Sept. 30, 1941. K. URBANSKI 2,257,404

CLOCK REWINDING MEANS

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Fig. 1.

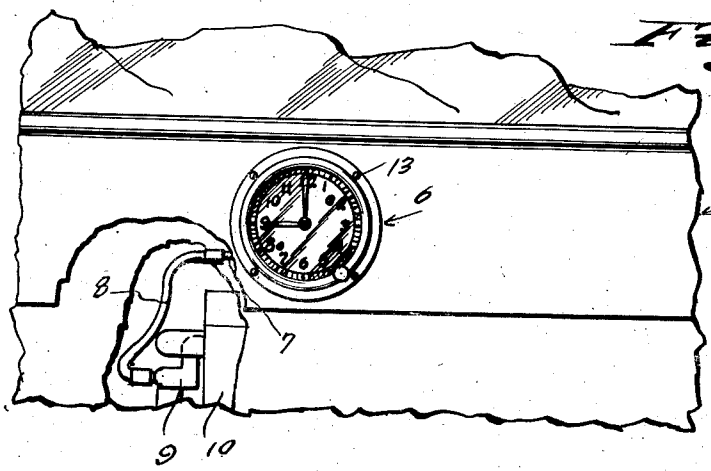


Fig. 2.

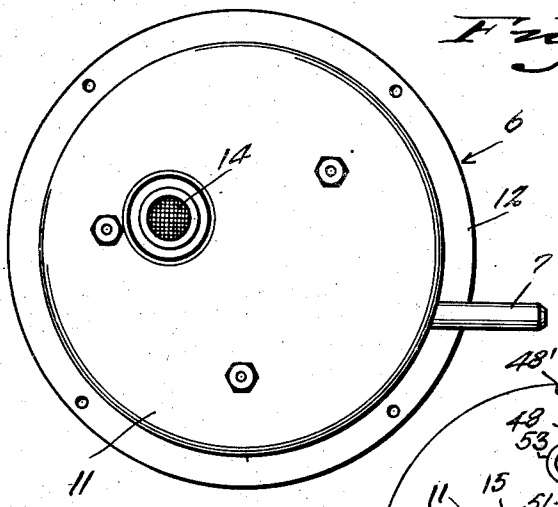


Fig. 3.

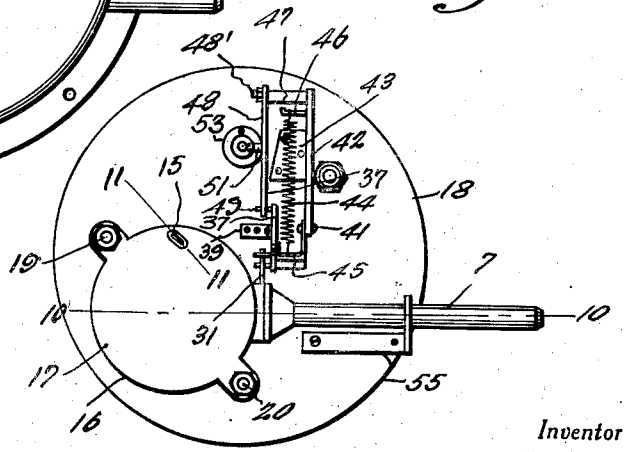
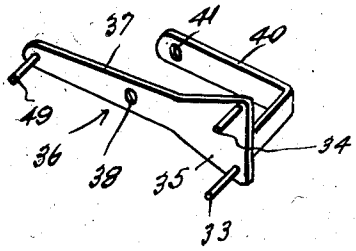


Fig. 22.



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CLOCK REWINDING MEANS

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Fig. 4.

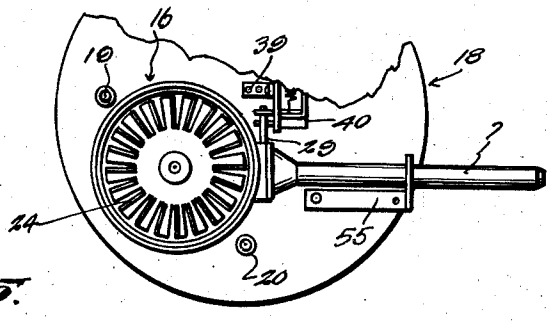


Fig. 5.

