United States Patent

[11] 3,578,327

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[73] Assignee **Marksman Manufacturing Corporation**

[54] **TARGET PROVIDING AN INDICATING SIGNAL UPON IMPACT BY A PROJECTILE OF A PARTICULAR PORTION OF THE TARGET**
9 Claims, 13 Drawing Figs.

[52] **U.S. Cl.** **273/102.2**
[51] **Int. Cl.** **F41j 5/04**
[50] **Field of Search** ..... 273/102.2, 102.1, 102.1 (B), 102.1 (C), 102, 102 (AP), 105 (A), 105, 95 (4)

[56] **References Cited**

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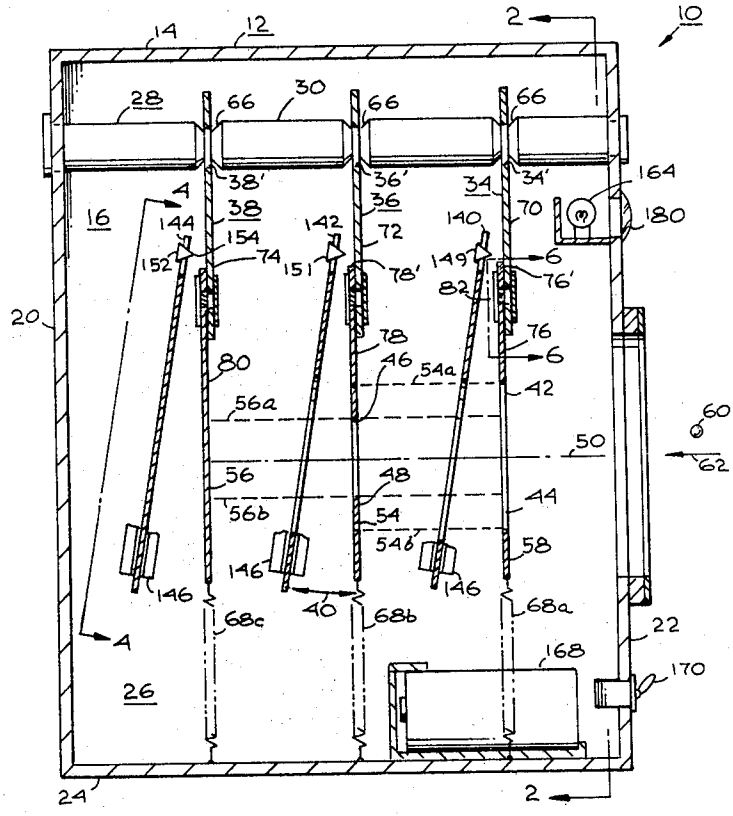
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ABSTRACT: There is disclosed herein an improved target arrangement for providing a preselected indicating signal upon impact of a projectile upon particular portions of the target. A plurality of target rings, each having a projective impingeable area, are pivotally mounted in a spaced apart relationship so that apertures in the first and all intermediate target rings provide a projectile passageway therethrough. A device to stop the target is provided behind each target ring to limit the pivotal angular movement of the target ring when that particular target ring is struck by a projectile. The pivotal motion of each of the target rings is highly damped, and when the target ring contacts the stop device there is generated an indicating signal unique to that particular target ring so that it may be easily determined which target ring was struck by the projectile.



