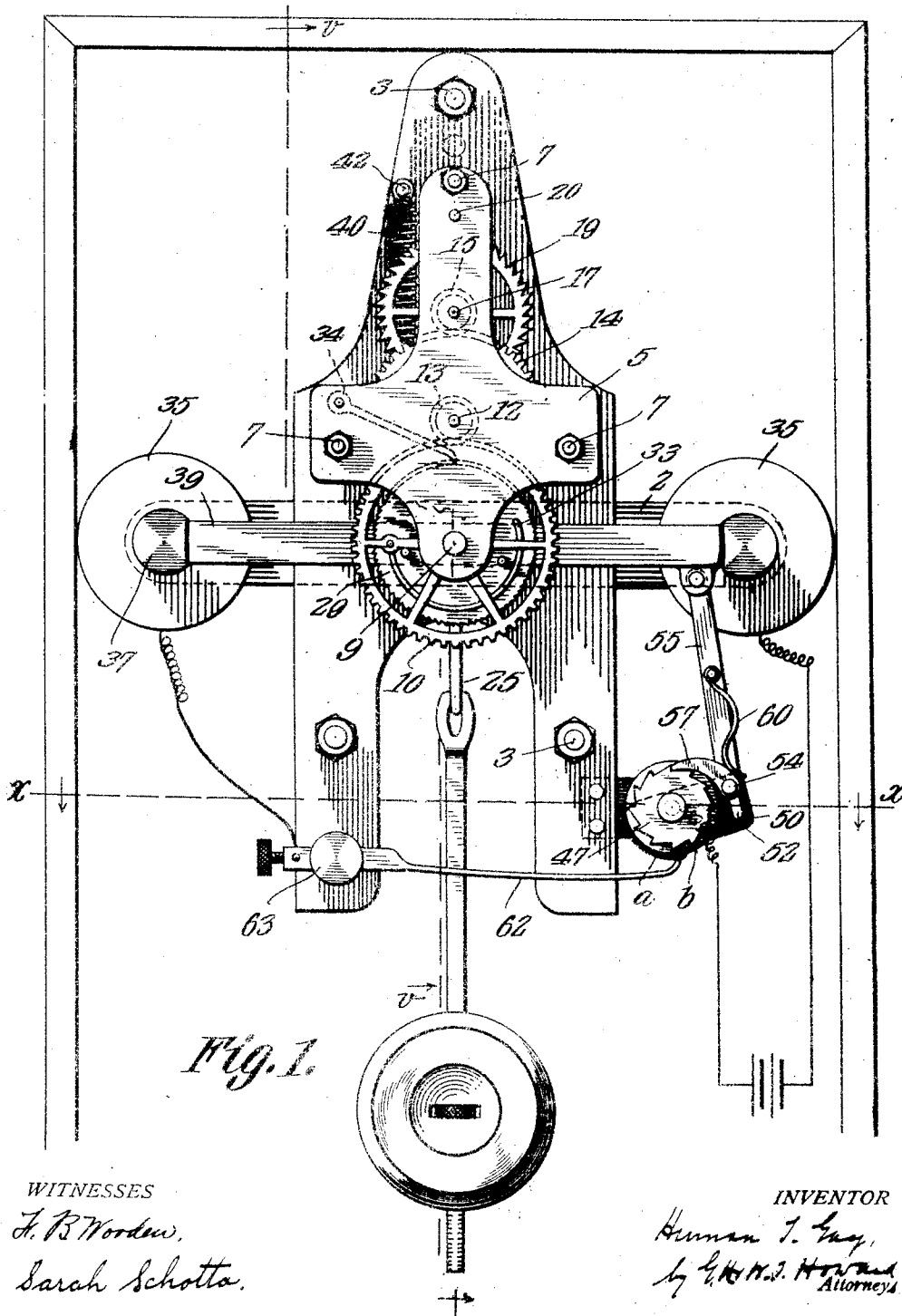


1,041,771.

Patented Oct. 22, 1912.

