

March 17, 1936.

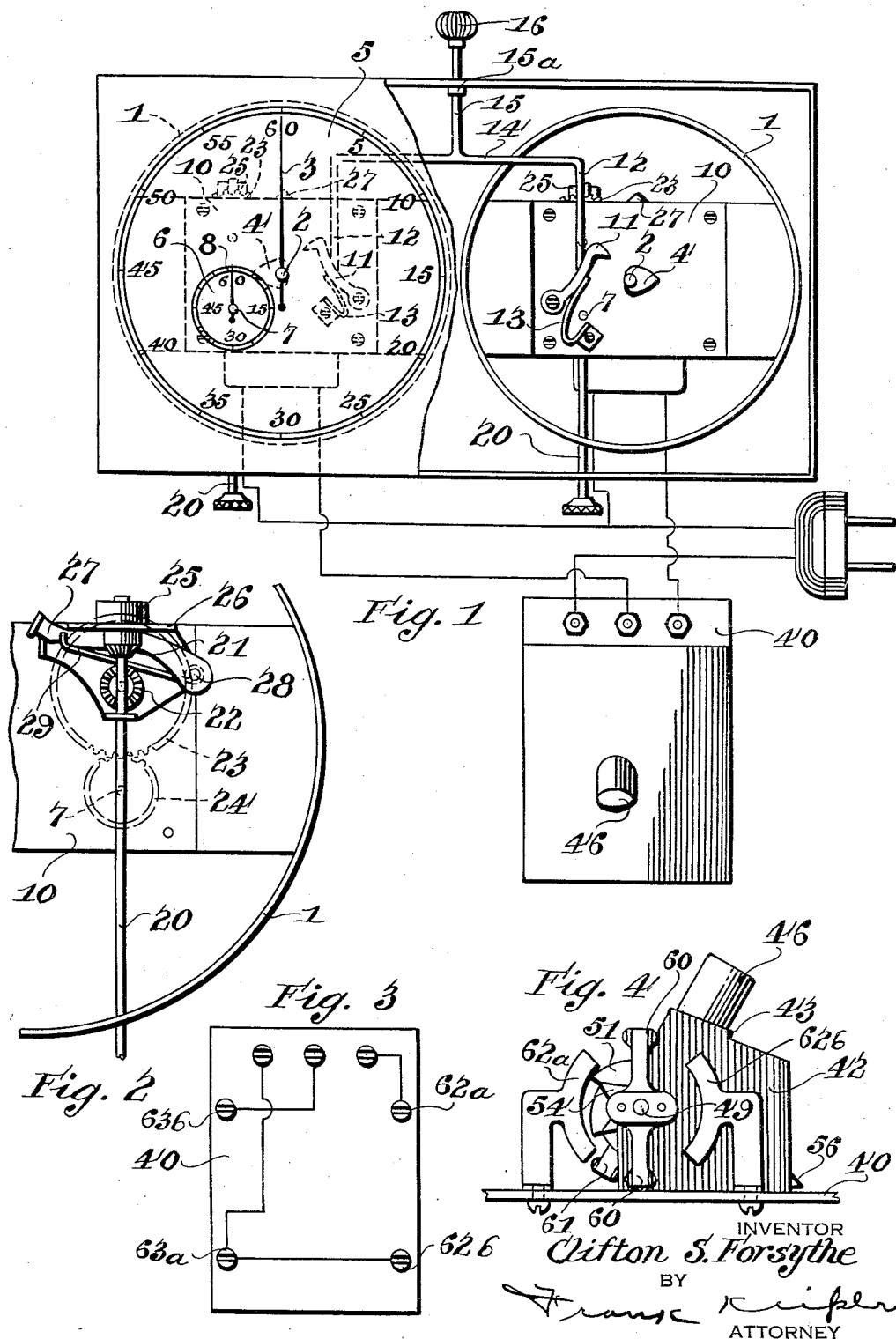
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2,034,613

APPARATUS FOR STARTING, STOPPING, AND RESETING AN ELECTRICALLY DRIVEN CLOCK

Filed June 1, 1933

2 Sheets-Sheet 1



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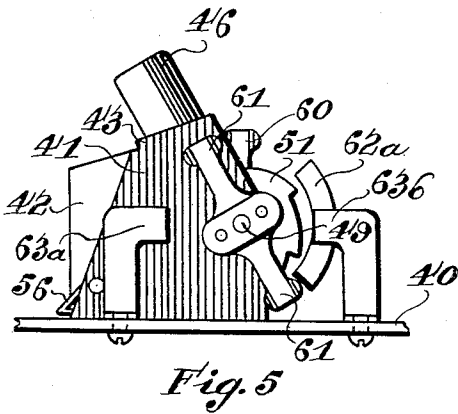


