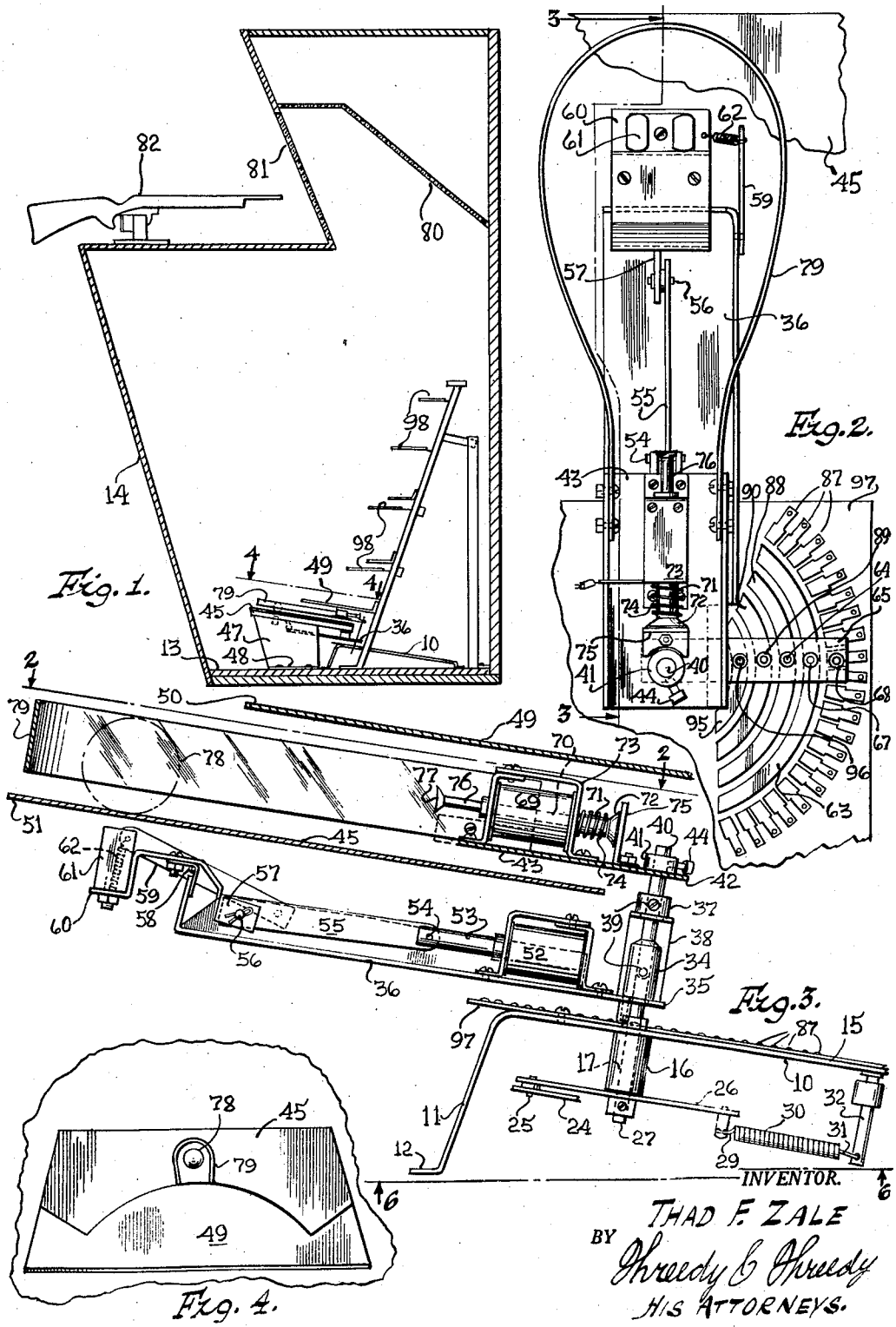
Aug. 11, 1959 T. F. ZALE 2,899,205

MOVING TARGET WITH SIMULATED PROJECTOR

Filed May 9, 1957 2 Sheets-Sheet 1



