

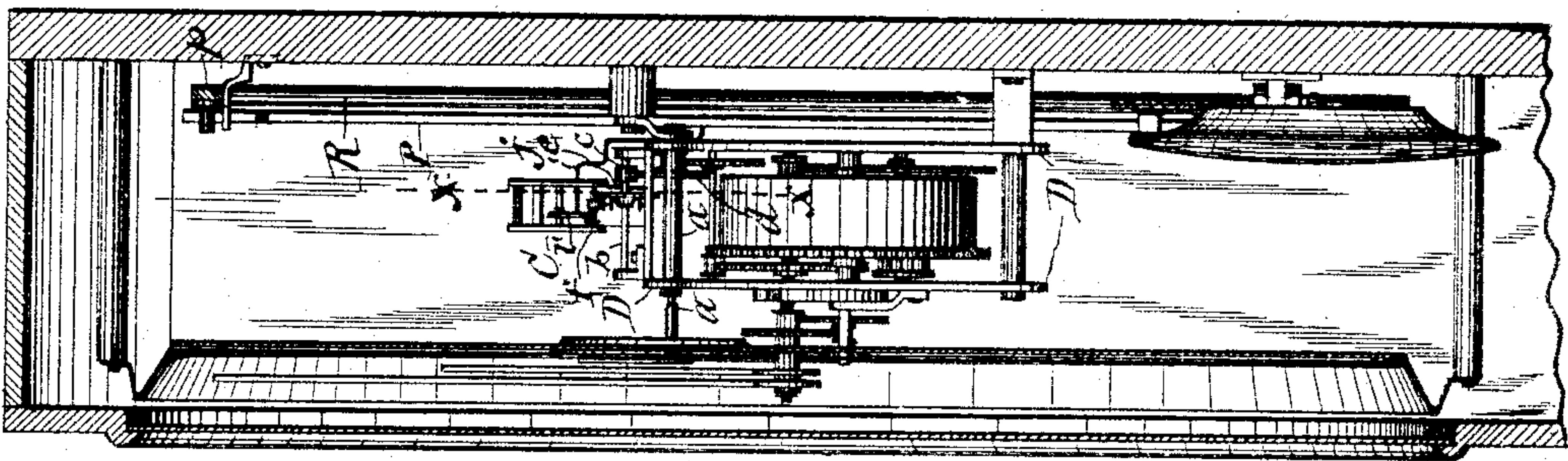
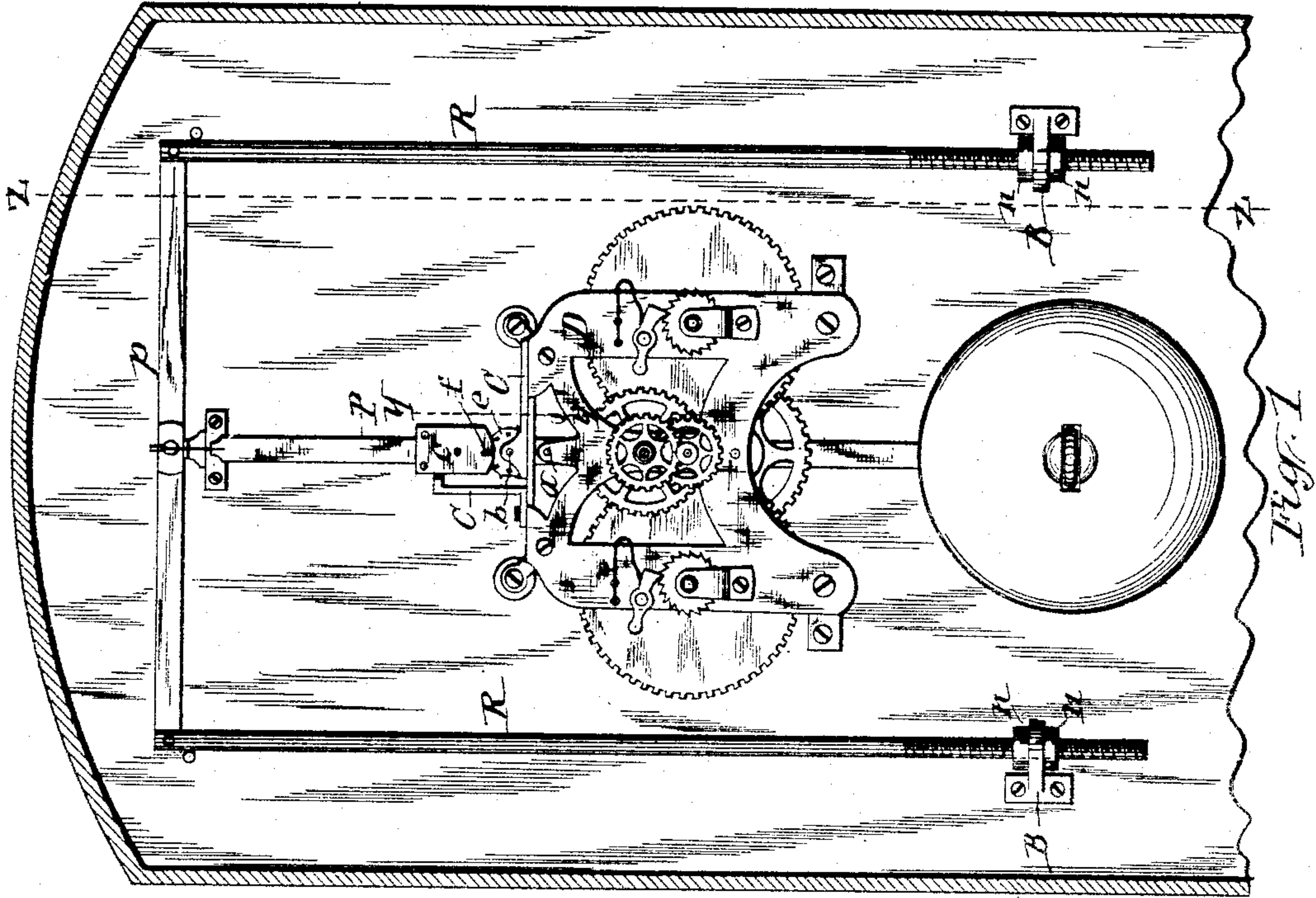
(No Model.)