Fig. 5

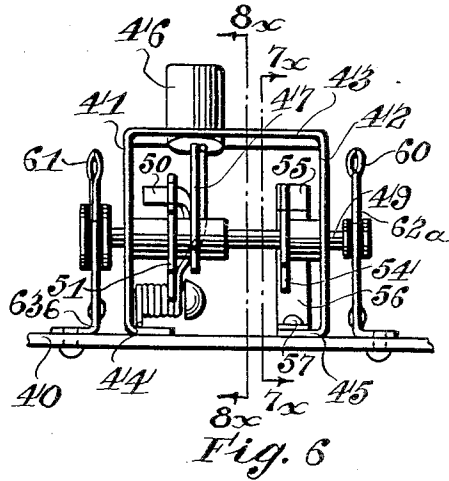


Fig. 6

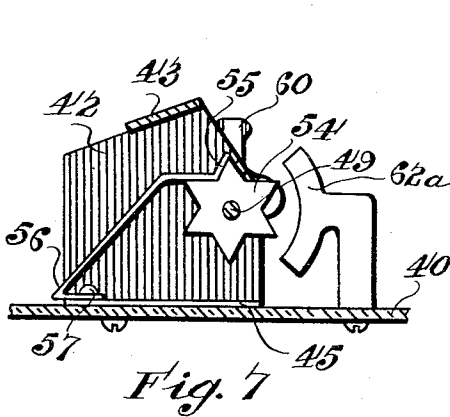


Fig. 7

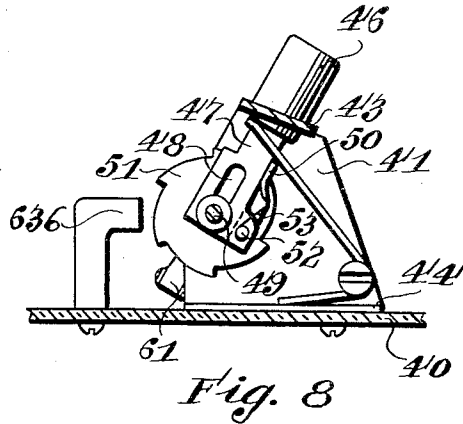


Fig. 8

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APPARATUS FOR STARTING, STOPPING,
AND RESETTING AN ELECTRICALLY
DRIVEN CLOCK

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Application June 1, 1933, Serial No. 673,876

5 Claims. (Cl. 161—15)

The object of this invention is to provide a new and improved form of clock that is driven by alternating current.

Another object of the invention is to provide the clock with a second hand and a minute hand, both of which can be manually reset to zero.

Another object of the invention is to provide two clocks exactly alike, each of which operates independently of the other, and to provide an electrical system for starting and stopping the two clocks.

Another object of the invention is to provide a switch which can be operated by the foot or hand for closing the circuit, setting both clocks in operation, and stopping first one and then the other.

Another object of the invention is to arrange a switch so that it will operate by a series of similar impulses, said switch having different contacts so that on the first operation the switch will start both clocks, on the second operation the switch will stop one clock, and on the third operation the switch will stop the second clock, leaving the first clock stopped, it being understood that the clocks can then be manually reset and can be started again by the switch which will repeat the foregoing cycle of operation.

In the drawings:

Figure 1 is a front elevation of the front of the two clocks and the switch and the electrical connections therefor, the casing being partly broken away to expose the inside of one of the clocks.

Figure 2 is a rear elevation of a portion of the clock partly broken away to show the resetting mechanism of the minute hand.

Figure 3 is a diagrammatic view of the connections on the bottom of the switch board.

Figure 4 is a side elevation of the switch, as viewed from the right of Figure 6, the parts being shown in zero, or the first, position with the circuit open.

Figure 5 is a side elevation of the switch viewed from the left of Figure 6, with the circuit open.

Figure 6 is a front elevation of the switch.

Figure 7 is a section on the line 7x—7x of Figure 6, looking to the right.

Figure 8 is a vertical section through the switch, the section being taken on the line 8x—8x of Figure 6, looking to the left.

