Aug. 30, 1932. W. H. GREENLEAF 1,874,967

CLOCK MECHANISM

Filed Dec. 27, 1926

Fig. 1.

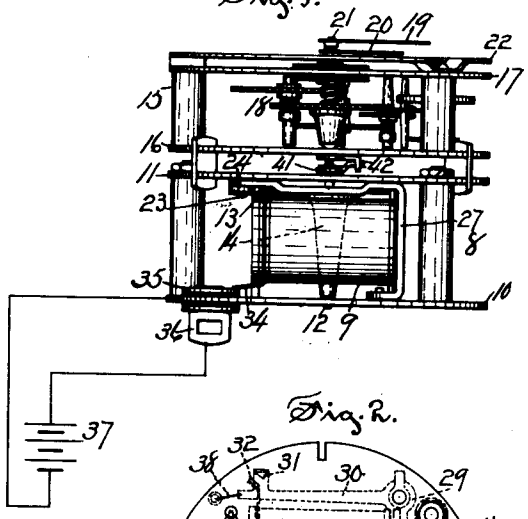


Fig. 2.

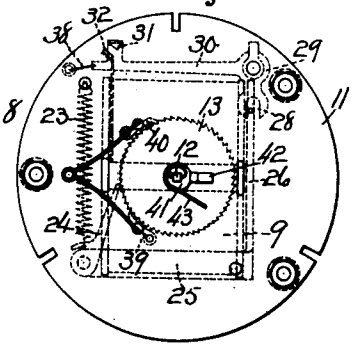


Fig. 6.

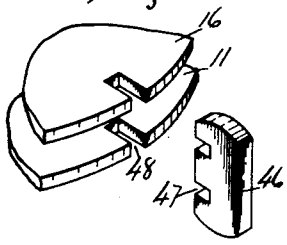


Fig. 7.

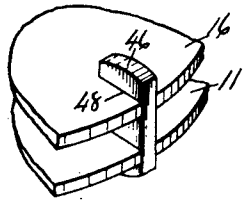


Fig. 4.

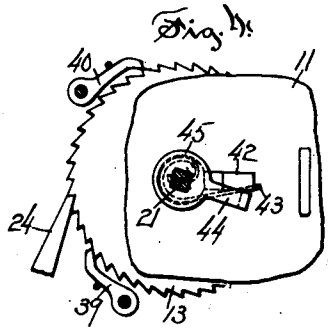


Fig. 3.

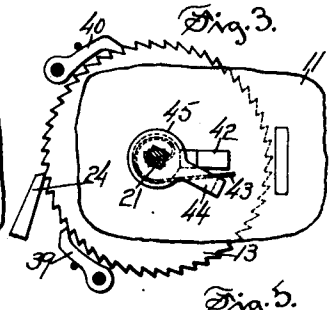
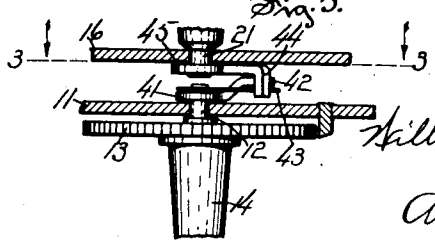


Fig. 5.



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1,874,967

UNITED STATES PATENT OFFICE

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CLOCK MECHANISM

Application filed December 27, 1926. Serial No. 157,058.

My invention relates more especially to that class of time pieces in which power for operating the mechanism is periodically applied and stored for continued use in a main source of power supply, and an object of my invention, among others, is the production of means for supplementing and maintaining a driving force on the clock mechanism whenever the main source of supply of power may be momentarily released, as in the operation of energizing such source.

One form of device embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained, is illustrated in the accompanying drawing, in which—

Figure 1 is a view in side elevation of a clock mechanism embodying my invention.

Figure 2 is an end view of the energizing means.

Figure 3 is a detail view illustrating the operation of my improved device in maintaining a driving force on the clock mechanism, on a plane denoted by the dotted line 3—3 of Figure 5.

Figure 4 is a similar view illustrating the position of the members when the main driving force is fully energized.

Figure 5 is a side view of the parts shown in Figures 3 and 4 with the supporting plates cut in section.

Figure 6 is a detail view illustrating the manner of securing the two units together.

Figure 7 is a similar view showing said plates secured together by my improved clip.

