

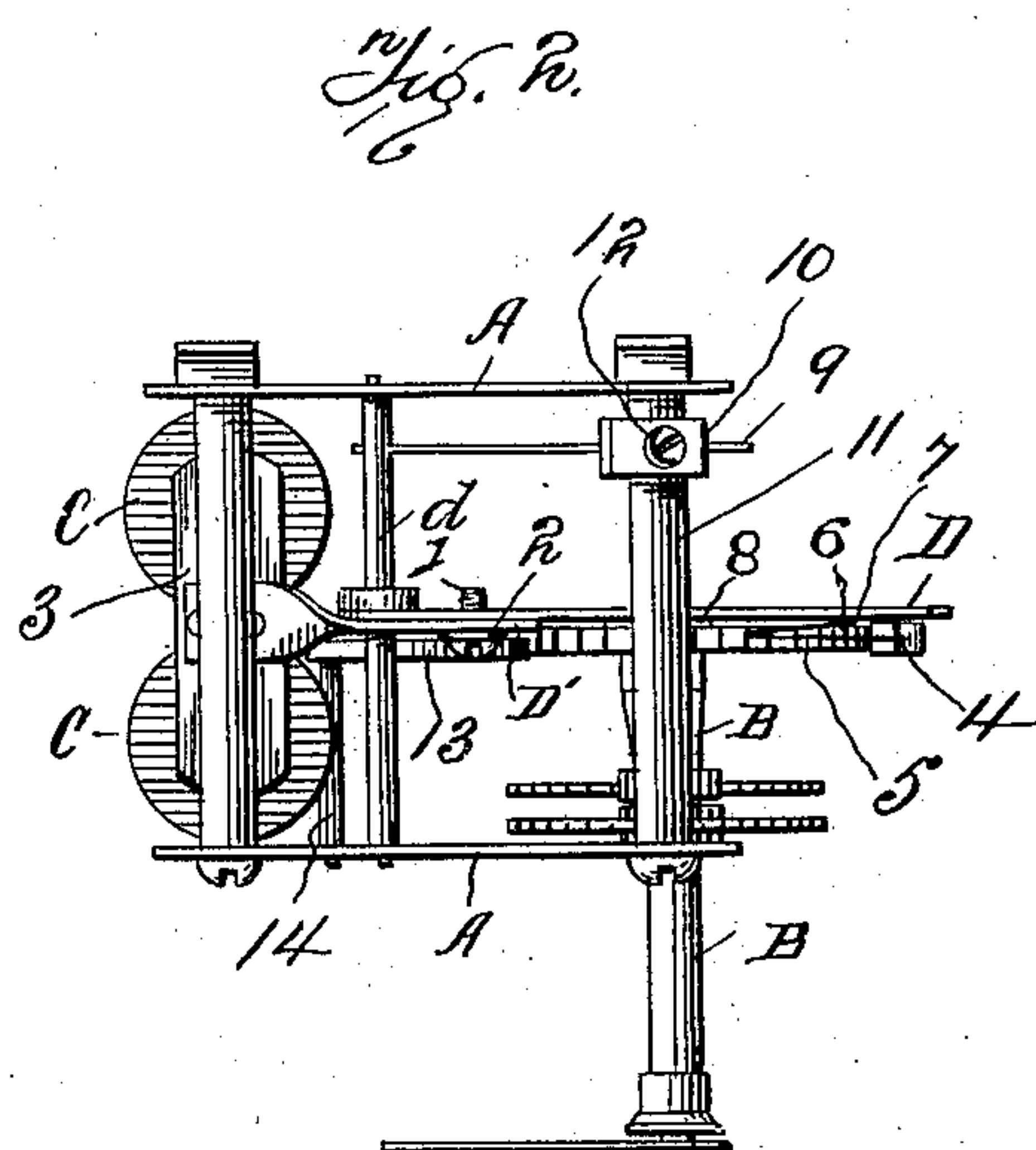
