March 7, 1933. W. A. SPEAR 1,900,311

CLOCK

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Fig. 1

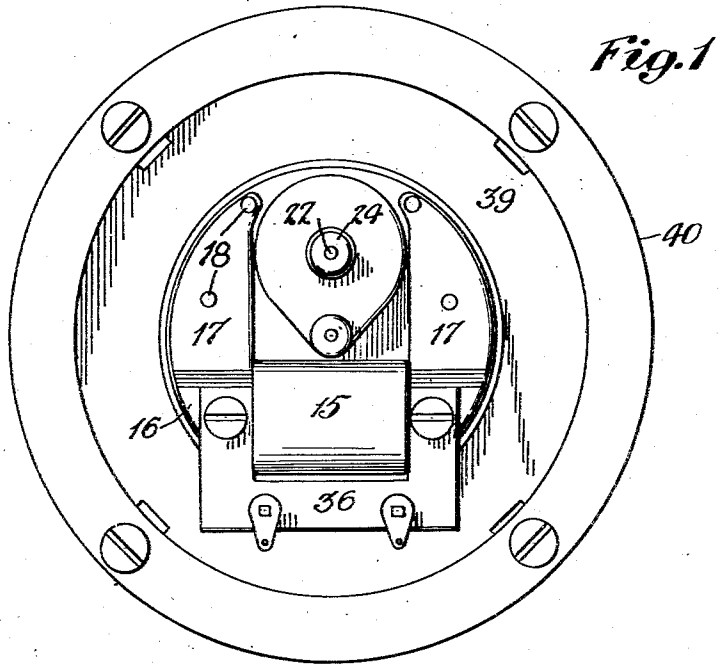


Fig. 2

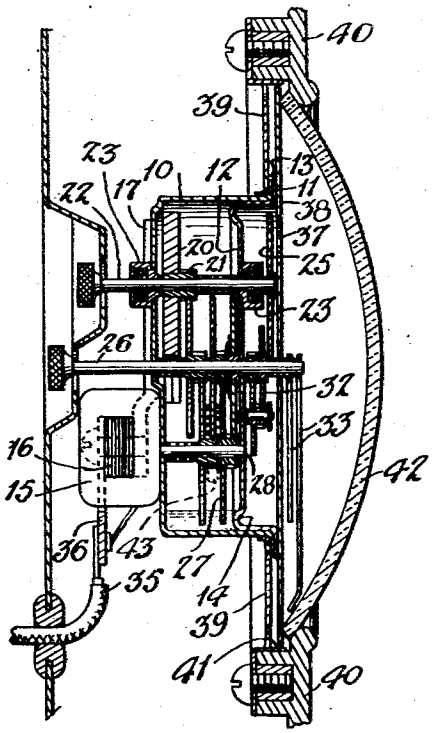
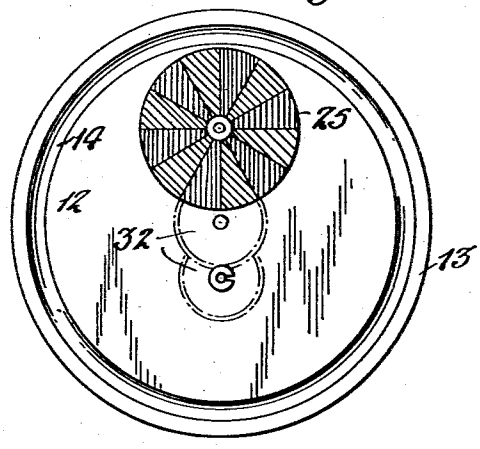


