

Nov. 23, 1954

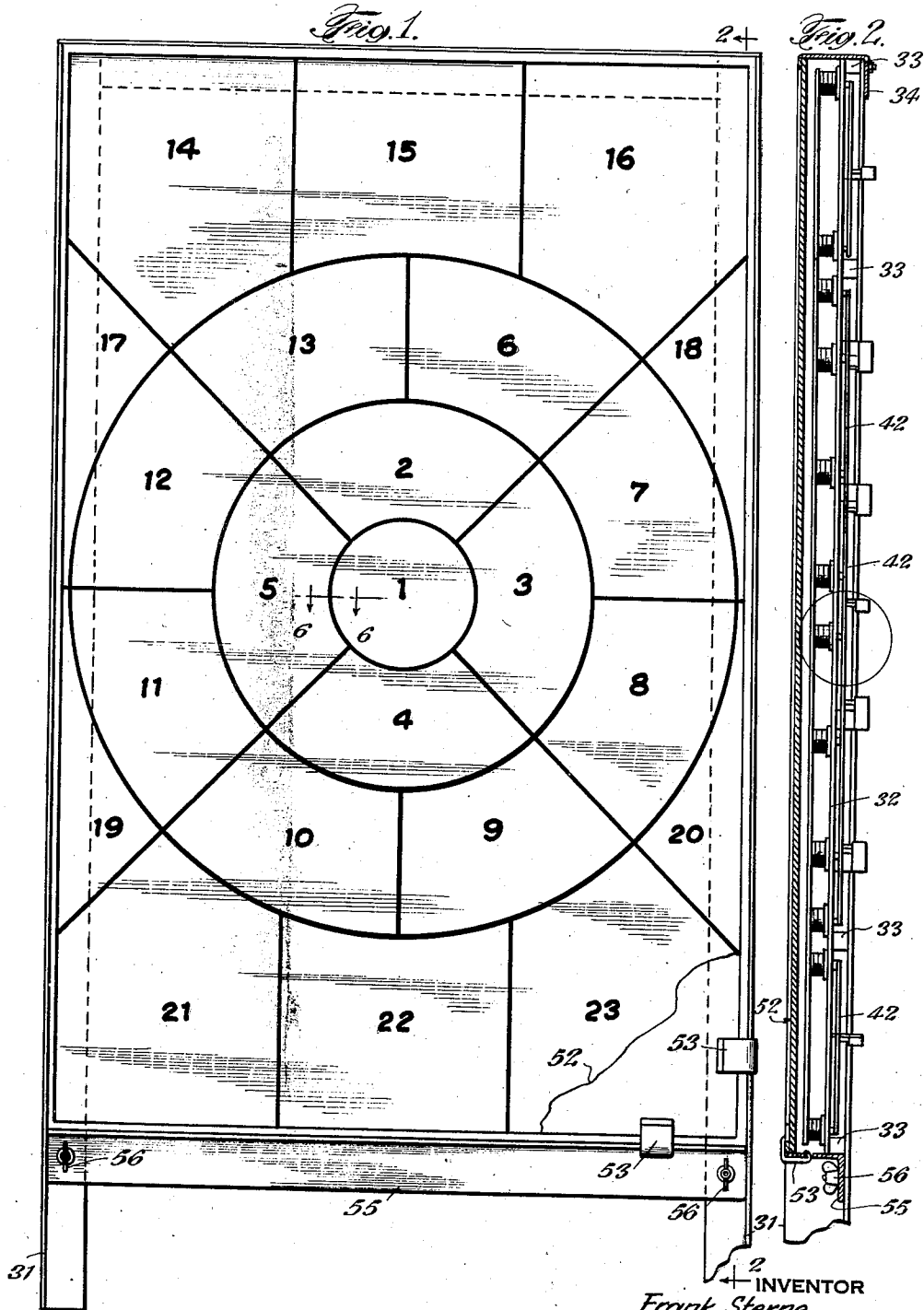
F. STERNE

2,695,173

REMOTE SCORING TARGET

Filed Dec. 9, 1950

4 Sheets-Sheet 1



INVENTOR  
Frank Sterne

BY  
