

No. 730,635.

PATENTED JUNE 9, 1903.

J. GOOD.

WINDING MACHINE FOR BALLS OR COPS.

APPLICATION FILED NOV. 25, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 4.

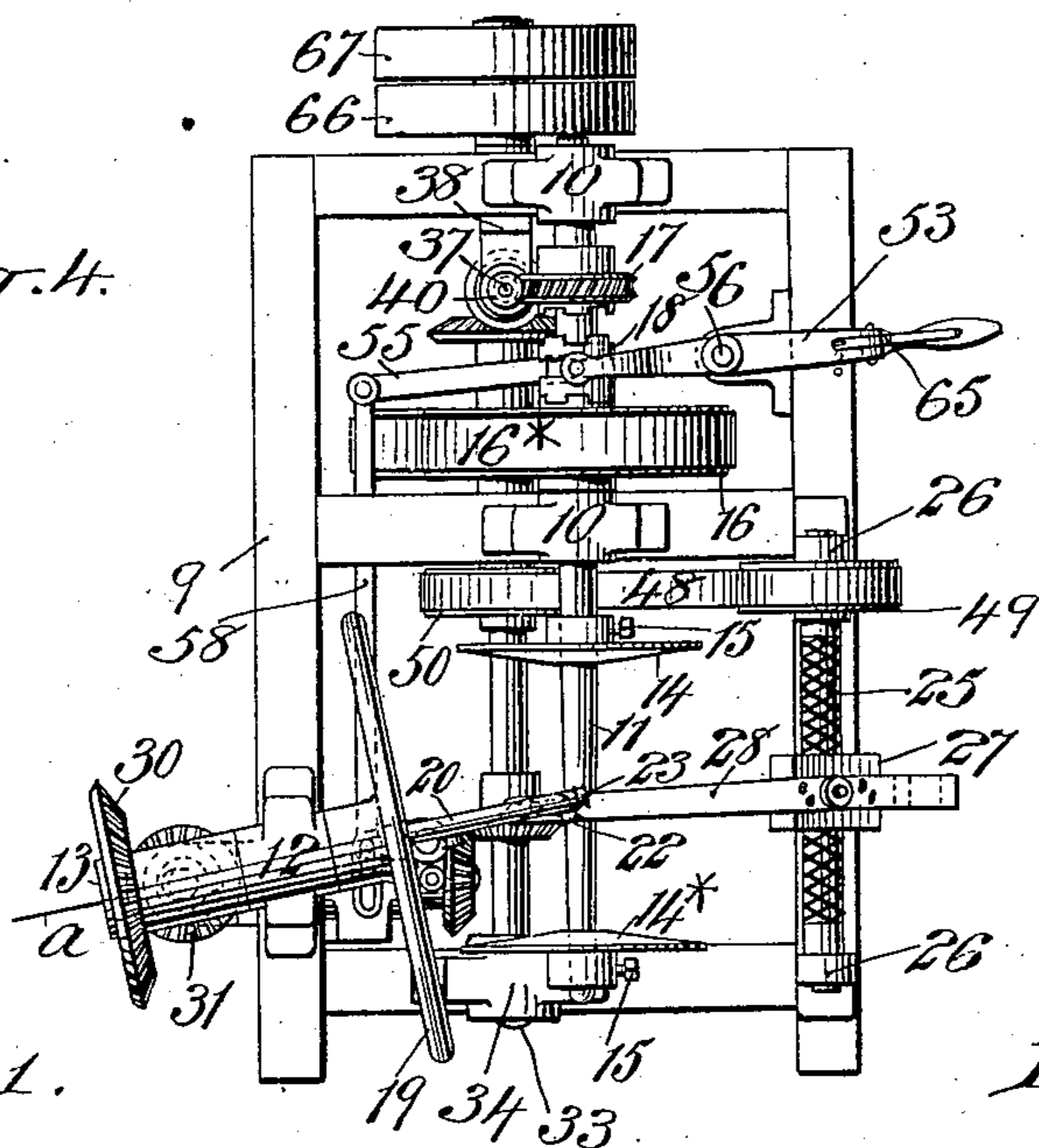


Fig. 1.

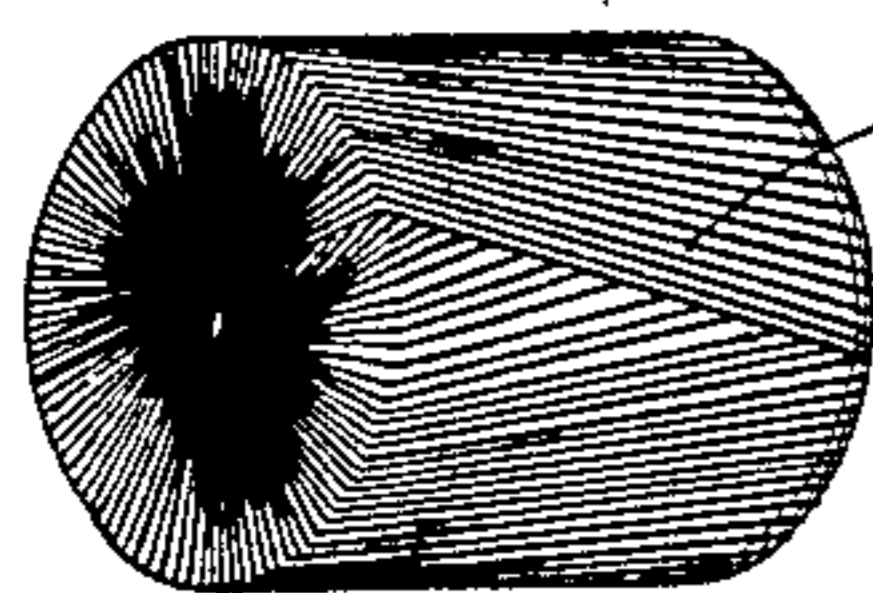


Fig. 5.