4 SHEETS—SHEET 1.



WITNESSES

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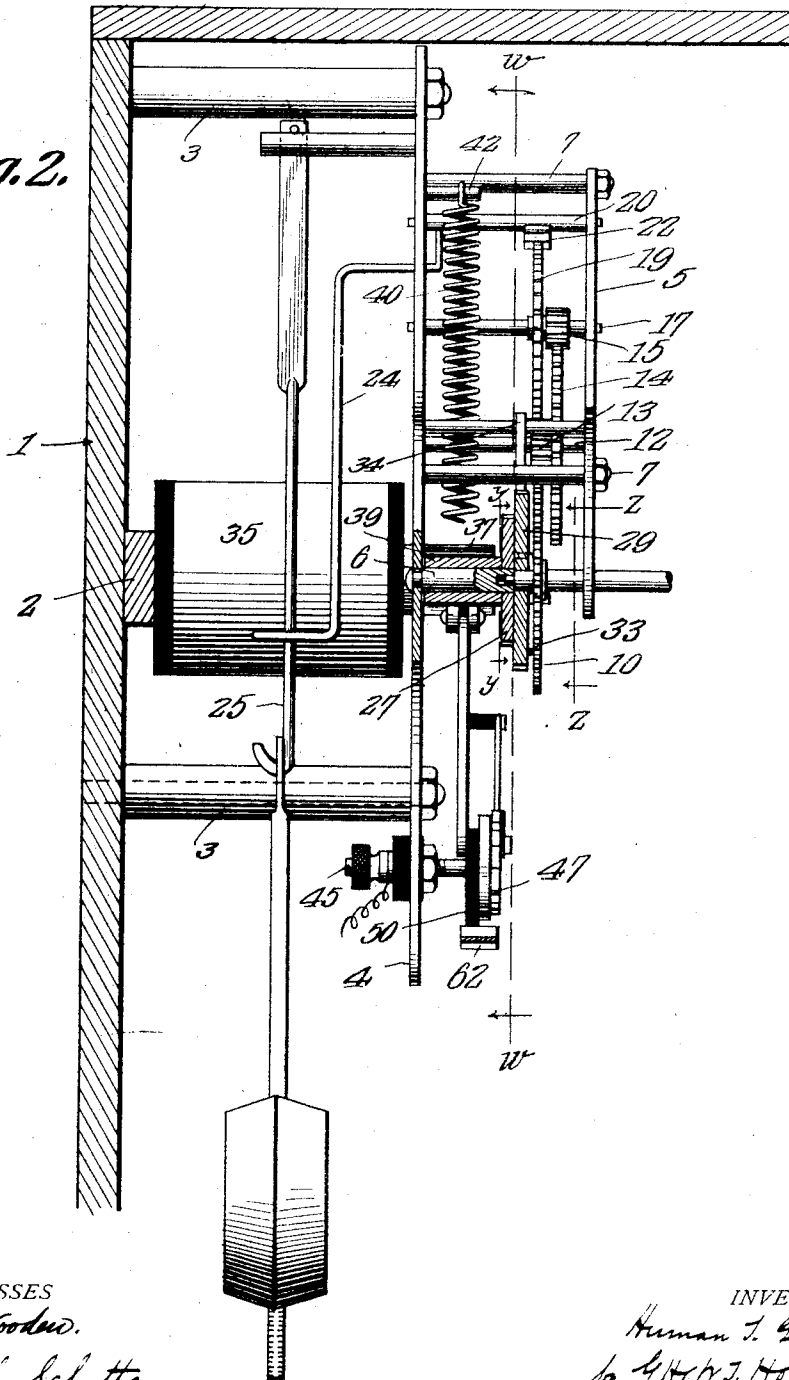
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4 SHEETS-SHEET 2.

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Fig. 2.