Emory Varney, Whittemore and  
ATTORNEYS

Nov. 23, 1954

F. STERNE

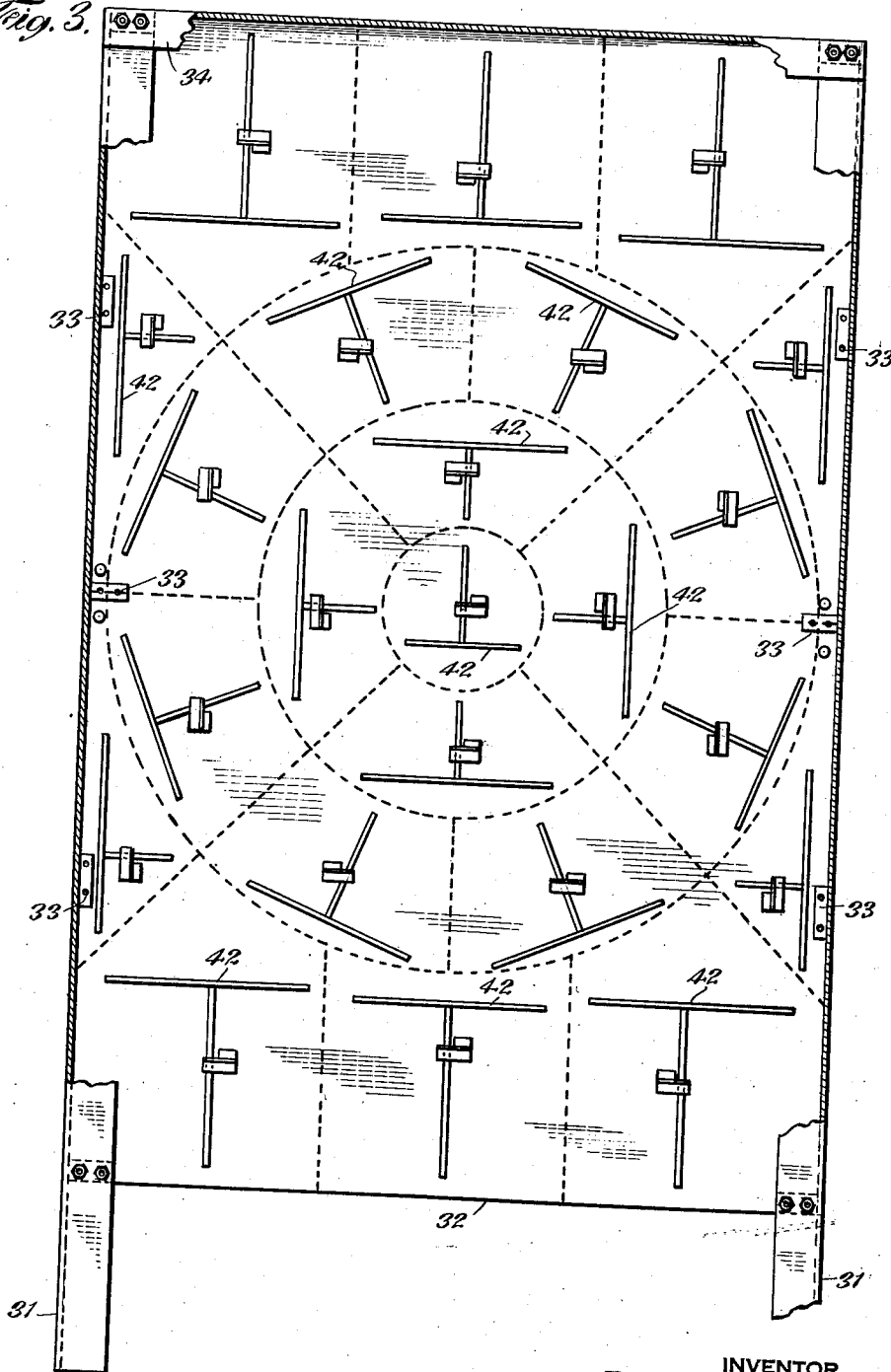
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*Fig. 3.*



