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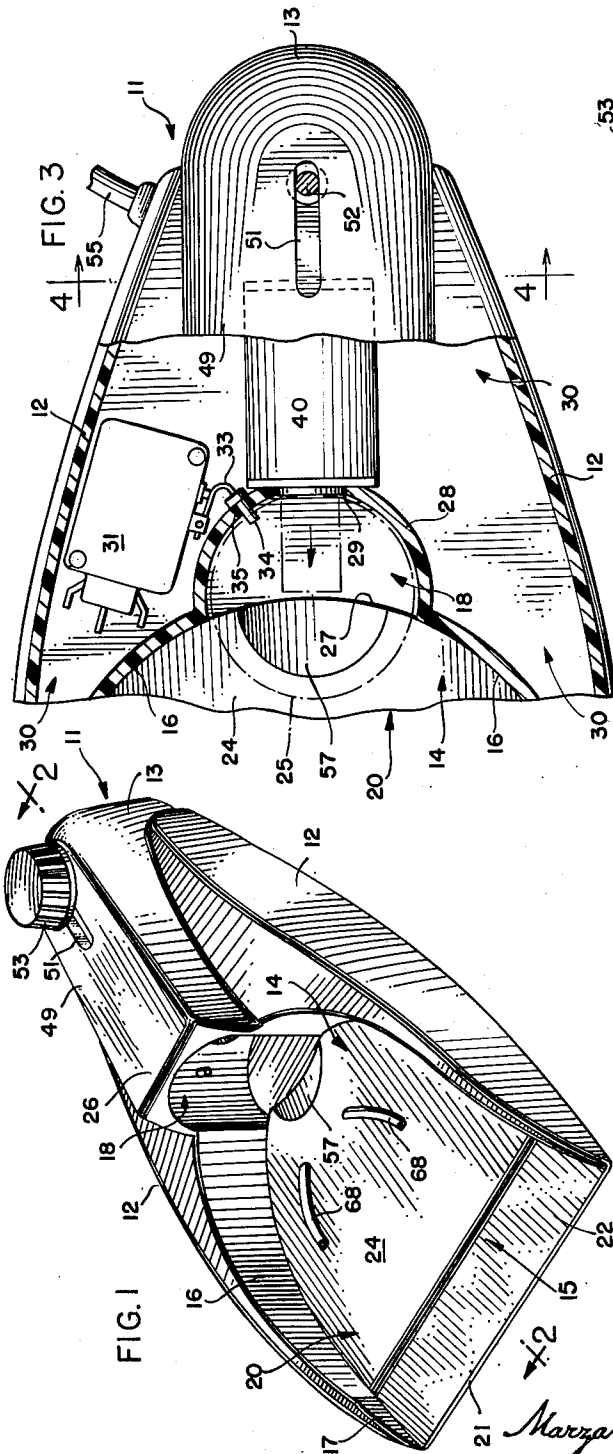
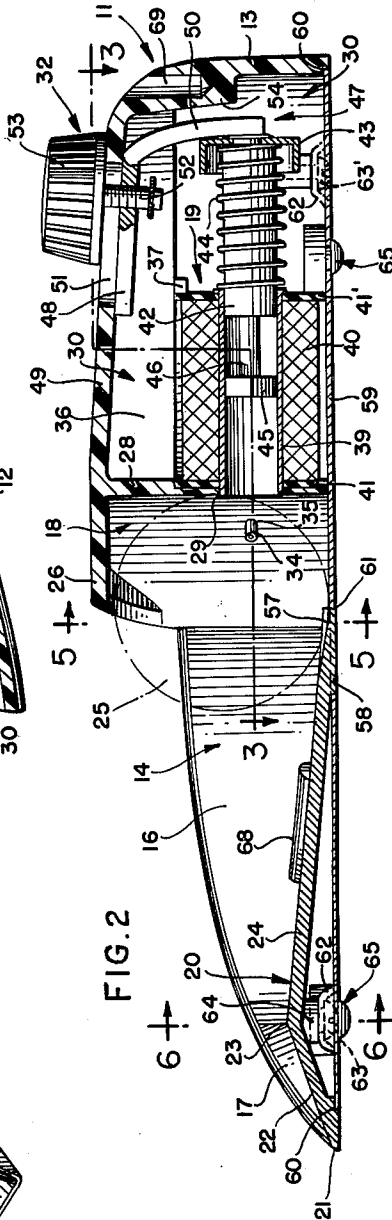
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3,030,113

