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Striking Movements for Clocks.

No. 200,518. Patented Feb. 19, 1878.

Fig. 1.

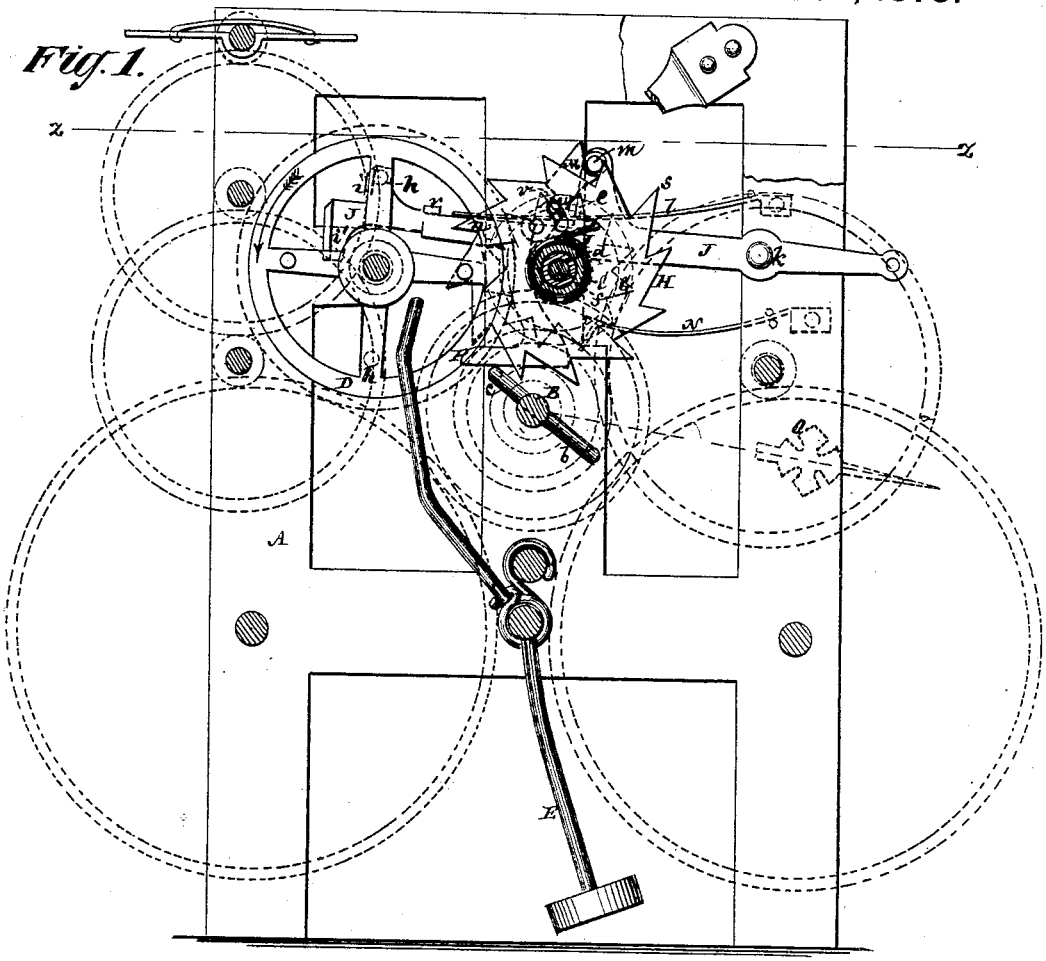

Fig. 2.

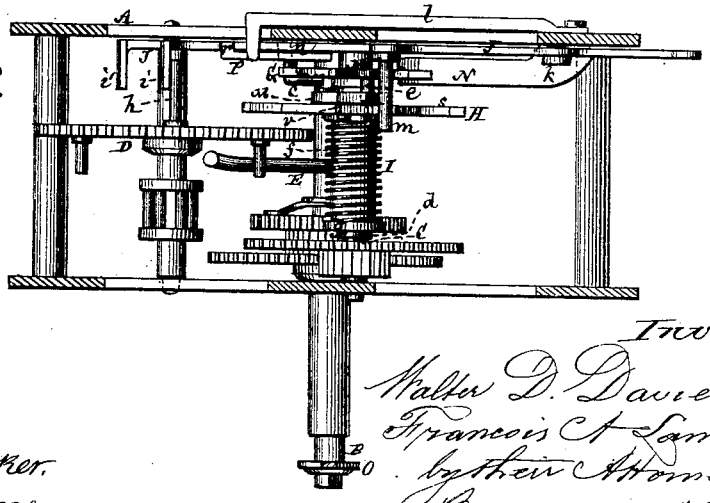

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Fig. 4.