INVENTOR  
*Frank Sterne*  
BY  
*Emery, Vanev, Whitman & Dix*  
ATTORNEYS



Nov. 23, 1954

F. STERNE

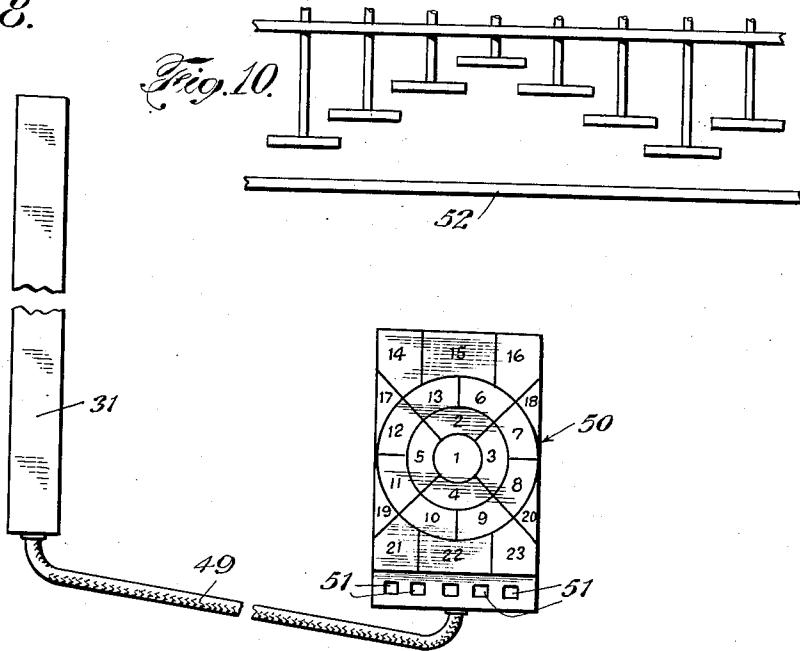
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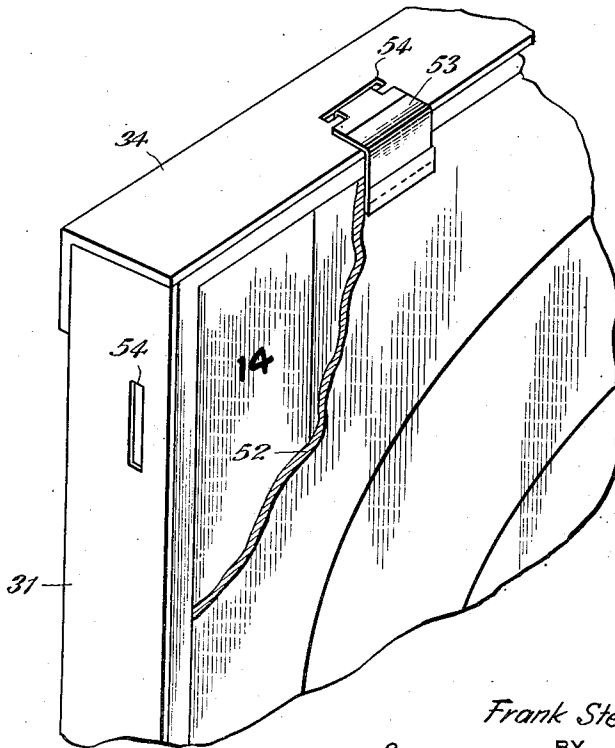
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*Fig. 8.*



*Fig. 10.*

*Fig. 9.*



INVENTOR  
*Frank Sterne*  
BY  
*Emory Varney Whittemore & Co.*  
ATTORNEYS

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2,695,173

**REMOTE SCORING TARGET**

Frank Sterne, New York, N. Y.