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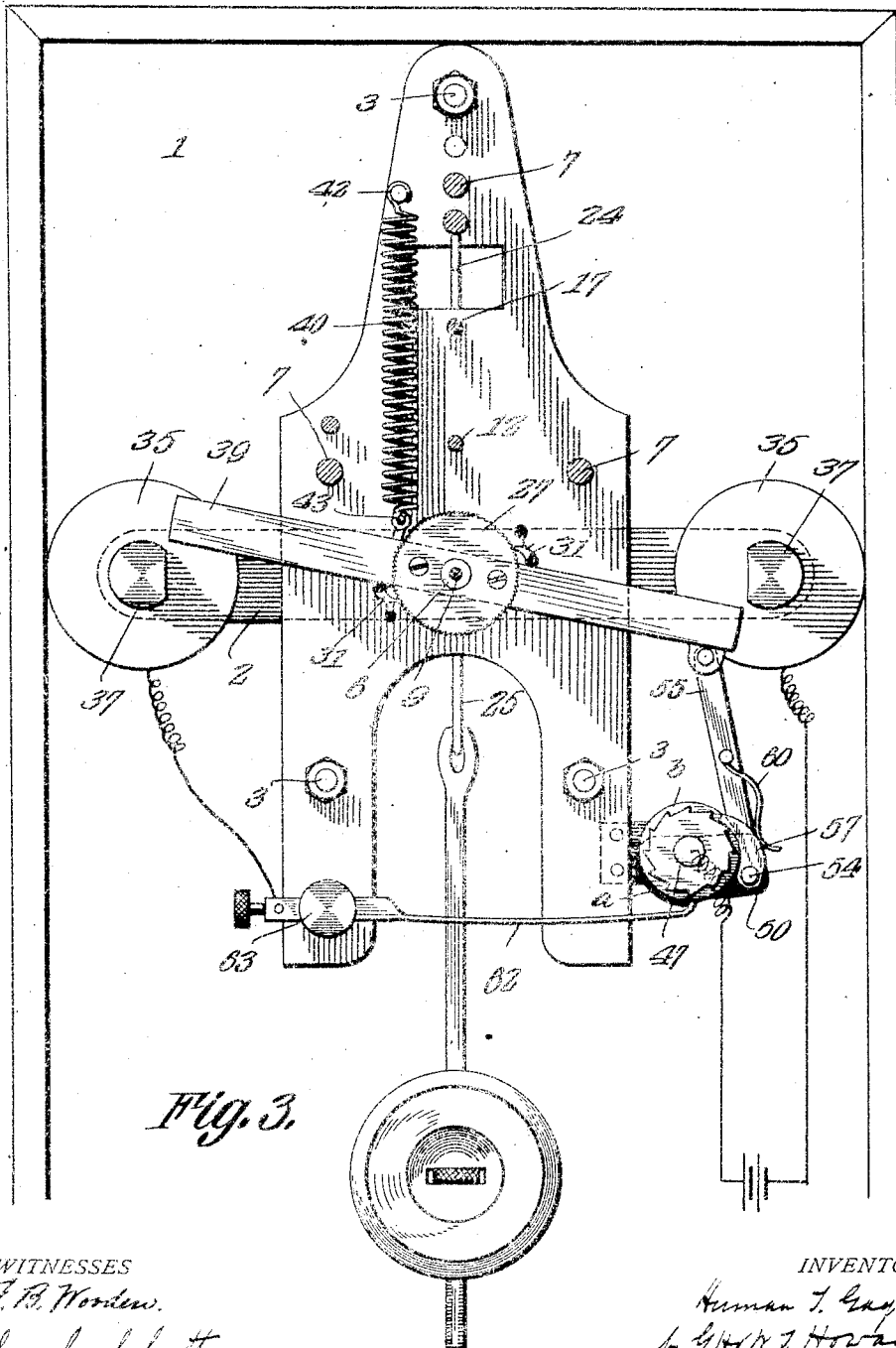
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ELECTRIC CLOCK.

APPLICATION FILED MAR. 14, 1912.

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4 SHEETS-SHEET 3.



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1,041,771.

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4 SHEETS—SHEET 4.

Fig. 4.

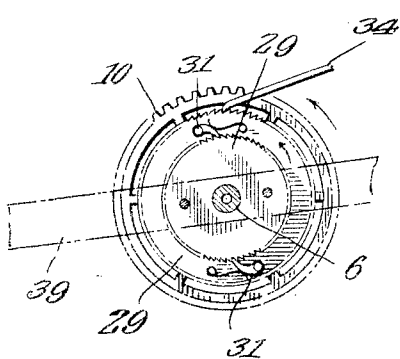
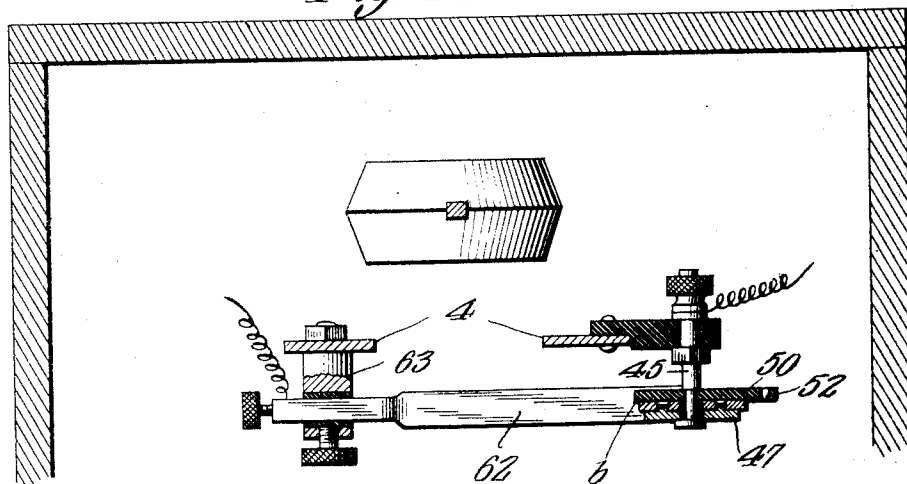


Fig. 5.

