

No. 679,318.

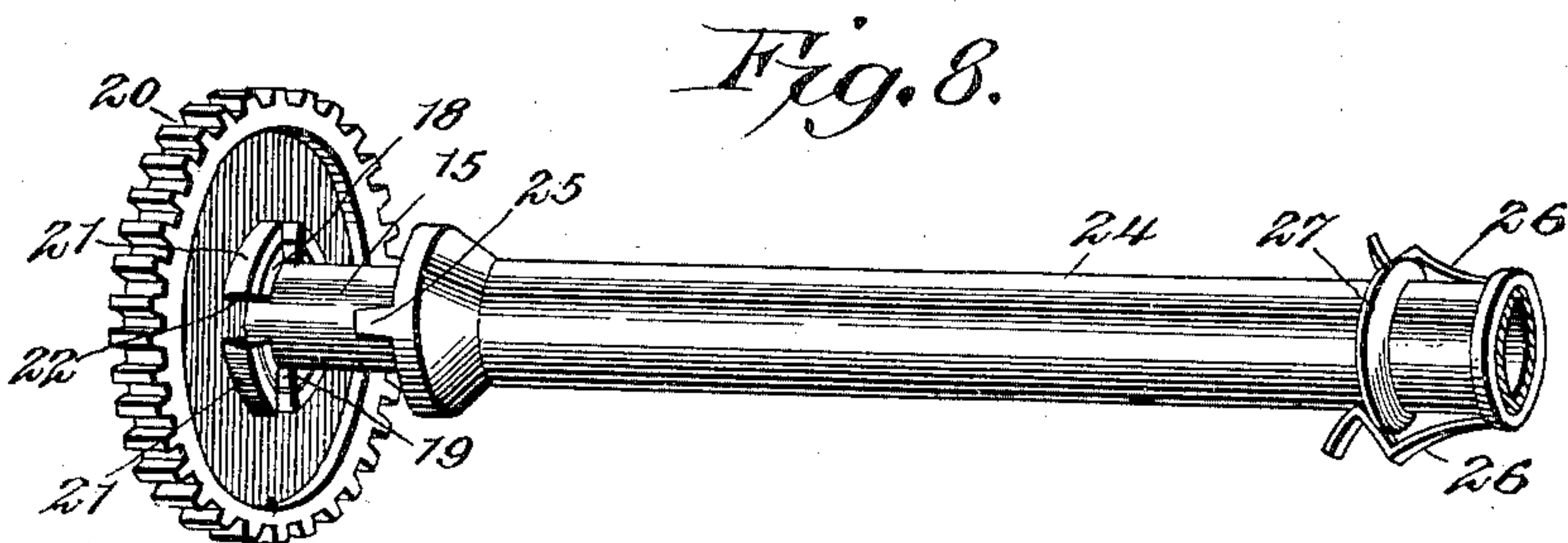
