

J. W. HILE.
CLOCK.

No. 176,309.

Patented April 18, 1876.

Fig. 1.

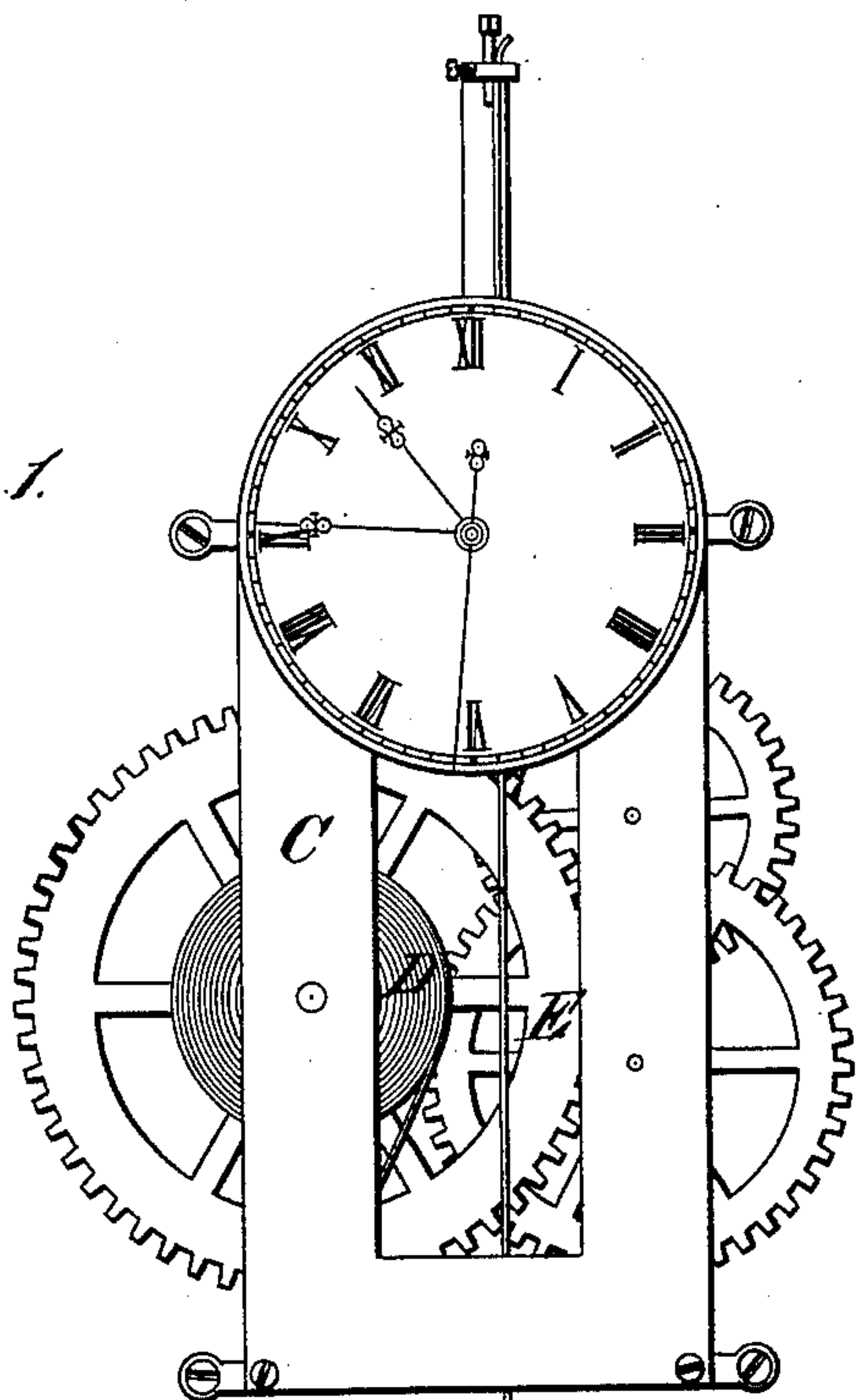


Fig. 2.