Fig. 2.

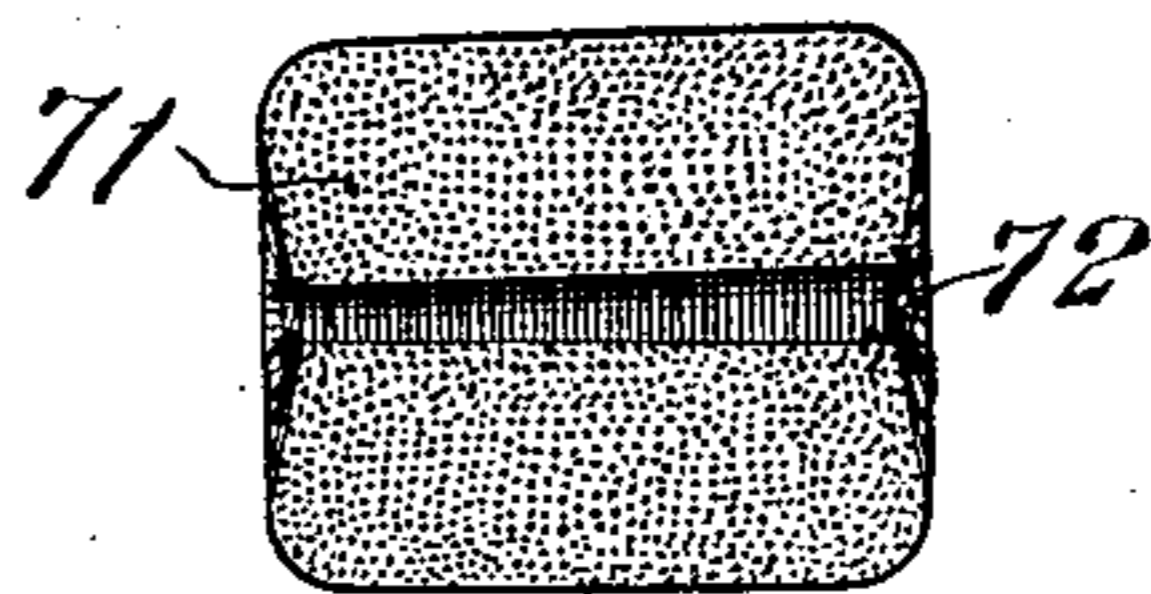


Fig. 5\*.

