(No Model.) 2 Sheets—Sheet 1.

M. ULLMAN.

ELECTRIC ANNUNCIATOR TARGET.

No. 346,876. Patented Aug. 3, 1886.

Fig. 1.

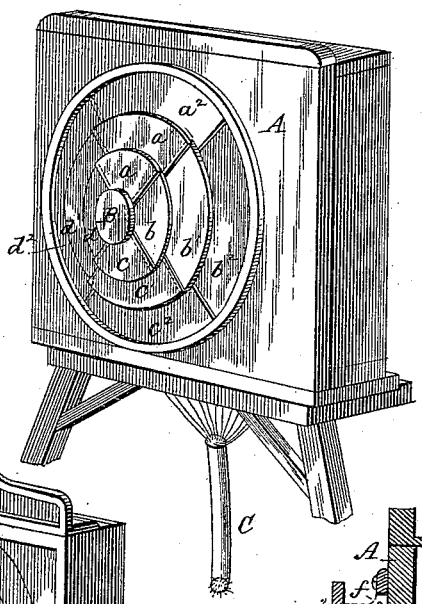


Fig. 2.

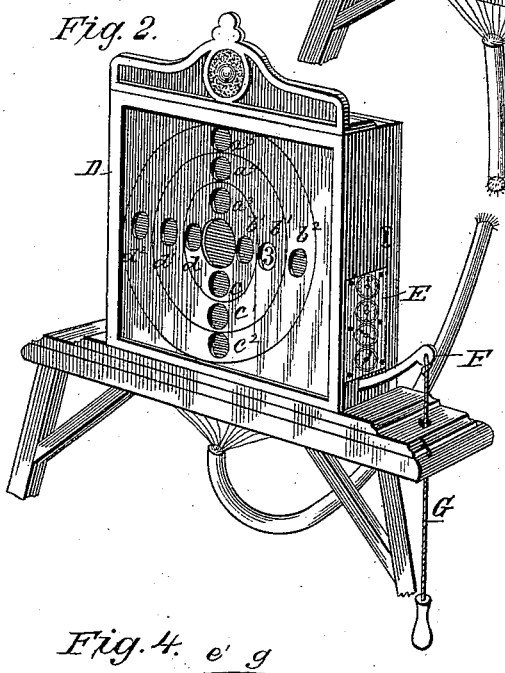


Fig. 3.

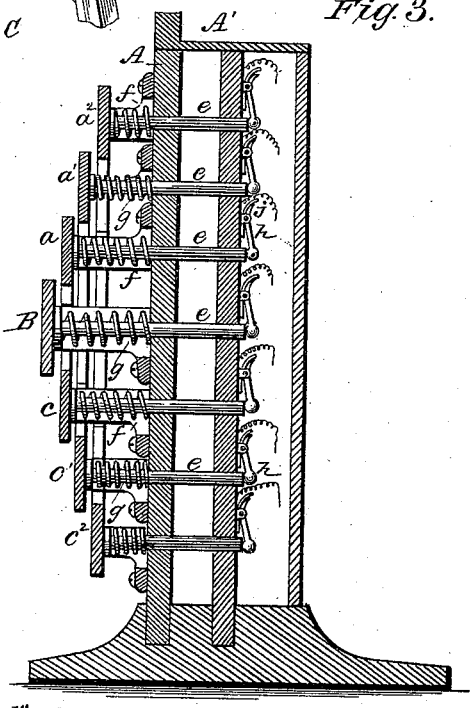


Fig. 4.

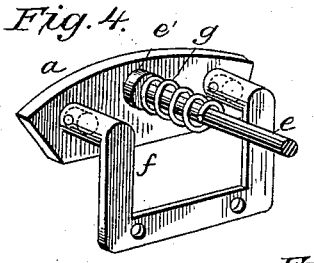
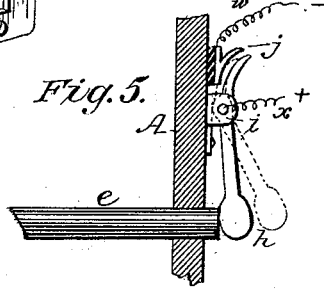


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

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ELECTRIC ANNUNCIATOR TARGET.

No. 346,876. Patented Aug. 3, 1886.