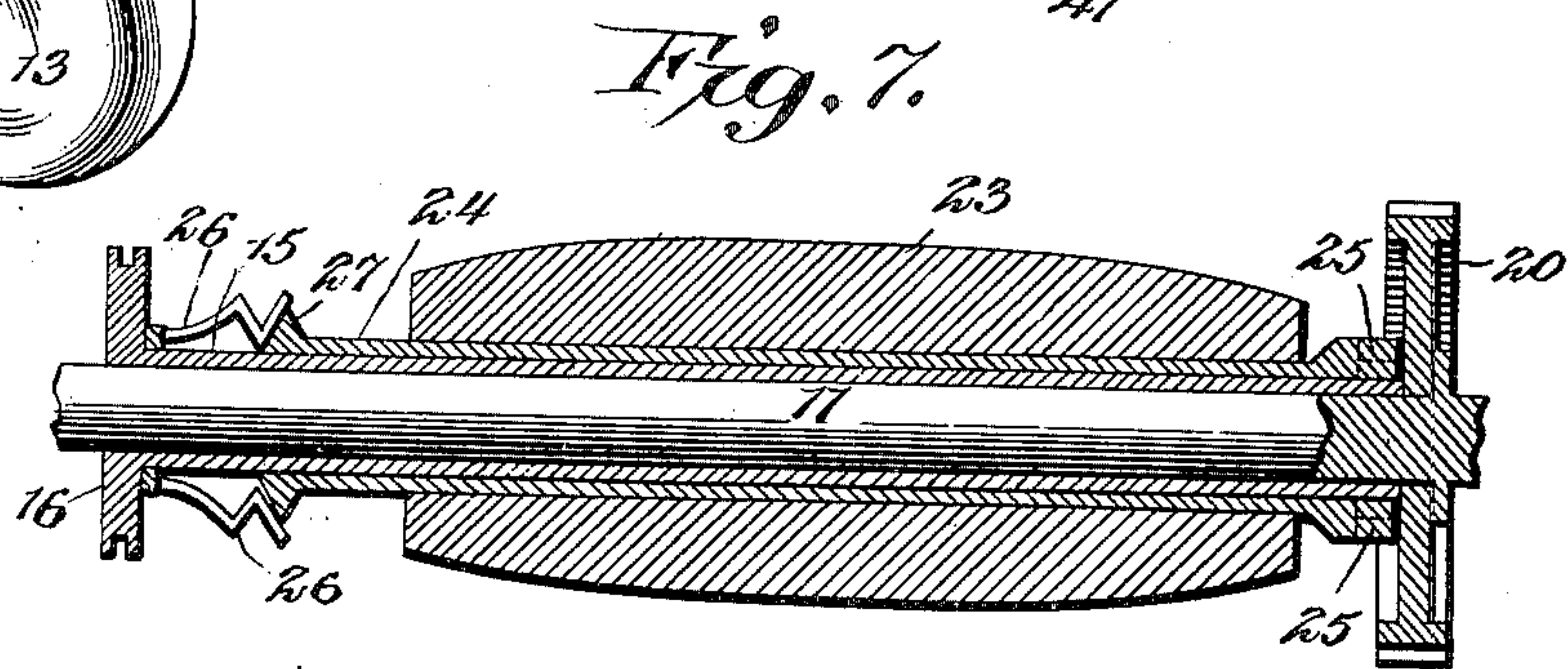
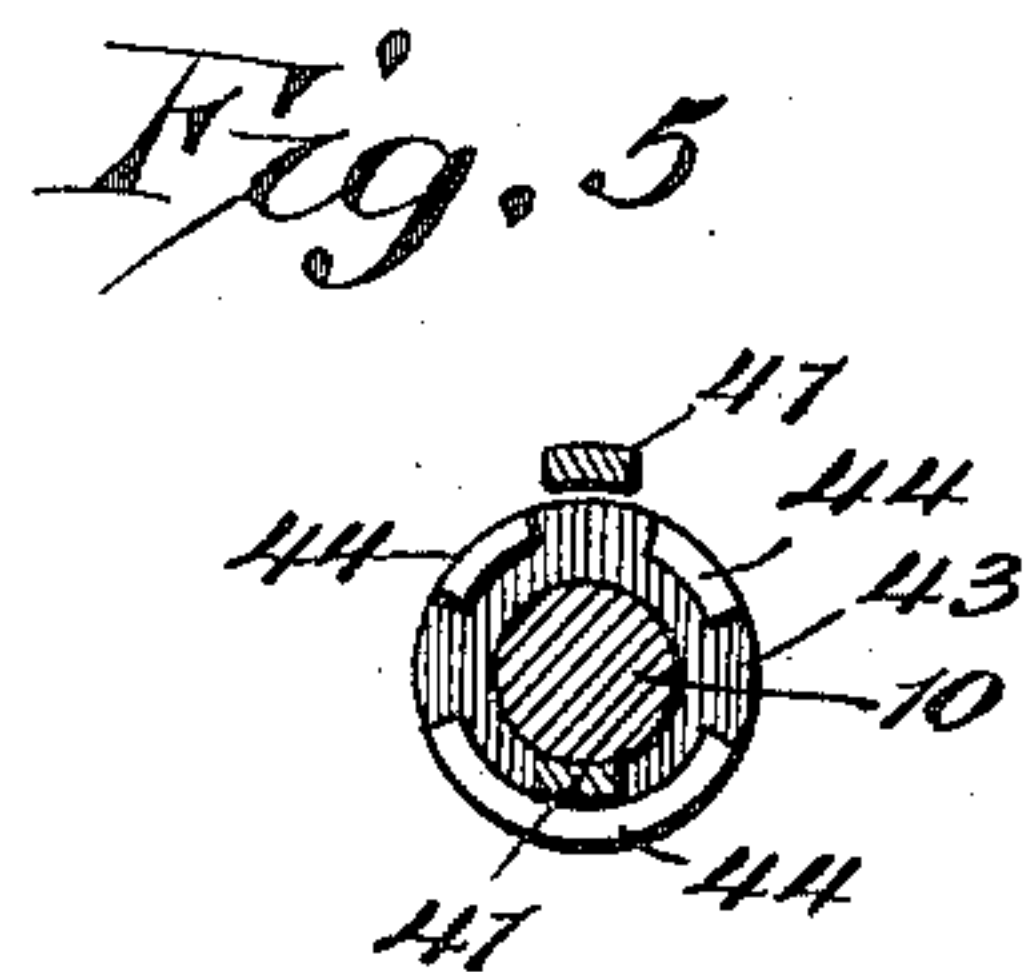
