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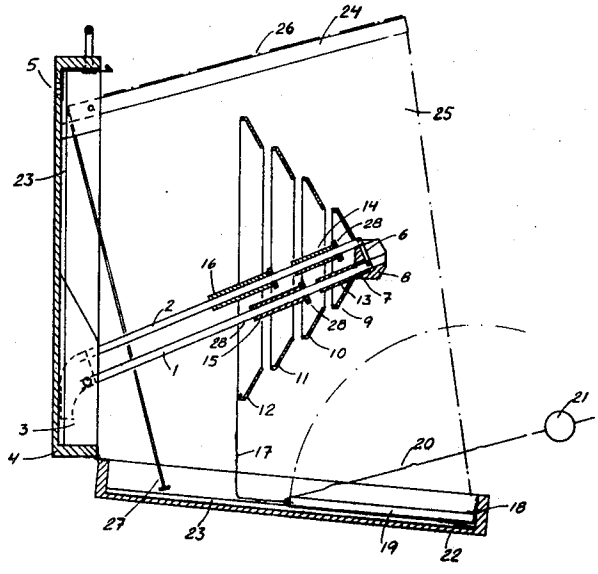
[54] **SELF-INDICATING TARGET WITH SLIDABLE TARGET SECTIONS**
5 Claims, 4 Drawing Figs.

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[51] **Int. Cl.** **F41j 7/00**
[50] **Field of Search** ..... 273/102 R, 102.1 R, 102.1 C, 102.1 D, 102.1 F

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ABSTRACT: A self-indicating target comprises several slidably displaceable target sections each mounted on guiding tubes which are in turn mounted on guiding elements. The target sections are placed behind one another to enable the user to see their movement as one or more sections are displaced, and the guiding tubes are slanted at an angle exceeding the friction angle for the sliding surfaces of the target sections and guiding tubes.



