May 26, 1964 J. R. BRANDELL 3,134,597

GOLF PRACTICE DEVICE WITH SOLENOID-ACTUATED BALL RETURN MEANS

Original Filed May 23, 1955 2 Sheets-Sheet 1

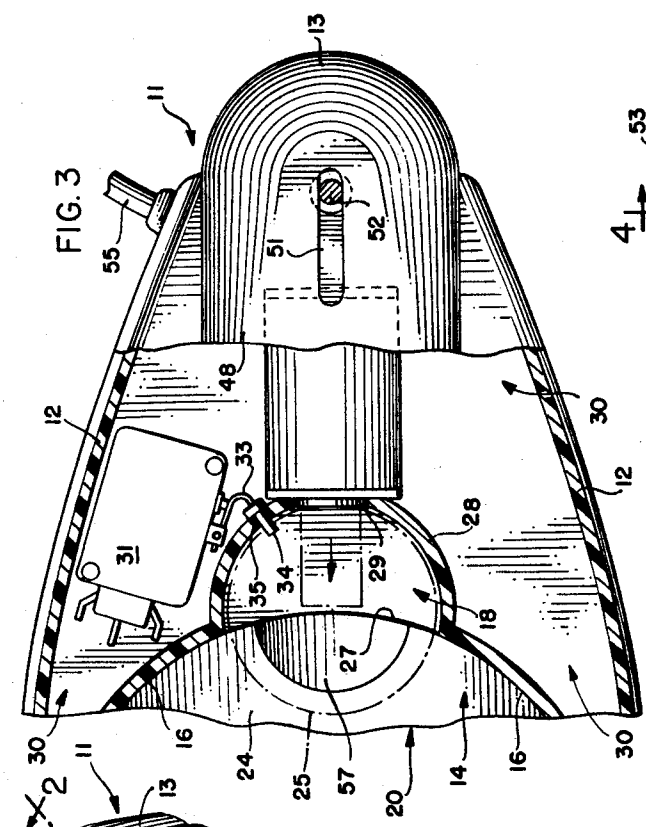


FIG. 3

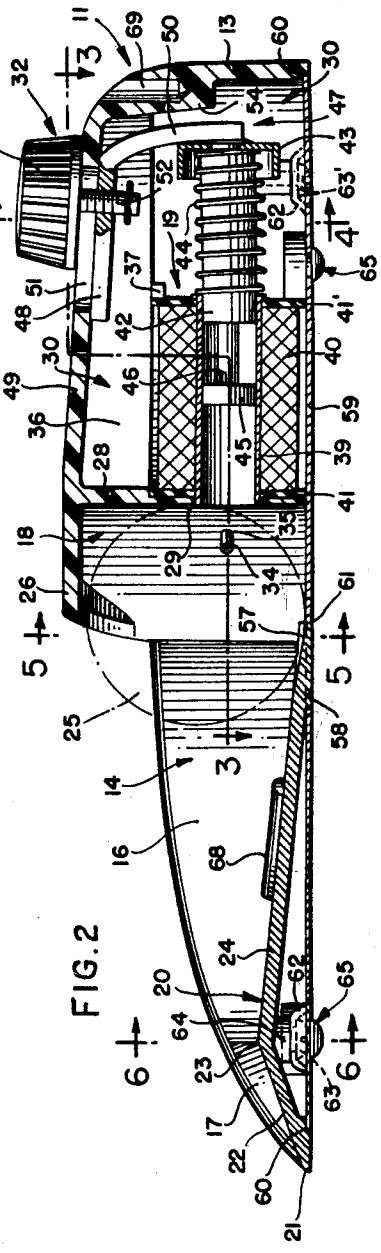


FIG. 2

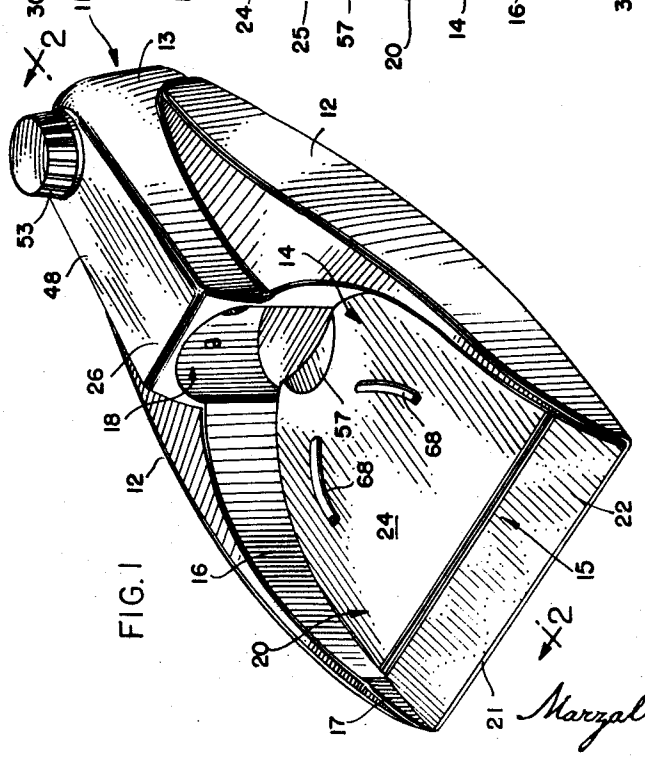


FIG. 1

INVENTOR:—
JOHN R. BRANDELL
BY:—
Marzall, Johnston, Cook & Root