3 Sheets—Sheet 1.

C. B. HIBBARD.  
DUPLEX ESCAPEMENT FOR CLOCKS.

No. 436,783.

Patented Sept. 23, 1890.



WITNESSES:

C. L. Bendixon

J. J. Laas

INVENTOR:

Charles B. Hibbard

BY

Shull, Laas & Dull  
his ATTORNEYS

(No Model.)

3 Sheets—Sheet 2.

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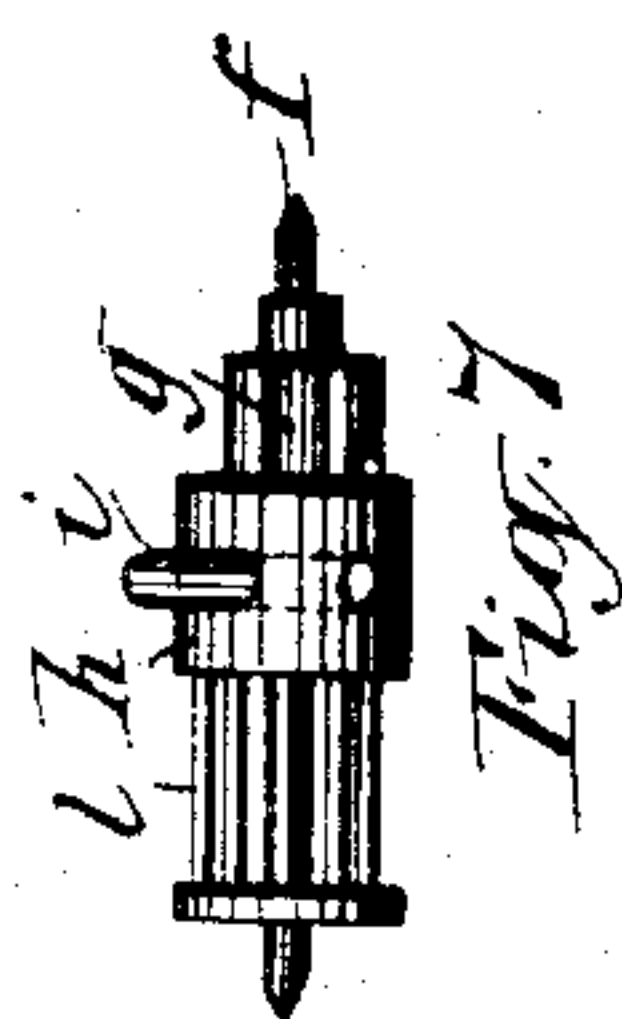


