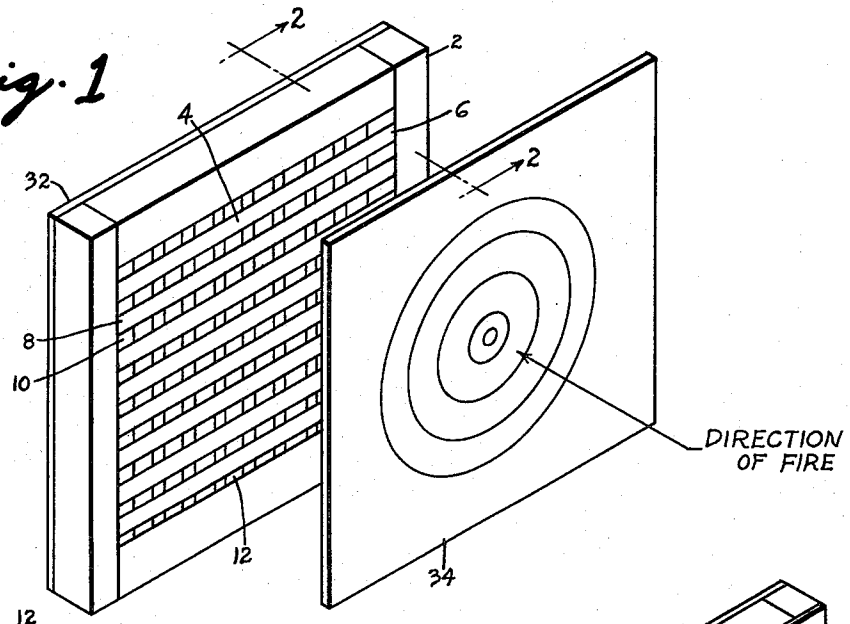
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AUTOMATIC INDICATING TARGET