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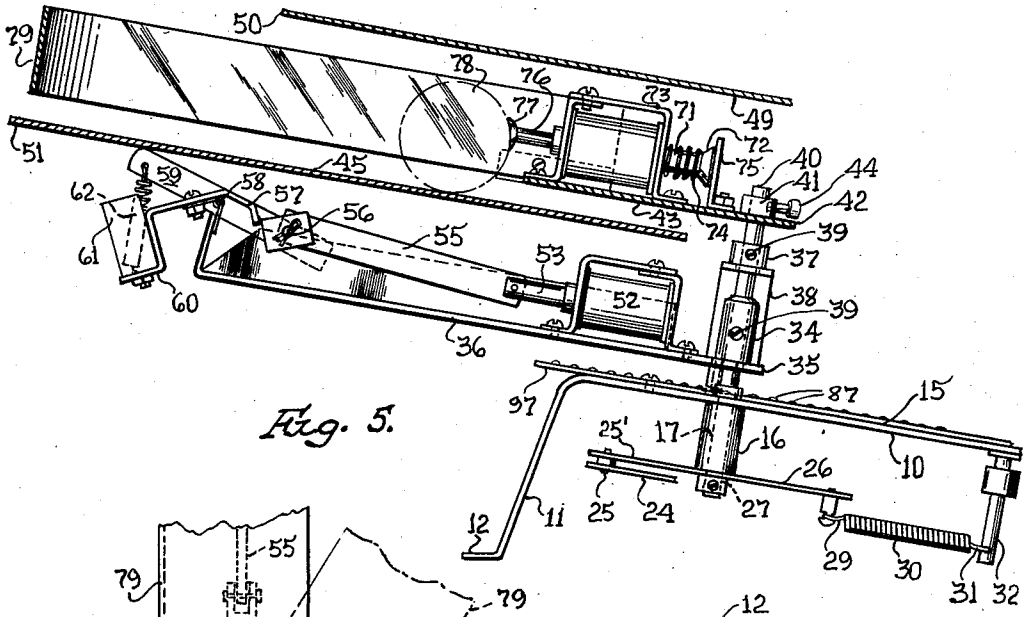

Fig. 5.

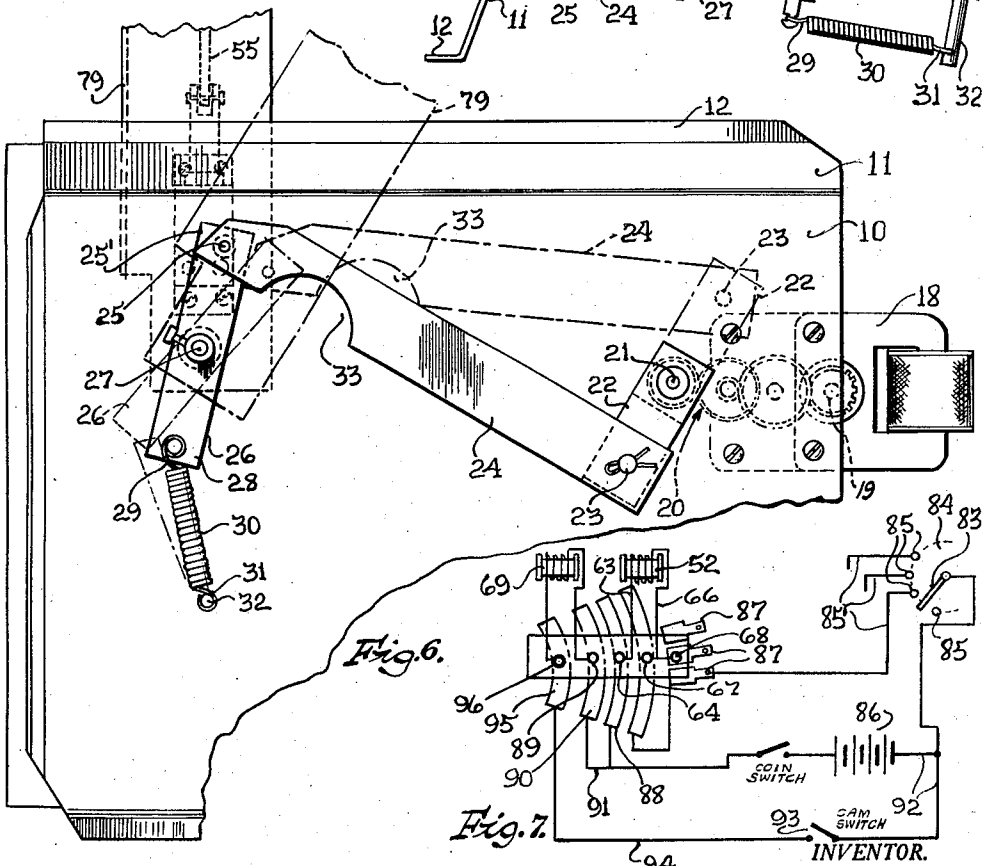

Fig. 6.

