C. H. WHITE.

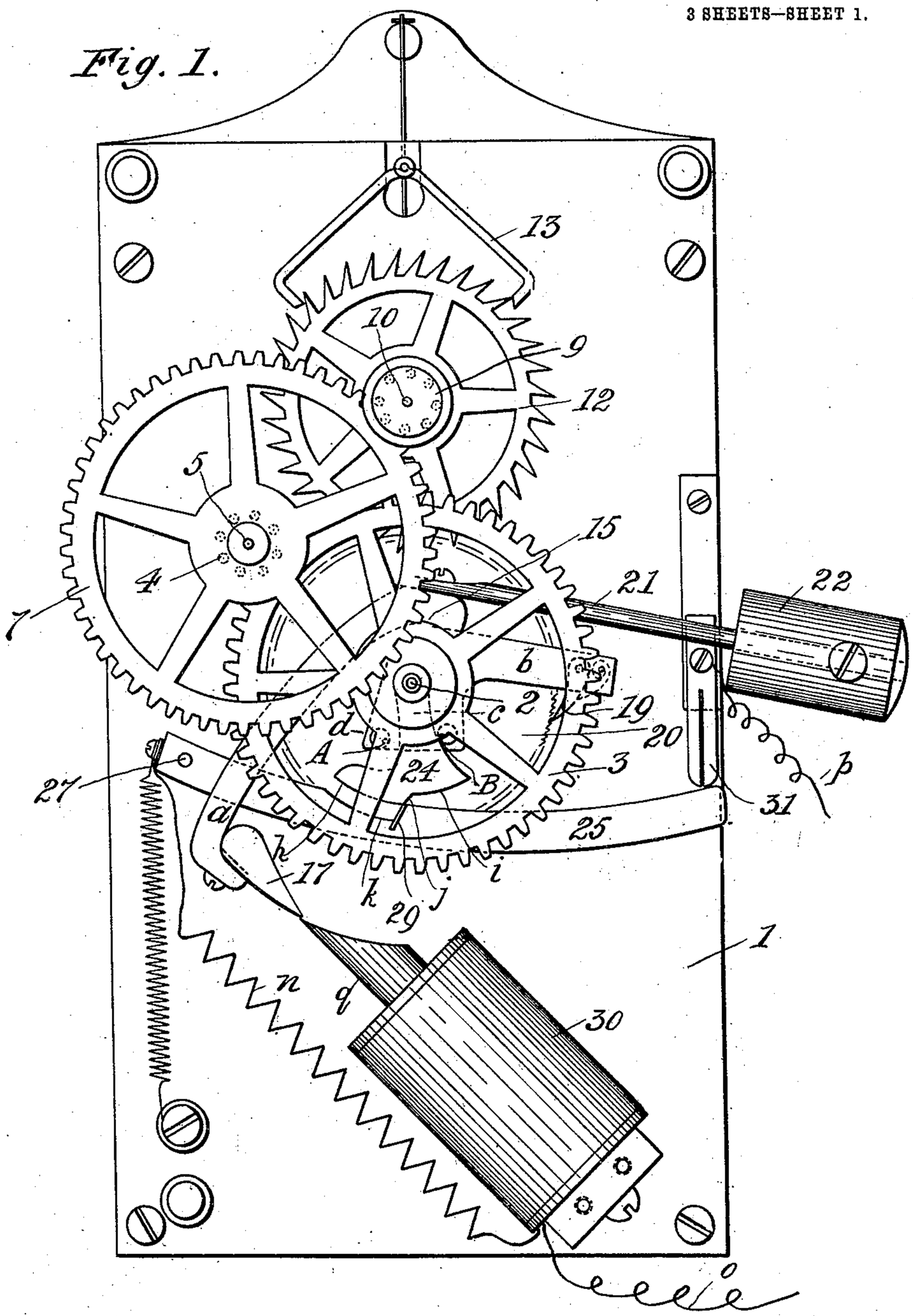
ELECTRIC CLOCK.

APPLICATION FILED APR. 24, 1907.

