No. 734,674. PATENTED JULY 28, 1903.

C. M. CROOK.

SELF WINDING ELECTRIC CLOCK.

APPLICATION FILED OCT. 16, 1902.

NO MODEL.

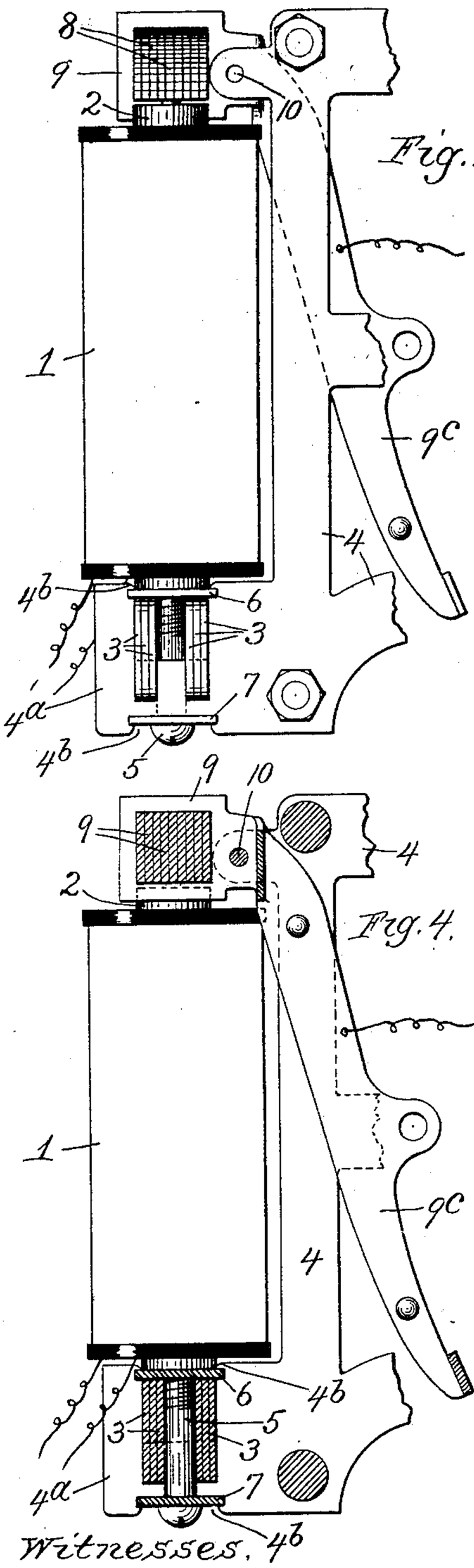

Fig. 1.