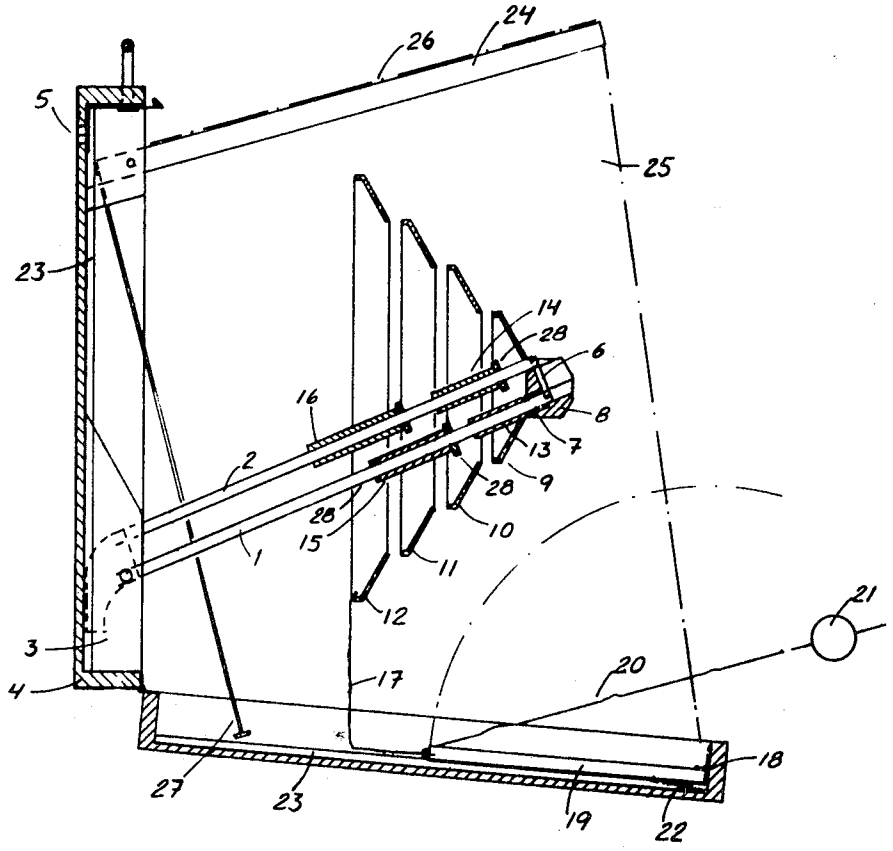


Fig. 1

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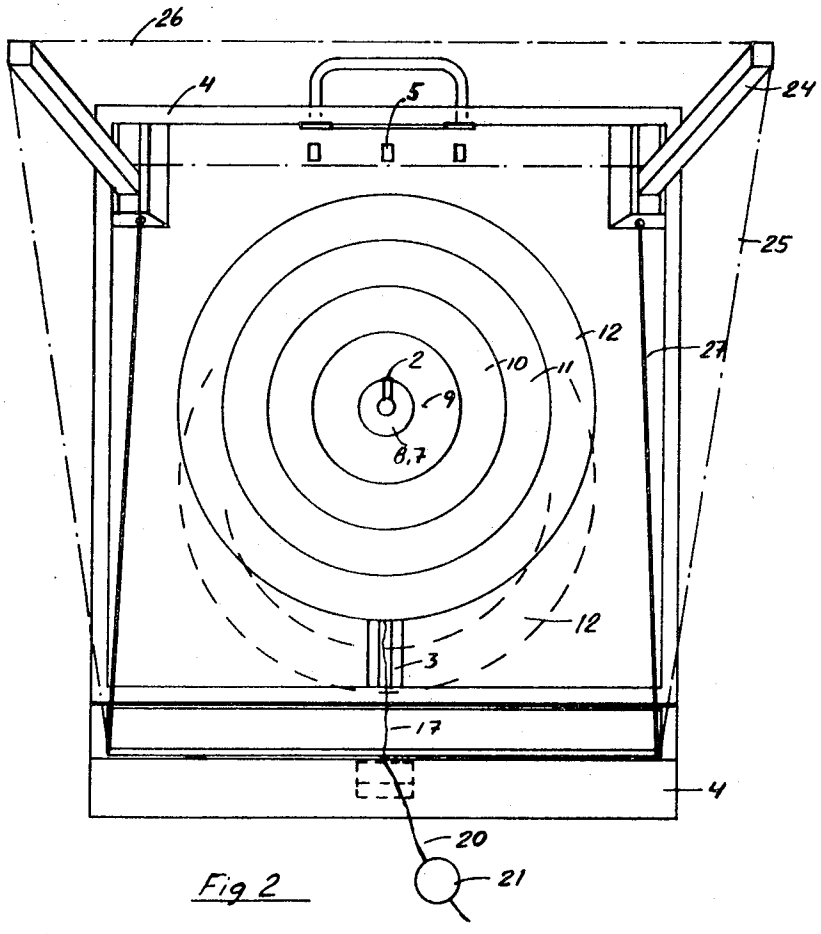


Fig 2

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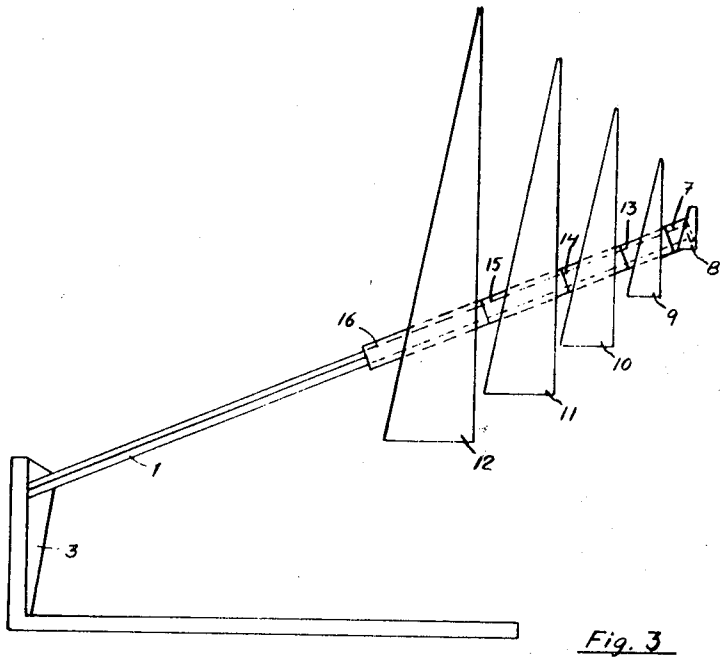