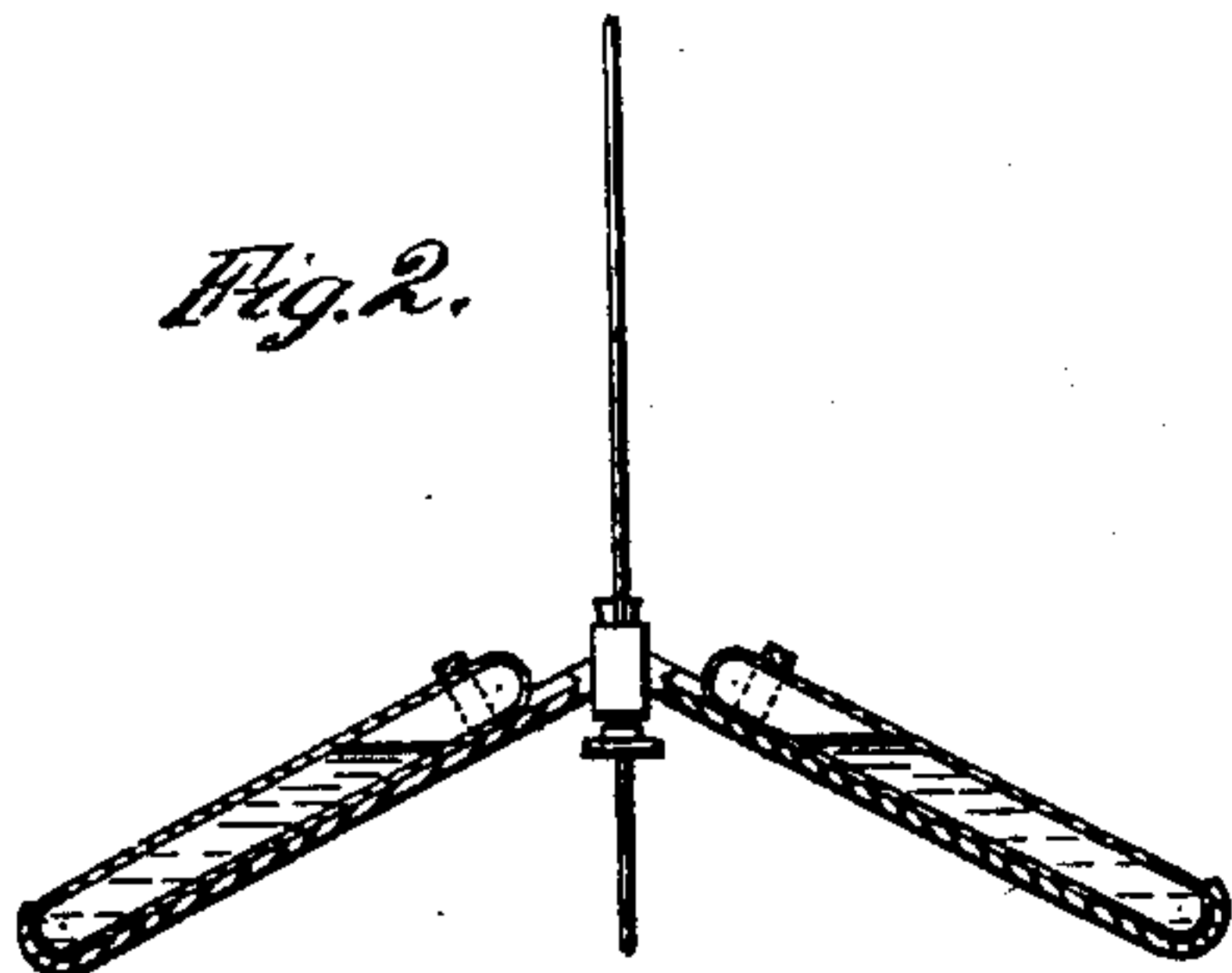
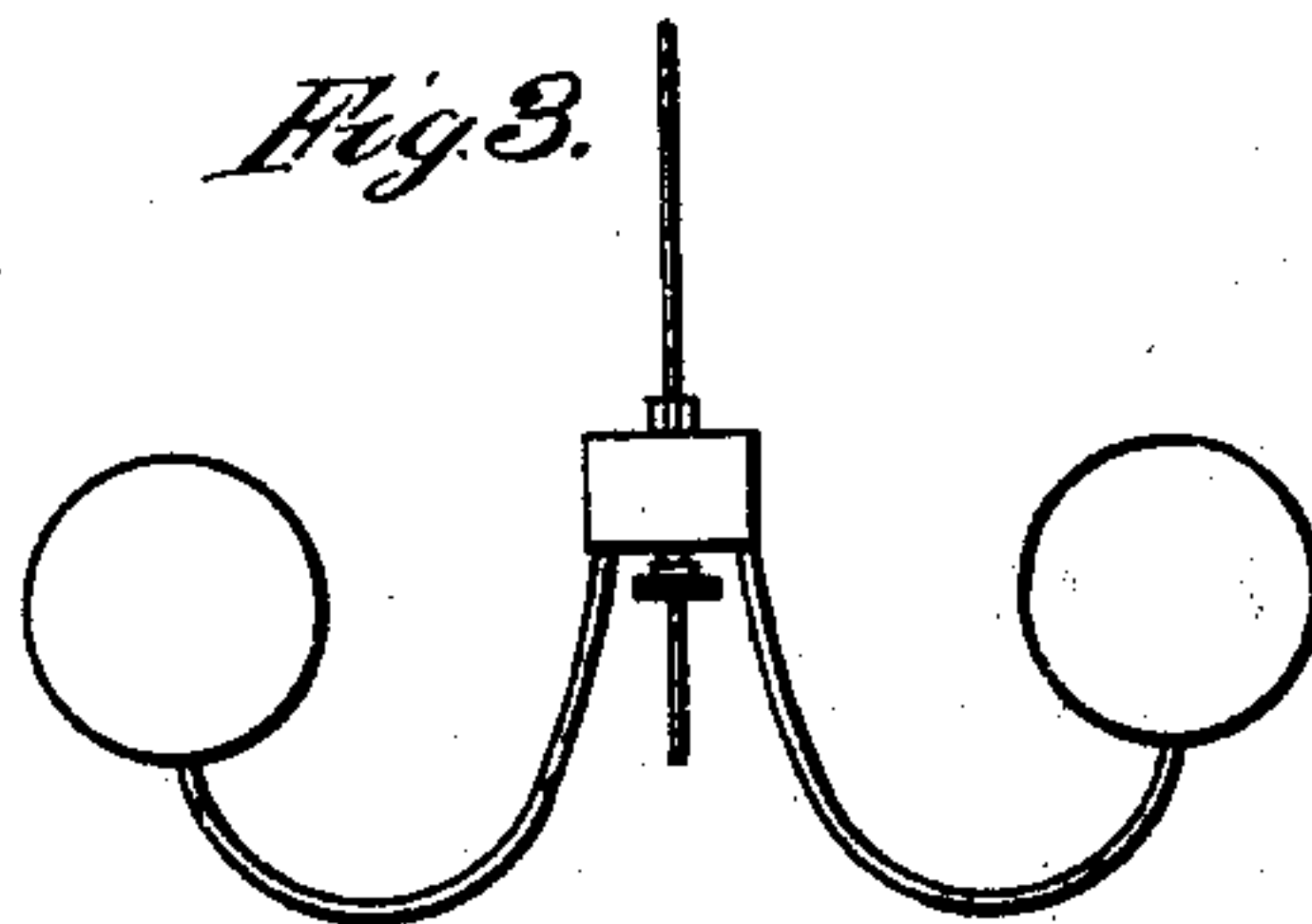


Fig. 3.



A

B

Fig. 5.