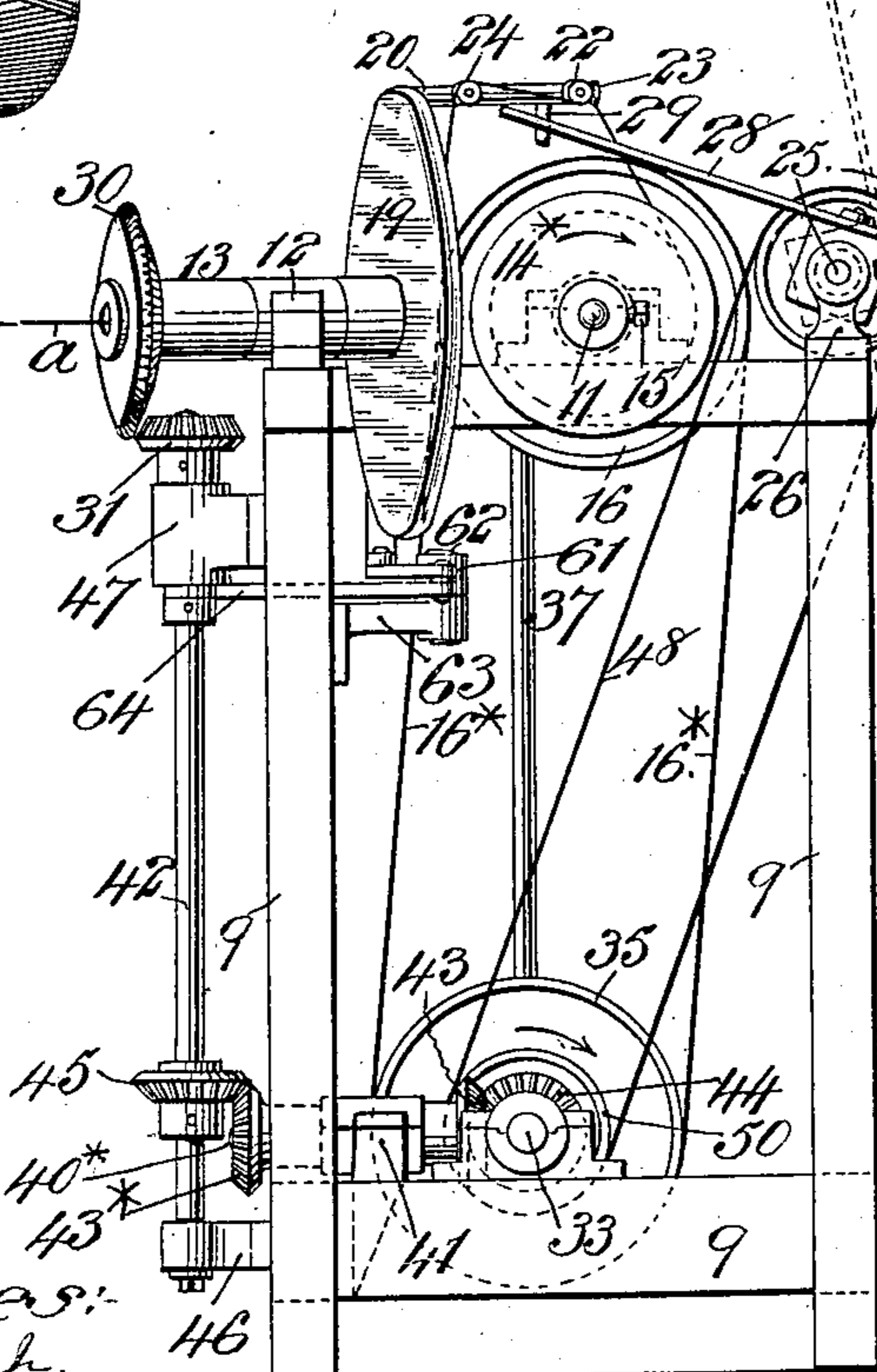
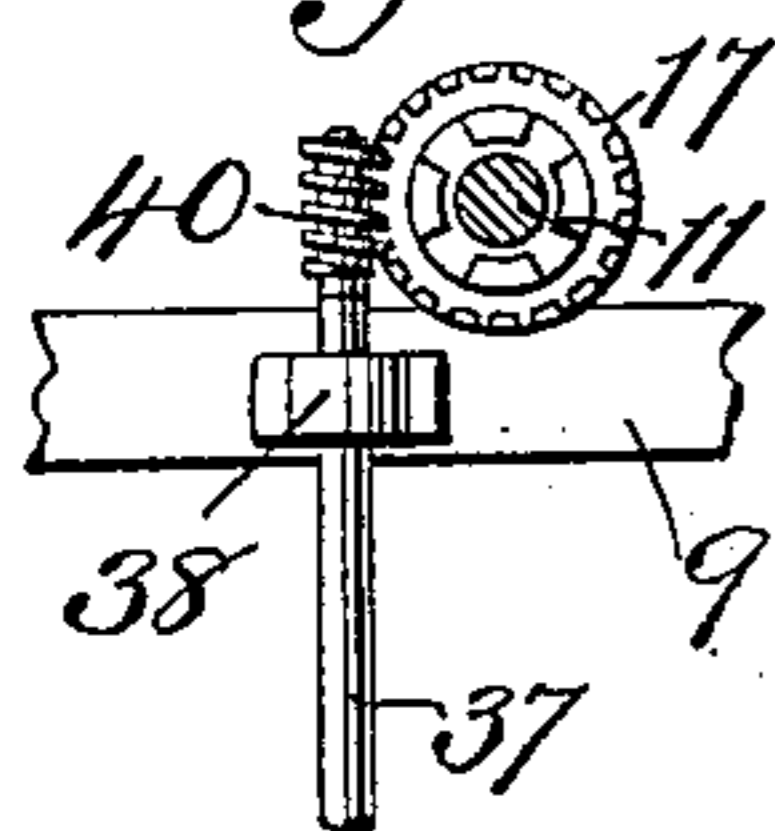
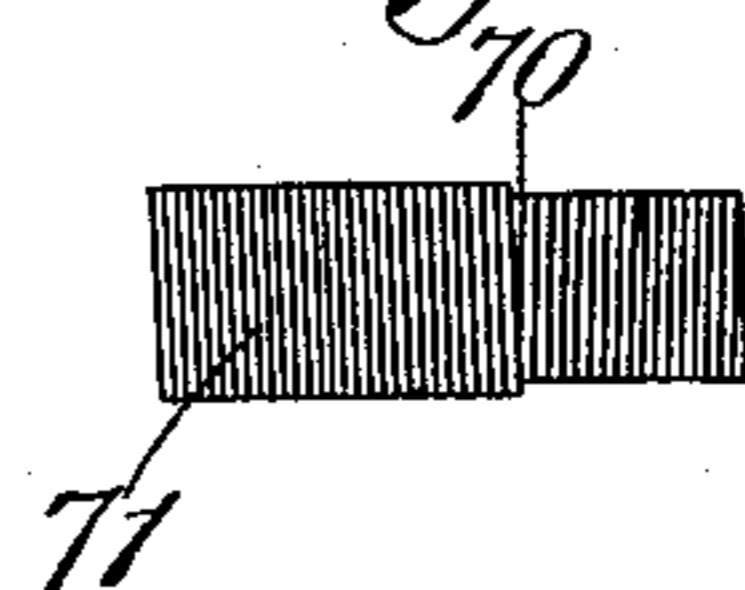


Fig. 3.