Fig. 7.

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United States Patent Office 2,899,205 Patented Aug. 11, 1959

2,899,205

MOVING TARGET WITH SIMULATED PROJECTOR

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Application May 9, 1957, Serial No. 658,145

10 Claims. (Cl. 273—101.2)

This invention relates to certain new and useful improvements in amusement game apparatuses and has for its principal object the provision of an amusement game apparatus of the character hereinafter described in which there is embodied an animated target of an improved construction and operation.

Among several other objects of this invention is to provide a simplified arrangement for moving a target element over an opaque plate by a mechanism concealed from view by the plate so that the target will appear as being suspended in mid-air.

Yet another and equally important object of the invention is the provision of an improved arrangement for magnetically holding a target element for movement transversely over an opaque plate and for moving said holding means to release said target for movement by gravity to a concealed position whenever the marksman accomplishes a hit, together with means for repositioning the target element within the vision of the marksman.

A still further object of the invention is the provision in an amusement device of a moving target element, the movement of which may appear to be erratic thereby making it more difficult for the marksman to score a hit.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a vertical sectional detail view of an amusement apparatus showing my improved target associated therewith;

Fig. 2 is a fragmentary sectional detail view taken substantially on line 2—2 of Fig. 3;

Fig. 3 is a fragmentary sectional detail view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary detail view taken substantially on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary sectional detail view similar to Fig. 3 but showing the parts thereof in different positions with respect to each other;

Fig. 6 is a view taken substantially on line 6—6 of Fig. 3; and

Fig. 7 is a suggested schematic wiring circuit.

The several objects of my invention are accomplished by the preferred form of construction shown in the accompanying drawings and which will now be described.

My improved target includes a mounting plate 10 having depending sides 11 providing lateral flanges 12 which are connected by any suitable means to the bottom wall 13 of a cabinet 14.

For structural reasons the top 15 of the plate 10 is inclined as shown. Fixedly secured to such top 15 of the plate 10 is a sleeve 16 having journalled therein the lower end portion of a shaft 17. The shaft 17 is adapted

to be oscillated through a predetermined arc by means of a motor 18 secured to the plate 10. A shaft 19 of the motor 18, through a train of gears 20, is operatively connected to a stud shaft 21 journalled in a suitable bushing carried by the plate 10. Fixedly secured to the stud shaft 21 is one end portion of a link 22 having its opposite end portion pivotally connected as at 23 to one end of an arm 24.

The opposite end portion of the arm 24 is pivotally connected as at 25 to the end portion 25' of a plate 26 fixedly secured intermediate its end portion to the lower end portion 27 of the shaft 17. To the opposite end portion 28 of the plate 26 is connected one end portion 29 of a spring 30, the opposite end portion of the spring 30 being connected as at 31 to a depending pin 32 carried by the plate 10. Formed in one edge portion of the arm 24 is a notch 33 to accommodate the shaft 27 when the arm 24 is moved to its extreme left hand position as viewed in Fig. 6 by operation of the motor.

From the bushing 16, the shaft 17 passes through a bushing 34 carried at one end portion 35 of a mounting plate 36. A collar 37 is fixedly carried by a bracket 38 carried by the end portion 35 of the mounting plate 36 which bracket likewise is fixedly secured to the plate 36. The collar 37, as is the bushing 34, is fixed to the shaft 17 by a set screw 39. The outer end portion 40 of the shaft 17 projects through a bushing 41 fixedly connected to the end 42 of a carriage plate 43. The bushing 41, by means of a set screw 44 is fixed to the end portion 41 of the shaft 17. By this arrangement the mounting plate 36 and carriage plate 43 are fixed to the shaft 17 for oscillation therewith, it being noted that the mounting plate 36 and the carriage plate 43 are arranged in parallel spaced relation with respect to each other.

Interposed between the mounting plate 36 and the carriage plate 43 is a target field plate 45, which plate is relatively flat. The plate 45 has depending side walls 47 having flanges 48 which are secured in any suitable manner to the bottom wall 13 of the cabinet 14. The plate 45 is formed of opaque material.

Above the plate 45 and in parallel spaced relation with respect thereto, is an opaque shield 49. The outer edge portion 50 of the plate 49 is inwardly of the outer edge portion 51 of the plate 45 for reasons which will hereinafter become apparent.

