March 22, 1938. W. A. TRATSCH 2,111,952

AMUSEMENT APPARATUS

Filed Nov. 16, 1936 2 Sheets-Sheet 1

Fig. 1.

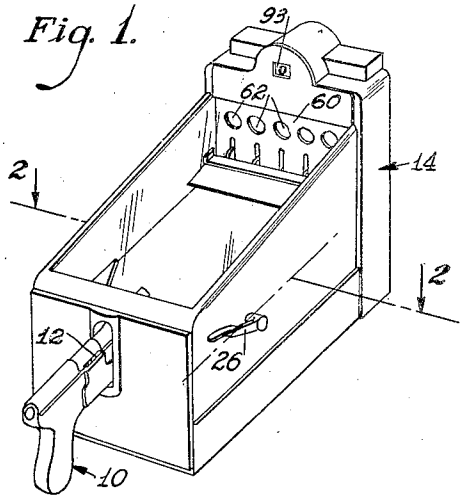


Fig. 5.

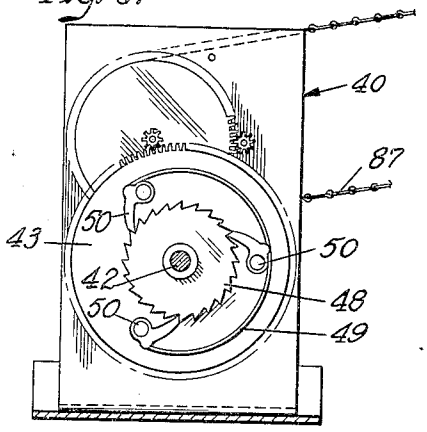


Fig. 2.

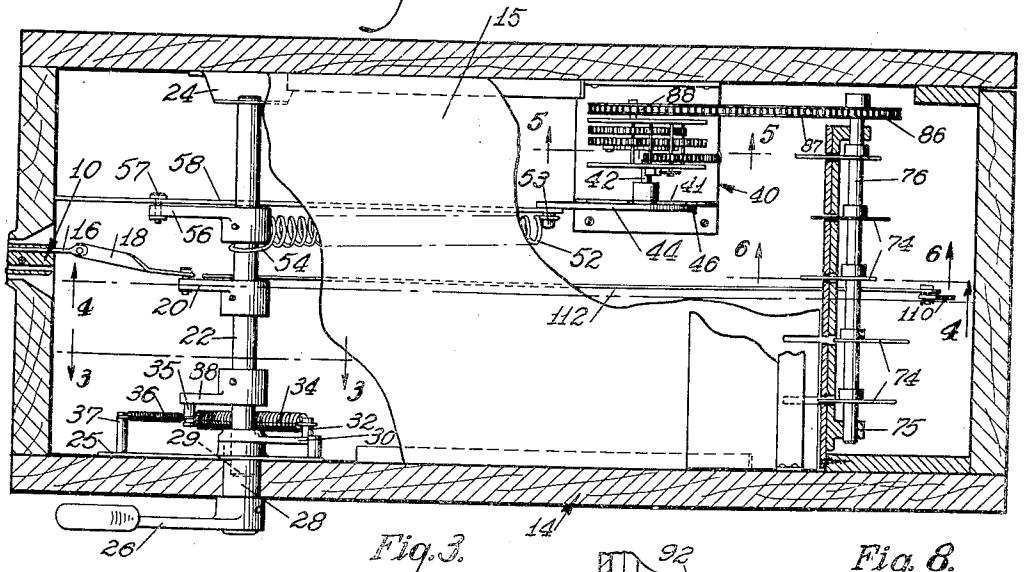


Fig. 3.

