

(No Model.)

2 Sheets—Sheet 1.

P. J. RUNSER.  
SPEED CHANGING DEVICE AND INDICATOR.

No. 598,817.

Patented Feb. 8, 1898.

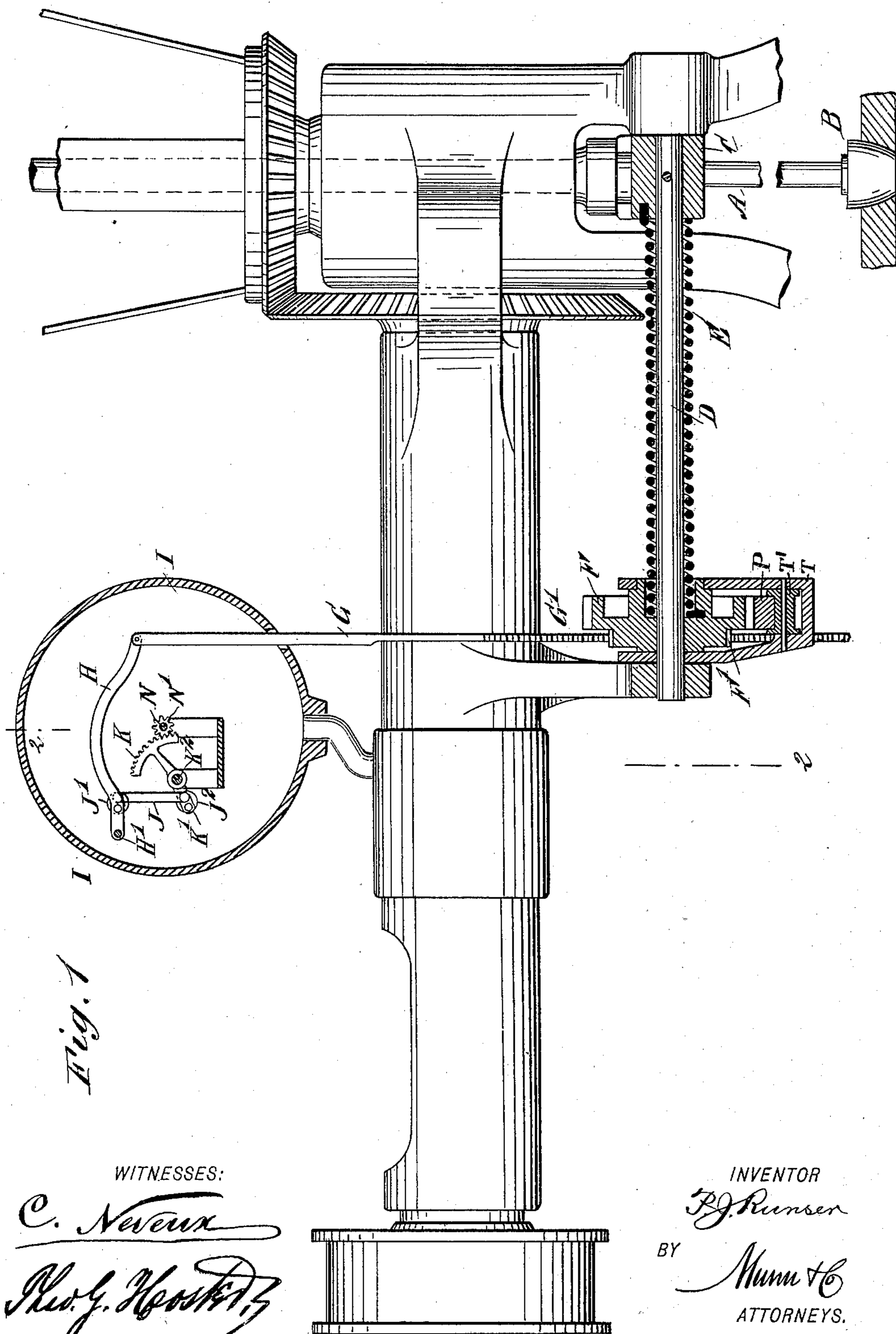


Fig. 1

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