

2 Sheets—Sheet 1.

No. 461,458.

Patented Oct. 20, 1891.



Inventor  
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per Wm. Hubbell Fisher,  
Att'y

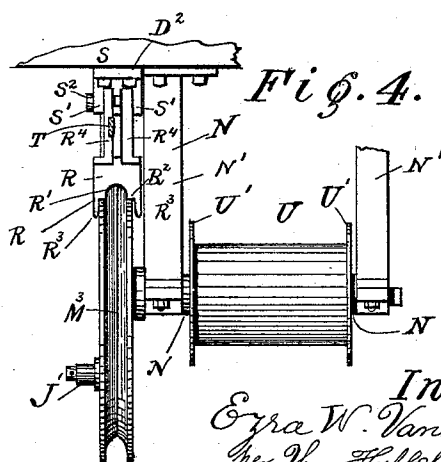
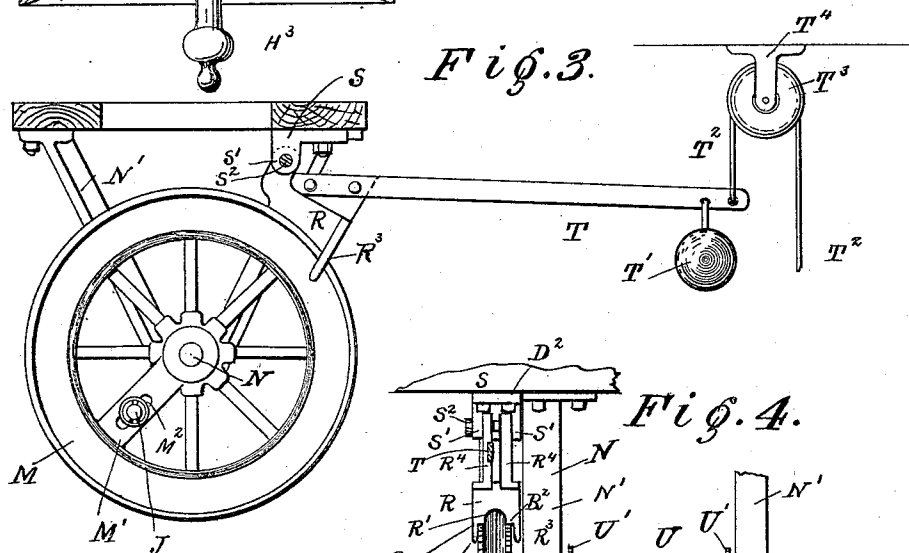
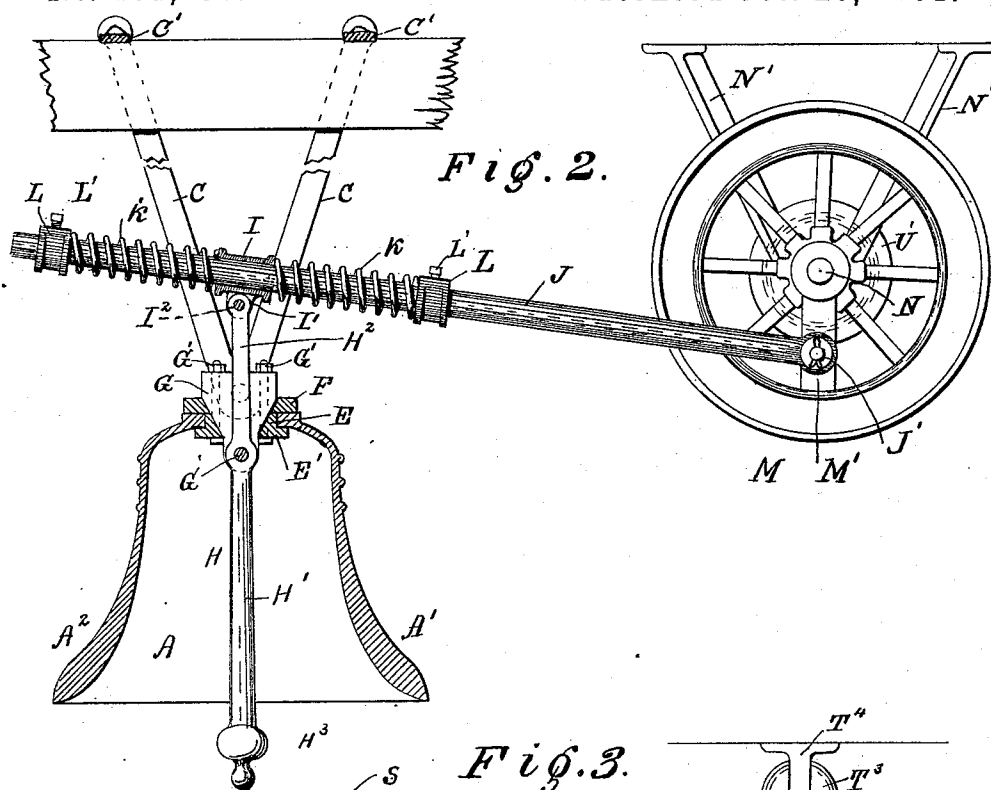
(No Model.)