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3 Sheets-Sheet 1

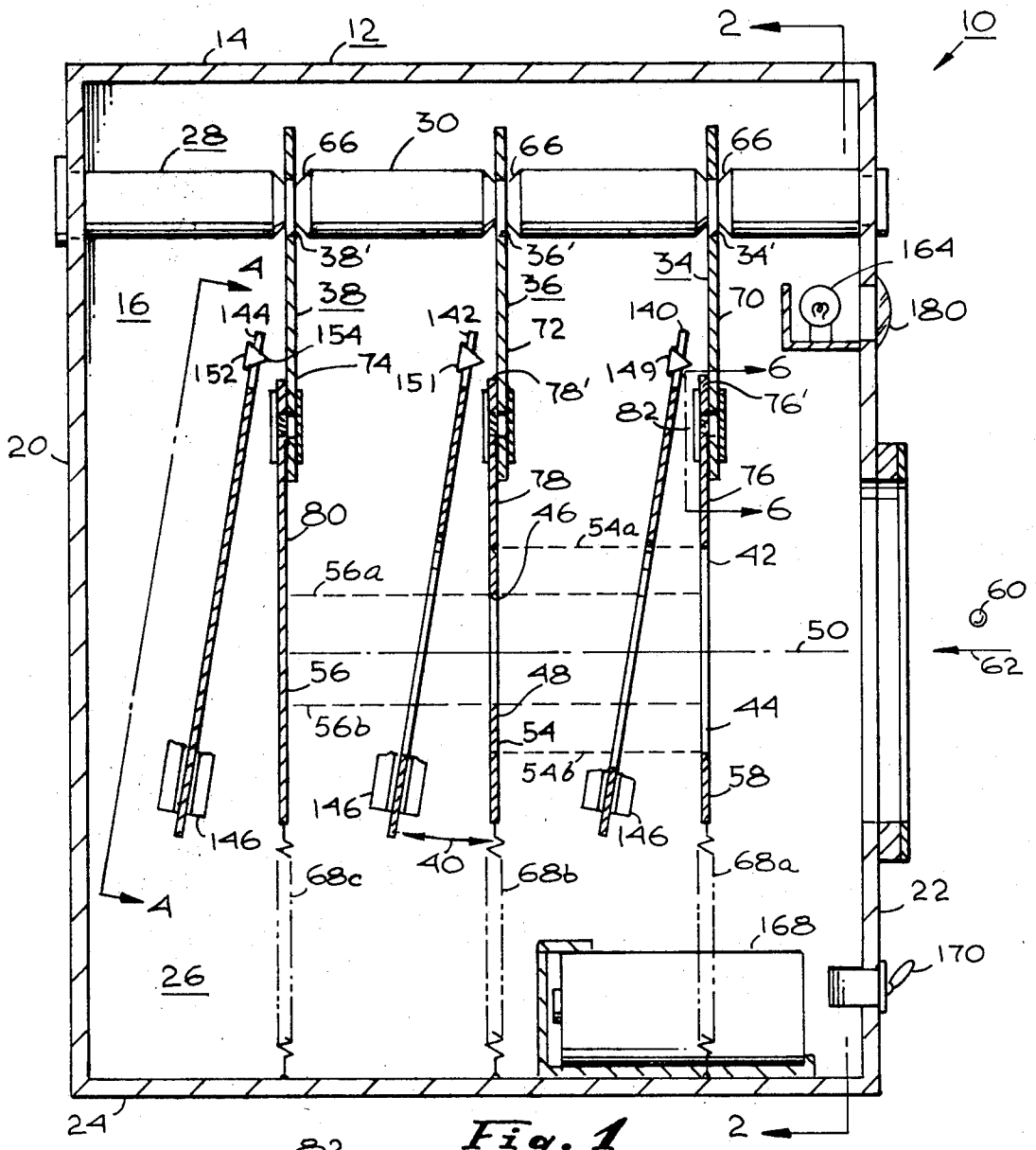


Fig. 1

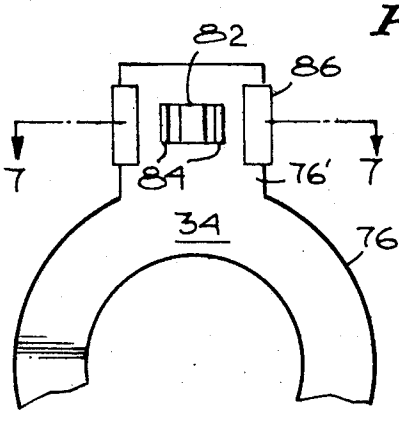


Fig. 6

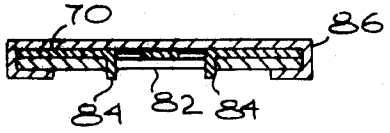


Fig. 7

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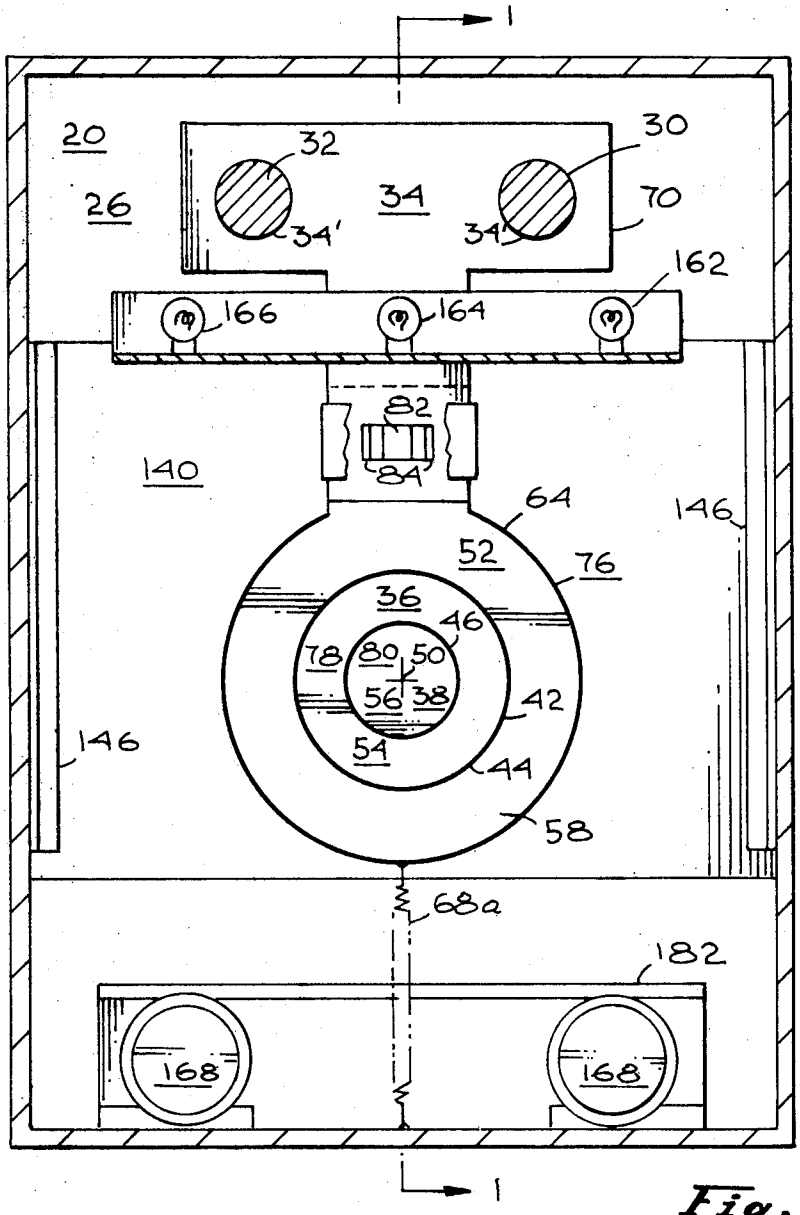


