A. ECKERT.

Magnetic-Alarm Bell.

No. 11,780. Patented Oct. 10, 1854.

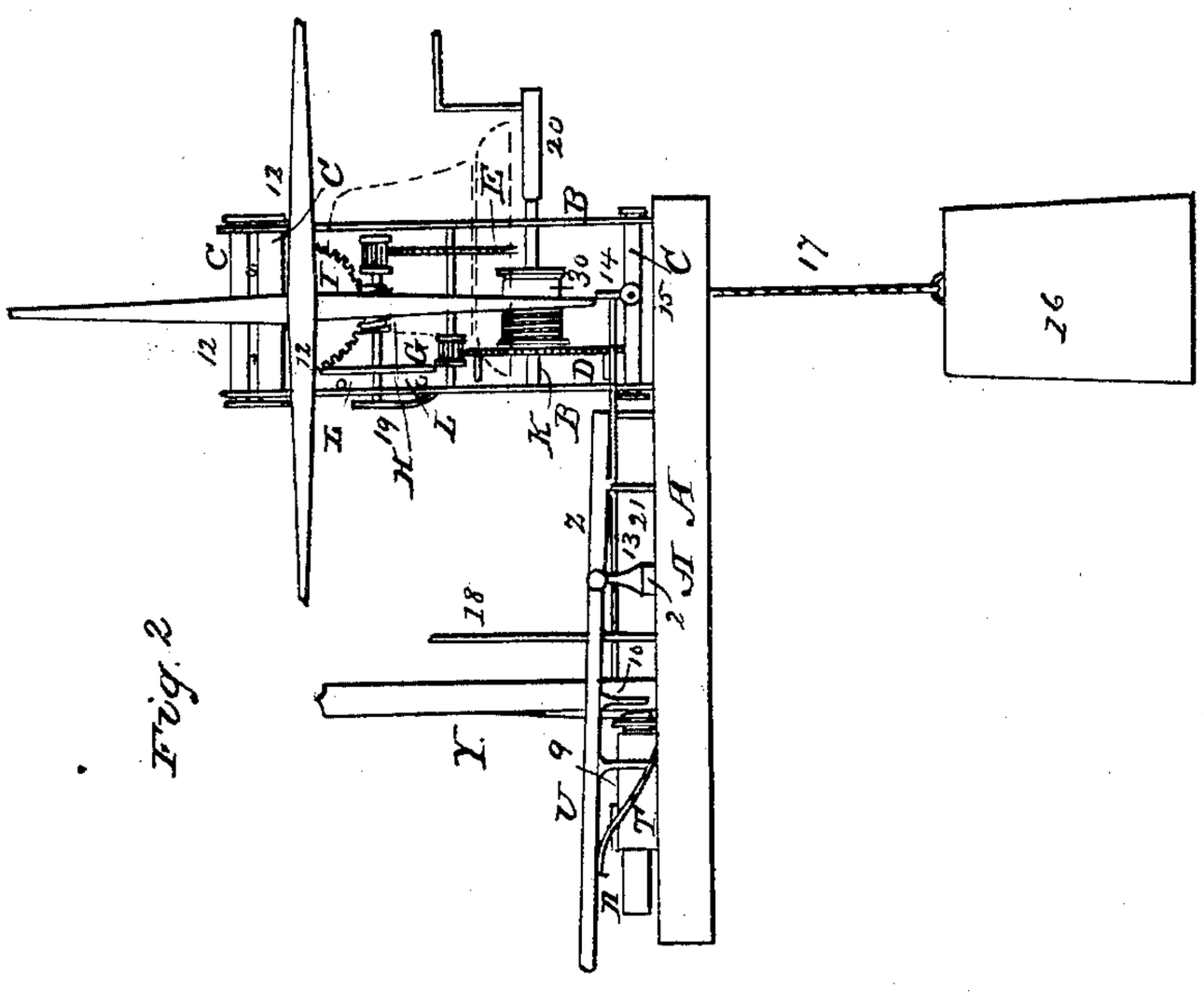

Fig. 2

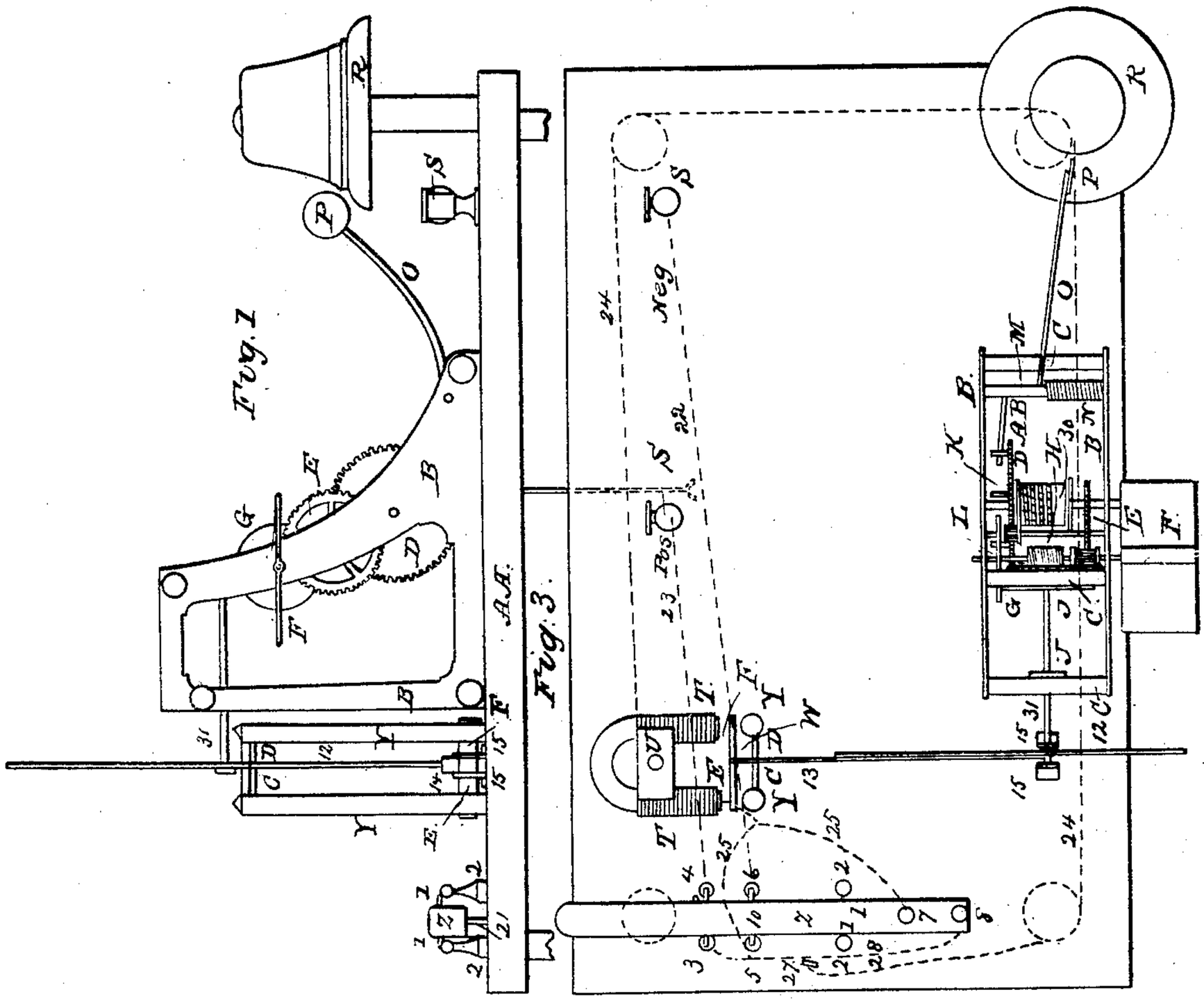

Fig. 1

Fig. 3.

UNITED STATES PATENT OFFICE.

AUGUSTUS ECKERT, OF TRENTON, OHIO.

IMPROVEMENT IN MAGNETIC ALARM-BELLS.

Specification forming part of Letters Patent No. **11,780**, dated October 10, 1854.

To all whom it may concern:

Be it known that I, AUGUSTUS ECKERT, of Trenton, Butler county, and State of Ohio, have invented a new and useful machine for liberating or setting in motion clock or wheel works for the purpose of striking signal or alarm bells, and which I entitle "electro-magnetic signal or alarm bells," for giving an alarm in cities in case of fire, to be used on railroads and all other places where it may be necessary to use such bells; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side view. Fig. 2 is an end view, and Fig. 3 is a top view.

