adapted to receive and hold between them a cop-tube or quill 17, onto which the thread is wound. Rotary motion of shaft 3 is transmitted to cop-tube or quill 17 through gears 8 and 9 and spindle 10, and in order to lock the cop-tube or quill to spindle 10, so that it will turn with it, the spindle is made with teeth 18, which enter the end of the cop-tube or quill.

15 The thread that is wound onto cop-tube or quill 17 is laid thereon by a thread-guide 19, carried by a traverser 20, which is journaled in bearings on standards 2 and at one end is fast to a slide 21, mounted in ways 22, fixed to one side of a casing 23 on the frame of the machine. Slide 21 carries a cam-roll 24 in engagement with a cam 25. Cam 25 is fast on a cam-shaft 26, which also carries a gear 27, driven through an idler 28 by a gear 29, fast on main shaft 7. When rotated, cam 25 reciprocates traverser 20 endwise in the usual manner.

As shown in Fig. 7, the thread-guide 19 is made from a single strip of metal bent upon itself near its middle, with a loop 19<sup>a</sup> at one end embracing traverser 20 and clamped thereto to the desired extent by means of screws 19<sup>b</sup>. The loop 19<sup>a</sup> is made with a slot 19<sup>c</sup>, into which projects a pin 20<sup>a</sup>, Fig. 6, from traverser 20. This construction prevents endwise movement of traverser 20 in loop 19<sup>a</sup>, but permits the thread-guide to swing resistingly on the traverser when subjected to pressure toward or from the cop sufficient to overcome the frictional connection between the traverser and thread-guide at loop 19<sup>a</sup>.

In order to secure the proper relation between the speed of cop-driving shaft 3 and the traverser-actuating cam 25 and to enable variations thereof to be made when the size of thread to be wound varies, so that the helices may be laid side by side and close together, the gears 4 and 27 are removably attached to their shafts, so that different-sized gears may be substituted therefor when such changes are to be made. In order to permit such changes to be made, the studs carrying idlers 5 and 28 are also adjustable on the frame of the machine in arcs concentric with shaft 7, as is usual with change-speed gearing.

The cop-holder 11 is made with a rigid depending arm 30, pivotally connected at its lower end to one end of a link 31, which extends through a slot 32, provided through the lower end of a frame 33. Frame 33 is pivotally connected at 34 to a bracket 33<sup>a</sup>, fixed to the cross-bar 1 of the frame of the machine. Upon the outer side of frame 33

link 31 is provided with a head 35, which serves to engage frame 33, as described later. Fixed to bracket 33<sup>a</sup> is a leaf-spring 36<sup>c</sup>, whose free end engages the upper end of frame 33, and said spring serves as a detent to yieldingly hold frame 33 in its normal position with an arm 33<sup>b</sup> against cross-bar 1, as shown in Fig. 1, or in its other position with a lug 33<sup>c</sup> thereon against cross-bar 1, as shown in Fig. 2.

Within frame 33 is pivotally mounted a dog 36, whose inner end 36<sup>a</sup> is normally just below and out of the path of a swinging arm 37, mounted on a shaft 38, journaled at its ends in bearings on the frame of the machine. An arm 39, fixed to shaft 38, is connected by a link 40 with a crank 41, fast on a continuously-rotated shaft 42, journaled at its ends in bearings on the frame of the machine. The front end 36<sup>b</sup> of dog 36 is in the form of a T-shaped arm which is somewhat lighter than the rear end 36<sup>a</sup>, so that normally the front end 36<sup>b</sup> is held elevated while the rear end 36<sup>a</sup> is below the path of swinging arm 37. The front T-shaped end 36<sup>b</sup> extends under a row of drops 43, and these drops 43 are pivoted on a cross-bar 44, carried by bracket 33<sup>a</sup>. Also each drop has fixed to it an arm 45, provided at its outer end with a thread-eye through which a thread passes from the supply to the thread-guide 19, and normally the engagement of the thread with arm 45 holds the drop in an elevated position against a stop 46; but if the thread breaks the drop falls and depresses the end 36<sup>b</sup> of dog 36 and raises the end 36<sup>a</sup> into the path of arm 37.

