W. D. CHASE.

Striking Clock.

No. 224,768. Patented Feb. 24, 1880.

Fig. 2.

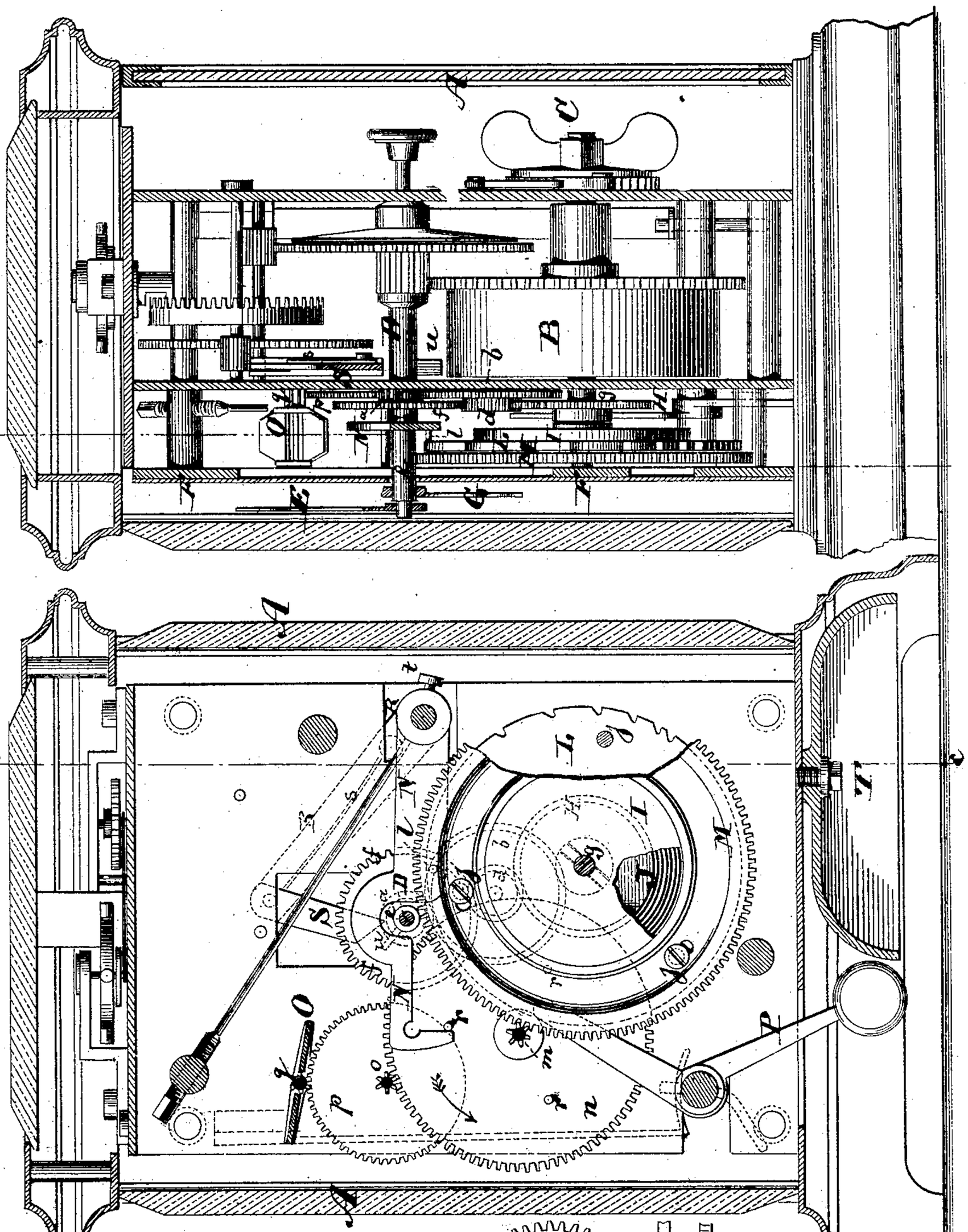

Fig. 1.

Fig. 3.

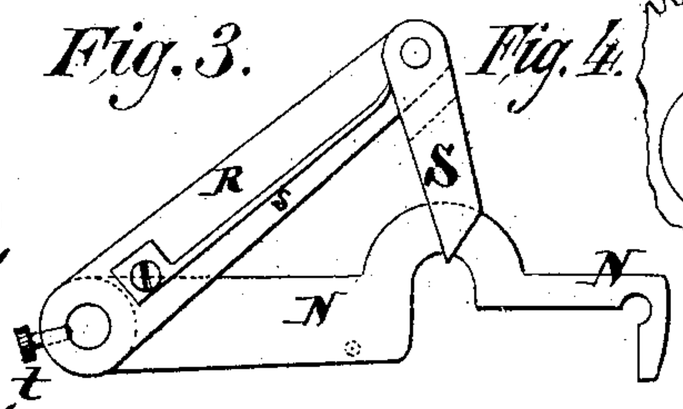

Fig. 4.

