

No. 686,013.

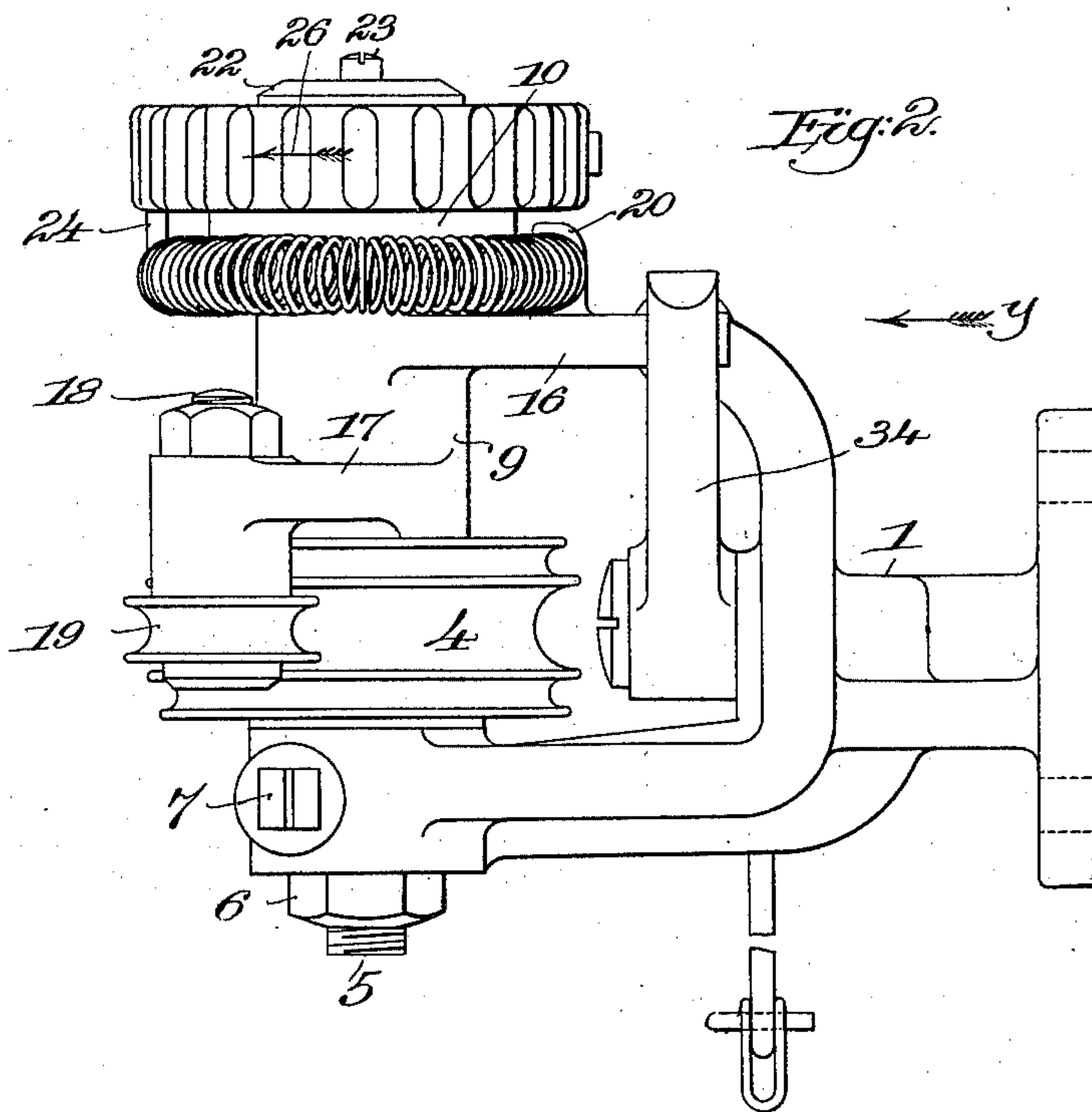
