(No Model.)

C. STAHLBERG.

CLOCK MOVEMENT.

No. 452,652. Patented May 19, 1891.

Fig. 1.

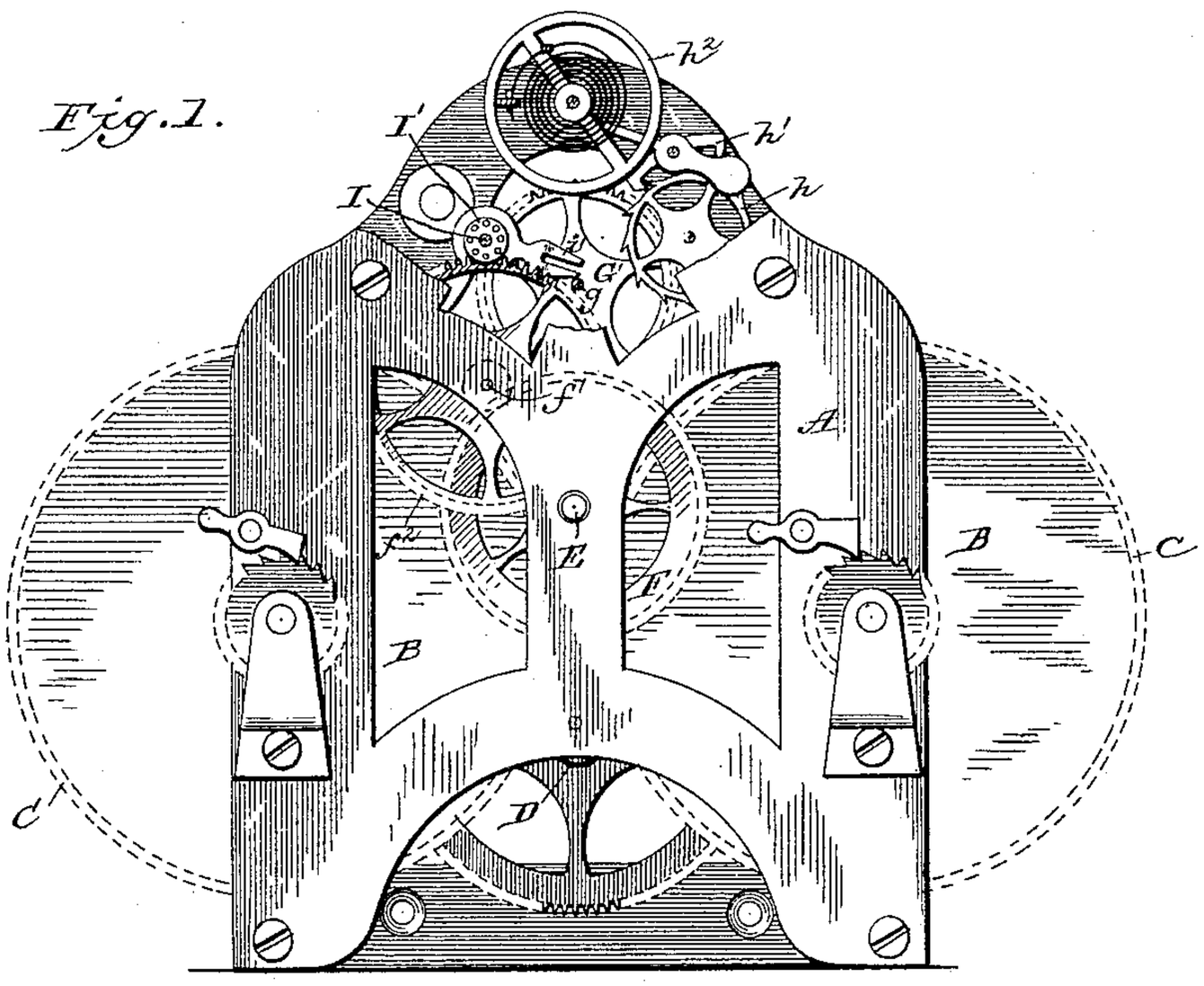


Fig. 2.