Fig. 2

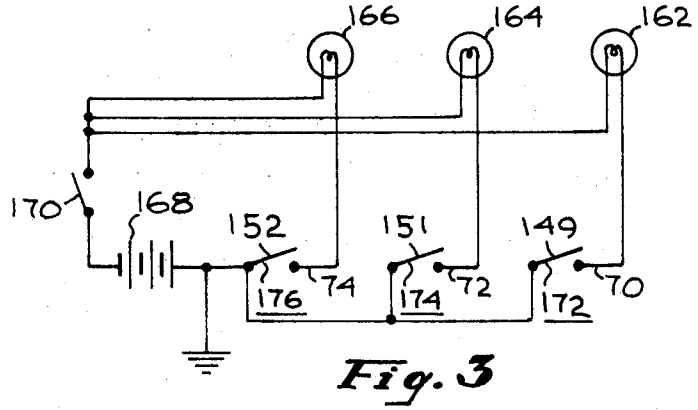


Fig. 3

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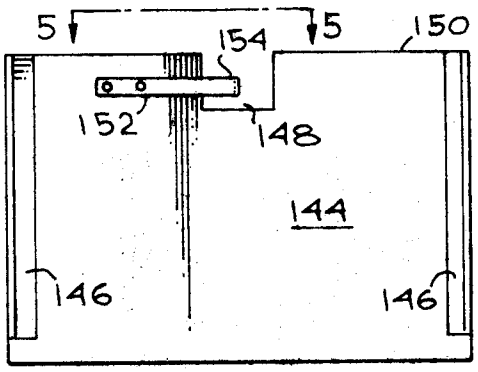