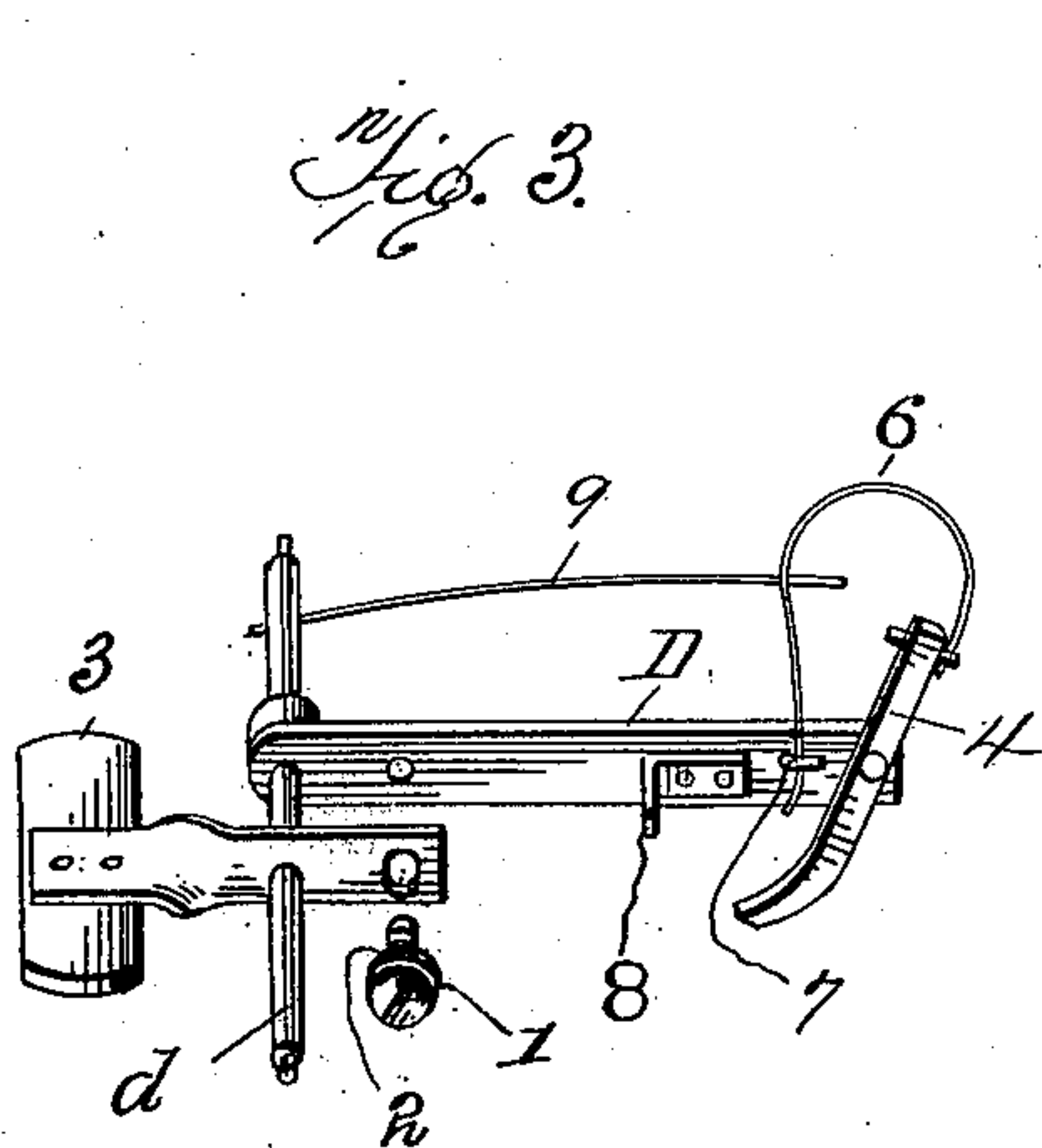