Fig. 1 represent a side view of the machine, in which A and A is the platform on which the machinery is screwed down. B and B is the brass frame containing the wheel-works. D is the master-wheel, which is made of brass, containing sixty cogs, and is made of sufficient strength to move machinery to swing a hammer of three pounds in weight, the shaft being made of a corresponding size and strength. The rest of the wheels are made to correspond with the master-wheel in size and strength. E is the wheel driven by the master-wheel, which has forty-eight cogs and drives the fly or vane and brake-wheel. F is the fly or vane, which is made of the proper size to regulate the motion of the machinery, and is fastened on the outside of the brass frame B on the shaft which carries the brake-wheel G. A side view of the bar which has the hammer attached to it is seen at O, and the hammer at P. The bell is seen at R, which may be suspended as bells are usually arranged in cupolas, and may be used for ringing as well as giving alarms, and may be of any size required. S is one of the binding-cups, which is made as all those used for ordinary electro-magnetic machines. Y and Y are two standards, which are made about four inches in height and one-fourth of an inch in diameter. They are screwed firmly into the platform A and A and are placed directly in front of the electro-magnet. There are two screws screwed through the standards, near the top of them, terminating in points on the inside of the standards, to receive the ends of the cross-bar C D, which has its ends sunken to receive the points of the screws. The cross-bar C D is made of steel or some other hard metal, and is the eighth of an inch in diameter and an inch in length. There is a rod seen at W, which is flattened at the top and is of sufficient size to let the cross-bar C D pass through it, and is brazed or soldered to it. This rod has the armature E F fastened to it at the lower end, so that the armature swings within the fourth of an inch of the platform. E and F represent a side view of the armature, which rests against the sides of the standards Y and Y, which causes it to be thrown the fourth of an inch out of a perpendicular line. 2 and 2 are two standards which support the key. The axis of the key is seen at 1 and 1; the end view of the key at Z. 12 represents an edge view of the revolving levers. 31 represents the shaft on which the levers are fastened. 15 and 15 are two standards, which support the short arm 14 of the horizontal lever 13. They are half an inch in height, the fourth of an inch in width, and the sixteenth of an inch in thickness. They are screwed down on the platform three-fourths of an inch from the end of the frame B and B, and are directly opposite the center of the frame-work, as seen at 15 and 15, Fig. 3. 14 is a piece of iron or brass, one-fourth of an inch in width, half an inch in height, and the sixteenth of an inch in thickness, and has two pivots at the bottom, one on each side, which work in two holes in the top of standards 15 and 15.

Fig. 2 represents an end view of the machine, in which A and A is the platform; B and B, the brass frame of the wheel-works; and C, C, and C, the brass or iron bars by which the frame B and B is firmly screwed together. They have a screw cut on each end and a nut screwed on the outside of the frame. The bars have a shoulder on the inside of the frame. D is an edge view of the master-wheel, with the spool 30 on its shaft, which is made and put on precisely as those in common clocks. The cord 17 is seen wound around the spool. The shaft passes through the frame B and is made square at the end, to receive the key 20, by which the weight 16 is wound up. E represents an edge view of the wheel driven by the master-wheel. G represents an edge view of the brake-wheel, which is fastened on the shaft of the vane on the inside of the frame, and

