

E. A. HUMMEL.
 AUTOMATICALLY DISPLAYED SYNCHRONIZER INDICATOR FOR CLOCKS.
 APPLICATION FILED AUG. 10, 1911.

1,066,016.

Patented July 1, 1913.

2 SHEETS—SHEET 1.

Fig. 2

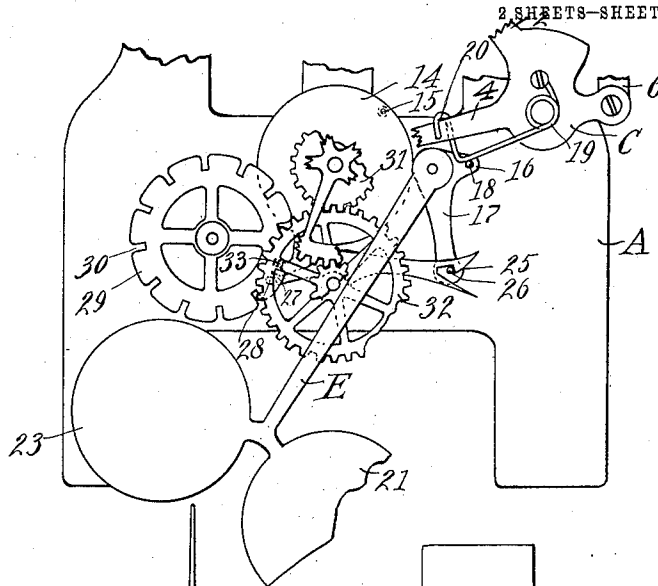
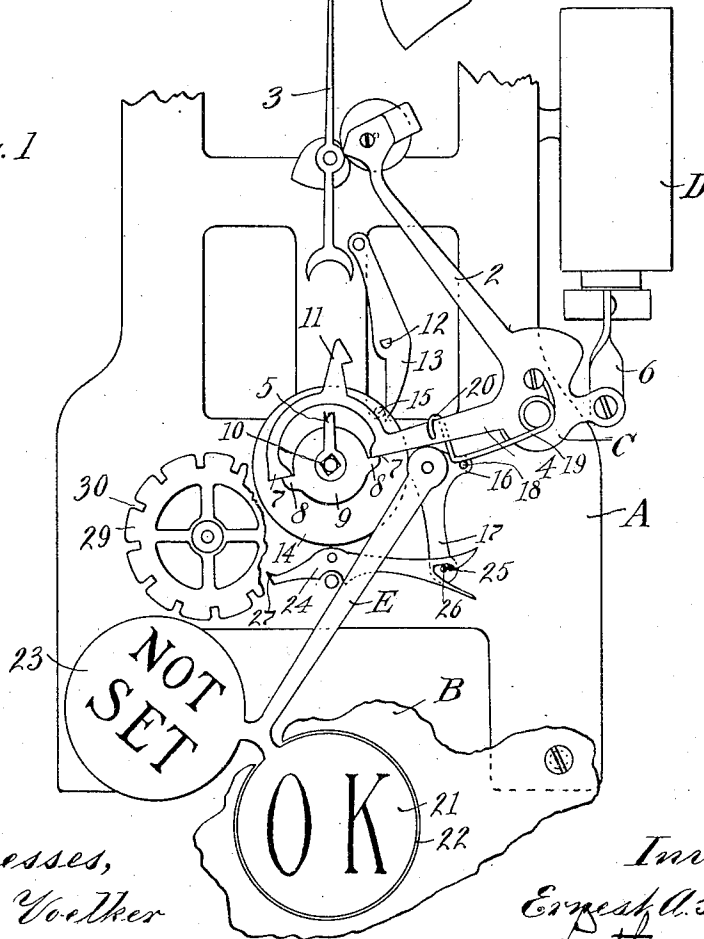