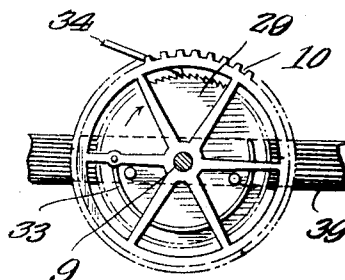


Fig. 6.

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UNITED STATES PATENT OFFICE.

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ELECTRIC CLOCK.

1,041,771.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed March 14, 1912. Serial No. 683,687.

To all whom it may concern:

Be it known that I, HERMAN T. GAY, of the city of Baltimore and State of Maryland, have invented certain Improvements in Electric Clocks, of which the following is a specification.

In the description of the present 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 electric clock as are involved in the present invention; and Fig. 2 a sectional side or edge view of the same taken on the broken line *v* in Fig. 1. Fig. 3 is a section taken on the broken line *w* in Fig. 2. Fig. 4 is a section taken on the broken line *x* in Fig. 1. Fig. 5 is a section taken on the broken line *y* in Fig. 2; and Fig. 6 a section taken on the broken line *z* in Fig. 2.

Referring now to the drawings, 1 represents a part of the clock casing to the rear wall of which is fastened the cross bar 2 which carries and electrically unites the cores of certain electromagnets hereinafter described.

3, 3 are studs which extend forward from the rear wall of the casing 1 and sustain the rear plate 4 of the clock movement.

5 is the front plate of the clock movement, supported by the posts 7 which extend from the rear plate 4.

9 is the minute arbor journaled in the end of a stud 6 riveted in the plate 4, and also in the plate 5, as best shown in Fig. 2, and to which the minute hand (not shown) is secured. The arbor 9 carries the tight main or first gear wheel 10.

12 is a second arbor having the pinion 13 which is in mesh with the gear wheel 10 and is driven by it. On the second arbor 12 is also the gear wheel 14 which is in mesh with the pinion 15 on the arbor 17 which carries the escapement wheel 19.

20 is the escapement spindle to which the anchor 22 (shown only in Fig. 2) is secured. To the escapement spindle is fastened the leading rod 24 which in the vibratory motion of the spindle 22, communicates movement to the pendulum bar 25.

The elements of the clock thus far de-

scribed are in common use and therefore in themselves embody no invention.

27 is a ratchet wheel which is loose on the stud 6, with its outer face in contact with a second and larger ratchet wheel 29 which is loose on the first or minute arbor 9.

Motion is communicated from the first to the second ratchet wheel by means of the spring-held pawls 31 (see Fig. 5), and from the second ratchet wheel 29 to the minute gear wheel 10 by means of a curved spring 33 the ends of which are inserted in those parts, as shown in Figs. 1, 2 and 6. The object of the spring connection is to continue the running of the clock, during an interval of time that the motive devices hereinafter described are inoperative. A backward rotation of the ratchet wheel 29 is prevented by the pawl 34. The employment of a curved spring similar to the one 33 for the purpose described, is old in clocks, and I claim no invention therein.

35, 35 are magnets with the center of their cores 37 in horizontal alinement with the center of the minute arbor 9; and 39 is an armature in the form of a rocker which is placed loosely on the stud 6, and made fast to the ratchet wheel 27 by means of screws, as shown in Figs. 3 and 5.

The tendency of the electromagnets when energized, is to retain the armature (rocker) in a horizontal position, or with its ends practically in contact with their cores, as shown in Fig. 1; and when the electric circuit is broken the rocker offers no resistance to vibration.

40 is a coiled spring one end of which is attached to the plate 4 at 42, and the other end to the rocker at 43, as best shown in Fig. 3 of the drawings. The function of the coiled spring 40 is to draw the armature 3, when the electric circuit is broken, into the inclined position shown in Fig. 3, and in reaching this position, the ratchet wheel is rotated in the direction indicated by the curved arrow in Fig. 5, through the agency of the spring held pawls 31 which are pivoted to the ratchet wheel 29 as shown in Fig. 5, and also illustrated in Fig. 3 except that in the latter figure the larger ratchet wheel 29 is removed.

From the foregoing description it will be understood that the operation of the clock is produced primarily by the spring 40; and that the function of the armature 39 is to re-
 5 extend the spring after its contraction, and place it in a condition that it will again serve as a motor.