In the drawings like reference numerals indicate like parts.

In the drawings reference numeral 1 indicates a clock case having therein a central arbor 2, carrying a second hand 3. A heart-shaped cam 4 is provided on the arbor of the second hand.

The dial 5 is provided for the travel of the second hand and is calibrated from 1 to 60 seconds.

Inside of the large dial 5 is provided a small dial 6, which is calibrated from 1 to 60 minutes, through which passes an arbor 7, on which is carried a minute hand 8. The second hand and the minute hand are driven in correct ratio to each other.

It will be understood that these hands are driven electrically as in the well known type of electrically driven clock, and the illustration of the driving mechanism of the clock is omitted because that part is old and well known and constitutes no part of my invention.

Inside of each clock is provided a bridge plate 10, on which is pivotally mounted a pawl 11. This pawl engages the heart-shaped cam 4 for the purpose of resetting the second hand. This pawl is operated by a rod 12 which contacts with the pawl 11 and makes sliding engagement therewith as the pawl is swung thereby. The pawl is pressed down against a C-shaped spring 13, which raises the pawl as soon as the bar 12 is released from its downward thrust.

Both clocks are equipped and are reset in the same way. The rods 12 in each clock are connected by a yoke 14, which in turn is moved by a stem 15, and handle 16. The operator presses down on the handle 16 with his finger and resets the second hands of both clocks at the same time. The upward movement of the stem 15 is limited by the shoulder 15a. This keeps the springs 13 from moving the stem 15 too far.

The minute hand is reset by the train of mechanism shown in Figure 2, in which the shaft 20 is provided having a bevel gear 21 on the rear end thereof, which shaft can be pulled down to bring the bevel gear 21 into mesh with the bevel gear 22. On the same arbor with the bevel gear 22 is the spur gear 23, which meshes with the spur gear 24. When the shaft 20 is pulled down and turned, it turns the bevel gear 22, the spur gear 23, and the spur gear 24. The spur gear 24 is carried on an arbor 7, shown in Figure 1, which arbor carries the minute hand 8. By pulling this shaft down and turning it, the minute hand is turned to any position desired.

The bevel gear 21 is provided with an enlarged shouldered hub 25 that turns in a hole in the plate 26. This shoulder engages the arm 27, pivoted at 28, which arm is normally held up against the plate 26 by the spring 29. When the shaft 20 is pulled down, it pulls the arm 27 and spring 29 down with it. When the shaft 20 is released, the spring 29 pushes the arm 27 up and raises the

shaft 20, taking the bevel gear 21 out of mesh with the bevel gear 22.

For the purpose of starting and stopping this clock, I provide an automatic switch shown in Figures 4, 5, 6, 7 and 8, which switch is mounted on the horizontal plate 40, and has two upright plates or members 41 and 42 connected by a yoke member 43. The bottom of each of the upright plates 41 and 42 are turned inwardly as shown at 44 and 45. These parts are all formed in one piece of sheet metal.

In the top member 43 is a large opening in which slides the push button 46. This push button is mounted on a blade 47, which is slotted as shown at 48, and engages the horizontal shaft 49 of the switch and has a sliding bearing thereon. Extending sideways from the blade 47 is the arm 50 that is adapted to engage with each of the six teeth on the ratchet wheel 51. This arm 50 is pivoted on the blade at 52, and is normally held against the edge of the blade by the spring 53, and in this position it is adapted to engage one of the teeth of the ratchet wheel 51 on its downward movement. Its downward movement carries the ratchet wheel and shaft around 60 degrees, or one-sixth of a circle.

The push button operates with a full stroke, and the ratchet wheel is turned 60 degrees by reason of the full stroke device, which will now be described.

On the shaft 49 is provided the star wheel 54, having six points thereon equally spaced apart, between which points engages the detent 55 of the spring 53 fastened to the base at 57. During the first half of its movement the point of the star wheel is forced under and beyond the detent 55, bending the spring up. The spring then snaps down and carries the star wheel 54, shaft 49, and ratchet wheel 51, through the rest of its movement of 60 degrees.

On each of the outer ends of the shaft 49 is provided a pair of contact arms 60 and 61. The arm 60 is on the right of Figure 6 and makes engagement with the stationary contacts 62a, 62b. The arm 61 is on the left of the shaft 49 in Figure 6 and makes contact with the stationary contacts 63a, 63b of Figure 5. The contacts 60 and 61 comprise two blades that are adapted to engage on the outside of the stationary contacts with which they engage as they move around the circle by successive steps.