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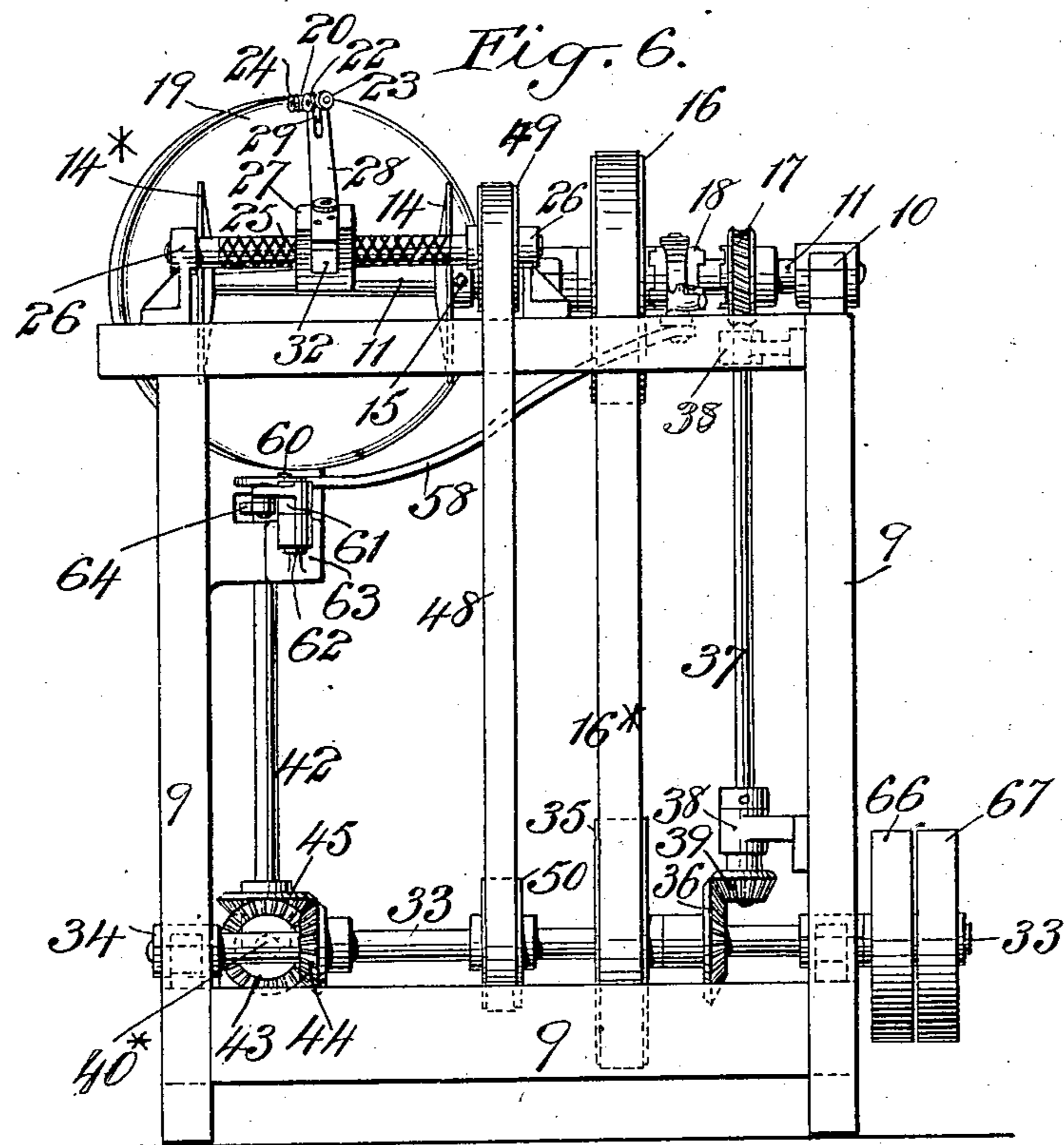
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