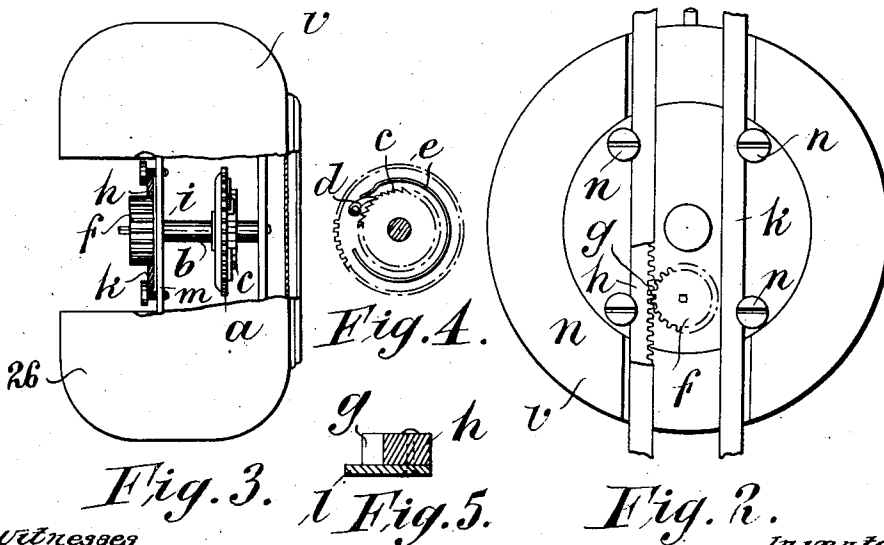
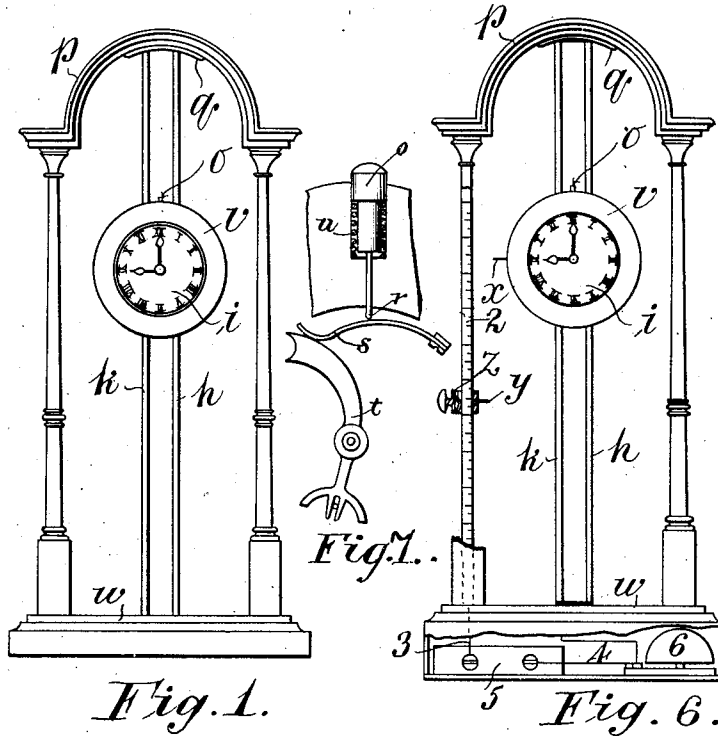


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CLOCK, TELLTALE, ALARM, AND THE LIKE.
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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHAIMSONOVITZ PROSPER ELIESON, subject of the King of England, residing at London, England, have invented certain new and useful Improvements in Clocks, Telltales, Alarms, and the Like, of which the following is a specification.

This invention relates to improvements in bodily movable or falling clocks for accurately measuring time and its object is to provide an accurate clock which will have no driving main spring but in which the clock work itself forms part of the driving weight.

According to the present invention, the casing of the clock is weighted and the driving pinion for the clock work engages a vertical rack, while the clock and its casing when falling are guided and balanced so that practically the whole weight of the clock and its case acts at the point of contact of the pinion with the vertical rack. To this end the center of weight or the line of action of the weight is arranged as near as possible to coincide with or pass through the point of contact of the driving pinion with the rack.

According to the preferred construction the clock is incased in a weight arranged either all around it or at the sides and this weighted clock is balanced and guided on two parallel vertical columns, one of which is provided with teeth on its inner surface which faces the other column while the driving pinion for the clockwork engages with these teeth. The center of weight is then very approximately arranged to coincide with the point of contact of the pinion and its rack. The same result however will be obtained if the center of weight is vertically above or vertically below the bearing point of the pinion on the rack. Of course more than two columns may be provided and in some cases efficient guiding and balancing may be obtained with one column only, but I prefer to employ two or more columns. The driving pinion is also preferably provided with a one way clutch and starting mechanism is conveniently used for starting the operation of the escapement when the clock is moved to its uppermost position.