2 Sheets—Sheet 2.

E. W. VANDUZEN.  
AUTOMATIC BELL SOUNDING MECHANISM.

No. 461,458.

Patented Oct. 20, 1891.



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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC BELL-SOUNDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 461,458, dated October 20, 1891.

Application filed June 9, 1890. Serial No. 354,705. (No model.)

*To all whom it may concern:*

Be it known that I, EZRA W. VANDUZEN, a citizen of the United States, and a resident of the city of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Mechanism for Automatically Ringing Bells and Gongs, of which the following is a specification.

10 The several features of my invention and the various advantages arising from their use, conjointly or otherwise, will be apparent from the following description and claims.

15 My device is useful for ringing different descriptions of bells and gongs. In the present illustrative instance my invention is shown applied to a fire or alarm bell.

In the accompanying drawings, making a part of this specification, and to which reference is hereby made, Figure 1 is a view in perspective of a bell, its supports, and of the mechanism for automatically ringing the bell, the devices for winding up the mechanism for thus automatically ringing the bell, and of the devices for allowing the mechanism for ringing the bell to be set in motion and for stopping the motion of the same. Fig. 2 is a side elevation of the reciprocating bar and springs and devices for setting the springs, also of the side of the crank-wheel and its adjacent hanger, also all of the supports on the farther side of the bell and of the beam whereby the said bell-supports are upheld. This figure also shows through the wheel the end of the windlass upon which is wound the rope or cord whereby the weight is suspended. In this view the bell itself and its immediate connections with the supports are shown in vertical central section. Fig. 3 is a side elevation of the aforementioned windlass, its adjacent supporting hanger or bracket, brake-shoe, its pivotal supporting-arm, its weight, and the adjacent end portion of the cord whereby it is elevated. In this figure is also shown a side elevation of the pulley over which runs said cord. Fig. 4 is an end view of the said crank-wheel, brake-shoe, its pivotal support, the windlass upon which the cord-support and operating-weight are wound, the shaft whereby the windlass and crank-wheel are fixed, and hangers whereby the

said shaft is supported. In this figure that end of the lever which is at the right hand in Fig. 3, together with the operating-weight and pulley whereby the said bell is supported, are omitted. This end view (shown in Fig. 4) is that view of the mechanism which would be seen by the spectator standing at the right hand of Fig. 3 and looking toward the device shown in said figure, the free end of the said brake-shoe, lever, and bell and bell-support being omitted. Fig. 5 is a view of a modification of the connection between the clapper-shank of the bell and the reciprocating rod for operating said clapper. This view shows at the right an elevation of the side of the upper portion or extension of the clapper-shank, washers, and part of the reciprocating rod and of the springs thereon. At the left-hand side of the figure is seen another elevation of the said clapper-shank. In this view the shank is turned around one-quarter of a turn and shows that edge of the clapper-shank which faces toward the right in the first-named or right-hand figure. Both opposite edges of the clapper are alike.

A indicates the bell. The bell is swung upon a pivotal connection by suitable hangers or brackets in turn suitably upheld. In the present instance these hangers C C are supported by an overhead support D. In the upper part of the bell is a slot or opening, and in this slot moves the extended portion of the clapper-shank, and the clapper-shank is free to oscillate on a pivotal connection. The preferred mechanism for connecting the bell pivotally to the hanger is that indicated in Figs. 1 and 2 and is the same as that specifically described and shown in Letters Patent of the United States numbered 229,570, dated July 6, 1880. The clapper is pivotally hung on a pivot G', located at or near the top of the bell. The bell is free to oscillate on its connection or connections, while the clapper is free to oscillate on its pivot independently of the movements of the bell itself.

At the upper end of the clapper-shank or extension H<sup>2</sup> thereof is a sleeve I. This sleeve I is provided with a couple of ears or eyes I' I'. Between these eyes is located the upper perforated end of the clapper-shank extension H<sup>2</sup>, and the latter is pivotally secured to the said eyes by means of the pivot I<sup>2</sup>.