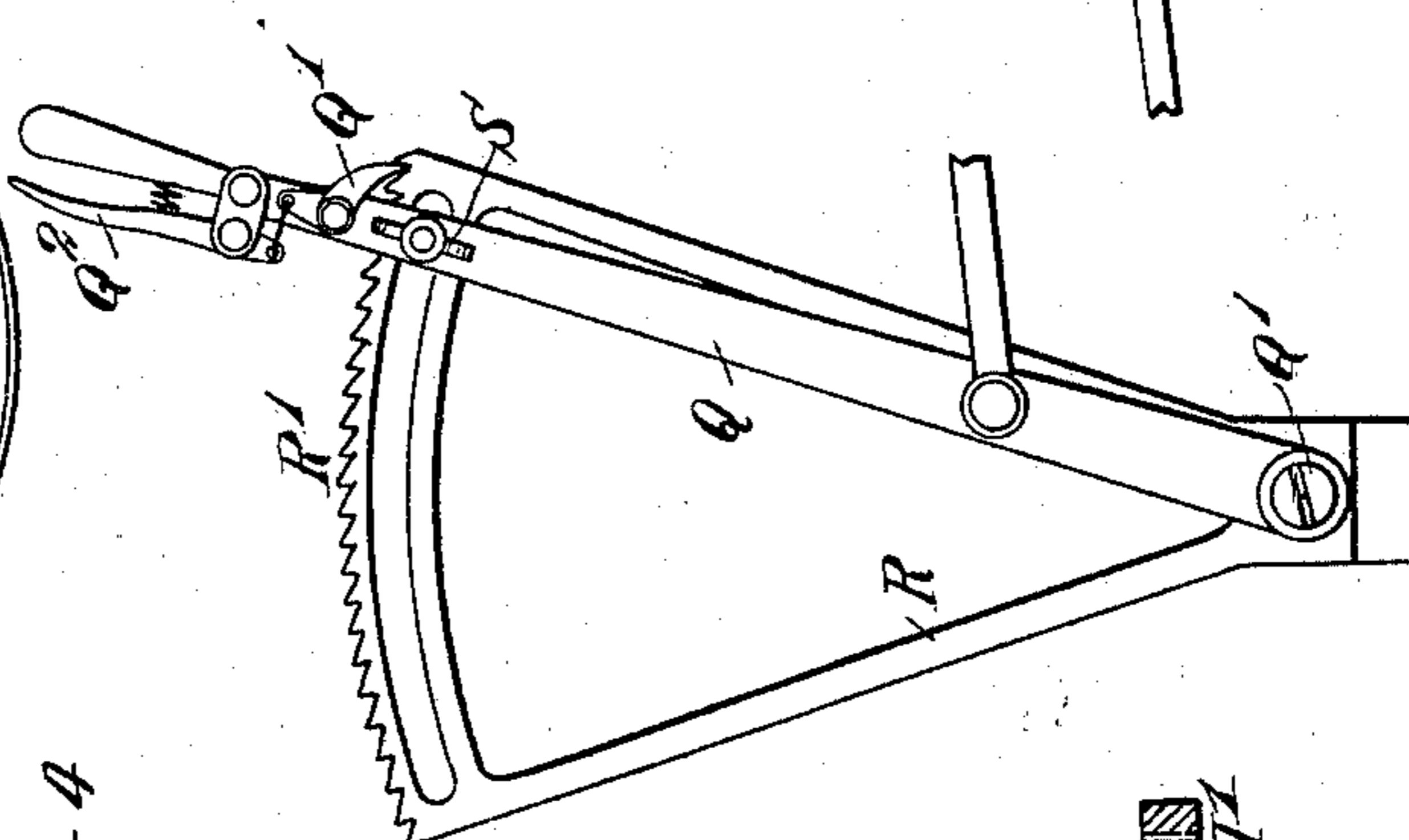
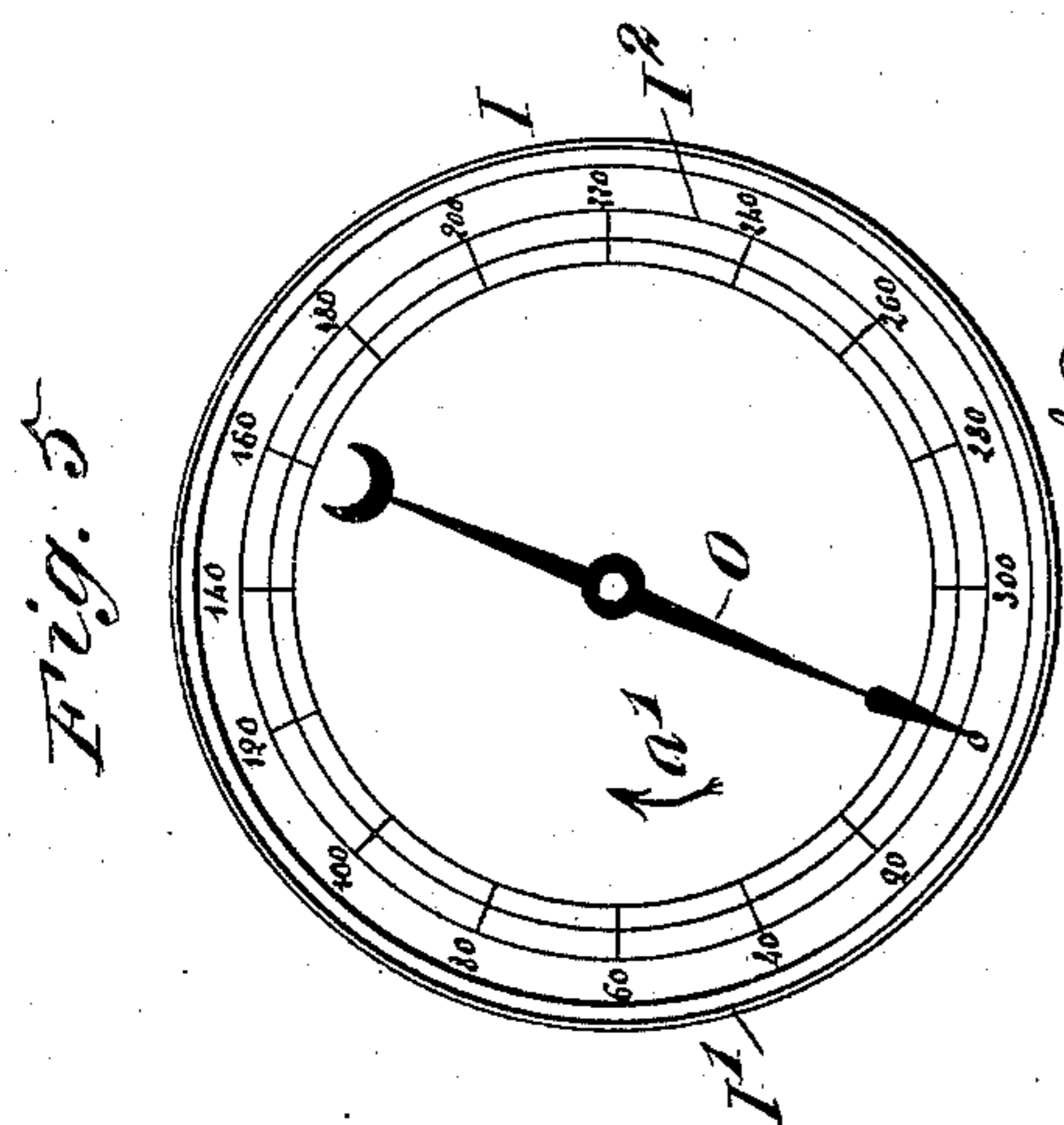
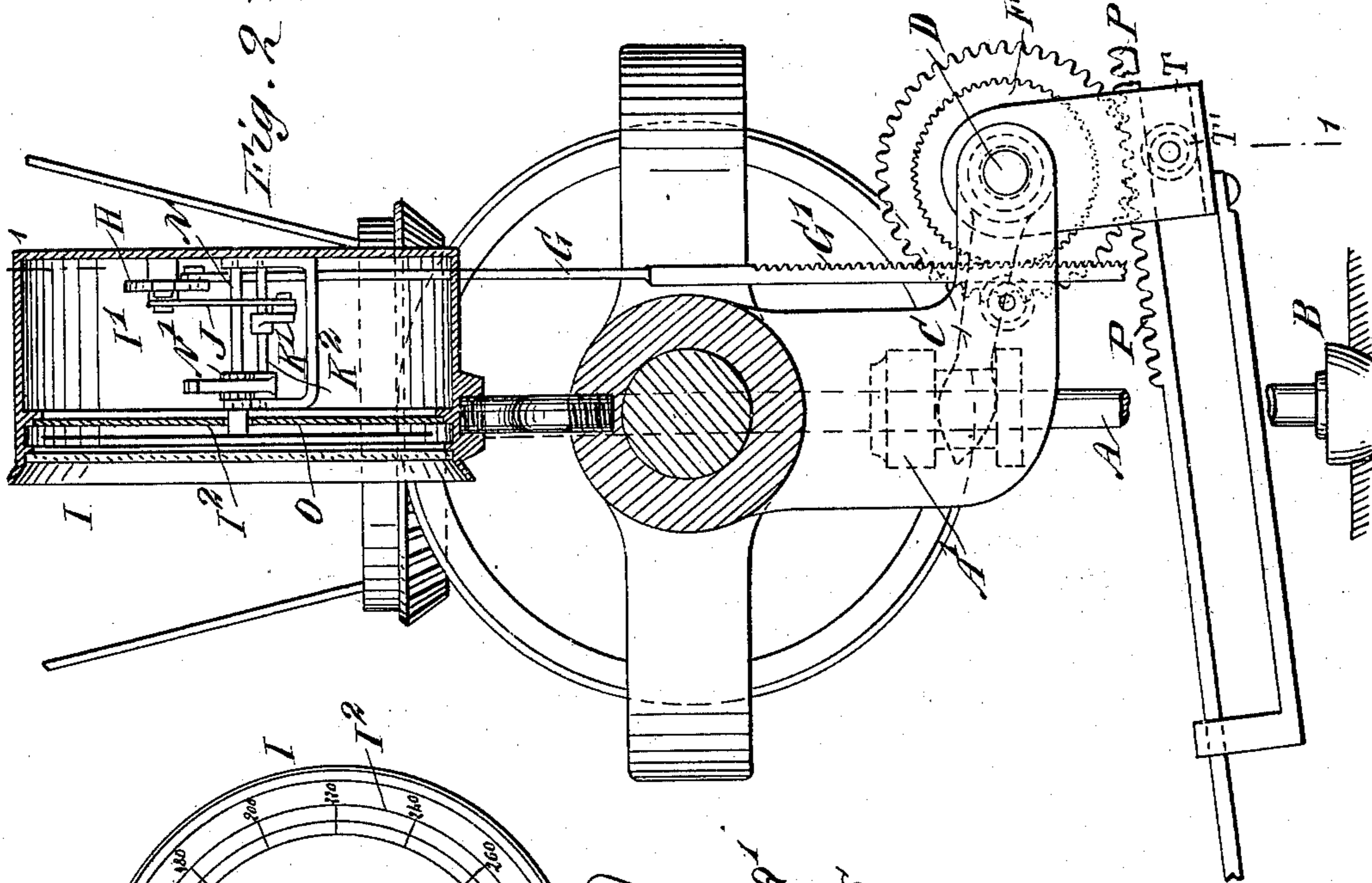
