N° 10,541 A.D. 1902

Date of Application, 7th May, 1902—Accepted, 18th Dec., 1902

COMPLETE SPECIFICATION.

"Improvements in and relating to Electric Clocks and Indicating Dial Mechanism for Use in connection therewith".

I, WILLIAM EDGAR PALMER, Watchmaker to the South Eastern and Chatham Railways, of Tonbridge, Kent, 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:—

My invention consists in improvements in electric clocks, and indicating dial mechanism therefor.

The object of my invention is to provide a simple and accurate time-keeper maintained by an electric current, and it comprises an improvement in the construction of the recording dials, whereby the hands and wheelwork are always locked whether working or at rest. It also comprises an improved contact maker.

In my invention the pendulum receives impulse by means of a device which is brought into action by the pendulum itself, and the pendulum by this means records its impulses.

I will describe my invention with reference to the accompanying drawings, in which,

Fig. 1 is an elevation of part of my invention comprising the electric regulator or controller, shewing the gravity impulse arm (hereinafter described) in its position of rest, the contact for setting up the circuit through the electro-magnets being broken.

Fig. 2 is a part view of Fig. 1 shewing the gravity impulse arm freed from its position of rest and in a position in which contact is made to complete the electric circuit

Fig. 3 is an elevation of the recording dial mechanism operated or controlled by the current set up by the regulator or controller Fig. 1.

Fig. 4 shows an alternative form of recording dial mechanism to that shown in Fig. 3.

The same numbers indicate the same or equivalent parts in the different figures of the drawings.

Referring to Figs. 1 and 2, 1 is a pendulum rod, 2 is a pawl, pivoted on to the pendulum, for engaging the teeth of the wheel 3. 3 is a ratchet wheel propelled by the pawl 2 one tooth at each swing of the pendulum. 4 is a back stop click for the wheel 3. 5 is a lifting pin fixed in the rim of the wheel 3. 6 is an arm pivoted at its centre and provided with a catch 6^a for supporting what I call a gravity impulse arm 7. 8 is a straight spring fixed on the plate 9, (or on the supporting framework on which the various parts are mounted) for throwing back the arm 6 to the position for holding up arm 7 as shown in Fig. 1. 10 is a catch pin secured in the gravity impulse arm. 7 is the gravity impulse arm pivoted at 8^a and having secured to it the impulse pin 11, the releasing screw 12 the contact plate 16 and the catch pin 10. 11 is the impulse pin, with a friction roller, which engages with the pendulum and conveys the impulse. 12 is a releasing screw or pin travelling with the impulse arm 7 and coming into con-

[*Price 8d.*]

tact with a spring or gravity catch 13 which it pushes out and releases the spring 14. 15 is an adjusting stop or screw to limit the fall of the gravity impulse arm 7. 16 is a contact plate, fixed by a screw and steady pin from the back to the gravity impulse arm 7 and faced with platinum, making one end of an electric circuit; it is placed at such an angle that when the gravity arm 7 is thrown up so that its projection 10 gets above the catch 6^a the end 16^a of said contact plate pushes the spring 14 away thereby separating the contact pin 17 from the contact plate 16 and breaking the circuit. The spring 14 carries the contact pin 17, which is tipped with platinum, making the other end to the circuit. Pin 17 travels with the spring 14 and when it comes in contact with plate 16 the circuit is closed. The catch 13 for holding the spring 14 in position shown in Fig. 1 (contact between 16 and 17 being broken) is pivoted at 13^a and it is pushed outwards by the releasing screw 12 and the contact spring 14 escapes when the gravity arm 7 has almost reached the stop screw 15. 18 is an electro magnet. 19 is an armature pivoted at 20, which, when attracted by magnets 18 lifts the gravity impulse arm into engagement with its catch 6^a. 21 is a projection on arm 7 on which armature 19 acts as hereinafter described. 22 is a banking pin or stop for the pawl 2.

The several parts above described are mounted on the plate or framework 9 in any convenient manner so as to operate as described.

Referring now to Figs. 3 and 4 which illustrate the recording dial mechanism, 23 is a plate or framework on which the mechanism is mounted, the recording or clock dial and hands being on the opposite side of said plate to that shown.