runs within the fourth of an inch of the side of the frame. It is made of brass or other metal, and will be made in size to suit the rest of the wheel-works. The shaft on which it is fastened is made of the same size from the brake-wheel to within a short distance of the end, where it terminates in a blunt point. The end of the shaft passes through the frame B the fourth of an inch, where it rests against a spring (seen at 19) which is soldered or screwed fast to the frame B, and is made sufficiently strong to hold the shaft to its place and prevent the brake-wheel G from coming in contact with the brakes L and L, which are two rough-headed brass or iron screws, which are screwed into the frame B nearly opposite the edges of the brake-wheel G, as seen in Fig. 2 at L and L. The shaft of the brake-wheel is passed through a cylinder, which is fastened to it and turned perfectly round, and has a single-threaded screw cut round it, as seen at H, Figs. 2 and 3. There is a cog-wheel placed directly over the screw, the cogs of which are made to work in the screw, as seen at J. The shaft of wheel J is seen at 31, and runs in two plates of brass fastened to the cross-bars C, and are seen at J and J, on Fig. 3, being a top view of the plates. The shaft is made of steel, and extends three-fourths of an inch farther out than the frame B and B. The shaft is made square at the end, and is passed through the center of the revolving levers 12, 12, 12, and 12, which are secured to the shaft. They are made of brass, the fourth of an inch wide at the center and the eighth of an inch at the points, and are the sixteenth of an inch thick, and are made of precisely the same length from the center of the shaft to the points, where they strike the arm 14, on which they lap one-sixteenth of an inch. They are sloped off at the point, as seen on the drawings, Fig. 2, the arm 14 being sloped at the top in the opposite direction. There is a lever fastened in the arm 14, about half-way from the top to the pivots, on which it works. This lever lies horizontal, and is made of a plate of brass or steel tapering toward the end. It is seen at 13, and will vary in length to suit the size of the machinery and the intended pressure or weight which it is intended to sustain. To sustain a weight of one hundred pounds at the master-wheel, the lever will be made about twelve inches in length; or it may be made shorter by making the lever heavy or putting a weight on the lever near the end. The point of the lever 13 extends out from the short arm and is held down by the armature E F. The end of the lever extends under the armature two-thirds of the distance of the space between the poles of the electro-magnet T and T and the armature, which is made twice as wide at the bottom as at the top, and is straight where it faces the poles of the magnet, and slopes on the opposite side, as seen on Fig. 2, being an end view of the armature. There is a small pin seen between the poles of the magnet, extending farther out than the poles of the magnet, to check the armature and prevent it from coming in contact with the magnet. There is a loop, made of wire, which is fastened into the platform A and A at the bottom, and is of sufficient width to let the lever 13 play up and down freely between it. The height of the loop is arranged to check the lever 13 as soon as it has been thrown up sufficiently to let the point of the lever 12 pass, and it falls back immediately; and if the armature has fallen back the weight of the lever striking the sloping part of the armature forces it forward and lets the lever fall below it. T and T is an edge view of the electro-magnet, which is made the same as those used for ordinary telegraphing, and is screwed down firmly to the platform by a screw passed through the plate H. The weight of the armature is calculated to throw it from the magnet, it being suspended out of a perpendicular line. The key by which the battery-connections are made is seen at Z, Fig. 2, being an edge or side view. 2 and 2 are the standards which support the key. They are three-fourths of an inch high, and are the fourth of an inch in diameter where they are screwed into the platform, and are made smaller at the top, where a pin passes through them, and which also passes through the key one-third of the distance of the length of the key from the end. The other end, being two-thirds of the length of the key from the axis, is the handle. There is a spring screwed fast to the key on the under side of the handle, to keep it up, and is seen at 11. There are three brass wires bent in the form of three-fourths of a square, thus, ⌐, the upper part of the square being flattened and screwed on the under side of the key cross-wise, the legs being downward about three-fourths of an inch long, and the part screwed on the key is one inch in length. They are seen at 9, 10, and 21. The plate 10 is about two inches from the axis of the key, and the plate 9, being an inch farther from the axis, as seen at 9 and 10, Fig. 3. The wire 21 is screwed lengthwise on the under side of the key, and is nearly an inch in length, the legs turning down three-fourths of an inch, as seen at 21, Fig. 2.

Fig. 3 represents a top view of the entire machinery. A and A is the platform. The wheel-works having been explained, the letters and figures referring to the same parts will be understood at once. S and S are the binding-cups. They are screwed down onto the platform, the ends of the screws passing through the platform the eighth of an inch, and are here represented on the same platform with the wheel-works, magnet, &c. The key is seen at Z, being a top view. There are six cups sunk in the platform, immediately under the ends of the legs of the wires 9, 10, and 21. They are seen at 3, 4, 5, 6, 7, and 8. Those seen at 3, 4, 5, and 6 are placed at the corners of a square of an inch and a quarter, so that

when the handle of the key is pressed down the legs of the wires 9 and 10 will drop down in the center of them, and those under the end of the key at 7 and 8 are arranged so that the legs of the wire 21 will always drop in the center of them and rest there as long as the handle of the key is not pressed down. There is a wire passed round the end of the screw of the binding-cup, on the under side of the platform A and A, which is conducted and passed up through the platform into cup 4 the sixteenth of an inch. This wire is from the positive pole, and is seen at the dotted line 23, and is marked "Pos." for positive pole. There is also a wire passing from the other binding-cup and terminating in cup 6 in the same manner as that in cup 4. This is seen at the dotted line 22, and is marked "Neg." for negative pole. The key-board and binding-cups may be placed at a distance from the magnet and machinery—for instance, on the ground floor—while the balance of the machinery, with the exception of the battery, may be placed in the cupola. The battery may be in the cellar and the wires carried to the binding-cups and be screwed in them. The wire from the magnet can be brought down and placed on the under side of the key-board or platform, and will be divided into two branches, as seen at 25 and 26. The branch 25 passes to the cup 5 through the key-board or platform, the same as those from the binding-cup pass into the cups. The branch 26 passes up into the cup 7. To form a continuous conductor the wire is terminated in two branches, as seen at 27 and 28. The branch 28 passes to the cup at 8, and the branch 27 to the cup 3 in the same manner as explained. The wire can then be carried up and passed out and conducted to the next ward or station, and passes the magnet, key, &c., at that station, passing the key in the same manner as explained, and then to the next ward, and thus to any number of stations required, and back to the place of beginning, or by using the earth as part of the circuit. The dotted line 24 and 24 represents the circuit, and is here passed round on the under side of the platform A and A, but we may suppose it to be many miles in length, &c.