Fig. 4

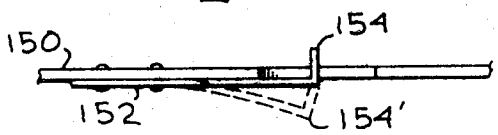


Fig. 5

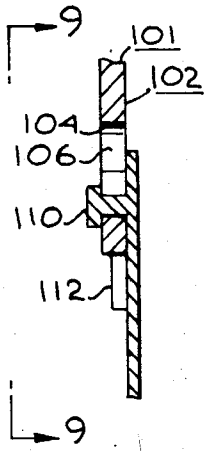


Fig. 8

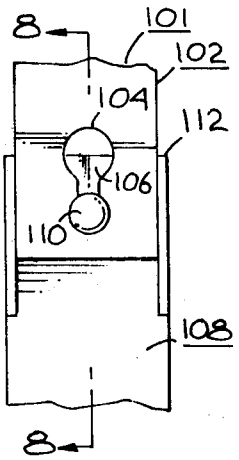


Fig. 9

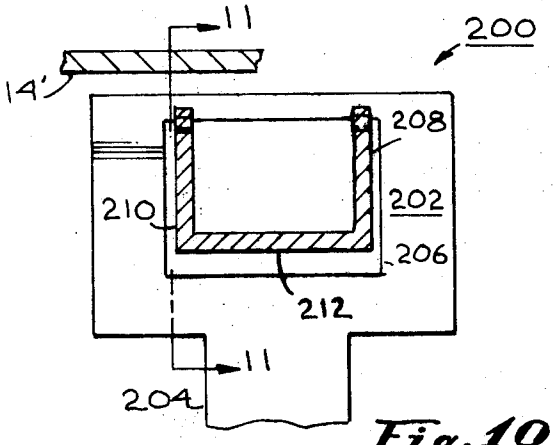


Fig. 10

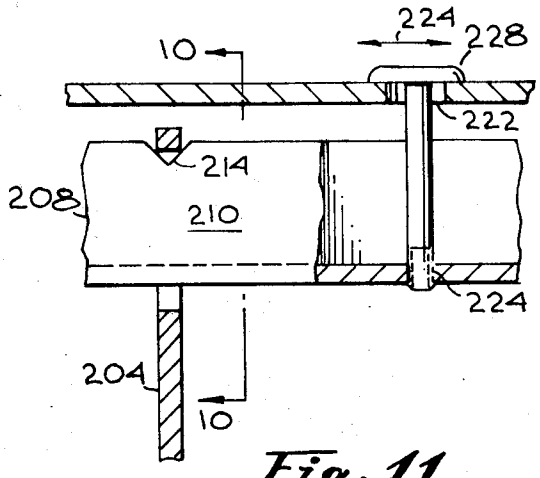


Fig. 11

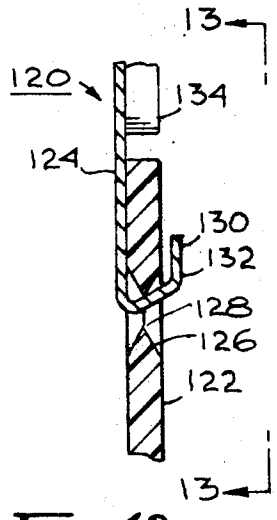


Fig. 12

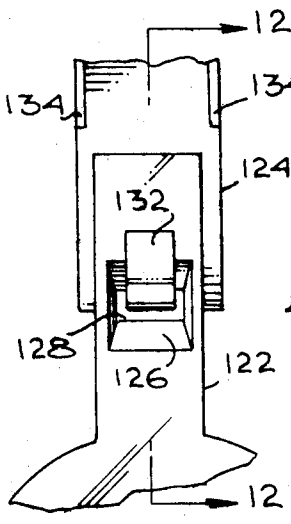


Fig. 13

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TARGET PROVIDING AN INDICATING SIGNAL UPON IMPACT BY A PROJECTILE OF A PARTICULAR PORTION OF THE TARGET

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the target art and, more particularly, to an improved indicating target for providing a preselected signal upon impingement thereof by a projectile.

2. Description of the Prior Art

In many applications involving the impact of comparatively low velocity projectiles upon a target, such as BB's, pellets, or the like, it is desirable to know the particular portion of the target that has been impacted by the projectile. For example, with such low velocity projectiles as the above-mentioned BB's, pellets, darts, or the like, visual tracking of the projectile to the target so that a visual observation of the particular portion of the target struck by the projectile may be ascertained is generally impossible. Further, for safety reasons, the person shooting the projectile was generally placed a sufficient distance from the target so that visual detection of the results of the impact, such as a colored mark on the target surface, indentations from the projectile, or the like, cannot be readily ascertained.

Therefore, there has long been a need for a target structure for such comparatively low velocity projectiles that provides a unique indication of the portion of the target that has been struck by the projectile. In the targets heretofore utilized, in general, there has often been provided a visual signal and/or an audible signal. However, in many instances the characteristics of the projectile were utilized as part of the circuitry, for example electrical circuitry, for providing an indication of the particular portion or segment of a target that was hit. That is, an electrically conductive projectile was necessary to complete an electrical circuit for discrete portions of the target to provide the unique indication of the target structure that had been impacted. For low velocity projectiles, such as the above-mentioned projectiles, penetration of target structure is generally not achieved and, therefore, utilization of electricity transmitting characteristics of the projectile are generally difficult to incorporate into a circuit.

In other prior art indicating targets, the impact of the projectile alone was sufficient to provide the particular signal, but, in most instances, where a visual signal was provided, there was a fairly complex electrical circuit required to first be illuminated upon impact by the projectile and then to be extinguished after a preselected time period. Further, such targets were often comparatively costly to manufacture.

SUMMARY OF THE INVENTION

Accordingly, it is an object of applicant's invention herein to provide an improved target structure.

It is another object of applicant's invention herein to provide an improved target structure in which a preselected signal is provided upon impact by a projectile of a particular portion of the target structure.

It is yet another object of applicant's invention herein to provide an improved target structure for providing a preselected signal when the target is struck by comparatively low velocity projectiles.

The above and other objects of applicant's invention are achieved, in a preferred embodiment thereof, by providing a plurality of target rings in a preselected spaced array extending from the front of the target to the rear of the target. Projectiles are fired at the target from the front and travel toward the rear of the target. Each of the plurality of target rings, except the last target ring, has an aperture to allow transmission of the projectile therethrough, and the size of the apertures in the target rings decrease from the first target ring in the forward portion of the target towards the last target ring. Thus, when viewed from the front, each target ring, even though spaced apart from the preceding target ring, has a projected area in the plane of the aperture in the first target ring. This projected area is a projectile impingeable portion of that particular target ring, and with the decreasing size of the apertures, it can be seen that the very last target ring, as well as all intermediate and first target ring of the plurality of target rings have particular portions that may be struck by the projectile depending upon the trajectory of the projectile.

The target rings are mounted for damped pivotal motion so that they may swing from the front towards the rear upon impact by a projectile.

Stop means are provided to the rear of each of the target rings to limit the angular excursion of each of the target rings when impacted by a projectile. That is, when a projectile strikes one of the target rings, that target ring tends to swing rearwardly towards the stop means immediately behind it. When the target ring has swung a preselected number of degrees, it encounters the stop means and the stop means prevents further pivotal motion of the target ring. The target ring may rebound from the stop means and actually swing back and forth a few times making contact with the stop means during each rearward portion of the swing, depending upon the energy imparted to the target ring by the projectile. The dampened pivotal motion, however, rapidly damps out such swinging and the target ring returns to its stable steady state condition.