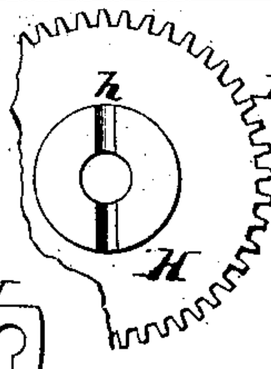

Fig. 5.

WITNESSES:

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WILLIAM D. CHASE, OF BROOKLYN, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO GEORGE W. ALMY, OF SAME PLACE, AND HARVEY S. ALMY, OF NEW YORK, N. Y.

STRIKING-CLOCK.

SPECIFICATION forming part of Letters Patent No. 224,768, dated February 24, 1880.

Application filed October 25, 1879.

To all whom it may concern:

Be it known that I, WILLIAM D. CHASE, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Striking-Clock, of which the following is a specification.

Figure I is a front elevation, partly in section, of my improved striking-clock, the dial and front portions being removed in order to disclose the striking mechanism. Fig. II is a vertical cross-section on the plane of the line *c c*, Fig. I. Fig. III is a detailed face view of the lifting mechanism for setting the striking apparatus into operation. Fig. IV is a detailed face view of the toothed wheel on the arbor of the striking-spring; Fig. V, a detailed edge view of the same.

Similar letters of reference indicate corresponding parts in all the figures.

The principal object of this invention is to produce a striking-clock in a comparatively small compass.

As heretofore made, all striking-clocks, as far as I am aware, were provided with a mainspring for operating the hands of the clock, with another mainspring for operating the striking mechanism of the clock, and with devices for winding said two mainsprings separately. The two mainsprings were usually of substantially the like capacity and strength, so that, for example, on an eight-day clock, where the one spring served to keep the hands in proper motion for an entire week, the other spring had also to be made sufficiently strong and large to enable it to keep the striking mechanism in proper operation for one week, and when about run down the two mainsprings had to be separately wound.

In order to make clocks of small size, but also for larger ones, if desired, it is not convenient always to have two large mainsprings, and from this reason—that is to say, owing to the desire to economize space—many clocks which otherwise would be made into striking-clocks are now made without the second spring.

My invention seeks to do away with the usual mainspring employed for actuating the striking mechanism; and it consists, more fully, in substituting for the striking-mainspring a far less powerful spring—namely, one which is far less powerful than the mainspring which actuates the hands of the clock—which secondary or striking spring is, under the principles of my invention, wound up by the mainspring, and kept wound during the operation of the clock. Thus, as the clock strikes, the striking-spring of my mechanism moves the clapper; but between the striking times my mainspring winds the striking-spring, and keeps it wound and always in a normal condition, all as hereinafter more fully described.

It is evident that in this construction I use but one single winding-key for winding the striking as well as the actuating mechanism; and my invention also consists in further details of improvement, which I shall hereinafter more completely describe.

In the accompanying drawings, the letter A represents the frame of the clock, which frame I do not propose here to more fully describe, as it may be of suitable construction, shape, size, and material. B is the mainspring and its drum, provided with a winding-stem, C, in the ordinary or suitable manner. In fact, I have shown said spring B to have its winding-stem provided with a handle at the back of the clock, so that the movable key usually employed may be dispensed with. This mainspring B imparts rotary motion by the usual connections, or in other suitable manner, to the minute-arbor D, which carries the minute-hand E in front of the dial F, and the minute-arbor, in turn, carries the frictional sleeve *e*, which sustains the hour-hand G in the manner well known in the construction of clocks.

Upon the minute-arbor D is mounted a pinion, *a*, which is shown in the drawings to gear into a toothed wheel, *b*, that carries another pinion, *d*. This pinion *d* engages into the teeth of a toothed wheel, H, which, being revolved by the gear-connection above stated, or by any other equivalent connection, winds the striking-spring, in manner hereinafter stated. The sleeve *e*, that carries the hour-hand G, derives its motion preferably, but not necessarily, from the pinion *d*, which meshes into the teeth of a wheel, *f*, that is rigidly

mounted upon said sleeve *e*. Thus it will appear that inasmuch as the wheels H and *f* are of the same diameter, have the same number of teeth, and gear into the same pinion *d*, both revolve with like speed, so that, in fact, whenever the hour-hand makes one revolution the wheel H makes one revolution; but this harmony of motion between the wheels H and *f* is not essential, is a mere matter of greater convenience, and any other ratio of speed may be advantageously employed.

The wheel H is fitted loosely upon an arbor, *g*, which is indicated in Fig. II, and has a notched or grooved face, which is clearly indicated at *h* in Figs. IV and V. Into this notch or groove enters a rib or pin, *i*, that projects from the face of the drum I, that contains the auxiliary or striking spring J. By the rotation of the wheel H through its connection with the minute-arbor, the spring J within the drum I is wound up, and yet motion in the opposite direction is permitted to the drum I, to allow it to unwind on the same principle as is usual on all drums of the springs of clocks or watches. The spring J is of much less power, and indeed very much smaller, than the mainspring in the drum B, so that the mainspring, while actuating the mechanism of the clock, will find no difficulty in keeping the small spring J properly wound up through the means of the intervening gearing.