Fig. 6

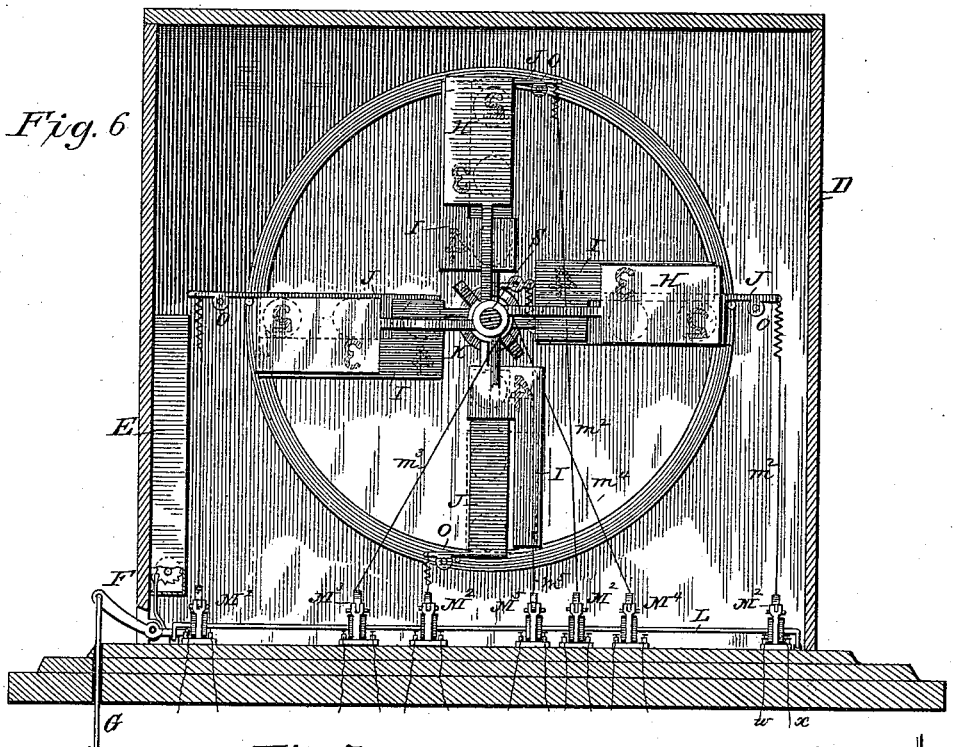


Fig. 7

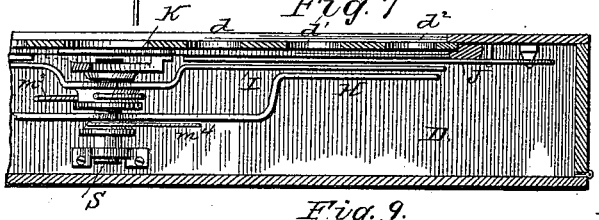


Fig. 8

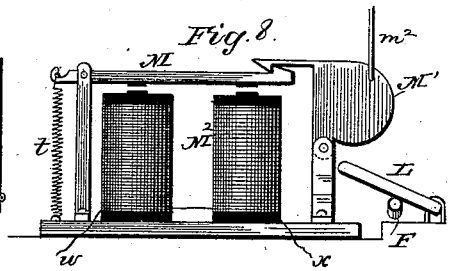


Fig. 9.

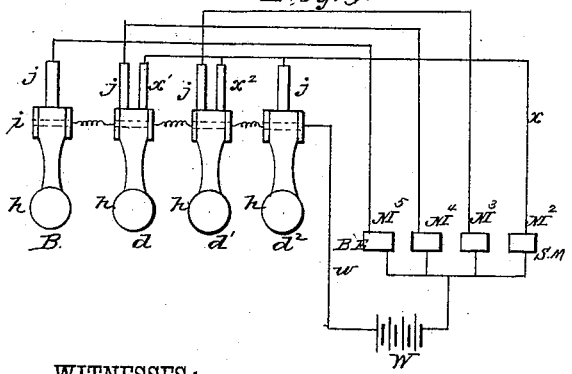
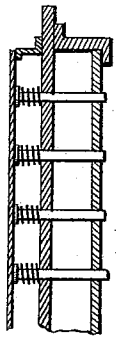


Fig. 10.



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UNITED STATES PATENT OFFICE.

