

June 5, 1951

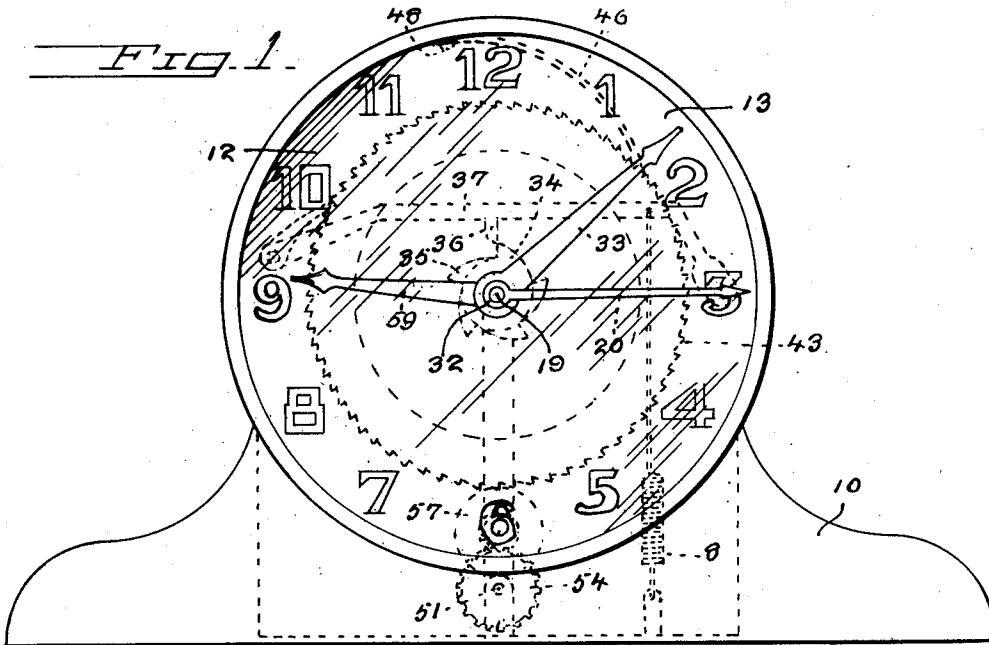
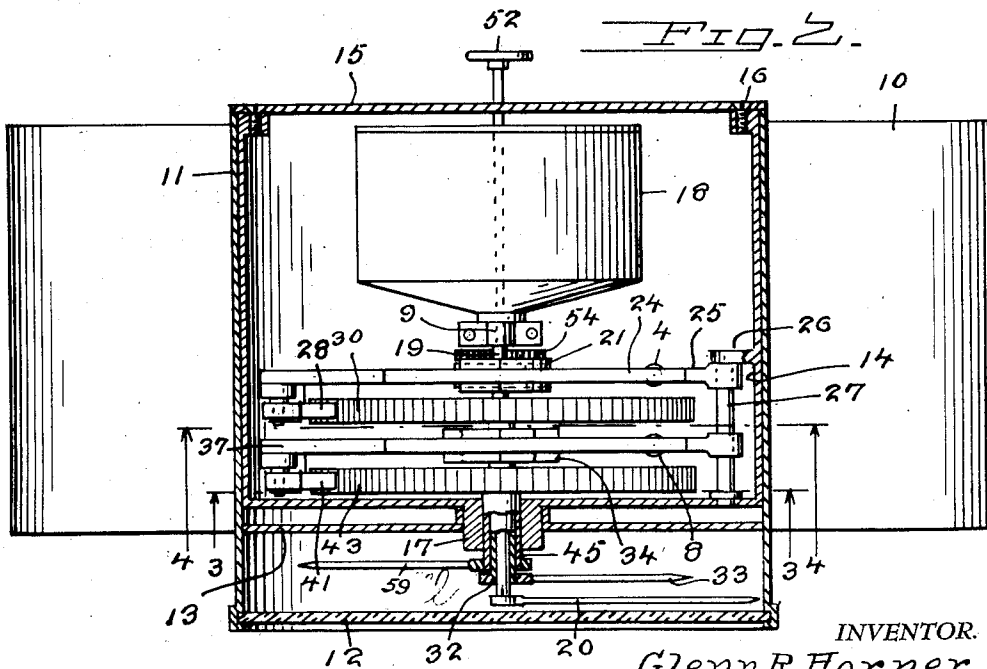
G. R. HORNER