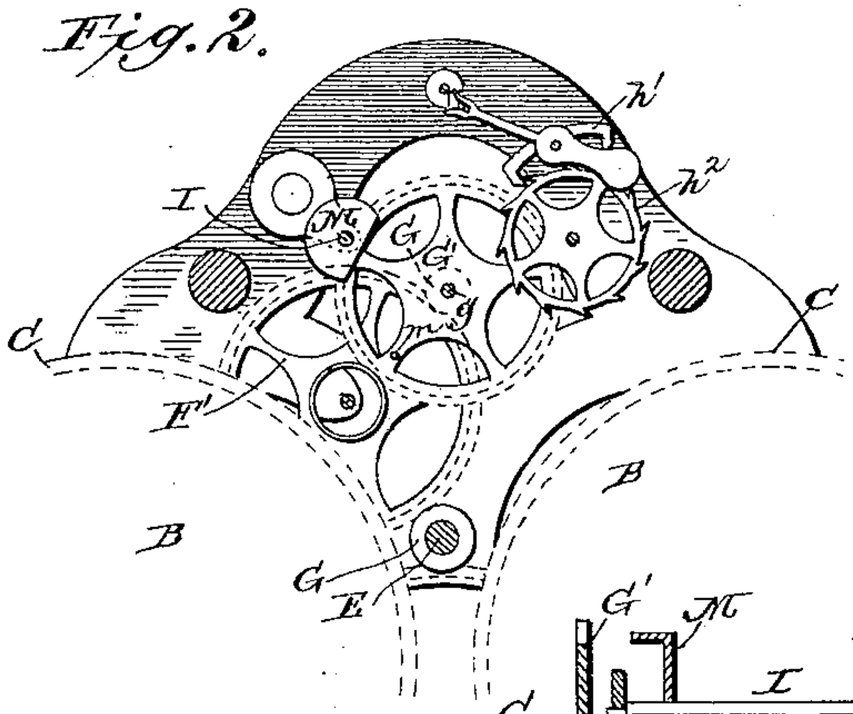


Fig. 3.

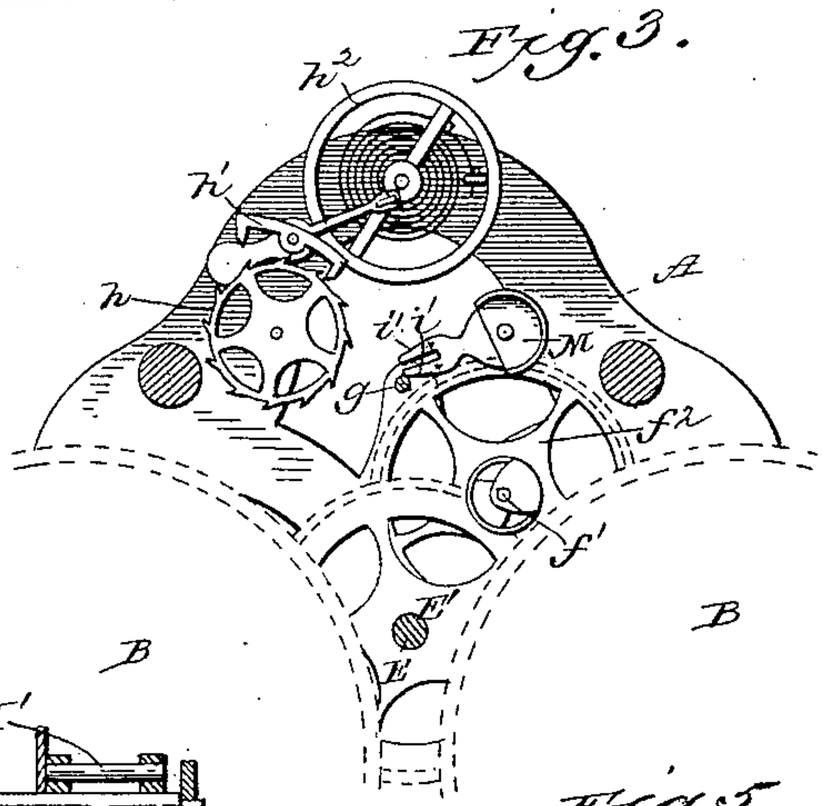


Fig. 4.