901,050. Patented Oct. 13, 1908.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:
M. Barton.
Elwood Bozman

INVENTOR.
Charles H. White.
BY
Geo. W. T. Howard
ATTORNEY.

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3 SHEETS—SHEET 2.

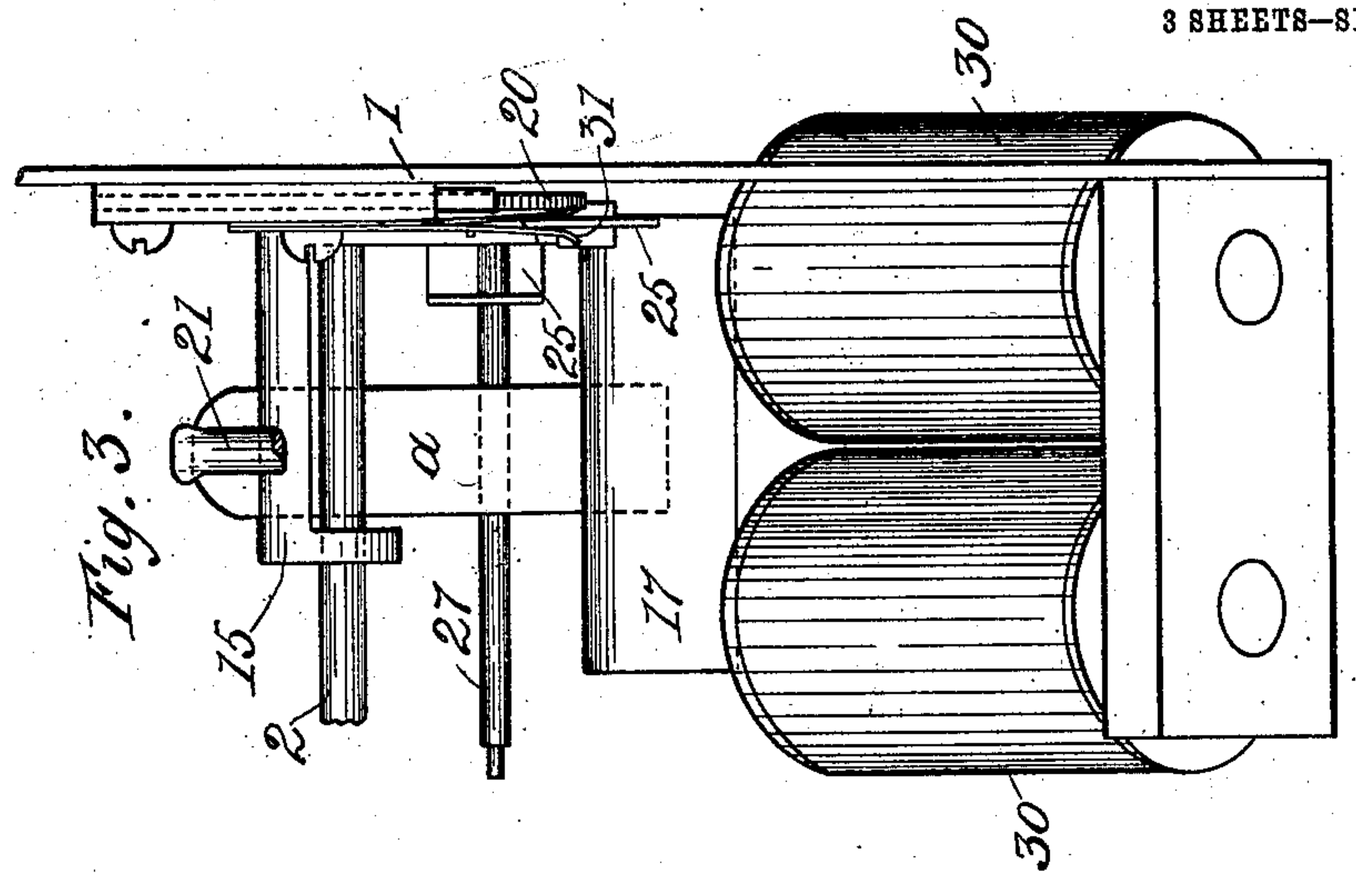

Fig. 3.