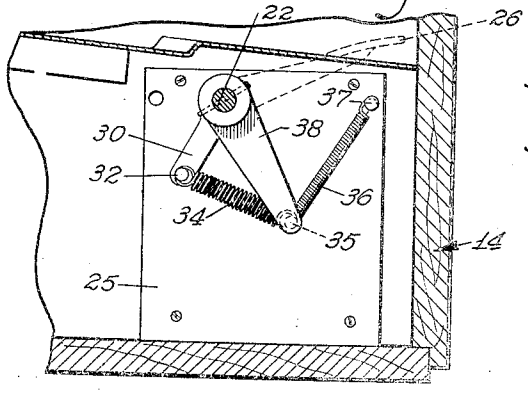
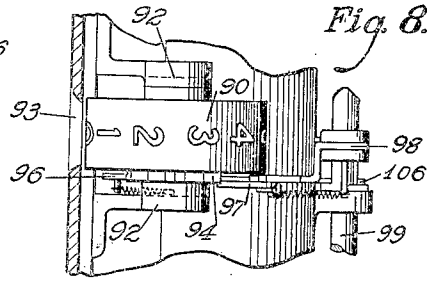


Fig. 8.



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Fig. 4.

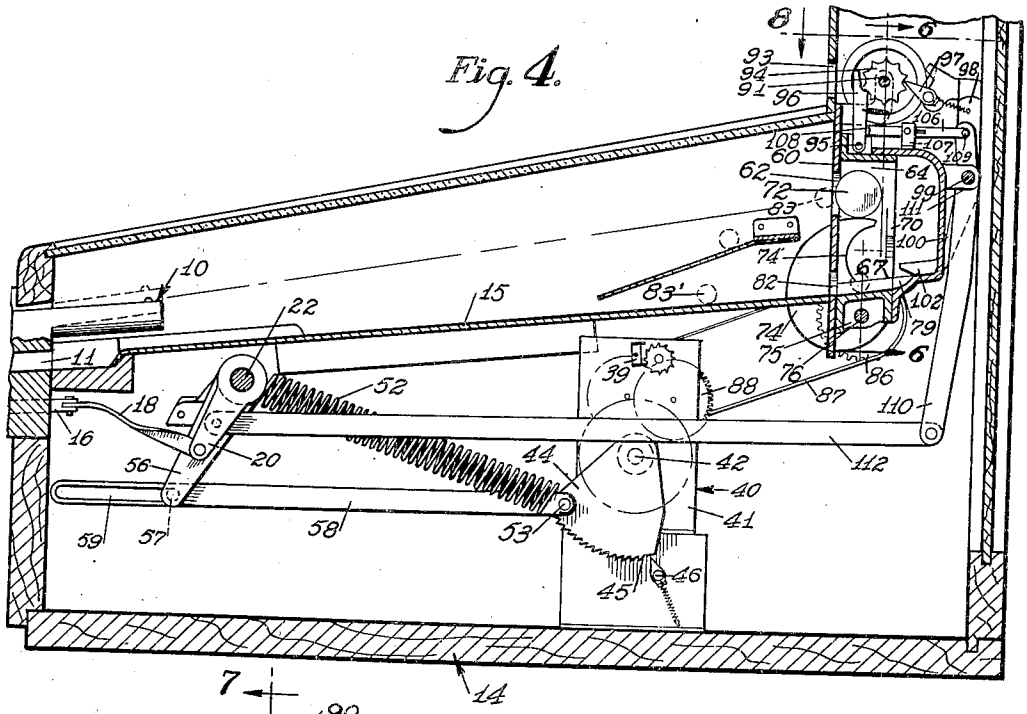


Fig. 6.