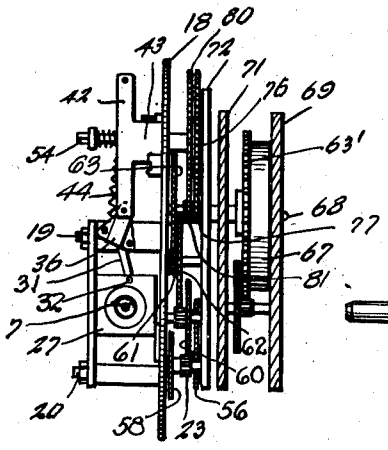


Fig. 6.

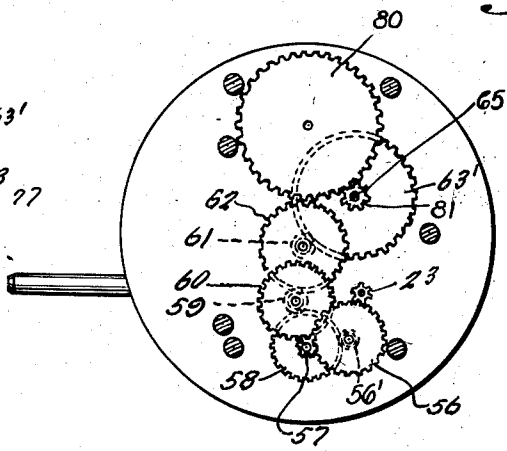


Fig. 7.

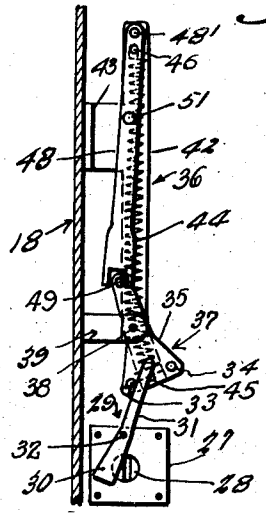
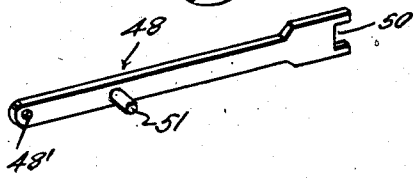


Fig. 21.



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CLOCK REWINDING MEANS

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Fig. 14.

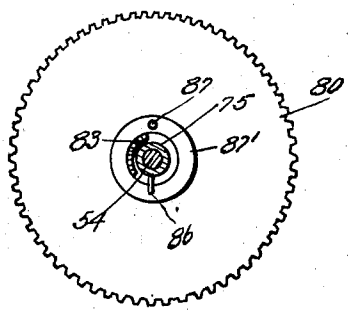


Fig. 15.

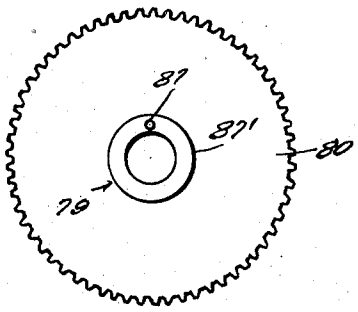


Fig. 17.

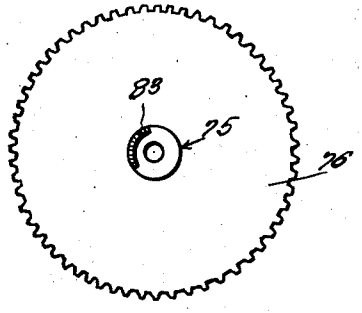


Fig. 8.