Fig. 7



Fig. 6

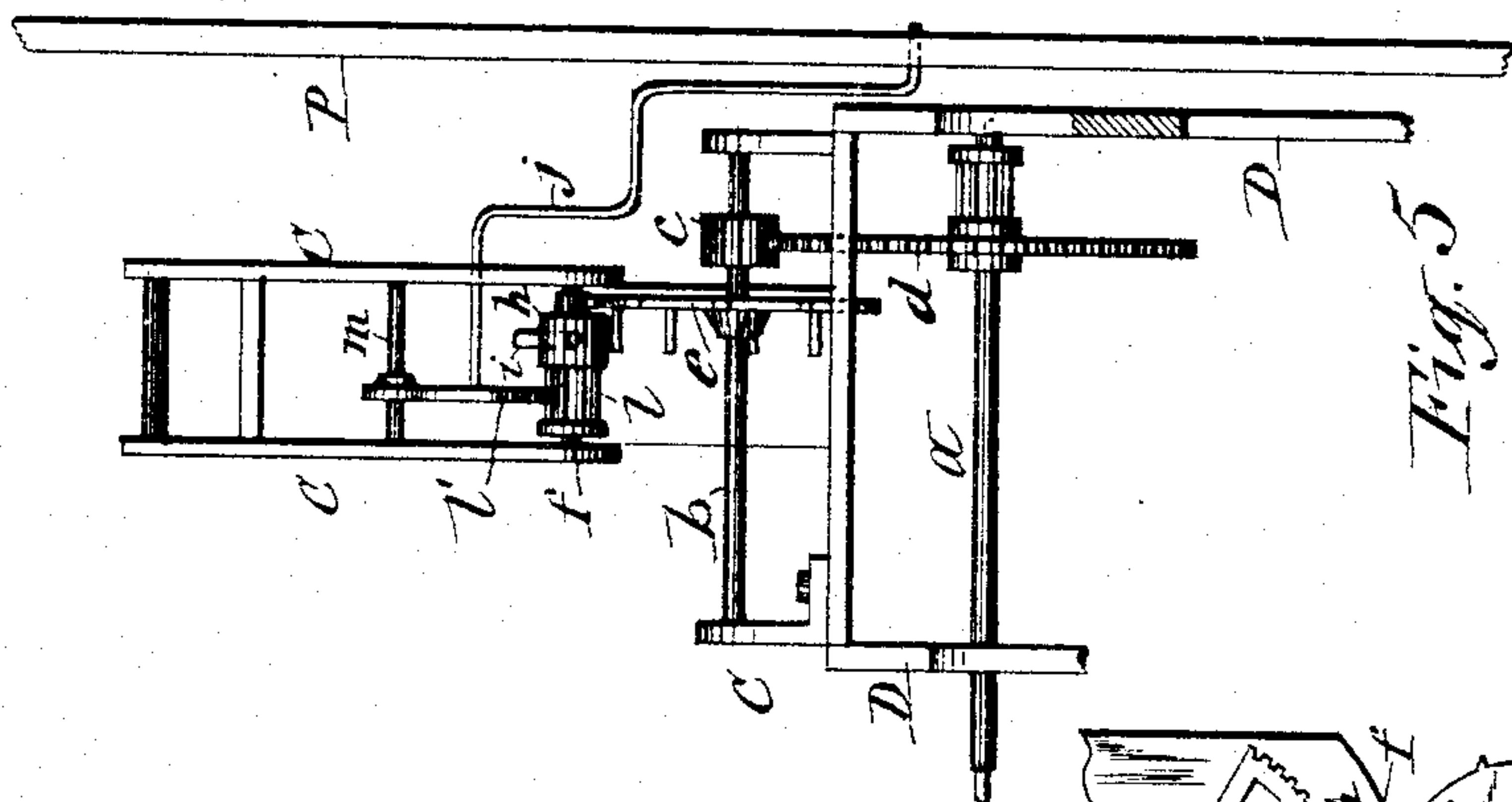


Fig. 5