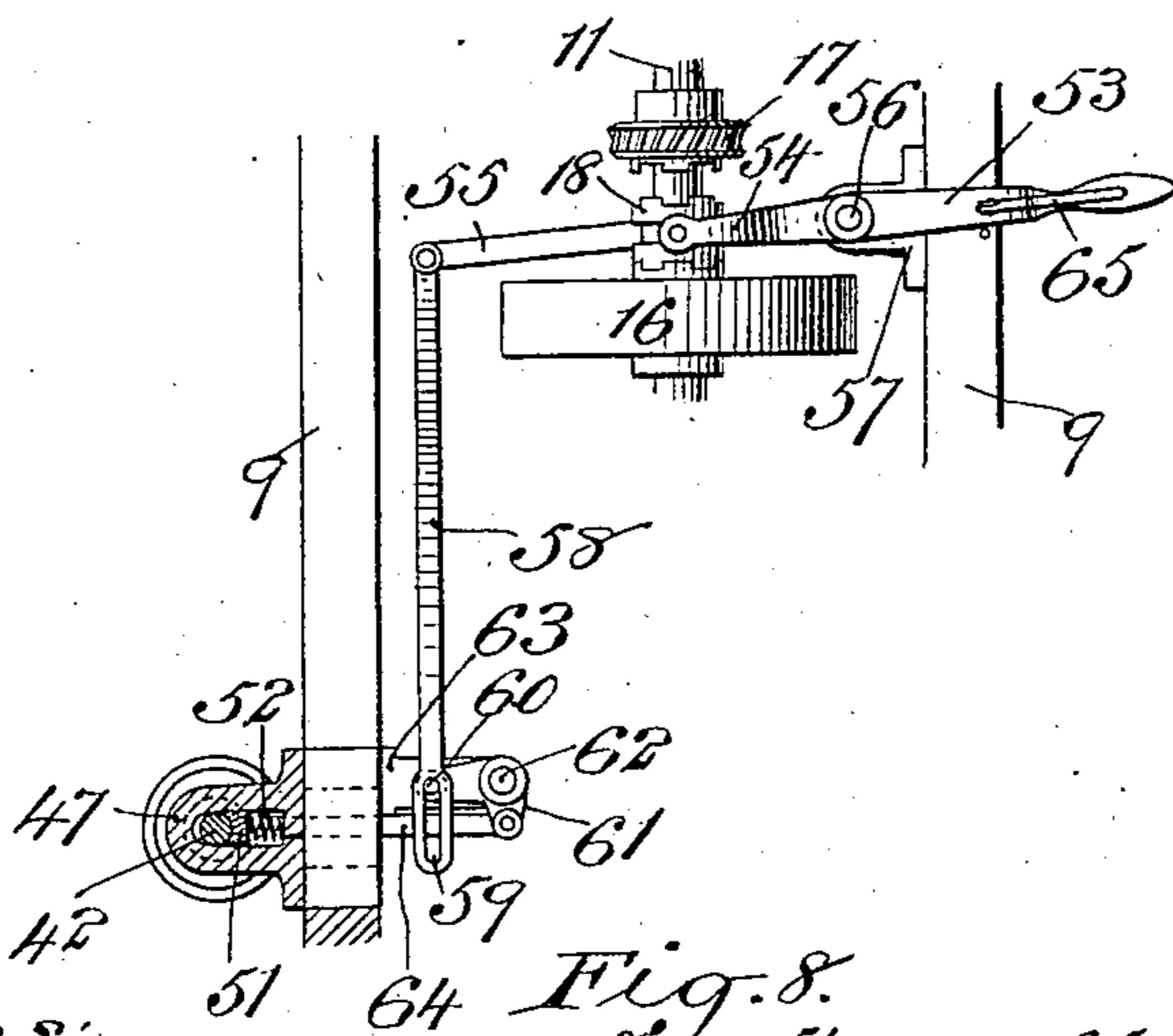
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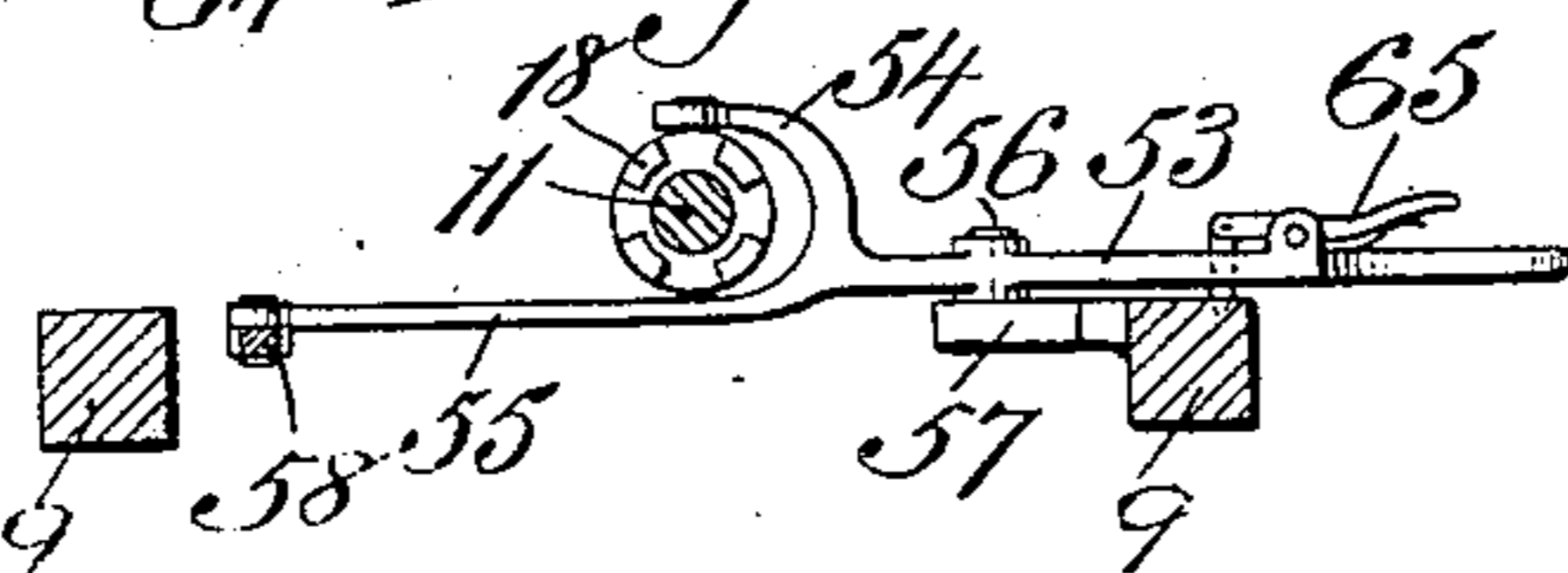
2 SHEETS—SHEET 2.