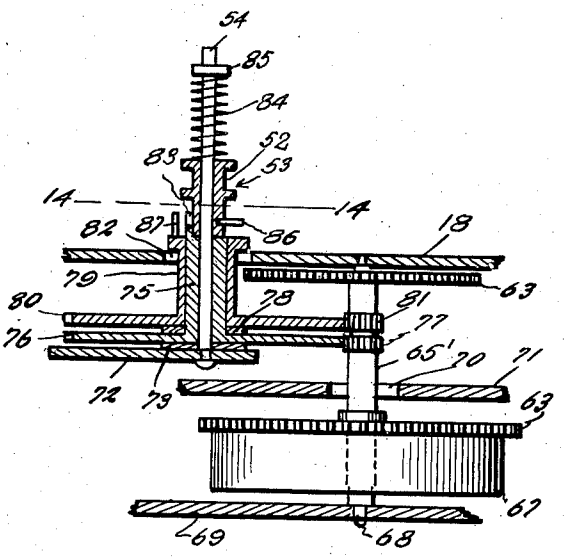


Fig. 20.

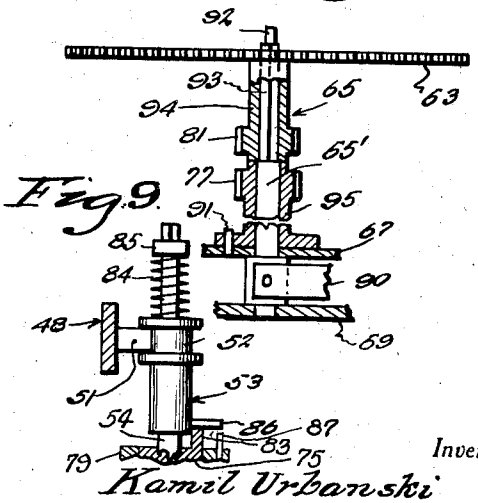


Fig. 9.

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CLOCK REWINDING MEANS

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Fig. 10

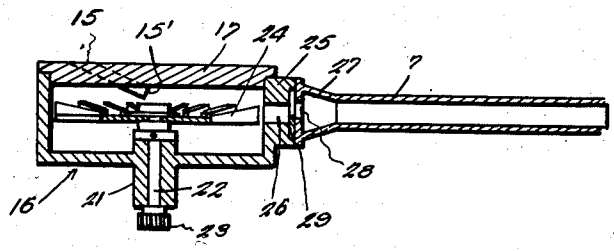


Fig. 11.

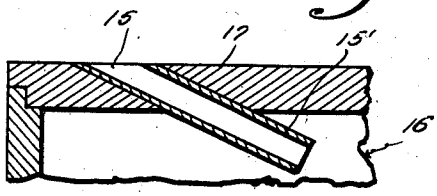


Fig. 13

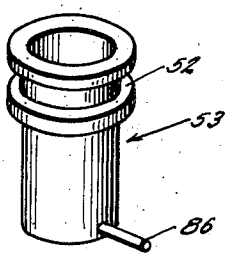


Fig. 16.

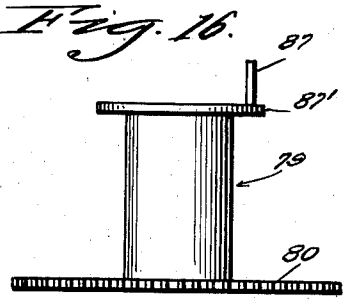


Fig. 18.

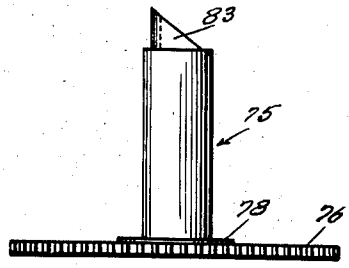


Fig. 19.

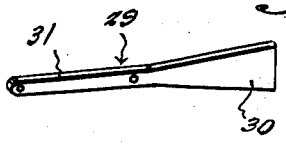
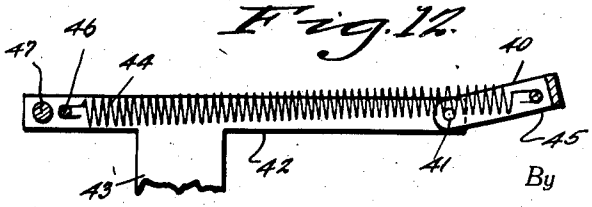


Fig. 12.