Through the sleeve I passes a rod J. This rod is free to slide through the said sleeve I. Around the rod J, to the right of the sleeve I, (see Fig. 2,) is a coiled spring K. On this rod J and at the right of this said coiled spring K is a sleeve L, provided with a set-screw L'. This sleeve can thereby be moved along the rod J and set at the desired point thereon. By moving it to the right and fixing it fast to the rod J the compression on the spring K is comparatively little when the rod J is drawn from the right to the left. By moving this sleeve L up against the spring K and compressing said spring and there fixing the sleeve L upon the rod J the resistance of the spring K will be greatly increased, and the amount of the resistance which the said spring will make to any effort to draw the rod from right to left can thereby be accurately adjusted. At the other end of the sleeve I is a similarly-coiled spring K', embracing the rod J, and at the left end of the spring K' is a similar sleeve L, located on the rod J and having a set-screw L'. The functions of this set-sleeve L L' are the same in relation to the spring K' as those of the set-sleeve L L' adjacent to spring K are to the latter. The opposing springs K K' and their set-sleeves L L' not only enable me to dispense with any means for fixing the sleeve I on the rod J, but also perform in relation to each other the function of abutments. They also perform other valuable and important functions, which will be hereinafter specified.

In the modification illustrated in Fig. 5 the sleeve I is omitted and the extension H<sup>2</sup> of the clapper is prolonged, as shown in Fig. 5. Through this prolongation of the extension is an opening H<sup>3</sup>, through which latter passes the rod J. The opening H<sup>3</sup> is larger in the direction of the length of the clapper-shank H' H<sup>2</sup> than the thickness or diameter of the rod J in order to allow the clapper-shank to oscillate as required. The inner ends of the springs K K' will then rest against the upper end of the clapper. In order to save making the end of the clapper-shank very wide and yet provide for the proper abutment or support for the ends of the springs at the clapper-shank, I interpose a washer H<sup>4</sup> between the said ends of the springs and the said clapper-shank, one of these washers H<sup>4</sup> being between the clapper-shank and spring K and the other of these washers being between the said shank and the spring K'. The sleeve connection I I' I<sup>2</sup>, hereinbefore described, is, however, the preferred device to be used in combination with the clapper and springs.

One end of the rod J is pivotally connected at J' to the crank-wheel M, substantially as shown. This crank-wheel M is fixed upon a shaft N and is concentric therewith. In the crank-arm M' of the crank-wheel M is a radial slot M<sup>2</sup>, and through this slot passes the pivot whereby the end of the rod J is secured to the crank-arm M'. The slot M<sup>2</sup> en-

ables the pivot J' to be set nearer to or farther from the center of the crank-wheel, and thereby the stroke of the rod J is lengthened or shortened, for a purpose to be hereinafter mentioned. The shaft M is duly supported upon hangers or brackets N N' of any of the well-known forms, the hangers in the present instance being connected to the beams or rafters D D' D' or the plate, as N<sup>2</sup>, connected to said rafters.

For economy of construction the crank-wheel M is itself a grooved pulley, and in the groove M<sup>3</sup> of its periphery is located the rope or cord P.

R is a brake-shoe arranged to ride upon the peripheral edges of the pulley-wheel M. The inner portion of this brake-shoe is provided with a hollow recess R', as shown. This hollow recess enables the groove of the pulley to be made less deep than it would otherwise have to be, and at the same time enables the brake-shoe at all times to keep out of contact with the rope P. The faces R<sup>2</sup> of the brake-shoe respectively rest upon the peripheral adjacent edges of the pulley-wheel M. At each side of the brake-shoe R is a flange R<sup>3</sup>, and between these flanges R<sup>3</sup> runs the pulley-wheel M. These flanges R<sup>3</sup> assist in keeping the rope or cord P in place upon the pulley-wheel M when the brake-shoe R is lifted from the wheel. This brake-shoe R is properly supported by and pivoted to the supporting-piece S, having two parallel eyes S' S'. Between these supporting-eyes passes the upward extension R<sup>4</sup> of the brake-shoe, and a pivot S<sup>2</sup>, passing through said eyes and through openings in the extensions R<sup>4</sup>, pivotally connects the brake-shoe to the pivotal support S. The upper part of this pivotal support S is preferably bolted or otherwise secured to the supporting beam or beams, as D' D', or plate N<sup>2</sup>.