ATT'YS

May 26, 1964 J. R. BRANDELL 3,134,597

GOLF PRACTICE DEVICE WITH SOLENOID-ACTUATED BALL RETURN MEANS

Original Filed May 23, 1955 2 Sheets-Sheet 2

FIG. 4

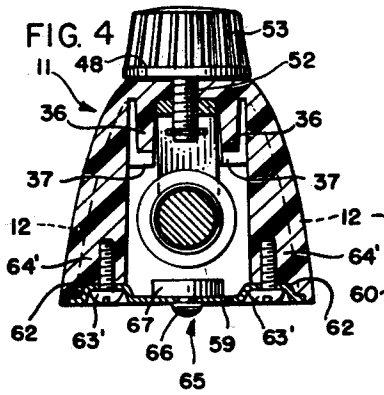


FIG. 5

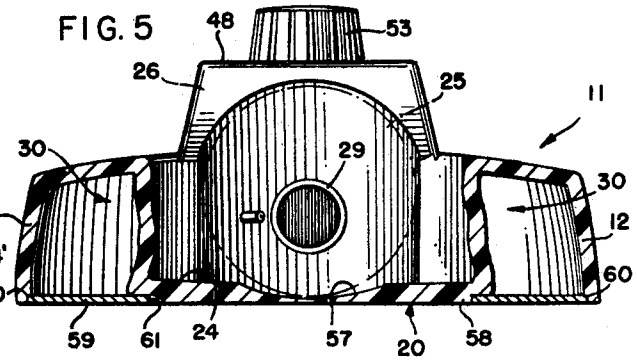


FIG. 6

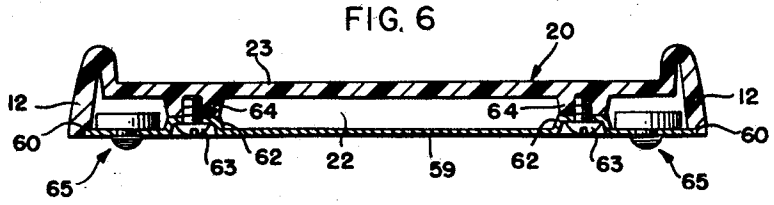
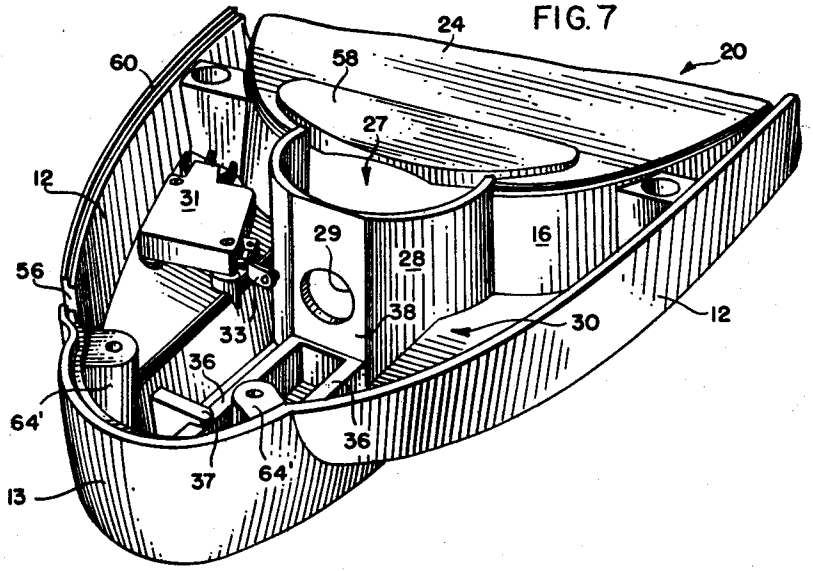