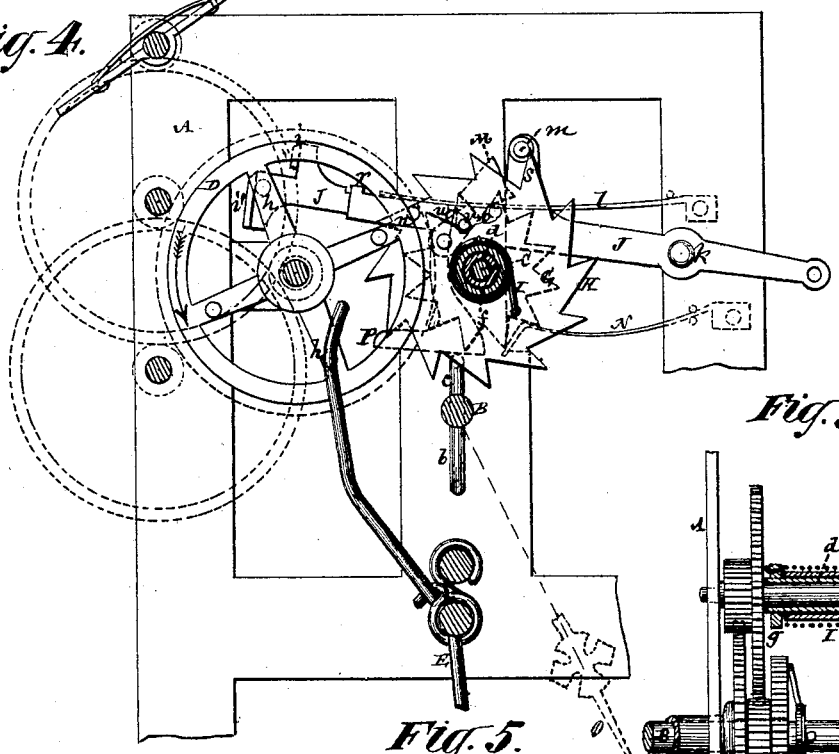

Fig. 3.

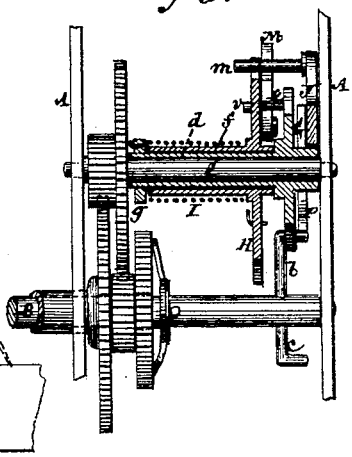

Fig. 5.

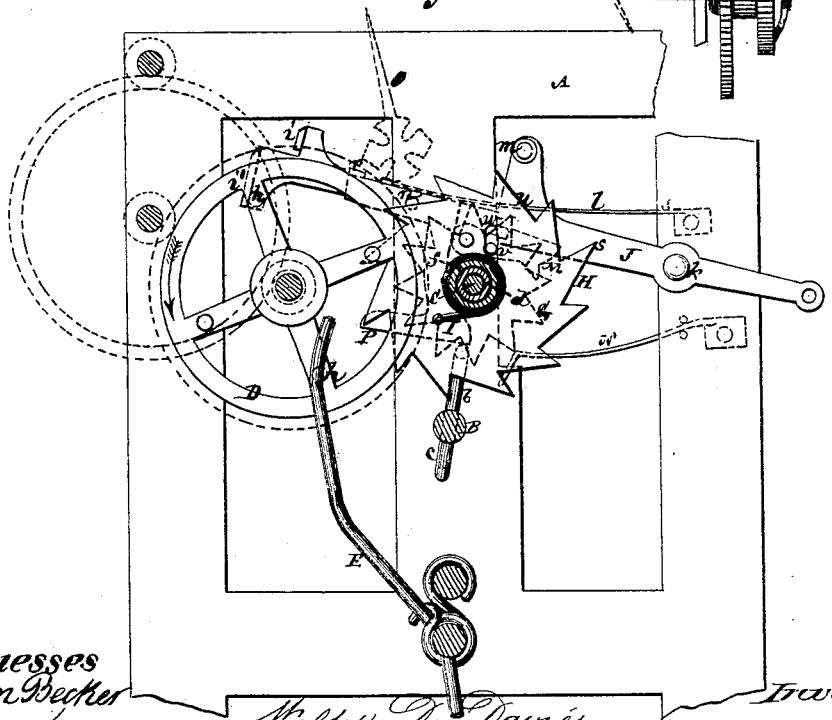

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Fig. 6.