In the accompanying drawing the numeral 8 indicates a power supplying unit as a whole that may embody coils 9 of an electric magnet, which coils are periodically energized in a manner common to structures of this class and for which reason a detailed illustration and description thereof are omitted herein, it being sufficient to state that such a type of mechanism will be found in my United States Patent No. 1,525,179, dated February 3rd, 1925, and to which patent reference is hereby made for any further understanding of this type of mechanism that may be desired. This power supplying unit embodies two supporting plates 10—11 in which a main shaft 12 is rotatably mounted, and which has a ratchet wheel 13 secured thereto as by means of a hub 14 of fusible material, in a manner common to structures of this class.

A time piece unit, generally indicated by the numeral 15, is attached to the unit 8 in a manner to be hereinafter described, said unit 15 comprising supporting plates 16—17, a time train, generally indicated by the numeral 18, and hands 19—20 secured to and supported by an arbor 21 that projects through the plate 17 and beyond the front of a face supporting ring 22, the opposite end of said arbor projecting through and beyond the plate 16. A further and detailed description of this clock mechanism is omitted herein as not being necessary to an understanding of my present invention, it being stated that a more complete description thereof will be found in my copending application S. No. 157,057 filed concurrently herewith and having an oath bearing even date with the oath in this case, which issued as Pat. No. 1,848,562, March 8, 1932, and to which patent reference is hereby made for any further understanding of such mechanism as may be desired, the invention forming the subject matter of this case relating particularly to the connection between the main shaft 12 and the arbor 21 in connection with the mechanism for applying power to said shaft and arbor as now to be described.

A main spring 23 is attached at one end to the plate 11 and at its opposite end to a pawl 24 (see dotted lines in Figure 2 of the drawing) pivotally mounted on an actuating lever, which lever is also pivotally mounted as between the plates 10 and 11. This lever comprises a pawl supporting arm 25, an armature 26 and a connecting bar 27, said lever having its pivotal connection with the plates 10 and 11 at opposite ends of said bar, and as shown in Figure 1. The armature 26 has a stud located in a slot 28 in an arm 29 of a switch bar, the slot 28 being somewhat wider than the stud so that the latter has a limited independent movement in said slot. The switch supporting arm 30 of said switch bar has a contact 31 adapted to engage with one of the contacts 32 of the coil 9, (comprising two

members as shown herein) the other contact 34 of said coil touching a terminal 35 of a post 36 connected with any suitable source of electric energy, as a battery 37. The battery may be grounded on the frame of the structure herein shown or to some part connected with said frame, and the contact 31 through the lever 30 is also grounded on the frame in a manner common to devices of this kind.

The arm 30 is adapted to be influenced for movement in opposite directions by a spring 38, depending upon which side of a line extending between the point of attachment of the spring to the plate 10 and the pivot of the arm 30 the point of attachment of the spring to the arm 30 is located.

From the description thus far given it will be noted that with the parts in the positions shown in Figure 4 the spring 23 is exerting a force upon the pawl 24, the ratchet 13 and the shaft 12 to rotate the latter in a clockwise direction, this force being transmitted to the arbor 21 by parts to be hereinafter described and comprising an important part of my present invention. As the ratchet 13 is rotated the force of the spring 23 is gradually lessened. This operation of the spring 23 will also swing the actuating lever comprising the supporting arm 25 on its pivot gradually moving the stud on the armature 26 to the opposite side of the slot 28 from that shown in Figure 2, and after touching the opposite side of said slot further movement of the armature will swing the switch bar, including the arm 30, in a direction to move the contact 31 toward the contact 32, this action also moving the spring 38 from the position shown in Figure 2 toward its opposite position of rest. After the point of attachment of said spring to the arm 30 has passed the "dead center" line, extending between the point of attachment of the spring to the plate 10 and the pivot of said switch bar, the latter will be snapped to cause the contacts 31 and 32 to engage. This will establish an electric circuit through the coils 33 which, being energized, will draw the armature 26 toward the coils and into the position shown in Figure 2. It will be noted that Figure 2 shows the position of the parts at the instant immediately following the breaking of the electric circuit, and before the parts have had an opportunity to assume their normal positions under the action of the various springs. Immediately after the breaking of the electric circuit, as just described, the spring 23 having been fully tensioned, will draw the pawl 24 into contact with the teeth of the ratchet teeth 13, as shown in Figure 4, and it is a purpose of my invention to supply a force to the arbor 21 at the time when the force of the spring 23 is not exerted upon the ratchet 13 during the operation of the parts just described to restore force to said spring. Detents 39—40 may be employed to prevent backward movement of the ratchet 13.

