

No. 744,741.

PATENTED NOV. 24, 1903.

G. H. FRY.  
DRIVING MECHANISM.  
APPLICATION FILED SEPT. 5, 1902.

NO MODEL.

Fig. 3.

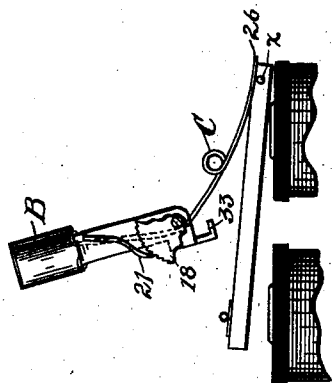


Fig. 4.

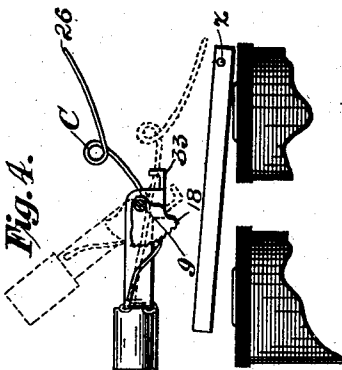


Fig. 2.

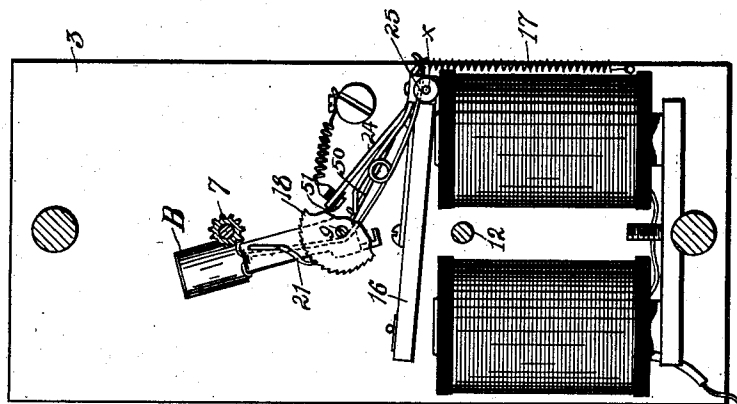
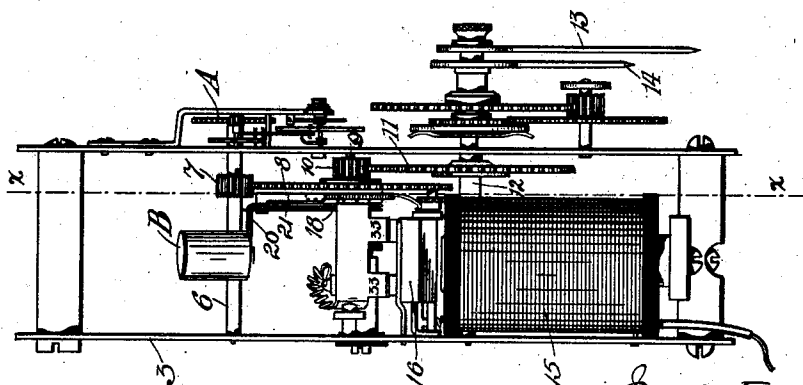


Fig. 1.



Witnesses  
Comitchee  
W. A. O'Brien, Jr.

Inventor  
George H. Fry  
by Foster Freeman  
Attorneys.

# UNITED STATES PATENT OFFICE.

GEORGE H. FRY, OF FORESTVILLE, CONNECTICUT, ASSIGNOR TO ELECTRIC SELF-WINDING CLOCK COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 744,741, dated November 24, 1902.

Application filed September 5, 1902. Serial No. 122,226. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE H. FRY, a citizen of the United States, residing at Forestville, in the State of Connecticut, have invented certain new and useful Improvements in Driving Mechanisms, of which the following is a specification accompanied by drawings.

My invention relates, primarily, to improvements in light-running driving mechanisms, such as may be employed for driving clocks or other timepieces.

My invention relates more particularly to that class of driving mechanisms, as clock mechanisms, which are actuated by gravity, as by means of a weight adapted to be raised at intervals and allowed to descend and drive the mechanism.

The objects of my invention are to improve upon such gravity-driven mechanisms and enable more efficient operation to be obtained than heretofore, increase the certainty of operation, and obtain more power than ordinarily with a given weight of the parts.

To these ends my invention consists in apparatus designed to carry out the above objects and having the construction and general mode of operation substantially as hereinafter fully described and shown in this specification and accompanying drawings, in which—  
Figure 1 is a side elevation of mechanism embodying my invention. Fig. 2 is a front view, partly in section, taken on the line *xx* of Fig. 1; and Figs. 3 and 4 are detail views showing the operation of the mechanism.

While my invention may be illustrated in connection with various light-running mechanisms, it is especially adapted to driving a clock or other timepiece, and I have shown my invention in connection with an electric clock in which the weight for driving the parts to be operated is automatically raised at intervals by electromagnets, the circuit of which is closed as the weight reaches the lowermost portion of its descent, thereby attracting an armature and moving the weight quickly to its uppermost position again in readiness to drive the mechanism.