Fig. 1



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Fig. 3

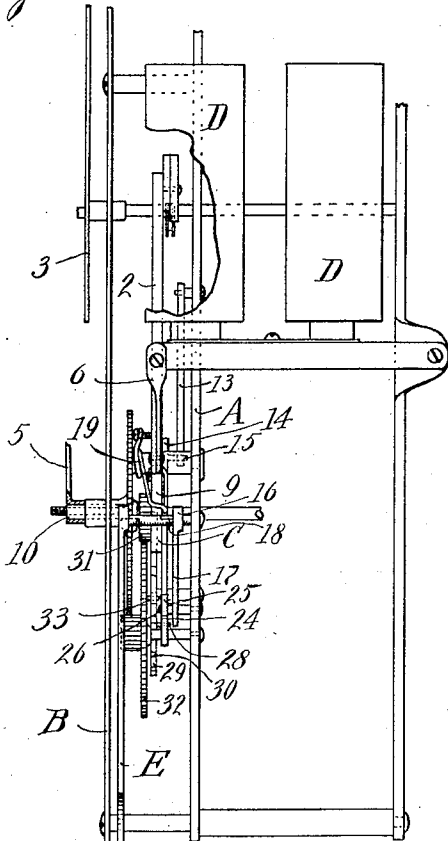


Fig. 5

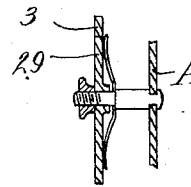
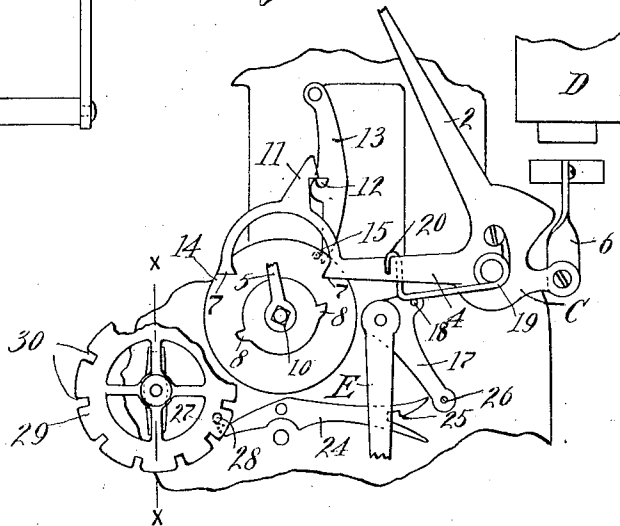


Fig. 4



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UNITED STATES PATENT OFFICE.

ERNEST A. HUMMEL, OF ST. PAUL, MINNESOTA, ASSIGNOR TO ALBERT L. HAMAN, OF ST. PAUL, MINNESOTA.

AUTOMATICALLY-DISPLAYED SYNCHRONIZER-INDICATOR FOR CLOCKS.

1,066,016.

Specification of Letters Patent.

Patented July 1, 1913.

Application filed August 10, 1911. Serial No. 643,260.

To all whom it may concern:

Be it known that I, ERNEST A. HUMMEL, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Automatically-Displayed Synchronizer-Indicators for Clocks, of which the following is a specification.

My invention relates to improvements in automatically displayed synchronizer indicators for clocks, adapted for use with clocks which are to be synchronized at greater intervals of time than every hour, for instance every twenty-four hours or every twelve hours. Its object is to provide means actuated by the synchronizing mechanism of such clocks which will visually indicate whether the clock was synchronized at the proper time.

In the embodiment of the invention shown in the drawings I have provided a visual indicator in position to be moved by the synchronizing lever into indicating or display position and then to be held in that position until just before the arrival of the next regular twenty-four hour synchronizing period, so that the clock will always show whether it was synchronized, as it should have been at the last regular period.

To this end the invention consists in the construction, combination, and arrangement of parts hereinafter described and claimed.

In the accompanying drawings forming part of this specification, Figure 1 is a front view of the indicator and synchronizing mechanism of a clock with some parts broken away, showing the indicator in display position; Fig. 2 is a similar view somewhat more in detail, showing the gears for operating the notched wheel; Fig. 3 is a side view of so much of a clock as is necessary to show the indicator and synchronizing mechanism, partly broken away; Fig. 4 is a front view of a fragment of the synchronizing and indicator mechanism, showing the position of the parts at the beginning of the stroke of the synchronizing lever; and Fig. 5 is a section on line $x-x$ of Fig. 4.