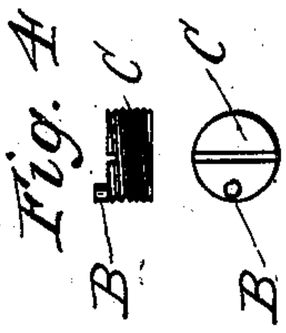

Fig. 4

Fig. 2.

Witnesses:
M. Barton.
Elwood Bozman

Inventor:
Charles H. White,
by Wm. H. T. Howard,
Atty.

C. H. WHITE.

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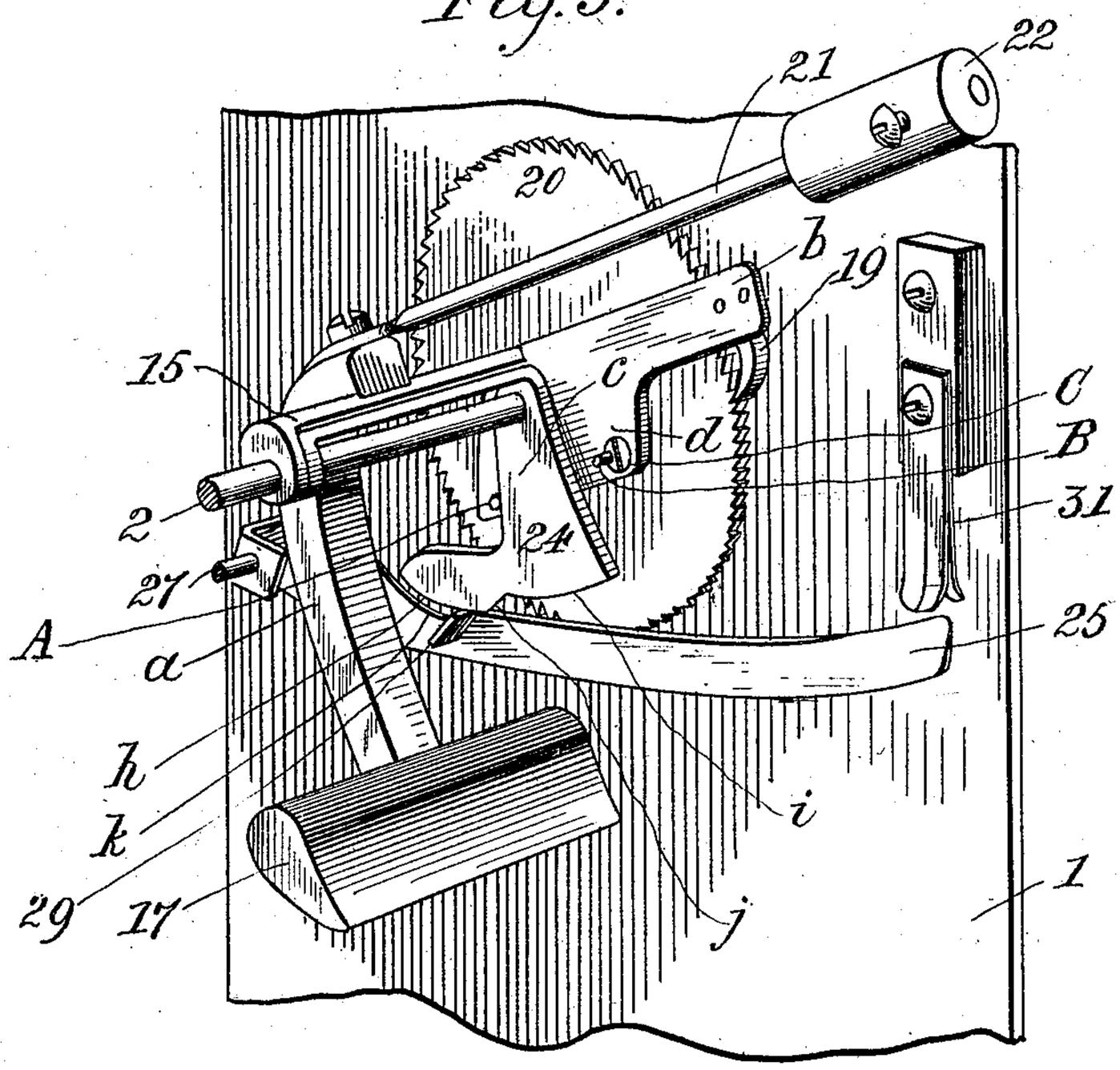
3 SHEETS—SHEET 3.