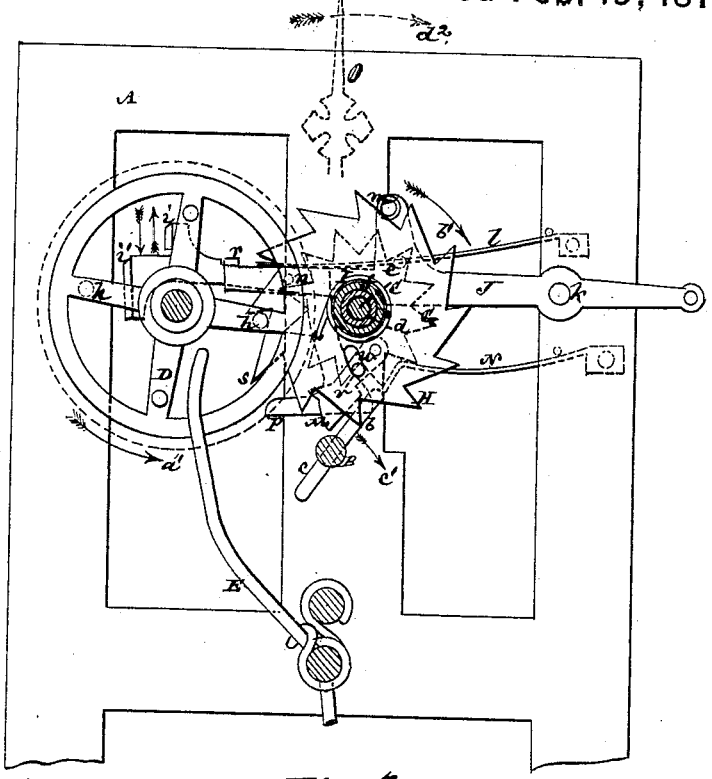


Fig. 7.

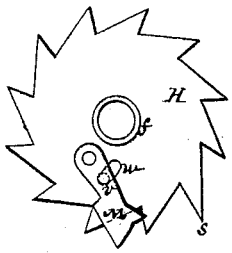
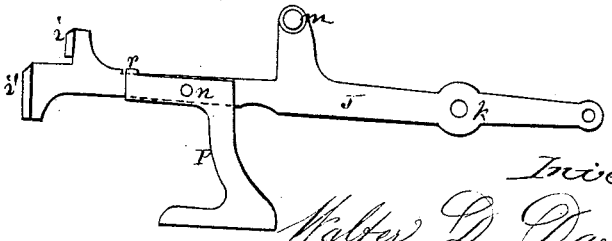


Fig. 8.



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UNITED STATES PATENT OFFICE.

WALTER D. DAVIES, OF BROOKLYN, AND FRANCOIS A. LAMBERT, OF NEW YORK, ASSIGNORS TO SAID DAVIES AND HENRY J. DAVIES, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STRIKING MOVEMENTS FOR CLOCKS.

Specification forming part of Letters Patent No. **200,518**, dated February 19, 1878; application filed December 27, 1877.

To all whom it may concern:

Be it known that we, WALTER D. DAVIES, of the city of Brooklyn, in the county of Kings and State of New York, and FRANCOIS A. LAMBERT, of the city, county, and State of New York, have invented certain new and useful Improvements in Striking-Movements for Clocks, of which the following is a description, reference being had to the accompanying drawing, forming part of this specification.

This invention consists in various novel combinations of devices for insuring, in a simpler or more perfect manner than has heretofore been done, the proper action of the striking-movement when the said movement is once properly adjusted in relation to the hands of the clock, so that the clock may always strike the hour indicated by the hands, and the correctness of the striking will not be affected by turning the hands forward or backward.

