

VOID : SEALING FEE NOT PAID.

N° 25,977



A.D. 1913

(Under International Convention.)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in France), } 21st Nov., 1912

Date of Application (in the United Kingdom), 12th Nov., 1913

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 3rd Sept., 1914

COMPLETE SPECIFICATION.

Improvements in Electrically Operated Clock Mechanism.

I, EUGÈNE CHARLES CLERC, of 103, rue de Ménilmontant, Paris, France, Clock-maker, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This invention relates to improvements in electrically operated clock mechanism of the kind wherein an electro-motor is used to actuate the winding and striking trains.

According to the invention the motor in rotating in one direction actuates the driving mechanism and the hour striking mechanism and in rotating in the other
10 direction actuates the quarter hour striking mechanism, a chime or the like.

The improved mechanism is arranged to operate with an extremely small amount of current, which allows of employing a battery of very reduced size capable of being housed in the clock case itself (mantel-piece or other clock).

In the annexed drawings given by way of example,

15 Figure 1 is a front view of the mechanism arranged according to the invention.

Figure 2 is a vertical section seen from the back.

Figure 3 is a development of the periphery of a drum.

Figure 4 is a detail view seen from the back.

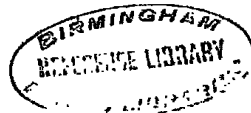
Figure 5 is a plan view, certain parts being omitted.

20 The winding of the mechanism is effected by an electric motor of which the armature 1 rotates by means of its shaft 2, in the supports 3, 4, in the field magnet 5, (Figure 2) which is formed by a permanent magnet fixed on the plate 6 of the mechanism.

The support 4 is fixed to the magnet 5 by means of two diametrically opposite
25 bolts 7 on which are engaged insulated split sleeves 8 to which the current from a battery is conducted by the wires 9 and 10.

The sleeves 8 are provided with brushes 11 which rub on the armature commutator.

[Price 8d.]



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The shaft 2 of the armature carries a worm 14 which gears with a worm wheel 50 (Figures 2 and 5) keyed on a shaft 51. This wheel is connected by a clutch 50^a, 53^a (Figure 5) to a pinion 53 which is in constant gear with a pin wheel 15 and is freely mounted on the shaft 51.

On this shaft is freely mounted a second pinion 54 which is in constant gear with the teeth 55 of a drum 56. The pinion 54 can be connected by a clutch 57 with a sleeve 58 keyed on the shaft 51. A spiral spring 59 wound on the shaft 51 tends to maintain the two clutches in engagement. The clutch 50^a, 53^a, is arranged in such a manner that the pinion 53 is only driven by the wheel 50 when the shaft 51 rotates in one direction, whilst the clutch 57, 58 is arranged so that the wheel 55 is only driven by the pinion 54 when the shaft 51 rotates in the opposite direction. In this manner when the electric motor rotates in one direction it operates the movement of the clock also the striking of the hours by the wheel 15 whilst when it turns in the other direction it rotates the drum 56 to operate the chimes or other quarter hour striking mechanism. The wheel work is such that the drum 56 makes one rotation per hour.

If, for example, the clock comprises a chime of four notes, which should sound the quarters, the drum 56 is provided on its periphery (Figure 3) with a series of four pins 60 for the first quarter, then at an angular distance of 90° with two successive similar series of four pins which will sound the half hour, then at a further distance of 90° with three series of four pins to strike the three quarters and finally at a further distance of 90° with four series of four pins which sound the four quarters before the hour. After each of the three first series of pins or at other suitable points the drum 56 carries on its periphery a supplementary pin 61. On one of its faces it carries also a pin 62.