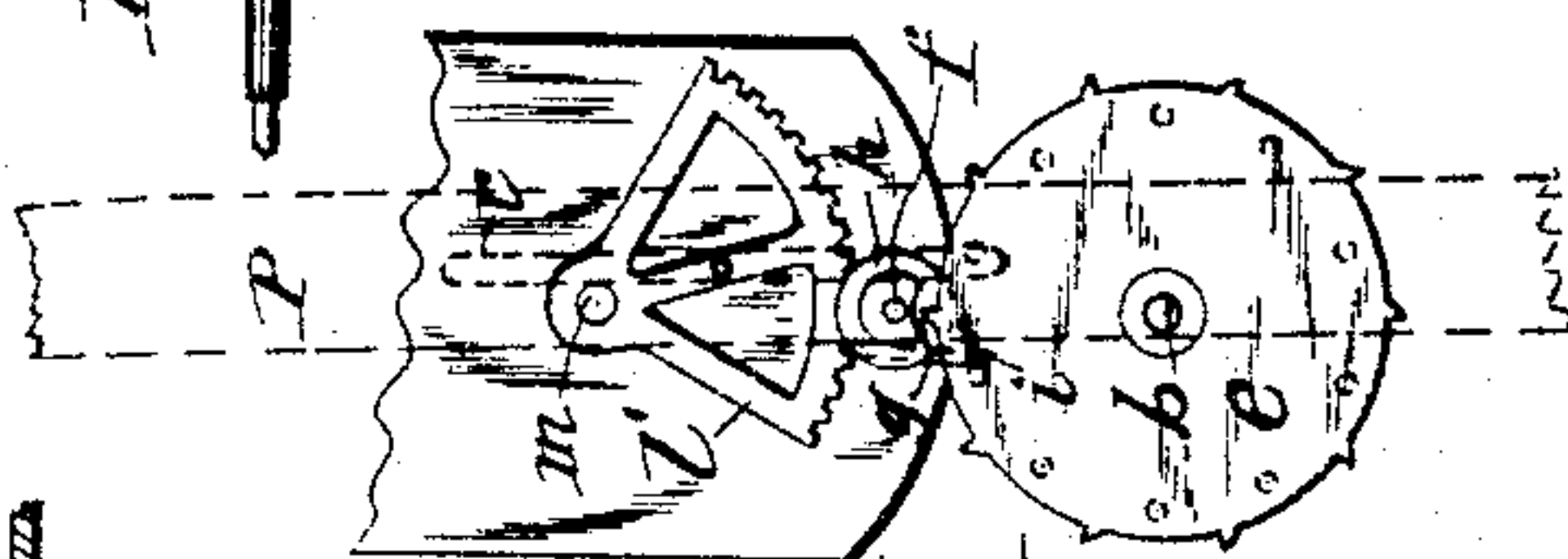


Fig. 4

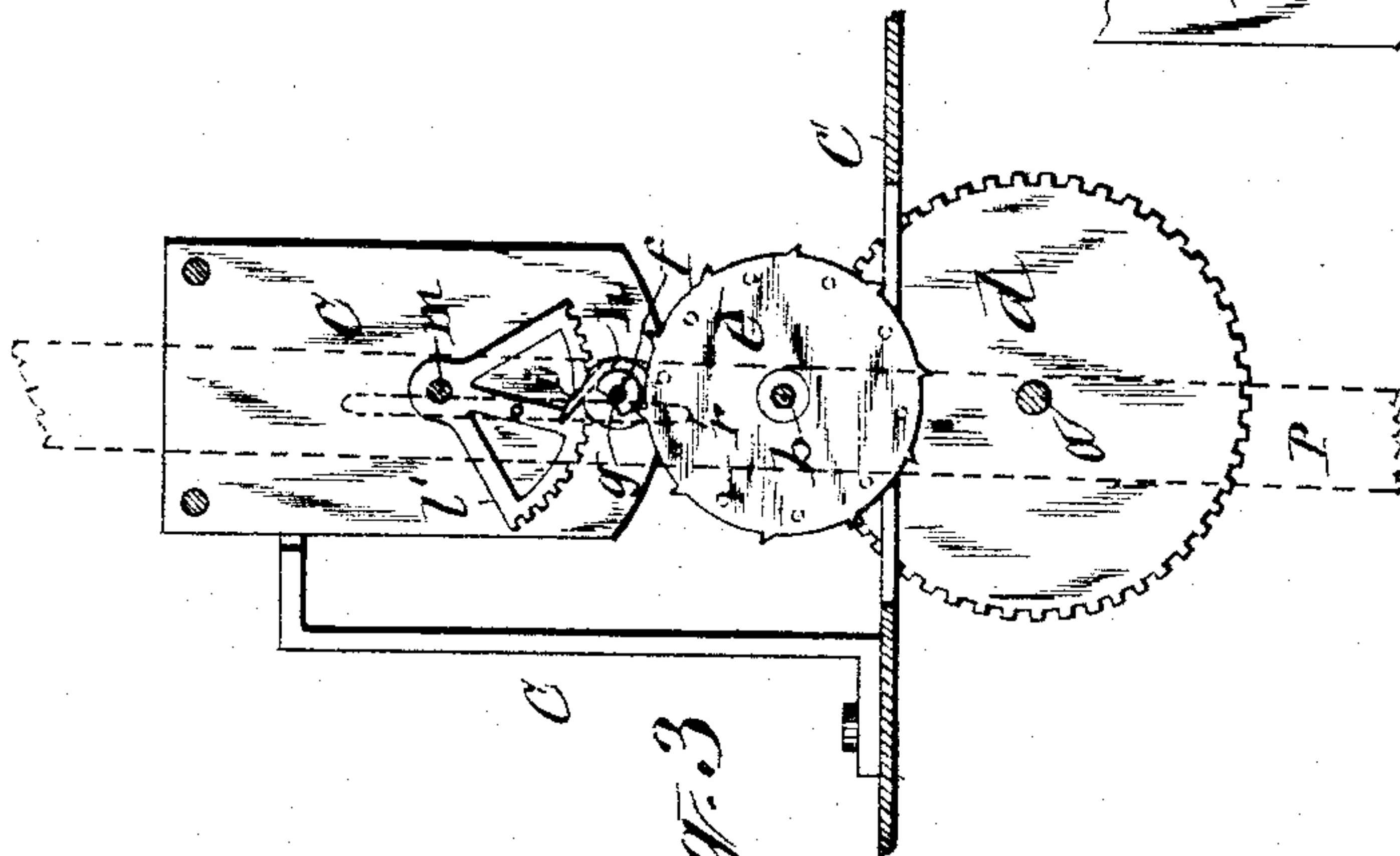


Fig. 3