Figure 1 represents a sectional front elevation of a clock, in part, having our invention applied, and showing the striking mechanism in position after the clock has struck a full hour. Fig. 2 is a horizontal section of the same, in part, mainly on the line *z z*. Fig. 3 is a mainly central vertical transverse section of the same, in part. Fig. 4 is a sectional front elevation, in part, showing the striking mechanism in position shortly before striking the half-hour. Fig. 5 is a sectional front elevation, in part, showing the striking mechanism in position shortly before striking twelve; and Fig. 6, a further sectional front elevation, in part, showing the striking mechanism in position during the act of striking. Fig. 7 is a rear view of a ratchet-wheel with attached dog, used in our invention; and Fig. 8, a longitudinal view of a lever with attached shoe, used in connection with the striking-wheel of the clock and with the wheel which carries the dog.

A represents the frame of the clock, which frame may be of any suitable construction. B is the minute-wheel arbor, having attached to it a long tappet, *b*, and a shorter tappet, *c*, the first one, *b*, of which is used in striking the hour, and the latter one, *c*, in striking the half-hour. In clocks which do not strike the half-hour, the tappet *c* is omitted. C is one of the arbors of the train-gear, by which motion is communicated from the mainspring.

D is the striking-wheel, which lifts the hammer E of the clock, and is operated, when released, by an independent spring, as usual. Weights may be substituted for the springs, to actuate the time movement and the striking movement.

Arranged preferably upon the arbor C is a loose sleeve, *d*, having attached to it a star-wheel, G, containing twelve teeth, and which is moved a tooth at a time once every hour by the tappet *b* of the minute-arbor, the half-hour tappet *c* not coming in contact with said wheel. N is a resistance-spring, applied to the star-wheel G to hold it from moving except when actuated by the tappet *b*. Upon one side or face of this wheel G is a stop or pin, *e*, which, by means of the wheel G and hour-tappet *b* operating the latter, (or it may be by any other devices connected with the time movement of the clock,) moves through an equal space each succeeding hour, and only completes a revolution once in twelve hours.

Arranged loosely upon or around the sleeve *d* is another loose sleeve, *f*, which has attached to it a ratchet-wheel, H, containing twelve teeth. This wheel H is connected with the star-wheel G, or device carrying the stop *e*, by a coiled spring, I, fast at its one end to the ratchet-wheel H, and at its other end to a collar, *g*, fast on the sleeve *d* of the wheel G. Said spring is coiled, so that the operation of the star-wheel G by the tappet *b* exerts a winding action upon it.

J is the lever by which the striking-wheel D is held or released, accordingly as a pin, *h*, or each one in succession of a pair of pins, *h*, on said wheel is arrested by or released from contact with a prong, *i*, or by or with each one in succession of a pair of prongs, *i i'*, on the lever J. This lever, which is pivoted at *k* and is held down to lock the striking-wheel by a spring, *l*, is provided with a stud or pin, *m*, which, when the lever J is down, engages with the ratchet-wheel H to hold it, and acts as a rest, when the clock completes its strike, for a dog, M, on the side or face of the

ratchet-wheel, the pin or stop *e* on the star-wheel G serving for the dog M to bear or rest against prior to the clock striking the hour; and according to the distance apart of the pins *m* and *e* will the count or number of strikes be determined.

The spring I rotates the ratchet-wheel H to throw the dog M back against the pin or stop *e* each time, except when striking the half-hour, when the pin *m* is raised by the lever J to clear its engagement with the ratchet-wheel. This motion of the ratchet-wheel H and dog M is in a reverse direction to the motion of said wheel by the striking-wheel D, the pins *h* on which serve as drivers of the wheel H.

In Fig. 6, the arrow *a'* indicates the motion of the striking-wheel D; the arrow *b'*, the motion of the ratchet-wheel H when the latter is driven by the striking-wheel; arrow *c'*, the motion of the hour-striking tappet *b* on the minute-wheel arbor B; and the arrow d^2, the motion of the minute-hand O.

The lever J is raised indirectly by the tappets *b c* through the instrumentality of a shoe, P, which is pivoted at *n* to the lever J, and is held in position on said lever by a lip, *r*, and the spring *l*.

When the clock is turned backward the tappets *b* and *c* simply lift the shoe P against the pressure of the spring *l* without raising the lever J, which latter consequently continues to hold the striking mechanism in check, and only the pin or stop *e* on the star-wheel is adjusted to correspond with the back adjustment of the hands of the clock. On the other hand, when the clock is set forward, the lever J is raised through its shoe P by the tappet *b* or tappets *b* and *c*, thereby causing the striking to be continued the same as if the action were taking place under the influence of the mainspring. Thus, when once the hands of the clock are set to conform with the striking-movement, no future manipulation of said hands, whether backward or forward, will interfere with or disarrange said striking-movement.