*Fig. 7.*



*Fig. 8.*



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOHN GOOD, OF FAR ROCKAWAY, NEW YORK, ASSIGNOR TO HIMSELF, PATRICK F. O'HARE, OF BROOKLYN, NEW YORK, AND JOHN M. REINER, OF RADNOR, PENNSYLVANIA.

## WINDING-MACHINE FOR BALLS OR COPS.

SPECIFICATION forming part of Letters Patent No. 730,635, dated June 9, 1903.

Application filed November 25, 1902. Serial No. 132,738. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN GOOD, a citizen of the United States, and a resident of Far Rockaway, in the county of Queens and State of New York, have invented a new and useful Improvement in Winding-Machines for Balls or Cops, of which the following is a specification.

The object of this invention is the production of a ball or cop of twine, cord, or thread consisting of a substantially cylindrical body in which the winding is in simple helical courses and a covering to said body formed by a continued winding of the same twine, cord, or thread of which said body is composed in helical courses of such obliquity to the axis of said body as to cross over the ends thereof, and so confine its helical courses both circumferentially and in a direction parallel with its axis; and to this end the invention consists in certain combinations hereinafter described and claimed, the principal elements of which are two spindles arranged obliquely to each other in fixed bearings. One of said spindles upon which the ball or cop, hereinafter termed the "ball," is wound has given to it a rotary motion for producing the winding of the body of the ball and assisting the winding of its covering. The other of said spindles carries a flier-arm which constitutes a director for the twine, cord, or thread to be wound, and it has given to it by turns an oscillating movement and a rotary motion, the said oscillating movement being for the purpose of producing the traverse of the twine, cord, or thread back and forth lengthwise of the body in regular helical courses and the said rotary motion being to direct the winding of the covering across the ends of the body.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of one of the balls or cops to be produced by the invention; Fig. 2, an axial section of the same; Fig. 3, a side view of a portion of the body of the same; Fig. 4, a plan of a machine embodying the invention; Fig. 5, an end elevation of said machine; Fig. 5\*, a detail view, which will be hereinafter explained; Fig. 6, a side elevation of the machine; Figs. 7 and 8, a plan and

transverse sectional view, respectively, of certain details of the machine to be hereinafter described.

9 is the framing of the machine, on the upper part of which are the stationary journal-boxes 10 for the spindle 11, hereinafter termed the "winding-spindle," and the stationary journal-box 12 for the spindle 13, hereinafter termed the "flier-spindle." The winding-spindle 11, upon which the twine, cord, or thread is wound to form the ball, is furnished with two movable heads 14 14\*, which when fastened to the said spindle by the set-screws 15, provided for the purpose, constitute, with the portion of the spindle between them, the equivalent of a spool or bobbin. The said winding-spindle is furnished, as shown in Figs. 4, 6, 7, with a belt-pulley 16 and with a worm-gear 17, both of which are fitted to turn thereon, and it is also furnished between said pulley and worm-gear with a clutch 18, which is fitted to turn with it, but to slide lengthwise upon it into engagement with either said belt-pulley or worm-gear or to an intermediate position out of engagement with both.

The flier-spindle 13 is hollow and carries a disk or head 19, on which is an arm 20, said spindle 13, head 19, and arm 20 constituting what is known in spinning and winding machinery as a "flier." This flier is arranged at one side of the winding-spindle 11, with the axis of its spindle 13 oblique to but in or about in the same horizontal plane with the axis of the winding-spindle and in such position relatively to the length of the winding-spindle that the axis of said spindle 13 would intersect the axis of the winding-spindle at a point about midway of that part of the latter included between the heads 14 14\* when the said heads are fastened thereon, as shown in Fig. 4. The distance of the flier-spindle from the winding-spindle is such that the flier-head 19, which is on that end of the flier-spindle nearest the winding-spindle, will rotate clear of the heads 14 14\* of the winding-spindle. The distance of the flier-arm 20 from the axis of its spindle 13 is such that said arm 20 in its revolution may pass around and outside of the space included between the said heads 14 14\*, and the obliquity of

the flier-spindle 13 to the winding-spindle is such that twine, cord, or thread 70, hereinafter referred to simply as "twine," passing, as shown in Fig. 5, through the flier-spindle to its arm 20 and out from said arm to a cylindrical body of twine 71, Figs. 2 and 3, wound on that part of the winding-spindle included between the heads 14 14\*, may when said heads are removed be carried and wound along and around the said body and across the ends thereof, passing over one end of said body on one side of the winding-spindle and over the other end of said body on the opposite side of said spindle and forming a covering 72 to said body, as shown in Fig. 1. The flier-arm has in or on its end a guide of any suitable kind to direct the twine to the winding-spindle. This guide is represented as consisting of two small sheaves 22 33, to which the twine or thread 70, passing through the flier-spindle, is directed over another small sheave 24, arranged on the flier-arm nearer to the disk 19. The flier-arm not only serves by the revolution of its spindle to produce the winding along and over the ends of the cylindrical body as above described, but serves by an oscillating movement of its spindle produced, as hereinafter described, by a traverse-screw 25, to direct the twine or thread in regular helical coils in the winding of the cylindrical body, as represented in Fig. 3.

