Jan. 14, 1947. J. B. DE KUROWSKI 2,414,288

GRAVITY OPERATED CLOCK

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FIG.1.

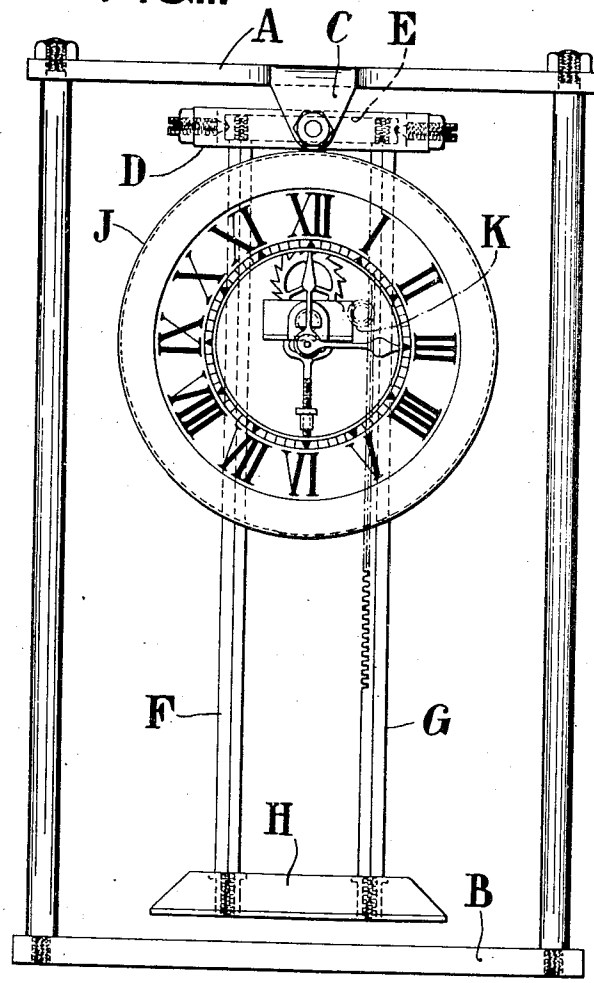

FIG.6.

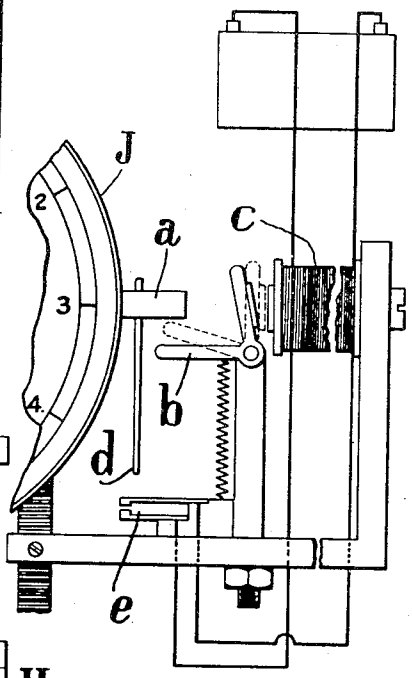

FIG.2.

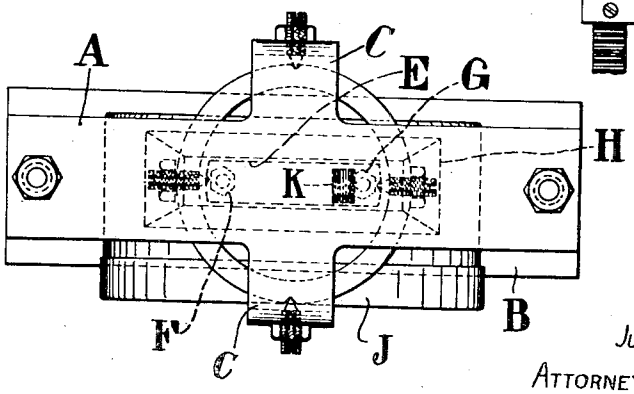

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FIG.3.