This pin 62 operates the current reversing switch in the following manner. It can at every hour lift an arm 63 (Figure 4) carried by a shaft 64 on which is fixed another arm 65 carrying two parallel insulated contact fingers or springs 66, 67. The finger 66 is connected by its upper extremity to an insulated block 68 (Figure 1) and the finger 67 to one of the poles of the battery. In the position shown in Figure 4 these fingers are in contact respectively with two blocks 69, 70. The block 69 is connected by the wire 9 to one of the brushes of the motor and the block 70 is connected by the wire 10 both to a third block 71 situated at the left of block 69 and to the other brush of the motor. The other pole of the battery is connected to the metal body of the mechanism. The current is then passed through the motor in the desired direction so that the motor actuates the drum 56 operating the chime. When the switch is in the position shown in dotted lines the direction of the current is reversed, the motor turns in the reverse direction and consequently actuates the winding mechanism as well as the hour bell. The reversing switch is brought to the position shown in full lines by a pin 72 (Figure 1) which is carried by the wheel 43 and which can push back a lever 73 keyed on the shaft 64. The wheel 43 is fixed to the shaft of the minute hand and makes one revolution in an hour.

The wheel 15 is provided on one of its faces with uniformly spaced pins 16. This wheel 15 actuates the clock mechanism by means of a spiral spring 17 with numerous coils, the one end of which is connected to the wheel 15 and the other to a pinion 18 which is free on its shaft and operates the wheel-work actuating the clock hands in the usual manner. The driving of the pinion 18 by the spring is effected by means of a friction member in such a way that the spring can never be too tensioned.

During its periods of operation the motor stores up in the spring 17 sufficient energy to assure the working of the clock for an hour.

The motor actuates the striking mechanism in the following manner; the pins 16 of the wheel 15, when the latter rotates, lifts an arm 19 (Figures 2 and 5) secured to the shaft 20 of the hammer 21 so that the latter when lifted falls and strikes the gong 22. When the striking mechanism is to operate, the angle piece or detent 23 (Fig. 1) which is no longer supported by one of the four pins 25^a of the pinion 24 is drawn by a coiled spring 74 which connects the

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detent 23 to the lever 29. By this movement a pawl 27 pivoted to the end of the detent 23 pushes back a pin 28 carried by the lever 29 and this lever in its movement pushes back the pawl 38 so that the rack 30 is disengaged and falls to a position corresponding to the number of strokes to be made and determined
5 by the snail 32 against which the arm or bar 33 of the rack abuts.

Each downward stroke of the hammer makes the rack 30 rise one tooth, under the combined action of the lever 29 and the pawl 38 which is pivoted at 39 on a spring 77 fixed at 77" to the plate 6 and the end of which engages under the curved end of an arm 41 fixed on the hammer shaft 20. Another arm 42 which
10 is also carried by this shaft and traverses a curved slot in the plate 6 can lift the pawl 27 of the detent.

On the minute wheel 43 is fixed a disk 76 which is provided with a notch 76^a and normally supports the rack 30 by its finger 45 whilst allowing it to fall and sound the hours.

15 The flow and interruption of the current are effected by the lever 29. For this purpose it is provided with a conductor finger 75, which, similarly to the lever 29, is earthed and interrupts the current in the position indicated in Figure 1 or closes the circuit by meeting the insulated block 68 as indicated in dotted lines.

The operation is as follows:—In the position shown the current is cut off by
20 the arm 75 of the lever 29 and the switch occupies the desired position so that the motor actuates the drum 56. If for example it is four o'clock the detent 23 escapes from one of the pins 25^a and under the action of spring 74 pushes back the pin 28 of the lever 29 and consequently the lever 29 itself so that the arm 75 takes the position shown in dotted lines and closes the circuit. At the same time
25 the rack falls on the snail, its finger 45 falling in the notch of disk 76. By reason of the position of the switch 66, 67, the drum 56 turns and operates in the known manner, by its four series of pins 60 on the chimes not shown, which consequently sound four times. Then the pin 62 (Figure 4) lifts the arm 63 which actuates the reversing switch, the current is then directed in the contrary
30 direction through the motor, which stops and starts again in the opposite direction. At this moment the wheel 15 rotates and actuates the hammer 21. The hammer in rising lifts the pawl 27 in the known manner by the finger 42 which frees the lever 29 and allows it to engage in the teeth of the rack (whilst resting on the block 68). The hammer sounds the hours in proportion as the
35 rack 30 rises. At the same time the spiral spring 17 (Figure 5) is tensioned so that the movement is wound up. When the rack is completely lifted the lever 29 is moved to the right by the spring 74 so that the current is interrupted. The movement continuing, the pin 72 carried by the wheel 43 of the minute hand at the end of some minutes pushes back the lever 73 which actuates the switch and
40 brings it back to the position shown in full lines. At the end of a quarter of an hour the detent 23 is again released, the pawl 27 which has in the meantime been set again, will push back the lever 29 towards the left but the rack will be retained by the periphery of the disk 76 and will not fall. The drum 56 is actuated and the chimes sound the quarter, whereupon the pin 61 of this drum
45 will effect the lifting of the pawl 27 by acting on an arm 20^a (Figure 5) of the hammer shaft 20 so that the lever 29 will return to the position in full lines to break the circuit and so on.