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Patented Sept. 30, 1941

2,257,404

UNITED STATES PATENT OFFICE

2,257,404

CLOCK REWINDING MEANS

Kamil Urbanski, Wilkes-Barre, Pa.

Application February 25, 1939, Serial No. 258,493

8 Claims. (Cl. 185—39)

My invention relates generally to clock rewinding means, and particularly to vacuum operated means of this character in connection with the suction manifold of the engine of an automobile, and an important object of my invention is to provide a simple and efficient arrangement whereby a spring driven automobile clock may be kept constantly wound.

Other important objects and advantages of my invention will be apparent from a reading of the following description taken in connection with the drawings, wherein for purposes of illustration I have shown a preferred embodiment of my invention.

In the drawings:

Figure 1 is a fragmentary elevational view of the instrument panel of an automobile showing a clock in accordance with the invention mounted on the instrument panel and broken away to show the vacuum connection with the intake manifold of the engine of the automobile.

Figure 2 is an enlarged rear elevational view of the clock casing.

Figure 3 is an elevational view similar to Figure 2 but with the clock casing removed.

Figure 4 is a fragmentary view similar to Figure 3 but with the cover of the vacuum operated rotor casing removed.

Figure 5 is a transverse vertical sectional view taken through the clock casing and to one side of the mechanism.

Figure 6 is a transverse vertical sectional view taken through Figure 5 to the left of the gear train.

Figure 7 is an enlarged transverse vertical sectional view taken through Figure 3 to the left of and showing the over-center valve operating arrangement.

Figure 8 is a horizontal sectional view taken through Figure 5, enlarged.

Figure 9 is a fragmentary view similar to Figure 8.

Figure 10 is an enlarged horizontal sectional view taken through Figure 3 approximately on the line 10—10.

Figure 11 is an enlarged transverse vertical sectional view taken through Figure 3 approximately on the line 11—11.

Figure 12 is a transverse vertical sectional view taken through Figure 3 to the left of the spring appearing therein.

Figure 13 is a perspective view of the rotatable and slidable sleeve.

Figure 14 is a horizontal sectional view taken through Figure 8 approximately on the line 14—14 looking downwardly.

Figure 15 is a view similar to Figure 14 but with the rotatable and slidable sleeve removed.

Figure 16 is a side elevational view of a combined sleeve and gear wheel.

Figure 17 is a top plan view of a combined gear wheel and hollow shaft.

Figure 18 is a side elevational view of Figure 17.

Figure 19 is a perspective view of the valve.

Figure 20 is a horizontal sectional view taken through Figure 5 and enlarged, and showing the operative connections between the clockworks spring and the vacuum rotor.

Figure 21 is a perspective view of the over-center valve operating arm.

Figure 22 is a perspective view of the valve operating and holding lever.

Referring in detail to the drawings, the numeral 5 generally designates a suitable support such as the instrument panel of an automobile on which is conveniently mounted the clock 6 preferably of the 8-day type which has a suction pipe 7 extending from one side to which is connected a tube 8 which has its opposite end connected to the suction manifold 9 of the automobile engine 10. The clock 6 comprises a suitable clock casing 11 having a mounting and securing flange 12 adapted to be screwed or bolted as indicated by the numeral 13 to the front of the instrument panel with the body of the clock casing disposed in a suitable opening in the panel, so as to dispose the vacuum connection 7 to the rear and out of sight behind the instrument panel 5. The back of the clock casing 11 is provided with a screened opening 14 to admit air into the interior of the clock casing and into the opening 15 in the vacuum rotor casing 16, this casing having a removable cover 17 in which the opening 15 is located, the cover and casing being held in place on the disk 18 by means of respective fastening means 19 and 20. The disk 18 and the parts attached thereto are mounted within the clock casing 11 in a suitable manner. Extending from the back of the casing 16 is a bushing 21 forming the journal for the rotor shaft 22 which has on its outward end a pinion 23 and on its inner end a bladed rotor 24 which has blades arranged circumferentially thereon to receive the impelling effect of air drawn through the opening 15 and directed on to the blades by the angulated nozzle 15' as shown in Figures 10 and 11. A radially arranged nipple 25 has an opening 26 communicating with the interior of