FIG. 7



INVENTOR:-

JOHN R. BRANDELL

BY:-

Marzall Johnston, Cook & Root

ATT'YS

United States Patent Office

3,134,597

Patented May 26, 1964

3,134,597

GOLF PRACTICE DEVICE WITH SOLENOID-ACTUATED BALL RETURN MEANS

John Roulund Brandell, 300 N. State St., Evanston, Ill.

Original application May 23, 1955, Ser. No. 510,397, now Patent No. 3,030,113, dated Apr. 17, 1962. Divided and this application July 24, 1958, Ser. No. 750,814

4 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 containing subject matter divided from my copending application Serial No. 510,397, now U.S. Patent No. 3,030,113 of April 17, 1962, which was filed May 23, 1955 as a continuation in part of my application Serial No. 167,061, filed June 9, 1950, in response to which U.S. Patent No. 2,709,594 was issued May 31, 1955.

An important object of the invention is to provide a ball receiving cup structure simulating conditions prevailing at the hole of a golf course putting green, said cup structure providing a ball receiving pocket, a ball return kicker in position to impel a ball from said pocket and outwardly of the cup structure, and switch means operable by a ball in said pocket for actuating the kicker.

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 towards 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 a ball striking device 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 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 a ball striking device embodying a solenoid and an associated rod or plunger forming an armature; wherein the plunger has 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 within and 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 mounting for a ball kicking device embodying a solenoid comprising 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, 4, 5 and 6 are sectional views respectively taken substantially along the lines 3—3, 4—4, 5—5, and 6—6 in FIG. 2; 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 in FIG. 1, may be of generally triangular shape, 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 preferably semi-cylindrical 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 inclined 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 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 aline 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 interfitting 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 form a recess capable of receiving 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 and the connecting member 46 may be integrally interconnected together and with the stem 42. 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 slidingly underlie a wall portion 49 of the frame 11 which forms the closed top of the chamber 30, said arm being slidingly 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 comprising the stop means 48 may have a dependent arm 50 forming a shiftable abutment disposed 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 con-

ventional 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 the 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 part embossments **64** formed on the underside of the floor of the target chamber, preferably immediately beneth 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 a frame forming a ball kicking station, an electrical solenoid having an axial channel extending therethrough from end to end and supported in the frame in position disposing the opposite ends of the solenoid respectively at and remote from the station, a rod forming an armature axially slidable in said channel between retracted and projected positions, bias means normally urging the rod yieldingly toward retracted position, a stop for determining the relative axial displacement of the armature with respect to the solenoid when in retraced position, said rod having a ball striking end disposed within the solenoid when the rod is in retracted position, and projectable outwardly of the station mounted end of the solenoid to strike a ball at said station when the solenoid is energized, said rod also having a station remote end extending outwardly of the station remote end of the solenoid when the rod is in retracted position, means actuated in response to the presence of a ball at said station to energize the solenoid and thereby move the armature from retracted toward ball striking position against the influence of said bias means, and a movement limiting member on and extending outwardly of said rod, at its station remote end, in position to engage the station remote end of the solenoid, to thereby stop projecting movement of the rod as it reaches projected position, said bias means comprising a helical spring surrounding the rod and bearing at its opposite ends upon the movement limiting member and on the station remote end of the solenoid, said movement limiting member providing a recess for receiving the compressed coils of said helical spring when the rod is stopped in projected position by engagement of the movement limiting member with the station remote end of the solenoid.