Fig. 3

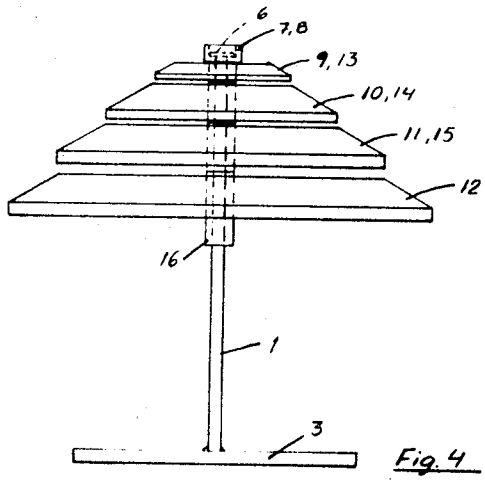


Fig. 4

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SELF-INDICATING TARGET WITH SLIDABLE TARGET SECTIONS

This invention refers to devices for marking or reporting the point of impact in games where balls, skittles or projectiles are thrown or shot against a target having several sections giving different points according to the distance from the bull's-eye. Such games or sports are for example shooting, bowling, darts, archery, golf and baseball. Some of these activities, e.g., darts, and archery involve some danger as the projectiles are provided with very sharp points. There are sometimes disputes about the judgement concerning a throw or a shot owing to the fact that the indication is not satisfactory. There is consequently a pronounced demand for a precision-made, amusing and harmless self-marking game with a target, suited for everyone and applicable for use indoors as well as outdoors. It is essential that the marking is reliable. Some kind of catching case for the projectiles should also be arranged preferably in games for use indoors.

In addition to arrows or darts having a sharp point in combination with a target made from paper, sponge rubber and the like, there are in the market several games using darts with suction cups which are intended to get stuck to an even target with annular marking fields; darts with small barbs which are intended to be thrown towards a target made from sponge rubber, flannel or the like and darts having permanent magnets as points and which are to be thrown towards a target made from sheet iron. There also exists several optical, electrical and mechanical devices for self-marking primarily for shooting.

This invention refers to a completely new construction in which all requirements for a proper marking and harmless competition tool for throwing and shooting have been fulfilled and every risk moment has been avoided. The invention thus offers the possibility of arranging serious and interesting competitions and sport activities where the immediate and well-visible indication makes the activity fair and amusing. Owing to the fact that balls or soft skittles may be used, the accident risks are eliminated. Further, the simple method for bringing back the targets into their initial positions even by considerable distances between the target and the game player contributes to make the games very attractive. The self-indicating target according to the invention consists of a plurality of target sections, which are each provided with guidings or bearings for cooperation with guiding elements and which are slidably arranged behind each other and that mechanical, electrical, magnetical or optical means are provided for indicating the displacement of one or more of the target sections.

The target may comprise several target sections which are each adapted to act upon the target section lying behind the same such that an impact upon said first target section will move all of the second targets. For indicating the displacement of one or more of the target sections mechanical, electrical, magnetical, optical or visually comparing elements may be used.

In order to facilitate the rearwards movements of the target sections towards an end stop or abutment along a guide rod system, the guide or the guides may have an inclination relative to the horizontal plane which exceeds the static friction angle between the sliding surfaces of the target sections and their guides.

The end stop or abutment may at the same time constitute a securing means for the guide or the guides. Depending upon the inclination of the guide elements the corresponding surfaces of the target sections should be arranged with a corresponding inclination in relation to the horizontal plane and they should also be arranged at such a distance from the geometrical center of the target that the target sections when brought together behind each other and when seen in a direction which is perpendicular to their plane, seem to be concentrically arranged in spite of the differing distance between the target sections in axial direction. As most of the target sections are guided below the center of gravity a separate guiding means must be provided for the orientation of the target sections or the points of balance of the target sections have to be displaced below their guide means by applying compensating counterweights.

For a constant and secure holding of the target sections in their front positions in spite of the action of the gravity component, several target sections are provided with permanent magnets, which may be tubular such that they at the same time constitute guiding and supporting means for the target section in question. The foremost target section, the so called bull's-eye, is at least in part permanently magnetic such that it may be held by an abutment made from iron and arranged in the front end of the guide means, which preferably is made from a nonmagnetic material such as brass, aluminum, plastic or a nonmagnetic stainless steel.

