

(No Model.)

3 Sheets—Sheet 1.

J. T. LONG.
CLOCK.

No. 555,387.

Patented Feb. 25, 1896.

Fig. 1

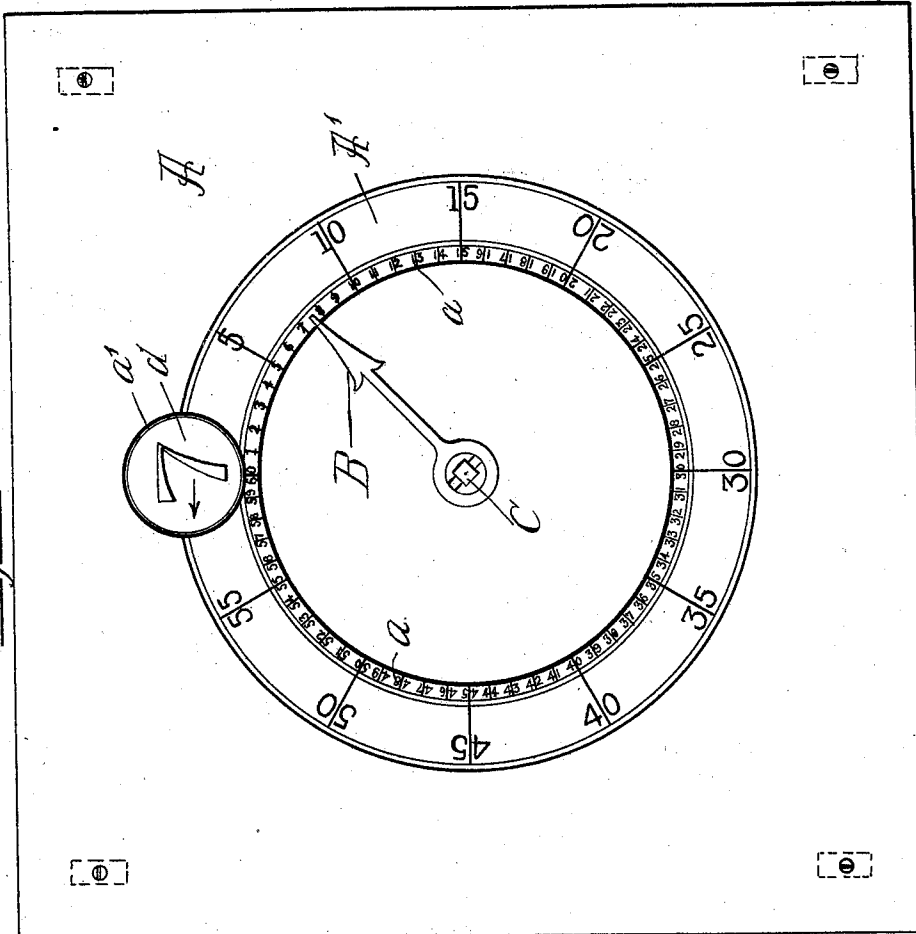
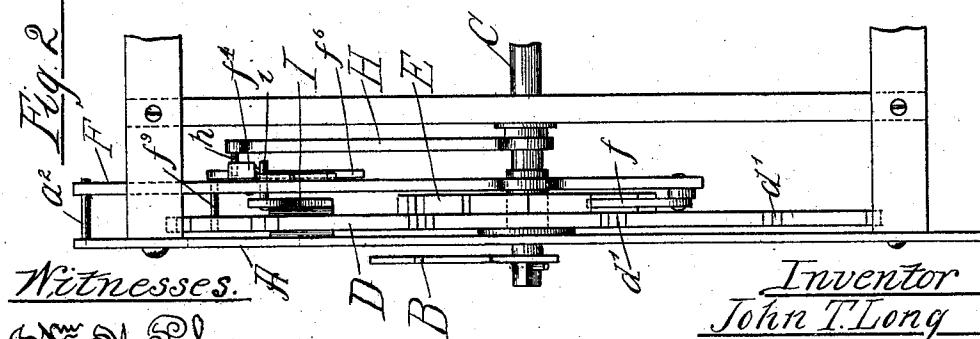


Fig. 2



Witnesses.