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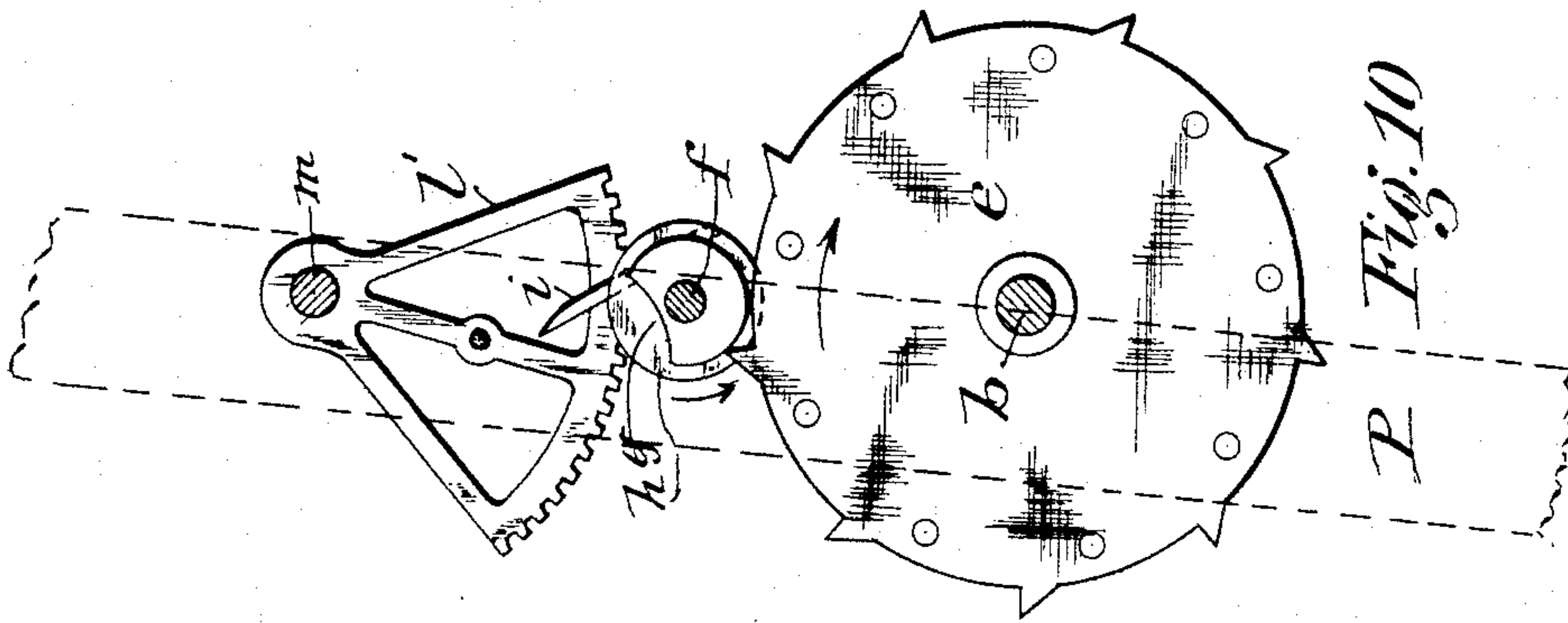


