

Fig. 1

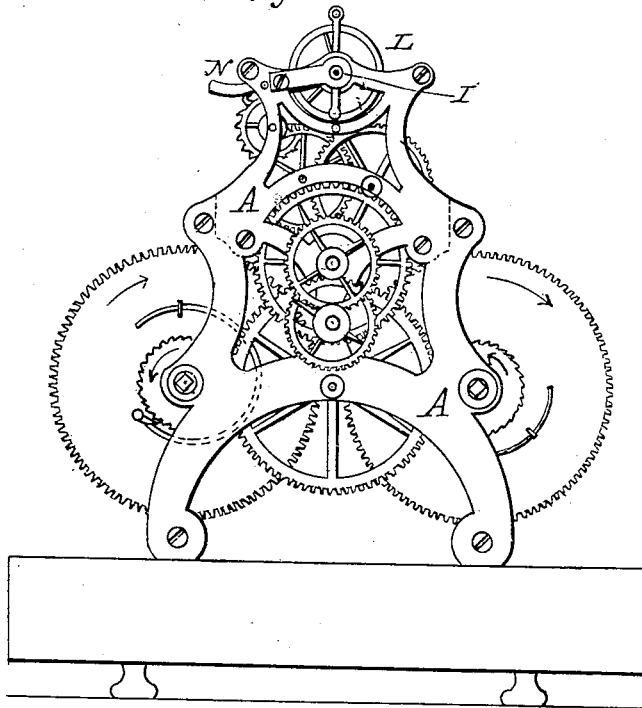


Fig. 2.

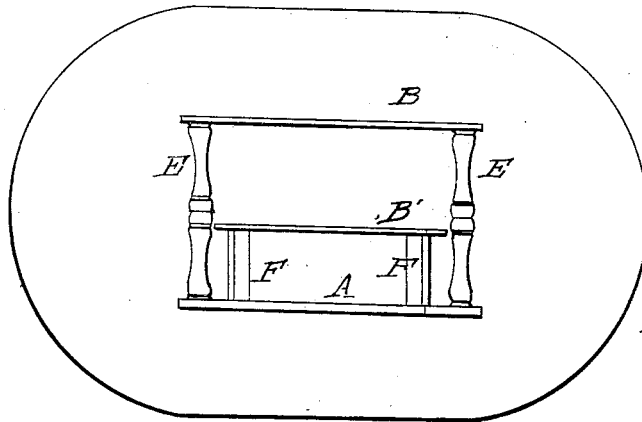
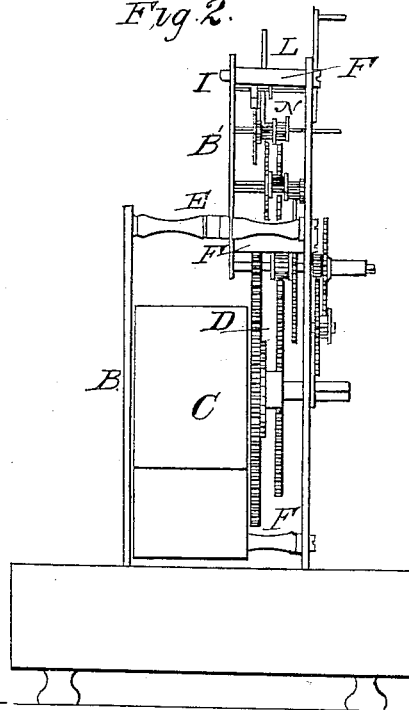


Fig. 5.

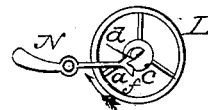
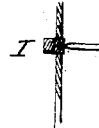


Fig. 6.



Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MARINE CLOCKS.

Specification forming part of Letters Patent No. 51,184, dated November 28, 1865.

*To all whom it may concern:*

Be it known that I, LAPORTE HUBBELL, of Bristol, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Marine Clocks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view of the movement; Fig. 2, a side view of the same; Fig. 3, a top view of the frame; Figs. 4, 5, and 6, detached views, to more fully illustrate my invention.