GAME DEVICE

Filed May 23, 1955

2 Sheets-Sheet 1



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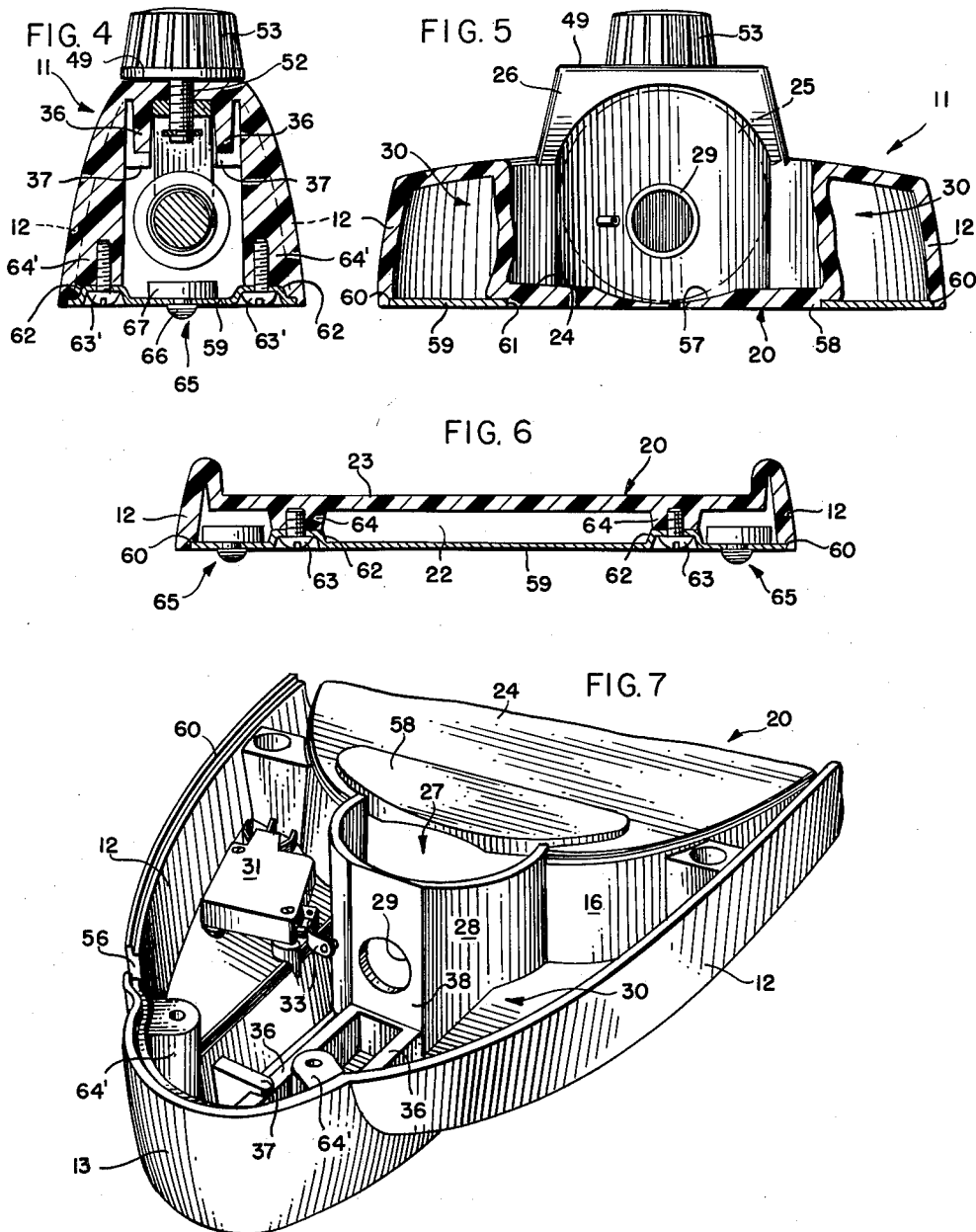
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GAME DEVICE