MORRIS ULLMAN, OF WASHINGTON, DISTRICT OF COLUMBIA.

ELECTRIC-ANNUNCIATOR TARGET.

SPECIFICATION forming part of Letters Patent No. 346,876, dated August 3, 1886.

Application filed May 19, 1886. Serial No. 202,655. (No model.)

To all whom it may concern:

Be it known that I, MORRIS ULLMAN, of Washington city, District of Columbia, have invented a new and useful Improvement in Electric-Annunciator Targets, of which the following is a specification.

My invention is in the nature of an electric-annunciator target, which serves to indicate on an annunciator close to the spot where the shot is fired the particular spot on the target which is struck by the bullet, the target being for this purpose divided into sections which have separate electrical connections, through a connecting-cable, with the annunciator, which latter is constructed to correspond to the target.

My invention is an improvement upon my previously-patented construction, shown in my Patent No. 232,424, dated September 21, 1880, in which the target is made in sections separately movable, and adapted when struck by a bullet to be forced back, and to make contact between two electrical terminals which control a particular part of the annunciator. I have found that the sudden impact of a comparatively light bullet against one of the target-sections will not impart movement enough to produce an electric contact of such intimacy and duration as to produce a reliable signal, and have discovered a novel principle of action and means for utilizing said principle, which entirely overcomes this difficulty and enables me to construct an electrical-annunciator target of absolute reliability. Instead of allowing the impact of the bullet to give motion to a depressible section of the target, to advance it to contact with and complete the electric circuit, I make the sections of the target practically rigid, but independent of each other, and by pins or rods interposed between the target-sections and pivoted or jointed pendulum keys I cause the vibratory impact of the bullet on the target not to depress the target-section, but to transmit a vibratory impulse to the jointed pendulum or pivoted key, which causes the latter to jump and move a considerable distance, and to firmly and with a sufficient duration of time to close the electric circuit.

In the drawings, Figure 1 is a perspective view of the target. Fig. 2 is a perspective view of the electric annunciator. Fig. 3 is a vertical central section of the target. Fig. 4 is a perspective view from the rear of one of the target-segments. Fig. 5 is a sectional view showing the relation of the impact-pin to one of the jointed-pendulum contacts. Fig. 6 is a sectional rear view of the annunciator on an enlarged scale. Fig. 7 is a horizontal section of the same; Fig. 8, an enlarged view of one of the annunciator-magnets. Fig. 9 is a partial rear view of the target, with diagram of circuits; and Fig. 10, a sectional view of a modified form of the target.

A, Figs. 1 and 3, is the target-case, upon the face of which are fixed the independent target-sections B, $a\ a'\ a^2$, $b\ b'\ b^2$, $c\ c'\ c^2$, $d\ d'\ d^2$. These sections are each rigidly fixed to a bracket, f, Fig. 4, which latter is screwed firmly to the face of the target A. Against the rear side of each segment of the target an impact-pin, e, solidly bears, and for this purpose it may be formed solid with the segment, or it may, as shown, be provided with a head, e', which is pressed solidly against the segment by means of a spiral spring, g, bearing at one end against the head e', and at the other end against the face-plate of the target. The impact-pins e pass through guide-openings in the face-plate, and also in the middle plate, A′, and bear against the pendulum-keys h. These latter are hung in brackets i on the back of the plate A′, and when swung into the dotted position bear against the insulated springs j. The latter connect with a wire, w, leading to one pole of a battery, and the pendulum connects with another wire, x, leading to the other pole of the battery, and this circuit, when completed through the contacts h and j, flows through the cable of wires C, Figs. 1 and 2, and controls a magnet at the annunciator.

From the foregoing description it will be seen that although the segments of the target are separate and independent, and also overlap each other, to prevent bullets from getting wedged between them, still they are practically rigid, and do not yield in the sense of having any definite progressive motion in advancing to and closing a contact; but when struck by the bullet the impact of the latter merely transmits a vibratory impulse through the pins e endwise, which, being imparted to the pendulum-key h, resting on the end of said pin, causes the said pendulum-key to fly up a considerable distance, giving a prolonged

and positive contact against the spring, which closes the electric circuit with certainty through the annunciator. This action of the pendulum-key *h* in responding to the vibratory impulse of the bullet's impact much resembles the tendency of a hammer to fly away from a board when the latter is struck on the opposite side by another hammer. In order to render these pendulum-keys free from or unaffected by any impulse except that transmitted through the impact-pins *e*, said pendulum-keys are mounted upon the middle board or plate, A′, it being obvious that if they were mounted on the face-plate which carries the target-segments a general shock would be transmitted to them all at each shot, which might interfere with the accuracy of the device.