Fig. 10  
P

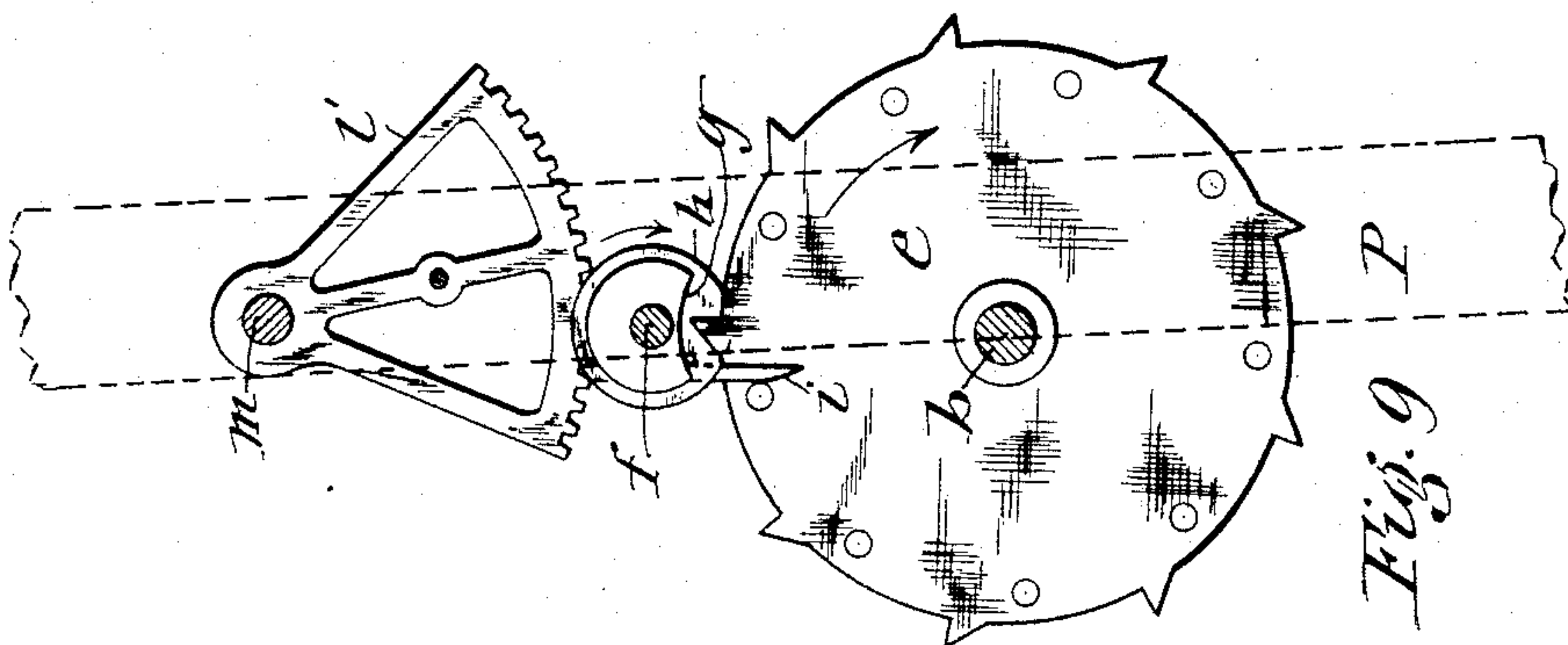


Fig. 9  
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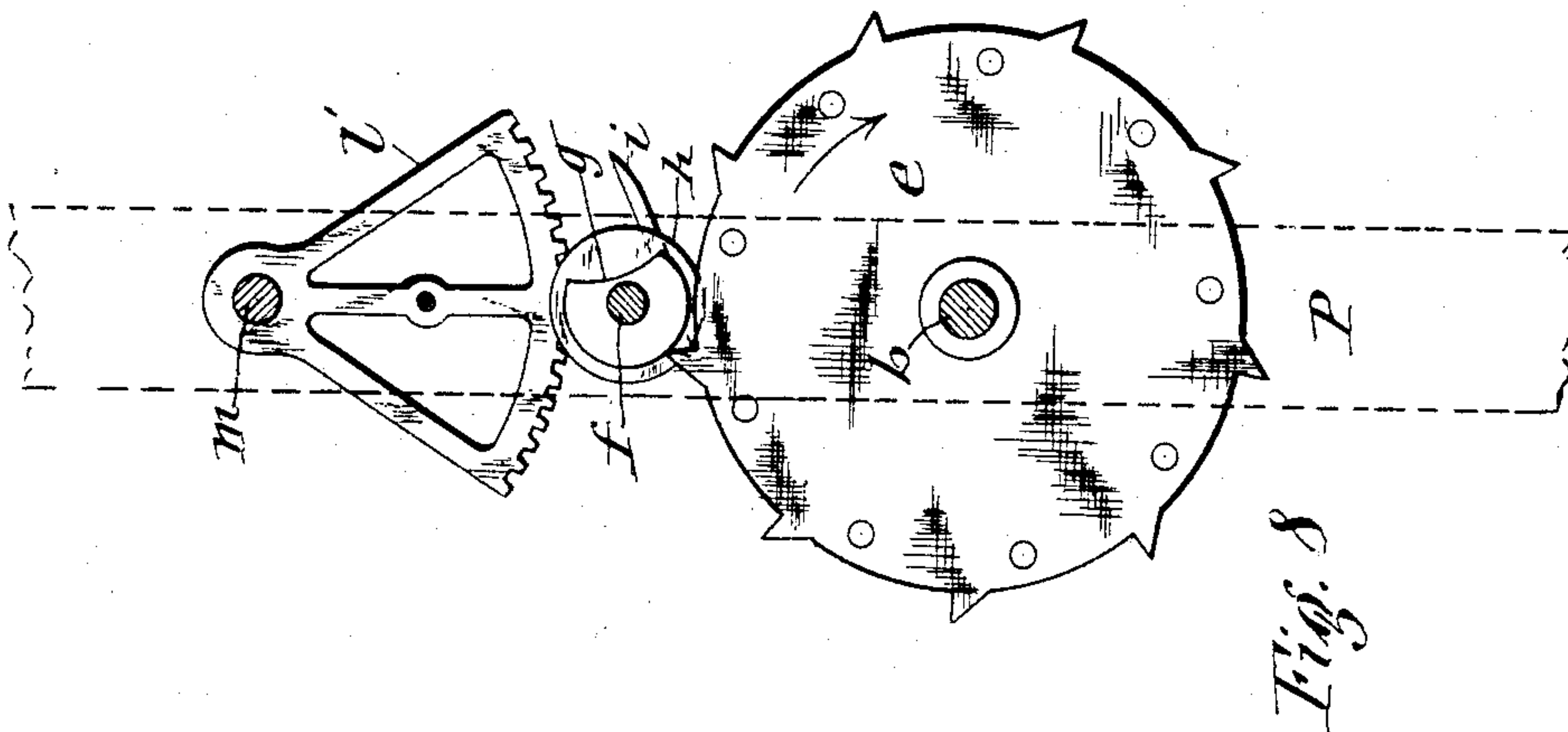


Fig. 8  
P

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# UNITED STATES PATENT OFFICE.

CHARLES B. HIBBARD, OF PULASKI, NEW YORK.

## . DUPLEX ESCAPEMENT FOR CLOCKS.

SPECIFICATION forming part of Letters Patent No. 436,783, dated September 23, 1890.

Application filed November 15, 1889. Serial No. 330,463. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES B. HIBBARD, of Pulaski, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Clocks, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in a novel connection of a duplex escapement with the pendulum of a clock, whereby the oscillation of the pendulum in one direction is produced solely by gravity of the pendulum and the friction of the connecting mechanism is so effectually obviated as to reduce the strain on the clock mechanism to a minimum, and thus a much lighter clock-spring may be employed than those usually required, and the clock is rendered more durable, all as hereinafter more fully described, and specifically set forth in the claim.

In the annexed drawings, Figure 1 is a front view of a clock-work embodying my invention. Fig. 2 is a side view of the same, taken inside of the line  $z z$ , Fig. 1, with the dial and hands connected to it. Fig. 3 is an enlarged sectional view of the escapement and its connection with the pendulum, taken on line  $x x$ , Fig. 2. Fig. 4 is a detail view showing the said devices in another of their operative positions. Fig. 5 is an enlarged vertical transverse section on line  $y y$ , Fig. 1. Fig. 6 is a detached face view of that portion of the pendulum which is connected with the escapement. Fig. 7 is an enlarged detached side view of the staff or shaft, which is provided with the notch in its side and has secured to it the impulse pallet or tooth and pinion; and Figs. 8, 9, and 10 are enlarged diagrams illustrating more fully the operation of my invention.

Similar letters of reference indicate corresponding parts.

$a$  represents the second-hand shaft, which is geared with the clock mechanism to receive motion therefrom in the usual and well-known manner. The clock mechanism may also be of any ordinary and well-known construction, and therefore needs no special description in this case.