Owing to the demultiplication obtained between the worm of the motor shaft and the wheel 15, the motor always has the necessary power to properly actuate
50 the hammer.

The magnetic motor described works at 3 volts at a load of 0.05 amperes, it is brought into operation for an average period of only sixteen seconds once in every hour so that even with a battery of very small size, capable of being housed in the clock case itself, the operation of the clock for a very long time is assured.

55 The invention is naturally not limited to the details represented and described. A small spring could be provided if required to brake the wheel 15.

Clerc's Improvements in Electrically Operated Clock Mechanism.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. Electrically operated clock mechanism wherein the motor in rotating in one direction actuates the driving mechanism and the hour striking mechanism and in rotating in the other direction actuates the quarter hour striking mechanism such as a chime or the like. 5
2. Clock mechanism as in Claim 1, wherein a shaft on which is keyed a wheel actuated by a worm is provided with clutch members held respectively in engagement by means of a coil spring, with clutch members integral with pinions which respectively actuate the driving mechanism and hour striking mechanism and the quarter hour striking mechanism, the clutch members having their teeth conveniently directed so that the one or the other operates when the aforesaid shaft rotates in the one or other direction. 10
3. Clock mechanism as in Claim 1, characterized by a reversing switch which normally conducts the motor current in such direction that the motor actuates the quarter hour striking mechanism or chime when the circuit is closed, whereupon the said switch is conducted by the wheel which operates this striking mechanism and after the operation of the same, to the reverse position and after the current is broken is brought to the initial position by the minute wheel of the clock, which makes one revolution per hour. 15 20
4. Clock mechanism as in Claims 1 and 3, wherein a detent governing the striking mechanism is connected by a coil spring to a lever which cooperates with a rack substantially as described.
5. Clock mechanism as in Claims 1, 3 and 4, characterized by the minute wheel which makes one revolution per hour being joined to a disk which has a notch so as to normally sustain the rack whilst allowing it to fall to sound the hours. 25

Dated this 12th day of November, 1913.