The traverse-screw 25 is arranged parallel with the winding-spindle 11 on the opposite side thereof to the flier-spindle in stationary bearings 26 on the framing 9. It is, like the cross-threaded traverse-screw, commonly used in spinning-machines of the jenny type and furnished with a switch-nut 27, which by the rotation of the screw is caused to run back and forth thereon. To the nut 27 there is rigidly attached a forked or slotted lever 28, adapted to receive in its fork or slot a pin or projection 29, Fig. 5, on the flier-arm. By the movement of the nut back and forth on the traverse-screw the lever 28 is caused to give the necessary traverse motion to the flier-arm, said motion being accompanied by an oscillating movement of its spindle 13, which is permitted by reason of the disengagement of the two bevel-gears 30 and 31, Fig. 5, through which the rotary motion of the said spindle is produced for winding the covering 72 along and across the ends of the body 71. The traverse-lever 28 is furnished at its outer end with a counterbalance 32 of sufficient weight to hold its forked or slotted end up into engagement with the flier-arm during the winding of the body; but before placing the gear 30 into engagement with its driving-gear 31 for winding the covering the said lever has to be disengaged from the flier-arm. The counterbalance 32 then throws the lever 28 to the position shown in dotted outline in Fig. 5.

The winding-spindle, flier-spindle, and traverse-screw are all represented as deriving their rotary motion from a common driving-shaft 33, which is arranged in bearings 34 in

the lower part of the framing and provided with fast and loose pulleys 66 67. The pulley 16 on the winding-spindle for driving it at a quick speed for the winding of the body 71 receives motion through a belt 16\* from a pulley 35 on said driving-shaft. The worm-gear 17 on the said spindle for driving it at a much slower speed for winding the covering 72 derives motion from a bevel-gear 36 on said driving-shaft through an upright shaft 37, running in bracket-bearings 38 on the framing 9, said shaft 37 having upon its lower end a bevel-gear 39, gearing with said bevel-gear 36, and having on its upper end an endless screw 40, (see Figs. 4 and 5\*,) gearing with the worm-gear 17. The flier-shaft derives motion through a horizontal shaft 40\*, running in a fixed bearing 41 on the framing 9, and an upright shaft 42, running in bearings in brackets 46 47 on the framing 9, said shaft 40\* having on it two bevel-gears 43 43\*, one gearing with a bevel-gear 44 on the driving-shaft 33 and the other with a bevel-gear 45 on the upright shaft 42, on the upper end of which is the gear 31, hereinbefore mentioned. The traverse-screw receives its motion through a belt 48, running on a pulley 49 on said screw and a pulley 50 on the driving-shaft.

For the purpose of permitting the bevel-gear 31 to be thrown into and out of gear with the bevel-gear 30 on the flier-spindle the upper bearing 51 for said spindle is fitted, as represented in Fig. 7, which shows the upper bracket 47 and the shaft and said bearing in section, to slide horizontally in said bracket, and a spring 52 is applied within said bracket to push the bearing and the upper part of the shaft 42 outward far enough to bring the bevel-gear 31 into gear with the bevel-gear 30.

For the purpose of moving the clutch 18 into gear either with the pulley 16 or with the worm-gear 17 there is provided a hand-lever 53 54 55, working on a fixed fulcrum 56 in a bracket 57 on the framing 9. This lever is forked, as shown in Fig. 8. The upper prong 54 of the fork engages with the clutch 18, and the lower prong 55 has connected with it a rod 58, which is slotted, as shown at 59 in Fig. 7, to receive a pin 60, which projects upward from one arm of an elbow-lever 61, which works on a fixed fulcrum 62 on a bracket 63 on the framing 9, the other arm of the said elbow-lever being connected by a rod 64 with the shaft 42. When the hand-lever is moving to the position shown in Fig. 7 to bring the clutch 18 into engagement with the pulley 16 on the winding-spindle to drive the latter at the higher speed for winding the body 71 of the ball, the inner end of the slot 59 of the rod 58 acts against the pin 60 of the elbow-lever 61 to pull the shaft 41 in a direction to bring the bevel-gear out of gear from the bevel-gear 30 on the flier-spindle; but when the hand-lever is moved to the position to bring the clutch into engagement with the worm-gear 17 for driving the wind-

ing-spindle at the slower speed for winding on the covering 72 of the ball the slot 59 is brought to such a position as to leave the spring 52 free to push and hold the shaft 41 to a position in which the bevel-gear 31 is in gear with the bevel-gear 30 for giving rotary motion to the flier-spindle 13.

The construction and operations of the several parts of the machine having been fully described, it will now only be necessary to describe briefly the order of their operations for making a ball or cop. The twine to be wound may be brought from any suitable holder—for example, a bobbin on which it has been spun or otherwise wound in its manufacture—and its end is introduced to the hollow flier-spindle 13 through the rear or outer end thereof and passed through said spindle to the flier-arm 20 and through the guide at the outer end of said arm to the winding-spindle, to which it is made fast between the heads 14 14\*, which are then fastened upon the latter. While this preparation for winding is going on the main driving-belt (not shown) is on the loose pulley 67 and the hand-lever 53 is fastened to the framing by the spring-stop 65, provided for the purpose, in a position in which the clutch 18 on the winding-spindle is out of gear both from the pulley 16 and the worm-gear 17, and the said lever then holds the rod 58 in a position in which the pin 60 of the elbow-lever 61 is free from both ends of the slot 59 in said rod, and the spring 52, applied to the upper bearing 51 of said shaft, keeps the gear 31 in engagement with the gear 30; but when the preparation for winding has been made as above described the traverse-lever 28 is placed in engagement with the flier-arm 20 and the hand-lever 53 is brought to the position shown in Figs. 4 and 7 to bring the clutch 18 into engagement with the pulley 16 and bring the latter into engagement with the winding-spindle. The rod 58 then acts, as shown in Fig. 7, on the elbow-lever 61, which by its action through the rod 64 on the upright shaft 42 takes the bevel-gear 31 out of engagement with the bevel-gear 30 on the flier-spindle. The traverse-lever 28 is then placed by hand in engagement with the pin on the flier-arm, and on the driving-belt being thrown onto the fast pulley 66 of the driving-shaft the winding-spindle is caused to rotate at the fast speed for winding the body 71 of the ball, and the traverse-screw at the same time receives rotary motion through the belt 48. As the winding proceeds the traverse of the twine in regular helical courses of the body is produced through the oscillating or reciprocating movement of the flier produced by the movement of the traverse-screw and the traverse-lever 28. This winding proceeds until the body is of sufficient size, when the machine is stopped by shifting the driving-belt to the loose pulley 67. The head 14 of the winding-spindle is then moved by hand on said spindle far enough from the adjacent