The manner of applying my invention is as follows: Suppose a conducting-wire to be suspended on insulators through a city, as explained, and passed to one or more engine-houses in each ward, there being a set of the machinery at each station and a bell on which the hammer is made to strike, the cups 3, 4, 5, 6, 7, and 8 being filled nearly full of crude mercury and the batteries being in order, the machinery being made precisely alike at each station and propelled by the same size weights, the circuit is always broken or open only when one of the keys is pressed down, there being a person in each ward whose duty it is to keep the battery in order and the machinery wound up. Suppose a fire is discovered in the fifth ward. The person discovering it proceeds to the nearest station, the handle of the key is pressed down and held in that position. This being done, the electric current passes from the battery to the positive binding-cup, along the wire to the cup 4, up the leg of the wire 9, and down the other leg to cup 3; thence along the branch 27 of wire 24, around the circuit to all the magnets; thence along branch 25 to cup 5; thence up the leg of wire 10 and down the other leg to cup 6; thence along the wire 22 to the negative pole of the battery. This instantly charges all the magnets in the circuit. The armatures are attracted and drawn from over the end of the lever 13, which is immediately thrown up by the pressure of the end of the lever 12 against the arm 14, which lets the lever 12 pass, and the wheel-works are liberated and set in motion by the weight, which is the propelling power, and every time one of the levers 12 passes the arm 14 and throws the lever 13 up the bell is struck one blow by the hammer. A continuous alarm will be struck as long as the key is pressed down by the armatures being held against the magnets. Thus the fire companies may be all called out, and when the alarm has been struck a sufficient length of time the number of the ward will be struck repeatedly, which is done by letting the handle of the key fly up, the armatures are released from the magnets, and they fall back over the end of the lever 13; and if the armature falls back before the lever has reached the platform it will strike the sloping side of the armature and force it forward and let the lever fall under it. Now, when the point of lever 12 strikes the top of the short arm 14 the end of the lever 13 is detained under the armature. This checks the motion of the wheel I instantly, and the cogs of the wheel answer as a nut to the screw H, in which they work. The shaft is immediately pressed through the frame B against the spring 19, which gives way, and the brake-wheel G comes in contact with the brakes L and L and locks the wheels firmly. Now the operator presses the handle of the key down and lets it fly up immediately. This causes the bell to be struck one blow. Then he presses it down again, and thus strikes the number of the ward, or the key may be held down until the number is struck, and then let fly up, making the proper interval between the numbers struck. When the lever 13 is liberated the spring 19 immediately throws the wheel G from the brakes and keeps it off until the lever 12 meets with resistance. Then the wheel G is again thrown against the brakes. The brass wire 21 forms the connecting-link at each station, one leg being in cup 7 and the other in cup 8.

The wheel-work may be made to cause the brake-wheel to revolve as fast as may be needed to regulate the machinery.

The wallowers on the shafts of wheels E and G have each eight pins, between which the cogs of wheels D and E work. This causes the fly and brake wheel to make forty-five revolu-

tions in the same time that the master-wheel D makes one, and consequently the wheel I must have forty-five cogs to cause it to make one revolution in the same time that the master-wheel makes one, there being four revolving levers, 12, and four pins, K, in the master-wheel D.

There may be as many or as few of the revolving levers 12 as we may choose to apply, this rule always being observed, that there must be as many pins K in the master-wheel as there are levers, so that the lever A B will be carried down by the pin K directly after each lever 12 passes the arm 14, as seen on Fig. 3 at A B. This carries the hammer back and causes one to be struck; and it will also be observed that there must be as many cogs in the wheel I as the screw H makes revolutions to the master-wheel's making one. The wheel I being moved one cog for every revolution made by the screw H, this arrangement causes the wheels I and D to make one revolution in the same time.

Having thus fully described the construction and operation of my invention, what I claim as my invention, and desire to secure by Letters Patent, is—

Combining with the train of mechanism that strikes the alarm an endless screw, H, driving the toothed wheel I, and one or more revolving levers, 12, the said endless screw being fixed upon a sliding shaft that carries a brake-wheel or disk, G, so that when the motion of the toothed wheel I is arrested by the short arm or detent 14 catching the lever 12 the sliding shaft will advance, carrying before it the spring 19, until the motion of the train is stopped by the disk G coming in contact with the brake-pieces L, and so that on the release of the lever 13 the force of the spring shall throw the lever 12 off the detent 14 and release the disk from the break-pieces, substantially as before described.

AUGUSTUS ECKERT.

Attested:

JOHN MCCLELLAN,

L. D. DOTY.