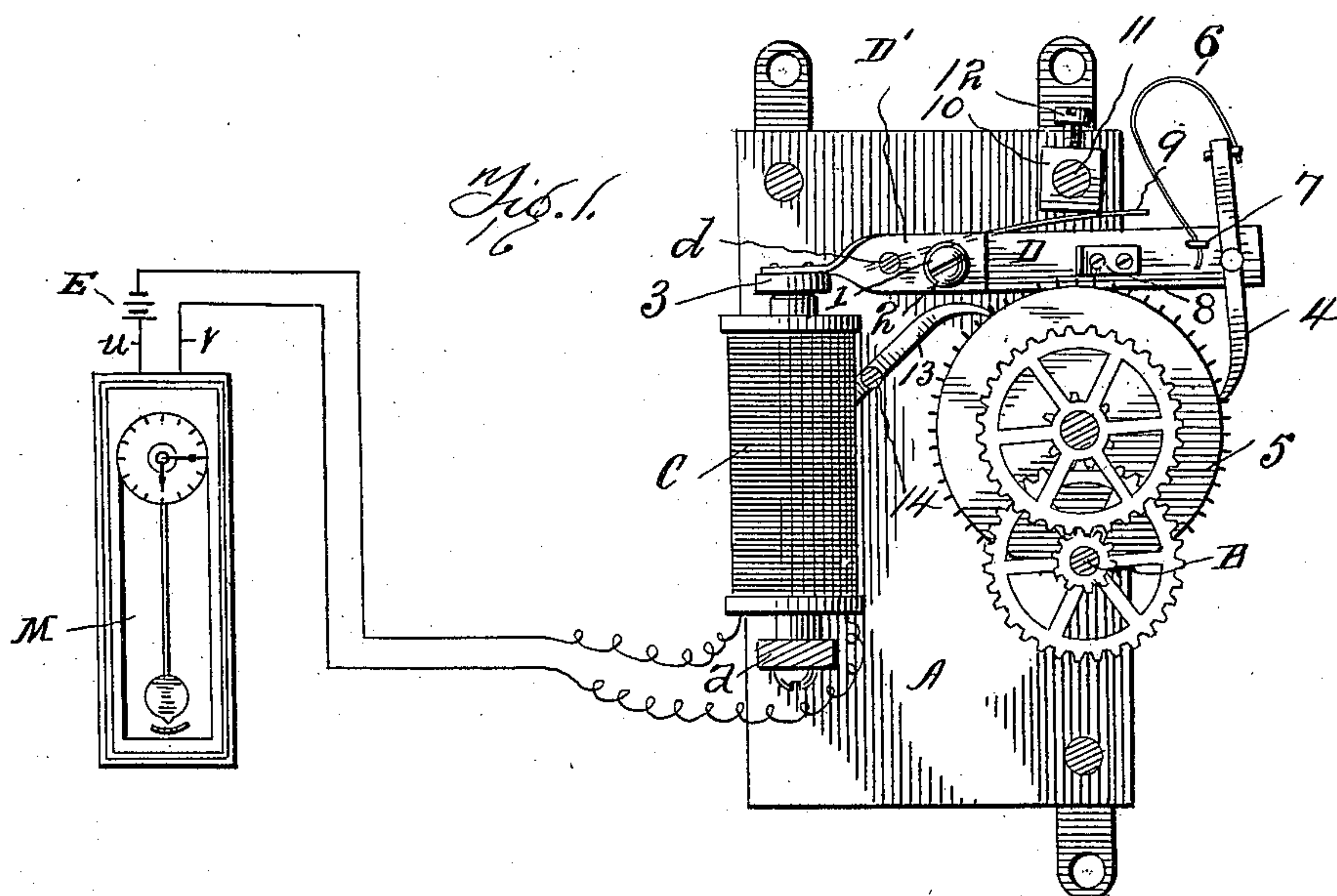
No. 692,054.