An indicating means is provided so that when the target ring has swung the preselected number of degrees and encounters the stop means, an electrical circuit is completed and a visual signal is generated. When the target ring swings forwardly away from the stop means, the electrical circuit is interrupted and the visual signal terminated. Thus, depending upon the number of swings that the target ring makes after being struck by the projectile, a flashing visual signal is presented.

Since each of the target rings, in this embodiment of applicant's invention, is connected to a separate visual signal generating means, a different visual signal is provided depending upon the particular projectile impingeable portion of the plurality of target rings that is struck by the projectile.

BRIEF DESCRIPTION OF THE DRAWING

The above and other embodiments of applicants' invention may be more fully understood from the following detailed description, taken together with the accompanying drawing wherein similar reference characters refer to similar elements throughout and in which:

FIGS. **1** and **2** illustrate one embodiment of applicants' invention;

FIG. **3** is an electric schematic diagram of an indicating system useful in the practice of applicants' invention;

FIGS. **4**, **5**, **6** and **7** illustrate structural elements of the embodiment of applicants' invention shown in FIGS. **1** and **2**;

FIGS. **8** and **9** illustrate another embodiment of applicants' invention;

FIGS. **10** and **11** illustrate another embodiment of applicants' invention; and

FIGS. **12** and **13** illustrate another embodiment of applicants' invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. **1** and **2**, there is shown the structure defining one embodiment of applicants' improved indicating target arrangement generally designated **10**. As shown, there is provided a case means **12** having a top wall **14**, sidewalls **16** and **18**, back wall **20**, front wall **22**, and base **24**, defining a cavity **26**. Supporting means **28**, such as the pair of rodlike supporting means **30** and **32**, extend through the cavity **26** and are supported in the front wall **22** and rear wall **20** of the case means **12**. A plurality of target rings **34**, **36** and **38** are mounted on the support means **30** and **32** for damped pivotal motion thereon in the directions indicated by the arrow **40**. The plurality of target rings are in a preselected spaced array from the first target ring **34** to the last target ring **38**, and there is provided at least the one intermediate target ring **38**.

Each of the target rings 34 and 36 have walls defining an aperture therethrough. Thus, first target ring 34 has walls 42 defining an aperture 44 therethrough, and intermediate target ring 36 has walls 46 defining an aperture 48 therethrough. Last target ring 38 does not have an aperture therethrough, but, as shown on FIGS. 1 and 2, may be solid. In the embodiment of applicants' invention 10 shown on FIGS. 1 and 2, the apertures 44 and 48 are circular. The aperture 44 in the first target ring 34 has a first size, and the aperture 48 in the intermediate target ring 36 has a second size smaller than the first size, and, if additional intermediate target rings were provided between intermediate target ring 36 and the last target ring 38, each of the other such target rings would have a sequentially decreasing aperture size, so that the aperture in each one would be smaller than the aperture in the immediately preceding target ring.

As shown more clearly in FIG. 2, the aperture 44 and 46 are circular and are coaxially aligned about the axis 50. Thus, since the aperture size constantly decreases in progressing from the first target ring 34 to the intermediate target ring 36, each of the plurality of target rings have a projectile impingeable portion such as the projectile impingeable portion 52 of the first target ring 34, the projectile impingeable portion 54 of the intermediate target ring 36 and the projectile impingeable portion 56 of the last target ring 38. Each of the projectile impingeable portions 52, 54 and 56 have a projected area in the plane of the forward face 58 of the first target ring 34 so that a low velocity projectile, for example a BB 60 moving in the direction indicated by the arrow 62, may hit either the area 52 on the first target ring 34, the area 54 on the intermediate target ring 36 or the area 56 on the last target ring 38. Thus, there is provided a projectile passageway from the forward face 58 of the first target ring 34 to the last target ring 38, as indicated by the dotted lines 54*a* and 54*b*. It will be appreciated that the lines 56*a* and 56*b* and 54*a* and 54*b* indicate the projectile impingement portion 54 and 56 of the intermediate target ring 36 and the last target ring 38.

It will be appreciated that the outer peripheral edge 64 of the first target ring 34, together with the wall 42 defines the projectile impingement portion 52 of the first target ring 34. Similarly, the wall 42 and the wall 46 define the projectile impingement area 54 of the intermediate target ring 36, and the wall 46 defines the circular projectile impingement portion 56 of the last target ring 38. While the impingement portion 52 of the first target ring 34 is shown as an annular structure, and the impingement portion 54 of the intermediate target ring 36 is shown as an annular structure, and the impingement portion 56 of the last target ring 38 is shown as a circular structure, it will be appreciated that any variation in the exact geometric shape may be provided so long as there is at least one impingement portion of each target that has a projected area at the forward face 58 of the first target ring 34.

As noted above, the plurality of target rings 34, 36 and 38 are mounted for damped pivotal motion on the support means 30 and 32. In this embodiment of applicants' invention, the support means 30 and 32 take the form of rodlike members extending between the front wall 22 and rear wall 20 of the case means 12 wherein they are supported. Each of the rod means 30 and 32 have a plurality of V-shaped grooves 66 therein in spaced apart relationship. Each of the target rings 34, 36 and 38 are mounted in a pair of the V-shaped grooves 66 of the respective rod means 30 and 32 for the above-mentioned damped pivotal motion. The plurality of target rings 34, 36 and 38 are each provided with walls 34', 36' and 38', respectively, defining flat sided edge sections that are mounted in the V-shaped grooves. Applicants have found that these flat sided edge sections positioned in the V-shaped grooves 66 provides a highly damped pivotal motion when the target rings 34, 36 or 38 are struck by the projectile 60.