2,555,408

GEARLESS CLOCK

Filed Sept. 22, 1948

2 Sheets-Sheet 1



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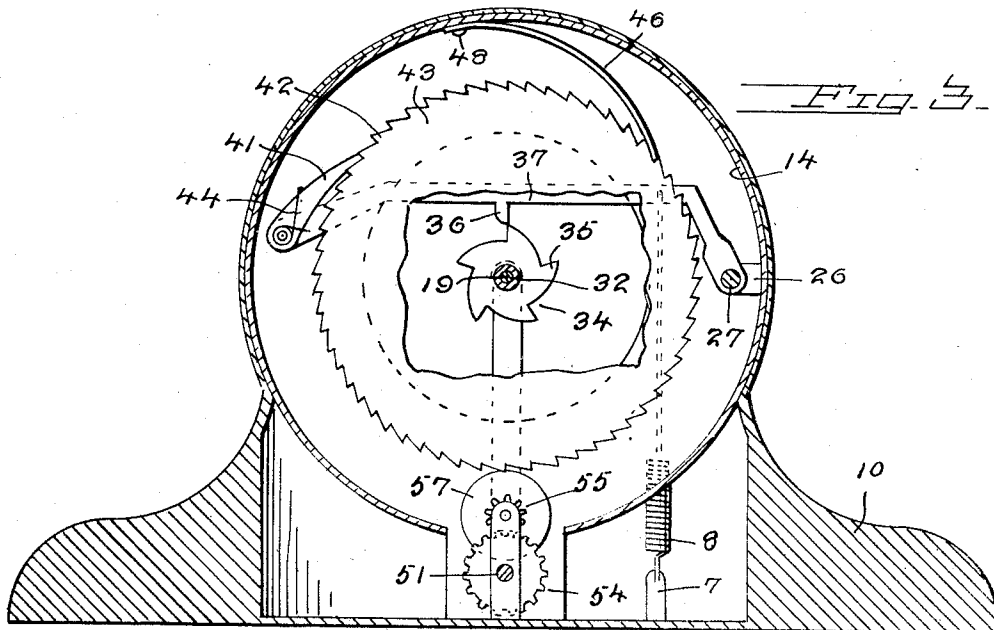
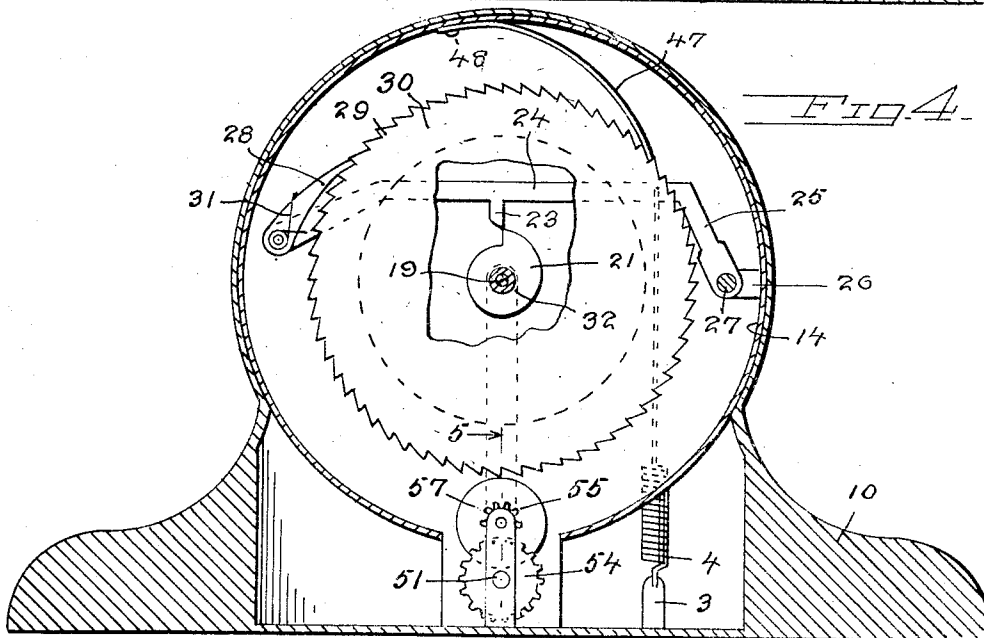
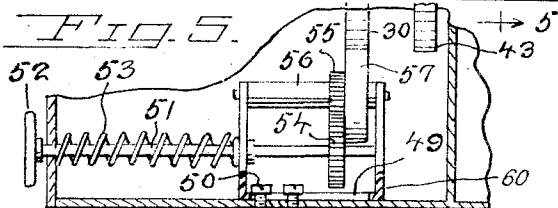
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UNITED STATES PATENT OFFICE