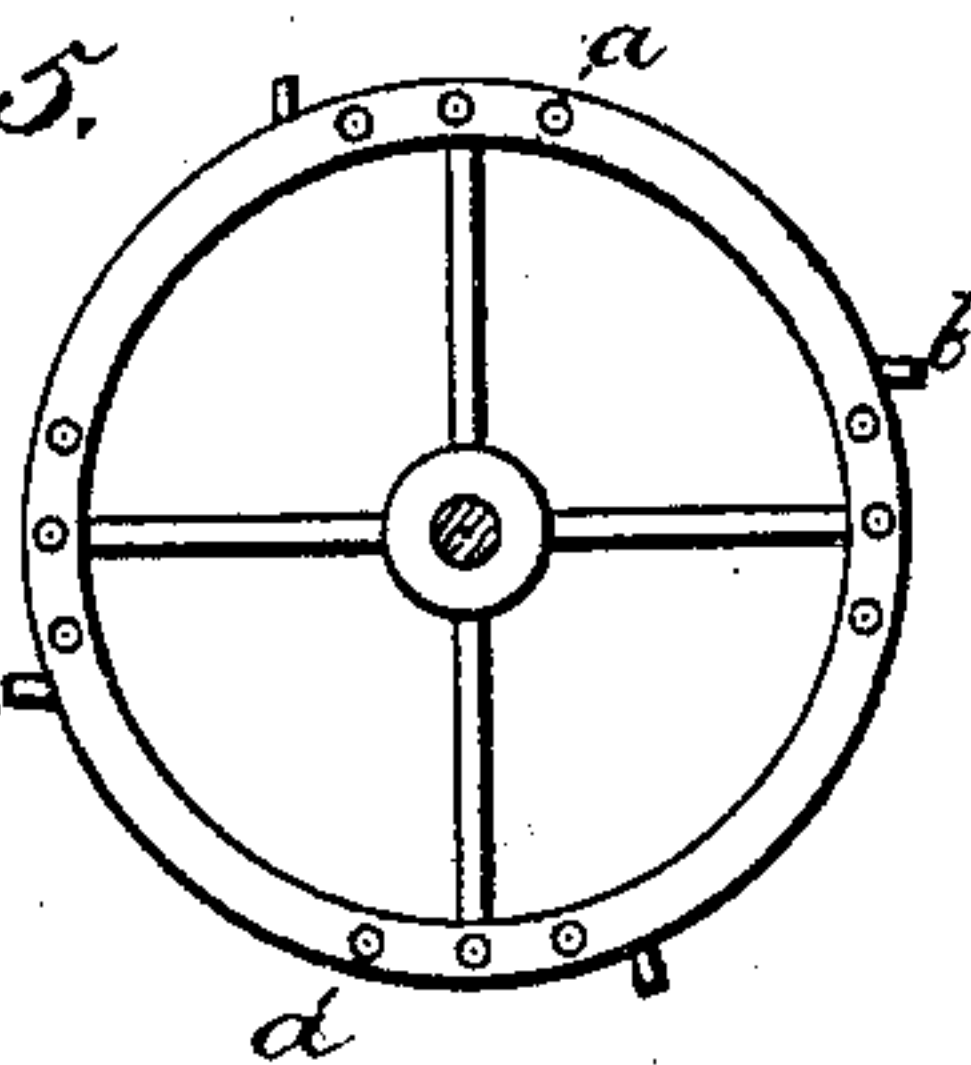
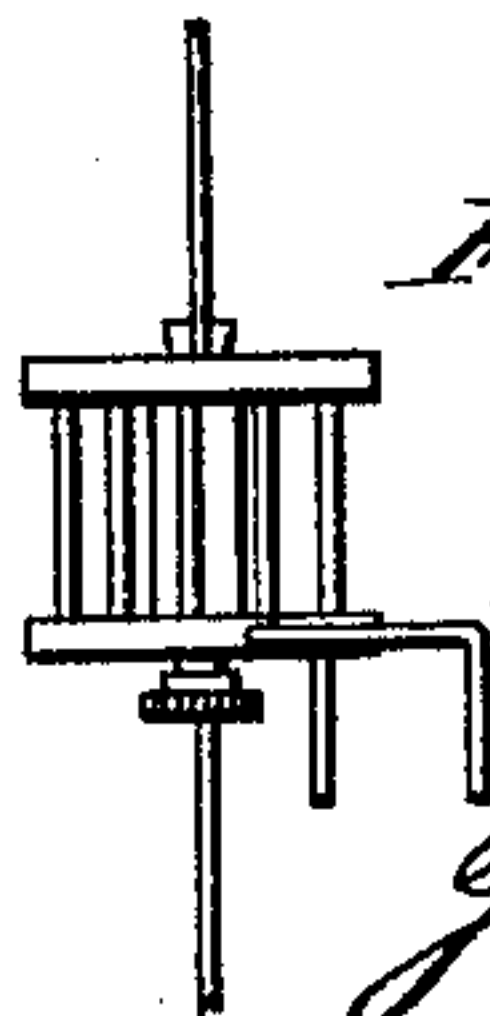


Fig. 4.



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Fig. 6.