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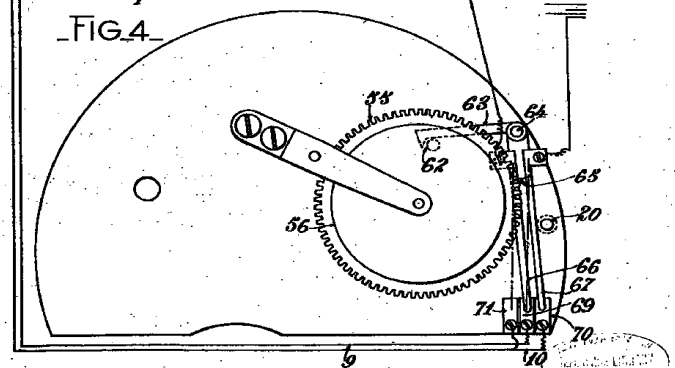
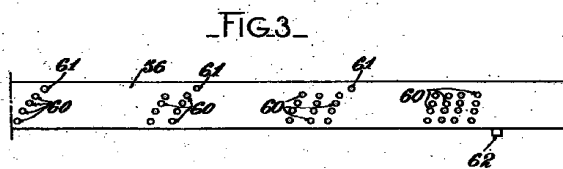
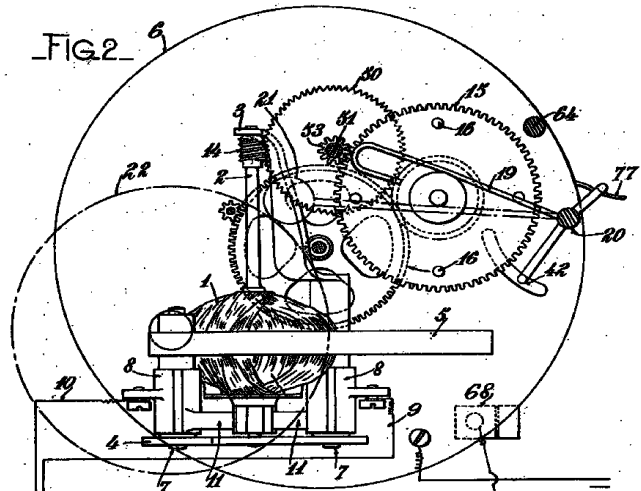
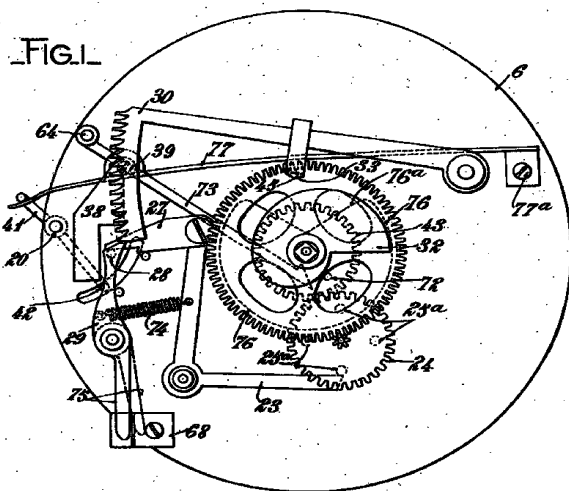