the rotor casing and to this nipple is connected and extends the vacuum pipe 7. The pipe 7 has a head 27 provided with a reduced opening 28 in the nature of a valve seat in front of which operates the valve 29 which has the fan-shaped part 30 operating directly in front of the opening 28 and the arm portion 31 which extends upwardly and is pivoted intermediate its ends as indicated by the numeral 32 on the said head and has its upper end operatively disposed between respective pins 33 and 34 on the lower extremity of the enlarged portion 35 of the valve operating and holding lever assembly 36 which involves the lever 37 which is pivoted at the point indicated by the numeral 38 on a bracket 39 projecting from the disk 18 as shown in Figure 7. Extending from the rear of the lower part of the lever 37 is the L-shaped arm 40 which is pivoted at its upper end as indicated by the numeral 41 to the lower end of the vertical portion 42 of the bracket 43 which is fastened to the disk 18. A contracting spring 44 is stretched between a pin 45 adjacent the lower end of the L-shaped bracket 40 and an anchor 46 at the upper end of the portion 42 of the bracket 43, the function of this spring being to hold the lever assembly 36 in an over-center position in which the respective one of the pins 33 and 34 will be operatively engaged with the appropriate side of the arm 31 of the valve 29, so as to hold the valve in an open or closed position, as the case may be. The vertical part 42 of the bracket 43 has a projection 47 from which pivotally depends the lever 48 which is pivotally traversed by a pin 49 at its lower end, the pin being secured to the upper end of the lever arm 37 of the device 36. The form of the lever 48 is shown in Figure 21, its pivotal point being designated by the numeral 48' and the lower end thereof being bifurcated as indicated by the numeral 50 to pivotally receive the pin 49. Intermediate the ends of the lever 48 the same is provided with a pin 51 which works in the groove 52 in the rotatable and slidable sleeve 53 which works on the shaft 54 as shown in Figure 9, the purpose of this arrangement to be described later on herein. A bracket 55 engages and supports the vacuum connection 7 on the disk 18 as shown in Figure 3.

The rotorshaft pinion 23 is in mesh with a gear 56 which has a pinion 56' in mesh with a gear wheel 58 having a pinion 57 in mesh with a gear wheel 60 which has a pinion 59, the last being in mesh with a gear wheel 62 having a pinion 61 in mesh with the gear wheel 63' which is on the winding shaft 65' of the spring motor to be described. The shaft 65' has a pinion 81 which is in mesh with a relatively large gear wheel 80, the gear 63' being on the circumference of the spiral spring containing casing 67. One end of the winding shaft 65' is journaled as indicated by the numeral 68 on the clockworks support 69 and the opposite end of this shaft is journaled in the disk 18 as shown in Figure 8, and passing through an opening 70 in the parallel clockworks support 71. Another support 72 located between the support 71 and the disk 18 has fixed thereto the shaft 54 and a washer 73 is disposed on the shaft 54 at the outer side of the support 72 and turning on this washer and on the shaft 54 is the hollow shaft 75 which includes integral therewith at the inner end thereof the relatively large gear wheel 76 in mesh with the pinion 77 on the shaft 65'. Turning on the hollow shaft 75 and spaced from the gear wheel 76 by a washer 78 is the bushing 79 which includes integral therewith the gear wheel 80 which is in mesh with the pinion 81 on the shaft 65', both the hollow shaft and the bushing 79 extending through an opening 82 in the disk 18, all as shown in Figure 8 of the drawings.

On the outer end of the hollow shaft 75 is an arcuate cam 83 which extends a fractional part of the circumference thereof for the purpose of engaging and raising a portion of the axially inward end of the slidable and rotatable element 53 in opposition to the action of the spring 84 which is circumposed on the shaft 54 between a stop 85 and the outer end of the member 53. The member 53 has a radial pin 86 with which a vertical pin 87 on a flange portion of the bushing 79 is adapted to engage to operate the parts shown in Figure 8.