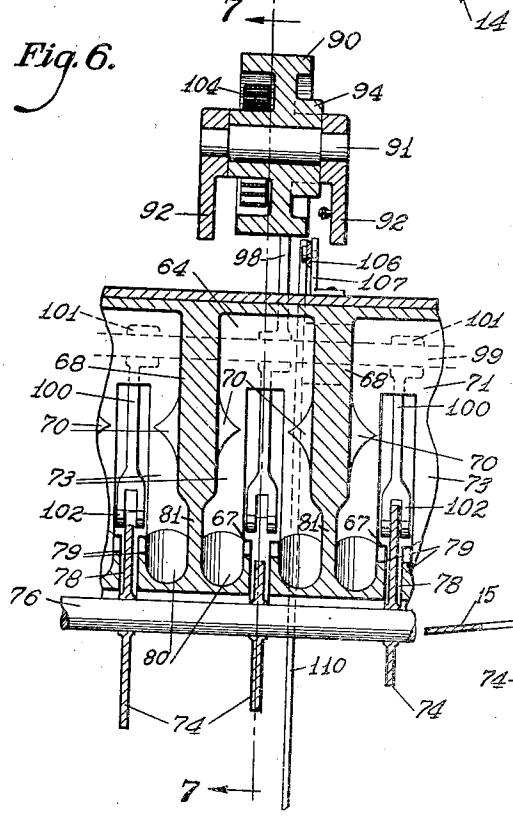
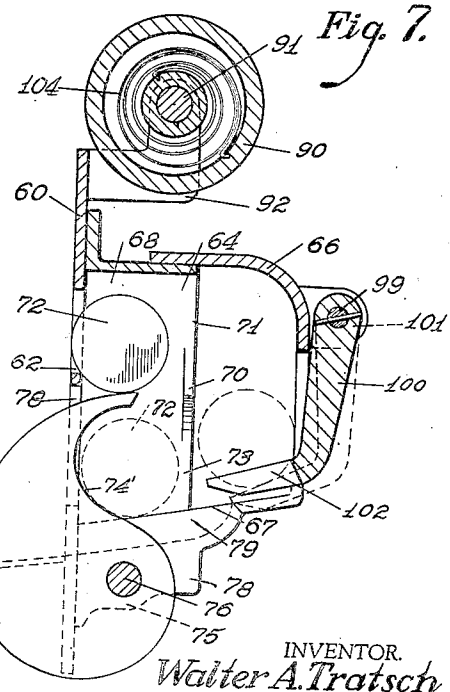


Fig. 7.



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UNITED STATES PATENT OFFICE

2,111,952

AMUSEMENT APPARATUS

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Application November 16, 1936, Serial No. 110,991

18 Claims. (Cl. 273—101)

This invention relates to amusement apparatus, and particularly to a coin operated mechanical marksmanship device or shooting gallery.

Among the important objects of the invention are the provision of novel moving target means, mechanism for moving movable target elements and operable by a manual control released by deposit of a coin in the machine, together with novel indicating mechanism for indicating the marksman's score.

Additional and more specific objects are the provision of a shooting gallery in the form of a housing member, having a plurality of target openings and target members periodically movable behind the openings and adapted to be struck by missiles from a mechanical gun in such manner that the said target members may be moved to actuate a score indicating mechanism.

Yet another object of the invention is the provision of a target structure comprising a series of vertically extensive wells having target apertures through the sides thereof, and each having a ball target member reciprocably movable therein into and out of sight before said openings, and cam means for reciprocating said ball members in their respective wells, together with clockwork mechanism for operating said cam members.

Still another object is the provision in a mechanism of the class described, of a clockwork driving mechanism energized by a manually set spring means, and operable to drive said cam members and reciprocate the ball target members.

Further novel features of construction and operation of the device disclosed herein will appear as the following detailed description proceeds in view of the drawings, in which:

Fig. 1 is a perspective view of the novel target device;

Fig. 2 is a horizontal section through the machine, taken in the direction of lines 2—2 of Fig. 1;

Fig. 3 is an enlarged vertical detail of the driving connection between the manually operable control lever and the driving control shaft of the machine;

Fig. 4 is a vertical section through the machine and taken along lines 4—4 of Fig. 2;

Fig. 5 is an enlarged detail of the ratchet escapement for the main clockwork driving shaft.

Fig. 6 is an enlarged vertical section through the ball wells and the score indicator, and taken along lines 6—6 of Fig. 4;

Fig. 7 is an enlarged vertical sectional detail of the ball reciprocating cam structure; while

Fig. 8 is an enlarged top plan view of the indicating drop and supporting structure therefor, and taken along lines 8—8 of Fig. 4.

The present invention utilizes a mechanical gun 10 such as shown in Fig. 1, this gun being desirably of the type shown in my U. S. Patent 1,551,858. This type of gun, in accordance with the detailed mechanical description in said patent, is released for operation by deposit of a coin in a slot 12 in the gun and disposed exteriorly of the main housing 14, as shown in Fig. 1 herein, the stock and trigger portions of the gun here used also being disposed exteriorly of the housing for manipulation by the user.

