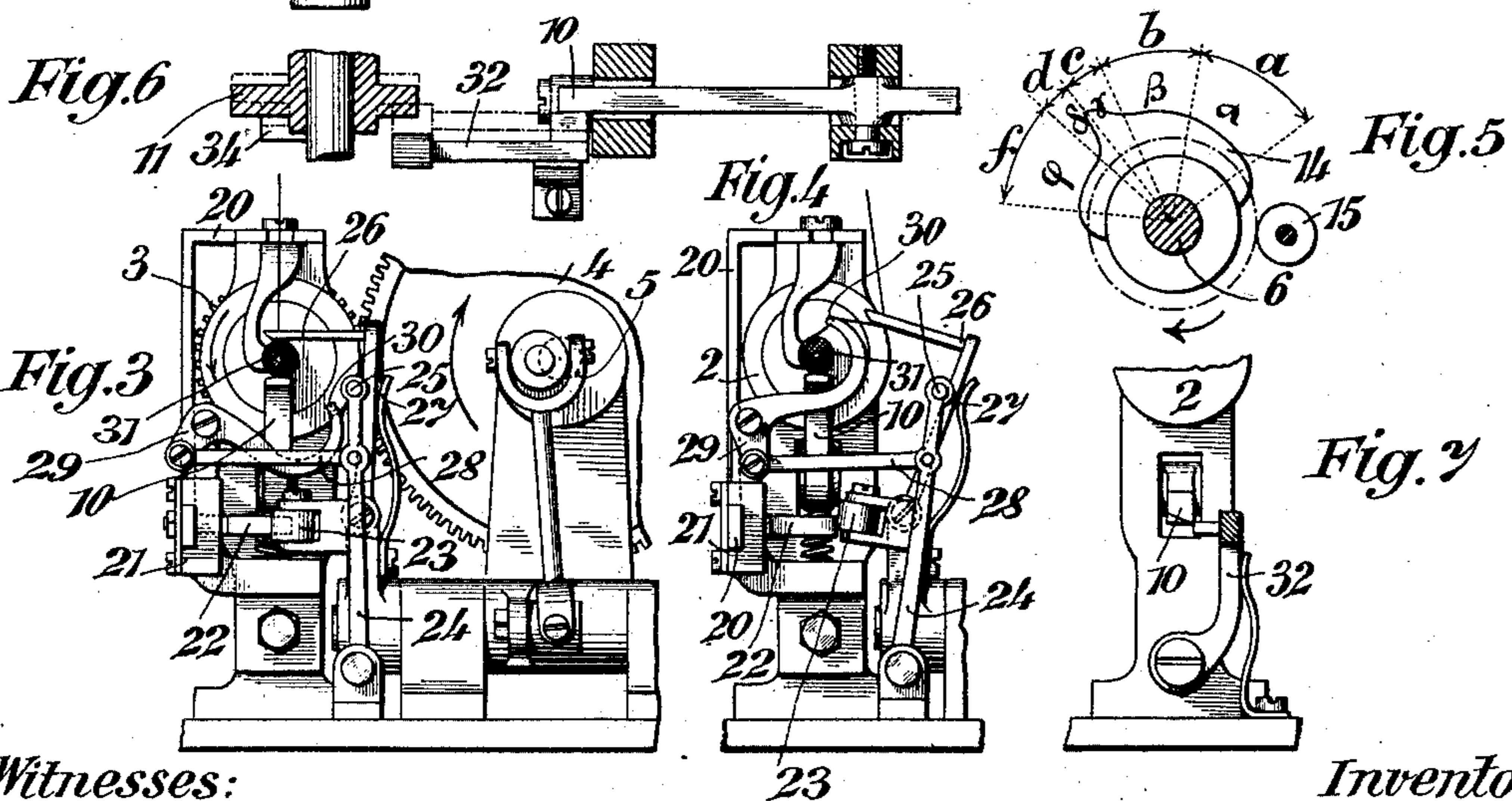