Connected to the upper portion of the brake-shoe is a brake-lever T. The free end of this brake-lever T is weighted, preferably, by means of the suspended weight T'. To the free end of this brake-lever is connected one end of a cord T<sup>2</sup>, which latter passes over the grooved pulley T<sup>3</sup> in the groove thereof. This pulley is duly supported, preferably, on a hanger, as T<sup>4</sup>, suitably secured to an overhead or other support. The lower end of this cord extends down to within reach of the person who is to operate the fire-alarm and is at its lower end provided with a suitable handle T<sup>5</sup>, preferably of a ring or hook shape. To the wall or other suitable support is fixed a hook T<sup>6</sup>. When the brake-shoe lies upon the wheel M, the handle T<sup>5</sup> is above the hook T<sup>6</sup>. When the handle T<sup>5</sup> is drawn to the hook T<sup>6</sup>, the brake-shoe will be lifted off from the wheel M.

On the shaft M and preferably located between the hangers N' N' is a windlass U, preferably provided with end flanges U' U'. Upon this windlass is wound the rope or cord V, and the purpose of these flanges U' U' is to prevent the rope V from riding off from

the windlass. For the purpose of preventing the rope V being of undue length and at the same time enable the windlass to make a given number of revolutions, and thus cause the clapper to be reciprocated the desired number of times, I employ the double pulleys W W. The upper of these pulleys is connected by a hook or hanger W' to a support, as W<sup>2</sup>, or other suitable fixture. The rope V passes down under lower pulley W, then over upper pulley W, then down over lower pulley W, thence up over upper pulley W, then over lower pulley W, when it is connected to the eye W<sup>3</sup> of the said lower pulley. The lower eye or connection W<sup>4</sup> of said pulley is connected to the weight X'. The weight X' is preferably as follows: This box X is provided with a bail or hanger X<sup>2</sup>, passing through the eye W<sup>4</sup> of the lower pulley W. This box X is open at the top, and into this box is thrown gravel or stone, &c.

That part of the endless rope P which is at the left hand in Fig. 1 is pulled down, and the pulley-wheel M is thereby rotated up over from right to left, and the windlass U is likewise rotated. The rotation of the latter causes the rope V to be wound upon the said windlass U and raises the weight toward the upper pulley W. When the cord V has been sufficiently wound upon the windlass U, all further operation of the rope P is suspended. The mechanism is now ready to be put in motion at any time.

When it is desired to sound an alarm, the party grasps the cord T<sup>2</sup> and draws it down. This operation elevates the brake-rod T and lifts the brake-shoe R from the wheel M. The weight X' now acts through the intermediate agency of the rope V, windlass U, and the shaft N upon the crank-wheel M, causing the latter to rotate rapidly. As the crank-wheel M rotates its operation upon the clapper is as follows: As the rod J is rapidly moved by means of the crank-wheel from right to left the spring K is compressed and the spring K' allowed to expand in the effort of the rod J, through the agency of the spring K pressing against sleeve I, to overcome the inertia of the clapper H and communicate motion to the latter. The clapper will immediately move toward the side A' of the bell, and its rapidity will increase as it moves toward the said side. Before the hammer H<sup>3</sup> of the clapper has reached the side A' of the bell the crank-wheel M has begun to move in the opposite direction—namely, from left to right—and it compresses the spring K'. The impetus of the clapper carries it onward until it strikes the side A'. At the same time while the head H<sup>3</sup> of the clapper is moving through this last portion of its stroke toward the side A' it is compressing the spring K', and this spring K' thus cushions the clapper. While it allows the head of the clapper to strike the bell A sharply and strongly, it has broken the force of its momentum to such an extent that it will rapidly and easily begin to move in the

contrary direction. The crank M' now draws the rod J from right to left, thereby compressing the spring K' and carrying the clapper rapidly toward the side A<sup>2</sup> of the bell. The momentum of the clapper carries its head forcibly toward the side A<sup>2</sup> of the bell, and it strikes said side A<sup>2</sup> sharply and vigorously. The reciprocal operations of the rod, the spring, sleeve I, and clapper H<sup>3</sup> are successively and continuously carried on until the rope V is unwound from the windlass or until the operator allows the cord T<sup>2</sup> to rise. Prior to the cord V being entirely unwound if the operator allows the cord to lower the lever T of the brake-shoe the latter will bring the brake R in contact with the wheel M, thereby causing the rotation of the latter to quickly cease. In case the operator does not desire to hold down the rope T<sup>2</sup> while the bell or gong is being rung he has only to hook the ring T<sup>5</sup> upon the hook T<sup>6</sup> and the operation of ringing the bell will continue until the rope V is entirely unwound from the windlass.