Applicants have also found that a resilient means such as a spring means 68*a*, 68*b* and 68*c* may be coupled to the base 24 of the case means 12 and to the bottom portions of the plurality of target rings 34, 36 and 38, respectively. The resilient spring means 68*a*, 68*b* and 68*c* aid in providing the damped pivotal motion to resist such pivotal motion of the target rings and also tend to maintain the proper parallel alignment of the plurality of target rings 34, 36 and 38 with, for example, the rear wall 20 of the case means 12 when the target arrangement 10 may be placed upon a nonlevel surface. That is, it will be appreciated that since the target rings 34, 36 and 38 are free to swing or pivot in the directions indicated by the arrow 40, if the target arrangement 10 may be set upon the nonlevel surface, gravity forces acting on the target rings 34, 36 and 38 will cause them to assume a position out of the preferred alignment as shown on FIG. 1.

As shown more clearly on FIG. 2, each of the target rings 34, 36 and 38 are comprised of holder members 70, 72 and 74, respectively, and target discs 76, 78 and 80, respectively. The holders 70, 72 and 74 have the walls 34', 36' and 38', respectively, defining the flat sided edge section, and the target discs 76, 78 and 80 have the projectile impingement portions 52, 54 and 56, respectively. The target discs 76, 78 and 80 also have walls defining a retention portion 76', 78' and 80' respectively, for detachable coupling to the holder members 70, 72 and 74, respectively. In the embodiment of applicants' invention 10 shown on FIGS. 1 and 2, the detachable coupling is achieved by providing for example in the target ring 34, walls 82 defining an aperture through the retention portion 76' of the target disc 76 through which ears 84 of the holder member 70 project, and a retainer means 86 slidingly mounted on the holder member 70 that engages the holder member 70 and the retention portion 76' of the target disc 76 for retaining the target disc in the detachable coupling on the holder member 70. The target disc 78 is similarly mounted on the holder member 72, and a target disc 80 is similarly mounted on the holder member 74.

FIGS. 8 and 9 illustrate another arrangement according to applicants' invention for retaining target discs on the holder. As shown in FIGS. 8 and 9, there is an embodiment of applicants' invention generally designated 100 in which a holder member 102 has walls 104 defining a keyhole shaped slot 106 therein. A target disc 108 is provided with a projection 110 thereon that fits through the keyhole slot 106 in conventional fashion for retention thereon. There is also provided, according to applicants' invention in the embodiment shown in FIG. 9, a pair of side tabs 112 that engage the sides of the holder member 102 to prevent lateral swinging motion of the target disc 108 in the target ring 101 about the projection 110.

FIGS. 12 and 13 illustrate still another embodiment of applicants' invention to illustrate another target ring, generally designated 120, and the method of supporting a target disc 122 on a holder member 124. As shown on FIGS. 12 and 13, the target disc 122 may be fabricated of a hard rubber, rather than of metal, according to the principles of applicants' invention herein, and be provided with chamfered walls 126 defining a substantially square edged aperture 128 therethrough and, as shown on FIGS. 12 and 13, the aperture 128 has a substantially knife edge.

The holder member 124 has walls 130 defining a hook portion 132, and the target disc 122 fits on the hook portion 132 for retention thereon.

In this embodiment of applicants' invention, the holder member 124 is provided with flanges 134 along the sides thereof to aid in the rigidity thereof.

Referring back now to FIGS. 1 and 2 and FIGS. 4 and 5, applicants provide, in this embodiment of applicants' invention, a plurality of stop means 140, 142 and 144. The stop means 140 is intermediate the target rings 34 and target ring 36 and is positioned with respect to the target rings 34 for limiting the angular excursion of the target ring 34 as it moved in a damped pivotal motion, as indicated by the arrow 40. Similarly, the target ring 36 has its angular excursion in the directions indicated by the arrow 40 limited by the stop means 142, and the target ring 38 has its angular excursion limited by the stop means 144. It will be appreciated that since the direction of the velocity 62 of the projectile 60 would move the target rings toward their immediately following stop

means, the stop means provide a means for limiting the angular excursion of the target rings after impingement by the projectile **60**.

Each of the stop means **140**, **142** and **144** are at a preselected angle with respect to the target rings **34**, **36** and **38** and are retained on the case means **12** by clips **146**. It will be appreciated that in the preferred embodiment of applicants' invention, the forward faces of each of the stop means **140**, **142** and **144** and the rear faces of each of the target discs **76**, **78** and **80** are planar so that there is substantially flat contact between the rear face of the target discs and the forward face of the stop means.

As shown more clearly in FIGS. **4** and **5**, each of the stop means **140**, **142** and **144** may be constructed similarly and are provided with walls **148** defining an aperture adjacent the top portion **150** thereof. A spring contact means **152** is coupled to the stop means **144** and has a portion **154** projecting through the aperture defined by the walls **148**.