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9 Claims. (Cl. 273-179)

The present invention relates in general to game equipment, and has more particular reference to improved ball kicking or impelling apparatus especially well adapted for use in golf putting practice devices for automatically ejecting, to a remote station outwardly of the device, a golf ball putted into the same from the direction of said remote station, the present application comprising a continuation in part of my copending application for U.S. Letters Patent Serial No. 167,061, filed June 9, 1950, which issued May 31, 1955, as U.S. Patent No. 2,709,594.

An important object of the invention is to provide a molded element forming a ball receiving cup structure accurately simulating conditions prevailing at the hole of a golf course putting green, said cup structure providing upstanding walls forming a target chamber having a lateral ball entrance portal at one side, a ball receiving pocket at the opposite side of the chamber, and a floor inclined downwardly and inwardly from the portal toward the pocket, the molded element providing a housing for a ball return kicker in position to impel a ball from said pocket and outwardly of the cup structure through the open side thereof, including switch means operable by a ball in said pocket for actuating the kicker, said inclined floor having a portion of maximum inclination and adjacent said pocket for assuring entrance of a ball therein with sufficient momentum to actuate said switch.

Another important object is to form the inclined floor of the target chamber as an integral part of the molded element; a further object, to that end, being to provide an opening through the inclined floor at the bottom of said pocket and to close said opening with a thin cover plate; a still further object being to utilize said thin cover plate to enclose the bottom of the kicker housing portions of said molded element.

Another important object is to provide an embossment upon the underside of the floor portion of the molded element, beneath its portion of maximum inclination in front of the ball receiving pocket, the depth of said embossment being substantially equal to the thickness of the cover plate, whereby said portion of maximum floor inclination, at the pocket entrance, may extend in registration with the pocket bottom forming surface of said plate.

Another important object of the invention is to provide a device of the character described which, after receiving a ball in the pocket, will operate automatically to return the ball outwardly of the device substantially to a station or place from whence the ball was directed to the device; a further object being to provide ball return kicker means automatically operable in response to the presence of a ball in the receiving pocket to impel the ball outwardly of the device; a still further object being to provide means readily adjustable for regulating the intensity of the ball impelling stroke of the kicker.

Another important object is to provide an improved ball impelling kicker comprising a solenoid adapted to be electrically energized to move an armature comprising a rod or plunger disposed axially of the solenoid and having a ball striking head; a further object being to normally bias the plunger in retracted position with respect to the solenoid, as by means of a relatively flexible spring, whereby the same may be advanced axially of the solenoid to ball striking position against the influence of the

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spring; a still further object being to provide adjustable stop means for regulating the retracted position of the plunger with respect to the solenoid in order thus to determine the intensity of ball striking impact of the plunger accomplished by energizing the solenoid.

Another important object is to provide the plunger with a driving portion of length substantially less than the axial length of the solenoid, and a ball striking head spaced forwardly of the driving portion and interconnected therewith by means of a connecting stem, whereby the forward end of the driving portion will be disposed substantially behind the forward end of the solenoid when the striking head engages the ball to be impelled.