In order to achieve the best mode of function these guiding tubes or tube magnets, which constitute the guide means of the target sections are adapted to fit snugly on the guide or guides and their magnetic force is such that the foremost coupling with the abutment is strongest and the rearmost coupling is weakest, which means that the coupling force between the rearmost target section and the target section in front of the same is the weakest in the system and therefore is most easy to overcome when a force acts upon all of the target sections. A gradation of the coupling forces between the different target sections may be obtained by variation of the section areas of the magnets by means of a matched magnet induction, by means of a different surface finish or contact surface at the different coupling surfaces or by means of isolation spacers upon the same. The mass inertia is of great importance for a good function, which mean that the target sections, which are not influenced by any impact will remain in their initial positions owing to their inertia and in spite of the force which is transmitted by a ceasing coupling force.

In order to avoid that an impact from a projectile, which hits the outer portion of a target section is taken up by the friction between the guide and the guide tube, the latter must have a length, which is dimensioned for the maximum moment for the target section in question. The friction between the guide tube and the guide must thus be low which can be obtained by using well-rounded edges in the guide tube with even and smooth gliding surfaces, a smooth nickel or chromium plated guide and a proper choice of material for the friction surfaces.

The target sections may be returned to their initial position independent by the distance between the target and the game player. For this purpose it is possible to use a cord or wire for operating a lever arm against the action of a spring or a counterweight and which is provided with a flexible cord or wire the opposite end of which is secured to the lower portion of the rearmost, largest target section.

The invention will be described in detail with reference to the accompanying drawings, in which:

FIG. 1 illustrates a device according to the invention in a side elevation, and

FIG. 2 illustrates the same embodiment in a front view,

FIG. 3 shows a second embodiment of the invention, and

FIG. 4 is a modification where the planes of the target sections are horizontally arranged and where the target sections are slidable mainly vertically relative to the guide device.

In the embodiments illustrated in the drawings the numeral 1 designates a guiding element made from a nonmagnetic material, which together with another guide element 2 is preferably detachably adapted in a holder 3. The holder 3 may be secured to a box 4, which is provided with an eyelet for hanging the box upon a wall, a standard or the like. The guide elements 1 and 2 are provided with an iron abutment 6 which is intended to serve as an end stop and securing means primarily for a magnet 7, which together with a target section 8 is slidable along the guiding element 1 and which constitutes the bull's-eye. The abutment 6 may also be so designed that it serves as a spacer and a reinforcement between the guide elements 1 and 2.

A plurality of target sections **9, 10, 11** and **12**, each secured to a guidings **13, 14, 15** and **16**, are displaceably arranged one behind the other upon the guides **1** and **2** with the target sections so arranged that the target section **12** having the largest area is situated adjacent the holder **3**, i.e., in the farthest back of the guide elements. Secured to this target **16, 12** and to its lower and rear portion is a thin and flexible cord **17**, which has a predetermined length and which with its other end is secured to a lever arm **19**, which is pivoted at **18** and which may be pivoted upwardly by means of another cord **20**, which preferably is provided with a grip element **21** or another indication, situated on a suitable distance from the target sections **8–12**. A coil spring **22** serves to return the lever arm **19** to its inoperative position. The box **4**, which is provided with a cover, is for its use indoors provided with a bump-preventing covering **23** at its inner side. Pivoted to the box **4** are further foldable levers **24** which serve as dispensing means for protection nets **25**, made from plastic, textile fibers, metal or the like. To close the box upwards another protection net **26** is secured to the lever **24**.

The foldable case **4** is as mentioned above intended to be disposed upon a hook in a wall or the like. The guide element **1** and the guide element **2** shall have approximately the same inclination angle relative to the horizontal plane when the target is used. The portion of the box **4** in which the holes **5** are provided ought to hang vertically with its base plane vertical while the other portion of the box **4**, the cover, should be open and held in an inclination of about 95° from the vertical plane. The cover may be secured in this position by means of a pair of cords **27** or the like. The guide elements **1** and **2** are adapted in the holder **3** in pairs for holding the target sections **9–12**. The target sections are for this reason provided with guide blocks **28**, slidable along the guide elements **1** respectively **2** such that the target sections **19–12** may be easily displaced along the guide elements without any wobbling or turning. The target section **8** with its magnet **7** should likewise be easily slidable along the guide element **1** without more pronounced rotation or wobbling movements. This may be obtained by designing the target section **8** and the magnet **7** such that their common center of gravity is located below the centerline of the guide element **1** or by magnetizing the magnet **7** and locating the guiding tube **13** diagonally transverse to the guide element **1** or by providing the target **8** with a guidance relative to the guide element **2**.