Figure 1, is a front elevation of one form of clock according to the invention. Fig. 2, is a rear view of the clock on a larger scale

showing the driving rack and pinion in engagement therewith. Fig. 3, is an inverted plan of the clock partly broken away to show the ratchet mechanism. Fig. 4, is a detail view of the ratchet mechanism. Fig. 5, is a detail cross section of the rack column. Fig. 6, is a front elevation partly in section illustrating the invention applied to an alarm clock. Fig. 7, is a detail sectional view illustrating the starting device for the escapement of a clock.

In carrying out the invention according to one mode as for example—in the application to a clock having the usual lever escapement controlled by a balance wheel—the usual main spring and winding barrel are dispensed with and in lieu thereof a wheel *a*, forming the first wheel of the usual clock train, is freely mounted on the arbor *b*. The wheel *a*, is provided with a pivoted pawl *d*, adapted to be held by a spring *e*, in engagement with the teeth of a ratchet wheel *c*, fixed upon the arbor *b*. A pinion *f*, is also mounted upon the arbor *b*, so as to be compelled to turn therewith and it is adapted to mesh with a rack *g*, formed on a column *h*, down which the clock *i*, is caused to descend under the action of gravity. As the clock descends, the pinion *f*, is rotated and drives the clock work through the medium of the arbor *b*, ratchet wheel *c*, pawl *d*, and wheel *a*. As the weight of the clock is constant the tension or force actuating the clock remains uniform until the clock reaches the base of the column *h*, when, by virtue of the ratchet wheel *c*, and pawl *d*, the clock can be merely raised again to reenergize it. As the clock is being raised, the pinion *f*, rotates the ratchet wheel idly. If the pinion *f*, and the clock case be suitably arranged, a single column *h*, may suffice, but in practice, especially when it is desired to utilize clocks of existing types, two columns *h*, *k*, are used, only one column *h*, being provided with a rack, the other *k*, being smooth and merely acting as a guide so as to counteract any tendency on the part of the clock *i*, to tilt. By this means friction or binding between the clock and the column, or columns, can be practically avoided. In order to give a better appearance the rack *g*, may be hidden by a lip *l*, Fig. 5, the lip being formed either integrally with the column *h*, or by a thin plate screwed or otherwise secured thereto. The clock frame *m*, may be fitted with any suitable guide pieces, such as screws *n*,

for receiving or engaging with the column or columns *h*, *k*, it being preferable to have four points of contact when two columns are used, two above and two below the pinion *f*, as indicated in Fig. 2. The screws *n*, may have eccentric portions adapted to engage the edges of the columns *h*, *k*, in order to provide for adjustment.

In use the clock *i*, remains suspended on the columns *h*, *k*, and can be repeatedly raised to any position thereon. In order to insure that the clock shall not stop when being raised, a power-maintainer of any convenient form may be provided. Instead of a power maintainer or in addition thereto a restarter may be provided such as a small push pin *o*, Figs. 1 and 11, in a suitable position in the clock, so that the pin *o*, will engage the frame *p*, or a projection *q*, thereon at the top of the columns, when the clock is raised, and being thereby pressed will automatically restart the clock. The end *r*, of the pin *o*, is adapted to act on a light spring *s*, which in turn engages the usual escapement lever *t*, and so starts the clock. The end *r*, of the pin *o*, is normally withheld from engagement with the springs by a spring *u*. Should the clock be raised to an intermediate position, the pin *o*, may be pressed by the finger or thumb.

The weight of the clock and an ordinary case are not sufficient to drive the clockwork of an accurate clock even with accurate balancing. Additional weight is therefore necessary and may conveniently be provided by means of a metal ring *v*, surrounding the clock *i*, and thus forming an ornamental case for it. By surrounding the clock with the weight, the available space between the clock and the base *w*, on which the columns *h*, *k*, are mounted, is not unduly reduced, which is an important feature, as the distance of the descent of the clock determines the period of time during which it can be driven without necessitating reenergizing. It is to be understood that the additional weight may take any other desired form and it may be utilized as an ornament, for instance, weights in the form of wings may be mounted on the sides of the clock casing. The weight is in all cases to be disposed and the clock is to be balanced so that the entire weight is effective at the point of contact of the pinion and its rack. This may be done by extending the weight rearward as shown at 26 in Fig. 3, so that the center of weight comes into line with the rack.