FIG. 1

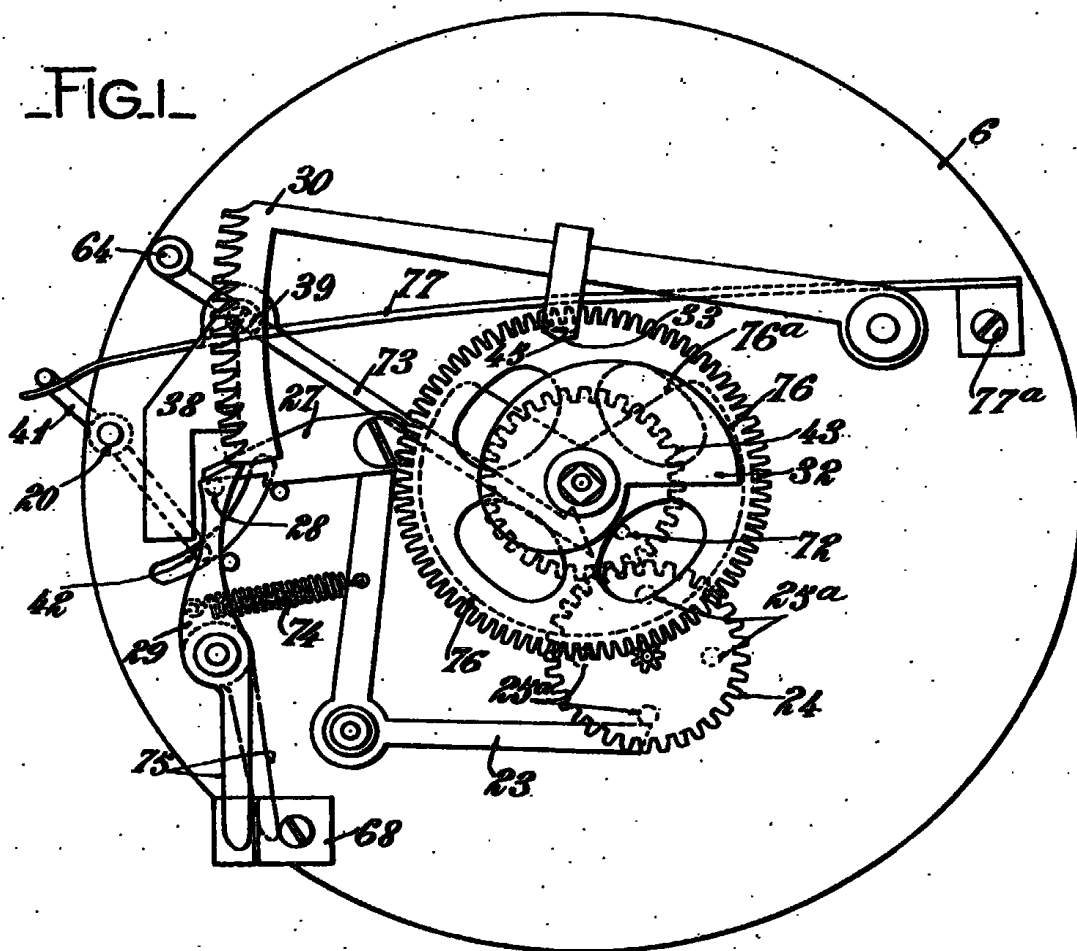
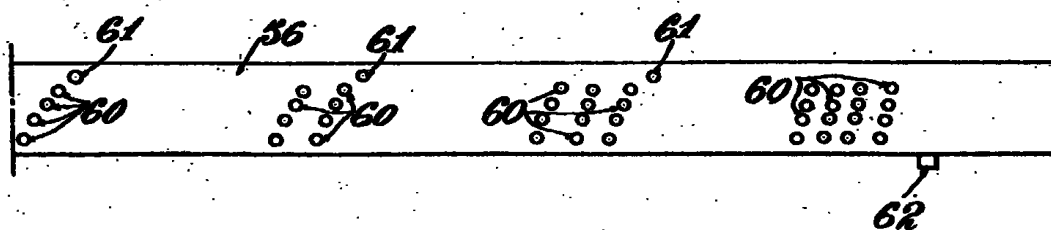


FIG. 3



[This Drawing is a reproduction of the Original on a reduced scale.]