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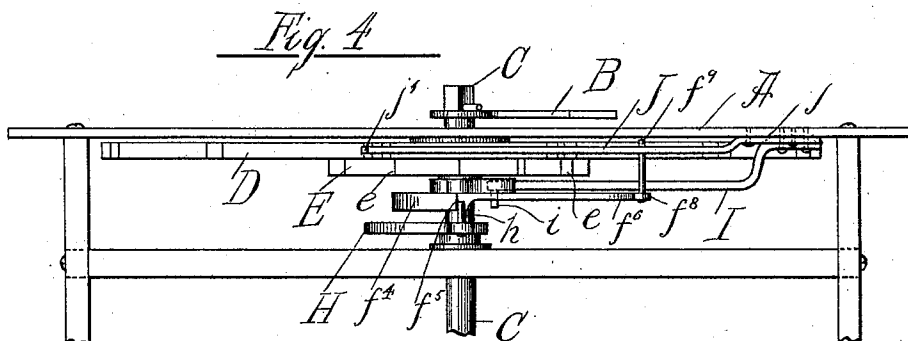
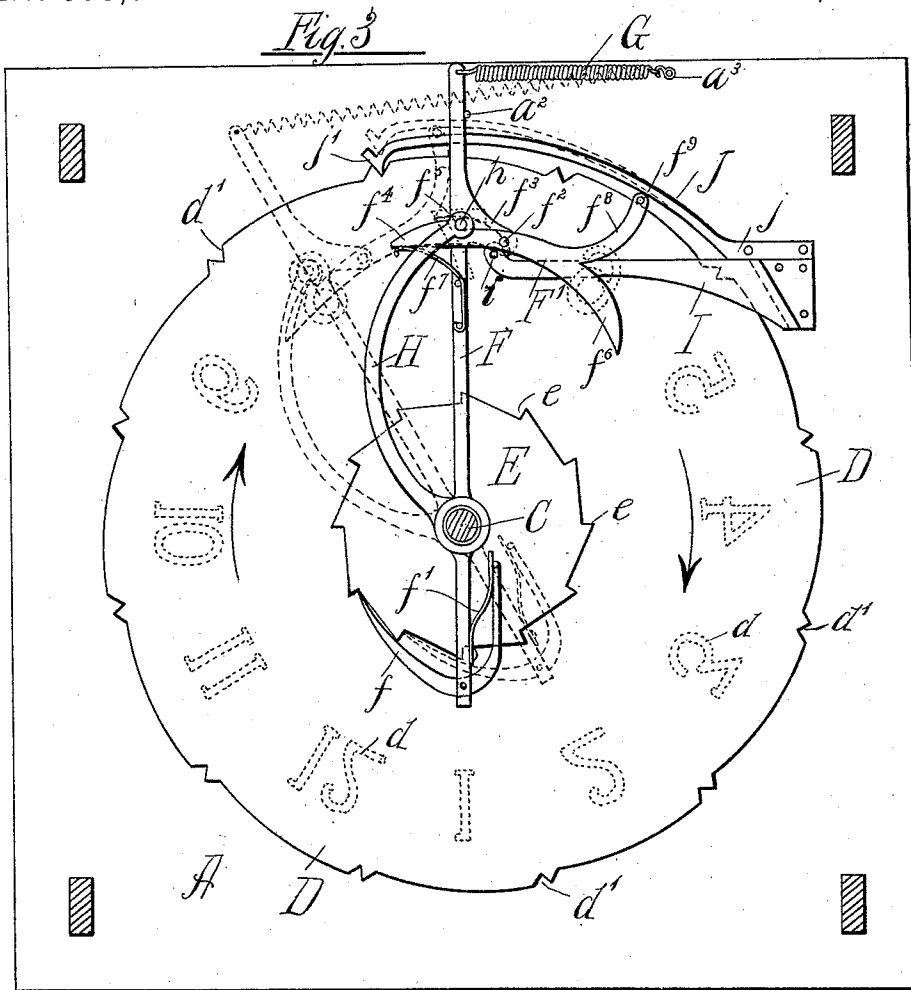
by *Wayton, Poole & Brown*

Attys

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Clinton Hamlin

Inventor

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Atty's

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3 Sheets—Sheet 3.