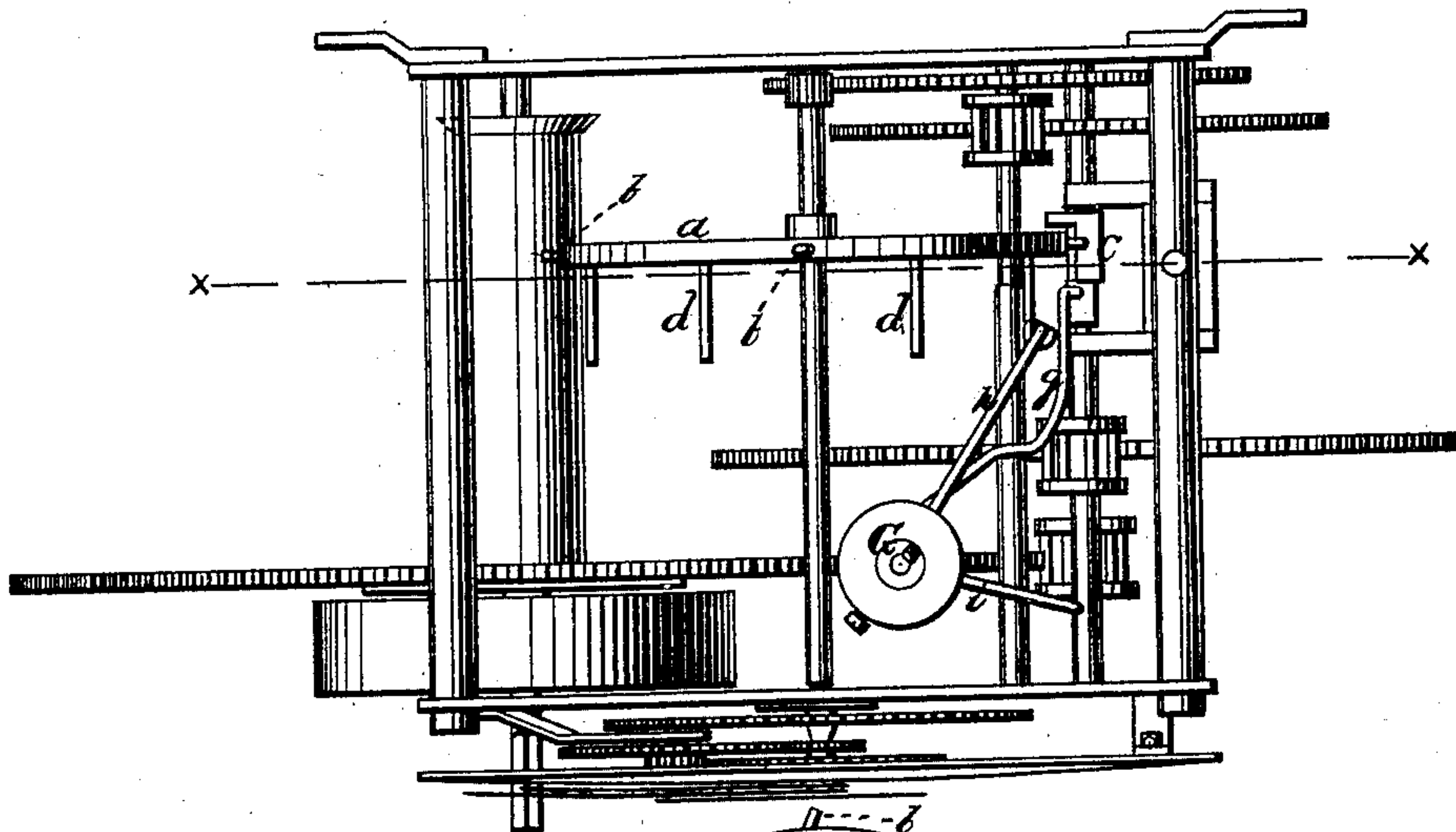


Fig. 7.

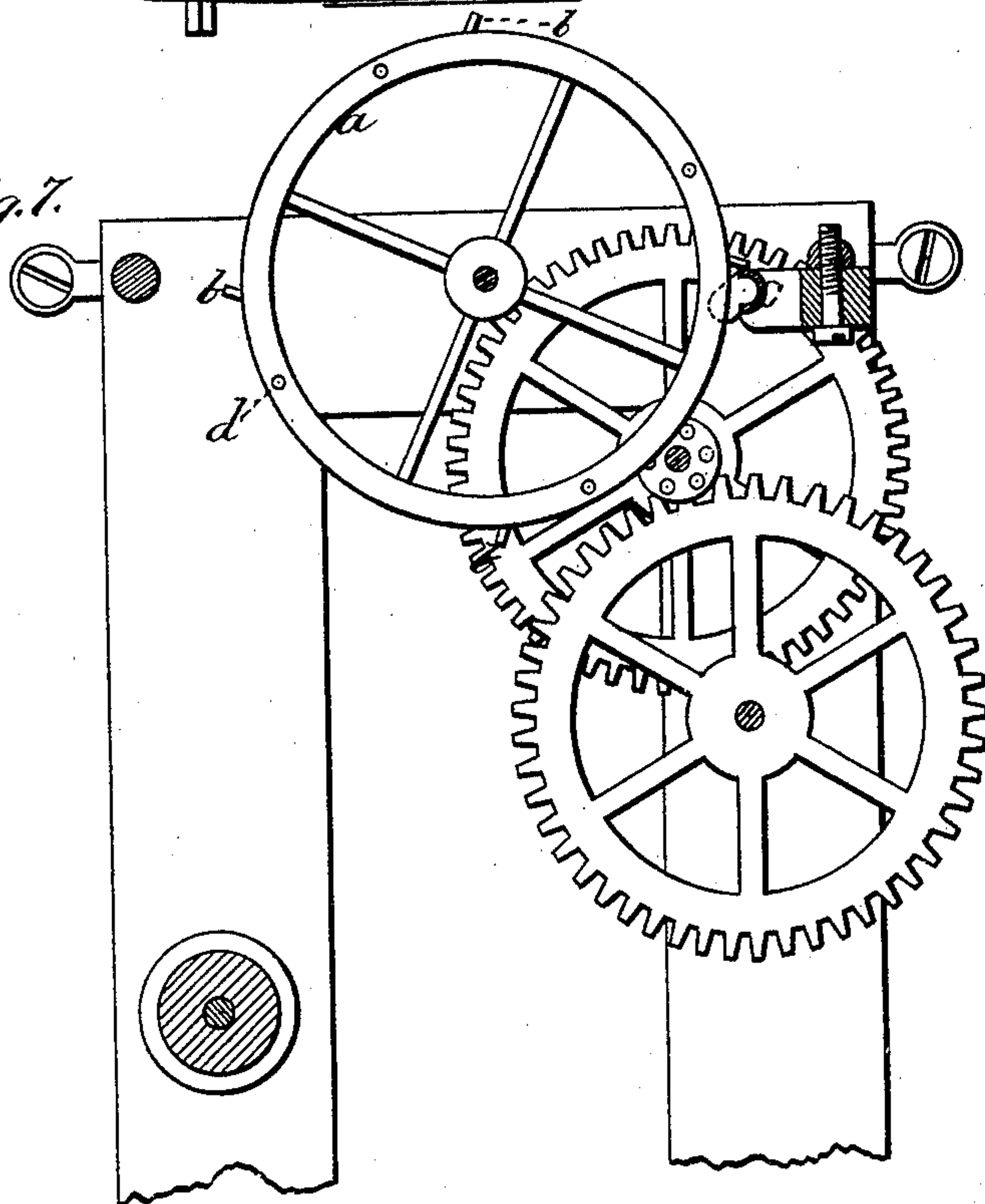
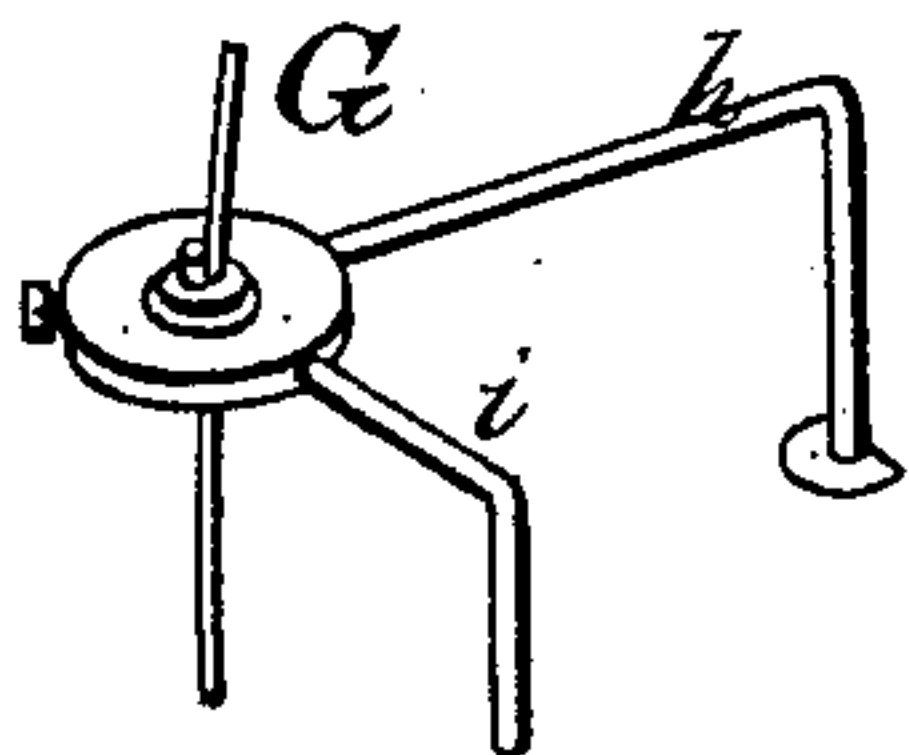