Fig. 5.



Witnesses

Frank B. Wooden.

Alberta C. Richards

Inventor

Charles H. White,

By G. H. & W. J. Howard,

Attorney

UNITED STATES PATENT OFFICE.

CHARLES H. WHITE, OF SPARROWS POINT, MARYLAND.

ELECTRIC CLOCK.

No. 901,050. Specification of Letters Patent. Patented Oct. 13, 1908.

Application filed April 24, 1907. Serial No. 369,928.

To all whom it may concern:

Be it known that I, CHARLES H. WHITE, of Sparrows Point, in the county of Baltimore and State of Maryland, have invented certain Improvements in Electric Clocks, of which the following is a specification.

This invention relates to certain improvements in that class of electric clocks in which the time movement is driven by a descending weighted lever, the said lever being raised at intervals by electro-magnets and an armature.

In the further description of the said invention which follows, reference is made to the accompanying drawings forming a part hereof, and in which,—

Figure 1 is a front view of such parts of the clock movement as are involved in the present invention. Fig. 2 is an enlarged front view of certain parts of the movement shown in Fig. 1. Fig. 3 is a view of certain parts of Fig. 2, looking in the direction indicated by the arrow. Fig. 4 represents two still enlarged views of an adjustable pin employed to communicate motion to a part of the clock movement, as hereinafter described. Fig. 5 is an enlarged perspective view of certain parts of the clock movement.

Referring now to the drawings, 1 is the back or rear plate of the clock movement, and 2 the minute arbor to which is fastened the first gear wheel 3 of the train of gearing comprised in the movement. The wheel 3 meshes with a pinion 4 on the arbor 5. The pins serving as teeth of the pinion 4 and those of another similar pinion hereinafter referred to, are shown dotted in Fig. 1. The arbor 5 carries the second gear wheel 7, and this wheel meshes with a pinion 9 on the escapement arbor 10. The escapement wheel is denoted by 12 and the anchor by 13.

All the parts of the clock movement thus far described, are common to clocks; and in order to avoid complication in the drawings, the remaining gearing which is embraced in a non-electric clock movement is omitted.

15 is a rocker placed loosely on the minute arbor, having a shank *a* to which an armature 17 is fastened. The said rocker is also provided with an arm *b* which carries a spring-held pawl 19 the point of which rests on the teeth of a ratchet wheel 20 fastened to the minute arbor 2.

21 is a rod shown as fastened to the rocker 15, having an adjustable weight 22 at its end, which as it descends, furnishes the power necessary to effect the action of the clock movement.

24 is a cam hung loosely on the minute arbor 2, with its active edge resting on a spring-held lever 25 fastened to a spindle 27 the pintles of which are loose in the clock plates only one of which is shown.

The shank *c* of the cam 24 is situated between the pins A and B projecting from the enlargement *d* of the arm *b*. These pins are formed on the face of screws C one of which is shown on an enlarged scale in Fig. 4; and they are placed eccentrically with respect to the axis of the screws, as is well shown in that figure. The pins are so spaced that the rocker 15 and its attachments will have considerable vibratory movement independent of the cam 24; and the object of placing the pins to one side of the axis of the screws, is to admit of the independent movement of the cam, being increased or diminished as required, the change in space between the pins being effected by turning the screws, as will be readily understood.

The active surface or edge of the cam is formed of two portions *h* and *i* which are concentric with the surface of the minute arbor 2, and these surfaces are connected by the practically straight tangential surface which forms a shoulder *j;* and the lever 25 is provided with a notch *k* in which the curved surface *h* of the cam will rest when the cam is in the position shown in Fig. 2.

