

(No Model.)

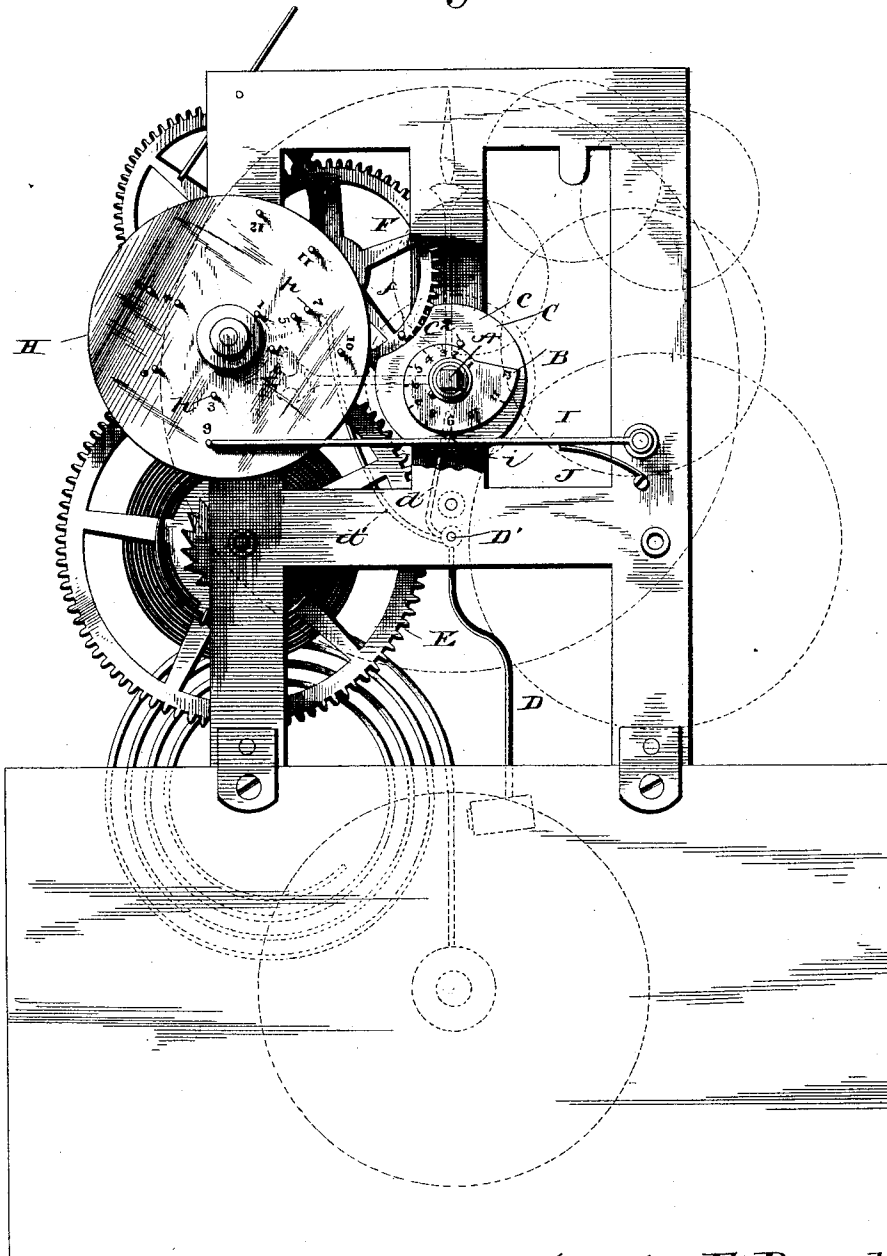
2 Sheets—Sheet 1.

C. E. BURNHAM.
STRIKING MECHANISM FOR CLOCKS,

No. 461,315.

Patented Oct. 13, 1891.

Fig. 1.



Charles E. Burnham.