Fig. 8.



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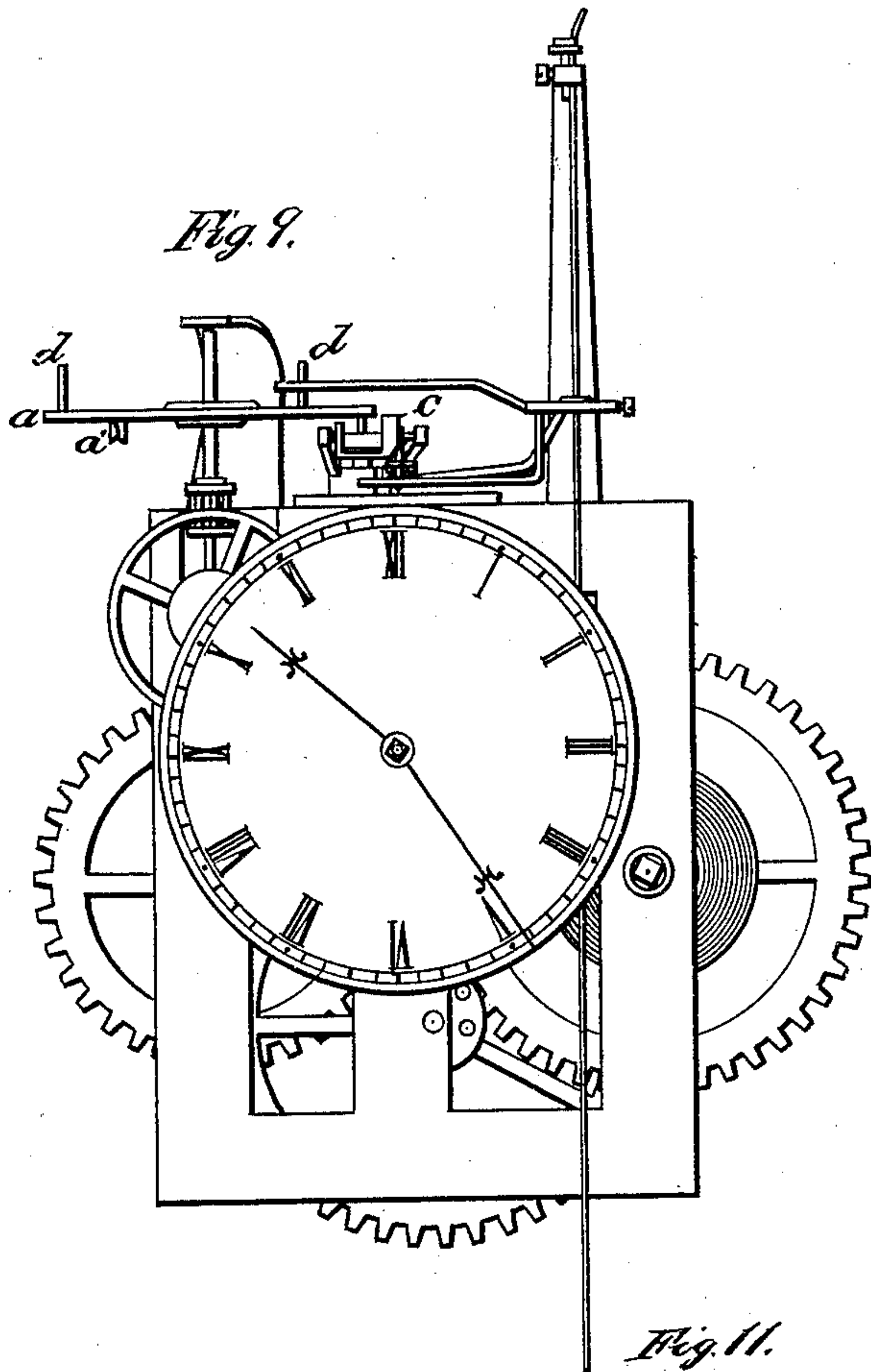


Fig. 10.