In the embodiment of the invention shown in the drawings A represents the framework of the clock and B the dial. The synchronizing mechanism here shown is of a kind well known in the art and comprises a bell crank synchronizing lever C

pivotally supported upon the framework and having two divergent arms, an arm 2 for synchronizing the seconds hand 3, and an arm 4 for synchronizing the minute hand 5. This lever is connected by means of a link 6 with the armature of an electro magnet D, which is in circuit with, and operated by, a standard or master clock not shown. At its outer end the arm 4 is arched upward so as to form two separated hammer ends 7 to engage the diametrically opposite lugs 8 upon the disk or annular shoulder 9 when the synchronizing lever is thrust down. This disk is carried by the minute hand sleeve 10, and the seconds and minute hands are driven by the usual clockwork mechanism, which is not here shown as it forms no part of the present invention.

In order to lock the synchronizing lever from being actuated except at the even hour, a thing that might happen by reason of false contacts in the electro circuit of the magnet D, the arched end of the arm 4 has a notched lug 11, which is normally engaged by a pin 12 on a depending pivoted arm 13, the end of which overlaps the inner face of a large disk 14 and stands in the path of a pin 15 upon the disk. This disk is integral with or fast upon the minute hand sleeve, so that it revolves with the minute hand. Once in each revolution of the disk 14 the pin 15 will engage and wipe the end of the arm 13, and thereby move the pin 12 out of engagement with the lug 11. The pin 15 is so positioned on the disk as to engage the arm 13 about two minutes before an even hour and to pass it so as to leave it free to swing back against the lug 11 about two minutes after the even hour. It is only during the interval when the notched lug is thus released that the synchronizing lever can be moved down to synchronize the clock. This locking arrangement for the synchronizing lever is of a kind well known in the art and need not be further described.

The present invention resides particularly in connecting with the synchronizing mechanism certain means which shall be displayed by the actuation thereof and remain displayed until the arrival of the next synchronizing period, it being understood that the present invention is designed particularly for use where the synchronizing occurs at intervals greater than one hour, apparatus for synchronizing at shorter inter-

vals being shown in my co-pending application filed contemporaneously with this application, Serial No. 643,259. In the embodiment of the invention which is shown in the drawings, an indicator arm E is pivotally supported in the framework below the synchronizing lever C. The arm E has at the top a laterally projecting arm 16 and a downwardly projecting arm 17. Upon the arm 16 is a stud 18 in position to be engaged by a spring 19 upon the arm 4 of the synchronizing lever C. This spring is secured at one end to the lever C near its point of pivotal support, while the other end 20 is looped or hooked over the arm 24. Thus the spring, which extends down below the arm 4, forms a resilient cushion which, when the lever C is thrust down engages the stud 18 on the lateral arm of the indicating arm E. This lever terminates at the bottom in a display plate 21, upon which may be placed any desired symbol, such as the distinguishing color or the letters "O K" shown in the drawings. When the stud 18 is struck by the synchronizing lever, as above described, the indicating lever E, which works at the back of the dial, will be moved across the inner side thereof and into registration with a hole 22 in the dial, through which the display face 21 will thus become visible from the outside. If desired the arm E can be provided with an extension plate 23 bearing any desired symbol such as a distinguishing color or the words "Not Set" shown in the drawings. This plate is so positioned that it will be visible through the hole in the dial when the indicating arm E falls back after being engaged by the synchronizing mechanism.

With the mechanism just described the arm E will be moved by each impact of the synchronizing lever so as to bring the plate 21 into registration with the dial opening 22, but will fall back by gravity into normal non-indicating position the moment the synchronizing lever springs back. In order automatically to hold it from falling back until just before the next synchronizing period, which in the embodiment of the invention shown in the drawings will occur twenty-four hours later, the following mechanism is provided.