With the clock idle, and with the parts in zero position, as shown in Figures 4 and 5, it will be seen in Figure 5 that the arm 61 is set a little in advance of the arm 60. It will also be seen that the stationary contacts 62a and 62b in Figure 4 are about 75 degrees long, and the stationary contacts 63a and 63b are only 10 or 15 degrees long. On the first downward movement of the push button 46, the contacts 60 and 61 both engage with the contacts 62a and 62b, and 63a and 63b, respectively. On the next downward movement of the button 46, the rotating contact 60 maintains contact with the stationary contacts 62a and 62b, and the rotating contact 61 passes out of engagement from the stationary contacts 63a and 63b. The next downward movement of the push button brings both of the rotary contacts into the zero position, where neither of them is in contact with the stationary contacts.

It will also be understood that the rotary contacts are insulated from the shaft 49, (this is not necessary) and that when either of the rotary contacts make engagement with the stationary contacts the current can flow through the rotat-

ing contacts from one side of the stationary contacts to the other side of the stationary contacts. The current is conducted by the conductors shown in Figure 3 and Figure 1.

With the switch in the zero position, the second hand is idle. The operator in measuring the time for an observation or an experiment pushes the button down with his foot or hand and starts both clocks, and at the time indicated by the next observation he pushes down on the button again and stops one clock, and on the next observation he pushes the button down again and stops the second clock, and the positions of the second hands on the two clocks will then give him two readings of time measurement. He can reset the clocks then by pushing down on the button 16, and turning the shaft 20, after which the cycle of operation can be repeated.

This instrument is devised for the purpose of measuring the reaction of patients to successive impulses, or measuring the reactions of patients to the same impulse, or it can be used for measuring the time of race horses, and can be used for other purposes.

I claim:

1. A switch having a central shaft, a ratchet wheel thereon having six teeth, a push-button and a pawl by which said ratchet wheel and shaft are advanced by a step-by-step movement, a pair of arms on each end of said shaft, stationary double pole contacts at each end of the switch with which said arms make contact, one pair of said stationary contacts having a width of but ten or fifteen degrees each, the other pair of stationary contacts having a width of about seventy-five degrees each, said arms being adapted to be moved together by successive impulses of said button, first from neutral or open circuit position to making contact with both sets of stationary contacts, and then being adapted on the next step to move one pair of arms out of contact with its stationary contacts, and on the next step to move the other pair of arms out of contact with its stationary contacts.

2. The combination of two clocks, an arbor in each clock, a second hand on each arbor, a motor in each clock for driving said arbors, a cam on each clock for resetting the arbor and the second hand thereof, a pawl in each clock for engaging said cam to reset the second hand, means for operating the two pawls together manually, a three position switch, connecting means connecting the switch to the motors, means for operating said switch to each of its three positions, said switch being adapted to energize said motors when in one position, said switch being adapted to de-energize one motor in another position, and being adapted to de-energize both motors in a third position.

3. The combination of two clocks, an arbor in each clock, a hand on each arbor, driving means for each of the two arbors, a switch having a series of sets of contacts, means connecting said contacts with each of said driving means, means for moving said switch by a series of impulses to operate said contacts successively, said switch operating with the first set of contacts to energize the driving means on both clocks on the first impulse, said switch operating to de-energize the driving means on the first clock on the second impulse, said switch operating to de-energize the driving means on the second clock by the third impulse.

4. The combination of two clocks, an arbor in each clock, a hand on each arbor, driving means

for each of the two arbors, a switch having a series of contacts, means connecting said contacts with each of said driving means, means for moving said switch by a series of impulses to operate said contacts successively, said switch operating to energize the driving means on both clocks on the first impulse, said switch operating to de-energize the driving means on the first clock on the second impulse, said switch operating to de-energize the driving means on the second clock by the third impulse, means for manually resetting both arbors and hands to starting position.

5. The combination of two clocks, an arbor in each clock, a hand on each arbor, driving means

for each of the two arbors, a switch having a series of sets of contacts, means connecting said contacts with each of said driving means, means for moving said switch by a series of impulses to operate said contacts successively, said switch operating with the first set of contacts to energize the driving means on both clocks on the first impulse, said switch operating to de-energize the driving means on the first clock with the next set of contacts on the second impulse, said switch operating to de-energize the driving means on the second clock with the third set of contacts by the third impulse.

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