Inventor

Attorney

Witnesses

John Ingle
E. M. Johnson

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

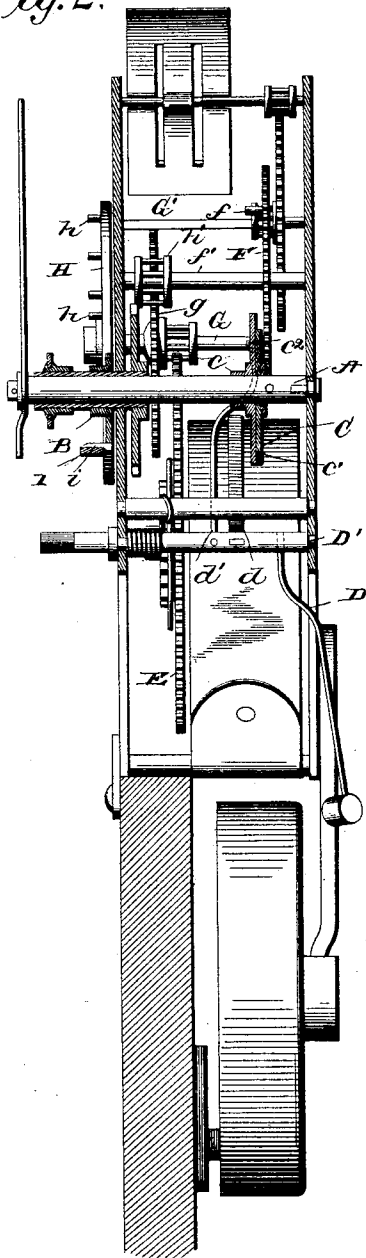


Fig. 3.

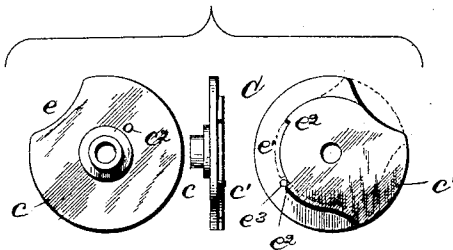


Fig. 4.

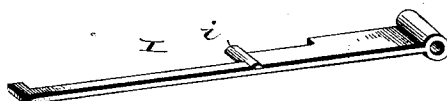
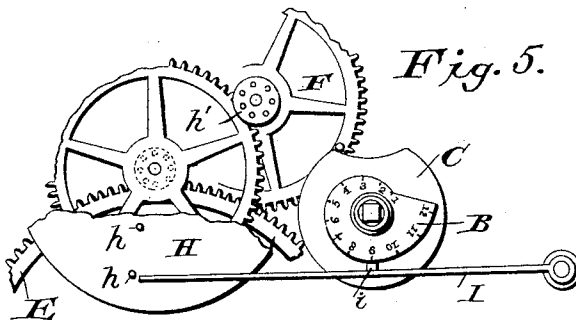


Fig. 5.



Charles E. Burnham.

Inventor

Witnesses

John J. [Signature]
A. M. [Signature]

[Signature]
Attorney

UNITED STATES PATENT OFFICE.

CHARLES E. BURNHAM, OF WHITE PLAINS, NEW YORK.

STRIKING MECHANISM FOR CLOCKS.

SPECIFICATION forming part of Letters Patent No. 461,315, dated October 13, 1891.

Application filed November 20, 1890. Serial No. 372,011. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BURNHAM, a citizen of the United States of America, residing at White Plains, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Striking Mechanism for Clocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in striking mechanism for clocks; and it consists in the novel construction, arrangement, and combination of devices, as will be hereinafter fully set forth, and particularly pointed out in the claims.

The object of my invention is to provide a clock with a striking mechanism of simple construction, that will, by the employment of certain peculiar parts, simplify the complicated construction heretofore employed in clocks adapted to strike the hours and half-hours, the construction being such that by the use of the means illustrated the hands of the clock can be turned back without disarranging the striking mechanism, said striking mechanism being substantially self-setting.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of a clock mechanism, a portion thereof being in dotted lines. Fig. 2 is a vertical sectional view on the line *x x* of Fig. 1. Fig. 3 are detail views of a compound cam-disk carried by the arbor of the minute-hand. Fig. 4 is a detail perspective view of the lever which controls the count-wheel; and Fig. 5 is a detail front view showing the count-wheel moved back by the cam and time mechanism, so that the arm will be out of engagement with the projecting pin on the count-wheel.

The clock-frame may be of ordinary construction, as well as the mechanism for operating the hands.

The minute-hand arbor A is driven in the usual manner from the time-keeping mechanism and carries the hour-hand arbor which

is geared thereto. The hour-hand arbor carries beyond the front portion of the frame a snail B, which is rigidly secured thereto and which is adapted to operate the lever for controlling the count-wheel, to be hereinafter described.