Patented Jan. 28, 1902.

F. FRICK.  
ELECTRIC CLOCK.

(Application filed June 29, 1901.)

(No Model.)



Witnesses  
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# UNITED STATES PATENT OFFICE.

FRED FRICK, OF WAYNESBORO, PENNSYLVANIA.

## ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 692,054, dated January 28, 1902.

Application filed June 29, 1901. Serial No. 66,497. (No model.)

*To all whom it may concern:*

Be it known that I, FRED FRICK, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification.

My said invention consists in various improvements in the details of construction of parts of a movement for "secondary" clocks for use in an electric-clock system whereby the operation is rendered positive and reliable at all times, as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, which are made a part hereof and on which similar characters of reference indicate similar parts, Figure 1 is a side elevation of a clock-movement embodying my said invention, the front plate of the frame being removed to show the parts more clearly; Fig. 2, a top or plan view, and Fig. 3 a detail perspective view of the parts segregated which compose the pivoted operating-arm.

In said drawings the portions marked A represent the frame; B, the shaft on which the hands are mounted; C, the electromagnets, and D the pivoted operating-arm.

The frame A, shaft B, and train of gearing from the shaft carrying the minute-hand to the sleeve thereon, which carries the hour-hand, are of the common or any approved construction and arrangement and are mounted in a suitable frame and provided with a face or dial, as in ordinary clocks. The electromagnet C is mounted on a cross-bar  $\alpha$  of the frame A and is connected with a battery E by wires  $u$  and  $v$ , which run to its opposite poles, the circuit passing through a "master-clock" M, which operates a circuit-closer of any usual or approved form to open and close the circuit at stated intervals, as each minute or any other interval of time desired.

The pivoted arm D is formed in two parts, each of which has a perforation through which a rock-shaft  $d$  extends, to which both parts are secured to rock therewith, the ends of said rod being journaled in the sides of the frame A. The front part of said arm extends back somewhat from said pivot and is formed with a slot in the form of the segment of a circle having said pivot  $d$  for its center. Op-

posite said slot is formed a screw-threaded perforation in the main part D of the arm. A clamping-screw 1 is adapted to extend through said slot and into said screw-threaded perforation and when drawn down tight to clamp the two parts D and D' rigidly together, a washer 2 being preferably provided under the head of said screw to afford more frictional contact and make the connection more secure. By this means the relative positions of the two parts may be adjusted to secure just the movement desired, as will be presently described. On the under side of the front end of part D' is mounted an armature 3, adjacent to the magnet C. The opposite end of said arm or rear end of part D is provided with a spring-pawl 4, which is adapted to engage the teeth of the ratchet-wheel 5. A long leaf-spring 6 in somewhat the form of an S is attached at one end to the top of said pawl and at the other end to a stud or eye 7 on the arm D. By such form great resiliency and a soft but positive action is secured, which is of advantage in the operation. The action of the spring is to normally hold the pawl into engagement with the ratchet-wheel. A lug 8 is secured on the side of the arm D, projecting at right angles therewith across the top of the ratchet-wheel 5, consisting, preferably, of a thin piece of metal bent at right angles, its rear edge being so positioned as to be adapted to drop in front of a tooth of said ratchet and limit its forward movement to one space when the arm D falls. A spring 9 is secured at one end to the rock-shaft  $d$  and extends forward and under a tension device 10, mounted on a cross-bar 11 of the frame A, consisting of a square block of any appropriate cam-shaped device, adjustably secured on said cross-bar by a set-screw 12. The tension of said spring can thus be adjusted as desired, and the force with which the arm D is normally pressed downward at its rear end may be regulated as required for the best results. A dog 13, mounted on an appropriate part of the frame by a pivot 14, is adapted to engage with the side of the ratchet-wheel opposite to pawl 4 and lock said ratchet-wheel against any backward movement.