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GEARLESS CLOCK

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1 Claim. (Cl. 58—26)

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This invention relates to a clock, and more particularly to a clock mechanism for driving the hands of the clock.

The object of the invention is to provide a clock having a simplified clock mechanism.

Another object of the invention is to provide a clock mechanism for uniformly and positively driving the hands forward, regardless of the position of the hands.

A further object of the invention is to provide a clock mechanism which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application, and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a front elevational view of the clock according to the present invention;

Figure 2 is a top plan view of the clock with the cover and flat springs removed;

Figure 3 is a vertical sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2.

Fig. 5 is a sectional view of the clock taken on the line 5—5 of Fig. 4, showing the setting mechanism.

Referring in detail to the drawings, the clock comprises a base 10 supporting a housing 11. Carried by the forward portion of the housing 11 is a transparent closure 12, Figure 2, and arranged in spaced, parallel relation with respect to the closure 12 is a dial 13 provided with the usual markings thereon. A frame 14 is positioned within the housing 11, there being a back wall 15 releasably secured to the frame 14 by means of screws 16 for gaining access to the clock mechanism. A sleeve 17 projects from the forward end of the frame 14 and through the dial 13 for a purpose to be hereinafter described.

Arranged within the frame 14 is a one-revolution-per-minute synchronous motor 18 adapted to be connected to a source of electrical energy, and a first rotatable shaft 19 supported on a bearing 9 has one end projecting through the sleeve 17 and secured to the second hand 20 of the clock. Arranged transversely with respect to the shaft 19 and secured thereto is a cam 21 provided with one tooth, Figure 4. Arranged in bearing contact with the cam 21 is a shoe 23 which is carried by a lever 24. One end 25 of the lever 24 is pivotally connected to the rod 27, the rod 27 being supported by a lug 26. A coil

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spring 4 connects the lever 24 to a lug 3 which is secured to the base of the clock, so that the shoe 23 will be maintained in contact with cam 21.

The other end of the lever 24 is pivotally connected to a pawl or ratchet 28 which has its end arranged in engagement with the teeth 29 of a disc 30, there being sixty evenly-spaced teeth on the disc. A spring 31 biases the pawl 28 into engagement with the teeth 29, regardless of the position of the clock. The disc 30 is secured to an end of a hollow shaft 32 and the other end of the shaft 32 is secured to the minute hand 33 of the clock, the shaft 32 being arranged in concentric relation about the shaft 19. Arranged in superposed relation with respect to the disc 30 and secured to the shaft 32 is a cam 34 provided with five teeth 35 thereon, Figure 3. Arranged in bearing contact with the cam 34 is a shoe 36 which is carried by a lever 37, and one end 38 of the lever 37 is pivotally connected to the rod 27. A coil spring 8 connects the lever 37 to a lug 7 which is secured to the base of the clock so that the shoe 36 will be maintained in contact with the cam 34 so that the clock will operate regardless of its position.

The other end of the lever 37 carries a pawl or ratchet 41 which has its end arranged in engagement with the teeth 42 of the disc 43 and a spring 44 biases the pawl 41 into engagement with the teeth 42, there being sixty evenly-spaced teeth. The disc 43 is secured to an end of a hollow shaft 45 and the other end of the shaft 45 is secured to the hour hand 59 of the clock, the shaft 45 being arranged in concentric relation about the shaft 32.

A pair of flat springs 46 and 47 each has one end secured by a rivet 48 to the upper portion of the frame 14, and the other ends of the flat springs 46 and 47 bear against the discs 43 and 30, respectively, to prevent the hands of the clock from being turned backwards.