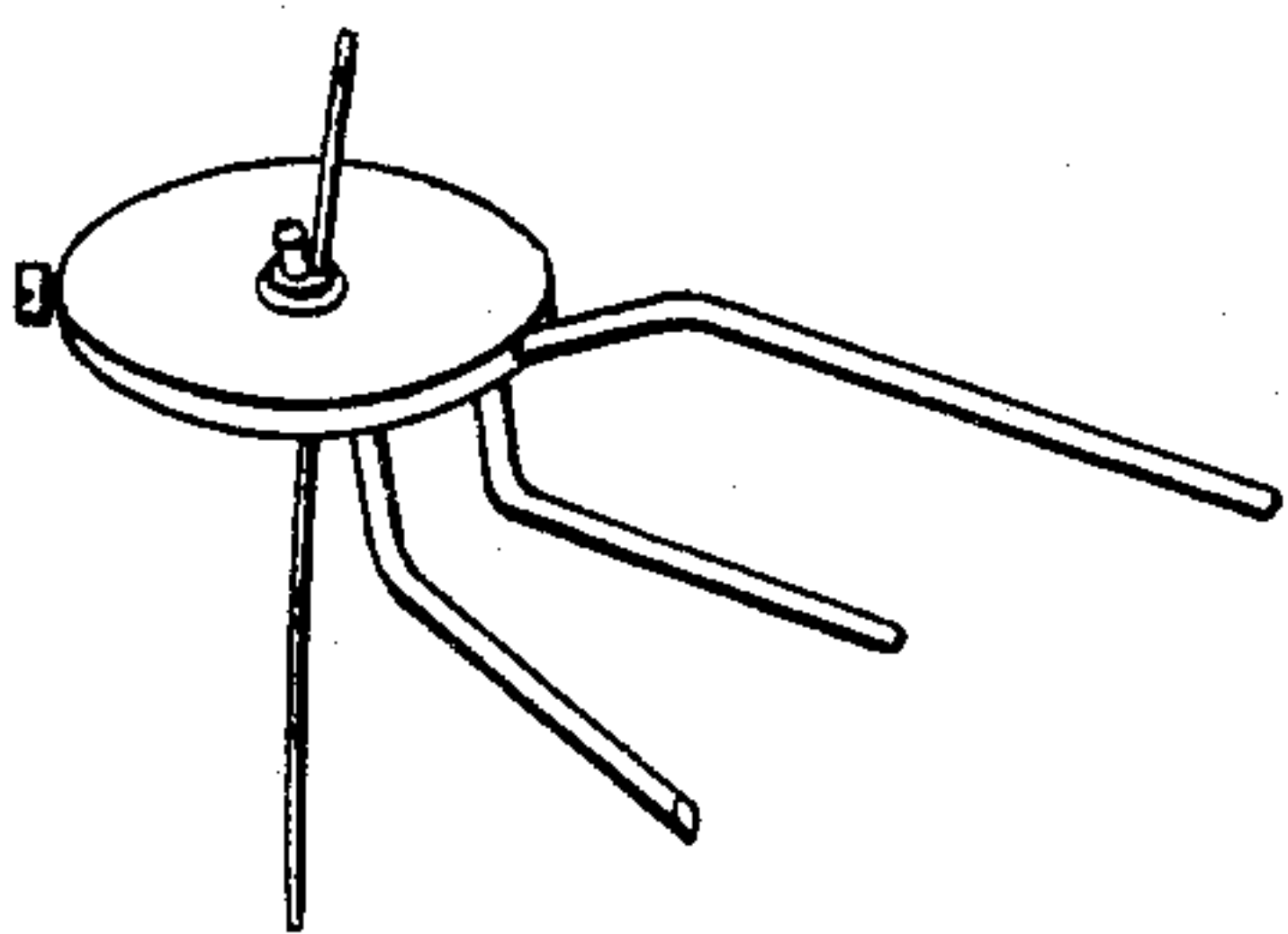


Fig. 11.