The operation is as follows: The parts being assembled and adjusted as described and the circuit-closer operated by the master-



clock M being arranged to close the circuit at the desired periods, the apparatus is ready for operation. As each predetermined period of time is marked by the master-clock the circuit is closed, the magnet C energized, and the armature 3 drawn down to its poles. Such operation draws the pawl 4 up over one tooth of the ratchet-wheel 5, which is held against any backward movement by the dog 13. The circuit being then broken by the action of the master-clock, as is well understood, the spring 9 operates to force arm D down and through the pawl 4 advances said ratchet, turning shaft B, on which it is mounted, and operating the clock-movement. As the said arm D drops the lug 8 falls in front of the next tooth on ratchet-wheel 5 and stops its forward movement at just the point required to move the hands over the dial of the clock the space to mark the period of time determined upon. The upward movement of arm D lifts said lug out of the path of the teeth, so that ratchet-wheel 5 is free to move forward when said arm is lifted by the magnet drawing down armature 3 on its opposite end. It is understood, of course, that as many of these secondary clocks may be placed in the circuit as desired and the system be governed by one master-clock. By this arrangement the action of all the secondary movements in the circuit must be positive and correspond in the marking of time with the master-clock. The parts are of simple and inexpensive design, but of absolute accuracy and perfection in operation and result.

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

1. In an electric clock, the combination, of the arbor, the dial-train, the magnet, a pivoted arm bearing upon one end the armature and upon the other a pawl adapted to engage with a toothed wheel forming part of the dial-train, said lever being formed in two parts secured together to be adjusted to extend in different planes, whereby the direction in which they extend in relation to each other may be varied, substantially as set forth.

2. In an electric clock, the combination, of the arbor, the dial-train, the magnet, the two-part pivoted lever bearing upon one end the armature adjacent to the magnet, and upon the other end a pawl engaging a toothed wheel of the dial-train, both parts of said pivoted lever being mounted on a single pivot

and adjustably secured together at a distance from said pivot, and a spring connected with said lever to operate oppositely to said magnet, substantially as set forth.

3. In an electric clock, the combination, of the arbor, the dial-train, the magnet, the two-part pivoted lever, the armature on one end of said lever adjacent to said magnet, the pawl on the opposite end of said lever engaging with a toothed wheel of the dial-train, a stop on said lever adapted to fall into engagement with a gear of said dial-train and limit its movement, the two parts of said lever being mounted on the same pivot and adjustably secured to each other at a point distant from said pivot, whereby they may be adjusted to vary the planes in which said two parts shall extend, substantially as set forth.

4. In an electric clock, the combination, of the arbor, the dial-train, the magnet, the two-part pivoted lever, both parts being mounted on the same pivot or shaft to be turned independently and adjustably secured together at a point distant from said pivot, the armature on one end of said lever adjacent to the magnet, the pawl on the opposite end engaging with a toothed wheel of the dial-train, a stop on said lever also adapted to fall into engagement with said toothed wheel and limit its movement forward, a detent for holding it from backward movement, and a spring connected with said lever to operate oppositely to the magnet, substantially as set forth.

5. In an electric clock, the combination, of the train of operating gear including a toothed wheel, the magnet, means for closing and breaking the circuit through said magnet, a pivoted lever adjacent to said toothed wheel, an armature on one end of said lever adjacent to said magnet, a pawl pivoted on the opposite end and engaging with the teeth of said wheel, a spring for holding said pawl into engagement, a spring for forcing said arm oppositely to the action of the armature, and a stop also mounted on said arm and adapted to fall in front of a tooth of said wheel, as it is moved forward, and limit its movement to one cog or tooth, substantially as set forth.

In witness whereof I have hereunto set my hand and seal at Waynesboro, Pennsylvania, this 27th day of June, A. D. 1901.

FRED FRICK. [L. S.]

Witnesses:

ALF. N. RUSSELL,  
EDITH BYERS.