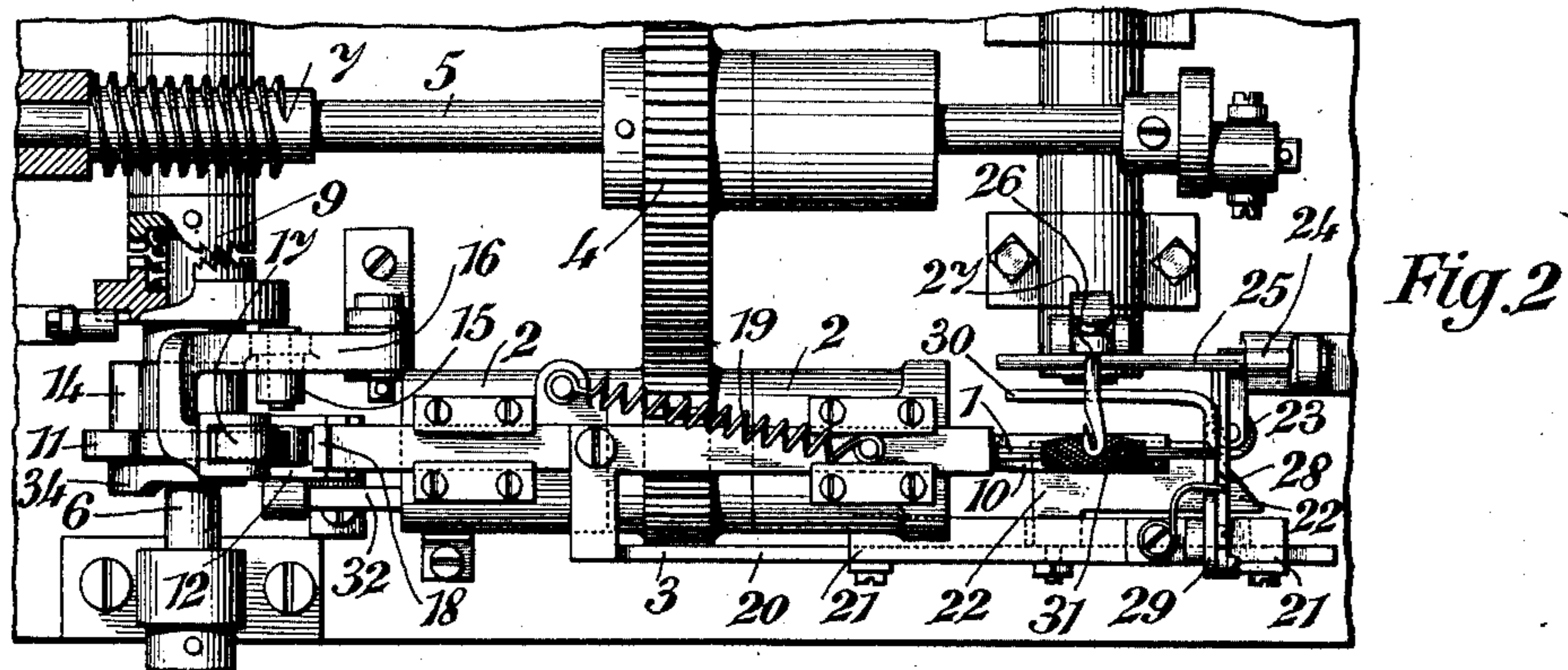