My invention relates to improvements in marine clocks; and consists, first, in forming the back plate in two parts, the upper part, which supports the nicely-adjusted parts of the movement, entirely independent of the lower part, which supports the spring-wheels, so that in securing the movement to its case the nicely-adjusted parts of the movement will not be affected by unavoidable twisting or springing of the frame by the manner of securing to the case, as in ordinary movements; second, in the peculiar form of the jewels which form the bearings of the balance-wheel, whereby much less friction is produced than by the common construction; third, in the manner of constructing the lever, whereby the verge is prevented from striking too deeply into the escapement-wheel and greater freedom is given to the movement of the balance-wheel.

To enable others skilled in the art to construct and use my improvement, I will proceed to describe the same as illustrated in the accompanying drawings.

A is the front plate; B and B', the rear plates, corresponding in their respective positions to the front plate, A, the broken lines in Fig. 1 denoting the form of the upper part, or, as I term it, the "bridge" B'. Between the lower part of the plate B and the plate A, I place one or more springs, C, and the wheels D, upon which the said springs act, in the usual manner, securing the two plates together by means of the bars E, also in the usual manner. The upper part or bridge, B', I place nearer the front plate, A, as seen in Figs. 2 and 3, as the shafts of the several wheels in this part of the movement do not require to be as long as

those to which the springs are attached. The said bridge B' is secured to the front plate, A, by means of the bars F in the usual manner of securing clock-plates, and between the said plates the balance-wheel L, lever N, verge P, escapement-wheel R, and the other usual wheels are placed. The balance-wheel L is supported in jewels secured in jewel-holders I, of the usual form, one of which is seen in Fig. 4. The ordinary manner of constructing these jewels is to bore a hole into the jewel to receive the gudgeon on the end of the shaft, which causes no inconsiderable amount of friction from the rapidly-moving balance-wheel. To overcome this friction I form the end of the shaft conical and the jewel the reverse, and so that but the point of the shaft will bear on the jewel, and adjust the jewels in the usual manner.

In Figs. 2, 5, and 6, my improvement in the lever and its operation are fully illustrated.

Heretofore in the construction of marine clocks the lever has been constructed so that when the balance-wheel has revolved to a certain point the movement of the balance-wheel would be arrested. The bearings of the balance-wheel when properly adjusted as well as the action of the lever are seriously injured by thus suddenly arresting the movement of the wheel, and when not so arranged the verge will strike hard down upon the escapement-wheel, and thus cause a similar difficulty. By my improvement in the construction of the lever these difficulties are entirely overcome, and the movement of the balance-wheel perfectly free.

I form the end of the lever upon which the balance-wheel acts as seen in Figs. 5 and 6. I form a slot, *a*, so that when the balance-wheel revolves a pin, *c*, on its hub will strike into the said slot *a* and carry the lever with it until the pin *c* can pass freely from it, as from the position in Fig. 5 to that denoted in Fig. 6. On each side of the slot *a* I form two concavities, *d* and *f*, which strike upon the shaft of the balance-wheel and arrest the movement of the lever when it has moved so far as to permit the pin *c* to pass from the slot, as denoted in Fig. 6, arrows denoting the direction of movement of the balance-wheel. Returning from the position denoted in Fig. 6 to that denoted in Fig. 5, the pin *c* will again enter the slot *a* and re-

turn the lever to the position denoted in Fig. 5, the end *d* striking the shaft of the balance-wheel and arresting its movement in like manner as did the end *f* in its first movement. By this arrangement and the proper adjustment of the hair-spring the action or reaction of the hair-spring will alone arrest the movement of the balance-wheel, the advantage of which over the usual manner of arresting a nicely-adjusted wheel will be readily seen.

Arresting the movement of the lever by means of the concave ends *d* and *f* striking upon the shaft of the balance-wheel will prevent the descent of the verge into the escape-wheel any farther than may be required to properly act thereon, and never can by any overmotion strike deeper than allowed by the lever thus moved, the movement being limited by the distance apart of the two ends, *d*

and *f*. Therefore, by my improved construction all the jar or concussion or overbanking of the verge produced by the ordinary constructions is obviated.

Having therefore thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. Constructing the upper part or bridge of the rear plate, *B'*, independent of the lower part, *B*, substantially in the manner and for the purpose set forth.

2. The lever *N*, provided with the slot *a* and concave ends *d* and *f*, when constructed and arranged to operate in the manner and for the purpose substantially as herein set forth.

LAPORTE HUBBELL.

Witnesses:

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