It will be appreciated that the stop means **140** and **142** are similarly constructed.

When the target disc **80** is struck by the projectile **60** and swing rearwardly due to the momentum exchange therebetween, the holder member **74** hits the portion **154** of the spring contact **152** and bends it resiliently backwardly, as indicated by the dotted lines **154'** in FIG. **5**. When the target disc **80** swings forwardly, the spring contact **152** resiliently returns to its original position as shown by the solid lines.

Applicants provide an indicating means **160** operatively connected to the plurality of target rings for selectively indicating a projectile impingement on each of the projectile impingement portions of the target rings **34**, **36** and **38**. In this embodiment of applicants' invention, the indicating means comprises means for generating a visual signal that is unique to each of the target rings. To achieve this, applicants provide an electrical circuit generally indicated by the schematic diagram in FIG. **3**. As shown on FIG. **3**, there is provided three visual signal generating means such as lamp bulbs **162**, **164** and **166**. A source of electrical energy such as a battery **168** is provided to energize the visual signal generating means **162**, **164** and **166**, and a simple on/off switch **170** is provided to minimize current drain.

A plurality of momentary contact normally open switch means **172**, **174** and **176** are provided to close the circuit to the visual signal generating means **162**, **164** and **166**, respectively. The momentary contact switch means may comprise the holder members **70**, **72** and **74**, respectively, as one terminal thereof and the spring clip means **149** of the stop means **140**, spring contact means **151** of the stop means **142** and spring contact means **152** of the stop means **144**. The rearward movement in a pivotal damped motion by each of the target rings **34**, **36** and **38** until the holder members **70**, **72** and **74**, respectively, contact the spring contact members **149**, **151** and **152**, respectively, indicates a closing of the momentary contact switches **172**, **174** or **176** and thereby selectively energizes the visual signal generating means **162**, **164** and **166**. As shown on FIG. **2**, the position of the visual signal generating means **162**, **164** and **166** on the case means **12** can provide a unique indication of the particular target ring that has been impinged by the projectile **60**. However, in the preferred embodiment of applicants' invention herein, applicants prefer to utilize different colored lenses such as lens **180** shown in FIG. **1** in front of each of the visual signal generating means **162**, **164** and **166**, so that a different colored light would appear when each of the target rings **34**, **36** and **38** are struck by the projectile **60**. The batteries **168** may be suitable mounted in any desired form of structure **182** that may be desired.

It will be appreciated that instead of a visual signal generating means, a suitable bell or other audio signal generating means could be coupled to each of the stop means to provide an audible signal upon impact of each of the target rings by the projectile.

For the embodiment shown in FIG. **3**, however, each of the visual signal generating means has a first contact terminal connected through the switch **70** to one side of the battery **168** and a second terminal connected, respectively, to the holder member **70**, holder member **72** and holder member **74**. The other terminal of the momentary contact switches **172**, **174** and **176** comprising the spring contact means **149**, **151** and **152** are connected to the opposite terminal of the battery **168**.

FIGS. **10** and **11** illustrate another form of supporting a target ring according to the principles of applicants' invention herein. As shown on FIGS. **10** and **11**, there is an embodiment generally designated **200** in which there is provided a holder member **202** of a target ring **204**. In this embodiment of applicants' invention, the holder member **202** has walls **206** defining a substantially flat sided edge section. However, in this embodiment of applicants' invention, the support means **208** is comprised of a U channel having a pair of spaced-apart legs **210** and a base **212**. A V-shaped notch **214** is cut into the tops of the legs **210** in an aligned relationship, and the flat sided edge section **206** is supported therein for the damped pivotal motion desired by applicants for the preferred embodiments of their invention herein.

If desired the sensitivity of applicants target may be varied. For example, the target rings may be moved closer to or further from the stop means to decrease or increase the angular swing allowed. As shown in FIG. **11**, a screw means **220** may threadingly engage the base **212** at channel **210** and hit into slotted aperture **222** in top **14'**. By loosening screw **220** and and moving screw **220** in slot **222** in the direction indicated by arrow **224**, the separation between each target ring **204** and its associated stop means (not shown in FIGS. **10** or **11**) may be varied. Tightening screw **220** clamps channel **210** in place. A similar sensitivity adjustment may be provided in the other embodiments of applicants' invention described herein.

This concludes the description of applicants' invention of an improved target arrangement. From the above, it can be seen that there has been described a target arrangement in which a unique signal is provided, depending upon which portion of the target is struck by a projectile.