24 is an electro-magnet, 25 its armature with an arm 26 extending under a wheel 27 said arm 26 having a slot 28 (shown partly in dotted lines) at its end. 29 is a pin fixed in a disc 30 and working in the slot of the arm 26. The disc 30 is mounted firmly on an arbor 31 rotatably mounted in plate 23 and bracket 32, said disc carrying a gathering pawl, and being oscillated through the pin 29 and arm 26 as hereinafter described. 33 is the gathering pawl on disc 30 which pawl gears in the wheel 27 and takes up one tooth at a time. The arbor 31 intersects the teeth of the wheel 27 and locks said wheel. Arbor 31 has a notch 34 in it through which a tooth of the wheel 27 may escape, and said arbor is oscillated through the disc 30 which it carries. The wheel 27 has the desired number of teeth and is mounted on an arbor 35 and secured to it by a spring or friction clutch. This arbor 35 carries the minute hand and may be turned backward or forward to set the hands to time. 36 is a back stop click which allows the wheel to go forward only. 37 is a spring which throws the armature back to the position shewn in Fig. 3 and through which arm 26 communicates motion to disc 30, pawl 33, wheel 27 and the hands of the clock as will be readily understood and further described hereinafter.

In Figure 4, which illustrates an alterantive form of the recording dial mechanism the disc 30 (Fig. 3) is omitted and the pawl 33 is pivoted on arm 26. The position of the back stop click 36 is also altered, as shewn. In lieu of arbor 31 being oscillated through pin 29 on disc 30 engaging arm 26 (as in Fig. 3) a rod 38 (Fig. 4) connects arm 26 with arbor 31, for instance by means of a yoke or strap 39 of the arbor as shewn.

a is the electric battery (or other source of electricity) one end of which is connected by wire *b* to the insulated contact pin 17, *c* is a wire connecting the plate 9 (which is usually of brass or other conducting material) with electro-magnets 18; *d* is the line wire connecting the magnets 18 with the magnets 24 of as many recording dials as it is desired or possible to control or actuate through the regulator Fig. 1; this wire *d* is connected to the other end of battery *a* as shown.

The working of my invention is as follows:—

The pendulum 1 is started swinging and (referring to Figs. 1 and 2) at each movement to the right the pawl 2 engages a tooth of wheel 3 and moves said wheel round one tooth and as said wheel moves round its pin or projection 5

once in each revolution strikes against arm 6 moving it and so frees catch 6ª from projection 10 on the gravity impulse arm 7 allowing it to fall. In the movement of arm 7 its roller or pin 11 strikes the pendulum 1, thus giving it impulse, and when said arm 7 has moved to the position in which screw 12 strikes catch 13 so as to disengage it from contact spring 14 (which takes place when arm 7 has nearly reached stop screw 15) said spring is released and moves contact pin 17 into contact with plate 16 (see Fig. 2) thus sending an electric current through magnets 18 by way of wire *b*, contact pin 17, contact plate 16, impulse arm 7 and its supporting bracket, plate 9 and through wire *c* to said magnets. The magnets now attract the armature 19 which acting on projection 21 lifts the gravity arm 7 so that its projection 10 again engages catch 6ª ready for the next operation of arm 6 by pin 5 when the various parts will again operate as above described. The spring 14 presses contact pin 17 on to contact plate 16 until it is pushed away or depressed by the outside end 16ª of said plate thus breaking the circuit, and the ends of spring 14 being pressed down on the sloping head of catch 13 re-engages therewith, when the armature 19 has thrown the gravity impulse arm 7 far enough up, and spring 14 is thus held against further upward movement until catch 13 is again actuated by screw 12 as hereinbefore described.

The arrangement of the spring 14 (see Fig. 1) carrying the contact pin 17 and of the sloping contact plate 16 is such that when in action the contacting surfaces slide on one another and are thus kept clean.

The action of closing the circuit through the magnets 18, as above described, also sends a current through wire *d* to the magnets 24 (Figs. 3 and 4) of the recording dials, which attract their armatures 25. The attraction of armature 25 (referring to Fig. 3) rocks the arm or lever 26, against the action of spring 37, and this movement of lever 26 through its slot 28 engaging pin 29 oscillates or moves disc 30 round so that the gathering pawl 33 pivoted on said disc rides over and picks up one tooth of wheel 27; this movement of disc 30, and with it arbor 31, brings notch 34 in said arbor into position to receive a tooth of wheel 27. On the circuit being broken at the regulator (by the return of the gravity impulse arm 7 to its position of rest as shown in and described with reference to Figures 1 and 2) the circuit through magnets 24 (Figs. 3 and 4) is also broken and spring 37 then acts on arm 26 moving it back to the position shown in Figs. 3 and 4; through this movement of arm or lever 26 disc 30 (Fig. 3) is oscillated or turned, in the reverse direction to that previously described, and with it the arbor 31, so that the notch 34 in said arbor is brought into position to receive the next tooth and wheel 27 is moved round by pawl 33, the tooth in notch 34 moving out of said notch as the arbor is also turned and the next tooth is brought to bear against the arbor 31 as clearly shewn in Figs. 3 and 4.