During the operation of the machine shaft 42 is continuously rotated and acts to continuously vibrate arm 37, so that when the inner end 36<sup>a</sup> of dog 36 is raised into the path of arm 37, as just described, said dog is struck by said arm and thereby frame 33 is swung on pivot 34 from the position shown in Fig. 1 to the position shown in Fig. 2. When swung in this manner, frame 33 acts, through link 31 and arm 30, to raise cop-holder 11 and disengage gear 9 from gear 8, which stops the rotation of spindle 10, while spring 36<sup>c</sup> serves to hold frame 33 in its forward position, with cop-holder 11 elevated, until returned to its normal position by the operator.

Fixed to stud 12 of the cop-holder is an arm 47, and when said cop-holder is raised, as above described, the outer end of arm 47 engages thread-guide 19 and swings it forward on traverser 20 away from cop-tube or quill 17, so as to leave the cop accessible to the operator for the purpose of repairing the broken thread or for the removal of a completed cop.

When the winding is to be resumed, the parts are reset by the operator depressing a handle 48, projecting from frame 33, and forces said frame back into the position shown in Fig. 1, which allows a spring 11<sup>a</sup> to



return cop-holder 11 to normal position with gears 8 and 9 in engagement. Inasmuch as the reciprocations of thread-guide 19 continue uninterrupted, I have herein provided  
 5 a hand-operated thread-guide shifter 49, pivoted loosely on a bar 50, fixed to the frame of the machine, by means of which the operator can swing the thread-guide 19 back against the cop when handle 48 is depressed to start  
 10 the winding. This shifter 49 is made with a weighted handle 51, which normally holds the shifter in the position shown in Fig. 1 with a pin 52 on said shifter against a stop-pin 53, projecting from bar 50. When the  
 15 thread-guide 19 is to be returned to its position against the cop, the operator lifts handle 51, which when released automatically returns the shifter to normal position with pin 52 against stop 53.

20 It will now be apparent that my improved machine is characterized mainly by the fact that during the winding operation the thread-guide is held against the cop by the frictional connection which connects it with the trav-  
 25 erser and that thereby I dispense with the use of a spring or weight continuously holding the thread-guide against the cop, as has heretofore been practiced, and also that the thread-guide recedes from the cop as the lat-  
 30 ter grows, but cannot move in the other direction unless actuated by hand.

The machine above described is especially useful in laying square-ended self-binding cops with a relatively quick traverse of the  
 35 thread-guide to the rotation of the cop, the helices of the thread being laid at a large angle to the axis of the cop from end to end of the cop. By this mode of operation it is unnecessary to have any headed spools, the cop  
 40 being built up upon a cylindrical spool or cop shell.

What I claim is—

1. In a winding-machine, in combination, a movable cop-holder; cop-actuating means  
 45 adapted to be thrown into and out of action by the movement of the cop-holder; a traverser; means to actuate the traverser, a

thread-guide frictionally connected with the traverser and movable under pressure of the growing cop and an arm on the cop-holder  
 50 for engaging the thread-guide and moving it away from the cop when the cop-holder is moved to throw the cop-actuating means out of action.

2. In a winding-machine, in combination, 55 a movable cop-holder; cop-actuating means adapted to be thrown into and out of action by movement of the cop-holder; a traverser; means to actuate the traverser; a thread-guide frictionally connected with the trav-  
 60 erser and movable under pressure of the cop; means to move the thread-guide on the traverser away from the cop when the cop-holder is moved to throw the cop-actuating means  
 65 out of action, and a movable thread-guide shifter for returning the thread-guide to position against the cop.

3. In a winding-machine, in combination, a thread-guide; a thread-guide traverser; means to reciprocate said traverser; means to  
 70 cause the thread-guide to be reciprocated with the traverser, and means frictionally connecting the thread-guide directly to the traverser so as to yieldingly oppose move-  
 75 ment of the thread-guide on its traverser away from the cop.

4. In a winding-machine, a swinging cop-holder carrying a cop-spindle; axial driving means for the cop-spindle carried by the cop-  
 80 holder; a thread-guide frictionally engaging a thread-guide traverser; means to actuate the driving means for the cop and the traverser at a predetermined relative rate of movement;  
 85 a stop-motion operated by the breaking of a thread to disengage the driving means for the cop-spindle and its driving means and to lift the reciprocating thread-guide from the surface of the cop, all substantially as described.

Signed by me at Boston, Massachusetts,  
 this 16th day of December, 1903.

JOHN OLIPHANT McKEAN.

Witnesses:

OLIVER MITCHELL,  
 JOSEPH T. BRENNAN.