It will be observed that each of the springs K K' operates to cushion the stroke of the clapper in both directions and conjointly act with great efficiency in cushioning the clapper, and nevertheless allow it to vigorously strike the opposite sides of the bell with the necessary force. By means of the cushion-springs K K' all jar which would arise from the connection of the extension H<sup>2</sup> of the clapper being fixed stationarily upon the rod J is obviated. If the springs K K' were absent and the sleeve I fixed stationarily to the rod J, then when the clapper struck the side of the bell the sudden stoppage of the clapper and the sleeve I and rod J, &c., would be so great as to break the sleeve I or other connection whereby the clapper-shank H' H<sup>2</sup> was connected to the rod J.

It will be further observed that the adjustment of the set-sleeves L L' nearer to or farther from the sleeve I will regulate the force of the blow which the clapper delivers upon the bell A. The force of the blow which the clapper delivers upon the bell is also regulated within limits by means of the slot M<sup>2</sup> in the crank M' of the crank-wheel M. While the pivot J' is moved toward the outer end of the crank M' the length of the stroke of the rod J will be increased, and the consequent force of the blow of the clapper upon the bell A will also be increased. As the pivot J' is moved inwardly toward the crank-shaft N—namely, the center—the length of the stroke of the rod J will be correspondingly decreased, and the force of the blow of the head H<sup>3</sup> of the clapper upon the bell A will be decreased in like ratio.

My invention allows the bell to be tolled for a funeral or to indicate when a fire is out, or for other purposes. When the operator desires to toll the bell, he grasps the winding rope P in one hand and with his other hand pulls down cord T<sup>2</sup> and lifts the brake-shoe.

In order to get rid of holding down the cord T<sup>2</sup>, he will hook it down on hook T<sup>6</sup> or otherwise secure it. He then pulls down on, say, the right-hand portion of said rope P and makes the clapper strike the side A' of the bell once. He now pulls down the left-hand portion of the said rope P and causes the clapper to strike the other side of the bell. He continues to alternately pull down the right and left portions of the winding rope P, and thereby continues to toll the bell.

While the various features of my invention are preferably employed together, one or more of the said features may be employed without the remainder, and in so far as applicable one or more of said features may be employed in connection with devices for ringing bells or gongs other than the one herein specifically set forth.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The bell and clapper-shank and pivot G, on which said shank is pivoted, the shank above the pivot extending above the bell and having a connection, and a reciprocating rod carrying elastic mediums reciprocated therewith and arranged, substantially as shown, to impinge against the said connection at the upper end or portion of the shank, substantially as and for the purposes specified.

2. The bell and clapper-shank and pivot G, on which said shank is pivoted, the shank above the pivot extending above the bell and having a connection, a reciprocating rod carrying elastic mediums reciprocated therewith and arranged, substantially as shown, to impinge against the said connection at the upper end or portion of the shank, and detents located on the reciprocating rod and carrying the elastic mediums with the reciprocating rod, substantially as and for the purposes specified.

3. The bell and swinging clapper H<sup>3</sup> H' H<sup>2</sup>, having sleeve I pivoted thereto, the reciprocating rod J, sliding in said sleeve, the abutments L L', fixed on said rod J, and coiled springs K K', embracing rod J, the sleeve I being located between the said springs and abutments and each of the latter being on the outside end of its respective adjacent spring, substantially as and for the purposes specified.

4. The bell and swinging clapper H<sup>3</sup> H' H<sup>2</sup>, having sleeve I pivoted thereto, the reciprocating rod J, sliding in said sleeve, the abutments L L', fixed on said rod and adjustable thereon, and coiled springs K K', embracing rod J, the sleeve I being located between the said springs and abutments and each of the latter being on the outside end of its respective adjacent spring, substantially as and for the purposes specified.

5. The bell - swinging clapper, clapper-shank, reciprocating rod J, connections, substantially as set forth, between the clapper and rod for enabling the said rod to reciprocate the clapper-shank, crank M, pulley, brake-shoe R, endless pulley-cord P, windlass U, weighted brake-lever T, cord T<sup>2</sup>, device for enabling cord T<sup>2</sup> to lift the latter, rope V, wound on windlass, and weight connected to rope V, substantially as and for the purposes specified.

6. The bell - swinging clapper, clapper-shank, reciprocating rod J, connections, substantially as specified, between the clapper and rod for enabling the said rod to reciprocate the clapper-shank, crank M, pulley, brake-shoe R, endless pulley-cord P, windlass U, weighted brake-lever T, cord T<sup>2</sup>, device for enabling cord T<sup>2</sup> to lift the latter, hook or loop T<sup>5</sup> on cord T<sup>2</sup>, and stationary detent or hook T<sup>6</sup>, rope V, wound on windlass, and weight connected to rope V, substantially as and for the purposes specified.

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