The drum I carries a notched disk, L, and also a toothed wheel, M, both rigidly connected together by screws or pins *j*. (Shown in Fig. I.) I prefer to have these screws *j* pass through slots of the toothed wheel M to allow of a very fine adjustment of said toothed wheel with reference to the notches of the wheel L, in order to make the motion produced by the wheel M upon the striking mechanism conform in proper manner to the position of the lifting-hook N, of which a projecting pin, *l*, enters the notches of the wheel L.

The wheel M meshes into a pinion, *m*, from which, by toothed wheel *n*, pinion *o*, toothed wheel *p*, and pinion *q*, or equivalent gearing, the usual rotary motion is imparted to the vane O.

The toothed wheel *n* has on its face a series of projecting pins, which are marked *r* in the drawings, and which serve to actuate the hammer or clapper P, and also to arrest the hook N, when the striking is to cease.

The hook N is rigidly connected with the lifter R, which has a pivoted arm, S, a spring, *s*, serving to hold the parts R and S in the proper relative position, but allowing, nevertheless, the arm S to swing independently of the rod or lever R. The requisite angle between the hook N and the rod R may be obtained by means of the fastening-screw *t*, that secures both upon the same arbor.

The arm S is in line with the lifting-hook *u*, that projects from the minute-arbor D, and whenever this lifting-hook comes into the path of the arm S it swings the same aside, and thereby lifts the rod R and the hook N, carrying the latter clear of the arresting-pin *r*, which, in the normal position, bears against the hook, as shown in Fig. I. The wheel *n*, being thus liberated from the hook, immediately commences to revolve in the direction of the arrow shown in Fig. I under the influence of the auxiliary spring J, and with it revolves the entire train M *m n o p q*, &c.

The notches in the wheel L are slightly beveled on their inner faces, as indicated in Fig. I, so that as the wheel L commences to revolve, as just stated, together with the wheel M, the pin *l* will be caused to rise on the beveled edge of the notch in which it was formerly contained, and thus to be sure and lift the arm S clear of the lifting-hook *u*, allowing it (the arm S) to swing back to its proper position behind the lifting-hook under the influence of the spring *s*. The clock now continues to strike as long as the pin *l* rides on the smooth periphery of the disk L; but as soon as another notch of the disk L arrives under the pin *l* the latter drops into such notch, and thus causes the hook N to come into the way of one of the pins *r*, and to arrest the entire striking mechanism in a proper manner.

The spacing of the parts is, of course, such as to cause the striking mechanism to produce the desired number of sounds at the proper time; and what I stated before with reference to the adjustment of the disk M upon the disk L has reference to the conformity of position of pins *r* to the notches on the wheel L, so that one of the pins *r* will invariably come against the hook N just when the pin *l* on the latter drops into a notch of the wheel L.

I have shown how the auxiliary spring J is wound by the mainspring, also how it actuates the striking mechanism. It remains only to state that during the time that the clock is in motion and does not strike the striking-spring is continuously being wound up by the mainspring, so that really the strength of the striking-spring need never exceed its capacity for producing the twelve strokes at the hour 12. By simply winding the mainspring B, therefore, the clock will have its striking mechanism continuously in proper action, and require much less mechanism, much less powerful frame-work, and much less space than a striking-clock having its own independent and separately-wound striking-spring.

The other parts of the clock, to which I have not referred before, but which incidentally are illustrated in the drawings, do not of necessity constitute part of the present invention. It is, of course, proper that the striking-hammer or clapper-piece should have a spring for driving it against the bell or gong T, and that the clock should have a suitable escape mechanism and other provisions which are necessary in every striking-clock, but which, as already stated, I do not propose to specifically set forth.

I am aware that in English Patent No. 408 of the year 1852 a mechanism is described

for keeping a small spring which moves the hands of a clock wound by a larger spring, which directly actuates the striking apparatus. This I do not claim, and said mechanism is, moreover, useless, as the striking action is too variable to properly control the motion of the hands. If the clock strikes 12, the small spring that moves the hands will be wound much more than if it strikes 1 or 2, and therefore the hands—the real time-keepers—will be moved with unequal power between the termination of the several hours. In my invention, however, the hands are always under the direct control of the mainspring, which also affects the striking-spring, winding it as much during one hour as during any other hour.

I claim as my invention—

1. A striking-clock containing a mainspring, B, for directly actuating the train which moves the hands of the clock, and an auxiliary less powerful spring, J, for actuating the striking mechanism, and intermediate gearing between the springs B and J, whereby the striking-spring J is wound by the spring B, substantially as herein shown and described.

2. The lifting-arm S, joined to the rod R, which is rigidly secured to the hook N, that carries the pin *l*, in combination with the notched disk L, and with the pins *r* on the rotary wheel *n*, substantially as herein shown and described.

3. The combination of the minute-arbor D of the clock and its pinion with the toothed wheels *b d f* and toothed wheel H, for operation substantially as herein shown and described.

WILLIAM D. CHASE.

Witnesses:

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