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Fig. 1



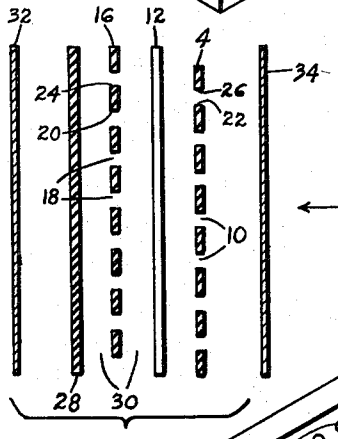


Fig. 2

BULLET PATH

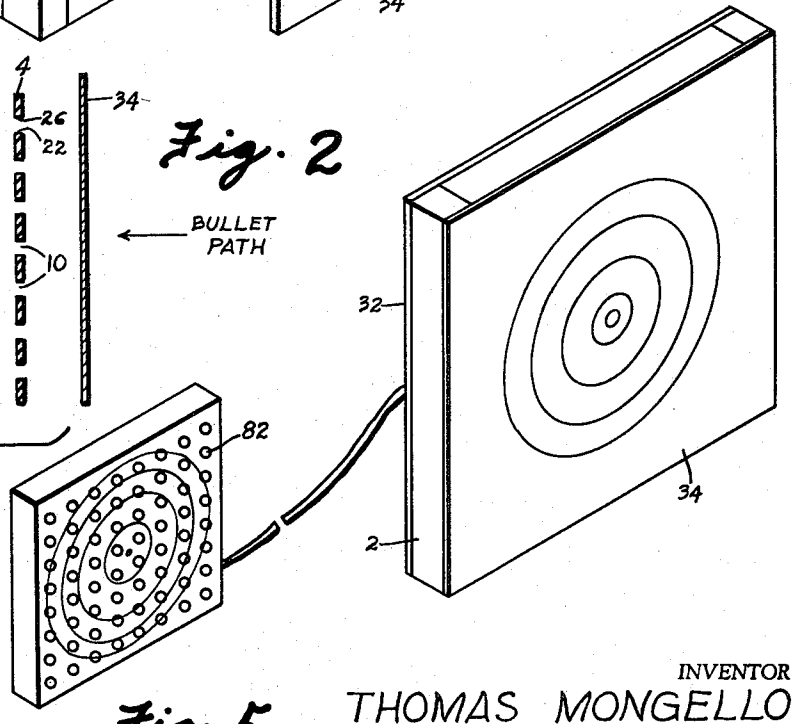


Fig. 5

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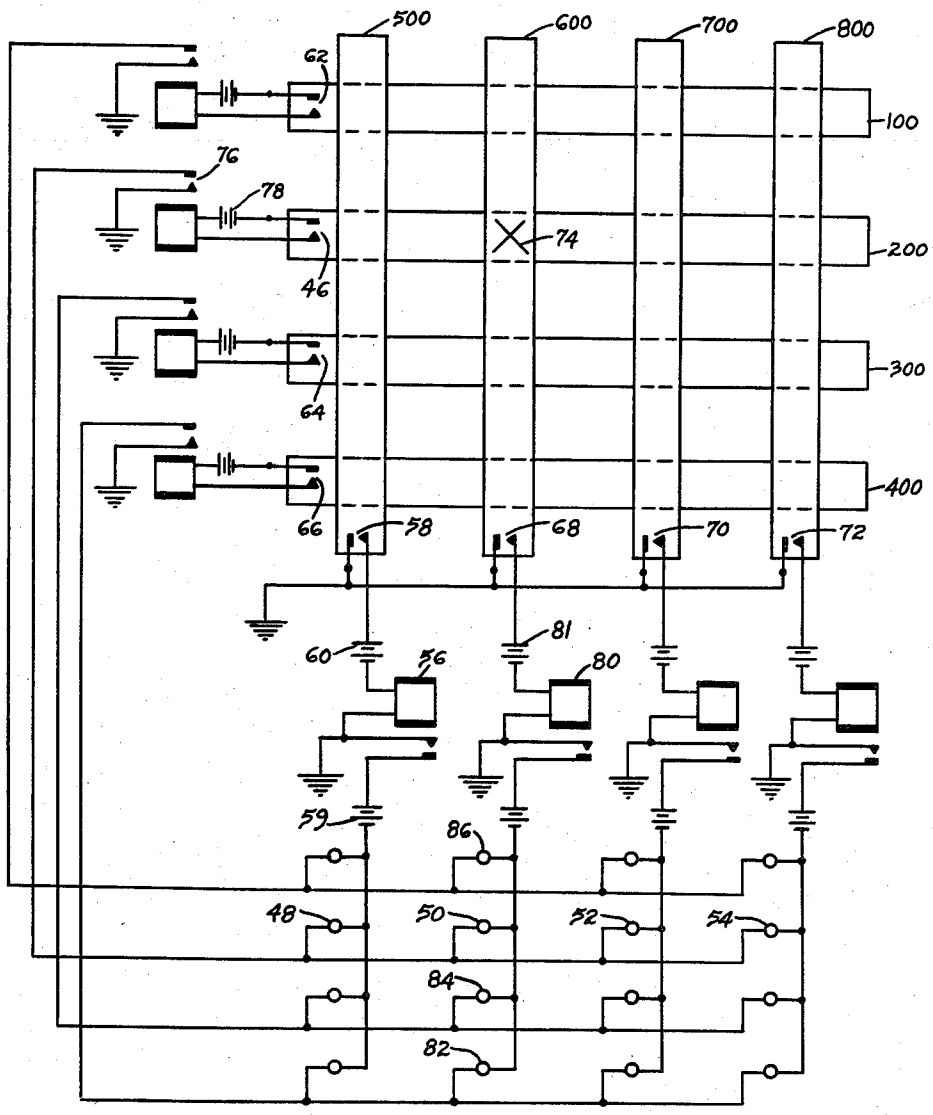