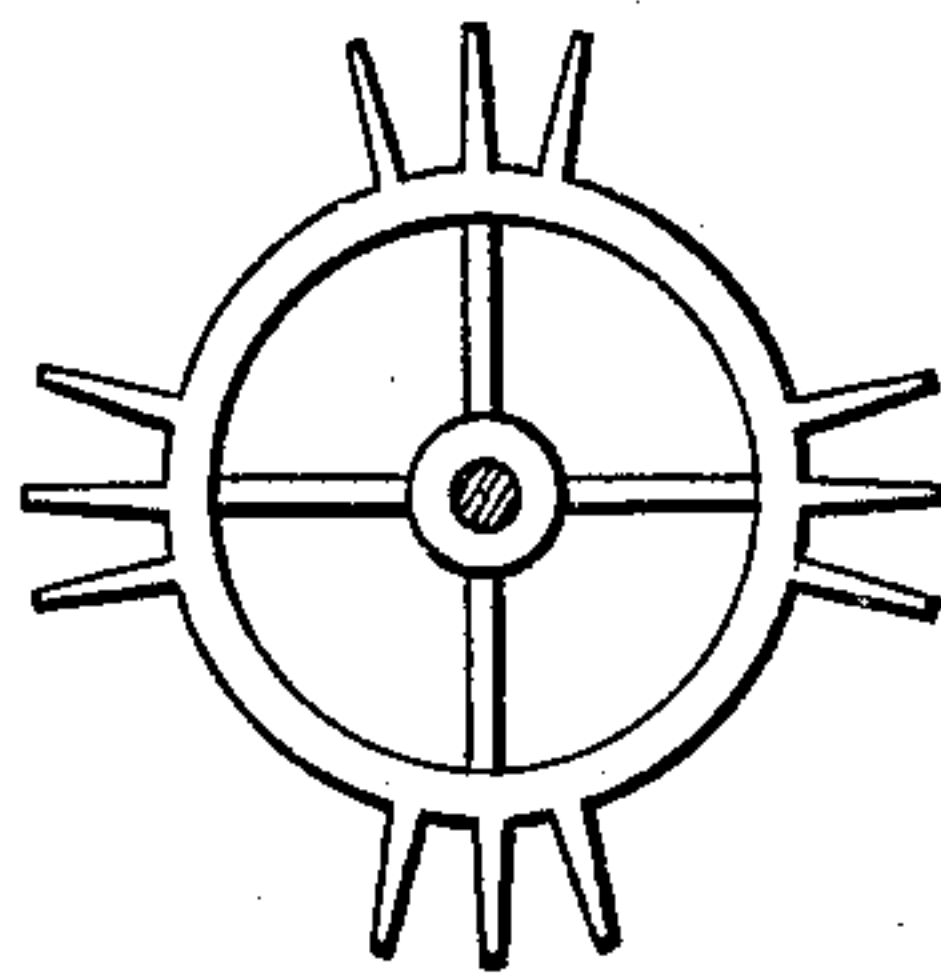


Fig. 12.

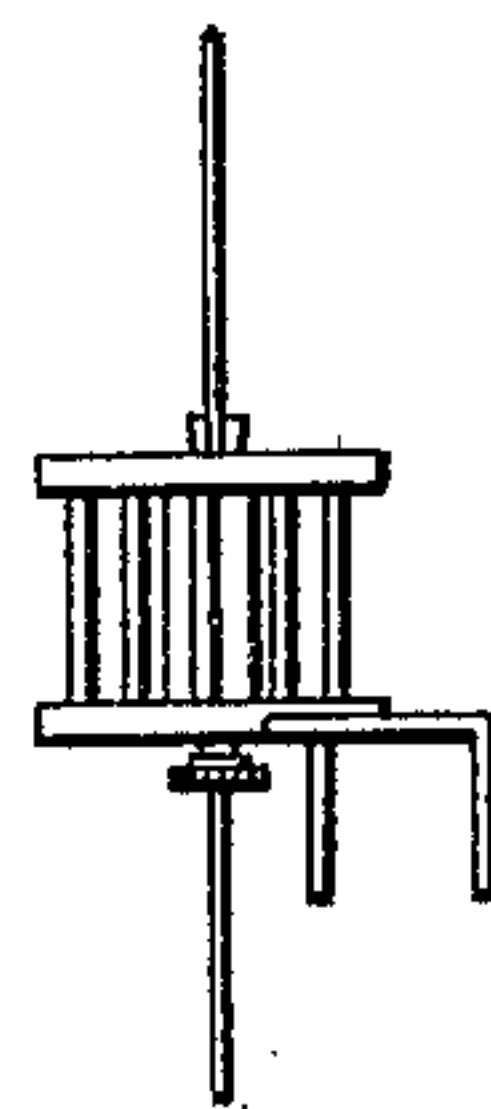


Fig. 14.

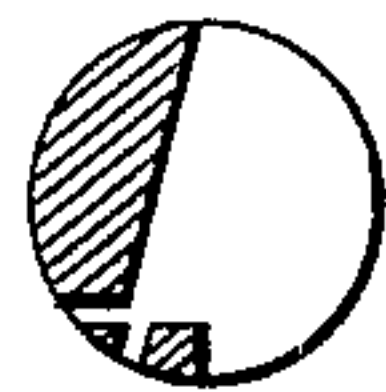


Fig. 13.

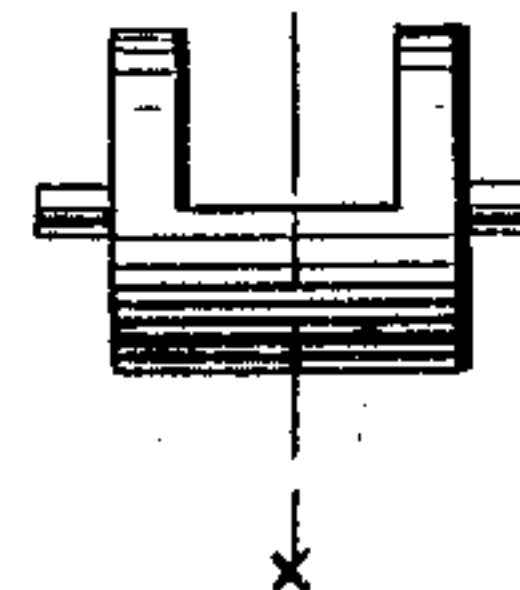


Fig. 15.

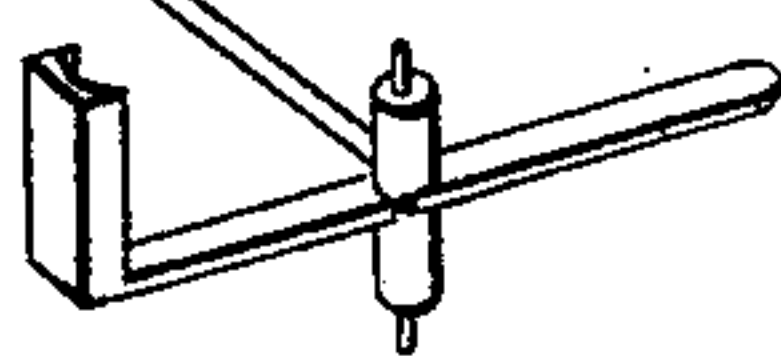
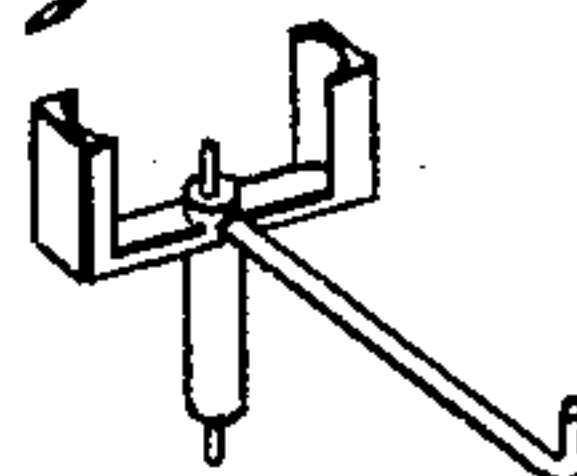


Fig. 16.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN W. HILE, OF WATERVILLE, KANSAS.