The arbor A, to which the minute-hand is rigidly secured, carries within the frame a compound cam C, the part *c* of which is rigidly mounted on the shaft, while the other part *c'* is journaled to turn freely on said shaft over the rear face of the part *c*, and is held in position by a locking-pin which passes through the shaft, a washer or spring-plate being interposed, as shown. From the disk *c* to one side of a line with the minute-hand projects a pin *c'*, which operates one of the members of the bell-hammer to sound an alarm every time the minute-hand reaches the half-hour point on the dial. By positioning the projecting pin *c'* a little to the side of a line with the minute-hand, as mentioned, it will, by contact with the member of the bell-hammer, elevate the said hammer and release it promptly on the half-hour. The disk *c* of the compound cam C has a segment removed therefrom which permits the operation of the striking mechanism at each hour by permitting the rotation of the gear-wheel F, one of the projecting pins of which at other times traverses the periphery of said disk and prevents rotation. After the hours have been struck the spring-actuated bar or arm I is in contact with a projecting pin on the count-wheel, thus causing additional friction which would have to be overcome by the spring operating the time-keeping train of gearing. As the minute-arbor A moves forward it carries with it the cam C and snail, the segmental or cut-away portion of the cam being positioned so that the stud or pin *f* will lie in said cut-away portion of the cam, and as the arbor revolves the end of the cut-away portion of the cam contacts with the pin and moves the gear-wheel F backward until the pin *f* rests upon the peripheries of the cams. This backward movement is imparted by the pinion on the shaft F to the gear-wheel and shaft upon which the count-wheel is mounted, thus moving the count-wheel backward to bring the projecting pin out of engagement with the spring-actuated arm I, thus leaving

the only work to be performed by the snail that of properly positioning said arm. This construction is desirable, as frequent impact of the pins on the count-wheel with the free end of the arm I may cause the same to become indented or recessed, so that it would require an excessive amount of power, which would affect the time mechanism, to depress said arm below the pin with which it might be in engagement.

The cut-away portion of the disk is covered when the hands are turned backward by the plate c' , which is operated to move with the said disk, to either cover its cut-away portion or expose it, according to the direction the shaft is operated, by the pin e^3 engaging one of the shoulders e^2 formed on the said plate.

The bell-hammer D is mounted on the pivoted shaft D', said shaft being rocked by two members, one of which d is acted upon at the half-hour by the pin c^2 , and the other d' at the hour by the pins f , projecting from the side of the gear-wheel F. The revolutions of the gear-wheel F are limited by the count-wheel, with which it is geared, and its speed is governed by the fly, to which it is also geared in the usual manner.

E refers to the driving-wheel for the striking mechanism, and is mounted upon the shaft, upon which is coiled the actuating-spring, and this driving-wheel meshes with a pinion on the shaft G, having a gear-wheel g , which meshes with a pinion on the shaft f' , upon which is mounted the gear-wheel F, having the projecting pins f , hereinbefore referred to, thus providing a train of gearing between the main driving-wheel and the fly.

Upon the outer end of the shaft G is rigidly secured the count-wheel H, which has twelve pins projecting from the face thereof, it being obvious that the number can be increased should the dial be spaced for twenty-four hours. These pins coact with the snail B and lever or arm I. The snail B is rigidly attached to the arbor of the hour-hand, as heretofore stated, and the contour thereof is as shown, its position determining the number of strokes given to the bell-hammer at the hour-point. The periphery of the snail B contacts with the inwardly-projecting pin i of the spring-actuated arm I, and as the hour-hand turns the arm is raised or lowered, so that the free end thereof will travel over the face of the count-wheel when the same is actuated and engage one of the pins h at the proper time.

It will be observed that by the construction hereinbefore described the striking mechanism is governed by the combined movement of the hour and minute hands, while the half-hours are struck by the turning of the minute-hand arbor.

For the purpose of illustrating the operation of the invention we will suppose the clock has just struck nine. In this position the projecting pin of the arm I will be at the point 9 on the snail, and the end of said arm

will be in contact with the projecting pin h of the count-wheel marked 9. Upon the united movement of the minute and hour hands the arm I will be depressed by the snail, and when the hour-hand reaches the next hour the projecting end of said arm will be in a concentric circle with the pin on the count-wheel marked 10, and the cut-away portion of the disk c will be positioned to permit the gear-wheel F to rotate and strike the hour, the number of strokes being determined by the travel of the count-wheel, which presents one of its pins h —in this instance the one marked 10—in the path of the arm, which stops the striking mechanism and holds the parts until the disk c has turned sufficient to hold one of the projecting pins f upon its periphery to prevent the rotation of the gear-wheel, when the snail will have depressed the arm I out of contact with the pin 10.