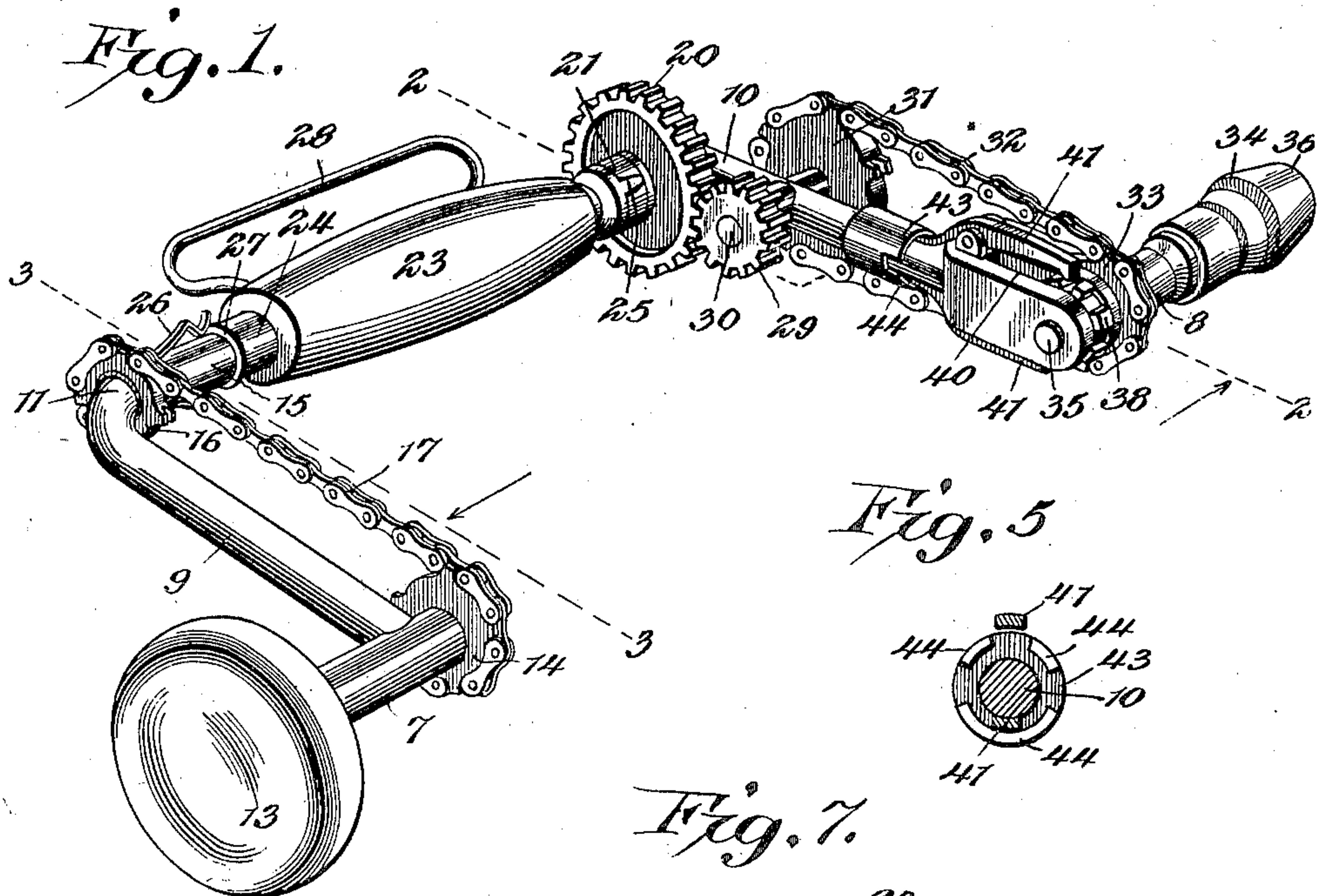
Patented July 30, 1901.