Referring to Figure 20, it will be evident that the shaft 65 is hollow and has rotatably extending therethrough the shaft 65' to which within the spring casing 67 is anchored one end of the spring 90, the opposite end of the spring being anchored conventionally to the casing, and the shaft 65' being rotatable relative to the casing 67. The hollow shaft 65 is anchored, however, as indicated by the numeral 91 to the spring housing 67 and to the gear wheel 63, the last being in mesh with the pinion 61 on the shaft of the gear wheel 62. A portion of the shaft 65' is squared as indicated by the numeral 93 so as to non-rotatably mount the portion 94 of the shaft 65 thereon which carries the pinion 81, the portion 95 of the hollow shaft being anchored as already stated to the spring housing 67.

Supposing the spring 90 to be in wound condition and the clock is operating on its usual 8-day schedule, and that the valve 29 is in the closed position, and the cam 83 out of operative engagement with the element 53, the unwinding of the spring 90 will cause the spring housing 67 to rotate in an opposite direction thereby causing the pinion 77 to operate the gear wheel 76 and hence the hollow shaft 75 so as to cause the cam 83 to approach operative engagement with the element 53 after the lapse of a predetermined period, so that at the end of said period the element 53 will be cammed out along the shaft 54 against the resistance of the spring 84 and in so moving, move the pin 51 on the lever 48 and thereby swing the lever in a direction to swing the valve operating and holding assembly 36, so that this last operates the valve 29 from the closed to an open position, thereby causing the established suction in the engine manifold, supposing the engine to be operating, to communicate with the interior of the rotor casing and cause rotation of the rotor 24, thereby turning the gear 63' on the spring winding shaft 65', and thereby effecting rewinding of the spring 90. Thus it is evident that at predetermined intervals of time, shorter than the 8-day operation normal to the clockworks, the vacuum rotor will be operated automatically to rewind the clockworks spring, so that the clockworks are constantly maintained at an efficiently wound condition. In view of the fact that the clock runs ordinarily for an 8-day period without rewinding, and in view of the fact that the automobile engine will probably be run for considerable lengths of time during each 8-day period, there is little likelihood that the clock, in the ordinary use of the automobile, will ever become fully run down. The operation of the solid shaft 65' by the operation of the vacuum motor produces also rotation of the pinion 81 which is in mesh with the

large gear wheel **80** on the bushing **79**, and the turning of this bushing, as a consequence, will bring the pin **87** into engagement with the pin **86** on the member **53** so as to turn the member **53** to a position on the shaft **54** in which it is out of engagement with the cam **83**.

Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not desire to limit the application of my invention thereto, and any change or changes may be made in the structure and arrangement of the parts, within the spirit of the invention and the scope of the subjoined claims.

Having described the invention, what is claimed as new is:

1. A clock comprising a spring motor having a winding arbor, a vacuum motor adapted for connection to a source of vacuum, gear means operatively connecting said vacuum motor to said winding arbor, a valve controlling connection of said vacuum motor with said source, said valve having an operating member comprising a toggle lever, and automatic means connected with and time-controlled by said spring motor, said automatic means comprising a rotary element having an eccentric member, said eccentric member being operatively engageable with said toggle lever at predetermined intervals of time and for predetermined periods of time for opening and closing the valve to operate the vacuum motor for periodically winding said spring motor over a predetermined interval of time.

2. A clock comprising a spring motor having a winding arbor, a vacuum motor adapted for connection to a source of vacuum, drive means operatively connecting said vacuum motor to said winding arbor, a valve controlling connection of said vacuum motor with said source, said valve having an operating member comprising a toggle lever, and automatic means comprising a rotary part connected with and time-controlled by said spring motor said rotary part having an eccentric member engageable with said toggle lever at predetermined intervals of time and for predetermined periods of time to open and close the valve to operate the vacuum motor for periodically winding said spring motor.