It is to be observed that the deposit of a proper coin or token in the slot 12 of the gun releases for movement a latch lever 16 (Fig. 4) which corresponds to the lever 82 shown in Fig. 2 of my aforesaid patent, and in the present novel device this latch lever 16 is pivotally attached to a link 18, which in turn is pivoted to an operating arm 20 on a driven control shaft 22 (Fig. 2) which is rotatably supported in bracket journals 24 and 25 attached to the inner wall portions of the housing 14.

Disposed exteriorly of the housing 14 is a manual operating lever 26 having a short sleeve shaft 28 extending within the housing for pivotal support by the bracket 25 with the central sleeve or bore portion thereof embracing an end 29 of the control shaft 22, such that the lever 26 may be pivoted co-axially with the shaft 22 and independently thereof.

Driving connection is established between the inner sleeve portion of the control lever 26 and the control shaft 22 by the mechanism shown in Fig. 3, in which the innermost extremity of the sleeve 28 of the lever 26 is provided with a lever arm 30, having at its eccentric end portion a pin 32 to which is secured a spring 34. The spring 34 is attached at its opposite extremity to a pin 35 extending from the eccentric end portion of a driven crank arm 38 secured to the control shaft 22 for rotation therewith. A spring 36 is secured to the pin 35 and has its opposite end anchored as at 37 to the bracket 25.

It will be observed that the spring 34 is, in the embodiment shown, of the extension type and is appreciably stronger than the spring 36, for reasons which will appear in conjunction with the detailed description of the operation of the device.

Disposed interiorly of the housing 14 and below the inclined panel 15 therein, is a motor means

in the form of a clockwork mechanism 40 (Figs. 2 and 4) having a main setting shaft 42 extending exteriorly of an end plate structure 41, and terminating in a segmental ratchet plate 44 rotatable therewith. Disposed on the supporting plate 41 of the motor adjacent the ratchet teeth of the ratchet plate is a spring-urged pawl 46, engageable with the teeth of the ratchet plate to prevent retroactive movement of the latter until the receded end portions 45 flanking the ratchet teeth on the plate move past the pawl in either direction. Thus the ratchet plate 44 cannot be moved from the position shown in Fig. 4 to a position half way toward the opposite end and then return to its initial position, the stroke must carry the ratchet plate completely past the pawl in both directions.

As seen in Fig. 5, the main drive or winding shaft 42 of the clockwork 40 is operatively clutched to a main driving gear 43 by means of a ratchet gear 48 rotatable with the shaft 42, and rotatable freely of the large gear 43 in an anti-clockwise direction, but effecting rotation of the gear 43 in a clockwise direction by engagement with a plurality of dogs or pawls 50 pivotally mounted on the gear 43 and urged by a spring means 49 into engagement with the ratchet gear 48.

The energizing means for the motor 40 comprises, in the embodiment shown, a large extension spring 52 attached at one extremity to the ratchet member 44 by means of a pin 53 extended therefrom, and at its other extremity 54 to the control shaft 22 which serves to anchor the spring. Secured to the control shaft 22 for rotation therewith is a setting lever 56 having its eccentric end portion pivotally connected to a setting arm 58 by means of a pin 57 in the eccentric end portion of the lever, and extending into an elongated slot 59 in the arm 58. The opposite extremity of the arm 58 is pivotally engaged with the pin 53 on the ratchet plate 44. Thus the anti-clockwise rotation of the control shaft 22 is transmitted through the arm 58 to the ratchet plate 44 (see Figs. 2 and 4).

The target structure comprises a vertically extending target wall or panel 60 (Figs. 1 and 4) having therein a plurality of target apertures 62. Behind each of these apertures is a well or chamber 64 provided by a casting having a back wall 66, and a plurality of vertical partition walls 68 (see Figs. 6 and 7), and each well having a pair of inwardly extending wings 70 disposed at the rearward marginal extremities of the partitions and substantially at the midpoint of the same, and which are effective to prevent the movement of a target ball 72 out of the well except through the open region 71 above these wings.