J. G. JOHNSON.
DRILLING MACHINE.

(No Model.)

(Application filed Mar. 27, 1901.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 2.

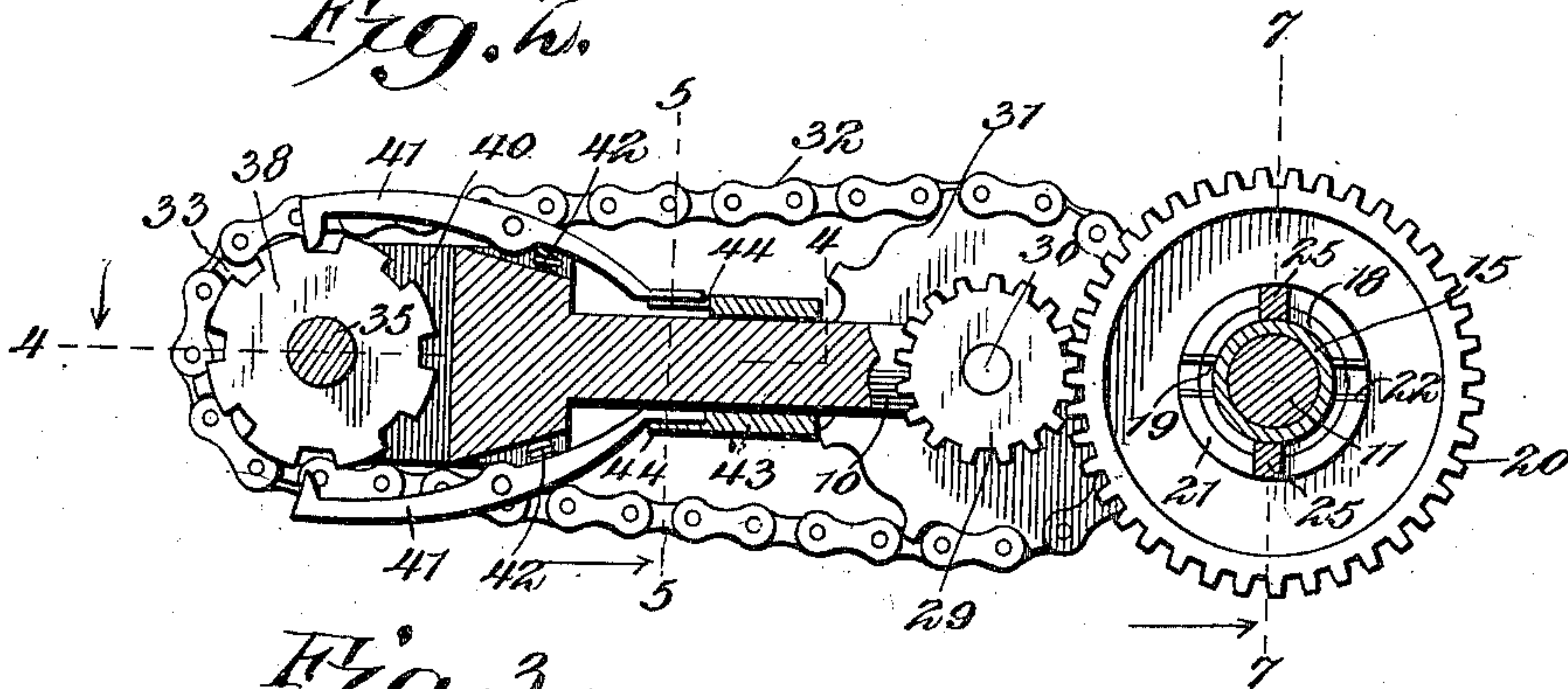


Fig. 3.

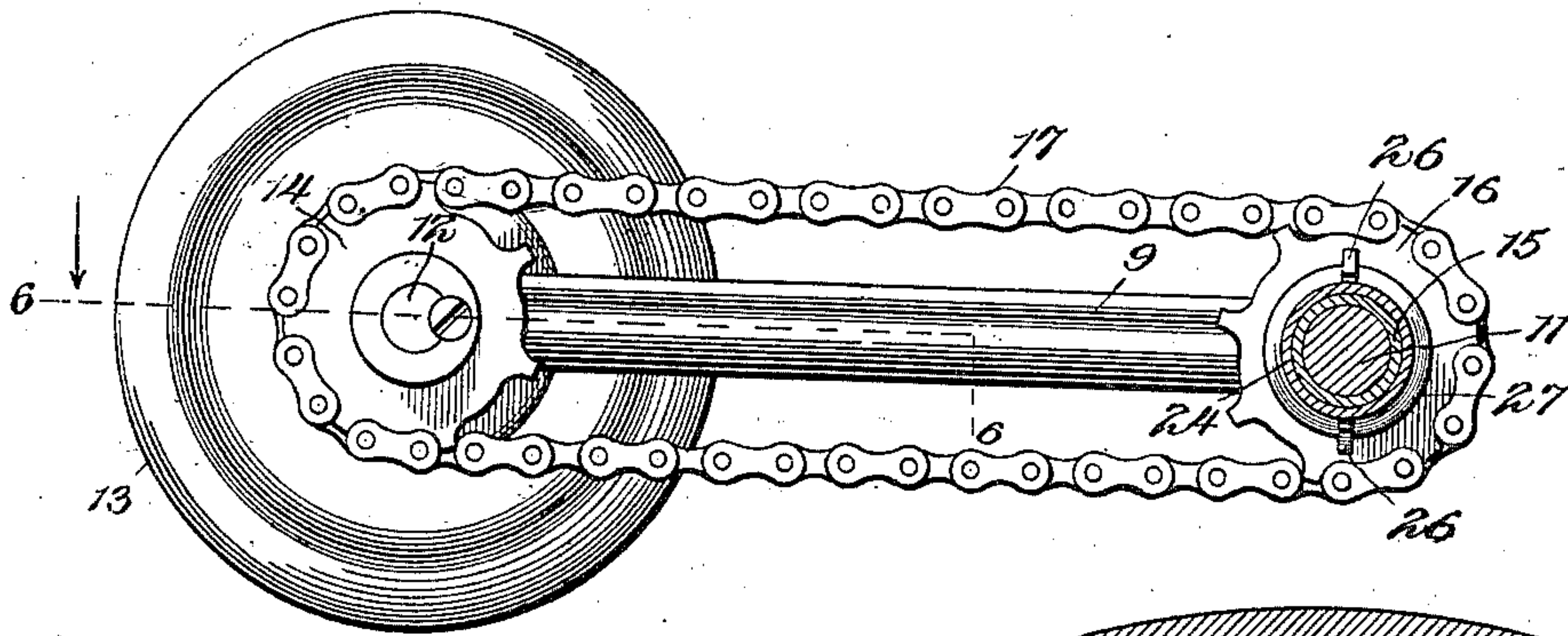


Fig. 4.