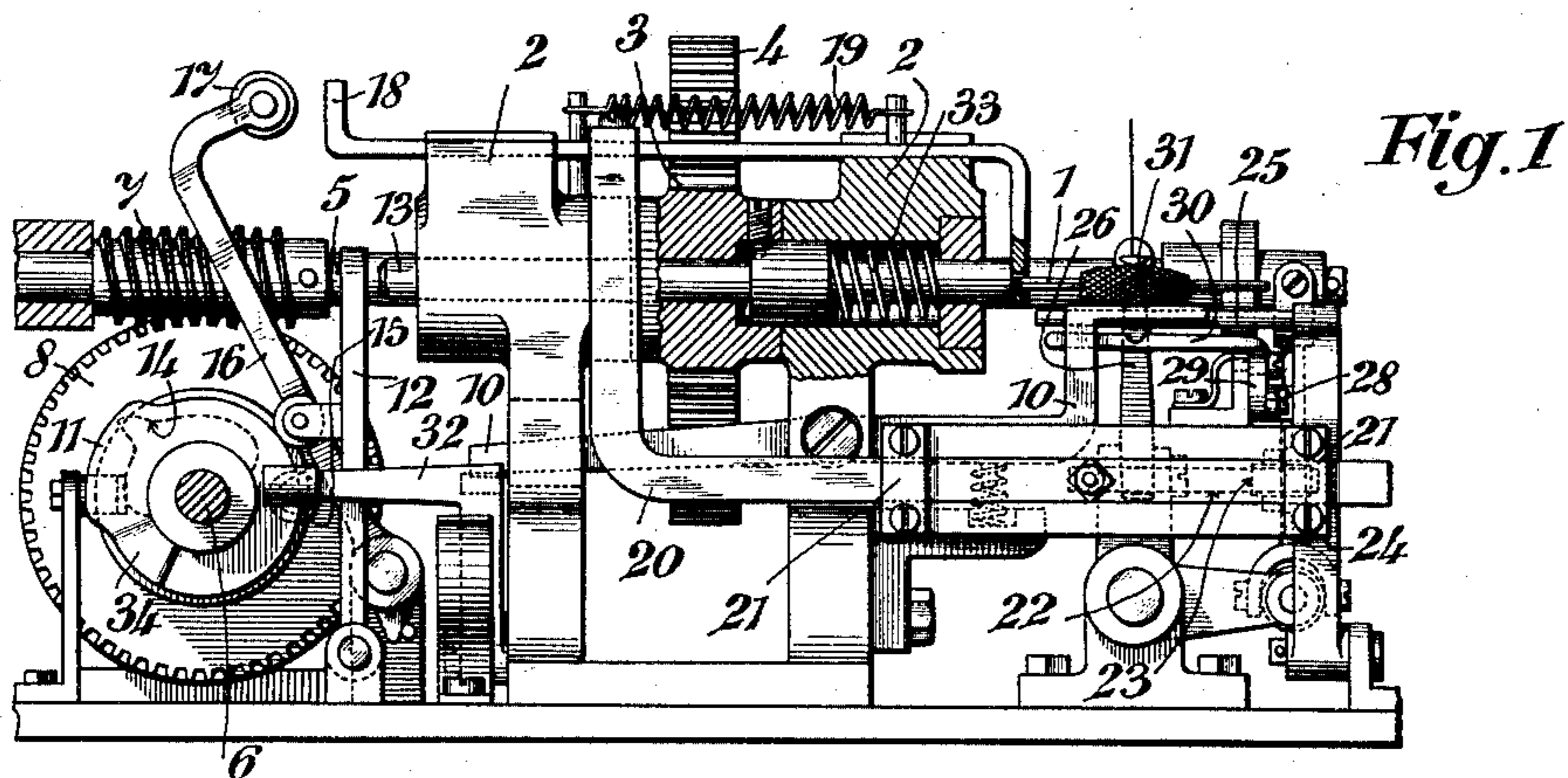