Fig. 3



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CLOCK

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Fig. 4

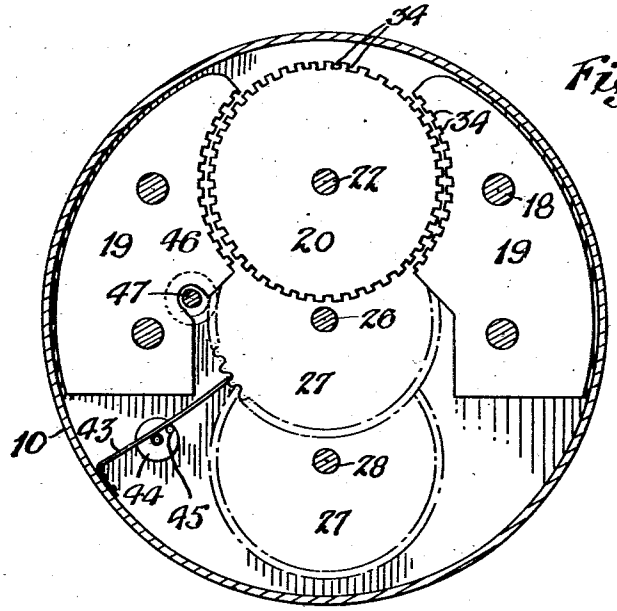


Fig. 5

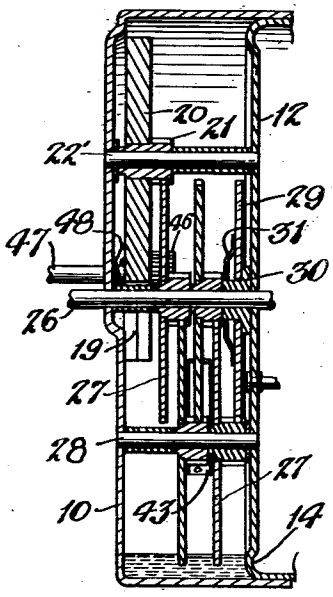
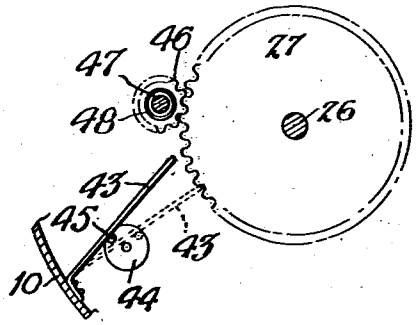


Fig. 6



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Patented Mar. 7, 1933 1,900,311

UNITED STATES PATENT OFFICE

WALTER A. SPEAR, OF CINCINNATI, OHIO, ASSIGNOR TO VICTOR ELECTRIC PRODUCTS, INC., OF CINCINNATI, OHIO

CLOCK

Application filed July 22, 1930. Serial No. 469,852.

My invention relates to improvements in clocks and more particularly to clocks or the like operated by electricity.

An important object of my invention is the provision of an electric clock having an improved and simplified rotor and gear train.

Another object of my invention is the provision of a device of this character having a novel case and dial construction.

A further object of my invention is to provide an electric clock with means to indicate the running thereof.

Still another object of my invention is a simple lubrication system for the clock train.

A still further object of my invention is the provision of a device of this character which is simple in construction and operation, inexpensive to manufacture, and strong and durable in use.

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

In the accompanying drawings, which form a part of this specification, and wherein like characters of reference denote like or corresponding parts throughout the same.

Figure 1 is a rear elevation of an electric clock embodying my invention,

Figure 2 is a central vertical section thereof,

Figure 3 is a front elevation of the clock with the dial removed,

Figure 4 is a sectional view through the rear of a slightly modified form of clock case, parts being shown in elevation,

Figure 5 is a fragmentary sectional view thereof, and

Figure 6 is a detail of the indicator.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a cup-shaped case having a radial flange 11 at its open end. A shallow cup-shaped cover 12 fits snugly into the case 10 and is provided with a radial flange 13 which abuts against the flange 11. An annular groove 14 pressed into the closed end of the cover 12 at its periphery adds resiliency to the cover and produces a very snug fit between the cover and case.

A synchronous motor comprises a coil 15 mounted upon a laminated core 16 which in turn is bolted or otherwise secured at its ends to primary pole pieces 17. The pole pieces 17 are spaced apart a distance equal to the length of the coil 15 and are secured to the rear face of the case 10 by suitable rivets or the like 18. The outer edges of the pole pieces 17 preferably conform to the shape of the case 10. Secondary pole pieces 19 are arranged within the case 10 and are secured thereto by the rivets 18. The upper inner edges of the secondary pole pieces 19 cooperate to form an opening to receive the rotor 20 mounted on the pinion 21 which is rigidly secured to the shaft 22. The shaft 22 is journaled in suitable bearings or stuffing boxes 23 arranged in the case 10 and cover 12 and accurately aligned. The end of the shaft 22 rearward of the case 10 is provided with a suitable starting knob 24 and its opposite end is provided with a disk 25 hereinafter described.

A shaft 26 is journaled substantially centrally of the case and cover and is provided with a gear set 27 comprising a pinion freely rotatable on the shaft and carrying a gear which meshes with the pinion 21 carrying the rotor. A shaft 28 is rigidly mounted in the case and cover and is spaced below and parallel with the middle shaft 26. A gear set 27 is freely mounted on the shaft 28 and engages the pinion of the gear set on the shaft 26. Other gear sets are mounted on the shafts 26 and 28 to freely rotate thereon and constitute the clock train. The last gear set on the shaft 28 has its pinion engaging a gear 29 freely rotatable on a flanged collar 30 secured to the shaft 26. A friction spring 31 is secured to the collar 30 and frictionally engages the gear 29 to rotate the shaft 26, (see Figure 5). The conventional intermediate time train 32 connects the hands 33 of the clock and together with the disk 25 is located within the cupped portion of the cover 12.