Another important object resides in providing an improved ball kicking solenoid and mounting, wherein the solenoid comprises a central sleeve carrying a generally cylindrical winding thereon between spaced end plates, the sleeve projecting outwardly of a said end plate at the forward end of the solenoid in position to interfittingly engage in an opening through a partition wall of the solenoid support structure, said support structure comprising abutment means forming a seat spaced from and facing said wall for snugly and interfittingly receiving and latchingly engaging an end plate of the solenoid, in order to resiliently clamp and secure the solenoid in operative position between said partition wall and said abutment means; a further object being to provide a cover plate adapted to be secured to the solenoid support structure in position overlying the supported solenoid and holding the same in position engaged with the abutment means.

The foregoing and numerous other important objects, advantages, and inherent functions of the invention will become apparent as the same is more fully understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment of the invention.

Referring to the drawings:

FIG. 1 is a perspective view of a game device embodying the present invention;

FIG. 2 is a sectional view taken substantially along the line 2-2 in FIG. 1;

FIGS. 3, 5 and 6 are sectional views respectively taken substantially along the lines 3-3, 5-5, and 6-6 in FIG. 2;

FIG. 4 is a sectional view taken substantially along the line 4-4, in FIG. 3; and

FIG. 7 is a perspective view of the underside of a portion of the device.

To illustrate the invention the drawings show an automatic ball return game device comprising a frame 11 which, as shown, may be of generally triangular shape, the frame having preferably slightly curved side walls 12 meeting and merging together to form a nose 13 at one end of the frame. At its opposite end, the frame may be formed with an open top target chamber 14 having a lateral entrance portal 15 opening at the nose remote end of the frame, said frame providing upstanding walls 16 defining the target chamber. The walls 16 may have a radius of curvature equal to that of a conventional golf hole, whereby the width of the entrance portal 15 at its narrowest portion is equal to the diameter of a conventional golf hole. The frame may include outwardly diverging abutment walls 17 defining said opening 15, outwardly of its narrowest portion.

The frame 11 may be formed with a ball receiving pocket 18 which opens upon the target chamber 14 at the side thereof opposite the entrance portal 15, said pocket being preferably sized to snugly yet freely receive a standard size golf ball therein, in order to position the same in alinement with kicker means 19 mounted in the frame behind the ball receiving pocket and operable in response

to the presence of a ball in the pocket to impel the ball forcibly from the pocket and outwardly of the device through the portal 15.

The frame 11 may also provide a preferably integral bottom wall or floor 20 for the target chamber, said floor extending at the opening 15 where it forms a thin, forwardly facing edge 21. Inwardly of said edge the floor provides an upwardly inclined portion 22 disposed at an angle such that a golf ball, if directed thereon at excessive speed, will be deflected upwardly and caused to jump over the walls 16 which define the chamber 14, and thus prevent the ball from being retained in the target chamber.

The inclined floor portion 22, inwardly of the edge 21, may terminate at and along a demarcation ridge 23 extending preferably parallel with respect to the edge 21. Inwardly of the ridge 23, the bottom wall 20 may provide an inclined plane portion 24 extending downwardly from the ridge 23 toward the pocket 18 at the side of the target chamber remote from the portal 15. Accordingly, a ball which passes over the ridge 23 in entering the chamber will thereafter gravitate along the inclined plane portion 24 and will be directed into the pocket 18, for ejection thence outwardly of the device, by operation of the kicker means 19.

The pocket 18 is preferably deep enough to receive a substantial portion of a golf ball 25, as clearly shown in FIGS. 2, 3, and 5 of the drawings, whereby to properly align the ball with the kicker means 19. To this end, the pocket may be and preferably is provided with a top or roof wall 26 in position overlying a ball in the pocket; and in order to permit the frame 11 to be fabricated as an integral molded element, as of suitable moldable plastic material, the frame 11 may be formed with an opening 27 through the floor or bottom wall 20 of the frame, such opening permitting the frame 11 to be molded as an integral unit including the floor portion 20 and the pocket roof 26.