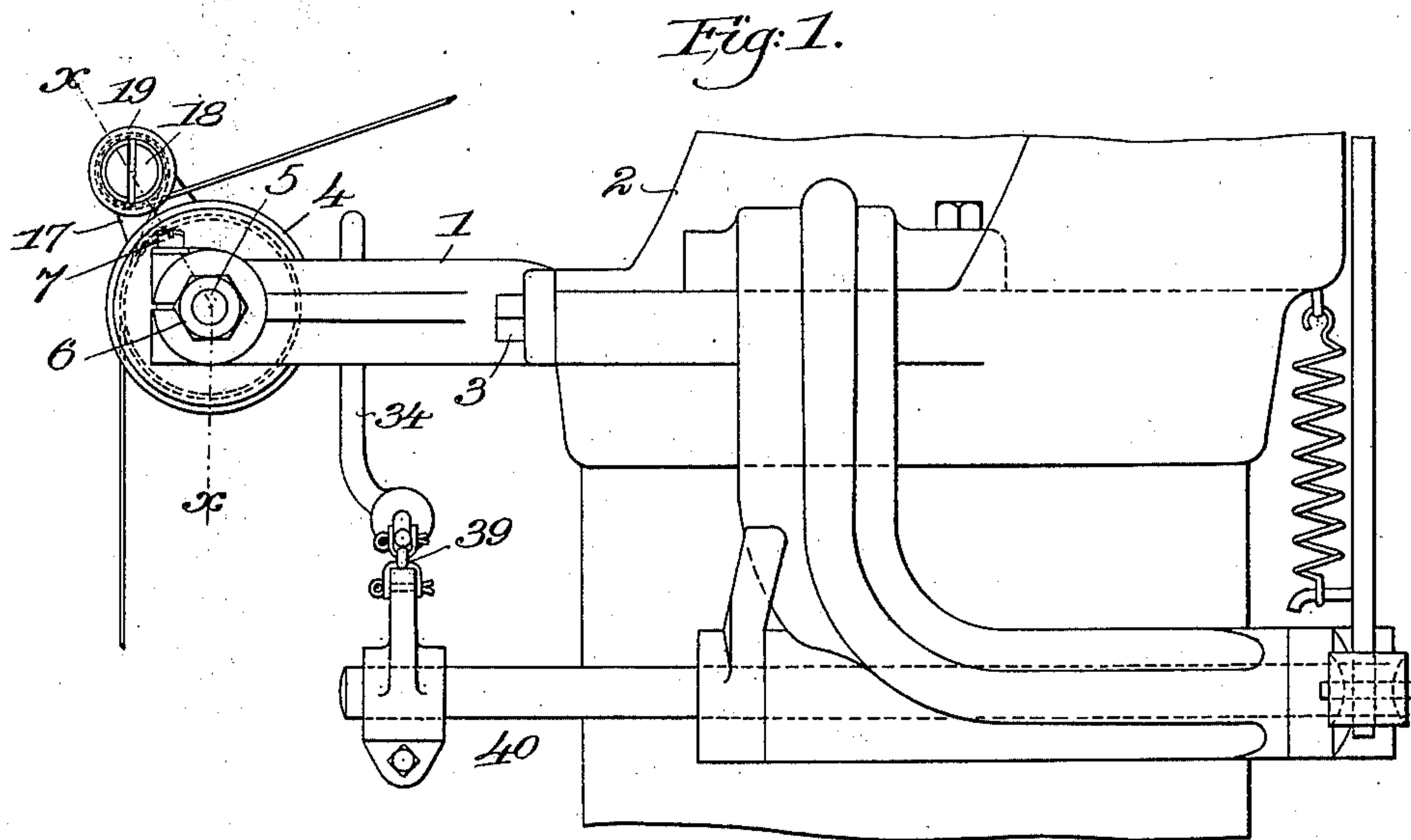
Patented Nov. 5, 1901.