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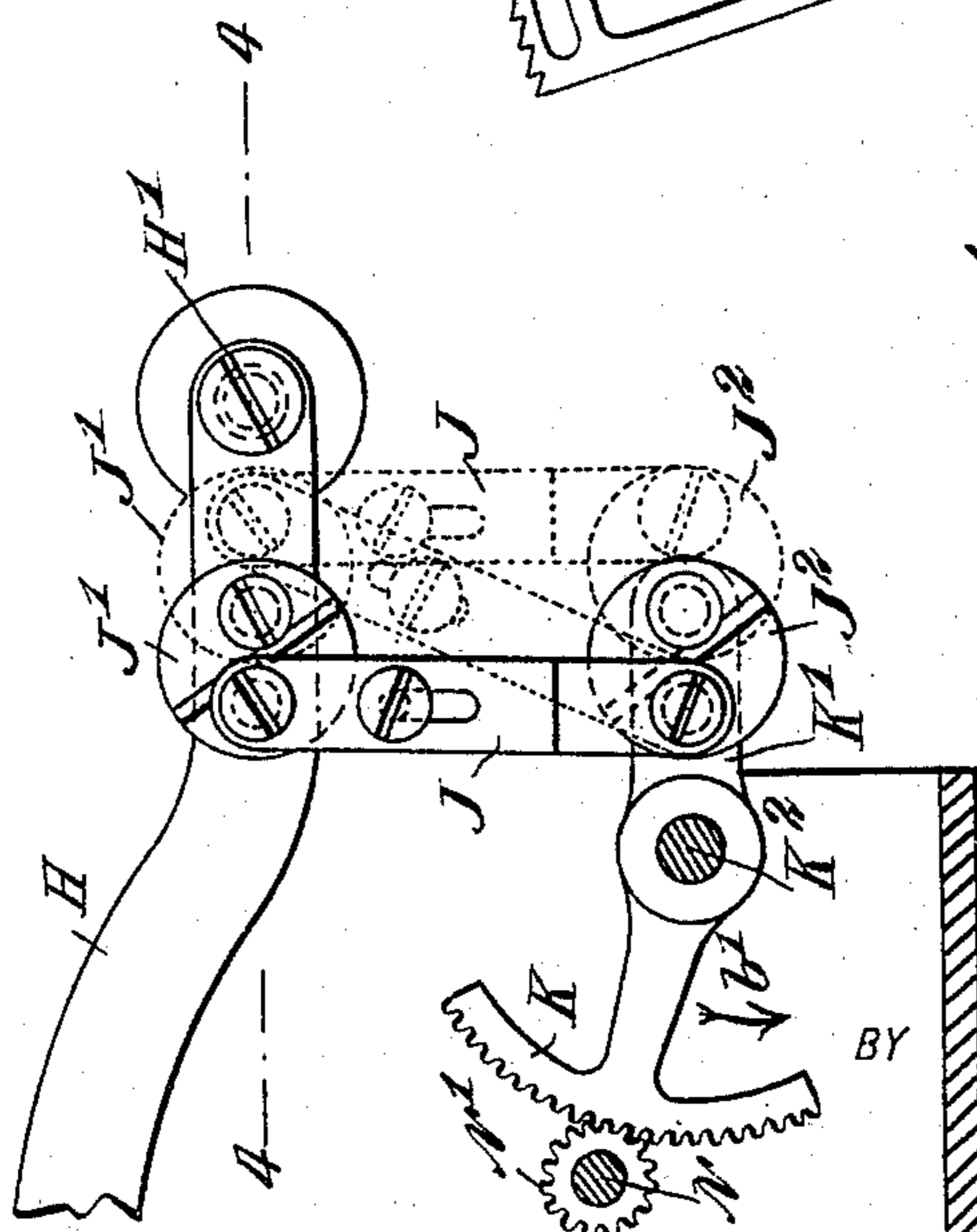