By this movement of the wheel 27 the hands on the recording dial are also moved on the dial to give the desired indication.

The back stop click 36 engages the teeth of wheel 27 so as to prevent its being turned in the direction opposite to that of the arrow (Figs. 3 and 4) as previously mentioned.

The action of the modified arrangement of recording dial mechanism shewn in Fig. 4 is practically identical with that of Fig. 3 above described, the only difference being that when the armature 25 is attracted pawl 33 gives a push on the teeth of wheel 27, and arm 26 moves away from the centre of arbor 31, the connection 38 to yoke 39 by this movement oscillating said arbor. The connection of the circuit wires to the apparatus of Fig. 4 is identical to that shewn in Fig. 3.

My invention as illustrated in the drawings is intended to give an indication every half minute, but it is obvious that by providing a smaller wheel than wheel 3 (Figs. 1 and 2) or by providing two or more projections or pins 5 the indications may be more frequent, or they may be made less frequent by providing a larger wheel than 3 with only one pin.

Palmer's Improvements in and relating to Electric Clocks.

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. In electric clocks a gravity device brought into action by the pendulum for giving impulse to the pendulum and means whereby said device also acts to make and break an electric circuit for actuating or controlling the recording dial mechanism substantially as set forth with reference to the accompanying drawings.

2. In electric clocks, the combination of a pendulum, a pawl on said pendulum, a toothed wheel operated by said pawl, a projection on said wheel, an automatic catch adapted to be actuated by said projection, a gravity impulse arm adapted to be held in a position of rest by said catch, a sloping contact on said impulse arm, an insulated spring contact adapted to make contact with the sloping contact, an automatic catch adapted to retain said spring in a position in which contact is broken, adjustable means on the impulse arm for releasing said spring, an adjustable stop for adjusting the gravity movement of the impulse arm, and an electro-magnet armature adapted to move the gravity impulse arm to its position of rest, all arranged and operating substantially as described for the purposes set forth and as illustrated in the accompanying drawings.

3. In recording dial mechanism for electric clocks, an arbor or shaft arranged so as to intersect or interlock with the wheel which drives the hands, substantially as and for the purposes set forth.

4. In indicating dial mechanism, a notched arbor or its equivalent engaging the wheel which drives the hands so as to allow only one tooth to pass at a time, in combination with means for actuating said arbor and wheel substantially as described with reference to the accompanying drawings.

Dated this 7th day of May 1902.

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Agent for Applicant.

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PALMER'S Complete Specification.

(2 SHEETS)
SHEET 1.

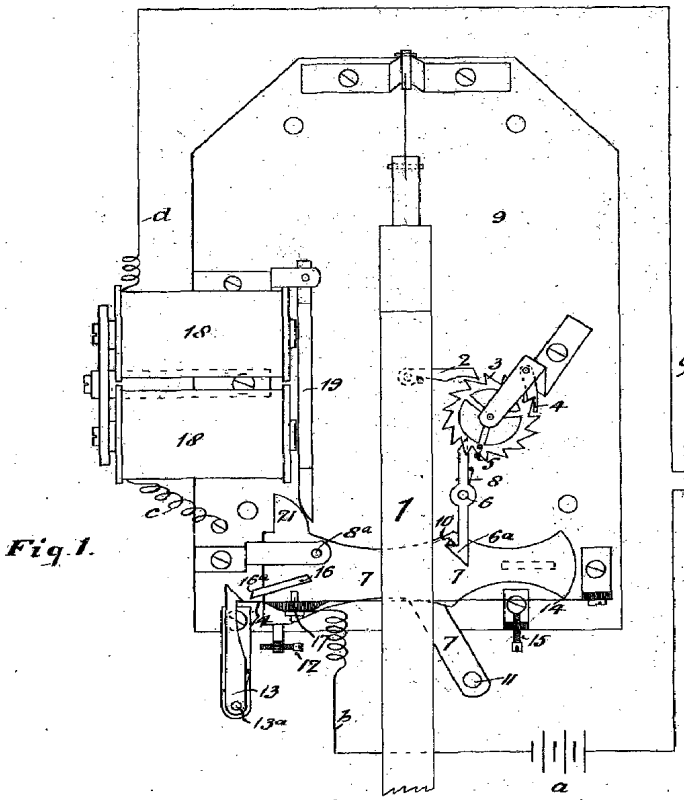

Fig. 1.