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Fig. 5.

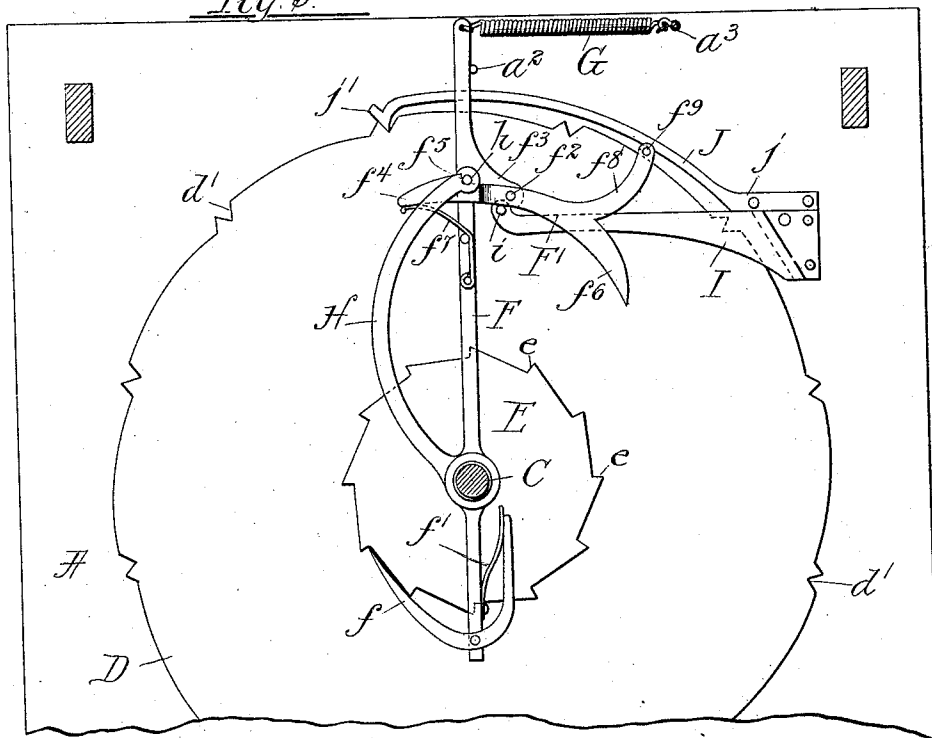
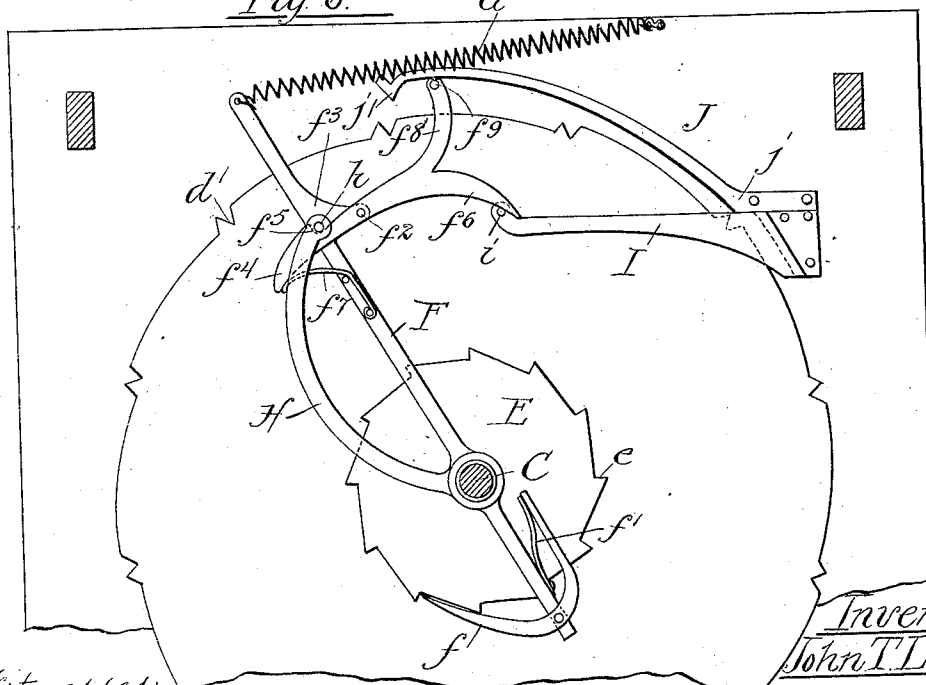