The frame may provide an upstanding semi-cylindrical wall 28 integrally connected with the walls 16 and defining the pocket 18, said wall 28 being formed centrally with an opening 29 therethrough communicating the pocket with a housing cavity 30 formed in the frame 11 behind the target chamber and pocket forming walls 16 and 28. As shown more particularly in FIGS. 4 and 7, the housing cavity 30 provides for the reception and enclosure of the kicker means 19 as well as microswitch means 31 for controlling the operation of the kicker means, the frame portions defining the cavity 30 also providing for the support of adjustable means 32 for varying the force of the impact applied by the kicker means upon a ball 25 in the pocket 18. To these ends, the frame 11 behind the wall 28 may provide a seat for supporting the microswitch 31 adjacent said wall, said microswitch having a switch actuating arm 33 formed with a finger 34 having an end extending into the pocket 18 through an opening 35 in the wall 28 adjacent the opening 29.

The frame may also be provided with a pair of spaced strengthening flanges or ribs 36 extending between the wall 28 and the nose portion 13 of the frame, said ribs having a pair of transverse extensions 37 forming abutment shoulders facing toward the medial portions of the wall 28 which may be flattened, as at 38, to form a seat at the opening 29. The kicker means 19 may comprise a solenoid embodying a central sleeve 39, preferably of non-magnetic material such as copper, brass or other cuprous metal, and a winding 40 of generally cylindrical configuration on and concentrically encircling the sleeve between a pair of end plates 41, 41', preferably comprising insulating material and secured in position at the opposite ends of the winding by the peened over ends of the sleeve which project outwardly of said end plates at the opposite ends of the solenoid.

The solenoid may be mounted in the frame by applying the plate 41', at one end of the solenoid, in inter-

fitting engagement with the abutments 37, and by then pressing the projecting peened over end of the sleeve 39, at the opposite end of the solenoid, interfittingly into the opening 29 of the wall 28, while simultaneously bringing the adjacent end plate 41 into engagement with the seat 38. The resilience of the solenoid structure, including that of the end plates 41 and 41', may thus be employed to secure the solenoid firmly in mounted position between the seat 38 and the abutments 37. The solenoid, accordingly, may be assembled in mounted position merely by snapping the end of the sleeve 39 into the opening 29, after applying the end plate 41' into position against the abutments 37.

The kicker device may also embody an armature comprising a rod or stem 42 of magnetic material sized for longitudinal sliding movement within the sleeve 39, said stem having an end extending outwardly of the pocket remote end of the solenoid and formed with an enlarged head 43. This head preferably comprises a formed sheet metal cup which may be riveted to the pocket remote end of the armature stem. The stem may be normally urged toward retracted position with respect to the solenoid, as by means of a helical spring 44 concentrically encircling the stem 42, between the head 43 and said pocket remote end of the solenoid. When the solenoid is electrically energized, the stem 42 will be drawn abruptly to ball striking position in the solenoid against the influence of the spring 44, such movement being limited by engagement of the head 43, as at the rim of the cup, with the end plate 41' of the solenoid. The armature stem provides a ball striking head 45 at the end thereof remote from the head 43 for striking a ball in the pocket when the armature is drawn to ball striking position within the solenoid. The cup which forms the head 43 may be made deep enough to receive all of the coils of the spring 44 therein without binding or crushing the same when the armature is in ball striking position within the solenoid, with the rim of the cup in armature movement limiting engagement with the end plate 41'.

While the armature stem 42 may be made sufficiently long to constitute as a ball striking head the end thereof remote from the head 43, the ball striking head 45 may comprise a button connected with the adjacent end of the armature stem 42, as by means of a mounting member 46, whereby the end of the stem 42, adjacent the kicker head 45, may be disposed substantially inwardly of the pocket adjacent end of the solenoid when the armature is in ball kicking position, such arrangement appreciably improving the ball striking action of the kicker device. In this connection, the stem 42 comprises magnetic material, such as steel. The ball striking head 45 and the connecting member 46 may also comprise steel or other magnetic material, if desired. Indeed, the striking head 45, the connecting member 46 and the stem 42 may be formed as an integral part. The head 45 and connecting member 46, however, may be formed of non-magnetic material, if desired, and secured to the stem 42 in any suitable, preferred or convenient fashion. The head 43 also may be formed as an integral part of the armature, although it is preferably formed as a separate element of any suitable or preferred material and secured to the stem 42 as shown in the drawings.