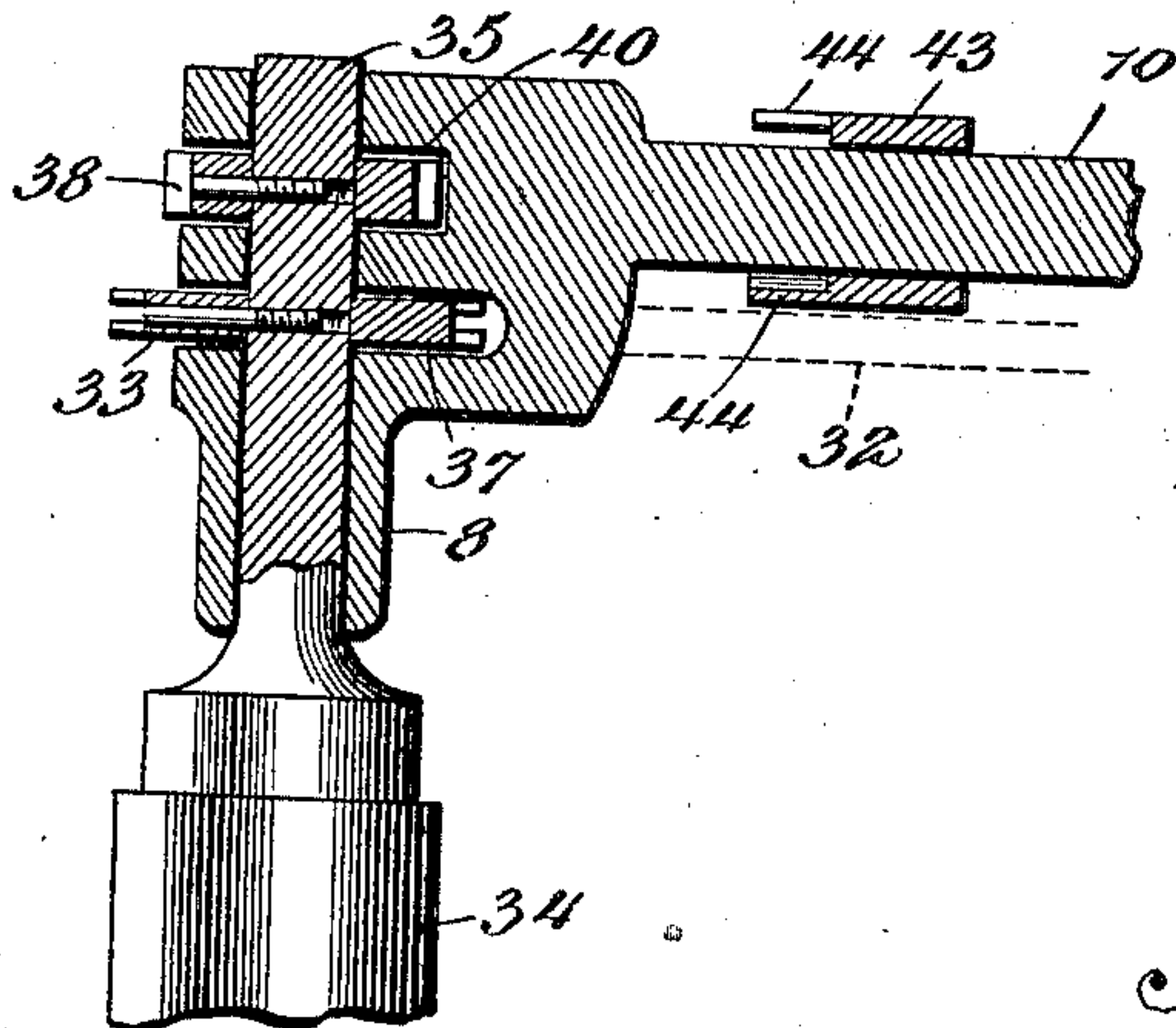
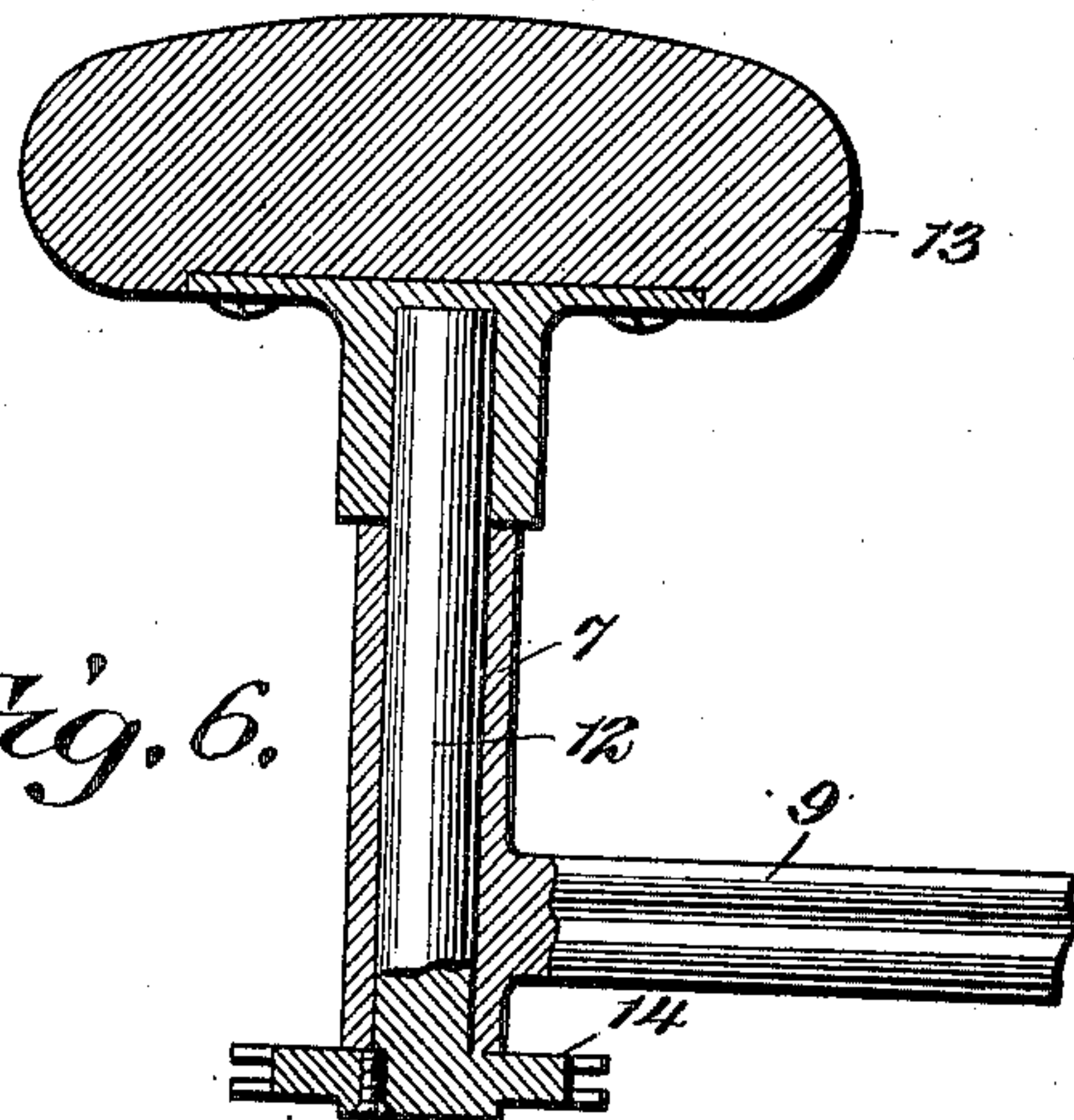