In setting the clock the minute-hand may be moved forward around the face as many times as necessary, and the movement thereof operating the hour-hand will turn the snail, so that the arm I will be positioned to strike the proper pin when the next hour is reached, and though it may not be in a position to strike the proper number of times at that hour it will thereafter. If it should be desired to turn the hands backward, supposing the hands are at nine, the minute-hand should be moved forward far enough to insure, upon its backward movement, the plate c' covering the cut-away portion of the disk when the same reaches the pin.

The construction and organization of the parts are extremely simple, and after once being properly combined the clock will be self-setting.

In constructing the striking mechanism for clocks hereinbefore described, I deem it preferable to provide the gear-wheel G' with fifty-two teeth, which mesh with the pinion h' on the shaft f' , having eight teeth. It being necessary that the wheel G' advance four teeth on each stroke of the bell-hammer, and making six revolutions in the twelve hours the wheel would advance three hundred and twelve teeth, which, being divided by four, the number of teeth required for each stroke of the hammer, would make seventy-eight, the number of strokes in twelve hours, it being noted that the pinion h' is rigidly secured to the shaft which carries the wheel F, having the projecting pins f , which operates the bell-hammer.

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

1. In combination with the time mechanism of a clock, a striking mechanism, a two-part cam or disk mounted on the minute-hand arbor and adapted to lock the striking mechanism by engagement with the laterally-projecting pin carried by one of the wheels of the train of gearing, and a laterally-projecting pin c^2 , carried by the cam to actuate the

bell-hammer while the striking mechanism is locked to strike the half-hours, substantially as set forth.

2. In combination with a time keeping and striking mechanism, an arbor A, carrying a two-part cam, one part being fixed upon the arbor and provided with a segmental cut-away portion, the other part being loosely mounted on the arbor and adapted to cover the cut-away portion of the fixed cam, substantially as shown, the parts being organized to act in connection with a snail, movable arm, and count-wheel, whereby the striking mechanism is rendered self-setting.

3. The combination, with a clock having a striking mechanism, of a snail rigidly secured to the hollow hour-hand arbor, a two-part cam carried by the minute-hand arbor, and an arm held in contact with the snail and adapted to engage the projecting pins on the face of the count-wheel, said count-wheel being geared to the gear-wheel F, having projecting pins which engage with one of the members of the bell-hammer to strike the hours, together with the fixed cam or disk on the minute-hand arbor, also carrying a projecting pin which engages with the other member to strike the half-hours, substantially as set forth.

4. In a clock, the combination of the minute-hand arbor carrying a compound cam C, made up of a plate c , having a segment thereof cut away, a plate c' , having a portion adapted to cover the cut-away portion of the plate c , and a wheel F in gear with the striking mechanism and provided with projecting pins f , which operate upon the bell-hammer and also engage with the periphery of the compound cam and lock the striking mechanism, substantially as set forth.

5. In a clock, the combination, with the minute-hand arbor carrying a fixed cam or plate c , with a segment thereof cut away, of a snail mounted on the hour-hand arbor, said snail operating an arm which engages with the count-wheel, and gearing connecting the count-wheel with a gear-wheel F, having projecting pins for operating the bell-hammer, the cam carried by the minute-hand arbor also engaging with said pin, so that a forward movement of the minute-hand after passing the hour-point will move back the count-wheel to release the arm from said count-wheel, for the purpose set forth.

6. In a clock, the combination, with the minute-hand arbor carrying a fixed disk c , having a segment thereof cut away, and pin c^2 , of a plate c' , loosely mounted on the minute-hand arbor and provided with a portion adapted to move over the cut-away portion of the plate c , a snail mounted on the hour-hand arbor, said snail being adapted to actuate an arm which engages with a count-wheel, and the gear-wheel F, connected to the count-wheel, as shown, and provided with pins f , which operate the bell-hammer and move in the path of the periphery of the compound cam C to operate the movable plate thereon and throw

it over the cut-away portion of the plate c , thereby locking the mechanism, so that it is not affected by the backward turning of the hands, and rendering the striking mechanism self-setting, substantially as set forth.

7. The combination, in a clock, of a count-wheel having projecting pins arranged at different distances from the center thereof, and an arm held by spring-contact with the snail carried by the hour-hand arbor, said arm having an inwardly-projecting portion with which the snail engages and an inwardly-extended end which engages the pins of the count-wheel, so that the said pins can pass under the arm, substantially as set forth.