One of the teeth *s* of the ratchet-wheel H is made longer than the other teeth of said wheel, so that when the short or half-hour tappet *c* of the minute-arbor B lifts the lever J to release the striking-wheel, it only raises said lever sufficiently high to cause the pin *m* to clear that one of the smaller teeth which is immediately in advance of the larger tooth *s*, and so that the pin or stop *m* on the lever J arrests, by its contact with said larger tooth, the back motion of the wheel H by the spring I; and the striking-wheel, being liberated by the rise of the lever J, gives a single strike to indicate the half-hour, and one of the pins *h* on the striking-wheel strikes a tooth of the wheel H to return it to its normal position, so that the future striking of the hour is not interfered with. When the lever J is thus lifted by the shorter tappet *c* to strike the half-hour, one of the prongs *i* is raised to clear one of the pins *h* of the striking-wheel, resting against it, and the said pin is caught by the other prong *i'* of the lever J, which action causes the usual "warning" to be given before the clock strikes. This occurs while the ratchet-wheel H is moving a single tooth in advance of the larger tooth *s*, catching the pin *m*, after which the lever J drops, and the same pin *h* passes over the prong *i'*, and the wheel moves through a limited space to effect the strike of the half-hour, and to return the ratchet-wheel to its normal position, as hereinbefore described, when the wheel D will be again arrested by a pin, *h*, striking the first-named prong *i*, which is left slightly raised for such purpose whenever the striking-movement is at rest by the pressure of the dog M on or under the pin *m* of said lever. In striking the hour the same operation takes place as in striking the half-hour, with the exception that, the lifting-tappet *b* being longer than *c*, the lever J is raised sufficiently to enable the stud or pin *m* to pass over the long tooth *s* of the ratchet-wheel H, so that said wheel has a longer run, the pin *m* falling to the bottom of each succeeding tooth, which allows of the pins *h* on the wheel D clearing the prongs *i i'* till the dog M again comes up against the pin *m* of the lever J, and, slightly lifting said lever, causes the raised prong *i* to again arrest the striking-wheel D.

As the pin or stop *e* moves through equal spaces each hour, and only completes a revolution once in twelve hours, it necessarily follows that the spring I, which, in unwinding, brings the dog M against said stop *e*, has its unwinding action limited, so that, while for each strike of the clock from the hour of one to that of twelve the unwinding of it is regularly increased, and it is always wound up again to its normal tension after each strike, it never is unwound more than a full turn or single revolution of the ratchet-wheel H and dog M connected therewith, thus preserving the integrity of said spring.

When the clock is about to strike twelve, it is necessary that the dog M should drop or get out of the way of the tooth *u* (see Fig. 5) on or down into the back of which the pin *m* is required to drop when the clock commences to strike said hour. To effect this the dog M has lost motion in its attachment to or connection with the ratchet-wheel H by a projection, *v*, on the dog within a slot, *b'*, on the wheel H, so that when the pin or stud *m* is raised, the position of the pin *e* in coming round admits of the dog M falling onto said pin and leaving the tooth *u*, Fig. 5, clear for the pin or stud *m* of the lever J to fall down over the back of said tooth. This is as the stop *e* passes from one side of the pin *m* to the opposite side thereof, as shown in Fig. 5. This lost motion of the dog M, however, may be variously provided for and other changes made without departing from the characteristic principle of our invention. Thus, for instance, it is not absolutely necessary that the pin *m* should act as a stop to the dog M when worked back by the strik-

ing-wheel; but the lever J may be constructed to work in connection with an independent stop on the ratchet-wheel H to arrest the latter, and with it the dog M, in its or their one movement.

We claim—

1. The combination of the wheel H, actuated in one direction by the striking-wheel or by the mechanism which drives the said wheel, a dog, M, connected with said wheel so as to move in concert therewith, a revolving stop, *e*, operated by the time-movement of the clock through an equal space each succeeding hour, a coiled spring, I, applied between the said wheel H and the said stop *e*, and a lever, operated by the time-movement of the clock, to control the liberation and stoppage of the striking-wheel and of the said wheel H and its dog M, substantially as specified.

2. The combination, with the minute-wheel arbor B, having one or more tappets, *b c*, the star-wheel G, having an attached pin or stop, *e*, the ratchet-wheel H, having an attached dog, M, the spring I, the lever J, and the striking-wheel D, essentially as described.

3. The dog M, provided with slip or lost motion, in combination with the ratchet-wheel H and the pin or stop M on the lever J, substantially as specified.

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