Mounted on the mounting plate 36, adjacent its end portion 35, is an electro-magnetic solenoid 52. The plunger 53 of this solenoid is pivotally connected as at 54 to an elongated arm 55 the outer end of which is pivotally connected as at 56 to one end portion of a tiltable plate 57. This plate 57 is pivotally carried as at 58 by an extended portion 59 of the mounting plate 36.

The tiltable plate 57 provides an outwardly extending flange 60 on which is mounted a permanent magnet 61 disposed beneath the field plate 45 adjacent its outer end portion. The plate 57 with the magnet 61 mounted thereon is yieldably held in the position shown in Fig. 3 with the magnet in close proximity to the plate 45 by means of a spring 62 one end of which is connected to the extension 59 and the opposite end to the flange 60.

A suggested wiring circuit is shown in Fig. 7. As there shown one side of the coil of the electromagnet solenoid 52 is by wire 63 connected to a conductor pin 64 carried by and insulated from an arm 65 constituting a lateral extension of the bracket 38. The other side of the coil, by a wire 66 is connected to spaced conductor pins 67 and 68 likewise carried by the arm 65, the conductor pins 64 and 67 being insulated from the arm 65.

The carriage plate 42 at its end portion adjacent the shaft 17, has mounted thereon an electro-magnetic sole-

noid 69. The solenoid of this coil is indicated at 70. The opposite end portions of the solenoid project beyond the opposite ends of the coil. The end portion 71 of the solenoid 70 is provided with a head 72. Disposed between the head 72 and the coil mounting 73 is an expansion spring 74 which yieldably projects the solenoid against a stop finger 75, Fig. 3.

The opposite end portion 76 of the solenoid provides a striker or head 77, which is curved to conform to the curvature of a ball 78. This ball 78 is adapted for transverse movement across the top surface of the field plate 45 and is formed of magnetically attractable material. Carried by the plate 42 is a U-shaped band 79 which serves as a guide and a retainer for the ball 78 and defines an area within which the ball 78 may roll.

The ball 78 being formed of magnetically attractable material, will, when positioned over the permanent magnet 61 (with such magnet in the position shown in Fig. 3) be caused to move by movement of such magnet over the surface of the field plate 45. As the means for moving the ball over the field plate 45 is concealed by such plate, the ball will have the appearance of being self-propelled and when reflected into an inclined mirror 80 will have the appearance of being movably suspended in mid-air. The mirror 80 is arranged within the cabinet 14. A transparent closure or sight opening 81 is provided by the cabinet forwardly of the mirror 80. Mounted on the cabinet 14, in opposed position with respect to the mirror 80 is a rifle 82. This rifle 82 is of a well-known construction and operates substantially in the manner shown in Patent No. 561,124, dated June 2, 1896, granted to one J. L. McCullough. The rifle 82 has a stylus pin 83 which sweeps over a non-conductive plate 84 having mounted thereon spaced contact heads 85 which are successively engaged by the stylus pin 83.

The stylus pin 83 is connected to one side of a power source 86. The contact heads 85 are connected by wires 85′ to contact plates 87, there being one such plate 87 for each of the contact heads 85. The other side of the power source is connected to a conductor strip 88. The contact pin 64 has slidable contact with the strip 88 while the contact pin 68 successively engages the plate 87.

The arrangement is such that each time the stylus pin 83 is in contact with a contact 85 in circuit with one of the contact plates 87 which has contact with the conductor pin 68, the coil of the solenoid 52 will become energized, moving the solenoid plunger 53 thereof to the right as viewed in Fig. 3 to the position shown in Fig. 5 thereby to pivot the tiltable plate 57 in a direction to move the permanent magnet away from the plate 45 thereby to release the ball 78 for gravitation into engagement with the striker head 77 of the solenoid 69 in which position the ball 78 will be concealed from view by the shield plate 49.

One side of the coil of the electromagnetic solenoid 69 is connected to a conductor pin 89 which has slidable contact with a conductor strip 90 connected as at 91 to one side of the power source 86. Connected as at 92 to the other side of the power source 86 is a cam actuated switch 93. This switch 93 is intermediately opened and closed a predetermined number of times by means of a cam which may be mounted on the shaft of the motor 18. The other side of the cam switch 93 is connected by wire 94 to a conductor 95 with which sliding engagement is had by a conductor pin 96. This pin 96 is connected on the other side of the coil of the electromagnetic solenoid 69.