The casting is provided with an inclined floor portion 67 over which one of the balls 72 may descend from the rearward region of the casing, adjacent the rear wall 66 thereof, downward through the large lower opening 73 below the wings 70, back into the bottom of the well 64. This construction provides for a possible circuitous movement of a ball 72 from a position at the top of the wells 64, over the wings 70 and downward below the wings 70, over the inclined floor 67 and back into the well.

Means for periodically elevating the ball 72 from the bottom floor 67 of the well to the top thereof and before the target opening 62, include in each well an elevating cam 74 (Figs. 2, 4, 6, and 7) supported on a cam shaft 76 journaled, as at 75, in a lower portion of the well casting. Each of the cams 74 extend upwardly within a corresponding well, through a bottom cam slot 78, these slots including a pair of oppositely disposed upstanding side flanges 79 which serve to guide the movement of the cams along a uniform path, and also serve to form one wall for the missile return troughs 80, the other wall 81 of which is provided by the adjoining well partition 68 of the casting, the forward lowermost extremities of each of these return troughs 80 having an opening 82 communicating with the inclined top return panel or floor 15 whereby a pellet or missile 83', which has entered the well through the target opening 62, may fall into one of the troughs 80 and pass through the lower openings 82 to descend over the floor 15 toward the gun 10 and into a reloading opening 11 therein.

The cam shaft 76 is drivingly connected with motor 40 by means of a large gear 86 and a drive chain 87 thereon, and passing over the motor driving gear 88. It may be observed that the speed of the motor 40 may be regulated by any suitable means such as the escapement mechanism 39, so that the cams 74 will pass into and out of the wells 64 at a uniform and preferably leisurely rate, whereby the balls 72 will be engaged by the riding edge of the cam when the same rotates in an anti-clockwise direction, as in Fig. 7 for example, to cause the balls to rise and fall before the target openings 62, it being observed that the inward or idling cam edge is provided with a receding arcuate recess 74' against which the ball 72 may ride while in lowered position.

Score indicating mechanism is provided in the form of a rotatable drum 90 having indicating characters about the periphery thereof, and supported for rotation between bracket means 92 extended from the well casting, so that the indicating numbers or characters may pass before a sight opening 93 in the upper region of the target panel. Rotatable with the shaft 91 of the target 90 is a driven ratchet 94 (Figs. 4, 6, and 8), with which is engageable a stopping dog 96 pivoted, as at 95, on the upper part of the well casting and engageable also with a driving pawl 97 on the upper extremity of a stepping arm 98 pivotally supported on a common shaft 99 which, in turn, is pivotable by any one of a plurality of paddle arms 100 attached to the shaft 99 at their collar portions 101, and having at their lower extremities a flared portion or ball paddle 102 extending into each of the wells 64 at the lower regions thereof, and engageable by one of the balls 72 in its descent from raised position toward the inclined floor of the well, in such manner that the arm 100 will be pivoted, and consequently the common shaft 99 likewise pivoted, this motion being transmitted to the stepping arm 98 to rotate the drum 90 through the pawl 97 and ratchet 94.

The drum 90 is provided with a coil spring 104 anchored to its shaft 91 and to the drum, so that the spring may be coiled or energized by the stepping movement of the drum, the locking or stopping pawl 96 being effective to prevent retrograde movement of the drum under the tension of spring 104.

In order to release the drum 90 from an indicating position to a normal and non-indicating position after a score has been set up, the latching dog 96 may be pivoted out of latching position (in an anti-clockwise direction) by the backward movement of a slide bar 106 (Figs. 4, 6,

and 8) slidably supported by pin and slot engagement with a bracket 107 on the top of the well housing casting, the slide bar 106 having an offset extension 108 which bears against the dog 96 to move the same out of latching position, and the bar having its outermost extremity pivotally connected, as at 109, to the upper end portion of a reset lever 110 pivotally mounted, as at 111, on the common shaft 99 and having its lowermost end pivotally attached to a reset arm 112.

The arm 112 is pivotally connected at its forward end portions to the releasing lever arm 20 on the control shaft 22, and is movable toward the right by the latter to pivot the reset lever 110 and thus slide the bar 106 inwardly to move the dog 96 out of latching relation with the ratchet gear 94 on the drum, thus permitting the return of the latter to its initial position under urgence of spring 104.