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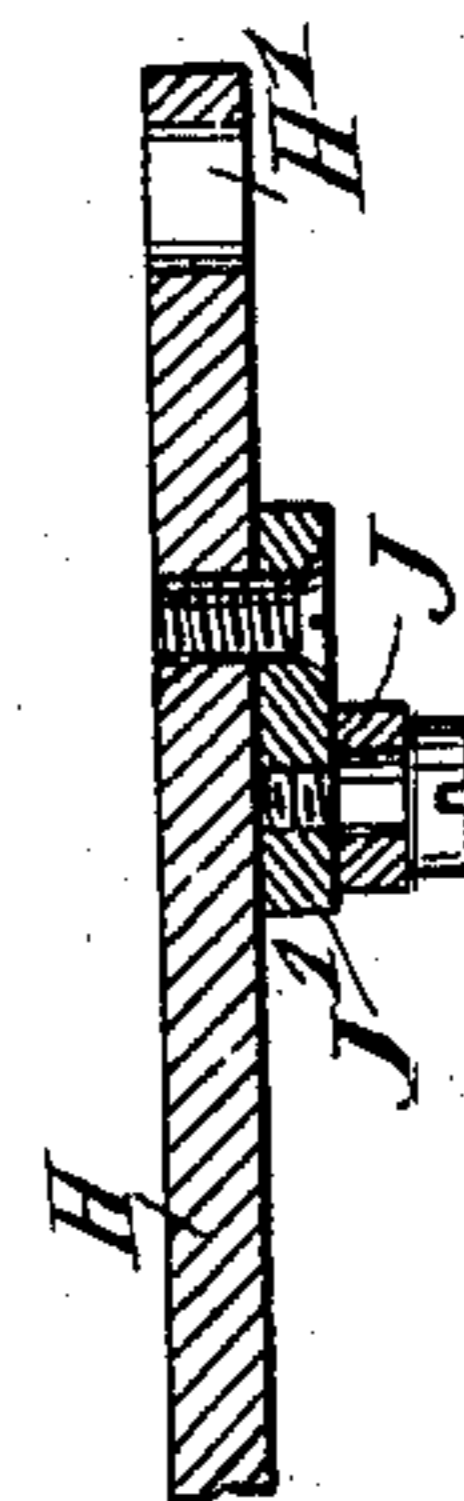
Patented Feb. 8, 1898.