end of the wound body to permit the passage of the flier-arm around and across said end, and the head 14\* is entirely removed from said spindle. To proceed, then, with the winding across and over the ends of the body, the traverse-lever 28 is disengaged from the flier-arm and thrown back to the dotted position shown in Fig. 5, and the hand-lever 53 is shifted to the position to bring the clutch 18 out of engagement from the pulley 16 and into engagement with the worm-gear 17 for driving the winding-spindle at the slower speed. By this movement of the hand-lever the inner end of the slot 59 in the rod 58 is caused to so act on the pin 60 of the elbow-lever 61 that the latter acting through the rod 64 on the shaft 42 brings the bevel-gear 31 on said shaft into engagement with the bevel-gear 30 on the flier-spindle. On the machine being again started by shifting the driving-belt to the fast pulley 66 the winding of the twine around and along and over the ends of the body to form its covering 72 is produced by the simultaneous slow revolution of the winding-spindle and the more rapid revolution of the flier. When the winding of the covering is completed, the machine is again stopped by shifting the driving-belt to the loose pulley 67, and the hand-lever 53 is then brought to its central position first described, in which the clutch 18 is disengaged from both the pulley 16 and the worm-gear 17. The completed ball is then drawn off from the winding-spindle, which is made sufficiently taper to allow this to be done easily, and on the replacement of the heads 14 14\* the machine is in condition to prepare for and proceed with the winding of a new ball.

What I claim as my invention is—

1. In a winding-machine, the combination of a rotary winding-spindle, a rotary flier having its axis oblique to said spindle and comprising a guide for directing thread or twine to said spindle, and stationary bearings for said spindle and flier.

2. In a winding-machine, the combination of a rotary winding-spindle and fixed bearings therefor, a rotary flier and fixed bearings therefor in which its axis is oblique to and approximately in the same plane with the axis of said spindle, and heads applied to said winding-spindle for confining the wound thread or twine lengthwise of said spindle and removable on or from said spindle.

3. In a winding-machine, the combination of a rotary winding-spindle, a second spindle having its axis in fixed oblique relation to said winding-spindle, a guide for twine, cord, or thread carried by said second spindle at a distance from its axis and means for giving said second spindle an oscillating movement.

4. In a winding-machine, the combination of a rotary winding-spindle, a flier having its axis oblique to the axis of the said spindle, bearings for said spindle and flier, means for giving said spindle a faster and a slower ro-

tary motion by turns, and means for giving the flier a rotary and an oscillating motion by turns.

5 In a winding-machine, the combination of a rotary winding-spindle and a flier having their axes oblique to each other, stationary bearings for said spindle and flier, and means for giving said flier an oscillating movement during one stage of the winding and a rotary  
10 movement during a later stage of the winding.

6. In a winding-machine, the combination of a rotary winding-spindle, a flier having its axis oblique to the axis of said spindle, bearings for said spindle and flier, means for giving  
15 simultaneously a faster rotary motion to the spindle and an oscillating motion to the flier, and means for giving simultaneously a slower rotary motion to the spindle and a rotary motion to the flier.

20 7. In a winding-machine, the combination of a rotary winding-spindle, a flier having its axis oblique to the axis of said spindle, bearings for said spindle and flier, a traverse-screw and a switch-nut thereon, means for engaging  
25 said flier with said nut and disengaging it therefrom to produce an oscillating movement or permit a rotary movement of said flier.

8. The combination with a rotary winding-spindle and a flier having their axes in the  
30 oblique relation described, and means for rotating the flier, of a traverse-screw and a traverse-nut thereon, a lever carried by said nut, means for engaging said lever with the flier for producing an oscillating movement of the  
35 latter and means for disengaging said means

for rotation from the flier when said lever is engaged.

9. The combination with a rotary winding-spindle and a flier having their axes in the oblique relation described, of means for pro- 40 ducing a rotary motion of the flier and means for producing its oscillating movement, and a lever having connections with both of said means for simultaneously placing either of  
45 said means out of operative relation with the flier while the other of said means is in operative relation therewith.

10. The combination with a rotary winding-spindle and a flier having their axes in the oblique relation described, of means for driv- 50 ing said spindle at a higher speed, means for driving said spindle at a lower speed, means for rotating the flier, means for oscillating the flier, a clutch on said spindle for engaging with it either of said means for driving it, and  
55 connections between said clutch and said means for rotating and oscillating the flier for producing either the faster driving of the spindle and the oscillation of the flier or the slower driving of the spindle and the rotation 60 of the flier.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 22d day of November, 1902.

JOHN GOOD.

Witnesses:

FREDK. HAYNES,  
LIDA M. EGBERT.