3. A clock comprising a spring motor having a winding arbor, a vacuum motor adapted for connection to a source of vacuum, drive means operatively connecting said vacuum motor to said winding arbor, a valve controlling connection of said vacuum motor with said source, said valve having a valve operating member, an automatic means connected with and time-controlled by said spring motor for operatively connecting a part of said spring motor with said valve operating member at predetermined intervals of time and for predetermined periods of time to operate said vacuum motor for periodically winding said spring motor, said valve comprises a pivoted gate operated by said operating member and comprising an over-center arrangement including spring means for holding said gate in an over-center position.

4. A clock comprising a spring motor having a winding arbor, a vacuum motor adapted for connection to a source of vacuum, drive means constantly connecting said vacuum motor to said winding arbor, a valve controlling connection of said source with said vacuum motor, said valve having an operating element, automatic means operatively connected with and time-controlled by said spring motor, said automatic means comprising a movable part normally disengaged from said operating element, said movable part being arranged to be moved to operatively engage said operating element to open the valve at predetermined intervals of time and for predetermined periods of time to operate said vacuum motor for winding said spring motor.

5. A clock comprising a clockworks having a winding arbor, a vacuum operated motor having a rotary element, means constantly connecting said arbor and said rotary element for operation of said arbor by said vacuum motor, said vacuum motor being adapted for connection to a source of suction, a valve controlling connection of said source with said vacuum motor, said valve having a valve operating element, automatic means operated by and time-controlled by said clockworks, said automatic means comprising a movable part normally disengaged from said valve operating element, said movable part being arranged to be moved to operatively engage said valve operating element to open said valve at a selected point in time and to close said valve after a predetermined interval of time, for winding said clock during such interval.

6. A clock comprising a motor having a rotary element, a source of energy for operating said motor, a clockworks having a winding arbor constantly connected to said rotary element, a control for effecting operative connection of said source of energy with said motor, said control having an operating element, automatic means operated by and time-controlled by an element of said clockworks, said automatic means comprising a movable part normally disengaged from said operating element, said movable part being arranged to be moved to operatively engage said operating element to operate the motor at a selected point in time and to engage said operating element after a predetermined interval of time to stop said motor, for winding said clock during such interval.

7. A clock comprising a spring motor having a winding arbor, a vacuum motor adapted for connection to a source of vacuum, means operatively connecting said vacuum motor to said winding arbor, a valve controlling connection of said vacuum motor with said source of vacuum, said valve having an operating member comprising a toggle lever, and automatic means operated and time-controlled by said spring motor, said automatic means comprising a first rotary element having longitudinally spaced radial projections engageable with opposite sides of a portion of said toggle lever, a second rotary element coaxially arranged with respect to said first rotary element, at least one of said rotary elements being operatively connected to a part of said spring motor for timed rotation thereby, said first rotary element being supported for axial movement toward and away from said second rotary element to work said toggle lever to open and close said valve, spring means urging said first element toward said second element, and cam means operating between the adjacent ends of said first and second elements for producing movement of said first rotary element away from said second rotary element, whereby opening and closing of said valve takes place at predetermined intervals of time.

8. A clock comprising a spring motor having a winding arbor, a vacuum motor adapted for connection to a source of vacuum, means opera-

tively connecting said vacuum motor to said winding arbor, a valve controlling connection of said vacuum motor with said source of vacuum, said valve having an operating member comprising a toggle lever, and automatic means operated and time-controlled by said spring motor, said automatic means comprising a first rotary element having longitudinally spaced radial projections engageable with opposite sides of a portion of said toggle lever, a second rotary element coaxially arranged with respect to said first rotary element, at least one of said rotary elements being operatively connected to a part of said spring motor for timed rotation thereby, said first rotary element being supported for axial movement toward and away from said second rotary element to work said toggle lever to open and close said valve, spring means urging said first element toward said second element, and cam means operating between the adjacent ends of said first and second elements for producing movement of said first rotary element away from said second rotary element, whereby opening and closing of said valve takes place at predetermined intervals of time, said first and second rotary elements having eccentrically positioned stops, said stops being arranged to engage to connect said elements for rotation together, said stops being arranged to avoid engagement with each other while said first rotary element is held away from said second rotary element.

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