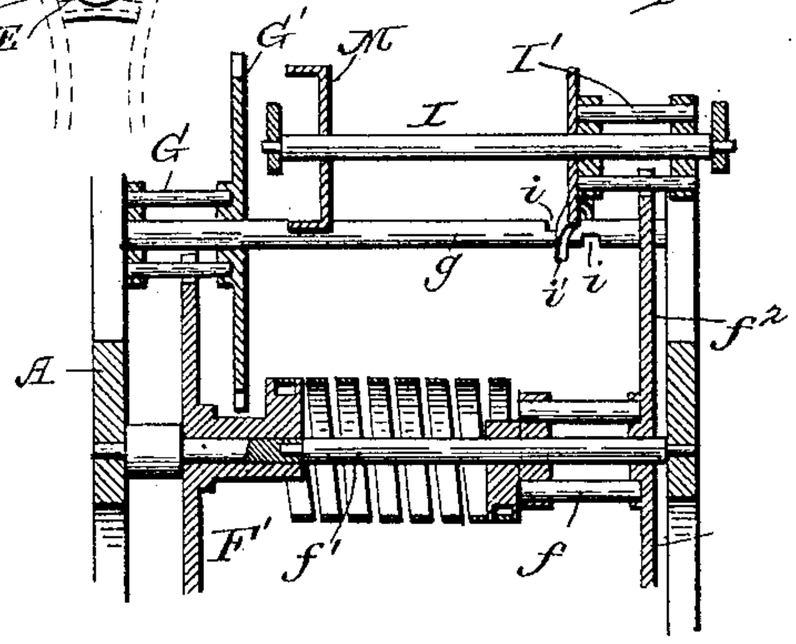
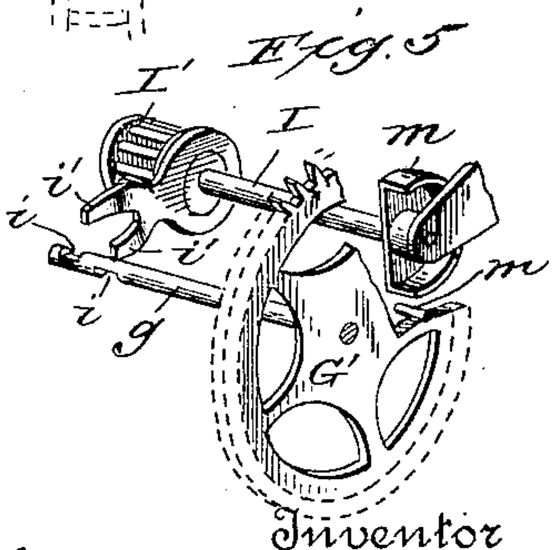


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES STAHLBERG, OF NEW YORK, N. Y., ASSIGNOR TO THE ACCURATE TIME STAMP COMPANY, OF WEST VIRGINIA.

CLOCK-MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 452,652, dated May 19, 1891.

Application filed June 7, 1890. Serial No. 354,634. (No model.)

To all whom it may concern:

Be it known that I, CHARLES STAHLBERG, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Clock-Movements and the Like; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates, particularly, to that class of movements employing a "remontoir-escapement," or, in other words, one in which a small spring or its equivalent, which drives a constantly-moving clock-train, is wound at regular intervals by means of a main or power spring or its equivalent, the latter being held in check and released at the proper intervals by a suitable escapement or stops controlled by the constantly-moving clock-train, the invention being particularly designed for use in a time printing-stamp such as disclosed in my prior patent, No. 424,369, dated March 25, 1890.