Application December 9, 1950, Serial No. 200,029

4 Claims. (Cl. 273—102.2)

This invention relates to targets for bullets such as are discharged from rifles, pistols and the like. More particularly, the invention relates to targets which indicate and record at a distant point the value and the location of each hit on the target.

It is an object of this invention to provide improved targets of the character described. It is a further object of the invention to provide an improved sectionalized target and improved means for accurately recording at a distant point which section of the target has been hit. Another object of the invention is to provide a target having means to prevent the ricocheting and rebounding of bullets from the face thereof, and to guide the spent bullets. Still another object of the invention is to provide a target having a perforable face which may be easily and quickly removed after use and replaced with a fresh target face.

The desirability of having a target which will accurately record the value of each hit automatically at point distance from the target has been recognized heretofore. In most cases, it is desired that the recording mechanism be located at the point of firing. Such a target should record not only the value of each hit, but also the location of the hit on the target, so that the individual who is shooting can make the proper correction or allowance in an attempt to bring the next shot into the bull's-eye. Practical means for accomplishing the desired results have not been available heretofore. Moreover, the recording targets of the prior art often presented unusual appearances and were not adapted to use of the conventional target face design consisting simply of a plurality of concentric circles on a plane surface. Bullets striking the recording targets of the prior art also were liable to ricochet or rebound, endangering personnel, as well as exposed portions of the target recording mechanism and nearby structures.

According to the present invention a target is provided which, from the shooter's standpoint, has the appearance of the conventional target, but which will record immediately at the firing point, the location on the target as well as the value of each hit. This recording is performed entirely automatically, thus eliminating the possibility of error which is always present with manual recording. Because the recording is performed automatically, the necessity for having someone continuously in the butts to record the hits on each target and to repair and replace the targets is eliminated. Moreover, the ricocheting and rebounding of the bullets from the target is prevented and the spent bullets are guided below to be collected so that the metal may be salvaged as scrap.

The preferred embodiments of the invention have been selected for purposes of illustration and description and are shown in the accompanying drawings, wherein:

Fig. 1 is a front elevation of the target, most of the perforable aiming cover being broken away to disclose the construction of the sectionalized impact plate which stops the bullets;

Fig. 2 is a vertical section through the target, substantially on line 2—2 of Fig. 1;

Fig. 3 is a rear elevation of the target, showing the electric switches and the means for selectively actuating these switches when a hit is scored on the front of the target;

Fig. 4 is an enlarged view of one of the electric switches and the switch actuating mechanism, taken from substantially the same point of observation as Fig. 3;

Fig. 5 is an enlarged sectional view substantially of

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the encircled portion shown in Fig. 2, and also is a view substantially on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged sectional view showing the edges of two adjacent sections of the sectionalized impact plate, for example on the line 6—6 of Fig. 1;

Fig. 7 is a side view of the electric switch, taken substantially on line 7—7 of Fig. 4;

Fig. 8 is a diagrammatic view showing the target, the remote indicating and scoring device, and the interconnecting electric cable;

Fig. 9 is a perspective view of an upper corner of the target, showing one form of means for mounting the perforable aiming cover, on which the target design is reproduced, in the front of the sectionalized impact plate; and

Fig. 10 illustrates diagrammatically the staggering of plate segments when the target is divided into a large number of sections.

The target is supported in a suitable framework. In one of the illustrative embodiments, this framework comprises two vertical side members 31 which are connected to the side edges of the target back plate 32. The back plate is a rectangular steel plate of approximately the same size as the target face. The side members may extend below the bottom of the back plate, as shown, for convenience in mounting the target in an upright position. In the illustrative embodiment, the side members 31 are structural angles which extend along and in back of the side edges of the target back plate. The back plate desirably is spaced forwardly from the back sides of the angles 31 by a plurality of spacer blocks 33, and these parts may all be secured together in known manner, for example, by bolts passing through the back plate, the spacer blocks, and the back sides of the structural angles, as shown. The side members 31 may be connected across the top of the target by a member 34, conveniently a structural angle extending along the top edge of the target back plate 32 and in back of the upper ends of the vertical side members 31.

