

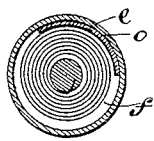
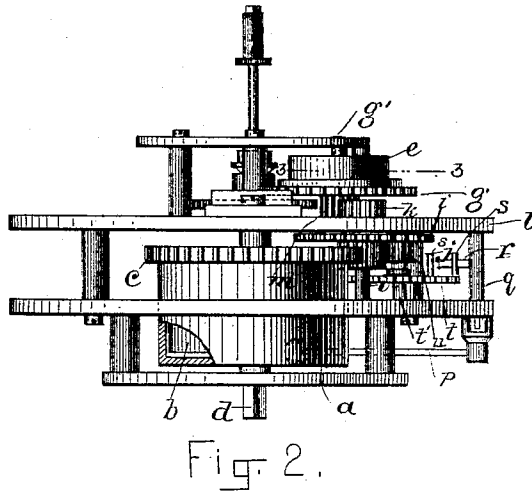
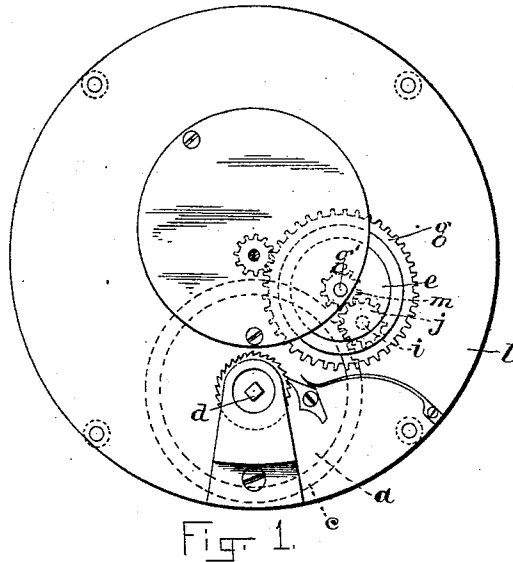
(No Model.)

C. BICKFORD.

CLOCK.

No. 394,816.

Patented Dec. 18, 1888.



WITNESSES:
Albert D. Swart,
James T. Ball,

Fig. 3.

INVENTOR:
Chas. Bickford
 By *Wm. Brown & Crosley,*
 5" attys.

UNITED STATES PATENT OFFICE.

CHARLES BICKFORD, OF BOSTON, MASSACHUSETTS.

CLOCK.

SPECIFICATION forming part of Letters Patent No. 394,816, dated December 18, 1888.

Application filed April 5, 1887. Serial No. 233,774. (No model.)

To all whom it may concern:

Be it known that I, CHARLES BICKFORD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Clocks, of which the following is a specification.

This invention has for its object to enable the time-movement of a clock to be wound by the operation of the spring of the striking-movement; and to this end it consists in the combination, with the time-movement and the striking-movement and their operating-springs, of a connection between said springs, whereby the rotation of the barrel of the striking-movement during the operation of the striking-movement and the unwinding of said spring is caused to wind the spring of the time-movement, the latter being, therefore, wound at frequent intervals and kept in a nearly uniform state of tension, as I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a front elevation of a clock-movement embodying my invention. Fig. 2 represents a side elevation of the same, the dial being removed in both figures. Fig. 3 represents a section on line 3 3, Fig. 2.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the barrel, which contains the impelling-spring *b* of the striking-movement of a clock and is rotated by said spring when the striking mechanism is in operation, as in any spring-driven striking-movement, the barrel *a* having a gear, *c*, formed on or attached to it, which gear forms a part of the usual striking-movement.

d represents the usual winding-post or arbor, which supports the winding-spring and its barrel, and is operated, as usual, by a key to wind up the striking-spring.

e represents the barrel containing the going or time-movement spring *f*. Said barrel has formed on or attached to it a gear, *g*, which forms a part of the time-train, the latter being organized in the usual or any suitable manner. The arbor *g'*, which supports the going-spring *f* and takes the place of the usual winding-post, whereby the going-spring is wound by a key applied thereto, is not formed to receive

a key, but is connected by suitable gearing with the barrel *a* of the striking-movement, so that at each operation of the striking-movement the rotation of the barrel *a* caused by such operation will rotate the arbor *g'* in the direction required to wind the going-spring. Any arrangement of gearing whereby this result will be effected may be adopted without departing from the spirit of my invention. I have here shown the arbor *i* having the pinion *j*, that engages with the gear *c* on the winding-barrel, extended through the plate *l* of the supporting-frame, and provided with another pinion, *k*, which meshes with a pinion, *m*, on the arbor *g'* of the going-spring. It will be seen that by this arrangement each operation of the striking-movement is caused to partially wind the going-spring, so that the latter is partially wound at least once each hour and twice each hour in case the striking-movement strikes the half-hours.

The chief advantages of this improvement may be stated as follows: The going-spring is kept at a nearly uniform strength or tension instead of varying from a condition of strong tension to one of weak tension, as is the case with springs which are wound at long intervals, as in ordinary eight-day or even twenty-four hour clocks. A comparatively light and therefore compact going-spring can be employed, requiring for its winding but little expenditure of power from the striking-movement spring and occupying but little room. The going-spring will necessarily be wound more during the latter part of each period of twelve hours beginning at one o'clock than during the earlier part of said period; but this variation will not affect more than two coils of the spring—that is to say, the spring will have only two more coils under tension when at its highest state of tension than when at the lowest state. In an ordinary clock-movement, which is wound by a key at intervals of eight days or thereabout, this difference usually involves as many as eight coils of the spring.

To guard against overwinding of the going-spring, its outer end may be attached to a band or shoe, *o*, in frictional contact with the inner surface of the barrel *e* and adapted to slip thereon when the spring is entirely wound,

said shoe being drawn inwardly by the entire winding of the spring, so that it slips on the barrel.

p represents the hammer of the striking-movement, the same being arranged to strike a gong or a spiral wire. (Not shown.) Said hammer is attached to a rocking arbor, *q*, which has an arm, *r*, projecting into the path of a series of pins, *s*, which are affixed to a wheel, *t*. Said wheel is affixed to an arbor, *t'*, which has a pinion, *u*, meshing with the gear-wheel *i'* on the arbor *i*. The rotation of the arbor *i* by the striking-spring *b* is imparted to the arbor *t*, and the pins *s* of the latter act on the arm *r* and alternately raise and release the hammer in a manner well known.

I have not shown all the operative parts of the striking-movement, as my invention does not relate to the construction thereof, but may be used with any suitable striking-movement.

I claim—

In a clock, the combination of the barrel and spring of a striking-movement, a time-movement consisting of a time-train and a mainspring having frictional contact with its inclosing barrel, so as to slide thereon when fully wound, and connections between the barrel of the striking-movement and the said mainspring, whereby the latter is partially wound at each periodical release of the striking-spring, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 30th day of March, A. D. 1887.

CHARLES BICKFORD.

Witnesses:

ARTHUR W. CROSSLEY,
A. D. HARRISON.