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN TURNER LONG, OF CHICAGO, ILLINOIS.

CLOCK.

SPECIFICATION forming part of Letters Patent No. 555,387, dated February 25, 1896.

Application filed June 15, 1895. Serial No. 552,870. (No model.)

To all whom it may concern:

Be it known that I, JOHN TURNER LONG, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Clocks; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in clocks or timepieces, and its object is to provide a construction of the same which shall enable the time to be easily and correctly read or noted, with less liability of error than in the case of clocks as heretofore commonly made, and shall at the same time be simple in character and economical to make.

The invention consists in the matters hereinafter described and pointed out in the appended claims.

It has been proposed heretofore to employ in place of the usual clock-dial, graduated for hours and minutes and having fast and slow moving hands, revolving hour and minute disks having figures thereon which are brought successively by an intermittent movement of said disks opposite apertures in the dial or face-plate of the timepiece.

While the timepieces thus constructed have the advantage that the time may be directly read or noted therefrom without liability of error by mistaking one hand for the other or like causes such as exist in the ordinary clock, the mechanism for operating the two revolving disks has largely increased the working parts of such timepieces and made them much more expensive to construct than the ordinary clock with two hands. I propose to secure the same result of direct reading of the timepiece, while preserving a simple construction thereof, by employing in connection with the main shaft of an ordinary clock-movement to which the minute-hand is directly attached a dial marked for minutes and provided with an opening together with a disk or other moving part carrying a series of numbers for indicating hours, which are adapted to be brought successively opposite the opening in the dial, and a device for intermittently operating such moving part, which device is actuated directly

from the minute-hand shaft and is of simple character, so that the suitable operation of the movable part indicating hours is secured by mechanism, which takes the place of the ordinary gear connection between the minute-hand shaft and the hour-hand of a clock. The timepiece thus made is as a whole no more complicated or expensive to construct than the ordinary two-handed clock.

In addition to the general features of construction above referred to, the invention includes also other novel features of construction in a timepiece of the character described, as will be hereinafter fully described and pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a front elevation of face view of a clock constructed in accordance with my invention, and in which the passage of the hours is indicated by the exposure of successive numerals, while the passage of the minutes is indicated in the usual manner by a rotary minute-hand which moves around a suitably-graduated dial. Fig. 2 is a side elevation of so much of said clock as relates to the present invention. Fig. 3 is a rear sectional elevation taken on line 3 3 of Fig. 4. Fig. 4 is a top plan view of the device.

In said drawings, A designates the face-plate of the clock, and A' the usual circular dial marked thereon, said dial being graduated with sixty divisions *a* to indicate the minutes.

B is a rotary minute-hand rigidly secured to the end of a shaft C, which projects through the face-plate A at the center of the dial A'. The shaft C is actuated by any usual or suitable form of clock-movement—as, for instance, by a weight or spring acting under the control of an escapement mechanism, by which the movement is maintained at a uniform rate of speed—but such clock-movement constitutes no part of my invention, and is accordingly not illustrated herein.