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN GUST JOHNSON, OF ISHPEMING, MICHIGAN.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 679,318, dated July 30, 1901.

Application filed March 27, 1901. Serial No. 53,108. (No model.)

To all whom it may concern:

Be it known that I, JOHN GUST JOHNSON, a citizen of the United States, residing at Ishpeming, in the county of Marquette and State of Michigan, have invented a new and useful Drilling-Machine, of which the following is a specification.

This invention relates to drilling-machines, and more particularly to those operated by hand and comprising a frame having a tool-holder at one end, a bearing-head at the other, and an intermediate operating-crank connecting the two.

The object of the invention is to provide a machine of this character adapted for use in either metal or wood working and having means whereby the speed of the tool may be changed with relation to the speed of the handle or crank.

A further object is to so construct the machine that the additional twisting strain due to the increased speed of the tool does not revert to the operating-hand, so that said hand and arm are free to exert the extra power necessary to drive the tool at its increased speed.

A still further object is to provide a machine in which the handle is used for the purpose of changing the speed of the tool and yet is relieved to a great extent of the additional twisting strain due thereto.

In carrying out the invention the construction shown in the accompanying drawings and described in the following specification is at present believed to be the most desirable; but it will be understood that it may be changed and modified within the scope of the claims hereto appended.

In said drawings, Figure 1 is a perspective view of the preferred form of machine. Fig. 2 is a cross-sectional view of the same, taken on the line 2 2 of Fig. 1. Fig. 3 is a sectional view taken on the line 3 3 of Fig. 1. Fig. 4 is a sectional view taken through the journal-bearing of the tool-holder on the line 4 4 of Fig. 2. Fig. 5 is a detail section on the line 5 5 of Fig. 2. Fig. 6 is a section through the bearing-head and on the line 6 6 of Fig. 3. Fig. 7 is a longitudinal sectional view through the operating-handle, the position of said section being indicated by the line 7 7 of Fig. 2.

Fig. 8 is a detail perspective view of the speed-changing clutch.

Similar numerals of reference designate similar parts throughout the several figures of the drawings.

In carrying out the invention as shown a frame is provided comprising a pair of spaced aligned journal bearings or boxes 7 and 8, having crank-arms 9 and 10, the outer ends of which are connected by a handle-shank 11, located in longitudinal relation to the journal-boxes. A stub-shaft 12 is rotatably mounted in the journal-box 7, said shaft having a bearing-head 13 secured to its outer end and a sprocket-wheel 14 fixed to its inner end. Rotatably mounted upon the handle-shank 11 is a sleeve 15, to one end of which is rigidly affixed a sprocket-wheel 16, similar in size and shape to the sprocket-wheel 14 and connected thereto by a sprocket-chain 17. By this means the sleeve 15 will have a fixed relation to the shaft 12 and head 13. The opposite end of the sleeve 15 carries an annular series of teeth 18, forming therebetween the tapering notches 19. A gear-wheel 20 is journaled upon this end of the handle-shank 11 and carries upon its inner face a series of outstanding teeth 21, located over the teeth 18 and forming the tapering spaces 22 therebetween, which are arranged to aline with the notches 19 between said teeth 18.

Slidably and rotatably mounted upon the sleeve 15 is the handle-grip 23, having an inner boxing 24 projecting beyond the ends of said grip. The end of the boxing which is adjacent to the gear-wheel 20 has a pair of outstanding tapering teeth 25, which are arranged to engage in the aligned spaces or notches 19 and 22 when the grip is moved longitudinally toward the gear-wheel. It will thus be seen that the gear-wheel 20 may be clutched to the sleeve 15 or be free to rotate independently thereof by means of the grip 23. In order to hold said grip in its operative and inoperative positions, a pair of holding-springs 26 are secured to that end of the sleeve 15 which carries the sprocket-wheel 16 and are adapted to engage on opposite sides of an annular flange 27, arranged on the adjacent end of the boxing 24, according as the grip is moved toward or away from its clutching engagement.