The present invention contemplates the provision of simple yet extremely effective means for adjusting the ball striking impact of the kicker means 19. As shown, said means may comprise adjustable stop means 47 mounted on the frame 11 within the solenoid housing cavity 30 for determining the extent of retraction of the stem 42 with respect to the solenoid under the influence of the spring 44. The stop means 47 may conveniently comprise a strip of preferably non-magnetic metal, such as brass or other cuprous material, having an arm 48 adapted to slidably underlie a wall portion 49 of the frame 11 which forms the closed top of the chamber 30, said arm being slidably guided between the spaced flanges

or ribs 36 which depend beneath the wall 49 and extend between it and the solenoid in a direction parallel with respect to the axis of the stem 42.

The metal strip 48 comprising the stop means 47 may have a dependent arm 50 in position to engage the head 43 and hence limit the spring induced retracting movement of the stem 42 outwardly of the solenoid. The arm 48 may underlie an elongated slot 51 formed in the wall 49 between the dependent flanges 36. A clamping stem 52, extending in the slot 51 and having threaded engagement in the strip arm 48, may be provided for securing the adjustable stop means 47 in any position of adjustment within the range afforded by the slot 51, said stem 52 being provided with a manually operable clamping knob 53 upwardly of the wall 49 and formed for clamping engagement therewith. If desired, the nose portion 13 of the frame may be formed with an embossment 54 for limiting the movement of the adjustable stop means in a direction away from the solenoid.

The microswitch 31 may be electrically connected in series with the actuating winding 40 of the kicker means and with any suitable source of electrical energy, such as the outlet socket of a domestic power supply system, as through preferably insulated electrical cable 55 of conventional character, which may extend into the solenoid and switch housing chamber 30 as through a notched opening 56 formed in a wall portion 12 of the frame adjacent the nose 13, the device remote end of the cable 55 being preferably provided with a conventional electrical connection plug.

In order to assure that a ball 25 delivered in the target chamber 14 will enter the cavity 18 with sufficient momentum to operate the microswitch, the inclined floor 24 of the target chamber is formed, immediately in front of the pocket 18, with a portion 57 having appreciably greater inclination than the remainder of the inclined floor 24. Accordingly, the momentum of a ball will be augmented as it rolls over the inclined portion 57 in entering pocket 18, whereby to assure actuation of the microswitch when the ball engages the switch actuating finger 34 in the pocket 18. In order to allow for the application of the inclined floor portion 57, the underside of the floor portion 24, immediately in front of the pocket 18, is provided with an embossment 58 whereby to provide sufficient material to accommodate the inclined floor portion 57, as clearly shown in FIG. 2 of the drawings.

A cover plate 59 may be provided for enclosing the lower open side of the solenoid and switch housing chamber 30. The cover plate may comprise any suitable relatively thin sheet material, such as steel, fiberboard, plastic, and the like. The cover 59 may conveniently comprise a steel plate and may be extended to underlie the bottom of the ball pocket 18 as well as the underside of the floor portions 22 and 24 of the target chamber. In this connection, the frame 11 may be formed with a peripheral groove 60 shaped to snugly receive the peripheral edge of the cover plate 59. The cover plate 59 also may be formed with a central opening 61 to receive the embossment 58, whereby the cover portion enclosing the bottom of the pocket 18 may register with the pocket facing edge of the inclined floor portion 57.