The gear sets 27 are similar and are interchangeable. The clock casing formed by the parts 10 and 12 is dustproof and liquid proof, and a supply of oil or other lubricant

may be arranged in the bottom of the casing to be carried through the clock train by the lower gears, as shown in Figures 2 and 5.

The periphery of the rotor 20, together with the adjacent edges of the secondary pole pieces 19, is provided with regularly spaced notches 34.

Alternating current is supplied to the coil 15 by wires 35 supported on the U-shaped non-conducting bridge 36, and sets up an alternating magnetic field in the coil core 16 and primary pole pieces 17. This magnetic field is transferred through the walls of the case to the secondary pole pieces 19 by induction, the coil and primary pole pieces being arranged outside of the case for heat radiation. The change in flux in the magnetic circuit forms a revolving field which turns the rotor at a definite speed, when the rotor has been brought to this speed manually by means of the knob 24. The disk 25, on the rotor shaft 22 is imprinted with narrow strips of colors, as in Figure 3, and this disk is visible through a suitable opening 37 in the dial 38, and indicates the running of the motor by displaying a solid neutral color.

The rotor acts through pinion 21 to revolve the gear sets of the clock train which are all mounted freely on shafts 26 and 28, and the gear sets operate through the gear 29 and friction spring 31 to rotate the shaft 26 and thus operate the hands 33 of the clock. The clock train is entirely supported by the two shafts 26 and 28 which are in turn supported by the casing which encloses the train.

A thin plate 39 is blanked out to fit over the housing or casing and is provided with a flange which is bolted or otherwise secured to the clock frame 40. Tabs 41 are turned down from this plate and fit into notches in the edge of the dial 38. The plate 39 presses against the flange of the case 10 which in turn presses against the dial 38, thereby forcing the dial against the peripheral edge of the clock glass 42. As the dial extends radially beyond the casing 10, the edge of the dial is slightly resilient and acts as a cushion for the glass 42, preventing rattling and breakage of the glass.

The rotor 20 is surface hardened to increase its magnetic reluctance and is operated at a relatively low speed. A synchronous motor has a tendency to rock above and below synchronous speed, due to variations in the load, line surges and the like. In the present motor the peripheral speed of the rotor, the width of the notches spacing the rotor tips, and the magnetic reluctance of the rotor are so related that an electric ratchet is formed, preventing hunting.

In Figures 4, 5 and 6 I have shown an audible indicator. A leaf spring 43 is secured to the side of the case 10 and extends into the teeth on the first gear set 27 on the shaft 26. As the gear set rotates, the spring 43, snapping from one tooth to the next, will give an audible tick or click, thereby showing that the clock is running. A disk or the like 44 is arranged for rotation adjacent the spring 43 and is provided with an eccentric pin 45 adapted to engage the under side of the spring. When it is desired to discontinue the operation of the ticking spring, the disk 44 is rotated, and the pin 45 caused to force the spring 43 away from the gear teeth as shown in Figure 6.

When the audible indicator is used, the rotor 20 may be mounted on a stationary shaft as at 22′ in Figure 5. The shaft 22′ need not be brought through the casing, and will form an oil tight joint therewith without the use of packing glands. The necessity for aligned bearings is also dispensed with.

When the stationary shaft 22′ is used, the clock is started by means of a pinion 46 mounted on a shaft 47 and normally held out of engagement with the first gear set 27 by means of a coil spring 48. The pinion 46 is moved into engagement with the gear set and rotated to start the motor, and when released will be thrown out of engagement by means of the spring 48.

If desired the ticking spring 43 may be used in conjunction with the spinner disk 25, as shown at 43 in dotted lines in Figure 2, and may be thrown out of operation when the ticking is not desired. This ticking may be made to simulate the sound of a spring operated clock.

While I have shown and described the preferred embodiment of my invention it is to be understood that various changes in the size, shape, and arangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claim.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

In a clock mechanism, a cup-shaped casing, a relatively shallow cup-shaped cover adapted to fit into the open end of the casing, said cover having a groove formed therein adjacent its periphery to render the cover compressible, shafts supported between the casing and cover, a gear train arranged on said shafts, and means to operate said gear train.

In testimony whereof I affix my signature.

WALTER A. SPEAR.