Located between the vertical side members 31, in front of the back plate 32 and substantially coextensive therewith, is the impact plate against which the bullets impinge. This impact plate, preferably made of hard steel so that it will not be indented or otherwise damaged by the bullets, is divided into a plurality of sections which are numbered 1 through 23 on the drawings for convenient reference. The front surfaces of these sections 1 through 23 are preferably flat and are substantially flush with each other so as to present a flat surface which is broken only by very narrow spaces separating the sections from each other.

The spacing between adjacent sections of the impact plate ordinarily will be substantially uniform and, as viewed from the front, the spacing will be substantially less than the diameter of the bullets for which the target is to be used, so that no bullet can penetrate the impact plate by passing between sections thereof. For example, in a target to be used with .22 caliber bullets, the spacing between adjacent segments may be about  $\frac{1}{32}$  of an inch.

Desirably the distance between adjacent sections of the impact plate increases from the front to the rear of the impact plate so as to prevent any binding or contact between the edges of a section when hit and pushed or tilted back by a bullet, and the edges of the adjacent sections. This object may be accomplished by chamfering the adjacent edges of the sections 1 through 23, substantially as shown in Fig. 6. Use of the chamfered edges also will minimize any danger of a portion of a bullet entering and jamming between adjacent sections.

As may be seen in Fig. 1, the central part of the impact plate is divided into sections whose sides are defined by a plurality of concentric circles and radial lines. The central section 1 is round and is of the same size as the bull's-eye of the aiming cover which is to be used. The sections 2 through 5 make up a ring which has the same overall diameter as the diameter of the first marker ring surrounding the bull's-eye on the aiming cover, and the sections 6 through 13 make up a ring which has the same overall diameter as the diameter of the second marker ring surrounding the aiming bull's-eye. The margin of the impact plate may be divided into sections by

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radial lines, or by vertical lines, or by a combination of the two, as shown. It will be understood, of course, that the particular number and the division of the sections herein disclosed are merely illustrative and will vary for target designs having smaller or larger numbers of counting rings. The impact plate should be divided into sections which make up a plurality of concentric rings equal in number and size to the rings on the face of the aiming cover which is to be shot at. The greater the number of sections, the more precisely will the hits on the target be spotted on the remote indicator.

The sections 1 through 23 of the impact plate are individually mounted so that they are movable by flexing or otherwise in the stopping of a bullet. In the preferred embodiment herein disclosed, there are three plungers 35, secured to the back of each of the impact sections. The arrangement of the plungers on the backs of the impact plate sections will vary somewhat, depending on the shapes of the sections, but will be such that a bullet hitting anywhere on the front of a section will result in the actuation of an electrical switch for the purpose and in the manner to be described hereinafter. In general, it may be said that when three plungers are employed they will be spaced widely apart to form a triangle. A smaller number of plungers per section may be adequate where the sections are small in size.

As may be seen in Figs. 4 and 5, each plunger 35 passes through a cylindrical bearing 36 and then through a hole in the target back plate 32. The inside diameter of the bearings 36 is somewhat greater than the outside diameter of the plungers 35, so that there will be no binding in the event that a plunger is tilted slightly as it moves in its bearing. The bearings 36 may be provided with flanged end portions 37 for convenience in securing the bearings to the back plate 32, for example, by means of bolts 38.

