No. 622,242. Patented Apr. 4, 1899.

# W. R. LIVERMORE.

## BELL RINGING MECHANISM.

(Application filed Apr. 27, 1898.)

(No Model.)

Fig. 1.

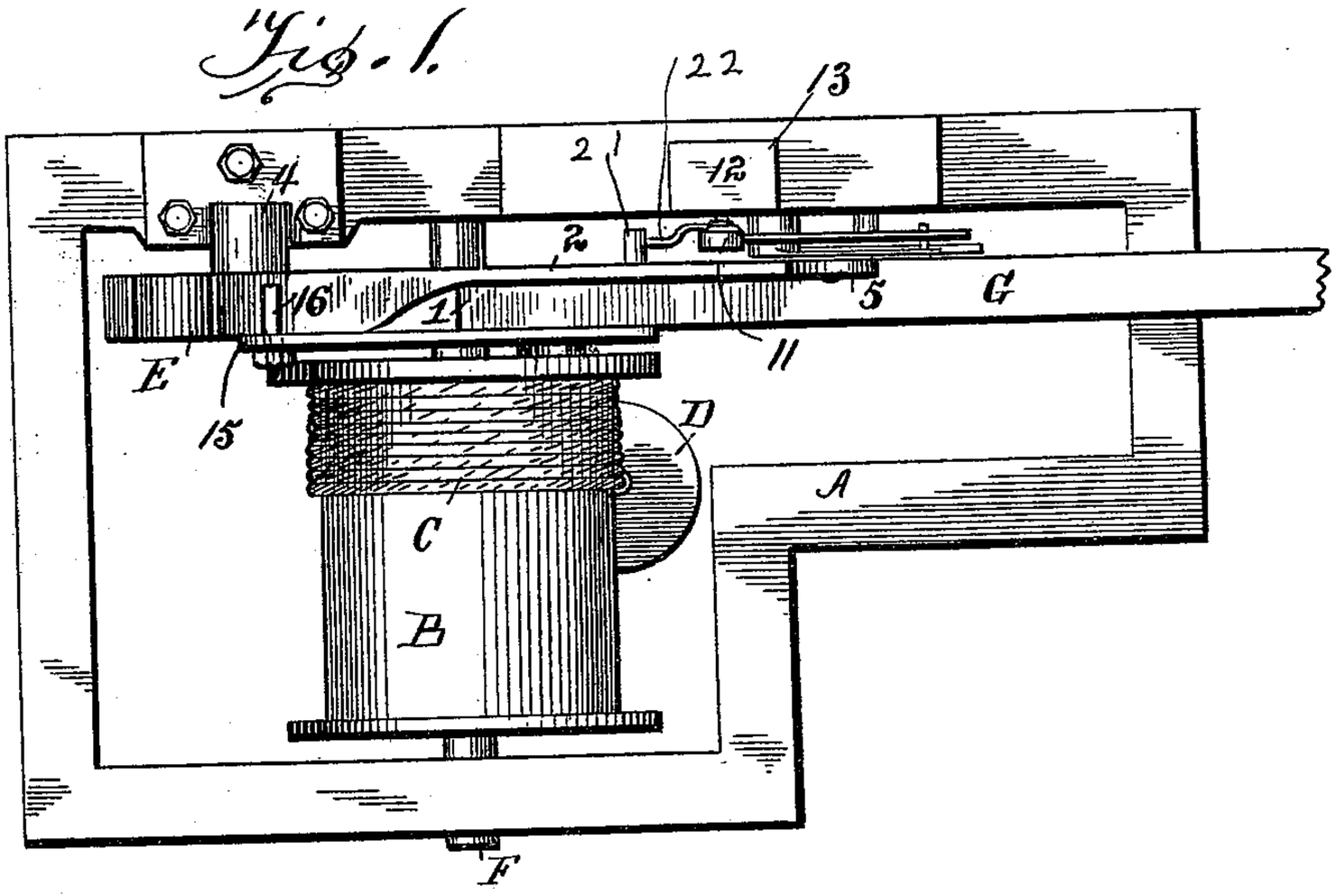
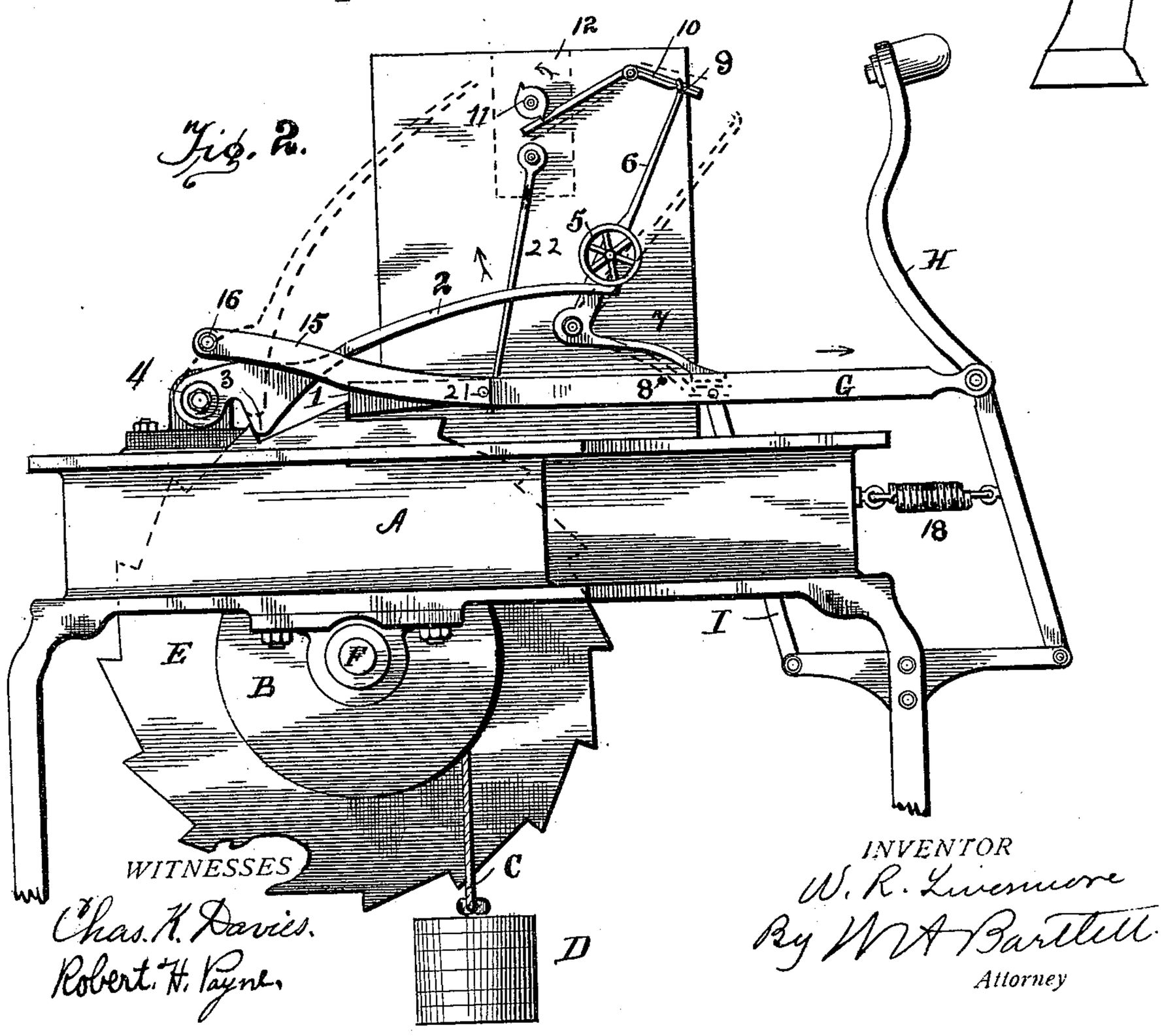
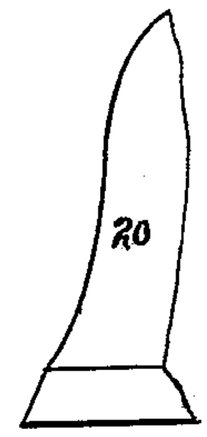