The objects of the invention are to secure greater accuracy of the movement and to prevent the remontoir or auxiliary spring from running down should the main or power spring be allowed to go too long without rewinding, and, further, to secure certain minor advantages in details of construction, all of which will be hereinafter described, and pointed out particularly in the claims at the close of this specification.

Referring to the accompanying drawings, Figure 1 is a front elevation of a clock-movement constructed in accordance with my invention with a portion of the front plate broken away. Fig. 2 is a sectional view taken in front of the escapement, showing the escapement-train and the safety device for preventing the running down of the small or auxiliary spring. Fig. 3 is a section looking toward the front of the same. Fig. 4 is an enlarged vertical section through the flying shaft, auxiliary spring, and its shaft and bearings. Fig. 5 is a perspective view of the stop-shaft, arms, and drum, showing their relative location, the frame and connected gearing being broken away or omitted.

Like letters of reference in the several figures indicate the same parts.

The letter A indicates the frame, which may be of any desired style; B B, the main or power spring barrels having gear-wheels C on their peripheries, both of which mesh with the pinion D, and through the latter the power is transmitted to the shaft E, which corresponds to the minute-hand in an ordinary clock-movement, and in the present instance is adapted to move or jump once a minute, being stationary in the intervals. This result is accomplished in the following manner: On the shaft E is mounted a gear-wheel F, meshing with a pinion *f* on the shaft *f'*, having pivot-bearings, the one at the front being in the frame and that at the rear in a stud-axle affixed to the frame and forming the bearing for the first wheel F' of the clock-train composed of the pinion and wheel G G', respectively, mounted on shaft *g*, and the escapement-wheel and escapement and balance wheel *h h' h²*, respectively, of any preferred construction.

A comparatively light spring, which I shall term the "remontoir-spring," surrounds the shaft *f'* and has its ends connected, respectively, to the pinion *f* and wheel F'. Thus, when the power-train is in operation it winds said spring, and during the time of winding itself drives the clock-train through the spring, the train being driven in the intervals by the power stored in the remontoir-spring.

As disclosed in my before-mentioned patent, the power-train was controlled through the medium of a stop-wheel corresponding to the wheel f^2 on the shaft *f'*, which engaged the shaft *g* and was released or passed by a notch in the same, forming, in effect, an escapement for the power-train; but with such an arrangement the friction on the shaft *g* was excessive, and as the shaft rotated toward the tooth-point any roughness of the parts would create a pinch. A further disadvantage of said construction and, so far as I am at present advised, of all remontoir-movements heretofore made was due to the fact that no provision was made for arresting the clock-movement when the power-train was run down. Thus, should the power-train meet with an accident, or should it run down or become inoperative through any cause, the

remontoir-spring would exhaust itself and the clock-train would not run until some skilled person put the proper tension on the remontoir-spring, as will be readily perceived by those skilled in the art. Now, in order to overcome these objections and to provide a very light and easily-operated escapement for the power-train, I make the wheel f^2 a toothed or gear wheel and provide a shaft I above the same with a co-operating pinion I′ and an escapement arm or arms which rest on top of the shaft g. The shaft G is provided with two notches i i, out of line with each other, and the shaft I with two co-operating arms i' i', arranged, preferably, substantially parallel and separated from each other far enough to permit the first one to just clear the shaft when the second is resting on the same, and when the second one is released to permit the shaft to make practically a complete revolution, securing accuracy in the movement and an exceedingly light pressure on the shaft G, which latter turns away from the arms and has no tendency to bind against the same. It will be noted that the shaft I acts under the impulse of the power-spring, being controlled or released at determinate intervals by the clock-train. Now in order to stop the clock-train when the power-train has run down it is only necessary to have co-operating stops, one on each train, and which, when the power-train is stationary, will not engage, but which will engage if the power-train does not make a full and complete movement, as would be the case were the arms released and the power-springs be almost run down, it being impossible with the construction shown to get the parts in such relation to each other when released as that the arms would remain in exactly the position occupied when in normal position, and the least variation from this position would cause the stops to engage. This idea is embodied in the present construction by locating a pin or pins m on wheel G′ and providing the shaft I with a hollow drum M, having a cut-out portion on one side, through which the pin travels when the shaft is held in normal position with the arms resting on shaft g; but when the arms are at a point away from normal position the drum or its rim will be in the path of the pins and the clock-train will be arrested before the remontoir-spring has run down or gone beyond its normal movement, and when the power-springs are again wound the arms will move around to normal position and the clock resume its working at once without other attention on the part of the attendant.

