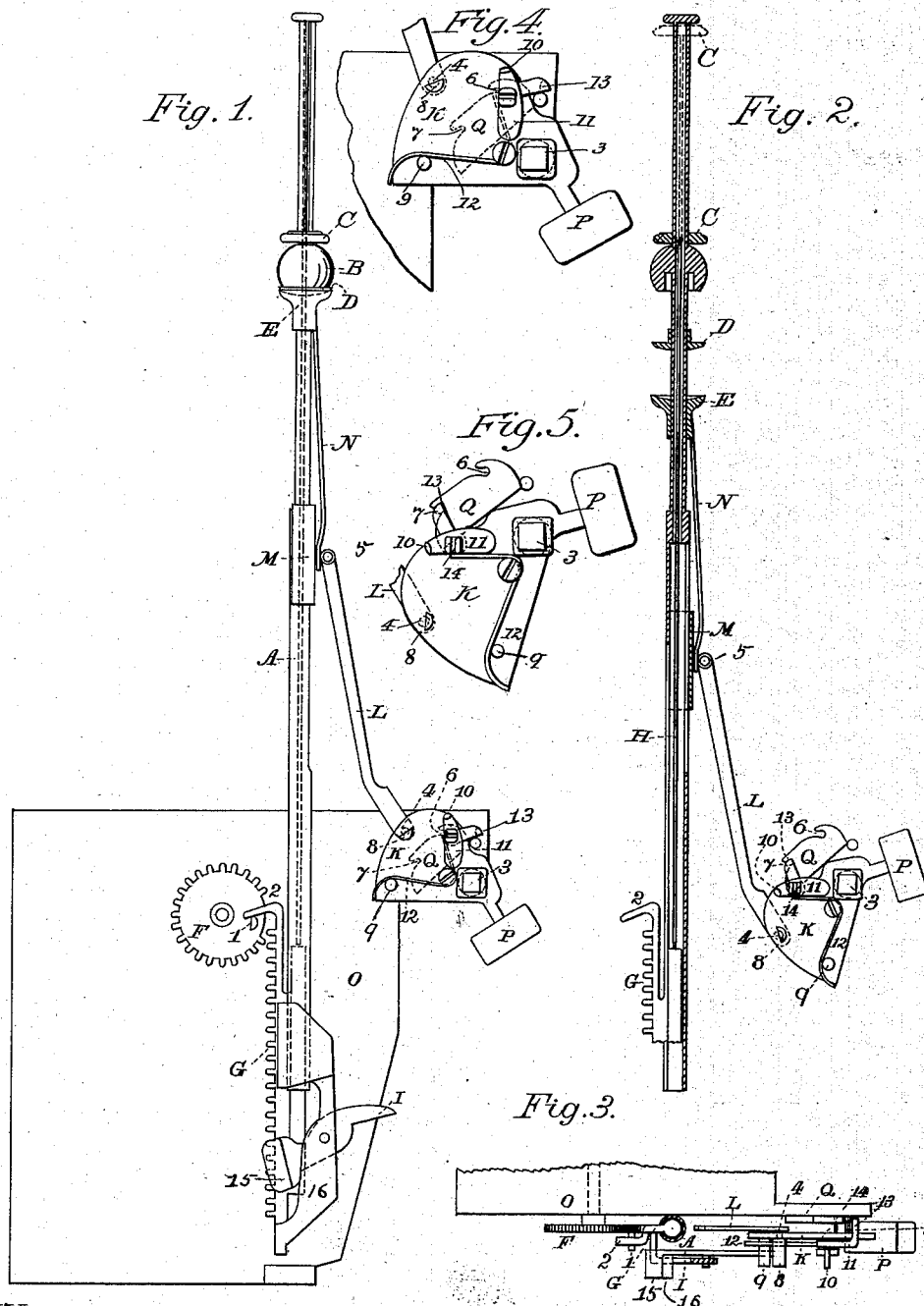


(No Model.)

C. MÜLLER.
TIME BALL.

No. 384,996.