Fig. 2.

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# UNITED STATES PATENT OFFICE.

WILLIAM R. LIVERMORE, OF THE UNITED STATES ARMY.

## BELL-RINGING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 622,242, dated April 4, 1899.

Application filed April 27, 1898. Serial No. 678,996. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM R. LIVERMORE, of the United States Army, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Bell-Ringing Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to apparatus for ringing bells for fog-alarms, fire-alarms, and other purposes.

The object of the invention is to produce an apparatus which will operate with very little friction to release the bell-striking apparatus at the proper time and which will be automatically set for another blow.

Figure 1 is a plan view of the mechanism of the invention, parts broken away. Fig. 2 is a side elevation.

A indicates a frame of any suitable construction which supports the mechanism of the bell-ringing apparatus. B denotes the driving-windlass on which the cord C is wound and impelled to rotate by weight D, as usual. The toothed wheel E is connected to the shaft F of the windlass by usual mechanism and is impelled to rotate therewith under the impulse of the weight. Push-bar G transmits the movement of one of the teeth of wheel E to the hammer-handle H. All these parts are common in their essential features.

Bar G may be supported by link I, said link being pivoted to the support on lines coincident with those of the hammer-handle, or the bar G may be otherwise suitably supported, so as to transmit the push of wheel E to the hammer-handle in usual manner. One tooth of wheel E bears against the shoulder 1 of bar G to push the bar and handle forward. Detaining-catch 2 has a shoulder 3, which engages a succeeding tooth of the wheel E and prevents rotation of the wheel and push on the push-bar until this catch is released. Catch 2 is pivoted, as at 4, to a suitable standard on the frame and extends forward, preferably on a curve. The front or free end of catch 2 is held down when in locked position by wheel or cam 5, which wheel or cam is carried by lever 6.