*Fig. 3*



*Fig. 4*



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# UNITED STATES PATENT OFFICE.

PHILLIP J. RUNSER, OF REDFIELD, SOUTH DAKOTA.

## SPEED-CHANGING DEVICE AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 598,817, dated February 8, 1898.

Application filed August 10, 1895. Serial No. 558,931. (No model.)

*To all whom it may concern:*

Be it known that I, PHILLIP J. RUNSER, of Redfield, in the county of Spink and State of South Dakota, have invented a new and Improved Speed-Changing Device and Indicator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved speed-changing device and indicator which is simple and durable in construction, very effective in operation, more especially designed for use on traction and other engines, arranged to indicate the speed while the engine is running, and to permit the engineer to change the speed at any time, according to the nature of the work to be performed by the engine.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement on the line 1 1 of Fig. 2. Fig. 2 is a transverse section of the same on the line 2 2 of Fig. 1. Fig. 3 is an enlarged sectional side elevation of part of the dial mechanism. Fig. 4 is a sectional plan view of the same on the line 4 4 of Fig. 3, and Fig. 5 is a face view of the dial.

The improved speed-changing device and indicator is connected with the governor of the engine, the said governor being of any approved construction and provided with the usual governor-stem A, carrying the valve B, for controlling the steam to the engine in the usual manner.