Fig. 4

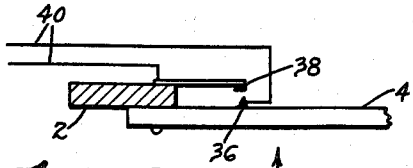


Fig. 3

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United States Patent Office 2,934,346
Patented Apr. 26, 1960

2,934,346

AUTOMATIC INDICATING TARGET

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Application January 26, 1954, Serial No. 406,371

3 Claims. (Cl. 273—102.2)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates in general to targets that are used in conjunction with small arms weapons such as pistols and rifles, and pertains more specifically to a target that indicates automatically the area of bullet penetration upon a target face.

One present day method of determining the position of impact of a bullet or round upon a target consists of placing an observer at or near the target and protecting him from gunfire by means of a wall, embankment or other bullet resistant device. After each round is fired, the observer marks the area of impact on the target. The marked area is then observed from the firing line and a permanent hand written record is made. In some cases, the location of the area of impact upon the target is determined by placing the target upon a hand-operated rack that can be lowered and raised. The observer is located in a protected area or pit directly below the target. To observe the area of hit, the observer lowers the target, marks the area, and then raises the target to its original position. The area of hit is then observed from the firing line and a written record made.

The present invention consists of a target or bulls eye that is mounted on a frame. Located immediately behind the target and supported by the frame are a plurality of cooperating vertically and horizontally mounted straps. Each strap is connected to a separate electrical switch. The switches of the vertical and horizontal straps are included in circuits that are inter-connected to indicate accurately at a remote location the area of hit or penetration. The instant that a round strikes straps that are located behind the target, a shock wave travels along the affected straps and actuates the corresponding switches. The circuits of the switches include lights indicating the area of penetration of the bullet through the target.

The primary object of this invention is to provide means to indicate automatically the area of impact of a round on a target.

Another object is to provide such an indicating means that can be used repeatedly.

An additional object is to provide a round impact indicating means that can be used with both regular and armor piercing bullets.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same become better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is an exploded isometric view of a preferred embodiment of the present invention showing the target face or bulls eye, the frame containing the horizontal and vertical straps, and the rear wind shield;

Fig. 2 is a section along the line 2—2 of Fig. 1 with the frame omitted and showing the physical arrangement of the straps, the horizontal spacing of the parts being exaggerated for the sake of clearness;

Fig. 3 is an enlarged view of one end of a strap illustrating the electrical contact;

Fig. 4 is a schematic diagram of the electrical indicating means of the invention connected to a plurality of straps; and

Fig. 5 is a general overall view of the entire device.

Frame 2 is mounted normal to the direction of fire, as by mounting in a vertical position by some convenient means (not shown). The frame 2 can be square, rectangular or circular the configuration of the frame being dependent upon the type and outline of the target area that is utilized. A plurality of straps 4 are firmly secured to the frame 2. Each strap 4 is retained securely in a horizontal position by connecting the ends 6 and 8 to the frame 2. The method of connecting said straps 4 to said frame 2 is not shown nor described, as any convenient means such as screws, bolts or clamps can be used. Each strap is preferably approximately two and one-half inches wide, one eighth of an inch thick and is of any type of material that will not disintegrate when struck by a round. One material that will perform this function in an acceptable manner is rubber or "Armadillo" chute lining that is manufactured by the Goodyear Tire and Rubber Company. The interspace 10 between adjacent straps 4 is approximately two inches. Located immediately behind but mechanically isolated from the horizontal straps 4 are a plurality of identical vertically placed straps 12. The vertical straps 12 are secured to the frame 2 by any convenient means such as screws, clamps, or the like. The straps 12 are located a sufficient distance behind the straps 4 so that a disturbance of any one or a plurality of the horizontally mounted straps will not be transmitted to the vertically mounted straps 12. The interspace of the vertical straps 12 is approximately 2 inches.