The advantage of mounting the pinion f on a shaft having pivot-bearings and the wheel F′ on a stud-axle will be understood when it is remembered that the friction, whether in one place or the other, decreases the available power, and as the pinion has to bear the entire strain of the power-springs it would be subjected to the greatest friction, and I reduce this as much as possible by the pivot-bearings, while the wheel F′, acting under the influence of the comparatively light spring, will create but little friction, and that little under the influence of a power which is practically constant and may be given a stud or smooth bearing without impairing the effectiveness of either of the trains in the least, the arrangement as an entirety being such as that the greatest accuracy is secured with very simple mechanism.

The variation of the strength of the power-springs or the load carried thereby, as the operating-shaft of a time-stamp, it will be seen, cannot affect the accuracy of the clock-movement and the release of the power-train at exact intervals.

Having thus described my invention, what I claim as new is—

1. In a remontoir clock-movement, the combination, with the power and clock trains, substantially as described, of a stop for the clock-train, controlled by the power-train, whereby the clock-train is arrested when the power-train is inoperative, substantially as described.

2. In a clock-movement, the combination, with the power and clock trains, a spring connecting said trains, and an escapement controlling the power-train and operated by the clock-train, of a stop controlled by the power-train and adapted to be thrown into position to engage the clock-train when the power-train does not make a complete movement, substantially as described.

3. In a clock-movement, the combination, with the power and clock trains, a spring connecting said trains, and a shaft in gear with the power-train and having an arm engaging a notched shaft in the clock-train, of a stop mounted on said shaft, and a pin on the clock-train adapted to pass said stop when the shaft is in its normal position of rest, but to engage therewith when the shaft is at any other point of its movement, substantially as described.

4. In a remontoir clock-movement, the combination, with the power and clock trains, substantially as described, of a pin on one of the gears in the clock-train, and a hollow drum controlled by the power-train, having a cut-out portion at one side, through which the pin passes when the power-train is in its normal position of rest, substantially as described.

5. In a remontoir clock-movement, the combination, with the power-train and the clock-train having the notched shaft and pin, substantially as described, of the shaft gearing with the power-train, the arm on said shaft engaging the notched shaft, and the hollow drum also mounted on said shaft and having the cut-out portion through which the pin passes when the arms are in engagement with the shaft in normal position, said drum being adapted to engage the pin when not in its normal position of rest, substantially as described.

6. In a remontoir clock-movement, the combination, with the clock-train having the

constantly-rotating shaft provided with two notches, of the power-train having a shaft in gear therewith, provided with two substantially parallel detent-arms slightly separated, so as to pass through their respective notches at slightly-different moments, substantially as described.

7. In a remontoir clock-movement, the combination, with the clock-train having the notched shaft, the power-train, and a spring connecting said trains, of a shaft in gear with the power-train, located at the side of the notched shaft, from which the latter turns, and an arm on the shaft in gear with the power-train, resting on the notched shaft, whereby the friction between the arm and notched shaft does not tend to bind, substantially as described.

8. In a clock-movement such as described, the combination, with the power-train having the shaft f', the clock-train having the gear-wheel F', and the notched shaft and the spring-connecting shaft f' and wheel F', of the wheel f^2 and shaft I, having the pinion I', and escapement-arm resting on the notched shaft, substantially as described.

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