The arrangement is such that each time the switch 93 is closed, the coil of the electromagnetic solenoid 69 will be energized and the solenoid 70 be projected in a direction toward the ball 78. Should the ball 78 be in engagement with the head 77 of the solenoid 70, the ball will be reprojected to its outermost position as shown

in Fig. 3 in which position the ball will be releasably held by the magnet 61.

Upon deenergization of the coil of the electromagnetic solenoid 52 the spring 62 (Fig. 3) will pivot the plate 57 in a position to dispose the permanent magnet 60 in a position to attract and hold the ball 78 in the position shown in Fig. 3 until such time as the electromagnetic solenoid is again energized by a simultaneous engagement of the stylus pin 83 with the contact of the one of the contact heads 85 and the contact plate 87 of which is engaged by conductor pin 68.

Each time one of the contact plates 87 is in circuit with one of the contact heads 85, by reason of the engagement of the stylus pin with such latter contact, the electromagnetic solenoid will be energized and move the permanent magnet away from the plate 45 to break the magnetic field holding the ball 78 in the position shown in Fig. 3. Upon the breaking of this field, the ball will roll by gravity to a position beneath the shield plate 49 thus indicating to the marksman that he has scored a hit. The electromagnetic coil 52 will be deenergized by the breaking of the circuit between the contact head and contact plate aforementioned, which circuit is in the first instance broken by movement of the contact pin 68 from engagement with the aforementioned one contact plate. The circuit also will be disrupted upon disengagement of the stylus pin with the contact head in circuit with the aforementioned contact plate.

The contact plates 87 are carried by a non-conductive plate 97 which may be mounted on the plate 10 as shown in Fig. 3.

An amusement apparatus having embodied therein my improved target and the means for moving the same will afford great amusement and will aid the marksman in improving his marksmanship.

Scene bearing plates 98 of different sizes as shown in Fig. 2, may be employed to reflect an appropriate scenery in the mirror.

The ball 78 may be of any shape which would not interfere with its rolling upon the plate 45 and may be of any desired color. It may be hollow or a solid ball and may have an irregular surface to give it erratic movement over the plate 45.

The circuit shown in Fig. 7 is merely a suggested circuit and may be varied according to requirements of construction and operation.

The cabinet as well as the rifle construction may be of any approved construction as neither the rifle nor the cabinet constitute the essence of this invention.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come 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. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, means for moving said magnet beneath the bottom surface of said bottom plate, means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target

element to move down said bottom plate to a concealed position between said plates, and means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

2. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, means for moving said magnet beneath the bottom surface of said bottom plate, means carried by and movable with the magnet moving means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

3. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, means for moving said magnet beneath the bottom surface of said bottom plate, means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and electro solenoid means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

4. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, means for moving said magnet beneath the bottom surface of said bottom plate, electro solenoid means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

5. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, means for moving said magnet beneath the bottom surface of said bottom plate, electro solenoid means carried by and movable with the magnet moving means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

6. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, means for moving said magnet beneath the bottom surface of said bottom plate, electro solenoid means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and electro solenoid means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

7. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebetween, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, means for moving said magnet beneath the bottom surface of said bottom plate, electro solenoid means carried by and movable with the magnet moving means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and electro solenoid means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

8. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, electric motor means for moving said magnet beneath the bottom surface of said bottom plate, means for pivoting said mag-

net relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and means for projecting said traget element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

9. An amusement and target apparatus comprising a pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, electric motor means for moving said magnet beneath the bottom surface of said bottom plate, electro solenoid means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and electro solenoid means for projecting said target elements from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

10. An amusement and target apparatus comprising a

pair of spaced apart inclined opaque plates of non-magnetically attractable material with the top plate thereof being of a width less than the bottom plate so as to expose a portion of said bottom plate therebeneath, a magnetically attractable target element carried by said bottom plate and movable between said plates, means for moving said target element by magnetic attraction over the exposed portion of said bottom plate, said means including a permanent magnet beneath the bottom surface of said bottom plate, electric motor means for moving said magnet beneath the bottom surface of said bottom plate, electro solenoid means carried by and movable with magnet moving means for pivoting said magnet relative to its moving means in a direction away from said bottom plate to release said target element from its magnetic attraction to permit said target element to move down said bottom plate to a concealed position between said plates, and electro solenoid means for projecting said target element from its concealed position between said plates to a position to be attracted and moved by said magnet over the exposed portion of said bottom plate.

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