2. A game device comprising a frame forming a ball kicking station, an electrical solenoid having an axial channel extending therethrough from end to end and supported in the frame in position disposing the opposite ends of the solenoid respectively at and remote from the station, a rod forming an armature axially slidable in said channel between retracted and projected positions, bias means normally urging the rod yieldingly toward retracted position, a stop for determining the relative axial displacement of the armature with respect to the solenoid when in retracted position, said rod having a ball striking end disposed within the solenoid when the rod is in retracted position, and projectable outwardly of the station mounted end of the solenoid to strike a ball at said station when the solenoid is energized, said rod also having a station remote end extending outwardly of the station remote end of the solenoid when the rod is in retracted position, means actuated in response to the presence of a ball at said station to energize the solenoid and thereby move the armature from retracted toward ball striking position against the influence of said bias means, and a cup member having a bottom secured on the station remote end of the rod and sides extending outwardly of and surrounding said rod, said sides forming a rim in position to engage the station remote end of the solenoid, to thereby stop projecting movement of the rod as it reaches projected position, said bias means comprising a helical spring surrounding the rod and bearing at its opposite ends respectively on the bottom of the cup, around the rod, and on the station remote end of the solenoid, said cup forming a recess around the rod for receiving the compressed coils of the helical spring when the rod is stopped in projected position

by engagement of the rim of the cup with the station remote end of the solenoid.

3. A game device comprising a frame forming a ball kicking station, an electrical solenoid having an axial channel extending therethrough from end to end and supported in the frame in position disposing the opposite ends of the solenoid respectively at and remote from the station, a rod forming an armature axially slidable in said channel between retracted and projected positions, bias means normally urging the rod yieldingly toward retracted position, a stop for determining the relative axial displacement of the armature with respect to the solenoid when in retracted position, said rod having a ball striking end disposed within the solenoid when the rod is in retracted position, and projectable outwardly of the station mounted end of the solenoid to strike a ball at said station when the solenoid is energized, said rod also having a station remote end extending outwardly of the station remote end of the solenoid when the rod is in retracted position, means actuated in response to the presence of a ball at said station to energize the solenoid and thereby move the armature from retracted toward ball striking position against the influence of said bias means, the rod being provided with a rivet at its station remote end, and a formed sheet metal cup having sides extending outwardly of and encircling the rod and a bottom provided with a central rivet hole for receiving said rivet to secure the cup on the rod, said sides of the cup forming a rim in position to engage the station remote end of the solenoid, to thereby stop projecting movement of the rod as it reaches projected position, said bias means comprising a helical spring surrounding the rod and bearing at its opposite ends respectively on the bottom of the cup, around the rod, and on the station remote end of the solenoid, said cup forming a recess around the rod for receiving the compressed coils of the helical spring when the rod is stopped in projected position by engagement of the rim of the cup with the station remote end of the solenoid.

4. A game device comprising a frame forming a ball kicking station, an electrical solenoid having an axial channel extending therethrough from end to end and supported in the frame in position disposing the opposite ends of the solenoid respectively at and remote from the station, a rod forming an armature axially slidable in said channel between retracted and projected positions, bias means normally urging the rod yieldingly toward retracted position, an adjustable stop for determining the relative axial displacement of the armature with respect to the solenoid when in retracted position, said rod having a ball striking end normally disposed within the solenoid, when the rod is in retracted position, said striking end being projectable outwardly of the station mounted end of the solenoid to strike a ball at said station when the solenoid is energized to move the rod from retracted to projected position against the influence of the bias means, said rod also having a station remote end extending at and outwardly of the station remote end of the solenoid and in engagement with said stop, when the rod is in retracted position, means actuated in response to the presence of a ball at said station to energize the solenoid and thereby move the armature against the influence of said bias means from retracted toward ball striking position, the frame being formed with a slide guideway parallel with the axis of the solenoid, said adjustable stop comprising a slide member adjustable longitudinally of said guideway, means to clamp the slide member in adjusted position in said guideway, and a stop lug supported on said slide member in position overlying the station remote end of the rod to determine its relative axial displacement with respect to the solenoid, when in retracted position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,725,504	Bettica	Aug. 20, 1929
2,117,880	Goddard	May 17, 1938
2,161,355	Jacobson	June 6, 1939
2,199,009	Perryman	Apr. 30, 1940
2,324,075	Gillon et al.	July 13, 1943
2,426,745	Porskievies	Sept. 2, 1947
2,427,630	Snyder	Sept. 16, 1947
2,443,759	Anderson	June 22, 1948
2,459,510	Ellmann	Jan. 18, 1949
2,582,290	Smith	Jan. 15, 1952
2,696,985	Hogeberg	Dec. 14, 1954