It is desired to keep each section of the impact plate in a forward position, and any suitable means may be employed for this purpose. For example, surrounding each bearing 36 is a helical recoil spring 39, with its associated end retainers 40, one resting against the back of the impact plate section and the other against the heads of the bolts 38. The plunger 35 may be provided near its rear end with a circumferential groove to receive a split spring retaining ring 41. This retaining ring 41 will be inserted in the groove of the plunger after the latter has been pushed back through the back plate to compress the recoil spring 39 partially and to expose the groove on the rear side of the back plate. This retaining ring 41 is larger than the hole through the back plate 32 and the ring holds the plunger 35 against removal from the hole through the back plate, with the recoil spring 39 pressing the retaining ring 41 firmly against the back of the back plate 32. In the illustrative embodiment, movement of the plunger to the rear, as when the impact plate section is struck by a bullet, is limited by engagement of the plate section with the end of the plunger bearing 36.

The rear ends of the plungers 35 for each section of the impact plate are connected together by a link. In the illustrative embodiment, where there are three plungers for each section, the ends of the plungers are connected by a T-shaped spider 42. These spiders can be seen in Fig. 3, and the details of a suitable connection between an end of one of the spider arms and a plunger are disclosed in Figs. 4 and 5. As shown, the spider arms are provided with holes near their ends to receive screws 43 which engage tapped holes in the rear ends of the plungers 35.

Secured on the rear of the back plate 32, as by means of brackets 44, are a plurality of suitable small, snap-action, electric switches 45, one for each spider. These switches are mounted in the rear of the spiders 42, in such manner that movement of any plunger 35 to the rear, caused by a hit on the connected impact plate section, will cause the spider to actuate the associated switch. When T-shaped spiders are employed, the switches preferably will be mounted adjacent the upright leg of each spider at approximately the middle thereof, or between the middle thereof and the junction of the upright leg with the cross member, substantially as shown in the drawings.

The switches 45 preferably have overtravel pin type plungers 46, providing for actuation of a switch with a very small movement of the plunger, while at the same

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time permitting a considerably greater movement of the plunger without damage to the switch. Switches suitable for this purpose are available commercially, for example, switches manufactured by the Micro Switch Corporation of Freeport, Illinois. These switches may be designed for operation with normally open electric circuits, or normally closed circuits, or they may be provided with three terminals as shown in the drawings, permitting operation with either type of circuit, as desired.

The switch plunger 46 projects from the switch toward the target back plate 32 and preferably is actuated by an arm 47, pivotally connected to the switch casing. One face of the pivoted switch arm 47 normally rests against the end of the plunger 46, while the other face of the arm rests against the back of the spider 42.

Thus, it will be seen that movement to the rear by one or more of the plungers connected to a section of the impact plate, such as occurs when the section is struck by a bullet, will cause the associated spider to turn the switch arm 47 and close or open an electric circuit, depending on whether the system is designed for operation on a normally open or normally closed circuit. Actuation of the switch in this manner will operate the distant recording mechanism, as will be described more fully hereinafter.

It has already been pointed out that the range of movement of the plungers 35 to the rear is limited. A hit on the impact plate section will not necessarily push all three connected plungers to the rear as far as it is possible for them to move. This will depend in part on the location of the hit on the impact plate section. The recoil springs 39 will return the plungers to their forward positions promptly following a hit on the impact section and unless additional means are provided, the electric switch 45 may remain actuated only for a very short period of time following a hit.

In order to insure efficient operation of the distant recording mechanism, any suitable mechanical or electrical arrangement may be provided. In the preferred arrangement, it is desirable to equip each switch with a device which will increase the time interval during which the switch remains in actuated condition following a hit. In the illustrative embodiment, for example, the free end of the switch arm 47 is provided with a weight 48; such as a small block of lead. Momentum imparted to this weight when the switch arm is actuated by movement of the spider will cause movement of the switch arm to its full limit, thus insuring action of the electric switch for a sufficiently long time interval to cause operation of the distant recording mechanism.

The terminals of the switches 45 are connected by means of a multiple conductor electric cable 49 to a distant recording device 50. Ordinarily this recorder will be located at the firing point, so as to let the person who is doing the shooting know immediately just where each shot has hit the target. Preferably, the recorder will have the appearance of a diminutive target, including a face which is marked off or divided to correspond to the divisions of the sectionalized impact plate of the target, each division or section of the recorder face having its own electric lamp or other visual signaling device. Each such signaling device in the recorder is connected through an electric circuit in the cable 49 to the switch 45 in the rear of the corresponding section of the target impact plate, so that a hit on any section of the target will operate, through suitable relays, to light the lamp or otherwise actuate the signaling device in the corresponding section of the diminutive target recorder.