A. ROTTER.
WINDING MACHINE.
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998,398.

Patented July 18, 1911.



Witnesses:

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UNITED STATES PATENT OFFICE.

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WINDING-MACHINE.

998,398.

Specification of Letters Patent.

Patented July 18, 1911.

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To all whom it may concern:

Be it known that I, ANTON ROTTER, a subject of the Emperor of Austria-Hungary, residing at Rorschach, Speerstrasse 10, Switzerland, have invented certain new and useful Improvements in Winding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In prior winding-machines a very slow, uniform motion is given to the doffer, in order to enable loosening and doffing of the cop or bobbin, without the latter being compressed or flattened.

According to the present invention the motion of the doffer is divided into three phases of different speeds, and the doffer controls the well-known central binding and foundation laying operations. The doffer, locked during winding of the cop, approaches while the central binding is being done, strikes the cop for the purpose of loosening it, pushes it (subsequent to loosening) axially, at increased speed, in order to doff it, and in the course of its accelerated retreat, halts for a certain interval, for the purpose of admitting of the foundation for a fresh cop being laid. All these movements are produced by means of a single cam and result during half a revolution of the shaft.

The new machine is illustrated in the accompanying drawing, in which—

Figure 1 is a side elevation, partly in section, and Fig. 2 a part sectional plan. Fig. 3 shows a front elevation of a part of the machine. Fig. 4 is a like view of a portion of the mechanism shown in Fig. 3, with the operative parts in another position. Fig. 5 shows the cam. Figs. 6 and 7 show details to be hereinafter referred to.

1 is the cop tube or spindle, mounted to revolve in the stationary bearing 2. 3 is a pinion, coupled with the cop tube 1, and 4

is a gear-wheel mounted on the working-shaft 5 and meshing with the pinion 3. 6 is an auxiliary shaft driven off the working-shaft 5 by means of a worm 7 and worm-wheel 8.

9 is a clutch of familiar construction, coupling the cam 11 with the shaft 6 and thrown in by means of a feeler 10. The cam 11 operates a lever 12, which acts upon the end 13 of the cop tube shaft. On the shaft 6, and secured to the cam 11, there is also mounted a second cam 14, into whose path there projects a roller 15 (Figs. 1 and 5) mounted on an oscillatory lever 16. A roller 17 at the free end of the lever 16 lies opposite the upturned end of the doffer 18. The latter is mounted in guides in the bearing 2, so as to slide parallel with the cop tube shaft. A spring 19 has the tendency always to draw the doffer 18 backward.

To the doffer 18 there is secured a push-bar 20, which at first descends vertically, but is then bent in horizontal direction. This bar 20 slides parallel with the cop tube 1 and doffer 18, in guides 21. To it there is secured a wedge-piece 22, against which there bears a roller 23 (Figs. 3 and 4) mounted on a pivotal lever 24. From the latter there projects a lateral rod 25, which bears against the pivoted thread-guide 26, constantly pressed toward the rod 25 by a spring 27. To the lever 24 there is also pivoted a connecting-rod 28, pivoted at the other end to a bent lever 29, whose other extremity carries a cross-bar 30, which temporarily serves as auxiliary thread-guide in well-known manner. The cam 14 (Fig. 5) is of peculiar shape, presenting a gradually ascending section *a*, a contiguous section *b* ascending somewhat more rapidly, and a section *c* of very much steeper gradient. The central angle $\alpha \beta \gamma$ decreases at the sections *a*, *b*, *c* corresponding with the increase in gradient. The fourth section *d* descends abruptly, almost radially; while the fifth section *f* exhibits a circular path. The angle δ is considerably smaller than the angle ϕ .