8. In combination with the striking mechanism of a clock, a count-wheel having twelve projecting pins, each pin being arranged out of a concentric line with the other and differently spaced, and arm I, having at one end an inwardly-projecting portion which engages with the projecting pins of the count-wheel and near its center a projecting portion i , which engages with the snail carried by the hour-hand arbor, said arm being pivoted to the clock-frame and provided with a spring for holding the same in engagement with the snail, substantially as shown, for the purpose set forth.

9. In combination with the striking mechanism of a clock, a snail attached to the arbor which carries the hour-hand, said snail positioning an arm to engage projecting pins carried by a count-wheel, said count-wheel having the pins located at different distances from the periphery thereof and unequally spaced, said count-wheel being rigidly fixed upon a shaft having fifty-two teeth, which mesh with a pinion having eight teeth, the shaft upon which the pinion is mounted carrying a gear-wheel F, with two projecting pins opposite each other for actuating the bell-hammer, whereby the count-wheel is rotated six times to one complete revolution of the hour-hand over the dial, and a plate carrying a projecting pin c^2 for actuating the bell-hammer direct from the minute-hand arbor, so as to strike the half-hours, substantially as set forth.

10. The combination, with the time mechanism of a clock, of a cam having a segmental cut-away portion rigidly mounted on the minute-hand arbor and provided with a projecting pin which engages with one of the arms of the bell-hammer to strike the half-hours, the hour-arbor carrying a snail with which an arm I engages, the end of said arm being located over the face of a count-wheel having projecting pins, and a train of gearing for operating the hour-striking mechanism, one of the wheels of said train, as F, having a pin which moves in the path of the cam attached to the minute-hand arbor, the segmental portion of said cam being adapted to engage said pin to move the train of gearing which actuates the count-wheel backward to disengage the arm from the projecting pin of the count-wheel

and lock the striking mechanism when the pin is in engagement with the periphery of the cam.

11. In combination with the minute-hand arbor carrying a two-part cam, one part being fixed thereon and the other movable, a train of gearing connected to the count-wheel, one of the wheels of the train of gearing having a laterally-projecting pin, which, when in engagement with the concentric periphery of the cam, locks the striking mechanism, said cam having a cut-away portion adapted to be moved in the path of the locking-pin, so that the train of gearing previously locked can operate, substantially as shown.

12. In a clock having a train of gearing for operating the time mechanism and a train of gearing for operating the striking mechanism, both having independent actuating means, a two-part cam carried by the minute-hand arbor, a bell-hammer having a member which is adapted to engage with a projecting pin c^2 , carried by the portion of the cam which is rigidly fixed upon the minute-hand arbor, and a gear-wheel F, carrying pins f , which are adapted to engage with the periphery of the rigidly-fixed cam and with the other members of the bell-hammer, said cam having a segmental cut-away portion e , lying partly out of the path of the pins f , whereby the hour-striking mechanism is locked until the minute-hand reaches the proper position to strike the hours, substantially as shown, and for the purpose set forth.

13. The combination, in a clock-striking mechanism, of a cam C, carried by the minute-hand arbor and provided with a seg-

mental cut-away portion, a movable plate C', forming a part of said cam, said movable plate having a cut-away portion with stops which engage with a pin c^2 to limit its movement on the fixed cam, and a gear-wheel F, having a projecting pin f , located in the path of the concentric periphery of the cam and adapted to bear upon the movable part of said cam, so that said movable part will be placed over the segmental cut-away portion e of the stationary part when the minute-arbor is turned backward, as in setting the clock, so as to lock the train of gearing of the hour-striking mechanism, substantially as set forth.

14. The combination, in a clock having a count-wheel, of a snail, arm governed by the snail, time and striking mechanisms, a cam carried by the minute-hand arbor, said cam having a cut-away portion, as e , and a movable portion adapted to cover said cut-away portion, and a gear-wheel F, having projecting pins f , which are adapted to engage with a bell-hammer to strike the hours, and with the peripheries of the cam to lock the striking mechanism, and with the terminal portion of the cut-out segment e to move the striking mechanism backward, so as to release the arm governed by the snail from the count-wheel, the parts being organized substantially as shown, and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. BURNHAM.

Witnesses:

WILSON BROWN, Jr.,
EUGENE ARCHER.