H. A. WEBSTER.  
TENSION DEVICE FOR SEWING MACHINES.

(Application filed May 2, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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Inventor.

*Harold A. Webster*  
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*Benjamin Phillips*

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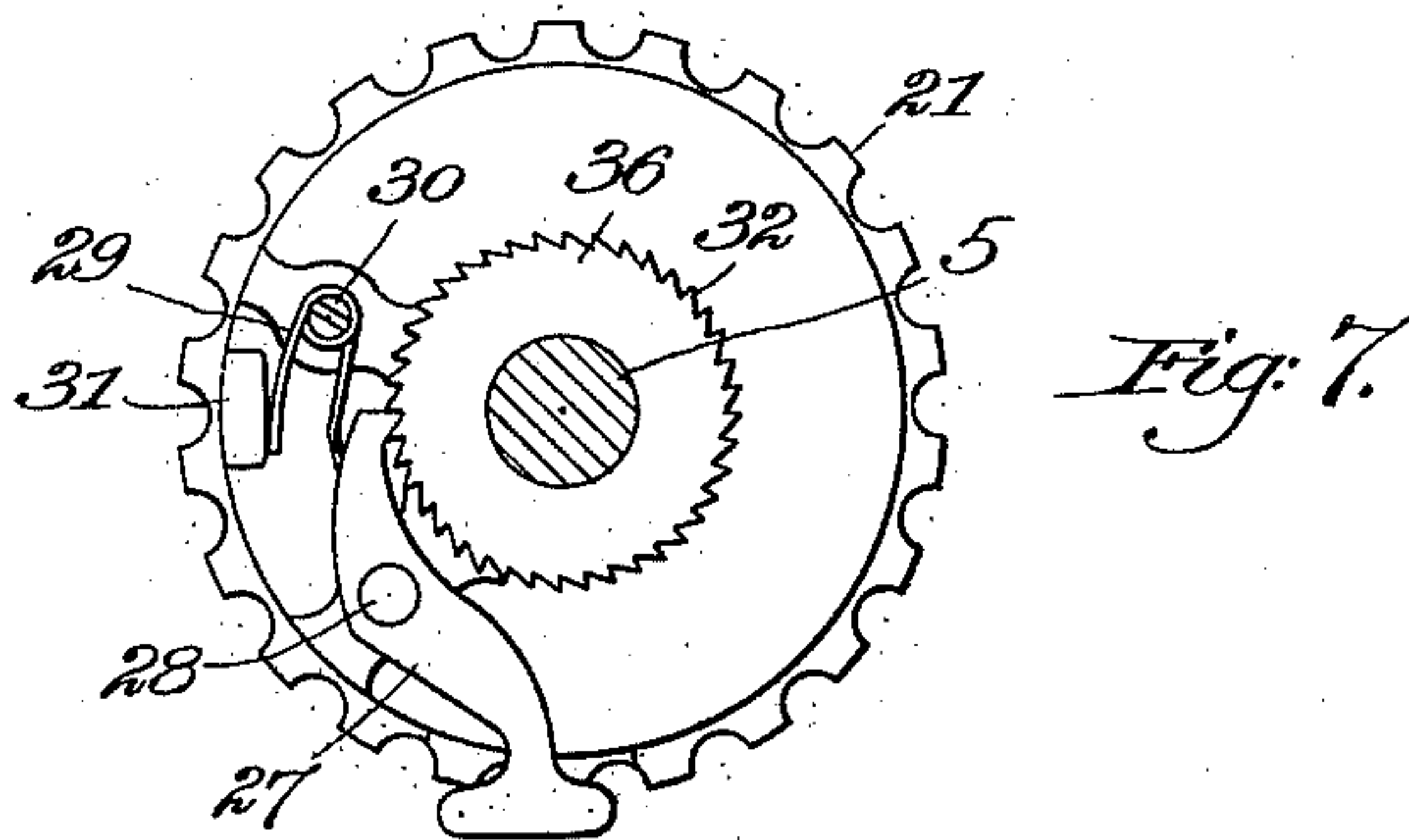