I prefer to make the target in independent sections or segments, as thus described; but I have found that the target-face may, within certain limits, be made in one piece, as in Fig. 10, and the locality struck by the bullet be still sufficiently affected by the shock in excess of the other part as to make the contact immediately behind the same without making contact elsewhere.

When an electrical contact is made behind the target between a pendulum, *h*, and spring *j*, a battery-current is closed through the magnets in the annunciator, Figs. 2 and 6, which display the signal, and the construction and operation of the parts necessary to an understanding of this I will now proceed to describe.

On the face of the annunciator there is a center hole or bull's-eye and four radial series of holes extending therefrom—one downwardly, another to the right, another upwardly, and the other to the left—and corresponding in number and relation to the segments of the target. Behind each of the four series of radial holes there is arranged a shutter, J, which lies close to the holes and prevents any number from showing through until the shutter is removed. Each of said shutters is pivoted or jointed upon a fulcrum, *o*, and is adapted to be pulled by a wire, m^2, worked by a magnet, M^2, so as to be withdrawn from behind the holes in the target or be allowed to drop back and cover the said holes. A similar circular shutter, K, rests behind the center hole or bull's-eye, and is worked by a wire, m^5, and magnet M^5. On a horizontal shaft, S, in the middle of the annunciator are hung two sets of blades or vanes, H H H H H and I I I I, of which one of the set H and one of the set I are arranged behind each series of the radial holes. At the outer end and near one edge of the blade H is placed, on its face next the holes, the figure 2. On its inner end and near the other edge is placed the figure 3. The vanes I extend in farther to the center than H, and on each of their faces, in line with figure 3 of blade H, is placed the figure 4, and on a plate behind the center shutter, K, is placed the figure 5. These figures 2, 3, and 4 correspond for each series of holes with the series of segments of the four subdivisions of the target, 2 representing the outer, 3 the middle, and 4 the one next to the bull's-eye. As all of the four vanes of each set act alike, I will only describe the action of those which control one series of radial holes. In the normal position of these vanes and shutters the shutter J obscures the numbers and allows none of them to show through the holes. Now, if an outer segment, d^2, of the target is struck, a single contact, Fig. 5, being made, it works the magnet M^3 and simply raises the shutter J, exposing figure 2 (on blade H) through the outer hole. If the bull's-eye is struck, the shutter K is removed through magnet M^5, disclosing 5; but if either of the two segments between these be struck two magnets are set to work—one to remove shutter J and the other to bring into position blade H or I, according to circumstances—so that the figure 3 or 4 may show through the holes of the annunciator, which action I will explain in detail a little further along with reference to diagram, Fig. 9.

The magnets M^2 control, as before stated, the shutters J, M^5 the bull's-eye shutter, M^3 the vanes H, and M^4 the vanes I, the pull-wires m^2 m^3 m^4 m^5 serving to move these vanes and shutters in one direction, and gravity serving to restore them, the vanes H moving altogether and the vanes I altogether, and both being heavier on one side than the other, so as to gravitate to position again after being moved. The mechanical action of the magnets M^2 to M^5 in pulling upon the wires m^2 to m^5 and moving the vanes and shutter is illustrated in Fig. 8, in which the armature M is held normally away from the magnets by a spring, *t*, and locks a weighted catch, M′, which is jointed to the pull-wire m^2. When, however, a contact is closed by a bullet, Figs. 5 and 8, and the magnet M^2 is charged, it attracts the armature M, and this releases the weighted catch M′, which, being free to move and much heavier on one side of its fulcrum, falls by its own weight and pulls down the wire m^2, thus operating the shutter or vanes to which it may be attached. All the magnets M^2 to M^5 are similarly constructed, and operated by different circuit-wires leading to the different contacts of the target, and the weighted catches M′ are lifted up and locked again by the rocking bail L, Figs. 6 and 8, which is lifted by the lever F and handled pull-cord G, and which lever and pull-cord also work a register, E, to record the shot.