The recorder desirably will be provided also with means for indicating visually the value of each hit. This diminutive target recorder may be one of the well known types of recorders that will show the positions of the hits and may include the ordinary mechanism that will also show accumulations.

The target cover at which aim actually is taken preferably is a sheet 52 stretched taut in front of the sectionalized impact plate and spaced a short distance therefrom. This aiming cover preferably will be a textile-reinforced rubber sheet and it may be somewhat elastic. This aiming cover will be held in taut position across the front of the target framework comprising the side members 31 and the top connecting member 34 by suitable means, for example, by a plurality of clips 53 secured to the edges of the cover 52 and extending around the edges of the frame-work into slots 54 through the sides

of the members 31 and 34. The lower edge of the aiming cover can be held taut by similar clips engaging slots in a cross member 55 extending between the vertical side members 31 of the framework, below the target back plate 32. The front of the aiming cover 52 has reproduced thereon the conventional target design, comprising a central bull's-eye and a plurality of concentric scoring circles.

As previously pointed out, the bull's-eye on the aiming cover 52 corresponds in size to the impact plate section 1 and lies directly over this section, and the concentric scoring circles on the aiming cover are of the same size as the concentric zones on the sectionalized impact plate. Hence, a hit through the bull's-eye of the aiming cover will be scored on the recorder 50 as a bull's-eye, that is in section 1, and a hit through any of the concentric scoring circles of the aiming cover will be accurately shown on the diminutive target recorder.

Bullets passing through the perforable aiming cover 52 and expending their force against the sectionalized impact plate will drop down through the space between the aiming cover and the impact plate and may be collected for salvage as scrap. To this end, the cross member 55 may be provided with one or more openings which permit the spent bullets to drop directly into a suitable container located below the target. The cross member 55 may be spaced slightly below the lower edge of the sectionalized impact plate, so that any spent bullets which may accumulate thereon will not cause a false indication on the recorder, or interfere in any way with the reliable operation thereof. The cross member 55 may be secured to the vertical side members 31 so as to be readily removable, for example, by means of bolts and wing nuts 56.

Escape to the side or upwardly of any bullet which strikes the impact plate a glancing blow is prevented by the target framework members 31 and 34. Any bullet rebounding from the impact plate will be stopped by the aiming cover and then will drop into the scrap container.

Referring now to Fig. 10 there is shown another satisfactory method of switch operating means when the target is divided into a large number of sections which would not allow the impact plates to be placed in the same plane, and therefore, the figure shows the impact plates positioned in different planes so as to allow the edges of one plate to overlap those of adjacent plates. This arrangement allows more efficient operation of the target structure.

When it is desired to use a silhouette target at the target structure point, a like silhouette type, preferably of paper or the like, will be placed over the face of the hit indicator 50 and the shots on the target structure will be easily noted on the face of the hit indicator. When a bull's eye target is employed at the target structure, then a bull's eye type of paper or other translucent material can be placed over the front of the lamps in the hit indicator so that the person firing will be able to note the place where the hits are made on the target structure.

The disclosures herein provide an improved type of target structure at the target itself, and a full combination of all of the target operating mechanism that includes the target and the hit indicator or recorder which is usually mounted very close to the person firing so that the point of hitting the target will be transmitted quickly and will be retained on the indicator for a predetermined length of time, thus allowing the person firing to make record of his hit.