IMPROVEMENT IN CLOCKS.

Specification forming part of Letters Patent No. **176,309**, dated April 18, 1876; application filed March 29, 1876.

To all whom it may concern:

Be it known that I, JOHN W. HILE, of Waterville, in the county of Marshall and State of Kansas, have invented a new and valuable Improvement in Rotating Clock-Pendulum; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a front elevation of my clock, and Figs. 2, 3, 4, and 5 are modifications of my pendulum and escapement. Fig. 6 is a plan view, and Fig. 7 is a longitudinal vertical sectional view, and Fig. 8 is a detail view, of the same. Fig. 9 is a modification of Fig. 1, and Figs. 10, 11, 12, 13, 14, 15, and 16 are other modifications of the escapement.

This invention has relation to clock-escapements; and the nature of my invention consists in a collet, carrying one or more arms, and secured to a flexible rod or strip of metal, which suspends a horizontally-oscillating pendulum, in combination with a "dead-beat" escapement, of suitable construction, actuated directly by the arm or arms of the collet, the escapement-wheel being actuated by the mainspring, acting through the medium of a train of wheels, as will be hereinafter described.

My object is mainly to make a pendulum-clock, which at one winding will run a much greater length of time, and which shall keep remarkably accurate time, and be very simple in construction, and not liable to get out of order.

In carrying my invention into effect I use a dead-beat escapement constructed in the manner which I shall hereinafter explain, or in any other suitable manner. I also use a flexible pendulum-rod, A, suspended from a point above the train, and having attached to its lower end a pendulum-weight, B, which may be in the form of a wheel, a globe, or a number of globes attached to radial arms, and it may be adjusted to heat or cold by means of two or more mercury-tubes. A chronometer-balance, or, indeed, any other suitable form of weight, may be attached to the pendulum-rod A; or this weight may be adjusted with two

or more tubes partially filled with mercury, as shown in Fig. 2, and may be adjusted by means of an expansion balance, on the same principle a watch is adjusted, or with two or more balls, as shown in Fig. 3.

The connecting-rods may be made of steel and brass, so that when the rod contracts or becomes stiffer the balls are carried farther from the rod. It may be regulated by means of raising or lowering the balls or balance with a screw, *y*, or with screws on the outer edge of the balance or governor.

In practice, I prefer to use a flat metallic rod for the pendulum-rod A, but a round rod may be adopted, which will twist and untwist freely, so as to allow a horizontal oscillating movement to be given to the weight B, as will be hereinafter explained.

In Fig. 1, C designates the frame of the clock, D the mainspring, and E a train of wheel-work, through which motion is communicated to an escapement-wheel, *a*, Fig. 6, having studs *b* on its periphery arranged at regular intervals apart. These studs *b* successively find repose on an oscillating dead-beat escapement, *c*. When wheel *a* is arranged horizontally, as shown in Fig. 9, the studs which find repose on the oscillating escapement-cylinder are arranged on the lower side of said wheel, and studs *d* are arranged on the upper side of this wheel for a purpose hereinafter explained.

The escapement-wheel *a* of Figs. 6 and 7 has pins or studs *a'* fixed upon its front side, which correspond to the pins or studs *d* on the horizontal wheel *a* of Fig. 9.

Any desired number of pins or studs may be used on the escapement-wheel according to the number of beats to the minute, and, if desired, the spurs on the wheel *a* may be made and arranged, as shown by Fig. 5, to be used with intermediate cog escape-wheel. (Shown by Fig. 11.)

G, Fig. 8, designates a collet, which is fixed on the rod A, Fig. 1, and which may be adjustable thereon.

Figs. 6 and 8 clearly show one practical mode of transmitting motion to the weight from the escapement-wheel. This consists in an arm, *g*, which is made straight or curved, as shown in Fig. 6, and rigidly secured to the cylinder, in combination with two arms, *h* and

i, which are rigidly secured to the collet G. Both arms *h* and *i* are bent, so as to form a right angle, as shown in Fig. 8. The arm *h*, which has an enlargement on its free end, is struck at every alternate rotation of the weight B by one of the pins or studs on the escapement-wheel. The impulse thus given to the weight B twists the rod A, and causes the arm *h* to make a return stroke, in doing which it acts on the arm and unlocks the escapement. The weight B then rotates backward, and in doing so causes the arm *i* to act on the arm *g* of cylinder *c*, and releases the escapement again, at which moment a stud on the wheel will strike the arm *h* and give another impulse to the weight B.

The escapement-wheels shown in the drawings are studded for giving four beats to the minute; but it is obvious that a less or greater number of studs may be used, according to the number of beats desired in a given time.

I contemplate using a single arm only on the collet G, instead of the two shown in Figs. 4, 6, 8, and 12, and sometimes I will use three arms or more, as shown in Figs. 9 and 10. I do not, therefore, confine myself to the precise

construction or number of the escapement-arms attached to the torsion-rod; neither do I limit my claim to the precise form of escapement herein shown, as any suitable escapement may be used of the kind known as the "dead-beat" escapement.

I wish to be understood in using the term "dead-beat" escapement an escapement which at times is in repose, and is not acted on by the mainspring or weight of the weight of the clock, and is independent of the principal motive power of the clock.

What I claim as new, and desire to secure by Letters Patent, is—

In a clock, the combination, with a dead-beat escapement, of a weight, *w*, suspended by a torsion-spring rotating alternately from right to left, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN W. HILE.

Witnesses:

JOHN F. ACKER, Jr.,

EUGENE W. JOHNSON.