A frame C is either mounted on or formed integral with the top of the usual frame D,

to which the clock mechanism is connected. To said frame C is pivoted a horizontal shaft  $b$ , to which is secured a pinion  $c$ , which meshes with a gear-wheel  $d$ , attached to the second-hand shaft  $a$ , and thus partakes motion from said shaft. On the shaft  $b$  is also rigidly mounted the duplex-escapement wheel  $e$ , which is of the usual form of a combined spur and crown wheel, which in this case is disposed with its plane in a vertical position and has a set of teeth projecting from its periphery and an equal number of spurs projecting from its side, said spurs being disposed about midway between the aforesaid teeth. Parallel with the shaft  $b$  is a shaft or staff  $f$ , pivoted to the frame C, and this staff is provided with a notch  $g$  in its side, though I prefer to form this notch in a jewel mounted on the staff, as shown in Fig. 7 of the drawings, said notch being in the path of the teeth, which project from the periphery of the escapement-wheel. Adjacent to this jewel is a hub  $h$ , secured to the staff, and to said hub is attached the impulse tooth or pallet  $i$ , which is in the path of the spurs projecting from the side of the escapement-wheel. To the staff  $f$  is also rigidly attached a pinion  $l$ , which engages a gear or segmental rack  $l'$ , mounted on a horizontal shaft  $m$ , pivoted to the frame C.

P denotes the pendulum, which is connected with the rack  $l'$  by an arm  $j$ , extending from the latter and passing through a vertical slot  $r$  in the pendulum or otherwise suitably engaging the pendulum to allow the arm to slide vertically thereon during the oscillation of the pendulum.

When the clock is at rest, the notch  $g$  is turned away from the escapement-wheel  $e$ , and one of the peripheral teeth of the latter rests against the staff  $f$  or jewel attached thereto, as shown in Fig. 8 of the drawings. By swinging the pendulum to the right the rack  $l'$  turns the pinion  $l$  and with it the staff  $f$ , so as to bring the notch  $g$  over the previously-engaged tooth of the escapement-wheel and the pallet  $i$  into the path of the side spurs of said wheel, as shown in Figs. 4 and 9 of the drawings. The peripheral tooth of the escapement-wheel, being allowed to pass through the aforesaid notch, liberates the escapement-wheel and allows the same to turn on its pivot, and in this movement the suc-



ceeding side spur of the escapement-wheel comes in contact with the pallet *i*, and by crowding the same out of the way it imparts a reverse movement to the staff *f*, pinion *l*, rack *l'*, and pendulum, which latter movement is only limited by the gravity of the pendulum, and thus no strain is exerted on said parts. In swinging the pallet *i* out of the path of the side spurs of the escapement-wheel the staff *f* is turned so as to carry the notch *g* away from the periphery of the escapement-wheel, and thus the succeeding peripheral tooth thereof strikes the staff or jewel attached thereto and momentarily arrests the movement of the escapement-wheel, as illustrated in Figs. 3 and 10 of the drawings. As the pendulum swings back and past a vertical position the notch *g* and pallet *i* are again brought into the position shown in Figs. 4 and 9 of the drawings, and the escapement-wheel is thus again released and caused to impart another impulse to the pinion *l*, rack *l'*, and pendulum by the engagement of one of the side spurs of the escapement-wheel with the pallet *i*.

In lieu of the pendulum a balance may be similarly connected with the rack *l'*.

To compensate for the expansion and contraction of the pendulum under different degrees of temperature, I suspend the same from the top of a suitable metallic frame secured at its base in a vertical position and having its upper end free to expand and contract in a vertical direction. Said frame I preferably, but not arbitrarily, form of two vertical rods *R R*, having their lower ends screw-threaded and passing through brackets *B B*, secured to

the frame or case of the clock, said rods being secured to the brackets by nuts *n n* on the rods above and below the brackets. To the upper ends of said rods is secured a cross-bar *p*, from which the pendulum is suspended. The nuts *n n* also allow the said vertical rods to be raised or lowered, and thus raise or lower the pendulum to bring the connection of the escapement mechanism with the pendulum a greater or less distance from the fixed end of the latter, and consequently regulate the stroke of the pendulum.

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

An escapement mechanism for pendulum clocks, consisting of the combination, with the pendulum, of a rotative shaft geared to the clock-work to be actuated thereby, a duplex-escapement wheel mounted on said shaft and having two sets of teeth in different planes, a pivoted shaft provided with a notch in its periphery adapted to engage the teeth of one of the aforesaid sets, an impulse pallet or tooth projecting from said shaft and in the path of the other aforesaid sets of teeth, a pinion secured to said shaft, a gear meshing with said pinion, and an arm connecting the said gear with the pendulum, substantially as described and shown.

In testimony whereof I have hereunto signed my name this 7th day of November, 1889.

CHARLES B. HIBBARD. [L. S.]

Witnesses:

C. H. DUELL,

J. J. LAASS.