Lever 6 is shown as a bell-crank lever having an arm 7 extending along the push-bar G, and this arm is preferably curved. A pin 8 in the push-bar engages the lower surface of the curved arm 7 at the proper time in the movement of the machine.

The upper end of lever 6 has a projection or pin 9, which is held by a notch in trigger 10 when the hammer is back. Trigger 10 is actuated by a rotating cam 11, which cam is driven by clockwork of usual construction contained in box 12, or the cam may be propelled or released by means of electric connections, as 13, it being common to release bell-ringing devices both by clockwork mechanism and by electric impulses, accordingly as a time or an electric control is desired.

Bar G has an extension 15 alongside of catch 2, and a pin 16 from this extension projects above said catch 2 and engages the catch in certain positions, as will be explained.

A spring 18, connected to the frame and to the hammer-handle, serves to draw back the hammer after a blow on bell 20.

Assuming the mechanism to be in position indicated in full lines, Fig. 2, the rotation of cam 11 rocks trigger 10 and this at such time as the clockwork or controlling mechanism of the apparatus shall determine. By a proper construction of the clockwork or actuating mechanism the trigger 10 can be rocked for as many blows of the hammer as may be desirable—as, for instance, in striking the hours. The rocking of trigger 10 (dotted lines) releases lever 6, and the pressure of catch 2 against the cam or wheel on this lever rocks the lever (dotted lines) and so releases catch 2. The curved form of catch 2 causes such engagement with cam or wheel 5 as is desirable, as by changing the form of contact-surfaces movement of the cam may be had with very little friction and consequent waste of power. The release of the free end of catch 2 permits wheel E to lift said catch from engagement with its tooth, and the wheel being then free to rotate under impulse of the driving-weight presses the push-bar in the direction of the arrow, causing the hammer to strike the bell. As the push-bar so moves, its pins 8 and 16 restore the catch 2 and lever 6 to position, (should catch 2 not have been restored by gravity,) so that cam 5 again engages the free end of catch 2 and the shoulder 3 comes in front of the next tooth on wheel E and

stops the rotation. The forward movement of wheel E and bar G also carries the tooth which had been in engagement with shoulder 1 down out of engaging position, (bar G having also rocked upward,) and the bar G is thus released to be drawn back by spring 18. Trigger 10 is also restored to engaging position by an overbalance in weight or by a spring, so that after each blow of the hammer the parts return automatically to the position in full lines, Fig. 2, except that the weight D has "run down" a distance sufficient to give the impulse.

The forward movement of bar G may serve to wind up the clockwork in box 12 by the engagement of pin 21, carried by the push-bar, engaging lever 22, which lever extends into the clockwork mechanism and can wind the same in manner well known to skilled mechanics.

What I claim is—

1. The combination, in a bell-ringing device, of the driving-weight, windlass, toothed wheel, and push-bar connected to the hammer-handle, of the catch engaging a tooth of the toothed wheel, the bell-crank lever engaging said catch, and a trigger engaging the bell-crank and actuated by clockwork, substantially as described.

2. In a bell-ringing apparatus, the toothed wheel and its driving means, the push-bar connected to the hammer, the catch engaging the toothed wheel and a bell-crank lever engaging said catch, and a projection on the push-bar by which the catch is restored to locking position, all combined substantially as described.

3. In a bell-ringing apparatus, the combination of the toothed driving-wheel, push-bar, and hammer, of the pivoted catch, the bell-crank lever engaging such catch, and the projection on the push-bar engaging the bell-crank lever to effect its locking engagement with the catch.

4. In a bell-ringing apparatus, the combination of the toothed driving-wheel, the push-bar and hammer, and the pivoted catch engaging a tooth of the driving-wheel, with the bell-crank lever having a cam-wheel engaging a curved arm of the catch, and projections on the push-bar by which both the catch and bell-crank lever are restored to locking positions, all combined substantially as described.

5. In a bell-ringing apparatus, the toothed driving-wheel, the push-bar engaging the teeth of said wheel and connecting to the hammer, the locking-catch engaging said wheel and thereby holding said bar, the bell-crank lever having a projection engaging said locking-catch, whereby the driving-wheel is held, the trigger engaging the bell-crank lever, and the trigger-operating cam, all combined substantially as described.

6. In a bell-ringing apparatus, the combination of the toothed driving-wheel, push-bar and hammer, the catch and bell-crank lever engaging the same, the trigger and a rotating cam engaging said trigger, and a winding-lever in position to be engaged by the push-bar to wind the mechanism by which the cam is rotated, all combined substantially as described.

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

WM. R. LIVERMORE.

Witnesses:
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FRANK J. MORSE.