Patented June 26, 1888.



Witnesses:

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TIME-BALL.

SPECIFICATION forming part of Letters Patent No. 384,996, dated June 26, 1888.

Application filed January 17, 1887. Serial No. 221,026. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MÜLLER, a citizen of the United States of America, and a resident of the city and county of San Francisco, State of California, have invented new and useful Improvements in Minute and Hour Time-Balls, of which the following is a full, clear, and exact description, referring to the accompanying drawings.

The object of my invention is to operate on a suitable pole or pipe a minute time-ball and one or more hour-balls by means of suitable devices and mechanism, and the same in combination with and operated by the mechanism of a clock.

Figure 1 is an elevation of my operating devices and mechanism, and showing the time-balls close to the stationary ball. Fig. 2 is a vertical elevation of the same, showing the hour balls or disks separated, thus showing the hours passed. Fig. 3 is a plan of the mechanism, looking down. Figs. 4 and 5 are detail views.

A shows a hollow pole or pipe, and I prefer to make the same of sheet metal, or I may use suitably-slotted metal pipe.

B is a stop-ball, the same being firmly secured to the pole or pipe; C, a minute ball or disk; D, first-hour ball or disk; E, second-hour ball or disk; F, operating gear-wheel, the same being suitably secured to the minute-shaft of a clock mechanism; G, a rack; H, lifting or connecting rod for operating the minute ball C. I is a lever for operating the pivoted oscillating plate K and connecting or lifting rod L and lifting or connecting rod N and the gear-wheel; O, a bed-plate, and P balance-weight.

The operating gear-wheel F is provided partially around its periphery with suitable teeth or cogs, for the purpose of allowing the rack G to slide by in its downward descent after the ball C is raised to the top of pipe A, which is accomplished in sixty minutes' time. When the rack G drops, then the arm 2, which is firmly secured to the racks, falls on pin 1 on the wheel F, thereby preventing the racks from descending any farther, and leaving the same in proper position to be operated on for the next hour by the wheel F and the

clock mechanism. To the rack G, I secure the rod H, which I prefer to place inside of pipe A, the rod H operating or lifting the ball C. This ball is provided with a ball or projection extending through a vertical slot in pipe A and into the hollow of the pipe and resting upon the top of rod H. This projection on ball C is raised when rod H ascends. That section of the pipe on which ball C travels may be divided into four or more equal divisions, and each division may be painted in different colors for the purpose of showing plainly the part or portion of the hour remaining, and the several balls or disks may be provided with a suitable illuminating device for the purpose of showing the time in the dark.

The pipe A is securely connected to a bed-plate, O, and the bed-plate is connected with or supports the clock-work. (Not shown.) For operating the hour balls or disks D and E, I have pivotally secured to the bed-plate O, at point 3, the oscillating plate K, and have connected therewith at its back, at point 4, the connecting or lifting rod L. The upper section of rod L, I secure pivotally at point 5 to the loose sleeve M, the same being constructed and applied for the purpose of connecting the rod L to pipe A. The lifting or connecting rod N, I secure to the loose sleeve M, which is attached to the disk E.

To the bed-plate O, I rigidly secure stop-plate Q, and provide the same with notches or recesses 6 and 7. The pivoted plate K, I provide with a balance-weight, P. To the face of plate K, I firmly secure pins or projections 8 and 9. The pin or projection 10 (shown in full lines in the several figures) is firmly secured to lever 11. This lever 11 is pivotally secured to plate K at point 14, while the pin or projection 13 is also secured to lever 11 on the side opposite the pin 10. Pin 13 acts alternately on the recesses 6 and 7 of stop-plate Q, and the spring 12 acts on the front of lever 11, pressing the same upward to hold pin 13 in notch 7 or 6, as the case may be. As represented, the pin 13 is on the farther side of the pivoted plate 11 and extending toward bed-plate O, to which is affixed stop-plate Q. Pin 10 extends from pivoted plate 11 in an opposite direction to engage with lever I, under

circumstances and for a purpose to be herein-after described.