D designates a rotary disk mounted loosely upon the shaft C immediately behind the face-plate A and provided on its front face with a circular series of numerals *d*, which are adapted to be successively exposed through an aperture *a'* in said face-plate. Said numerals are herein shown as arranged in a circle of about the same size as the outer circumfer-

ence of the dial A', and the aperture a' is located centrally of the top of said dial and cuts through the latter just above the circle of minute-graduations a . The numerals d are herein shown as running from 1 to 12 in regular succession, in accordance with the ordinary system of counting time by twelve-hour intervals, and an intermittent rotary movement is given the disk D, by which a succeeding numeral is exposed as often as the minute-hand B completes its circuit, or at the end of each hour. In the mechanism for intermittently actuating said disk, E designates a ratchet-wheel securely fastened to the back of the disk D, concentrically therewith, and provided with twelve notches or teeth e corresponding with the twelve numerals d of the disk D.

F is an oscillatory lever pivotally mounted on the shaft C immediately behind the ratchet-wheel E and provided with a pivoted pawl f , which operatively engages the teeth e of the ratchet. One end of the lever F extends radially outward beyond the edge of the disk D and is normally held against a fixed stop-pin a^2 on the back of the face-plate A by means of a spring G, which is secured at one end to the end of said lever F and at its other end to a hook a^3 on the back of the face-plate A. The other end of the lever F extends in the opposite direction past the edge of the ratchet-wheel E and bears the pawl f at its extremity. The rear end or tail of said pawl is bent inward along the lever F, and a spring f' is applied between the tail of the pawl and the lever to press the point of the pawl against the ratchet-teeth e .

H designates a rotary arm rigidly attached to the shaft C, so as to rotate therewith, and located immediately back of the lever F. At its outer end said arm is provided with a forwardly-projecting pin b^8 , which is adapted to engage a latch F' on the lever F once in each revolution of the arm. Said latch F' is herein shown as pivoted at f^2 to a laterally-projecting lug f^3 of the lever and is formed with a head f^4 , which is thickened or offset on its rear side so as to afford a shoulder f^5 , facing in the direction from which the pin b approaches. Said pin b is short enough to clear the main body portion of the latch, but long enough to engage said shoulder, and by its engagement with the latter serves to swing the lever F forward on its pivot until the pawl f of the lever engages the next succeeding tooth of the ratchet. The rear end or tail f^6 of the latch F' rides during this forward movement of the lever upon a stationary pin i , which projects from the extremity of an arm I, that is fastened to the back of the plate A, and said rear end, f^6 , is so shaped that by reason of such contact with the pin i the latch is gradually oscillated until the pin b slips off the shoulder f^5 thereof. Being thus freed from connection with the arm H the lever F is free to return to its normal position against the stop

a^2 under the tension of the spring G and in its return movement operates through its pawl f to rotate the ratchet-wheel E through an angular distance corresponding to one ratchet-tooth or one-twelfth part of a complete rotation. Such movement of the ratchet-wheel will obviously cause equal angular movement in the disk D, which is secured thereto, and will consequently cause the next succeeding number d to be exposed at the aperture a' of the face-plate. The latch F' in the meantime is forced back to its normal position, as the lever F returns, by a spring f^7 , applied between the lever and the latch, and the latter is thus left in proper position to be engaged by the pin b in the next rotation of the arm H. To prevent the disk D from being rotated more than one-twelfth of a complete revolution under the impulse imparted by the return movement of the lever F, I provide a suitable brake or stop mechanism, which in this instance consists of a spring-arm J, that is fastened at its base j to the back of the face-plate A and the free extremity of which is arranged to press against the periphery of the disk D. Twelve marginal notches d' are provided on the latter, and the spring-arm J is formed with a V-shaped head j' , which is adapted to enter either of said notches and temporarily restrain the disk from further movement. The arm J is lifted at the proper moment to free the disk by an outwardly-projecting lug f^8 on the ear or tail end f^6 of the latch F', said lug being provided with a pin f^9 , which projects between the arm J and the periphery of the disk D. When the latch is carried forward by the contact of the arm H the pin f^9 is moved toward the free end of the spring-arm J and gradually forces the said spring away from the disk as the latch is oscillated by riding upon the pin i . The spring J is in this manner lifted clear of the adjacent notch d' of the disk just before the lever F is released from the arm H and leaves the disk free to rotate in the return movement of said lever. As the latch F' is carried back with the lever the pin f^9 moves inwardly and permits the head j' of the arm J to bear against the disk D, so as to act as a brake thereon, and when the movement of the disk is completed said head j' of the arm J drops into the next succeeding notch d' and locks the disk against further movement at that time.