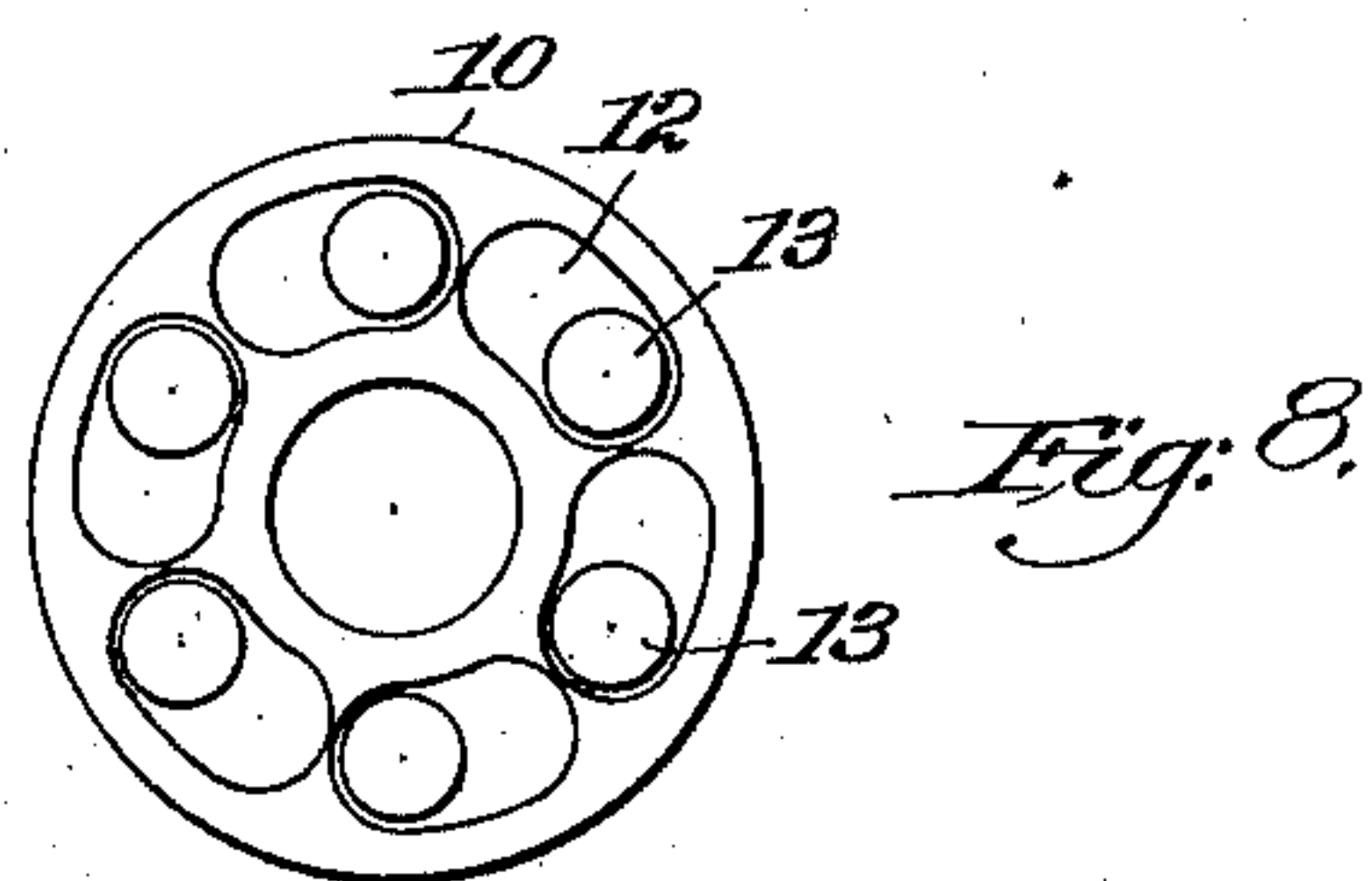
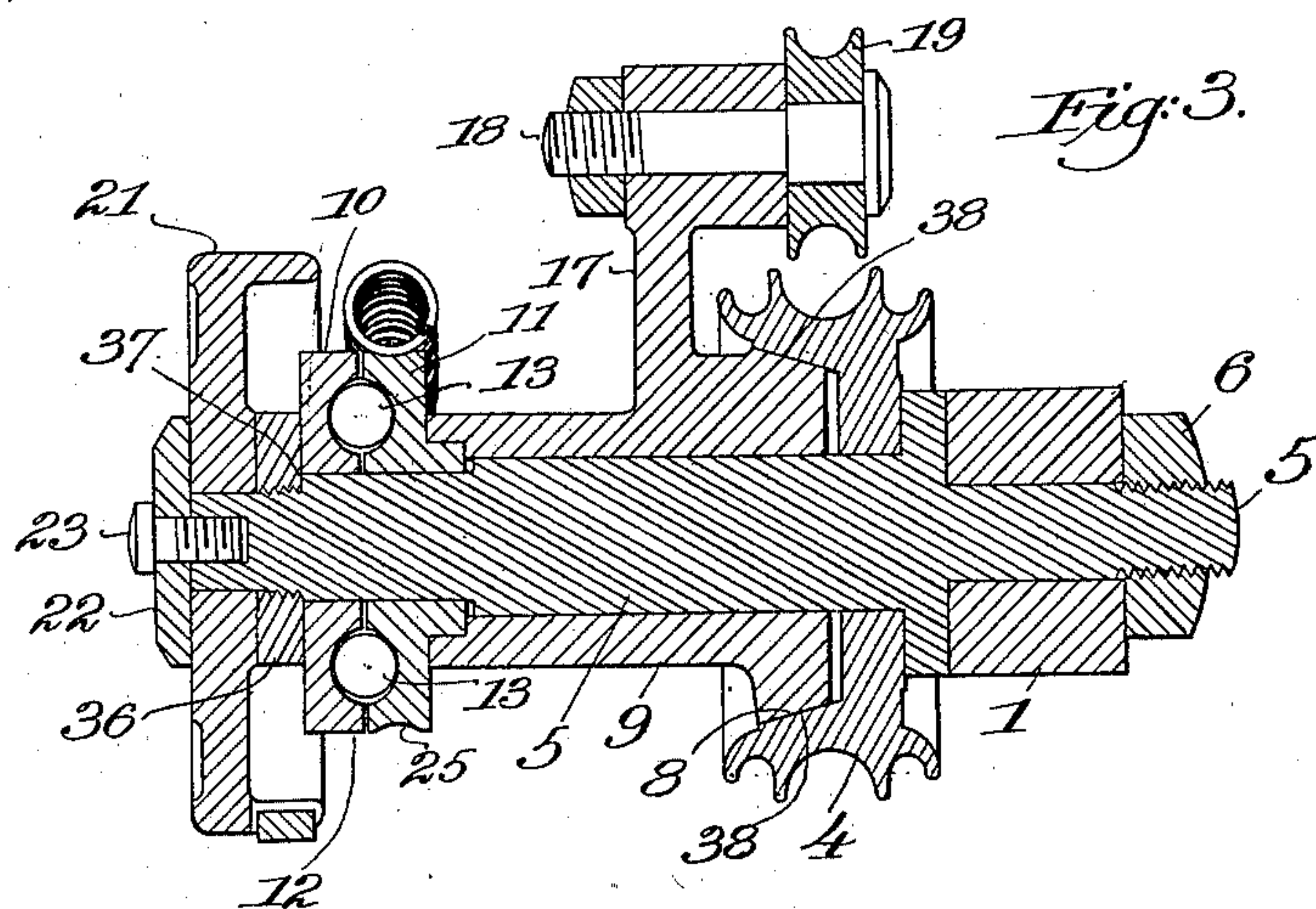
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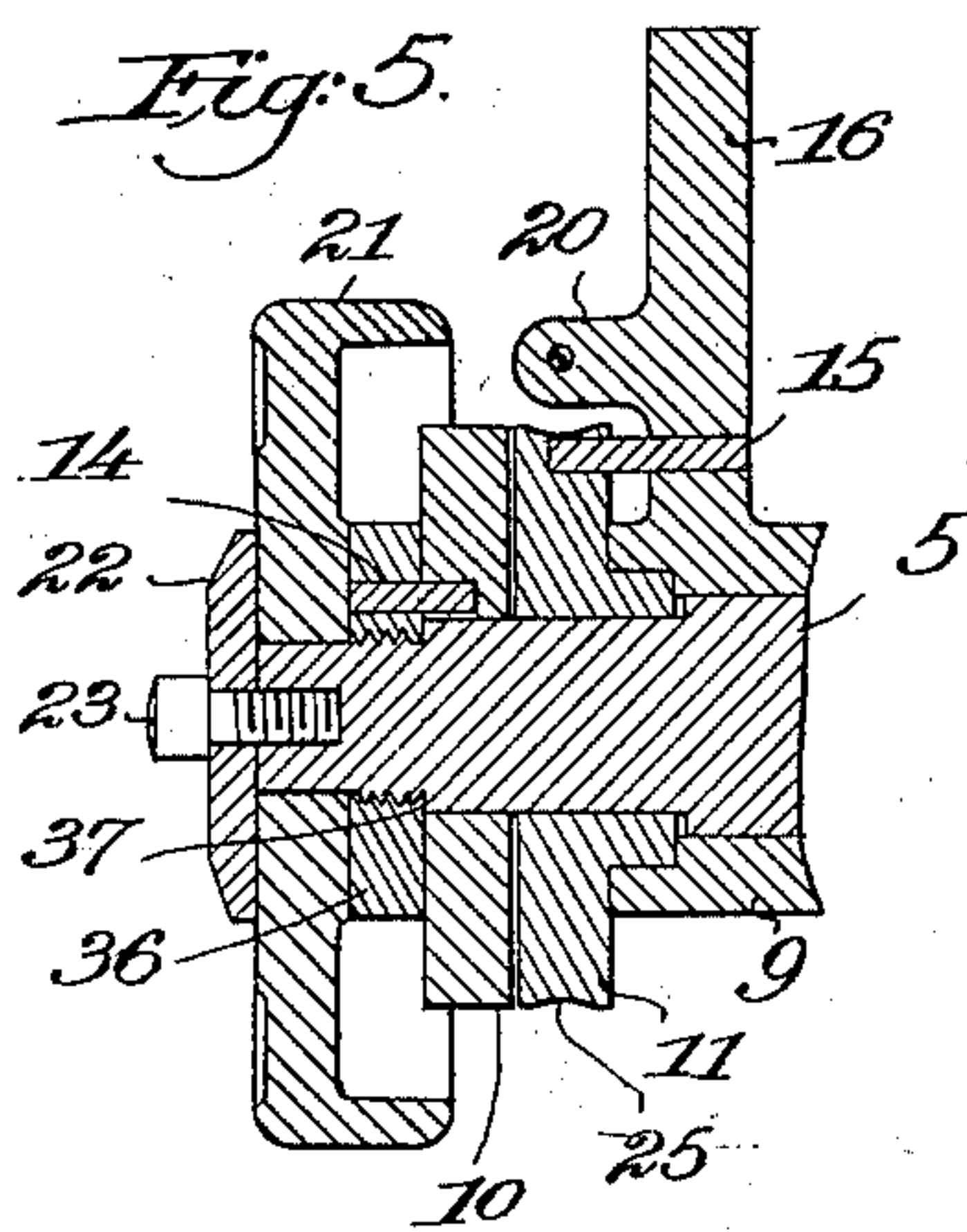