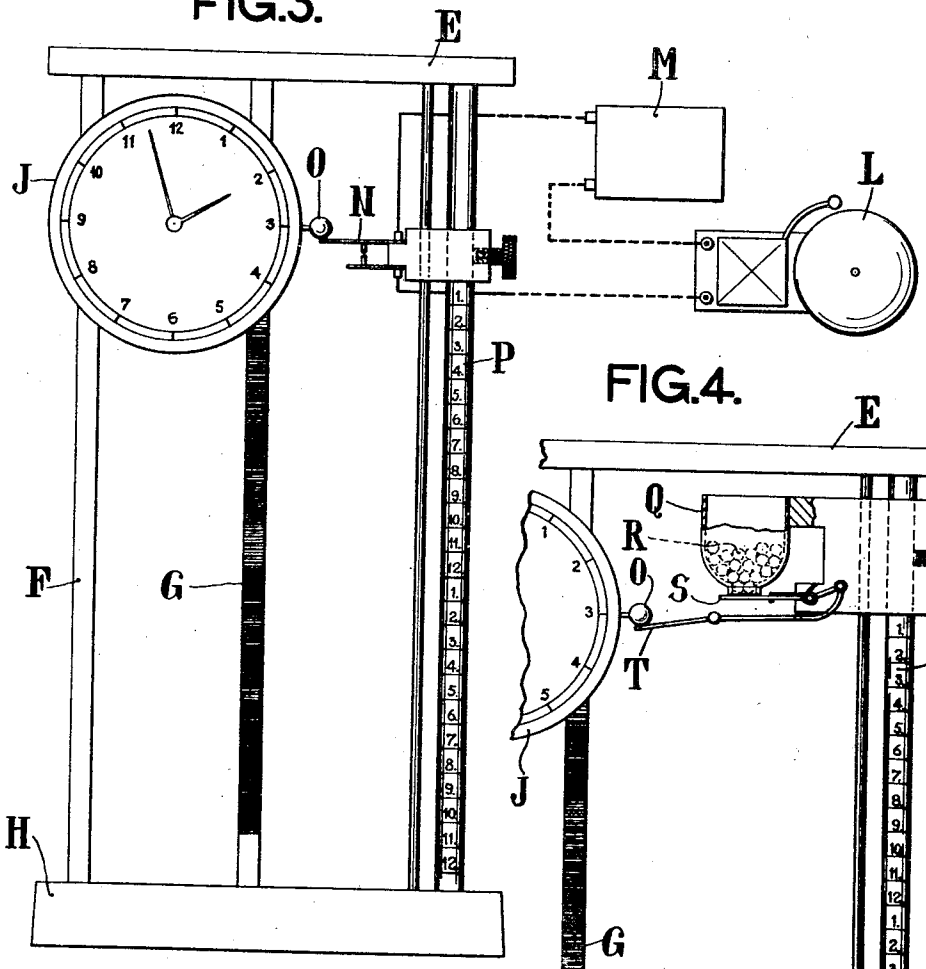
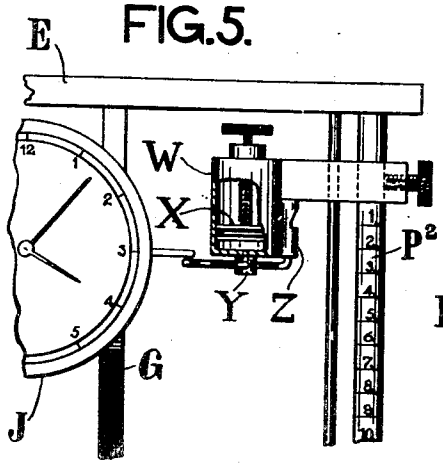


FIG.4.

FIG.5.



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GRAVITY OPERATED CLOCK

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Application December 11, 1944, Serial No. 567,628
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1 Claim. (Cl. 58—2)

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The invention relates to gravity operated clocks, and is concerned with clocks of this kind which are not driven by descending weights suspended from stationary clockwork mechanism but which themselves descend by gravity from an elevated position, with a pinion engaging a fixed, vertical rack and driving the hand by means of suitable trains of gearing. The guidance of the clock is effected by means of a holder generally consisting of a pillar or pillars, the rack itself being if desired formed on a guide pillar, and for accurate time keeping it is important that the path of the clock should be truly vertical, the friction between the rack and pinion being affected by any deviation from the perpendicular, with resultant change in the rate at which the clock descends.