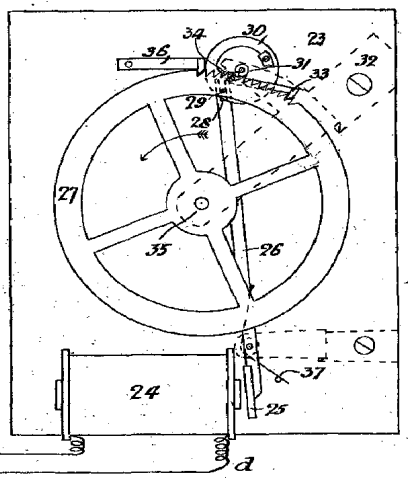

Fig 3

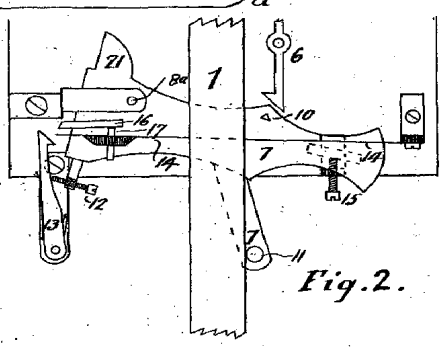

Fig. 2.

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

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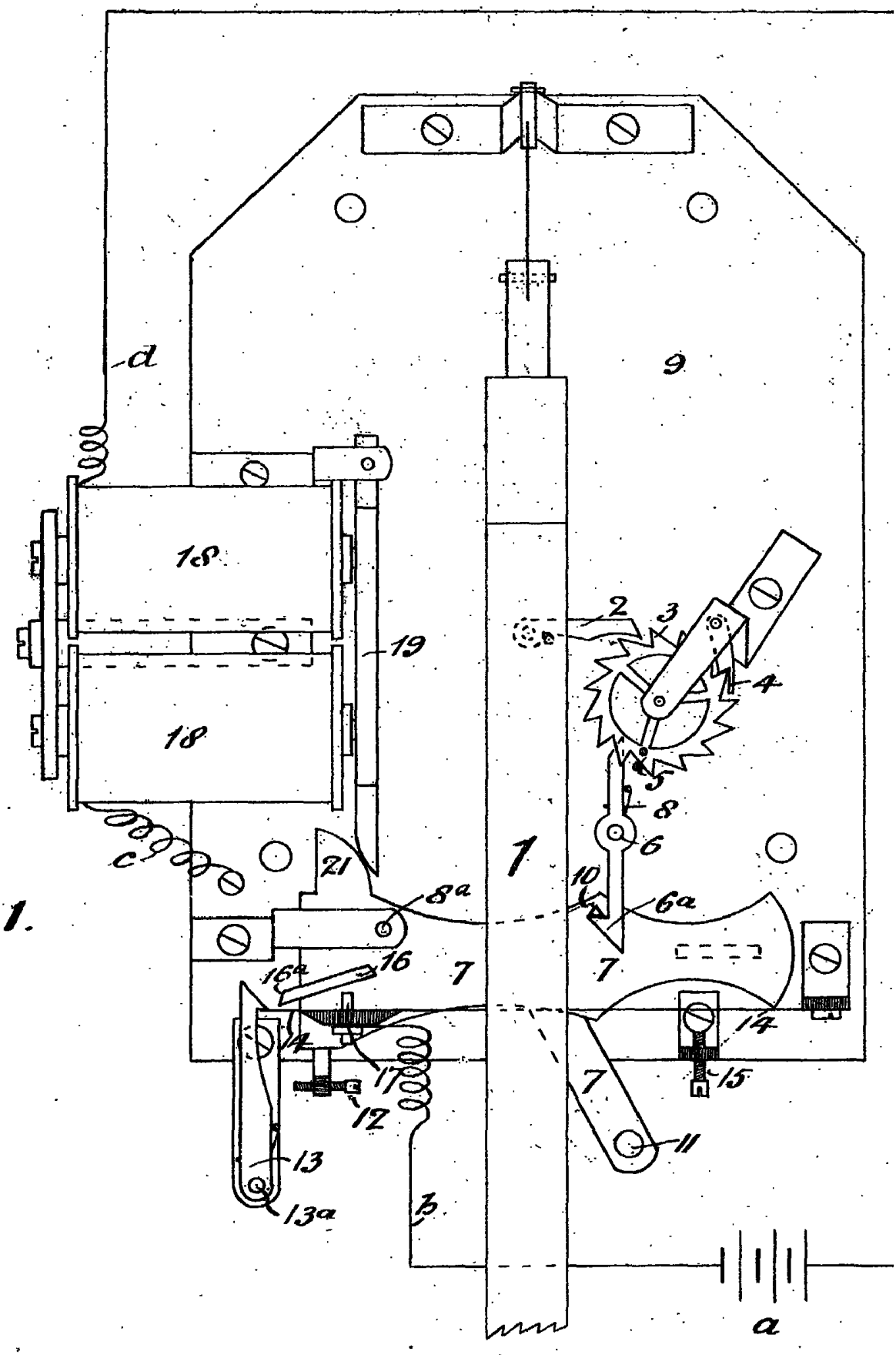