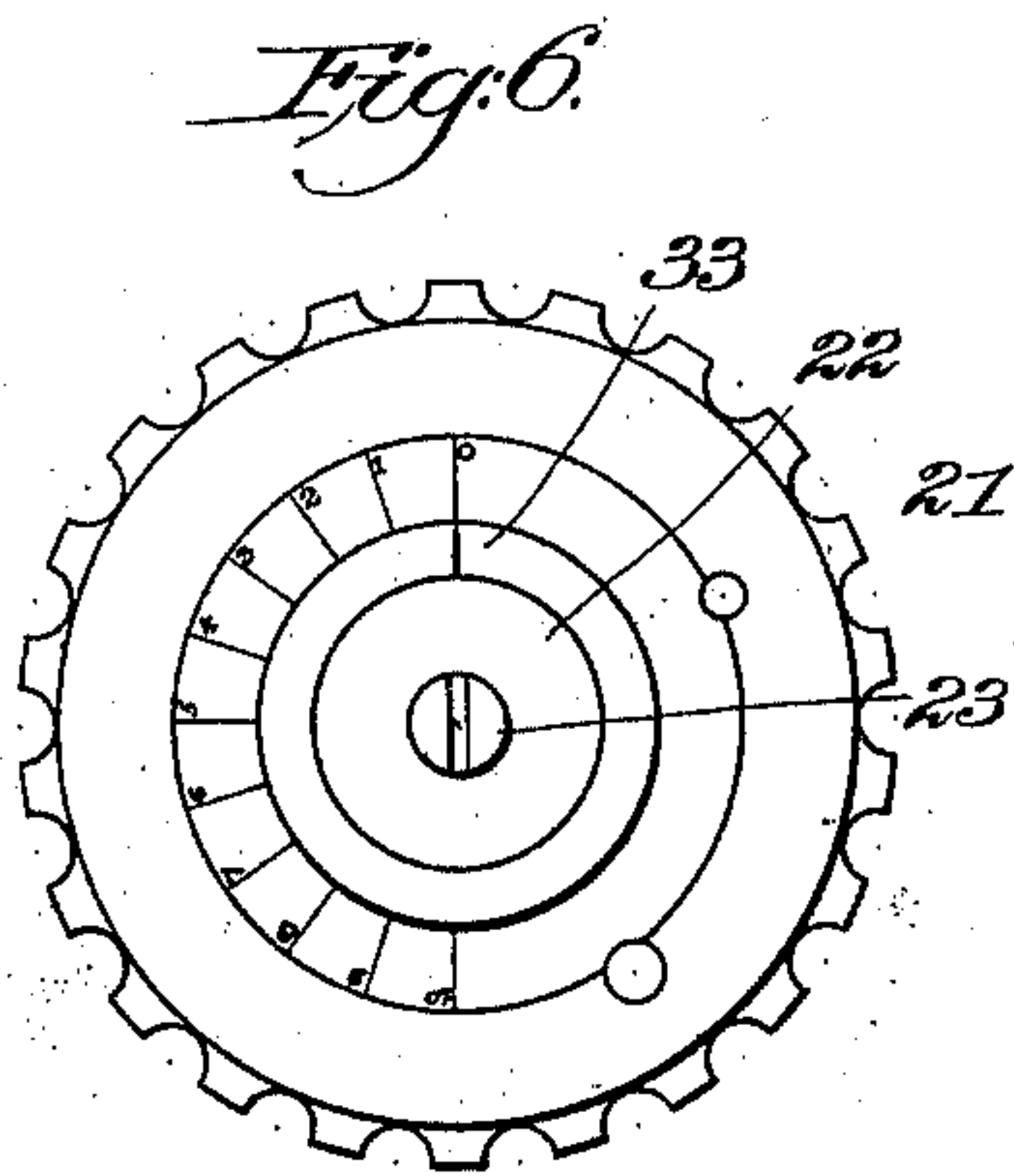
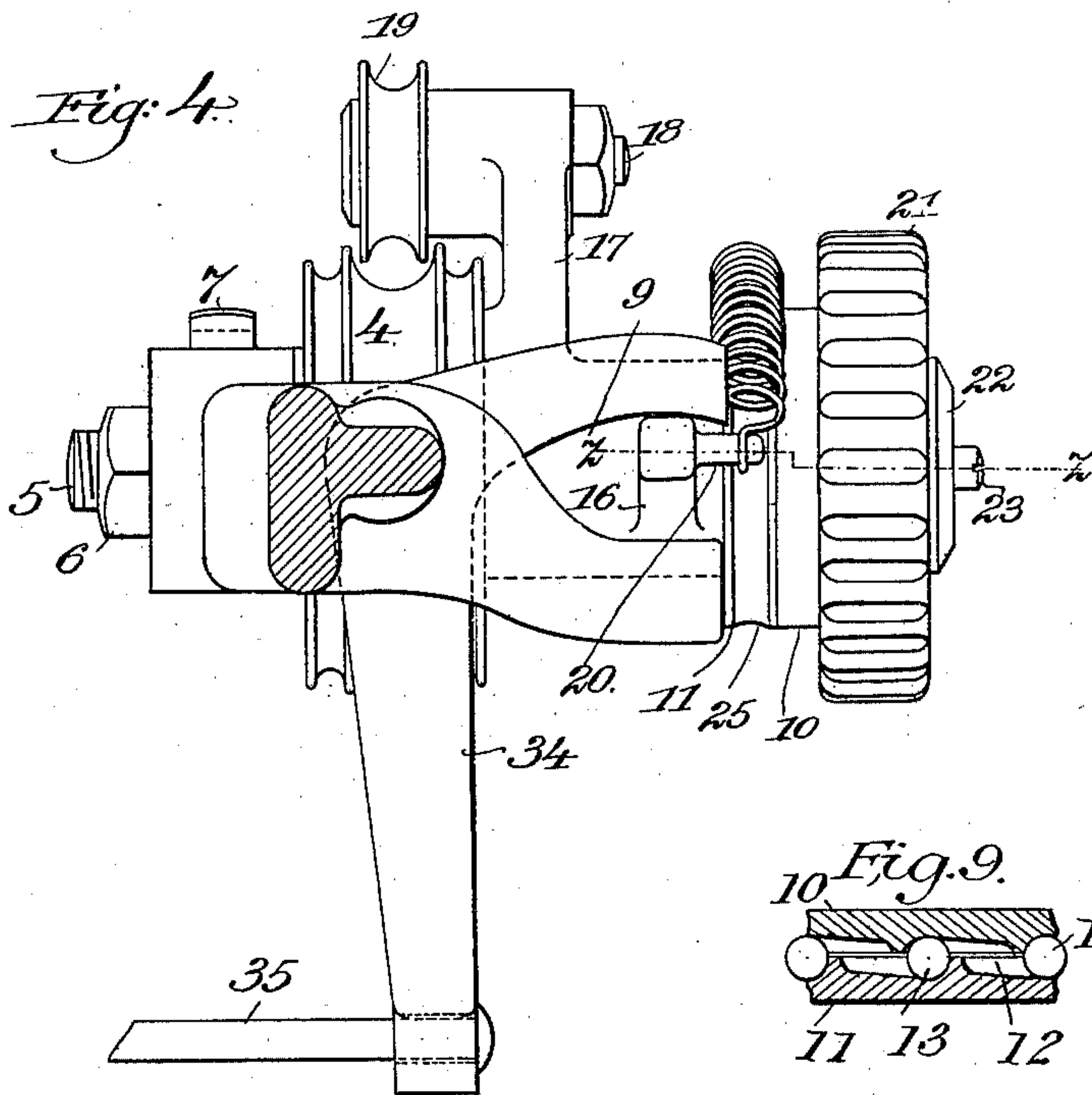
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# UNITED STATES PATENT OFFICE.