According to my invention such deviation is prevented by suspending the holder, with the rack and the rest of the clock, from a frame to which the clock is connected by a universal joint, so that no attention at all need be paid to securing precision of level as regards the support, because even if the support is askew the pillar and rack adjust themselves by gravity to the perpendicular.

A clock constructed according to the invention is shown by way of example in the accompanying drawings, in which:

Fig. 1 is a front elevation thereof, and

Fig. 2 a plan view.

Figs. 3, 4, and 5 are diagrammatic views of alarm devices which may be fitted to the clock, and

Fig. 6 is a diagrammatic view of a motor device for automatically returning the clock to its starting position after its descent by gravity.

The clock stand consists of a yoke A on a foot plate B. From the crossbar of the yoke project two lugs C, into which are screwed the pivots supporting the ring D of a gimbal joint. Within the ring the crossbar E of the gimbal joint is mounted on pivots screwed into the ring, and into the bar E are screwed two rods F and G both extending downwards to within a short distance of the footplate B, above which they are screwed into a small floating platform H. The rods F and G constitute the holder carrying the clock. They pass through the casing J of the clock, and serve as guides along which the clock can move upwards and downwards. On the rod G is formed a rack engaging a ratchet pinion K, which is one of the members of a freewheel clutch driving the clockwork. During the descent of the clock by gravity the clutch is operative, but

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during the return of the clock to its starting position the pinion yields to the resistance of the going train and slides out of engagement, against the action of a spring.

From its lowered, run-down position the clock may be lifted back to the starting position by hand, but this may also be done automatically by a motor device put into operation by the descent of the clock, as will be described hereinafter.

The clock may have a balanced pendulum, that is to say a pendulum with a counter bob above the point of oscillation.

Fig. 3 shows an alarm device associated with the clock, comprising an electric bell L fed from a battery M. In the bell circuit there is a switch N adapted to be closed by a tappet O on the clockcase, and the switch is adjustable on a vertical post P with hour and minute markings fixed to the gimbal member E and the platform H.

An alternative form of alarm device is shown in Fig. 4. A cup Q adjustable on a post P^1 contains pellets R normally retained therein by a pivoted spring loaded shutter S, which is opened by the tappet O and a lever T in the course of the descent of the clock, so that some of the pellets drop on to a sounding plate U, off which they roll into a receptacle V.

Fig. 5 shows a pneumatic alarm device. A pneumatic cylinder W is adjustable on a post P^2 and has therein a plunger X which can be screwed down by hand to compress air in the cylinder, the air being retained till the tappet O opens a valve Y and allows the air to escape and blow a whistle Z.

Fig. 6 shows a motor device for automatically restoring the clock to its raised position after descent. In the path of a tappet *a* on the clock there is one arm of a bell crank lever *b*, the other arm of which has fixed thereto the armature of an electromagnet *c*, so that attraction of the armature by the electromagnet causes the bell crank lever to act on the tappet and lift the clock. A rod *d* projecting downwards from the tappet closes an electric switch *e* in the circuit of the electromagnet when the clock has descended for, say, an hour, so that the path of the clock is quite short, and the lifting movement is of very small amplitude, requiring little expenditure of power.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

A gravity operated clock comprising in combination a clockstand, a clockcase, clockwork in said clockcase including a pinion adapted by

rotation in one direction to drive said clockwork, a holder for said clockcase having a weight member at its lower end, said clockcase being vertically slidable on said holder, a universal joint connecting the upper end of the holder to the clockstand whereby said holder is suspended in constant vertical position from said clockstand, and a vertical rack on said holder, engaged with said pinion,

whereby when said pinion is rotated for driving said clockwork by downward movement of said clockcase and clockwork on said holder friction between the rack and pinion and between the contacting surfaces of the clockcase and holder will be constantly minimized.

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