Fig. 1.

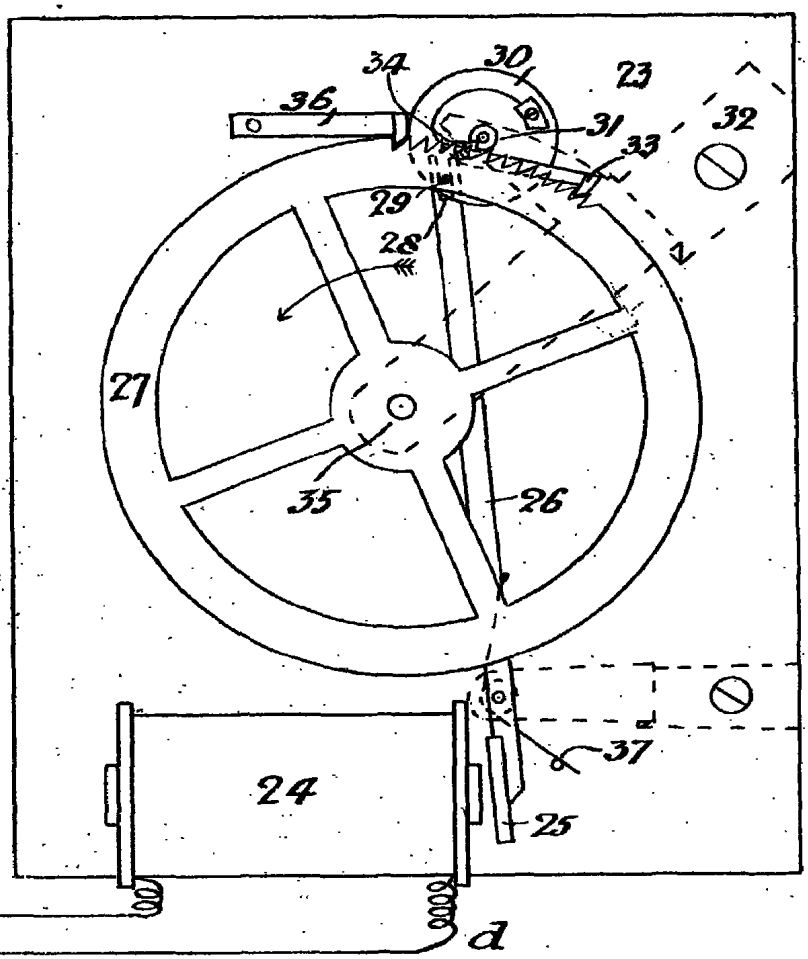


Fig 3

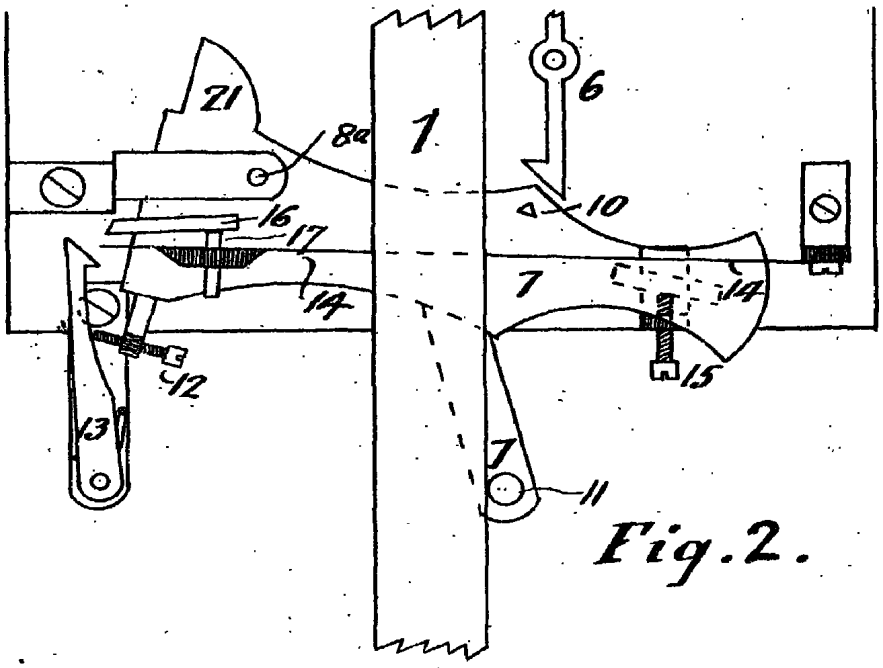
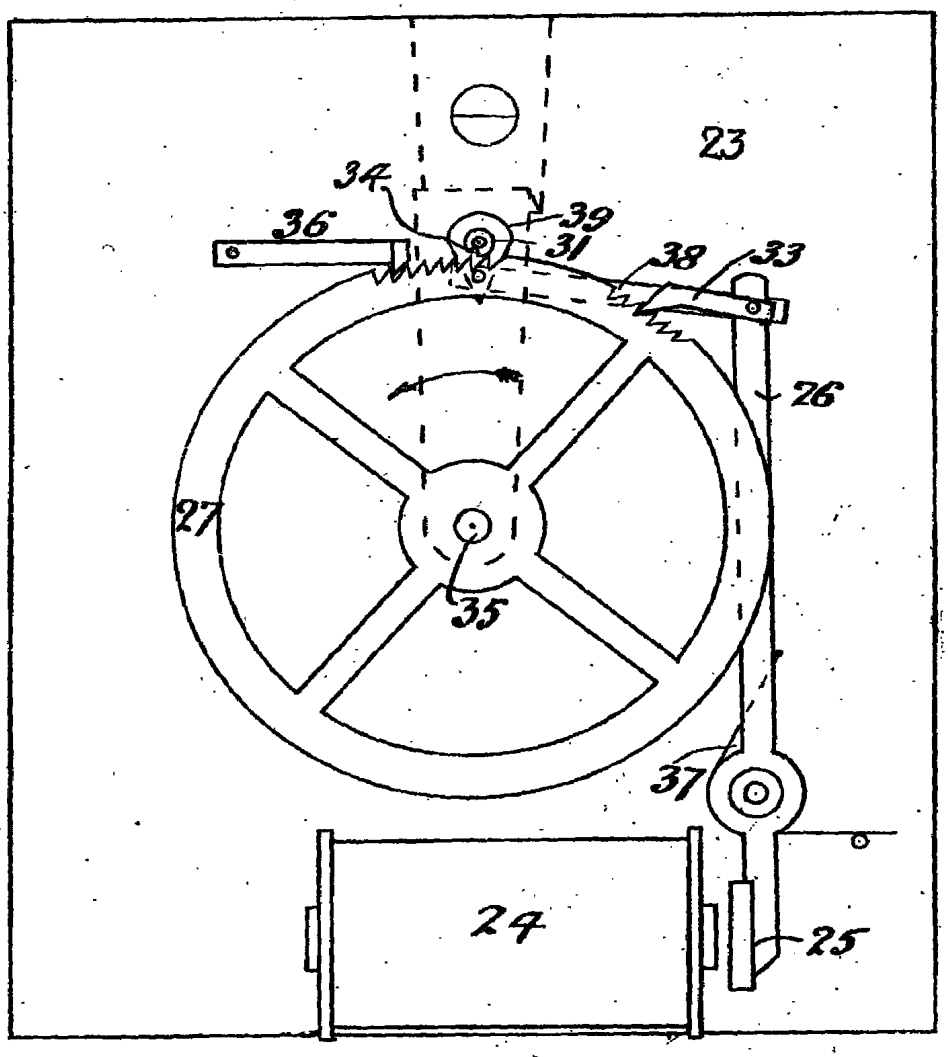


Fig. 2.

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

Malby&Sons, Photo-Litho.

Fig. 4.



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