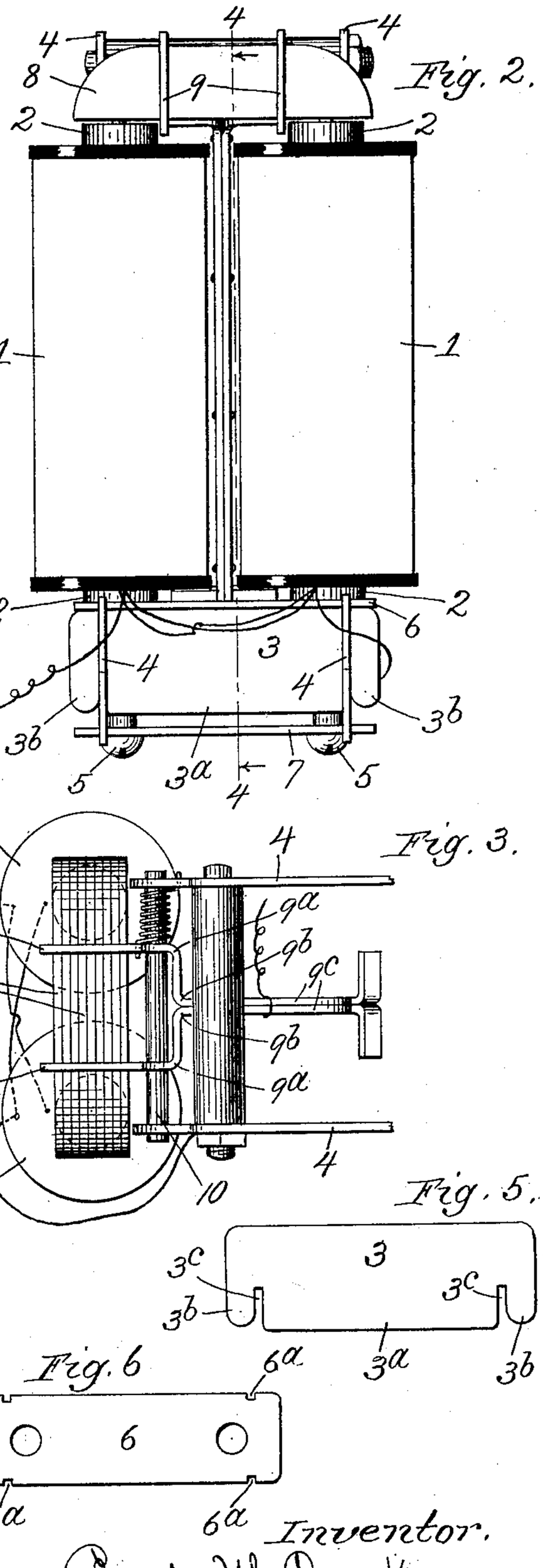

Fig. 2.

Fig. 4.

Fig. 3.

Fig. 5.

Fig. 6

Witnesses.
Edward T. Wray.
Weston B. Lazear.

Inventor.
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No. 734,674. Patented July 28, 1903.

UNITED STATES PATENT OFFICE.

CHARLES M. CROOK, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO CHARLES S. BURTON, TRUSTEE, OF OAKPARK, ILLINOIS.

SELF-WINDING ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 734,674, dated July 28, 1903.

Application filed October 16, 1902. Serial No. 127,452. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. CROOK, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Electromagnets and Armatures for Clocks, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved structure for electromagnets and armatures for the same and for and in connection with electric clocks.

It consists in details of construction of the magnet and clock-frame at the part for attachment of the magnet thereto and of the armature and the lever which it moves, as fully set out in the claims.

In the drawings, Figure 1 is a side elevation of an electromagnet and armature and portion of the clock-frame in which it is mounted embodying my improvements. Fig. 2 is an edge elevation of the magnet and adjacent portion of the frame and armature and armature-lever. Fig. 3 is a top plan of the same. Fig. 4 is a section at the line 4 4 on Fig. 2. Fig. 5 is a detail plan of one of the plates of the magnet cross-head. Fig. 6 is a plan of the locking-plate securing the magnet to the clock-frame.

I aim by the present invention to produce a magnet and armature and connected parts cheaply and at the same time adapt them in form to cause the magnet to be supported with exact erectness and fixedness of position on the clock-frame by means of the cross-head, which is the element by which the attachment is necessarily made, and I aim also to make the armature cheap and at the same time exact in construction and all the parts easy to be assembled in the clock-frame. The details of construction are directed to the accomplishment of these purposes. The spools 1 1 of the magnet are of ordinary construction, having soft iron or steel cores 2 2 protruding from the heads of the spools sufficiently for attachment of the cross-head of the magnet to them at one end and for the proper approach of the armature to them at the other end. The cross-head is made of a multiplicity of thin soft iron or steel plates 3 3 3, which being made of sheet metal can be readily cut out with a die and are therefore substantially exactly uniform. These plates 3 are designed to be interlocked with the clock-frame plates, and for this purpose they are formed with a portion 3^a, constituting a broad short tongue whose lateral edges are parallel and whose extent in the direction of length of the plate is the distance between the front and rear clock-frame plates 4 4, so that a group of these plates assembled as seen in Figs. 2 and 4 may be lodged between the bars 4^a, which project horizontally from the front and rear plates at one lower corner to afford means for mounting the magnet, and thereby both constitute an exact spacing means between the plates and may also be clamped firmly between them by any bolts or like means used to bind the frame-plates together front and rear. To more fully interlock the plate 3 with the clock-frame plates and further increase their value as a means of securing the clock-plates together, I form these cross-head plates in some instances with the narrow lugs 3^b 3^b at the ends beyond the lateral limits of the broad tongue 3^a, with slots 3^c 3^c between the lateral edges of said tongue and said lugs, said slots being in width substantially equal to the thickness of the front and rear clock-plates 4 4, so that the cross-head plates being lodged, as described, between said front and rear clock-frame plates receive said latter plates in said slots, and thus check them against outward as well as against inward movement. These plates are bound to the magnet-cores 2 2 and also bound to the clock-plates by means of the bolts 5 5, which are screwed into the ends of the cores, being inserted through the group of plates 3, said group being divided into two parts, preferably with an equal number of plates on each side of the bolts, as seen clearly in Figs. 2 and 4. In order to insure the most perfect continuity of metallic connection between the

two cores, I provide a tie-plate 6, which bears upon the ends of the cores and extends over the upper edges of the entire group of plates 3, making contact-throughout the entire length of said edges, and below the bars 4^a of the clock-plates there is lodged a binding-plate 7, through which the bolts 5 5 take and by which the heads of the bolts are stopped, so that when the bolts are tightened the lugs 4^a of the cross-head plates 3 3 3, the tie-plate 6, and the binding-plate 7 are all clamped rigidly to the ends of the cores. Preferably the bars 4^a are recessed at the upper and lower edges, as seen at 4^b 4^b, to cause the tie-plate 6 and the binding-plate 7 to be lodged accurately as to lateral position, and these plates may also be notched, as seen at 6^a, to receive the edges of the notches 4^b, thus further increasing the certainty of exact relation between the parts when assembled.