A clock as above described can be readily made to close electric circuits during its descent, so as to sound an alarm or actuate any other devices at predetermined intervals. Such an application of an alarm clock is illustrated in Fig. 6. One of the contacts *x*, for the electric bell circuit is

upon the clock and the other *y*, is carried by a slide *z*, on a metal support 2, so that it may be set in any desired position thereon. The support 2, is provided with a scale indicating hours and sub-divisions thereof, so that the slide *z*, may be set in any required position below the contact *x*, according to the period of time after which the alarm is to be sounded. For instance, if the clock be raised into any position to reenergize it and it is desired that the alarm bell shall ring in six hours' time, the slide *z*, will be moved on the support 2, through a distance from the clock contact corresponding to six hour divisions on the scale. As the clock descends it will ultimately push its contact *x*, into engagement with the contact *y*, and so complete the electric bell circuit. One or both of the contacts *x* and *y*, are preferably of springy material so that the friction or resistance encountered during the period of contact will not be adversely on the clockwork. The support 2, and columns *h*, *k*, are suitably insulated and are connected for instance by leads 3 and 4, to the battery 5, of the electric bell 6, the battery and bell being of any suitable form and preferably inclosed within the base *w*, of the clock stand.

I claim:

1. In combination with the clockwork train, escapement mechanism, hour and minute hands and cooperating dial of a bodily movable, falling clock, means for driving said clock comprising a driving pinion for said train, a vertical rack with which said driving pinion engages and an additional weight of predetermined amount carried by said clock.

2. In combination with the clockwork train, escapement mechanism, hour and minute hands and cooperating dial of a falling clock, means for driving said clock comprising a driving pinion for said train, a rack with which said driving pinion engages and an additional weight disposed substantially symmetrically about the point of contact of said driving pinion and rack.

3. In combination with the clockwork train, escapement mechanism, hour and minute hands and cooperating dial of a falling clock, a driving pinion for said train an additional weight arranged around the clock and disposed symmetrically with reference to the driving pinion, a vertical rack and means for guiding said clockwork and weight independently of said rack and pinion.

4. In combination with a falling clock and the clockwork train and escapement mechanism thereof, a driving pinion for said clock, an additional annular weight disposed about said clockwork and driving pinion, a vertical rack and means for guiding said clock and weight independently of said rack and pinion.

5. In combination with a falling clock and the clockwork train and escapement thereof, two parallel vertical standards spaced apart, teeth on the face of one of said standards opposite the other standard, a pinion on the clockwork between said standards engaging in said teeth, a one-way clutch on said pinion, an additional weight symmetrically disposed about said clockwork and means engaging with said standards for guiding said clock and weight independently of the pinion and rack.

6. In combination with a clockwork train and escapement of a rising and falling time piece, two parallel vertical standards spaced apart, teeth on the face of one of said standards opposite the other standard, a pinion on the clockwork engaging in said teeth, a one-way clutch on said pinion, an additional weight symmetrically disposed about said clock work, means engaging with said standards for guiding said clockwork and weight independently of the pinion and rack and means engaging the escapement for starting it moving when said clockwork and weight are moved to the top of the rack.

7. In combination with a clockwork train and escapement of an ascending and descending time piece, two parallel vertical standards spaced apart, teeth on the face of one of said standards opposite the other standard, a pinion on the clockwork engaging in said teeth, a one-way clutch on said pinion, an additional weight symmetrically disposed about said clockwork, means engaging with said standards for guiding said clockwork and weight independently of the pinion and rack and adjustable means for co-acting with said clockwork and weight to sound an alarm at any desired point in the descent of the clock.

8. In combination with a falling clock, its escapement, the clockwork train, the dial and time indicating hands thereof, of two standards, teeth on one standard, a pinion secured to the clockwork engaging said teeth, a one-way clutch transmitting motion from said pinion to said clockwork train, an additional weight of predetermined amount carried by the clock for driving its train and means for guiding the clock in its descent.

9. In combination with a falling clock and the clockwork train and escapement thereof, two parallel vertical standards, spaced apart, teeth on the face of one of said standards opposite the other standard, a pinion on the clockwork engaging in said teeth, a one-way clutch on said pinion, said pinion being to the rear of the clockwork, an additional annular weight disposed around said clockwork and rollers engaging said standards for guiding said clockwork and weight independently of the pinion and rack.

10. In combination with a falling clock and the clockwork train and escape mechanism thereof, means for driving said clock comprising a driving pinion for said train, a rack with which said driving pinion engages, and an additional weight disposed substantially symmetrically about the driving pinion, and means for automatically starting said escape mechanism when the clock is raised.

11. In combination with a falling clock and the clockwork train and escapement mechanism thereof, means for driving said clock comprising a driving pinion for said train, a rack with which said driving pinion engages and a weight in addition to that on the clock for driving the clock work train and escapement mechanism and means for automatically starting the escapement mechanism when the clock is raised.

12. In combination with a falling clock, having a clock-work train, and an escapement, means for driving said clock, comprising a driving pinion for said train, a rack with which said driving pinion engages, an additional weight of predetermined amount disposed substantially symmetrically about the driving pinion, a finger adapted to engage a part of the escapement and a member carried by the clock for actuating said finger to re-start the escapement when the clock is raised.

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

CHAIMSONOVITZ PROSPER ELIESON. [L. s.]

Witnesses:

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F. E. SQUIRE.