The cover plate 59 may be inwardly embossed, as at 62, to receive the heads of fastening screws 63, 63', a pair of said screws 63 being provided for threaded engagement with downwardly extending, spaced apart embossments 64 formed on the underside of the floor of the target chamber, preferably immediately beneath the ridge 23. Another pair of fastening screws 63' may be provided for threaded engagement with spaced apart embossments 64' formed in the frame 11 at and on opposite sides of the nose 13 thereof within the solenoid and switch enclosing chamber 30.

Resilient foot members 65 may be secured on said cover member 59, said members 65 preferably comprising molded elements of rubber-like material embodying each

a hemispherical head 66 and a preferably cylindrical disc-like body 67 joined by an interconnecting neck. These foot elements may be mounted in perforations formed in the cover plate with the hemispherical heads and disc-like bodies respectively extending at the outwardly and inwardly facing surfaces of the cover plate. A pair of the elements may be mounted in position outwardly of the fastening screws 63. A single foot element may be mounted in an opening formed adjacent the fastening screws 63' in position such that the body portion of said element may press upon the solenoid end plate 41' at the ball pocket remote end of the solenoid, whereby to aid in retaining the solenoid in mounted position in the frame. In that connection, it will be noted that the cover plate 59 may snugly underlie the lower edges of both end plates 41, to thereby also aid in retaining the kicker device in mounted position in the frame 11.

The invention also contemplates the provision of ball retarding ribs 68 upon the inclined surface of the floor 24, which ribs will serve to control the motion of a ball rolling upon the floor.

If desired, for decorative purposes a flag supporting stem may be mounted in a socket 69 formed in the nose portions of the frame 11, as at the embossment 54.

It is thought that the invention and its numerous attendant advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the form herein disclosed being a preferred embodiment for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. A game device comprising means forming a ball receiving pocket and a floor inclined at a ball impelling angle sufficient to roll a ball thereon by gravity action toward the pocket, kicker means for ejecting a ball from said pocket, and kicker actuating means operable in response to the entrance of a ball into said pocket for actuating said kicker means, said inclined floor having a ball accelerating portion at the entrance to said pocket and inclined at an angle greater than said ball impelling angle of the floor, whereby to increase ball momentum when entering the pocket and thus assure operation of said kicker actuating means.

2. A game device comprising an integral molded frame providing upstanding walls forming a target chamber and a ball receiving pocket connected with said chamber on one side thereof, said chamber having an inclined floor integral with said walls for guiding a ball into said pocket, said frame including an integral portion covering the top of said pocket, said floor being formed with an opening at the bottom of said pocket, kicker means operable in response to the entrance of a ball into the pocket for ejecting the same thence through said target chamber and outwardly of the device, and a removable cover plate enclosing said opening and forming a continuation of said floor in said pocket.

3. A game device comprising an integral molded frame providing upstanding walls forming a target chamber and a ball receiving pocket connected with said chamber on one side thereof, said chamber having a floor integral with said walls and downwardly inclined toward said pocket for gravitating a ball into the same, said frame including an integral portion forming a roof covering the top of said pocket, said roof having a convergent orientation relative to the inclination of said floor, in the direction of the target chamber from the pocket, said floor being formed with an opening therethrough at the bottom of said pocket, beneath said roof, to accommodate a molding die element in said opening and thereby permit the formation of said roof, the chamber, the pocket defining walls and said inclined floor as integral portions of the frame, whereby to strengthen and rigidify the same and minimize manufacturing cost, and kicker means operable

in response to the entrance of a ball into the pocket for ejecting the same thence through said target chamber and outwardly of the device.

4. A game device comprising an integral molded frame providing upstanding walls forming a target chamber and a ball receiving pocket connected with said chamber on one side thereof, said chamber having a floor integral with said walls and inclined to a ball impelling angle sufficient to roll a ball thereon by gravity toward said pocket, said upstanding walls forming a lateral entrance portal to said chamber on the side thereof opposite said pocket, kicker means for ejecting a ball from said pocket medially across said chamber and out of said device through said lateral portal, and kicker actuating means operable in response to the entrance of a ball into said pocket for actuating said kicker means, said inclined floor having a ball accelerating portion at the entrance to said pocket and inclined at an angle greater than the ball impelling angle of the floor, whereby to increase ball momentum when entering the pocket and thus assure operation of said kicker actuating means.