The grip is furthermore preferably provided with a keeper-bail 28.

As clearly shown in Fig. 1, the gear-wheel 20 meshes with a pinion 29, fixed upon the inner end of a shaft 30, that is journaled in the crank-arm 10 and has a sprocket-wheel 31 keyed or otherwise secured upon its outer end. A sprocket-chain 32 connects said wheel 31 with a somewhat smaller sprocket-wheel 33, that is fastened upon the tool-holder, which is designated as a whole by the reference-numeral 34, and is journaled in the boxing or bearing 8, and therefore in alinement with the shaft 10, carrying the bearing-head.

The tool-holder comprises a shaft 35, rotatably mounted in the boxing 8 and carrying at its outer end a tool-socket 36, which may be of any construction desired and is adapted to receive the drill, bit, or other tool to be used. The boxing 8 is cut out, as shown at 37, to provide a space for the above-mentioned sprocket-wheel 33, which is secured to the shaft 30 by any suitable means. A toothed wheel 38 is also secured to the shaft 35 in another notch or opening 40 and is adapted to be engaged by a pair of dogs 41, pivoted upon the boxing 8. These dogs are urged into said engagement by springs 42, interposed between them and the face of the boxing. Their rear ends are located adjacent to the crank-arm 10, and a cuff 43, rotatably mounted thereon, has a plurality of fingers 44, which are arranged to be engaged over said rear ends to hold one or both dogs out of engagement with the toothed wheel 38, as will be readily understood.

The operation of the device is as follows: Assuming, first, that the low speed is desired, the sleeve 15 is unclutched from the gear-wheel 20 by moving the grip 23, so that its teeth 25 will be disengaged therefrom. One or both of the dogs 41 are then brought into engagement with the toothed wheel 38, so that the shaft 35 will be locked to move with the crank-arm 10. Upon grasping the grip 23 and rotating the device therefore the tool-holder will be correspondingly rotated, or, in other words, upon a complete revolution of the handle the tool will have been given but one revolution, as with an ordinary brace. When it is desired to rotate the tool at a higher speed with relation to the handle, the shaft 35 is released to permit of its independent rotation in the boxing 10. The grip is then moved longitudinally, so that its teeth will engage between the alined teeth of the sleeve 15 and the gear-wheel 20, whereby the gear-wheel, sleeve, and grip will all be locked together. Upon revolving the handle about the alined shafts the pinion 29 will be caused to revolve about the gear-wheel, thus rotating the shaft 30 and through the sprocket-chain 32 the tool-holder 34. Because of the difference in size between the gear-wheels 20 and 29 and the sprocket-wheels 31 and 33 the speed of the tool-holder will be greatly increased with relation to the speed of the grip,

so that upon the completion of one revolution of the handle the tool will have been revolved several times. In practice I have found the relation of three to one very satisfactory, although it may be constructed for more or less, as desired.

It will be evident to those skilled in the art that there are exceedingly important advantages derived from this construction. In the first place a simple machine is provided by means of which a large drill or other tool may be operated, as with an ordinary brace, or a small tool may be revolved at a much higher speed without increasing the speed of the hand operating it. An especially important feature resides in the employment of the sleeve 15 and its attachment to the bearing-head 13, for the reason that when the tool-head is geared up by the clutching of the grip a great part of the additional strain is removed from the operating-hand and is taken up through the sleeve and chain 17 by the head 13. The strain is thus divided and distributed between the bearing-head and the grip, whereby the operating hand and arm are relieved of the twisting strain due to holding the gear-wheel 30 relatively stationary.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention, what I claim is—

1. In a machine of the class described, the combination with a bearing-head, of a frame rotatably mounted upon the bearing-head, a tool-holder revolubly mounted upon the frame, gearing carried by the frame, and means for detachably connecting the bearing-head and tool-holder through the medium of said gearing so that upon the rotation of the frame the tool-holder will be rotated at a relatively greater speed.

2. In a machine of the class described, the combination with a bearing-head, of a frame rotatably mounted upon the bearing-head, a tool-holder revolubly mounted upon the frame, gearing carried by the frame, means for detachably connecting the bearing-head and tool-holder through the medium of said gearing so that upon the rotation of the frame the tool-holder will be rotated at a relatively greater speed, and means for locking said tool-holder against relative movement upon the frame when the bearing-head and tool-holder are disconnected.

3. In a machine of the class described, the combination with a bearing-head, of a frame rotatably mounted upon the bearing-head, a tool-holder revolubly mounted upon the frame, gearing carried by the frame and en-

gaging the tool-holder, and a movable clutch interposed between the gearing and the bearing-head and adapted to detachably lock a portion of said gearing and the bearing-head against relative movement.

4. In a machine of the class described, the combination with a bearing-head, of a frame rotatably mounted thereon, a tool-holder rotatably mounted upon the frame, an operating-handle arranged upon the frame, gearing carried by the frame and operatively connected to the tool-holder, and means for connecting the operating-handle and the bearing-head to the gearing.

5. In a machine of the class described, the combination with a bearing-head, of a frame rotatably mounted thereon, a tool-holder rotatably mounted upon the frame, an operating-handle arranged upon the frame, gearing carried by the frame and operatively connected to the tool-holder, and common means for detachably connecting the operating-handle and the bearing-head to the gearing.