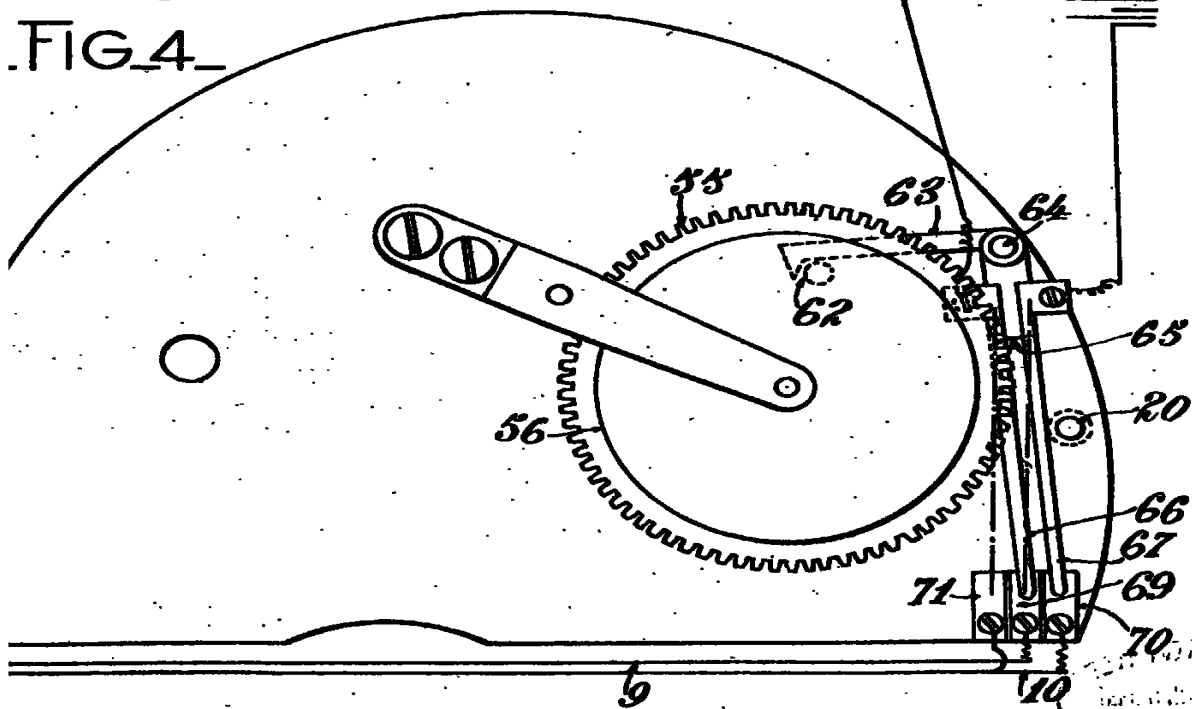
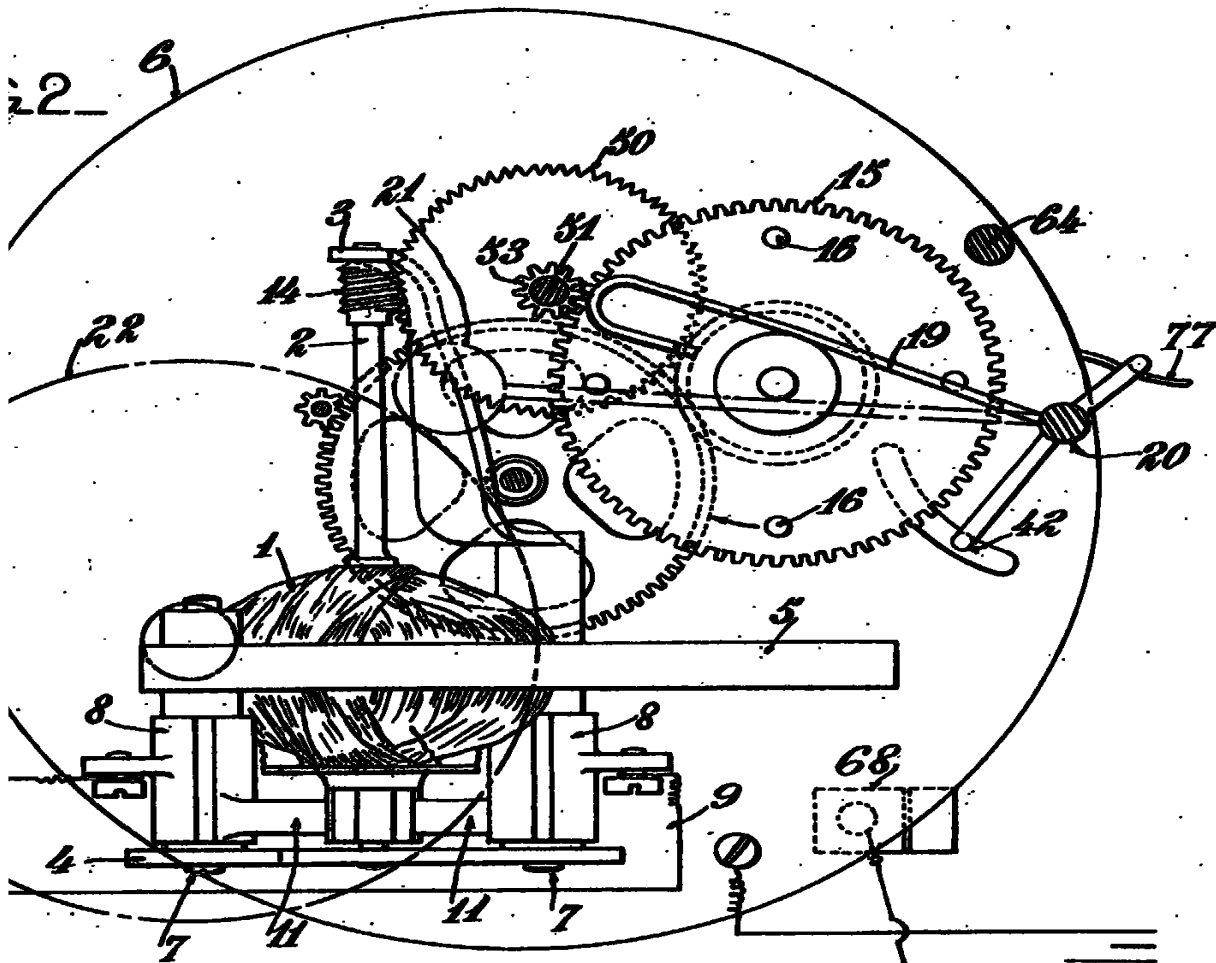
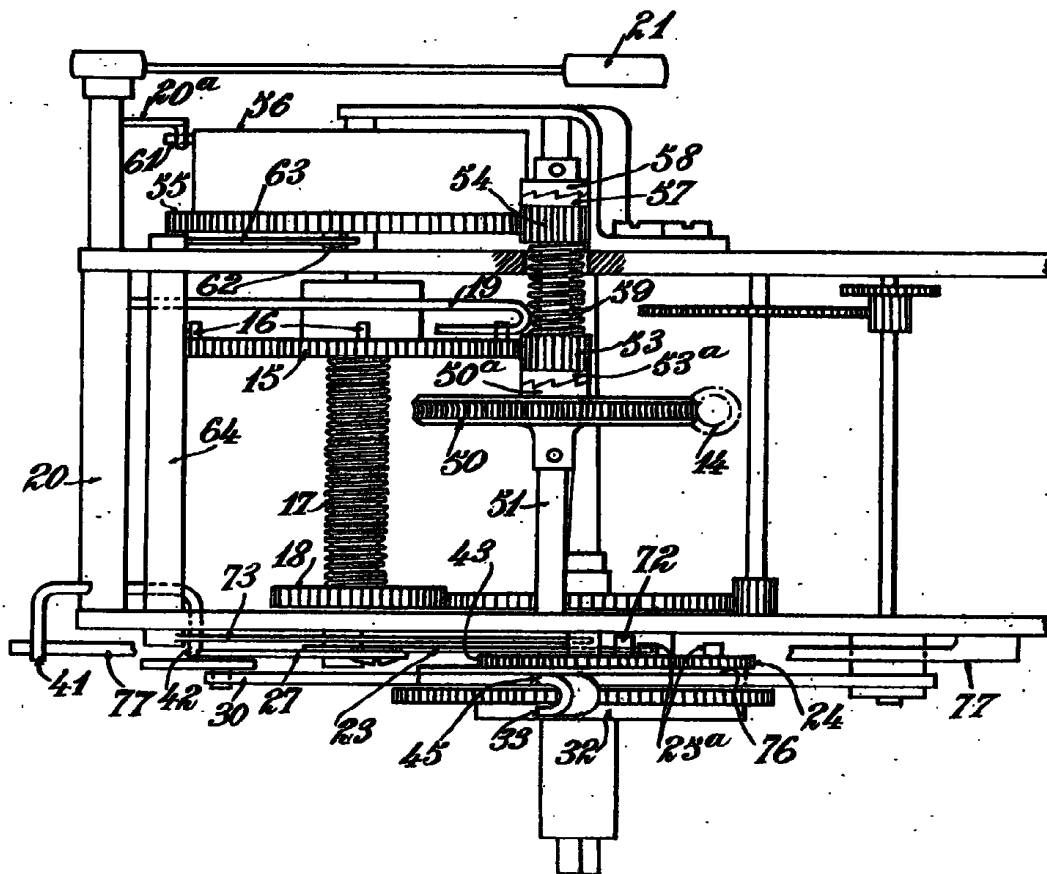


FIG. 5.



[This Drawing is a reproduction of the Original on a reduced scale.]