The mechanism for re-setting the clock is shown in detail in Figure 5, and comprises a carriage 60 slidably mounted on the base of the clock, there being a slot 49 in the carriage 48 and projecting through the slot 49 is a pair of screws 50 for maintaining the carriage in alignment as it is moved. For moving the carriage, a rod 51 is supported thereon and is provided with a knurled knob 52 on one end thereof. A tension spring 53 is circumposed on the rod 51 and has one end secured to the carriage 48 for normally biasing the latter toward the back of the clock. A spur gear 54 is secured to the rod 51 and is arranged in meshing engagement with a second

spur gear 55 secured to a rotatable shaft 56. A rubber wheel 57 is secured to the shaft 56 and is adapted to be moved into and out of engagement with the disc 30, as the carriage is moved. Upon rotation of the rod 51, the disc 30 will be rotated to thereby move the hands to the desired position.

The sequence of operation of the clock is as follows: The motor 18 turns over one revolution per minute to cause the second hand 20 to turn 360° every minute. Also, by the action of the shoe 23 bearing against the cam 21, the pivotally connected lever 24 and pawl 28 will cause one 360° rotation of the minute hand 33 for every sixty revolutions of the second hand 20. Similarly, rotation of the disc 30 rotates the five-toothed cam 34 which has bearing against it the shoe 36 so that the lever 37 and pawl 41 cause the disc 43 and hour hand 50 to rotate one 360° revolution for every sixty complete revolutions of the minute hand 33. The coil springs 4 and 8 maintain the shoes 23 and 36, respectively, in contact with the cams 21 and 34 to insure operation of the clock, regardless of its position. A pair of flat springs 46 and 47 exert light pressure on the discs 43 and 30, respectively, to thereby prevent the hands from being turned backwards. The clock can be reset by movement of the knob 52 inwardly to move the rubber wheel 57 into engagement with the disc 30, so that by rotation of the knob 52, the hands of the clock can be moved to their proper position.

From the foregoing it will now be seen that there is herein provided a device which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

A clock comprising a base, a housing supported on said base, a transparent closure carried by the forward portion of said housing, a dial arranged in spaced parallel relation with respect to said closure and provided with markings thereon, a frame positioned within said housing, a back wall releasably connected to said frame, a sleeve projecting from the forward end of said frame and extending through said dial, a motor adapted to be connected to a source of electrical energy arranged within said housing, a first rotatable shaft projecting through said sleeve and having an end secured to said motor, a second

hand secured to the other end of said first shaft, a first cam carried by said first shaft and provided with a single tooth, a second rotatable shaft arranged in concentric relation about said first shaft, a first disc provided with a plurality of spaced teeth on an end of said second shaft, means operatively connecting said first cam to the teeth of said first disc for rotating the latter upon rotation of said first shaft, said means comprising a horizontally disposed rod arranged in said housing, an offset lever having one end pivotally connected to said rod, a shoe arranged on the lower surface of said lever for engaging the tooth on said first cam, a pawl pivotally connected to the other end of said lever and engaging the teeth on said first disc, a lug extending upwardly from said base, a coil spring extending between said lug and said lever, a spring for urging said pawl into engagement with the teeth on said disc, a minute hand carried by the other end of said second shaft, a second cam carried by said second shaft and provided with a plurality of teeth, a third rotatable shaft arranged in concentric relation about said second shaft, a second disc provided with a plurality of spaced teeth mounted on an end of said third shaft, means operatively connecting said second shaft to the teeth of said second disc for rotating the latter upon rotation of said second shaft, said last-named means comprising a lever having one end pivotally connected to said rod, a shoe arranged on the lower surface of said last-named lever for engaging the teeth on said second cam, a pawl pivotally connected to the other end of said last-named lever and engaging the teeth on said second disc, an hour hand carried by the other end of said third shaft, manually operable means on said clock for resetting the latter, and resilient means embodying a pair of flat springs secured to said frame and bearing against said discs for preventing the hands of the clock from being turned backwards, said clock hands being advanced during the raising of the levers.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,008,610	Florman	July 16, 1935
2,058,609	Magro	Oct. 27, 1936

FOREIGN PATENTS

Number	Country	Date
439,035	Great Britain	Nov. 28, 1935