Behind the second layer or vertically mounted straps 12 are a plurality of horizontally mounted straps 16 having interspaces 18 approximately two inches apart. The straps 16 are disploced or staggered so as to fill in the projected area of interspaces 10 between the straps 4. Thus, the projection of the plurality of the combination of straps 4 and 16 is, in effect, a solid area. Since each strap 4 and 16 is approximately two and one-half inches wide and the interspaces 10 and 18 is approximately two inches, then the projection of the straps 16 and 4 indicates that the edges 20 and 24 of the straps 16 overlap the edges 22 and 26 of the straps 4 approximately one quarter of an inch.

A fourth set of vertically mounted straps 28 is secured to the frame 2 immediately behind the set of straps 16.

The vertically mounted straps 12 and 28 coact in the same manner that the horizontally mounted straps 4 and 16 cooperate. The space 30 between each set of straps is of sufficient magnitude to prevent the transmission of disturbances from one strap to another. This arrangement of straps will permit the construction of a target six feet wide and six feet high by the use of thirty-six vertical straps and thirty-six horizontal straps. Thus, the size of the target can be increased or decreased by altering the number of straps. For purposes of illustration only, a considerably smaller number of straps and indicator lamps are shown in Fig. 1 and Fig. 5.

A wind shield or baffle 32 of any convenient material such as wood or cloth, is located immediately behind the frame 2. The target face 34 is located immediately in front of the frame 2. Said target face 34 is usually made of cloth to present a target of the desired design to the marksman and to act as a wind shield or baffle for the front portion of the device.

Each strap of each layer of straps contains an elec-

trical make-break contact at one end. An electrical contact 36 (Fig. 3) is secured to the strap and follows all disturbances of said strap. A second electrical contact 38 adapted to mate with said contact 36 is secured on the frame 2. Electrical lead wires 40 are connected to the contacts 36 and 38.

Fig. 4 shows a schematic diagram of a target containing four vertical and four horizontal straps that are separated and restricted to two layers for illustrative purposes only, and the remote indicating system that cooperates with the target. Each vertical and each horizontal strap cooperates with a separate electrical switch of the normally open make-break type. All substantial disturbances of the straps will cause their respective switches to make electrical contact. An electrical make-break switch 46 containing two contacts cooperates with the horizontal strap 200. The switch 46 operates a quick make-slow break relay 76 through the battery 78. One of the normally open contacts of the relay 76 is connected to ground. The other contact of the relay 76 is connected to one terminal of a plurality of bulbs 48, 50, 52 and 54 that are connected in parallel. The other terminal of the bulb 48 is connected to one of the normally open contacts of the quick make-slow break relay 56 through the battery 59. The other contact of said relay 56 is connected to ground. One terminal of the coil of the relay 56 is connected to ground. The other terminal of said relay coil is connected to a contact of the normally open switch 58 through the battery 60. Said switch 58 cooperates with the vertically mounted strap 500. The other contact of said switch 58 is connected to ground. The bulbs 50, 52 and 54 are connected in a manner that is similar to the connection of the bulb 48. The horizontally mounted straps 100, 300 and 400 cooperate with switches 62, 64 and 66 respectively. Said switches 62, 64 and 66 cooperate with and are connected to the switches 58, 68, 70 and 72 through relays, light bulbs and batteries in a manner that is similar to the coaction between, and connection of switch 46 to switches 58, 68, 70 and 72 through the bulbs, batteries and relays.

In operation the target unit, consisting of the wind shield, the frame and its associated parts and the target face, is placed on the firing range so that the target is in a vertical position at right angles to the line of fire. The indicating unit is located close to the position of the marksman. A bullet that is fired with some degree of accuracy will pass through said target face, through a plurality of straps, and then through the rear wind shield or baffle. As the bullet passes through the straps, a disturbance is generated within the affected straps. This disturbance closes the contacts of the switches that cooperate with the affected straps. The combination of switches that are activated determines which bulb lights. The illuminated bulb indicates the location of the area of contact of the bullet on the target face.