The lengths of the guide tubes **13–16** are adapted to the target section to which they respectively belong and for which they serve as guidance, sliding element and shock absorbing element. These guidings preferably constitute the permanent magnets, which are intended to hold all the target sections pressed against the abutment **6** between the guide elements **1, 2**, which are inclined relative to the horizontal plane. The magnetism of these guidings **7, 13 14, 15** and **16** and the construction of the guide tubes should be such that the holding forces between the biggest target section **12** and the biggest but one target section **11** is the lowest and that the forces gradually increase between adjoining and in front of each other located target sections to a maximum between the abutment **6** and the target section **8**. These forces should be of such a value that all of the target sections may be held against the abutment **6** even when the guide elements **1** and **2** are considerably inclined relative to the horizontal plane. The inclination of the guide elements **1** and **2** relative to the horizontal plane according to the embodiment shown in FIGS. **1–3** may be about 22° or at least bigger than the static friction angle.

FIG. **3** illustrates a device, the construction of which is principally similar to that according to FIGS. **1** and **2**. The guide element **2** is however eliminated and the guide element **1** is thus adapted to alone prevent the target sections **8–12** from turning or wobbling when anyone of them has been hit. If however the center of gravity of the target section is located sufficiently low, this circumstance per se may be sufficient for the purpose.

FIG. **4** shows a device according to the invention in which the planes of the target sections coincide with the horizontal plane, an arrangement which is intended for shooting or throwing where the skittle or the projectile hits the target, i.e., one of the target sections angularly from upwards or vertically. The guiding element **1** then extends vertically and there is no need for neither any other guiding elements nor for any device or element for preventing the turning of the target sections. However, the magnets, which are intended to keep all the target sections pressed against the abutment **6** have to be well dimensioned as the entire weight of the target sections will act upon the connections or couplings, generated by the magnets.

A simplified embodiment of a device according to the invention may consist of the guide element **1**, eventually the guide element **2**, the holder **3**, the abutment **6** and the target sections **8–12** with their guidings or magnets **7, 13, 14, 15** and **16**. Such an embodiment may be used for marking purposes in connection with shooting with ball ammunition from fire arms and the device for bringing back the target sections to their initial positions may be remotely controlled by electrical or pneumatical means. In this case the construction with the lever arm **19** and the cords **17** and **20** is not adequate and should be replaced by a linearly acting drive means such as a pneumatically or electrically driven return mechanism.

Depending upon the use the material of the target sections may be wood, plastic or metal sheet. A convenient material for balls is plastic having flexible and resilient properties or rubber having low-resilience values and as a consequence thereof bad bound properties. Such a choice of material is advantageous when the balls may be caught by the nets **23, 25** and **26** of the box **4**.

The invention may be varied within the scope of the appended claims.

1. A self-indicating target comprising:
- a. a plurality of displaceable target sections,
- b. each of said target sections provided with guiding tubes,
- c. said guiding tubes being slideably arranged on guiding elements,
- d. said target sections being placed behind each other on the guiding tubes to enable the user to see their movement as one or more of the sections are displaced, and
- e. said guiding elements being slanted with respect to the horizontal such that the inclination exceeds the friction angle between the sliding surfaces of the guiding tubes and the guiding elements.

2. A self-indicating target as claimed in claim **1**, wherein the target sections are provided with magnetic means to hold the target sections assembled behind each other on the guiding tubes.

3. A self-indicating target as claimed in claim **2**, wherein the magnetic attraction force of the magnetic means between the target sections successively decreases from the foremost target section to the rearmost target section.

4. A self-indicating target as claimed in claim **2**, wherein the magnetic means consist of magnetic guiding tubes.

5. A self-indicating target as claimed in claim **1**, wherein the target sections and the guiding element are arranged in a housing means having means for returning displaced target sections to their initial positions.

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