On the stem A are arranged the collars A', engaged by the fork end of an arm C, secured on the shaft D, journaled in suitable bearings on the frame of the governor. On the shaft D is coiled a spring E, secured with one end to the arm C and with the other end to the hub of a gear-wheel F, mounted to rotate loosely on the shaft D, and carrying a second, but smaller, gear-wheel F' in mesh with rack-teeth G' on a rod G, extending upwardly and having its upper end passing into the casing I' of the indicator I. The upper end of the

rod G is pivotally connected with a lever H, fulcrumed at H' on the back of the casing I', and the said lever H is connected by a link J with an arm K' on a shaft K<sup>2</sup>, journaled in the casing I' and carrying the segmental gear-wheel K in mesh with a pinion N', fastened on the shaft N, carrying the pointer O, indicating on the graduation I<sup>2</sup> the normal speed of the engine corresponding to the tension of the spring E.

The link J is preferably made in two adjustable parts and is pivotally connected at its ends with the disks J' J<sup>2</sup>, of which the disk J' is eccentrically riveted on the lever H, and the other disk J<sup>2</sup> is likewise connected with the arm K'. By this arrangement a long or a short stroke can be given to the arm K' from the rod G and lever H by the operator by forcibly turning the disks to an inner, outer, or intermediate position, as shown in Fig. 3.

The gear-wheel F, previously mentioned, is in mesh with a rack P, pivotally connected with a lever Q, fulcrumed at Q' on a notched segment R, the teeth R' of which are engaged by a pawl Q', controlled by a hand-lever Q<sup>2</sup>, held on the handle end of the lever Q. A clamping screw or bolt S serves to lock or fasten the lever Q in position on the segment R after the lever is moved to the desired position. The under side of the rack P is supported on a friction-roller T', journaled in the casing T and serving to hold the rack in mesh with the gear-wheel F and at the same time permitting an easy forward and backward movement of the rack whenever the operator manipulates the lever Q.

The operation is as follows: By reference to Figs. 1 and 2 it will be seen that the up-and-down movement of the governor-stem A is more or less retarded or assisted, according to the tension of the spring C, and the latter is controlled by the operator manipulating the lever Q. When this is done, a simultaneous shifting of the pointer O takes place to indicate the normal speed of the engine. When the engine is at rest, the lever is in the position shown in Fig. 2, and then the pointer O is at zero, (see Fig. 5,) and the valve B is closed or nearly so. It will be understood, however, that such variations of speed that are corrected by the governor will

not be indicated by the pointer O, as the ordinary movement of the governor has no effect upon the position of the pointer, said position remaining unchanged as long as the lever Q is left in the same position. Now when it is desired, for instance, to start the engine and it is intended to run it, say, at eighty revolutions per minute, then the engineer moves the lever Q to the left, to turn the wheels F F', to increase the tension of the spring E, and to bring the pointer O to the numeral "80" on the dial I<sup>2</sup> of the indicator. The engine is now set to run at a rate of eighty revolutions per minute, and will run at this normal speed when the throttle-valve is open. When it is desired to increase this speed, say, to one hundred revolutions while the engine is running, the engineer simply moves the lever Q farther to the left to increase the tension of the spring E to hold the valve B open under a higher speed of the governor. At the same time the pointer O is positively moved to the numeral "100." When it is desired to run the engine at a lower rate of speed—say forty revolutions per minute—then the lever Q is moved to the right to reduce the tension of the spring E, and consequently the upward pressure of the arm C on the stem A, so as to permit the governor-stem to move the valve B nearer to its seat to admit less steam to the engine for reducing the speed of the latter.

In moving the governor-stem B downward by the action of the spring C it causes the governor-valve to throttle the engine—that is, admit less steam to the cylinders—to run the engine at a lower rate of speed; but if the lever is moved in an opposite direction the action of the spring C causes the stem B to be moved upward, and consequently more steam is admitted by the governor-valve to the engine, so that the latter can run at a higher rate of speed. Thus the engineer without touching the throttle can change the rate of speed of the engine at will by the lever Q, and at the same time this change of speed is indicated by the pointer O on the dial I<sup>2</sup>, as the shifting of the lever Q not only affects the spring E by means of the rack P and gear-wheel F, but the turning of the lever causes a like movement of the gear-wheel F' and the shifting of the rod G to change the position of the pointer O, as previously explained.