Now, it will be remembered that the outside segments of the target make a single contact to work the magnets M^2, and simply move the shutter J, and that the central segment also makes a single contact and works the single magnet M^5, that controls the round bull's-eye shutter. The two sets of segments between these must, however, work each two magnets in the annunciator—one for the shutter J and the other for the vanes H or I, according to circumstances. Referring, now, to the dia-

gram, Fig. 9, which represents the back view of the target on the left-hand side, with the arrangement of contacts for this series of segments in relation to the battery and the magnets of the annunciator, the battery W is connected by one wire, *w*, to all the pendulum-contacts *h*, and the other wire goes through all the magnets of the annunciator, and thence, dividing, goes to all the spring-contacts *j*. The contacts for the two middle segments, however, are made double, one of each, x' and x^2, being also connected by wire *x* with the shutter-magnet M^2. It will thus be seen that when the bull's-eye or center segment, B, is struck, *h* and *j*, coming in contact, make the battery-circuit only through magnet M^5, which (see Fig. 6) works the bull's-eye shutter and discloses the center, Fig. 5. When the outer segment, d^2, Figs. 1 and 9, is struck, the circuit is closed only through magnet M^2, which (see Fig. 6) raises shutter J and allows figure 2 to show. If, now, segment d' is struck, the current is closed through both magnets M^2 and M^3, and (see Fig. 6) M^2 raises the shutter, while M^3 swings down the vane H until figure 3 shows through its hole. If segment *d*, Figs. 1 and 9, is struck, the current is closed through magnet M^2 and M^4, and (see Fig. 6) M^2 raises the shutter, while M^4 turns the vane I until its figure 4 shows through its hole, and this same movement of vane I causes its outer end to hide figure 2, which would otherwise show.

The principal features of merit in my invention is to be found in the accurate indication of the annunciator and the combination therewith of the register, which renders it impossible to use the instrument without registering each shot. This latter is a feature of great value when the target is left for a time in the hands of attendants at shooting-galleries, who may or may not make correct returns of the cash taken in.

In making use of my invention I do not limit it to the combination of the impact-pins, as the pendulum or jointed keys may be arranged to bear directly against the rear side of the target-sections.

Having thus described my invention, what I claim as new is—

1. The combination, with an electric annunciator, of a target having a substantially rigid or non-yielding face, and pivoted or jointed keys or contact-pieces adapted to be moved by vibratory impulse, and an electric circuit connecting the target and annunciator, substantially as described.

2. The combination, with an electric annunciator, of a target having a substantially rigid or non-yielding face, and pivoted or jointed keys or contact-pieces, impact-pins interposed between the pivoted contact-pieces and the target-face, and an electric circuit connecting the target and annunciator, substantially as described.

3. The combination, with an electric annunciator, of a target having a substantially rigid or non-yielding face made in independent sections, pivoted keys or contact-pieces, and interposed impact-pins placed between the segments of the target and the pivoted keys or contact-pieces, and an electric circuit, substantially as described.

4. The target composed of a face-plate with segments *a f* mounted thereon and overlapping each other, the impact-pins *e*, held against the segments by springs, and the middle plate, A′, bearing pivoted keys or contacts *h* and contacts *j*, substantially as and for the purpose described.

5. The combination, with the annunciator-frame having the openings in the same, of the shutters J and K, the rotary vanes H and I, the magnets M^2 M^3 M^4 M^5, the armatures M and weighted catches M′, the connecting-wires m^2 m^3 m^4 m^5, the lifting-bail L, and the circuit-wires connecting with the target, substantially as and for the purpose described.

6. The combination, with the annunciator, of a register for recording the number of shots, a setting mechanism for restoring the annunciator to its normal position, and a handle for operating both the register and the setting mechanism by one and the same movement, substantially as described.

7. In an electric-annunciator target, the combination, with the impact-face of the target, of an independent back plate or support bearing electrical contacts, one section of each of which is made independently movable with a secondary action from vibratory impact, and means for transmitting the impact of the bullet thereto, substantially as described.

8. The combination, with an electric annunciator, of a target having an impact-face made in segments, a back plate or support bearing electrical contacts, one part of each of which is made independently movable from vibratory impact, and means for transmitting the vibratory impact of the bullet to the movable contact, substantially as shown and described.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

MORRIS ULLMAN.

Witnesses:
CHAS. A. PETTIT,
SOLON C. KEMON.