5. A game device comprising an integral molded frame providing upstanding walls forming a target chamber and a ball receiving pocket connected with said chamber on one side thereof, said chamber having a floor integral with said walls and inclined to a ball impelling angle sufficient to roll a ball thereon by gravity toward said pocket, said upstanding walls forming a lateral entrance portal to said chamber on the side thereof opposite said pocket, kicker means for ejecting a ball from said pocket medially across said chamber and out of said device through said lateral portal, and kicker actuating means operable in response to the entrance of a ball into said pocket for actuating said kicker means, said inclined floor having a ball accelerating portion at the entrance to said pocket and inclined at an angle greater than the ball impelling angle of the floor, whereby to increase ball momentum when entering the pocket and thus assure operation of said kicker actuating means, the floor being formed with an embossment on its underside to accommodate the portion of increased inclination.

6. A game device comprising an integral molded frame providing upstanding walls forming a target chamber and a ball receiving pocket connected with said chamber on one side thereof, said chamber having an inclined floor integral with said walls for guiding a ball into said pocket, said upstanding walls forming a lateral entrance portal to said chamber on the side thereof opposite said pocket, kicker means for ejecting a ball from said pocket, kicker actuating means operable in response to the entrance of a ball into said pocket for actuating said kicker means, said inclined floor having a portion of increased inclination at the entrance to said pocket to assure ball momentum when entering the pocket sufficient to operate said kicker actuating means, the floor being formed with an embossment on its underside at the entrance to said pocket, to accommodate the portion of increased inclination, and a removable cover plate secured upon the bottom of said frame, said plate being provided with an opening conforming with and snugly receiving said embossment.

7. A game device comprising a frame forming an up-

standing wall, a ball receiving pocket and a compartment on opposite sides of the wall, kicker means mounted in said compartment comprising an electrically operable solenoid having a movable armature, said wall being formed with an opening communicating the pocket with said compartment and a seat facing into the compartment at said opening, said solenoid having a central armature guiding sleeve adapted to extend, at one end, in said opening, and an end plate adapted to engage said seat around said opening, said frame being formed with abutments spaced from and facing said seat, in position to grippingly engage the seat remote end of said solenoid to hold the same removably in mounted position on the frame.

8. A game device comprising a frame forming an upstanding wall, a ball receiving pocket and a compartment on opposite sides of the wall, kicker means mounted in said compartment comprising an electrically operable solenoid having a movable armature, said wall being formed with an opening communicating the pocket with said compartment and a seat facing into the compartment at said opening, said solenoid having a central armature guiding sleeve adapted to extend, at one end, in said opening and an end plate adapted to engage said seat around said opening, said frame being formed with abutments spaced from and facing said seat, in position to grippingly engage the seat remote end of said solenoid to hold the same removably in mounted position on the frame, and a holding member demountably secured on said frame in position engaging the seat remote end of the solenoid to retain the same in facing engagement with said abutment means.

9. A game device comprising a frame providing upstanding partition walls forming a target chamber and a ball receiving pocket, laterally connected with said chamber, on one side of said walls, and a compartment, on the opposite side of said walls, an inclined floor for said target chamber for delivering a ball by gravity action into said pocket, and kicker means mounted in said compartment and operable in response to the entrance of a ball in said pocket to eject the same thence outwardly of the device, said kicker means comprising an electrically operable solenoid having a movable armature, said walls being formed with an opening communicating said pocket with said compartment and a seat facing into the compartment at said opening, said solenoid having a central armature guiding sleeve, adapted to seat at one end in said opening and an end plate adapted to engage said seat around said opening, said frame being formed with abutment means spaced from and facing said seat in position to grippingly engage the seat remote end of said solenoid to hold the same in mounted position in the frame.

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