HAROLD A. WEBSTER, OF HAVERHILL, MASSACHUSETTS, ASSIGNOR TO  
GOODYEAR SHOE MACHINERY COMPANY, OF PORTLAND, MAINE, A  
CORPORATION OF MAINE.

## TENSION DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 686,013, dated November 5, 1901.

Application filed May 2, 1900. Serial No. 15,224. (No model.)

*To all whom it may concern:*

Be it known that I, HAROLD A. WEBSTER, a citizen of the United States, residing at Haverhill, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Tension Devices; 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.

The present invention relates to an improvement in tension devices for sewing-machines, and more particularly to an improvement in tension devices of the character described in my copending applications, Serial No. 686,422, filed July 20, 1898; Serial No. 696,812, filed November 18, 1898, and Serial No. 727,265, filed August 15, 1899, which are especially adapted for use in connection with wax-thread sewing-machines.

The object of the present invention is to make an improved tension device operating on the same general principles as those of the above-named applications.

To the above end the present invention consists of the improved tension device hereinafter described and claimed.

In the drawings illustrating the preferred embodiment of my invention, Figure 1 is a side elevation of the device attached to the rear of the well-known Goodyear welt and turn machine, of which the upper part of the stand and the lower part of the head are shown. Fig. 2 is a plan. Fig. 3 is a section on the line  $x x$  of Fig. 1. Fig. 4 is an elevation looking in the direction of the arrow  $y$  of Fig. 2, the base of the frame being broken away. Fig. 5 is a section on line  $z z$  of Fig. 4. Fig. 6 is an elevation of the outside, and Fig. 7 is an elevation of the inside, of the tension-adjusting wheel. Fig. 8 is a face view of one of the clutch-operating disks hereinafter described; and Fig. 9 is a section of the clutch-operating disks, showing the oppositely-inclined bottoms of the ball-receiving recesses.

In the illustrated embodiment of the invention the frame 1 of the tension device is secured to the rear of the base 2 of the head of the sewing-machine in any desired manner,

as by the bolts 3. The frame is projected rearwardly and supports the operative parts of the tension device. The tension-wheel or thread-truck 4 is revolubly supported upon the stud 5, which is mounted in the rear end of the frame 1 and secured in position by the nut 6 and clamping-screw 7, which clamps the slotted bearing for the stud 5 together securely to hold the said stud 5 from rotation. The tension-wheel 4 is provided with a friction-face 8, which is adapted to be engaged by an opposing friction-face 8 of a sleeve 9, loosely mounted on said stud, the construction of the friction-faces being such that when the sleeve 9 is forced toward the tension-wheel 4 it will engage and hold the same from rotation. Thus the two friction-faces comprise a friction-clutch which may be opened and closed to release or hold the tension-wheel.

The means provided for moving the sleeve 9 toward the tension-wheel 4 consists of two disks 10 and 11, the former of which is rigidly secured to the stud 5, and the other of which is rigidly secured to the sleeve 9. These disks are provided on their adjacent faces with recesses 12, the bottoms of which are inclined in opposite directions and in which balls are placed. The above arrangement is such that when a rotational movement is imparted to the sleeve 9 the balls will roll up the oppositely-inclined bottom surfaces of the recesses 12 and force the sleeve 9 toward the tension-wheel 4, thereby clamping the tension-wheel and holding it from rotation.

I have found when a screw-thread is used to force the clutch-faces together and a heavy tension is employed that sometimes the screw-thread will bind or stick and that by substituting the ball-disks for the screw-thread this binding or sticking is obviated, thus contributing materially to certainty of operation of the clutch at the predetermined tension. The present construction therefore removes an ingredient of possible uncertainty in the operation of the prior construction.

The disk 10 is held in place by a nut 36, screwed onto the reduced end of the stud 5,



firmly against the shoulder 37, so that the said disk is held from any movement on the stud 5 away from the tension-wheel 4. The disk 10 is held from rotation by a pin 14, which passes through a hole in the nut 36 and enters a corresponding hole in the disk 10, so that the said disk is thus held from rotational movement and from movement away from the tension-wheel 4. The other disk 11 is rotatably mounted upon the stud 5 and is secured to the sleeve 9 by means of the pin 15, which passes through a hole in the arm 16 of the sleeve 9 and enters a corresponding hole in the disk 11. This arrangement is such that the disk 11, while it is free within certain limits to move longitudinally upon the stud 5, is held from rotational movement thereon except in conjunction with a rotational movement with the sleeve 9. The sleeve 9 is provided with an arm 17, which carries a stud 18, upon which is loosely mounted a small thread-truck 19, about which the thread passes after leaving the tension-wheel on its way to the stitch-forming mechanism. The lead of the thread is illustrated in Fig. 1. It goes up from the wax-pot around the tension-wheel 4, thence around the thread-truck, which is mounted on the arm 17 of the sleeve 9, thence passes upward and forwardly to the stitch-forming mechanism, the above arrangement being such that a pull upon the thread by the stitch-forming instrumentalities tends to rotate the sleeve 9, and when rotated in this direction the balls 13 roll into the deeper portion of the recesses 12 and the tension-wheel is released.