Pivotally supported upon the framework at a point between its ends is a lever 24, which here stands below the disk 14. At one end of the lever is a notched latch 25 adapted to receive and interlock with a pin 26 upon the arm 17 of the arm E, while at the other end is a lug 27, having preferably a beveled face, in position to be engaged and wiped by a tooth or trip 28 upon the inner side of the notched wheel 29. This wheel is rotatably mounted upon the framework of the clock adjacent to the disk 14, and is formed with twelve notches 30. This wheel

is driven from the minute hand sleeve by means of the meshing gears 31 upon the minute hand sleeve and 32 rotatably supported in the frame. The teeth of these gears are so adjusted that the gear 32 will make a complete revolution once in every two hours. Upon the gear 32 is a pin 33 in position to enter the notches 30 in the wheel 29, whereby the gear 32 in making one complete revolution will turn the notched wheel 29 the distance between two adjacent notches, or one-twelfth of a revolution. Thus the notched wheel 29 will be turned through one complete revolution every twenty-four hours. It follows that the pin 28 will engage and trip the lever 24, which holds the indicating lever, once every twenty-four hours. Obviously the frequency with which the lever 24 is tripped will depend upon the speed to which the gear 32 is geared and upon the number of notches in the wheel 29, or upon the number of pins 28 which are used, but as clocks are usually synchronized every twenty-four hours, I have shown the apparatus adapted for that interval of time.

In operation, when the synchronizing arm C is actuated and thrown down the spring 19 will strike the stud 18 and turn the arm E so as to bring the display plate 21 into view through the opening 22 in the dial. By the same movement of the indicating arm E the pin 26 will be thrown into locking engagement with the latch 25, whereby the indicator will be held in this display position after the synchronizing lever returns to its normal position, as shown in Fig. 4. Just before the next synchronizing period arrives the trip 28 upon the notched wheel 29 will wipe and pass the lug 27 upon the lever 24, and thereby turn the lever sufficiently to release the latch 25 from the pin 26, when the indicating arm E will drop back by gravity into the position indicated in Fig. 4, carrying the plate 21 out of registration with the opening in the dial and the "Not Set" plate 23 into registration therewith. In Fig. 4 the trip 28 is shown still in engagement with the lug 27 after it has tripped the latch so as to release the pin 26. If the clock is now synchronized at the regular period, the parts will remain only momentarily in the position shown in Fig. 4, for as soon as the synchronizing lever is actuated, the indicating lever E will be again thrown up and locked in the position shown in Fig. 1 with the indicator plate 21 displayed through the hole in the dial. But if the operator should fail to actuate the synchronizing mechanism at that period, the parts will remain in the non-indicating position represented in Fig. 4, showing that the clock was not synchronized as it should have been at the last regular synchronizing period.

I do not herein claim broadly the principle of an indicator actuated by the synchronizing mechanism, because this is the subject of broad claims in my co-pending application above referred to, Serial No. 643,259 this application being intended to cover the particular adaptation of that principle to clocks which are to be synchronized oftener than once an hour.

I claim as my invention:

1. In a clock, the combination with synchronizing mechanism and minute hand sleeve, of an indicator adapted to be moved into display position by the synchronizing mechanism, means automatically interlocking with said indicator to hold it in such position, and means driven from the sleeve for releasing it from said interlocking means at time intervals greater than one hour.

2. In a clock, the combination with synchronizing mechanism and minute hand sleeve, of an indicator in position to be moved into display position by the synchronizing mechanism, a latch in the path of the indicator and automatically locking therewith to hold the same in display position, a freely operating wheel rotatably mounted independently of said sleeve, but driven therefrom, and a trip carried by said wheel in position to trip the latch and thereby release the indicator at predetermined times.

3. In a clock, the combination with synchronizing mechanism and minute hand sleeve, of a latch, an indicator adapted to be moved by the synchronizing mechanism into locking engagement with the latch, a gear wheel mounted upon the frame and driven from the minute hand sleeve, a freely operating notched wheel adjacent thereto, a pin upon the gear wheel for entering the notches of the notched wheel and thereby turning the same at regulated intervals, and a pin carried by the notched wheel in position to engage and trip the latch at predetermined times.

4. In a clock, the combination with synchronizing mechanism, of an indicator in position to be moved into display position by the synchronizing mechanism, a latch arranged in the path of the indicator and automatically locking therewith to hold the same in display position, a freely-operating clock-work driven wheel mounted independently of the minute hand sleeve, and a trip carried by said wheel in position to trip the latch and thereby release the indicator at predetermined times.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST A. HUMMEL.

Witnesses:

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