This device is more especially designed for use on engines employed for threshing and like purposes and is especially applicable to traction-engines, to enable the operator to set the engine back or ahead at any time without stopping or interfering with the running of the same. For instance, when cleaning up after a bundle of straw or grain is threshed and the sieve becomes empty of straw and the grain is thereby wasted it is necessary to slow up the speed of the engine. This is very quickly done by the operator moving the lever Q, as previously described.

It will be seen that when this change is made the pointer O is shifted on the graduation I<sup>2</sup> from the speed at which the engine was running to the desired lower speed, and when it is again desired to set the engine to the rate of speed it was running formerly the engineer shifts the lever Q until the hand O again indicates on the dial the rate of speed at which the engine had been running previous to the change.

It is expressly understood that the speed of the engine is changed by increasing or diminishing the tension of the spring E, so as to hold the valve B open under a higher speed of the governor or closing the said valve quicker when necessary, and this change of the tension of the spring can be readily and quickly accomplished by the operator moving the lever Q.

It will further be seen that for threshing various grains—such as wheat, oats, &c.—to insure proper work the engine must be run at different rates of speed, and as the pointer O can be readily set to indicate any speed by the engineer manipulating the lever Q it is evident that the engine can be run at the speed required for properly threshing oats, barley, or wheat.

When a traction-engine is on the road, then the engineer in charge can quickly change the rate of speed of the engine, according to the nature of the ground over which the engine is running, by setting the lever P accordingly.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An indicator provided with an operating-rod adapted for connection with mechanism for controlling the indicator, a pivoted pointer having a pinion on its shaft, a toothed pivoted arm engaging with said pinion, a lever pivotally connected to the operating-rod, disks pivoted on the said lever and arm respectively, and a link eccentrically connected to said disks, substantially as described.

2. The combination with a governor-stem, of a spring one end whereof is connected to said stem, a double gear-wheel connected to the other end of the spring for adjusting the tension thereof, said gear-wheel being normally stationary, an operating device engaging one of the series of teeth on said gear-wheel to turn the same, and an indicator operated by the second set of teeth, substantially as described.

3. The combination with an indicator, and a governor-stem, of a shaft adjacent to the governor-stem, a fork on one end of the shaft and engaging the said stem, a gear-wheel on the other end of the shaft, a spring surrounding the shaft and having one end secured to the fork and its other end connected with the said gear-wheel, means for turning the shaft to increase or decrease the tension of the spring, a rod provided with rack-teeth engaging the gear-wheel, and intermediate

mechanism between the rod and indicator for operating the latter from the former, substantially as described.

4. The combination with an indicator, and  
5 a governor-stem, of a shaft adjacent to the governor-stem, a fork on one end of the rod and engaging the stem, two gear-wheels secured to the other end of the said shaft, a spring surrounding the shaft and having one end secured to the fork and its other end to one of the gear-wheels, means for operating one of the said gear-wheels, a rod provided with rack-teeth engaging the other gear-wheel, and intermediate mechanism between the rod and indicator for operating the latter from the former, substantially as described.  
15 indicator for operating the latter from the former, substantially as described.

5. The combination with an indicator, and a governor-stem, of a shaft adjacent to the

stem, a fork on one end of the shaft and engaging the said stem, two gear-wheels secured to the other end of the shaft, a spring surrounding the shaft and having one end secured to the fork and its other end to one of the gear-wheels, a rack engaging the gear-wheels to which the spring is secured, a lever  
20 for operating said rack, a rod having rack-teeth on its lower end engaging the other gear-wheel, and intermediate mechanism between the rod and indicator for operating the latter from the former, substantially as herein  
25 shown and described.  
30

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Witnesses:

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HAGBORT HENRIKSON.