29 is a plate of hard material such for instance as steel, which forms the abrupt edge of the notch *k* to reduce wear at that point, in the operation of the clock as hereinafter described.

30, 30 are electro-magnets in an electric circuit comprising wires *n*, *o*, *p*, the lever 25, and the insulated split contact plate 31. This circuit is open when the free end of the arm 25 is disconnected from the contact plate, as shown in Fig. 5 and by the dotted delineations of the said arm in Fig. 2. The battery whereby the magnets are energized is not shown.

By reference to Fig. 2 it will be seen that the ends of the cores *q* of the magnets are concentric with the minute arbor, consequently there is a common distance between the cores and the armature during the swinging or vibratory movement of the armature to which it is subjected in the operation of the clock.

It will be understood that the downward

movement of the weighted rod 21 effects the operation of the clock, the spring pawl 19 causing the rotation of the ratchet wheel 20 which is fast to the minute arbor 2. In Fig. 1 the various parts of the clock movement are shown in the positions which they occupy when the weighted rod 21 had nearly reached its lowest position and is about to become an inoperative device. In the further motion of the arm *b* of the rocker 15 consequent upon the fall of the weighted rod, the pin B which is in contact with the edge of the cam, carries its shoulder *j* into the slot *k* which as it enters allows the end of the lever 25 to make electric contact with the split plate 31. This contact of the lever 25 with the split plate 31 closes the electric circuit, and by the armature 17 being drawn down into the position shown by its dotted delineation in Fig. 2, the weighted rod 21 is instantly lifted to its highest position shown by the dotted lines in the same figure, the pawl clicking on the teeth of the ratchet wheel. This movement of the weighted rod as described is so rapidly performed, that the momentum of the weight causes that device to pass beyond a point it would reach by a gradual upward movement.

At the beginning of the upward movement of the weighted rod 21, the portion *h* of the cam 24 is fully within the slot *k*, and the contact of the lever 25 with the split plate 31, complete, as shown in full lines in Fig. 2; and as the pin A stands a proper distance from the edge of the shank *c* of the cam 24, the said weighted rod continues to ascend under the influence of the magnet, until the armature 17 is directly over or in alinement with the cores of the magnets as shown by the dotted lines in Fig. 2. The pin A then strikes the cam shank and the momentum of the weight 22 throws the shoulder *j* over the edge of the slot *k*, when the surface *h* will ride on the upper edge of the lever 25 which is forced from contact with the split plate 31 as shown by the dotted lines in Fig. 2 and in full lines in Fig. 5. The electric circuit now being open, the weighted lever descends from its elevated position shown in Fig. 5 and effects the operation of the clock, until it approaches its first position, when the pin B throws the cam to its original position shown in full lines in Fig. 2, and the weighted rod again ascends, and the operation described is repeated.

I claim as my invention:—

1. In an electric clock, the minute arbor thereof provided with a tight ratchet wheel, a rocker which is loose on the arbor having an extended weighted arm and carrying a pawl which engages with the teeth of the ratchet wheel together with a shank bearing an armature, a cam suspended loosely from the arbor, an independent spring-held lever having a notch therein to receive the cam, means to communicate motion from the rocker to the cam and thereby in the vibratory motion of the rocker, throw the cam into and out of the said notch, combined with a magnet and a contact plate for the notched lever, the said magnet notched lever and contact plate being in an electric circuit, substantially as specified.

2. In an electric clock, the minute arbor thereof provided with a tight ratchet wheel, a rocker which is loose on the arbor having an extended weighted arm and carrying a pawl which engages with the teeth of the ratchet wheel together with a shank bearing an armature, a cam suspended loosely from the arbor, an independent spring-held lever having a notch therein to receive the cam, spaced pins on the rocker to communicate motion from the rocker to the cam and thereby in the vibratory motion of the rocker, throw the cam into and out of the said notch, combined with a magnet and a contact plate for the notched lever, the said magnet notched lever and contact plate being in an electric circuit, substantially as specified.

CHARLES H. WHITE.

Witnesses:
THOMAS G. HULL,
WM. T. HOWARD.