The armature is composed of a multiplicity of soft-iron plates 8 8 8, which are assembled in a bunch and retained by brass or other non-magnetic yoke-plates 9 9. These yoke-plates are preferably formed so as to constitute also the lever-arm of the armature; but this is incidental. The yoke-plates have each a rectangular aperture which in vertical dimension is equal to the width of the plates 8 8 and in horizontal dimension is equal to the combined thickness of the group when assembled compactly. The two yoke-plates are preferably for convenience in adapting them also to serve as the armature-lever made separately and are folded at 9^a and 9^b, so as to have each a lever portion 9^c, said lever portions extending face to face and being, if desired, secured together by soldering or riveting. The distance between the two bends 9^a and 9^b is such that when the two yoke-plates are thus assembled the distance between the apertured arms in which the armature-plates are mounted is such that the edges of these arms shall not strike the poles, but preferably may both pass between the latter, permitting the plates which constitute the armature proper to approach as close as may be desired to the magnet-poles, said poles projecting from the heads of the spool a sufficient distance to accommodate the width of the lower marginal portion of the yoke-plates below the rectangular aperture which holds the armature-plates. This form of yoke-plate is convenient as affording easy means for pivoting the armature, as by the rock-shaft 10, which extends through the yoke-plates a suitable distance back from the rectangular aperture in which the armature-plates are lodged. The armature-plates are preferably formed with their ends reduced in width, as by curving them, as seen in Fig. 1, so that they may be easily entered and driven tight into the rectangular apertures of the yoke-plates, no other means for securing them than the tight fit which may thus be produced being necessary.

I claim—

1. In an electric clock, in combination with the clock-plates having bars for mounting the magnet, the magnet, comprising cross-head plates for connecting the spool-cores interlocked with bars of the clock-frame plates; and means for binding said plates and bars rigidly together and to the spool-cores.

2. In an electric clock, in combination with the clock-frame plates having bars for supporting the magnet, the magnet comprising the spools and a multiplicity of plates for a cross-head provided with tongues extending between the clock-frame-plate bars; and means for clamping the clock-frame-plate bars and cross-head plates to the ends of the spool-cores.

3. In an electric clock, in combination with clock-frame plates having bars for mounting the magnet, the magnet comprising spools; a multiplicity of thin plates of uniform pattern assembled side by side, abutting edgewise toward the spool-cores, and interlocking edgewise with the bars of the clock-plates; a clamping-plate extending across the lower edge of the bars, and clamping-bolts taking through such clamping-plate, extending through the group of cross-head plates and taking into the spool-cores.

4. In an electric clock, in combination with the clock-frame plates having bars for mounting the magnet; the magnet comprising the spool-cores and a cross-head connecting the cores consisting of a multiplicity of plates assembled edgewise toward the ends of the cores and interlocked with the clock-frame bar-plates; a clamping-plate extending across the edges of the clock-plates opposite the ends of the cores; and bolts from the ends of the cores extending through the group of cross-head plates, having a stop on the outer side of the clamping-plate.

5. In an electric clock, a magnet-armature comprising a pair of yoke-plates secured together and fulcrumed on the clock-frame, having terminal portions spaced from each other overhanging the magnet-spools, said terminal portions having apertures in line, and a multiplicity of armature-plates assembled and fitting tightly in said apertures.

6. In an electric clock, a magnet-armature comprising a pair of yoke-plates secured together and fulcrumed on the clock-frame, having terminal portions spaced from each other, overhanging the magnet-spools, said terminal portions having apertures in line, and a multiplicity of armature-plates assembled face to face edgewise toward the magnet-poles occupying said apertures.

7. In an electric clock, a magnet-armature and lever comprising two similar plates of non-magnetic substance, folded so as to have portions coinciding and terminal pieces extending parallel at a distance apart; a rock-shaft for such lever extending through the

spaced or separated portions, whereby a wide bearing is obtained; said parallel separated portions having apertures in line and a multiplicity of soft-iron plates assembled and tightly fitted in said apertures.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Bristol, Connecticut, this 25th day of September, A. D. 1902.

CHARLES M. CROOK.

In presence of—
JAMES D. WHIPPLE,
STEPHEN H. MASON.