The detailed operation of the device is such that by deposit of a proper coin in the slot 12 of the gun 10, mechanism in the latter will be actuated, in accordance with the disclosures of my aforesaid patent, to release the latching lever 16 of the gun for free movement and also release the missile projecting mechanism of the gun for operation by the trigger in the usual manner.

Having deposited a coin as aforesaid, the user of the apparatus may depress the lever 26, transmitting pivotal motion to the control shaft 22 through the spring link system 34—38, whereupon the energizing arm 58 will move toward the right, as seen in Fig. 4, and pivot the segmental ratchet plate 44 against the tension of the main spring 52. As a result, the winding shaft 42 of the motor 40 will be rotated a corresponding distance free of the driving gear 43, until the arm 58 reaches the limit of its stroke, whereupon the pawls 50 will lock the gear 43 with the shaft 42 and the tension spring 52 will energize the motor mechanism through the gear 43, thus rotating the motor gear 88 and transmitting rotative movement to the cam shaft 76 through the driving chain 87 and driven gear 86.

Meanwhile, the pivotal movement of the control shaft 22 by operation of the lever 26 will also have urged the reset arm 112 toward the right, and this motion will be transmitted to the indicating mechanism to move the locking pawl 96 out of locking engagement with the ratchet gear 94 through the medium of the linkage 110, 109 and slide bar 106, thus effecting a return of the drum 90 to its initial position under urgence of its coil spring 104 and clearing the machine of any previous score.

Thereafter the operator may depress the trigger of the gun 10 and project one of the pellets or missiles 83 toward the target apertures 62 and one of the target balls 72 positioned therebehind, by movement of the cams 74, it being understood that as these cams rotate in an anti-clockwise direction, as seen in Figs. 4 and 7, each of the several balls 72 in their respective wells 64 rides along the rising cam edge 74' upwardly into position before its corresponding target opening 62, and as soon as the tail of the cam passes from under the ball the latter will fall downward and idle along the edge 74' of its corresponding cam 74, until the rising cam edge again moves beneath the ball for a repetition of the elevating movement.

Should the marksman succeed in directing one of the pellets 83 through an opening 62 behind which at that moment is positioned a target ball 72, the impact will unseat the ball 72 and cause it to fall backwardly through the upper opening 71 above the wings 70 at the back of the well, and the ball will thence fall down onto a paddle 102 and pivot its arm 100 and the common shaft 99 so as to pivot the stepping arm 98, which in turn will cause the stepping pawl 97 thereon to engage a tooth of the stepping ratchet 94 on drum 90 and rotate the drum a distance corresponding to one of the indicating numbers or characters which will be positioned before the sight opening 93 in the target panel.

The struck ball 72, having operated the stepping mechanism by impact with the paddle 102, will thereafter descend over the inclined bottom portion of its corresponding well and into the latter through the lower opening 73 below the wings 70, where the ball will again be engaged by the rising cam for subsequent positioning before its target opening 62. The pellet 83 which succeeded in unseating the ball 72, will meanwhile have descended over the inclined floor trough 80 on the floor of that particular ball well and issue through the lower pellet return opening 82 in the front of the target panel, to descend over the inclined floor 15 and back into the reloading opening 11 of the gun.

Having taken a number of shots determined by mechanism associated with the gun 10, or otherwise abandoning the operation of the machine, the score, if any, which the operator has set up will remain in reading position until the machine is again released for operation by deposit of another coin, whereupon the foregoing cycle of operation may be repeated. It will be observed, also, that the mechanism is in effect deenergized by the return of the spring 52 to its initial condition, and suitable means may be provided for preventing a repeated operation of the lever 26 until another coin is deposited in the gun to release the link 18 for further free movement. Or, if desired, any well known form of coin control device may be provided with mechanical connection to link 18 and the driving mechanism associated therewith, for controlling the release of the machine by deposit of a coin.

The foregoing particularly described apparatus is intended to be illustrative of the invention and as one of the preferred embodiments thereof, and it will be apparent that the particular structure disclosed may be modified in various ways without departing from the spirit of the invention, and the foregoing recitations are therefore not intended as limitations but are to be construed broadly within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A target device including a guide having a target opening, a movable target member in said guide and normally disposed below said opening, and driven means extending into said guide and operable to periodically engage and move said target member into a position before said opening and release said target member for gravitating movement away from said opening.