When a round penetrates the intersection of the vertical strap 600 and the horizontal strap 200 at the cross 74, a disturbance is generated within the two straps 200 and 600. The disturbance of the strap 200 closes the switch 46, thus operating the relay 76. The action of said relay 76 completes one-half of a discrete circuit and thus conditionally enables one of the bulbs 48, 50, 52 and 54 to light. The disturbance that is generated within the vertically mounted strap 600 operates the relay 80 through the contacts 68 and the battery 81. The contacts of the relay 80 completes one-half of a second discrete circuit and thus conditionally enables one of the bulbs 82, 84, 50 and 86 to light. The light bulb 50 is the only bulb that is common to the two circuits and, therefore, said bulb 50 will pass current and illuminate.

The plurality of light bulbs are placed behind a miniature transparent target face that is a facsimile of the target face that is in front of the target. Thus the marksman need only look at the indicator after each round is fired to determine the location of the area of penetration of a round.

The relays are of the quick make-slow break type so that the indicator bulb will remain illuminated for a time duration that is sufficient to allow the gunman to observe the hit location of his round.

The wind shields or baffles prevent vibrations of the straps resulting from the action of the wind. An armor plate frame, not shown nor described, is placed in front of the target to protect the frame 2 and the switches from destruction by inaccurately fired rounds.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A target for automatically and repeatedly indicating the target areas hit by fired rounds of ammunition comprising, in combination: a frame; a plurality of spaced parallel planes, each plane comprising a plurality of spaced parallel strips firmly secured at their ends to said frame, two said planes constituting a pair, each plane of a pair having its strips aligned at an angle relative to the strips of the other plane of said pair, the strips of one pair paralleling the strips of a second pair but being displaced so as to overlay, in projection, the spaces between the strips of said second pair, said strips fabricated from bullet-penetrable, non-rigid, non-shatterable material adapted to transmit by shock wave action the force induced therein by the impact of a round; a plurality of switch means, each connected with a different one of said strips and operable in response to a shock wave travelling along said strip; and a plurality of indicating means, each connected in electrical circuit with a different two of said switch means, one said switch means associated with a strip in one plane of a pair and the other said switch means associated with an intersecting strip in the other plane of said pair, so that each indicating means is related to a specific intersection of two strips in a pair of planes, and each indicating means operates only in response to the activation of both of its associated switches.

2. A target for automatically and repeatedly indicating the target areas hit by fired rounds of ammunition comprising, in combination; a frame; a plurality of parallel spaced planes, each plane comprising a plurality of spaced parallel straps firmly secured at their ends to said frame, successive planes constituting a pair and having vertically and horizontally arranged straps respectively, and the straps of two planes of the same horizontal or vertical structure in two successive pairs positioned to overlap the spaces of the other, said straps being fabricated from bullet-penetrable, non-rigid, non-shatterable material adapted to transmit by shock wave action the force induced therein by the impact of a round; a plurality of normally open switches, each associated with a different one of said straps and having one contact secured to said frame and the other contact secured to one end of its associated strap in such manner that a shock wave travelling along said strap forces the contacts together; a plurality of quick-make, slow-break relays, each connected in circuit with a different one of said switches and each having a set of normally open contacts; connections for a source of energizing power for each said relay, each relay being energized when the contacts of its associated switch are forced together momentarily; a plurality of indicator lamps, each in series electrical circuit with a different two sets of relay contacts, one set belonging to one of the relays in the horizontal strap plane of a pair and the other belonging to one of the relays in the vertical strap plane of said pair, so that each said indicator lamp is associated with a specific intersection of the horizontal and vertical straps of a pair, all said indicator lamps being arranged to simulate the

actual geometrical arrangement of said intersection; and connections for a source of energizing power for each said lamp, so that penetration by a round of a vertical and horizontal strap in a pair forces together the contacts of its associated switch thereby energizing the associated indicator lamp to show the location of the penetration.

3. A target as set forth in claim 2, wherein said strap material is rubber.

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