45 is an insulated stud projecting from the plate 4, upon which is adapted to rotate freely the flanged ratchet wheel 47; and at the rear side of the said ratchet wheel, and loose upon the said stud, is an arm 50 formed of some insulating material such for instance as hard rubber, having a
 10 curved slot 52 near its end, as best shown in Figs. 1 and 3.

Within the slot, and free to slide longitudinally thereof, is an insulating pin 54 projecting laterally from a link 55 which is pivoted to the inner side of the rocker 39, and near one end thereof. Upon the pin 54 is a loose pawl 57 the point of which engages the teeth of the ratchet wheel 47. A spring 60 on the link 55 serves to keep the pawl 57 in engagement with the ratchet teeth of the ratchet wheel for a purpose hereinafter described. A portion *a* of the hard rubber arm 50 extends beyond and is concentric with the circumference of the flange *b* which as before stated, is a part of the ratchet wheel 47.
 20 62 is a spring arm fastened by means of the insulated stud 63 to the rear plate 4, the end of which is turned upward and bears with a slight pressure upon either the flange *b* of the ratchet wheel 47, or the part
 25 *a* of the arm 50 which as before stated is of insulating material. In Fig. 1 it is shown as bearing upon the latter.

Supposing the various parts of the clock movement to be in the positions indicated in Fig. 1, in which the end of the spring arm 62 is shown as resting upon the part *a* of the hard rubber arm 50, the electric circuit is open, and the magnets not energized, the
 30 armature 39 is not held in the position shown, but instead, is free to vibrate. Upon the pendulum being swung to one side to start the clock, the contraction of the coiled spring 40 causes the armature to gradually reach the position shown in Fig. 3, and during its motion, the operation of the clock movement is continued through the medium of the gearing described.

Upon the armature reaching the oblique position shown in Fig. 3, the pin 54 strikes the bottom of the slot 52, and the arm 50 is thereby thrown down, and causes the part *a* of the arm 50 to move around and from under the end of the spring arm 62, where-
 35 upon the end of the spring arm will bear upon the metallic flange *b* of the ratchet wheel 47, and the electric circuit is thereby closed. The armature is then returned to its original position, or that shown in Fig. 1, when the electric circuit is again broken by

the pin 54 striking the upper end of the slot 52, and the operation of the clock as above described is repeated.

It will be understood that each time the armature is brought to the horizontal position shown in Fig. 1, the flange *b* of the ratchet wheel 47 is moved circumferentially a distance equal to the pitch of the ratchet teeth, and the flange thereby presents a different surface to be drawn across by the end
 40 of the spring arm 62, thus reducing to a large extent, oxidation of the points of contact due to sparking.

I have shown and described two spaced electromagnets, the cores of which are on the same horizontal plane as the minute arbor, a vibratory armature which when in a horizontal position, is in alinement with the cores of the said magnets, and a spring connected to the armature, whose function
 45 when the magnets are not energized, is to throw the armature into an inclined position, with one of its ends above, and the other end below a core; and in this operation, through the medium of suitable gearing, the running of the clock is effected; but it is evident that while the two magnets arranged as described are preferred for the reason that endwise movement of the armature toward the cores of the magnets is then
 50 equalized, the magnet to the left in Fig. 3, could be dispensed with, and the one to the right, only employed; and I therefore do not limit myself to the employment of two electromagnets, but use them in the belief that better results will be attained thereby.

I claim as my invention:

1. In combination with the vibratory armature of an electric clock, a magnet, a stud having a rotary disk with ratchet teeth thereon and also a loose vibratory arm of insulating material with a portion thereof practically concentric with the disk and projecting beyond the circumference of the same, a spring held arm with its free end adapted to rest alternately on the disk and the projecting portion of the insulating material, the said spring arm, disk and magnet being in an electric circuit, and a link which communicates motion from the armature
 55 to the vibratory arm, and is provided with a pawl in engagement with the ratchet teeth of the disk to effect the vibratory motion of the insulating arm from the armature, and thereby produce an intermittent rotary motion of the disk, the object of the devices described being to present a different point of contact to the end of the spring arm at each vibration of the armature, substantially as, and for the purpose
 60 specified.

2. In an electric clock, a stud, a metallic disk electrically connected with the stud and adapted to turn thereupon, an arm of insulating material adapted for vibration on
 65

the stud, the said arm having a portion which projects beyond the circumference of the disk, a spring arm the point of which is adapted to bear alternately on the metallic disk and the said arm, the stud and spring arm being in an electric circuit, and pawl and ratchet mechanism to produce an

intermittent rotation of the said disk and thereby alternately open and close the electric circuit, substantially as specified.

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