Means are provided normally tending to rotate the sleeve 9 upon the stud 5 in the direction to cause the balls 13 to roll to the higher parts of the recesses 12, so as to force the sleeve 9 against the tension-wheel 4 to clamp and hold the same. In the present form of my invention these means are so constructed that the pressure of the friction-faces upon each other can be adjusted with the utmost nicety, so that the amount of tension which is required to be applied to the thread in order to release the tension-wheel is susceptible of the most accurate adjustment. The arm 16, before referred to as projecting forwardly from the sleeve 9, is provided with a lug 20, to which a spring is attached, and suitable devices are provided for regulating the tension of the spring, so as to determine the pressure with which the friction-faces will be forced against each other, and thus the amount of tension required upon the thread in order to release the tension-wheel 4. My invention is not limited to any particular means for accomplishing this purpose, but I have shown in the drawings the device which I prefer. They consist of a hand-wheel 21, which is loosely mounted upon the end of the stud 5 and held in place by a washer 22 and screw 23. One end of the spring is attached to the lug 20 on the arm 16 and the other end of the spring is attached to a lug 24 on the

hand-wheel 21, the spring being wrapped loosely around the disk 11, which is provided with a groove 25 to hold the spring from accidental displacement therefrom. A rotation of the hand-wheel in the direction of the arrow 26 will increase the tension on the spring and a rotation in the opposite direction will decrease it. Means are provided to hold the hand-wheel in any desired position, and such means are shown in the drawings as the pawl 27, which is pivoted at 28 to the hand-wheel and the engaging tooth of which is normally pressed inward by the spring 29, which consists of a piece of spring-wire wound around a pin 30, bearing outward against the inside of the rim 31 of the hand-wheel 21 and inwardly against the pawl 27. The pawl is provided with the outwardly-projected end, which extends slightly beyond the surface of the periphery of the hand-wheel, so as to be in convenient position to be engaged by the hand while grasping the wheel to adjust the tension of the spring. The toothed end of the pawl engages the ratchet-teeth 32, formed on the periphery of the nut 36. The above arrangement is such that by turning the hand-wheel to the right, as seen in Fig. 6, the tension on the spring can be increased to any desired amount, at which point it will be held securely in position by the pawl-and-ratchet device. Upon the outer face of the hand-wheel I may engrave graduating-marks, the mark opposite the index 33 on the washer 22 indicating, if desired, the tension in pounds necessary to be applied to the thread in order to release the tension-wheel, or, in other words, the tension under which the machine is working. In the machine of the drawings two ratchet-teeth correspond to one mark on the graduating-scale, so that if the scale indicates pounds the tension can be adjusted to half-pounds.

Means are provided for releasing the tension-wheel when the sewing of a shoe is completed. To this end a bell-crank lever 34 is pivoted to the frame 1, with one end projected over the forwardly-projected arm 16 of the sleeve 9, so that when the lever 34 is oscillated to depress the arm 16 the sleeve 9 will be oscillated thereby against the force of the spring to release the tension-wheel 4. The down-hanging end of the bell-crank lever 34 is connected with any suitable devices for operating it, as the rod 35, chain 39, and rock-shaft 40 of the well-known Goodyear welt and turn machine.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States—

1. A tension device for sewing-machines, having, in combination, a thread-truck, a locking device therefor, a support for said locking device, said support and locking device carrying complementary inclines, and a ball interposed between the complementary inclines, substantially as described.

2. A tension device for sewing-machines,



having, in combination, a thread-truck, a locking device therefor, and a support for said locking device, about which it is arranged to turn, said support and locking device having  
5 a series of complementary inclined contact-faces separated by a series of balls for moving the locking device toward the thread-truck as said locking device is turned on its support, substantially as described.

10 3. A tension device for sewing-machines, having, in combination, a thread-truck, a locking device therefor, a support for said locking device, two ball-disks mounted on said support, the one secured to the support and  
15 the other secured to the locking device, and balls interposed between the said ball-disks, substantially as described.

4. A tension device for sewing-machines, having, in combination, a thread-truck, a locking device therefor, a support for said locking device about which it is arranged to turn,  
20 a ball-disk secured to said support provided with ball-recesses in its face, having inclined bottoms, a complementary ball-disk having  
25 similar ball-recesses in its face rotatably mounted upon said support and means secured to the said latter ball-disk controlled by a pull of the thread for rotating the latter ball-disk to actuate the locking device, substantially as described.  
30

5. A tension device for sewing-machines, having, in combination, a thread-truck, a locking device therefor, movable axially toward

and from the thread-truck provided with an idle thread-truck arm and an arm for a spring, 35  
a support for said locking device, a stationary ball-disk provided with recesses secured to said support, a movable ball-disk secured to said locking device provided with ball-recesses in its face, the said recesses being inclined in opposite directions, balls mounted  
40 in said recesses, an idle thread-truck mounted on said idle thread-truck arm of the locking device, a ratchet-and-pawl adjusting device, and a spring connected at one end to the said  
45 arm for the spring of said locking device and at the other end to said ratchet-and-pawl adjusting device, whereby the tension of the spring may be adjusted, substantially as described.  
50

6. A tension device for sewing-machines, having, in combination, a thread-truck, a locking device therefor, a support for said locking device, said support and locking device  
55 carrying complementary inclines, a ball interposed between the inclines, and means acting normally to cause the locking device to lock the thread-truck, substantially as described.

In testimony whereof I affix my signature 60  
in presence of two witnesses.

HAROLD A. WEBSTER.

Witnesses:

HORACE VAN EVEREN,  
ALFRED H. HILDRETH.