In the particular construction shown, the lever F is arranged in a substantially vertical position and the springs G and J and arm I are located at the upper portion of the device, but their operation would obviously be the same if otherwise located, provided the relative arrangement of the several parts remain substantially undisturbed. It will, furthermore, be obvious that the details of the construction shown may be varied in many particulars without departing from the spirit of my invention.

The features of construction herein described may be applied to watches as well as to clocks.

A timepiece constructed as above described has the important advantage of being used with much less liability to error in noting the time than the ordinary two-handed clocks, while at the same time its mechanism is so simple that it may be constructed at a cost not materially greater than that of the ordinary clock. The advantage in noting the time arises from the fact that the hour will be in such clock at all times displayed in plain figures while the minute will be indicated by a single hand and also in plain figures.

The special value of a clock of this kind is for use in cases where the correct observation of time is important, as in the case of clocks or watches used for running trains on railroads. It has been found that in the use of an ordinary two-handed clock or watch, errors are likely to occur, especially where the observer is hurried or where the timepiece is in a poor light or in a position where it cannot be clearly seen, errors being especially liable to occur by reason of the observer failing to distinguish between the long and short hands of the timepiece. In a timepiece constructed as herein shown, the time may be read in hours and minutes exactly as they are noted or written down on time-tables or in the note-books and memoranda of railroad operators, no intermediate mental process being required in ascertaining the time, which is noted directly from the figures indicated by the clock. While this latter fact is also true of clocks heretofore made having movable disks for indicating both hours and minutes, yet the latter have the disadvantage of being much more expensive to construct and involving a greater complication of mechanism than an ordinary clock, while the clock herein shown is simple in construction, may be cheaply manufactured, and will be durable and reliable in use.

I claim as my invention—

1. The combination with the main shaft, of a clock-movement and a minute-hand secured thereto, of a rotary hour-disk mounted concentrically with the shaft, an oscillatory lever mounted concentrically with the shaft and having a pawl-and-ratchet connection with said disk, an arm rigidly attached to the

shaft, a latch pivotally secured to said lever and adapted to engage said arm in each revolution of the shaft, a stop for oscillating the latch to release the lever from the arm after a predetermined movement therewith, and a spring for returning the arm to its normal position after such release, substantially as described.

2. The combination with the main shaft, of a clock-movement and a minute-hand secured thereto, of a rotary hour-disk mounted concentrically with said shaft, an oscillatory lever pivoted concentrically with the shaft and having a pawl-and-ratchet connection with the disk, a rigid arm on said shaft, a latch pivotally secured to said lever and adapted to engage said arm in each revolution of the shaft, a stop for oscillating the latch so as to release the lever from the arm after a predetermined movement therewith, a spring for returning the arm to its normal condition after such release, a brake acting on the disk to control the movement thereof, and means carried by the lever acting to release the brake from the disk to permit the turning of the latter, substantially as described.

3. The combination with the main shaft, of a clock-movement and a minute-hand secured thereto, of a rotary hour-disk mounted concentrically with said shaft, said hour-disk having ratchet-teeth near its center and marginal notches equal in number to said teeth, an oscillatory lever mounted concentrically with the shaft and having a pawl engaging the ratchet-teeth of the disk, a ratchet-arm on the said shaft, a latch pivotally mounted on the lever and adapted to engage the arm in each rotation of the shaft, a stop for oscillating said latch to release the lever from the arm after a predetermined movement therewith, and a stationary spring-arm engaging the notched periphery of the disk, said latch being constructed to release the spring-arm from the notches of the disk to permit the turning of the latter, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 12th day of June, A. D. 1895.

JOHN TURNER LONG.

Witnesses:

WILLIAM L. HALL,
WILLIS D. SHAFER.