My invention is further an improvement on the mechanism fully shown and described in United States Patent No. 620,864, granted

March 7, 1899, to Joseph Butcher for an electric clock. In that patent a weighted arm is shown which is raised by electromagnets after each descent, the highest position to which the weighted arm is raised in order to begin its descent being substantially forty-five (45) degrees or a little over, it having been found that if the arm is raised to a nearly-vertical position there is not sufficient power in the weight unless an exceedingly heavy one is employed to drive the mechanism.

My improvement consists, essentially, in employing elastic means to assist the force of gravity in the descent of the weight, whereby the weight may be started from a nearly-vertical position, the elastic means assisting during the first part of the descent of the weight and being thereafter removed for the remainder of the descent of the weight.

For convenience of illustration I have shown my improvement as applied to a mechanism substantially like that shown in the above-named patent, No. 620,864; but it of course may be embodied in any light-running mechanism to which it is applicable.

Referring more particularly to the drawings, an escapement mechanism A is shown mounted on the movement-frame 3 of the clock mechanism and operatively connected with the arbor 6, which bears a pinion 7, gearing with a wheel 8, and on the arbor 9 of this wheel is a pinion 10, which gears with a wheel 11 on the main arbor 12 of the clock. This arbor 12 bears the minute-hand 13, the hour-hand 14 being mounted on a sleeve of the arbor 12 and driven from the latter by a train in the usual way. The dial is not shown in the drawings, as it is not necessary to a full understanding of the invention. The above-described mechanism may be of any conventional form for operating the clock.

Suitable electromagnets 15 are mounted upon the frame 3 and provided with an armature 16, pivotally mounted, as at *x*, and held elevated or away from the poles of the magnet by a spring 17. In this instance on the arbor 9 is secured a ratchet-wheel 18 rotatable with the wheel 8 and arbor 9.

The ratchet-wheel 18 or part to be turned may be driven by gravity or any other suit-

able means, and, as shown in the drawings, a weighted arm 20, provided with a weight B, is loosely pivoted on the arbor 9 and operatively connected to the ratchet-wheel 18, as by means of a pawl 21, that engages the teeth of the ratchet-wheel, whereby the descent of the weight will drive the clock mechanism. The construction of the mechanism is such that when the armature 16 is attracted by the magnet the arm 20, carrying the weight, is quickly raised to an upright position, the pawl 21 riding over the teeth of the ratchet-wheel and engaging them above. Any suitable means may be provided for accomplishing this result; but, as shown in the drawings, the arm 20 is provided with an extension having projecting lugs 33, which may be called the "lifting lugs," which when the weight B has descended to its lowest point take under projecting arms 24 on the armature 16, and when the armature is attracted to the magnet these arms 24 act on and depress the lifting lugs 23 in such manner as to rotate the arm 20 about the arbor 9, thereby elevating the weight B.

Means are provided for automatically closing the circuit of the magnets as the weight reaches the lowermost point of its descent, as shown in this instance a contact-spring 50 being provided on the armature 16, adapted to make contact with an insulated point 51 on one of the arms 24, the electric circuit being made by suitable electric connections through the magnets and armature, spring 50, contact 51, and binding-posts 52 to a suitable source of supply. When the weight reaches its lowermost position, circuit is closed between the spring 50 and contact 51, causing the magnet to quickly attract its armature and throw the arm to an upright position. As soon as the arm rises the circuit of the magnet is broken after the spring 50 moves away from contact 51. The arm is automatically raised every few minutes by means of the construction shown, and it is so quickly raised, the time of movement being a small fraction of a minute, that this fraction may be disregarded in an ordinary clock.

According to my invention elastic means are provided for assisting the downward movement of the weight, and while any suitable elastic means may be provided and arranged in any suitable manner I have shown by way of illustration a spring in the form of

a leaf or wire spring C, connected to the weighted arm 20 and adapted to bear upon a suitable stop 25 when the arm 20 is in its uppermost position. The arrangement of the spring is such that with the arm in its uppermost position the tension of the spring assists the downward movement of the weight, tending to push the arm downward. It will be readily seen that in the upward movement of the weighted arm 20 as the arm rises above an angle of forty-five (45) degrees the effective leverage grows less and less, and it is during the first part of the descent of the weight that the assistance of the spring is most required. After the arm passes about the forty-five (45) degree position in its downward movement the spring is no longer necessary and its tension may be removed. In order to provide for this, I so arrange the spring that it relaxes its tension during the downward movement of the arm, and the tip of the spring moves away from the stop 25 at the desired time, as shown.

According to my invention for a given weight the mechanism may be operated more efficiently and regulated better than heretofore.

Obviously some features of my invention may be used without others. Therefore, without enumerating equivalents nor limiting myself to the construction shown,

I claim, and desire to obtain by Letters Patent, the following:

In a driving mechanism, the combination of an arbor, a part to be operated, a weighted arm pivoted on the arbor, connections between said arm and the part to be operated, means for elevating the weighted end of the arm to an angle of more than forty-five degrees above the horizontal, a spring arranged to assist by its tension the movement of the arm during the first part of its descent from its elevated position, and means for removing the tension of the spring from the arm during the remainder of its descent, substantially as and for the purposes set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORGE H. FRY.

Witnesses:

WM. A. MALLIET,  
HENRY C. GARRETSON.