2. A target apparatus as defined in claim 1 and in which said driven means is further constructed to hold said target member momentarily in position before said sight opening and thereafter to release said target member suddenly for quick gravitation away from said opening.

3. In a target mechanism of the type having means for projecting a missile, target means comprising a target panel having a target open-

ing therein, an unattached member reciprocably movable into and out of position relative to said opening and behind the latter, means including a rotatable member for moving said first-mentioned member relative to said opening, and driving mechanism for moving said rotatable member.

4. In target devices including means for directing a projectile at a target, target mechanism comprising a target member having a target opening, a chamber behind said opening, a scoring member movable up and down within said chamber into and out of position before said opening, a rotatable member having a portion movable in said chamber for raising said scoring member as aforesaid the same normally descending by gravity from raised position, and motor mechanism for driving said rotatable member and including manually energized energy storing means for driving said motor mechanism.

5. In a target amusement device, having means for projecting a missile, a target comprising a member having a target opening, a target ball movable from lowered to raised position before said opening, means including a rotatable member for periodically raising said ball from lowered to raised position before said opening and to disengage the ball when the same is in raised position to permit the ball to fall again to lowered position, driving means for said rotatable member, the said target ball being adapted when in raised position before said opening and struck by a missile therethrough to be dislodged from operative engagement by said rotatable member and fall to lowered position, together with score indicating mechanism having an actuating means positioned near said target and operable by engagement with said target ball when the same is struck by a missile and falls to lowered position as aforesaid, together with means for guiding the ball when struck into operative engagement with said actuating means.

6. A target structure comprising a target panel having a target opening therethrough, a movable scoring member behind said panel and adapted for movement from lowered to raised position before said target opening, means including a rotatable member engageable with said scoring member to raise and position the same before said opening, means for driving said rotatable member, means for confining the movement of said scoring member to the region adjacent said target opening, said scoring member being adapted to be dislodged from position before said target opening when struck by a missile therethrough for movement into lowered position for subsequent engagement by said rotatable member whereby the said scoring member may again be raised to position before said opening, and score indicating mechanism including an operating member disposed relative to said confining means to be operatively engaged by said scoring member when the same is dislodged by a missile for movement into lowered position.

7. An amusement device including a device for discharging a projectile, a target comprising a panel having a target opening therethrough, a chamber behind said panel and said opening, a target ball movable from lowered to raised position before said opening and in said chamber, a cam-like member supported for rotation with an eccentric portion movable in the chamber and engageable with said ball to raise the same from lowered position into raised position before said target opening from which the said ball may be dislodged when struck by a projectile, said cam member being movable to disengage said ball and permit the same to drop by gravity into lowered position, score indicating means, control means for operating said indicating means and including an arm positioned relative to said chamber to be transiently engaged and moved by said target ball when the same is dislodged by a projectile and moves into lowered position as aforesaid, and driving mechanism for said cam member.

8. A target device including a chamber having a sight opening, a ball in said chamber and normally positioned below said opening, and driven means in said chamber and periodically operable to raise said ball into position before said opening and release said ball for gravitating return to the bottom of the chamber.

9. A target device including a chamber providing a vertical well having a sight opening in an upper side portion thereof, a target ball in said chamber and normally positioned below said sight opening and out of view, and means including a revoluble member in said chamber and operable to raise said ball periodically into position before said sight opening and thereafter releasably disengage said ball to permit the same to gravitate out of raised position and out of view, together with means for driving said revoluble member.

10. A target structure comprising a chamber having a sight opening in an upper wall portion thereof, an unattached target member in said chamber and normally resting out of view below said sight opening, together with driven means in said chamber for effecting a periodic raising and lowering of said target member relative to said sight opening.

11. A target structure including a score indicator, a housing providing a vertical well having an opening in a wall portion thereof above the bottom of said well, a ball in said well, and driven means in said housing and operable to raise said ball into position before said opening, said ball in raised position being adapted to be dislodged from said means when struck by a missile directed through said opening, and control mechanism for said indicator and including an operating member positioned in said housing for engagement and operation by a dislodged ball.