In operating my time-balls the mechanism of the clock turns the gear-wheel F in sixty minutes sufficiently to lift the bar C and lifting-rod H, the latter raising the minute-ball C gradually to the top of pipe A, and when the sixty minutes have passed then the bar G and rod H drop, and also the minute ball or disk C, until the same rests again on the stationary ball B. The rack-bar also drops, and the pawl I strikes the pin 9, thereby forcing the pivoted plate K downward until the pin 13 catches into recess 6, which movement of plate K has the effect to lower the connecting-rods L and N and hour disks E D to the position of disk D, Fig. 2. The disk D slides freely on tube A, but is arrested at the position shown in Fig. 2 by a stop. (Not shown.) For the second hour the operation of the mechanism is the same as above set forth, with the exception that the pawl I presses on or strikes pin 8, thereby forcing plate K downward until the pin 13 catches in recess 7, thereby lowering the rods L and N and ball or disk E still farther, while the disk or ball D stays in the same position as by the operation for the first hour, being there supported in any suitable manner, the balls or disks D E taking their relative position, as shown in Fig. 2, thus marking the second hour. For the third hour the operation is the same, excepting that the pawl I presses on or strikes the pin 10, thereby releasing the pin 13 from the recess 7, and when the pressure is released by the passage of the pawl I the plate K moves quickly upward. By this motion the rods L and N and balls are lifted up to the stationary ball B, thus marking the close of the third hour. For marking the fourth hour the same operation is performed by the mechanism as for the first hour. The three positions of the pivoted plate above described are as follows: The first is indicated in Fig. 1, in which the plate K is at its highest position, the counter-balance being at its lowest. The pin 13 (shown in dotted lines in Figs. 1 and 2 and in full lines in Fig. 3) is back of notch 6 in the fixed plate Q. As gear-wheel F revolves and rack-bar G rises and lever I comes in contact with pin 9, it turns on its pivot. Rod H and disk C are carried to their highest positions at the end of the first hour. The rack G, rod H, and lever I then drop, as above set forth, and in falling

I strikes pin 9, and being prevented from turning on its pivot by lateral extension 15 bearing against bracket 16, it forces pin 9 down and turns plate K on its pivot until pin 13 (on connected plate 11) is carried forward into slot 6 and holds the plate K against the action of the counter-balance. This position of the plate is between those indicated in Figs. 1 and 2. When G, H, and I drop at the end of the first hour, pin 9 is held out of the path of I by pin 13 resting in notch 6 of the plate Q, fixed to the bed-plate. Pin 8, however, is in said path, and plate K is forced down to the position shown in Fig. 2, so that pin 13 engages notch 7. Pin 10 is now in the path of I, and when the latter falls at the end of the second hour it strikes said pin, with the effect to release pin 13 by compressing spring 12 and moving plate 11 on its pivot from notch 7, whereupon the plate K is carried by the counter-balance to the position shown in Fig. 1.

It will be understood from the foregoing that at the beginning of a triad of hours the disks are in the position indicated in Fig. 1, and that at the beginning of the second hour they are in the position shown in full lines in Fig. 2, except that disk E is in contact with D at the latter's position there illustrated. The positions of the several disks at the beginning of the third hour are shown in full lines in Fig. 3. The several positions indicate the particular hour of the triad, and C indicates at the proper interval the particular quarter of the hour, as before said.

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

1. In combination with a clock movement or mechanism, the hollow shaft or pipe A, ball or disk C, stationary ball B, hour balls or disks D E, and operating mechanism, substantially as and for the purpose set forth.

2. In a time-ball mechanism operated by clock-work, cog-wheel F, rack-bar G, pawl I, hollow shaft or pipe A, lifting-rod H, stationary ball B, ball or disk C, hour balls or disks D E, rod N, sleeve M, stop-plate Q, pivoted lever 11, pins or projections 8, 9, 10, and 13, and spring 12, substantially as and for the purpose set forth.

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Witnesses:

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