6. In a machine of the class described, the combination with a bearing-head, of a frame rotatably mounted thereon, a tool-holder revolvably mounted upon the frame, an operating-handle arranged upon the frame, gearing carried by the frame and operatively connected to the tool-holder, and a clutch element carried by the handle and arranged to be moved into engagement with the gearing and also serving to connect the bearing-head to the gearing.

7. In a machine of the class described, the combination with a bearing-head, of a frame rotatably mounted upon the head, a tool-holder revolvably mounted on the frame, gearing carried by the frame and connected to the tool-holder, holding means connected to the bearing-head and located adjacent to the gearing, and means for detachably connecting the holding means and gearing.

8. In a machine of the class described, the combination with a bearing-head, of a frame rotatably secured to the head, a tool revolvably mounted on the frame, gearing carried by the frame and connected to the tool-holder, holding means connected to the bearing-head and located adjacent to the gearing, and a handle rotatably mounted upon the frame and carrying means for detachably connecting the holding means and gearing.

9. In a machine of the class described, the combination with a bearing-head, of a frame rotatably secured to the head, a tool-holder revolvably mounted on the frame, gearing carried by the frame and connected to the tool-holder, holding means connected to the bearing-head and located adjacent to the gearing, a handle rotatably mounted upon the frame, and means for simultaneously locking the handle and holding means to the gearing.

10. In a machine of the class described, the combination with a bearing-head, of a frame rotatably secured to the head, a tool-holder revolvably mounted on the frame, gearing car-

ried by the frame and connected to the tool-holder, holding means connected to the bearing-head and located adjacent to the gearing, and a handle-grip rotatably and slidably mounted upon the frame and carrying means for simultaneously locking the handle-grip and holding means to the gearing.

11. In a machine of the class described, the combination with a bearing-head, of a frame revolvably secured to the bearing-head, a tool-holder rotatably mounted upon the frame and in substantial alinement with the bearing-head, gearing carried by the frame and connected to the tool-holder, a handle rotatably mounted on the frame, means for detachably connecting the handle to the gearing, and means for holding said handle in both its connected and disconnected positions.

12. In a machine of the class described, the combination with a frame comprising a pair of crank-arms connected by a shank, a bearing-head rotatably mounted upon one arm, a tool-holder rotatably mounted upon the other arm, gearing carried by the frame and connected to the tool-holder, a sleeve carried by the shank and connected to the bearing-head, and means for detachably connecting the sleeve and gearing.

13. In a machine of the class described, the combination with a frame comprising a pair of crank-arms connected by a shank, a bearing-head rotatably mounted upon one arm, a tool-holder rotatably mounted upon the other arm, gearing carried by the frame and connected to the tool-holder, a sleeve carried by the shank and connected to the bearing-head, a handle-grip rotatably mounted on the sleeve, and means for detachably connecting the grip and sleeve to the gearing.

14. In a machine of the class described, the combination with a frame comprising a pair of crank-arms connected by a shank, a bearing-head rotatably mounted upon one arm, a tool-holder rotatably mounted on the other arm, a gear-wheel loosely journaled on the shank and geared to the tool-holder, a sleeve carried by the shank and connected to the bearing-head, a handle-grip rotatably mounted on the sleeve, and means for detachably connecting the grip and sleeve to the gearing.

15. In a machine of the class described, the combination with a frame comprising a pair of crank-arms connected by a shank, a bearing-head rotatably mounted upon one arm, a tool-holder rotatably mounted on the other arm, a gear-wheel loosely journaled on the shank and geared to the tool-holder, a sleeve carried by the shank and connected to the bearing-head, a handle-grip rotatably mounted on the sleeve, means for detachably connecting the grip and sleeve to the gearing, and means for securing the tool-holder against relative movement upon the frame when the grip and sleeve are disconnected from the gearing.

16. In a machine of the class described, the combination with a frame comprising a pair

of crank-arms connected by a shank and carrying alined journal-boxes, of a bearing-head journaled in one box, a tool-holder journaled in the other box, a gear-wheel mounted upon the shank and meshing with a pinion mounted on one of the crank-arms, said pinion having a geared connection with the tool-holder, a sleeve rotatably mounted upon the shank and having a fixed connection with the bearing-head, and a grip slidably and rotatably mounted upon the sleeve and carrying teeth arranged to engage the sleeve and the gear-wheel to hold said gear-wheel, sleeve and grip against relative movement.

15 17. In a machine of the class described, the combination with a frame comprising a pair of crank-arms connected by a shank and carrying alined journal-boxes, of a bearing-head journaled in one box, a tool-holder journaled in the other box, a gear-wheel mounted upon the shank and meshing with a pinion mount-

ed on one of the crank-arms, said pinion having a geared connection with the tool-holder, a sleeve rotatably mounted upon the shank and having a fixed connection with the bearing-head, a grip slidably and rotatably mounted upon the sleeve and carrying teeth arranged to engage the sleeve and the gear-wheel to hold said gear-wheel, sleeve and grip against relative movement, and a pivoted dog carried by one of the crank-arms and adapted to engage the tool-holder to hold the same against independent movement when the grip and sleeve are disconnected from the gear-wheel.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN GUST JOHNSON.

Witnesses:

JOHN MANDLEY,
H. WALSETH.