The shaft 12, to which the ratchet wheel 13 is secured has a disc 41 also secured thereto with a driving finger 42 projecting from said disc. An accelerating driving spring 43 has one end also secured to said shaft and its opposite end pressed against a driven finger 44 projecting from a disc 45 secured to the end of the arbor 21 and as shown in Figure 5 of the drawing. This spring is so arranged as to be under tension and to exert a pressure against the finger 44 that transmits this pressure to the arbor 21 and at such times as when the finger 42 is not exerting a pressure upon the finger 44 and hence upon the arbor 21. For example: the parts being in the position shown in Figure 4, the main spring is exerting a driving pressure through the pawl 24 and ratchet 13 to the shaft 12 and this, through the contact of the fingers 42 and 44, is transmitted to the arbor 21. The spring 43 is also in contact with the finger 44, but its tension is not sufficient to overcome the force of the spring 23 and hence the latter is driving the arbor 21, and as shown in Figure 4. When, however, the action of the spring 23 momentarily ceases, owing to disengagement of the pawl 24 from the ratchet 13 as hereinbefore described, and during the operation of the parts to restore tension to the spring 23, the spring 43 is brought into action, as shown in Figure 3 and exerts a direct pressure upon the finger 44 and hence upon the arbor 21, and a driving force is, therefore, maintained on said arbor at all times with a result that the clock does not "lose time" as would be the case if this driving force was released during the time when the tension of the main spring 23 is being restored.

The units 8 and 15 are connected by clips 46 having notches 47 receiving and frictionally gripping the plates 11 and 16 when the clips are received within notches 48 formed in the edges of the plates 11 and 16 of said units, and as shown in Figures 6 and 7, such number of these clips being employed as may be desired. It will be understood that when the clock is in use the unit 8 will be attached to a suitable support and the unit 15 will be attached to and supported by the unit 8 by means of clips hereinbefore referred to. The mechanisms of the two units are separably connected and clips provide means whereby the timepiece unit may be readily and conveniently separated from the power supply unit for purposes of repair, for change of unit, or for any other desired purpose or to permit ready access to the power supplying unit.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to

represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim—

1. A clock mechanism comprising a plurality of units including supporting plates, and clips located at intervals about said plates and frictionally engaged with the edges of both plates to space and secure the units together for convenient and ready separation thereof.

2. A clock mechanism comprising a plurality of units including supporting plates, and clips located at intervals about said plates and having notches interlocked with the edges of both of said plates to secure said units together for convenient and ready separation thereof.

3. A clock mechanism comprising a plurality of units including supporting plates having notches in the edges thereof, and clips having notches in their edges to interlock with the notches in the edges of said plates to secure said units together for convenient and ready separation thereof.

4. A clock mechanism comprising a plurality of units each having mechanism therein and including means for detachably connecting said mechanisms to permit disconnection upon movement of one unit away from the other, and clips frictionally engaged with adjoining plates of said units to connect said units for convenient and ready separation.

5. A clock mechanism comprising a power unit and a driven unit, each including supporting plates, a shaft journaled in the power unit, a shaft journaled in the driven unit, means associated with said shafts comprising an initially resilient, non-rigid connecting means which subsequently becomes rigid, and clips located at intervals about said plates and frictionally engaged with the edges of both plates to space and secure the units together.

6. A clock mechanism comprising a plurality of units including a power unit and a driven unit, each unit comprising supporting plates, a shaft journaled in the driven unit, a shaft journaled in the power unit, means associated with said shafts comprising an initially resilient, non-rigid connecting means which subsequently becomes rigid, and clips located at intervals about said plates and frictionally engaged with the edges of both plates to space and secure the units together.

7. A clock mechanism comprising a plurality of units including a power unit and a driven unit, each unit comprising supporting plates, a shaft journaled in the driven unit, a shaft journaled in the power unit, means associated with said shafts comprising an initially resilient, non-rigid connecting means which subsequently becomes rigid, and fastening means located at intervals about said plates and frictionally engaged with the edges of both plates to space and secure the units together.

WILLIAM H. GREENLEAF.