12. A target device including a score indicator, a housing having a sight opening in a wall thereof and a well formed behind said opening, said well being divided into a front chamber with which said sight opening communicates, and a rear chamber behind said front chamber and said sight opening, a target ball normally positioned at the bottom of said front chamber out of view relative to the sight opening, periodically moving drive means movable into engagement with said normally positioned ball and effective to raise the ball into position before said sight opening to be struck by a missile projected therethrough, said front chamber having a discharge opening near its bottom and means for guiding missiles projected into said front chamber to said discharge opening, said drive means being arranged to hold said ball momentarily before said sight opening and suddenly disengage and release the same for gravitation back to said normal position, said front chamber having communication with said rear chamber through a return opening near the bottom of the latter and also at a point substantially behind said sight opening, said ball being adapted to be dislodged by a mis-

sile from said drive means for movement into said rear chamber and through said return opening back into said front chamber, together with means for actuating said score indicator and including an operating member positioned in said rear chamber for engagement and operation by a dislodged ball.

13. An amusement apparatus in the form of a target device including means for projecting missiles at a target, a target having a target opening through which said missiles may pass, a target ball and guide means therefor guiding the movement of the ball behind said target into and out of position before said target opening, and a cyclically movable member having a portion in said guide means and engaging said target ball to move the same into position before said target opening, said ball being adapted to be dislodged from said cyclically movable member by a missile through said target opening, motor means for actuating said cyclically movable member, and means for positioning said target ball for operative engagement by said cyclically movable member when the ball has been dislodged as aforesaid.

14. An amusement apparatus in the form of a target device including means for projecting missiles at a target, a score indicating device, a target member having a target opening through which said missiles may pass, a target ball, and means guiding the same for movement behind said target member into and out of position before said target opening, and a cam member arranged to move said target ball in said guiding means relative to said target opening, motor means for actuating said cam member, said guiding means being constructed to permit movement of the target ball from a position before said target opening by a missile striking the ball through said target opening, together with an operating member for said score indicating device and positioned relative to said guiding means so as to be engaged and actuated by said target ball when the same is struck and moved away from the target opening as aforesaid.

15. An amusement device comprising a target structure and means for directing a projectile at said structure, the said structure including a panel having a target opening therein, guide means behind said opening, a target member behind said panel and movable in said guide means into and out of position before said target opening, a cam member having a portion movable in said guide means for engagement with said target member to move the latter into position before said target opening to be struck by a projectile, said guide means being constructed to permit dislodgment of the target member from said cam member when struck by a projectile as aforesaid, motor means for operating said cam member, indicating means and an actuating member therefor disposed in said guide means and operatively engageable by said target member when the latter is dislodged as aforesaid, said guide means being constructed to effect re-engagement of said target member with said cam member after the target member has been dislodged as aforesaid.

16. In a target mechanism of the type having a means for projecting a missile, target means comprising a target panel having a target opening therein, an unattached member reciprocably movable into and out of position relative to said opening and behind the latter and means guiding the movement of said member relative to said opening, means including a rotatable member for moving said first mentioned member relative to said opening in said guiding means and the latter means being provided with an exit portion opposite said opening and through which said member will be moved away from said opening when struck by a missile projected through the opening, and mechanism for moving said rotatable member.

17. A target device including a chamber having a sight opening, and divided into front and rear compartments, said front compartment being disposed between said sight opening and said rear compartment, said front compartment having a communication with said rear compartment at a point substantially opposite said sight opening and also at a point below said opening, a ball normally positioned below said opening in said front compartment, and driven means in said front compartment and periodically operable to raise said ball into a position before said opening, and then to release said ball for gravitating movement back to the bottom of said front compartment, said ball being adapted to be moved into said rear compartment from a position before said sight opening by a missile directed through the latter and to return to said front compartment through said lower communication for operative re-engagement with said driven means.

18. A target device in accordance with claim 17, and further characterized by the provision of an indicating device having a control member disposed in said rear compartment and arranged to be transiently engaged by said ball as the latter moves through said lower communication into said front compartment to actuate said indicator.

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