It will be particularly noted that the impact of the bullet in the target structure functions to operate a complete target indicating system which has many advantageous features. One of these features is safety wherein it is not necessary that a person be in the target pits to point out the place of actual hit. Another advantageous feature is that the person firing can note immediately the point of hit and can make such records as he may desire. Another feature is that a new or substitute face or cover may be presented over each of the target and indicator. Such a face or cover may have any particular design on it or have a design of any desired size so that the firings are representative of different distances (yardage). The placing of different covers or target distances in front of the target structure itself may be accomplished by having a different set of designs

which are mounted below the target structure itself and which can be raised at any time by remote control from the point of firing. Corresponding covers or facings are to be placed over the hit indicator.

It will be understood that various modifications and changes may be made in the preferred form of the invention herein, and such modifications and changes are to be understood as part of this invention, as outlined in the following claims.

I claim:

1. A target comprising, in combination, a sectionalized impact plate consisting of a plurality of interfitting flush segments of divers shapes which are separated from each other at their adjacent edges by distances substantially less than the diameter of the missiles to be fired against the target, three plungers secured to each said segment at spaced points on the segment and extending rearwardly thereof, a back plate substantially coextensive with the sectionalized impact plate, said back plate having a plurality of perforations through which the ends of the aforesaid plungers protrude, bearings for said plungers, said bearings being slightly larger than the plungers and secured to the back plate, means limiting the range of movement of the plungers in their bearings, resilient means pressing the segments away from the back plate in the direction toward the firing point, a T-shaped spider for each segment of the impact plate, the spiders being located to the rear of said back plate with the ends of the spider arms secured to the ends of the plungers protruding through the back plate, an electric switch mechanism for each spider, said switch mechanisms being secured on the back side of the back plate adjacent the spiders and means for actuating one of the switch mechanisms by its associated spider when any plunger connected to the spider is moved rearwardly a small distance, as by the impact of a missile against the face of the segment.

2. A target comprising, in combination, a sectionalized impact plate consisting of a plurality of interfitting segments of divers shapes which are separated from each other at their adjacent edges by distances substantially less than the diameter of the missiles to be fired against the target, plungers secured to each said segment at spaced points on the segment and extending rearwardly thereof, a back plate substantially coextensive with the sectionalized impact plate, said back plate having a plurality of perforations through which the ends of the aforesaid plungers protrude, bearings for said plungers, said bearings being slightly larger than the plungers and secured to the back plate and acting to limit the range of movement of the plungers in their bearings, resilient means pressing the segments forwardly away from the back plate, a connecting link for the plungers of each segment, the connecting links being located to the rear of said back plate with the ends of each link secured to the ends of the plungers protruding through the back plate, an electric switch mechanism for each link, said switch mechanisms being secured on the back side of the back plate adjacent the links, and means for actuating one of the switch mechanisms by its associated link when any plunger connected to the link is moved rearwardly a small distance, as by the impact of a missile against the face of the segment.

3. A target according to claim 2 including, in combination, a correspondingly sectionalized, diminutive target recorder located at the point of firing, electrically operated, visual indicating means for each segment of the sectionalized recorder, and electrical circuits interconnecting each switch of the target with the indicating means in the corresponding segment of the recorder, so that a hit on any segment of the target will automatically and temporarily operate the correspondingly positioned indicating means on the diminutive target recorder.

4. A target comprising, in combination, a sectionalized impact plate consisting of a plurality of flush, interfitting segments of divers shapes which are separated from each other at their adjacent edges by distances substantially less than the diameter of the missiles to be projected against the target, a back plate in the rear of said impact plate, a plurality of plungers secured to and projecting rearwardly from each segment of the impact plate, openings through the back plate through which the rear ends of the plungers extend, a bearing for each said plunger in which the plunger can slide, means securing the said plunger bearings to the back plate, each of

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said bearings extending most of the distance between an impact plate and said back plate and acting to limit the rearward movement of said impact plate, resilient means surrounding each of said bearings and pressing the said segments forwardly away from the back plate, an electric switch mechanism for each said segment, and means interconnecting all of the plungers of each segment with the switch mechanism therefor, so that movement of any plunger in its said bearing will actuate the switch means associated with that segment of the impact plate.

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