We claim:

1. An improved target arrangement of the type adapted to emit a signal upon impingement by a preselected projectile comprising, in combination:

a plurality of target rings in a preselected spaced array, and said plurality of target rings having a first target ring, a last target ring and at least one intermediate target ring between said first and said last target ring, and each of said first and intermediate target rings having an aperture therethrough, and said aperture in said first target ring having a first size, and each other aperture in said intermediate rings having a size sequentially smaller than said first size and sequentially smaller than the immediately preceding aperture, and each of said plurality of target rings having a projectile impinge portion having a projected area in the plane of a forward face in said first target ring, and said apertures in said plurality of target rings defining a projectile passageway free of obstructions from said aperture in said first target ring to said projectile impingement portion of said last target ring, and each of said plurality of target rings comprises:

a holder member having first walls defining a support means engaging portion and second walls defining a stem portion, and said support means engaging portion of said holder member define a substantially flat sided edge section;

a target disc member having first walls defining a retention portion and second walls defining said projectile impingeable position thereof, and said retention portion detachable coupled to said stem portion of said holder member; and

retainer means engaging said holder member and said target disc for retaining said target disc in said detachable coupled relationship to said holder member;

support means for supporting said plurality of target rings in said spaced array, and said support means having a plurality of V-shaped grooves therein, and each of said plurality of said target rings mounted for individual damped pivotal motion on said support means in at least one of said V-shaped grooves for the condition of each of said target rings impinged by a projectile, and each of said flat sided edge sections of said first walls of said holder member engaging at least one of said V-shaped grooves for providing said damped pivotal motion;

a plurality of stop means and one of said plurality of stop means intermediate each pair of adjacent target rings of said plurality of target rings and spaced apart in target engaging relationship to the immediately preceding target ring for limiting the angular excursion of said immediately preceding target ring for the condition of said damped pivotal motion of said immediately preceding target ring;

and indicating means operatively connected to said plurality of target rings for selectively indicating a projectile impingement on each of said projectile impingement portions of said plurality of target rings.

2. The arrangement defined in claim 1 and further comprising:

a case means having walls defining a cavity;

said support means coupled to first portions of said walls of said case means for supporting said target rings in said cavity;

and resilient means coupled to said case means and to each of said plurality of target rings for yieldingly resisting pivotal motion thereof.

3. The arrangement defined in claim 2 wherein:

said indicating means comprises a plurality of selectively actuated, electrically energized visual signal generating means, and each of said visual signal generating means having a first contact and a second contact;

a source of electrical energy for supplying electrical energy to said visual signal generating means, and said source of electrical energy having a first terminal connected to said first contact on each of said visual signal generating means, and a second terminal;

a plurality of electrically conductive spring contact means, one of said spring contact means mounted on each of said plurality of stop means, and each of said electrically conductive spring contact means connected to one of said second contacts on one of said plurality of visual signal generating means, and each of said electrically conductive spring contact means in holder member engaging relationship to said immediately preceding target ring;

said holder members comprise electrically conductive holder members, and each of said holder members electrically connected to said second terminal of said source of electrical energy, whereby one of said visual signal generating means is selectively energized to emit electromagnetic radiation in the visual portion of the electromagnetic spectrum for the condition of each one of said projectile impingeable portions of said plurality of target rings impinged by a projectile.

4. The arrangement defined in claim 2 wherein:

said plurality of target rings are substantially parallel to each other for the condition of absence of pivotal motion, and each of said target rings has substantially planar external walls;

each of said stop means has planar external walls, and each of said plurality of stop means coupled to said case means at a preselected mounting angle, and each one of said plurality of stop means immediately following said first target ring and said intermediate target ring having a projectile transmitting orifice therethrough, and each of said projectile transmitting orifices of said stop means having a size larger than the immediately preceding and immediately following apertures in said target rings;

and said planar external walls of each of said target rings selectively engaging said planar external walls of one of said plurality of stop means for the condition of said target ring pivotally moving in a preselected direction toward said immediately following stop means at said preselected angular excursion thereof.

5. The arrangement defined in claim 1 and further comprising:

said indicating means comprising a plurality of selectively actuated, electrically energized visual signal generating means, and each having a first contact and a second contact:

a source of electrical energy for supplying electrical energy to energize each of said visual signal generating means, and said source of electrical energy having a first terminal connected to said first contact on each of said visual signal generating means, and a second terminal;

a plurality of normally open, momentary contact switch means, each having a first terminal connected to said second contact on one of said plurality of visual signal generating means, and each of said plurality of normally open switch means having a second terminal connected to said second terminal of said source of electrical energy;

and said normally open switch means closed for the condition of said target rings pivotally moving approximately said preselected angular excursion.

6. The arrangement defined in claim 5 wherein:

each of said first terminals of said plurality of normally open switch means comprises a spring contact means mounted on each of said stop means in target ring engaging relationship to said immediately preceding target ring, said second terminal of said normally open switch means comprises said target ring, whereby one of said visual signal generating means is selectively energized to emit electromagnetic radiation in the visual portion of the electromagnetic radiation spectrum for the condition of each of said projectile impingement portions of said plurality of target means impinged by a projectile.

7. The arrangement defined in claim 1 wherein:

said support means comprises a pair of spaced-apart supporting members, each of said supporting members, each of said supporting members having said plurality of V-shaped grooves therein and said V-shaped grooves in the first of said pair of spaced-apart supporting members align with said V-shaped grooves in the second of said pair of spaced-apart supporting members, so that said flat sided sections of said first walls of each of said holder members can engage and align pair of said V-shaped grooves.

8. The arrangement defined in claim 1 wherein:

said indicating means comprises a visual signal generating means.

9. The arrangement defined in claim 1 wherein:

said indicating means comprises an audible signal generating means.