The operation of the machine is as follows:—When the cop 31 has attained a certain diameter the rear end of the thread-feeler 10 (Figs. 6 and 7) releases an arm 5 32, which shifts the two cams 11, 14, and the one half of the clutch 9, and thus couples the cams with the shaft 6. The roller 15 occupies the position shown in Fig. 5. The cam 14 rotates in the direction of the arrow 10 and the roller 15 ascends the cam track as far as the commencement of the section *a*, whereby the roller 17 is caused to butt against the doffer 18. On continued rotation of the cam 14 the doffer 18 with push- 15 bar 20 is slightly shifted and the nose 22 pushes back the lever 24, whereby the auxiliary thread-guide 30 is drawn from the position shown in Fig. 3 into that shown in Fig. 4. At the same time the thread-guide 20 26 will be swung back by the rod 25 (Figs. 3 and 4), so that the thread is caught in the notch of the auxiliary guide 30 (Fig. 1). The doffer 18, which has not yet arrived at the cop, travels slowly up to the 25 latter for the purpose of loosening it. During this period the final central-winding *i. e.*, a series of windings of threads which are placed on top of the cop while the auxiliary thread guide is in action, will be 30 performed, as the thread is held in central position by the auxiliary guide 30. Meanwhile the elevated section of the cam 11 will have arrived opposite the roller of the lever 12, whereupon the latter will butt against 35 the end 13 of the cop tube shaft and will thus break the connection between the latter and the pinion 3 in well-known manner, so that the cop tube will be stopped. The doffer has now arrived in a position cor- 40 responding substantially to the meeting-point of the sections *a* and *b* of the cam 14 and is ready to act upon the cop. It loosens it by a slow motion and then suddenly doffs it by rapid motion (sections *b* and *c* of the 45 cam 14 operating). Thereupon the doffer returns at still increased speed (section *d* operating). Before reaching its backmost position it halts for a certain interval (section *f* operating). This occurs when the 50 roller of the lever 12 has left the elevated track of the cam 11, so that the cop tube shaft is again coupled with the pinion 3 by the action of the spring 33 (Fig. 1). Since the auxiliary guide 30 still occupies the po- 55 sition shown in Fig. 4, the central foundation will now be laid owing to the rotation of the cop tube. When the roller 15 has reached the end of the section *f*, it returns rapidly to its initial position, whereupon 60 doffer, thread-guide and auxiliary thread-guide will likewise return to the positions they originally occupied (Figs. 1 and 3). A lateral prominence 34 on the cam 11 will now return the lever 32 (Fig. 7) into its 65 initial position in well-known manner.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In a winding machine having means 70 for binding the thread at the close of the winding operation, the combination with a doffer and a lever to actuate it, of an irregular shaped cam for moving said lever and thereby the doffer, said cam having a cam 75 face the first portion of which moves the lever to advance the doffer during the binding operation, a second portion of a steeper gradient to cause the doffer to loosen the cop or bobbin with a slow axial shifting motion, 80 a third portion to cause the doffer to rapidly doff the cop, a fourth portion to permit the rapid return of the doffer for a portion of its travel at a still faster speed, and a final portion to retain the doffer in its partially 85 retracted position for an interval of time and then permit the doffer to complete its return movement more rapidly than its forward movement.

2. In a winding-machine, in combination, 90 a doffer, a disk having an irregular cam-surface, the first section of which rises rapidly in radial direction; a second section rising slowly; a third section rising more rapidly to the highest point; a fourth section de- 95 scending abruptly and being approximately radial; a fifth section running coaxially; a sixth section again rapidly descending, and a pivotal lever operating the doffer and actuated by said cam-disk; whereby the doffer is 100 advanced and retracted at different speeds.

3. In a winding-machine, in combination, a cop-spindle, a reciprocating doffer, a thread-guide, an auxiliary thread-guide, and means for retracting the thread-guide from 105 the spindle and simultaneously advancing the auxiliary thread-guide toward the spindle during the forward motion of the doffer, substantially as described.

4. In a winding-machine, in combination, 110 a cop spindle, a reciprocating doffer; a disk having an irregular cam-surface the first section of which rises rapidly in radial direction; a second section rising slowly; a third section rising more rapidly to the highest 115 point; a fourth section descending abruptly, being approximately radial; a fifth section running coaxially; a sixth section again rapidly descending; a pivotal lever operating the doffer and actuated by said cam- 120 disk; a thread-guide, an auxiliary thread-guide, and means actuated by the doffer in its forward movement for retracting the thread-guide from the cop spindle and simultaneously advancing the auxiliary thread-guide 125 toward the latter substantially as described.

5. In a cop winding-machine, in combination, a cop-spindle, a doffer, means for actuating the latter, a push-bar carried by the doffer and presenting a wedge-piece, a 130

pivotal thread-guide, and a pivotal auxiliary thread-guide actuated by the said wedge-piece, whereby the thread-guide is retracted from the cop spindle and the auxiliary
5 thread-guide simultaneously advanced toward the latter, substantially as described.
In testimony that I claim the foregoing

as my invention, I have signed my name in presence of two subscribing witnesses.

ANTON ROTTER.

Witnesses:

ERNST FISCHER,
JOSEPH SIMON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
