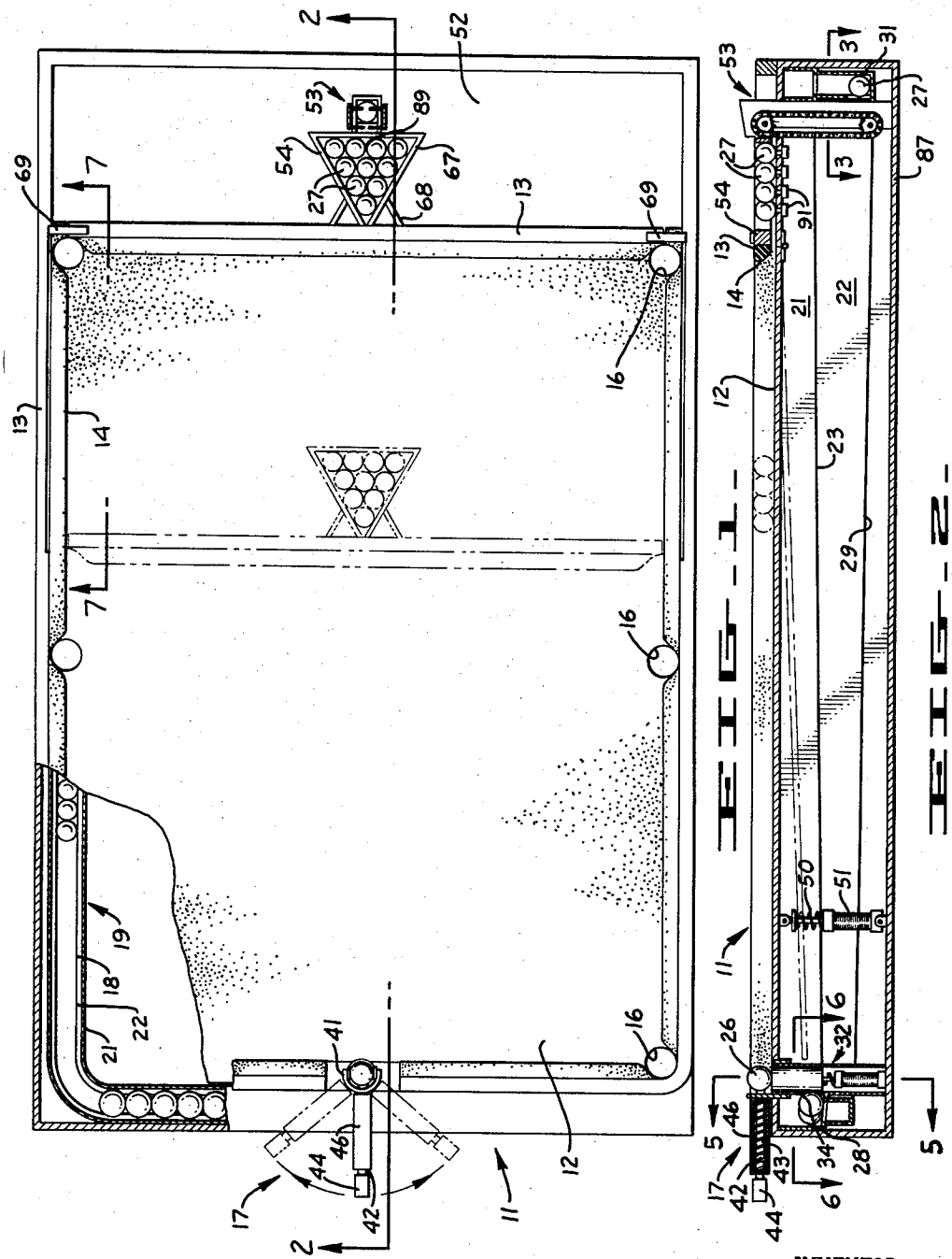
July 7, 1964 S. SINGER 3,140,093

BALL GAME WITH PROJECTOR AND AUTOMATIC BALL SUPPLYING AND RACKING MEANS

Filed Nov. 13, 1961 3 Sheets-Sheet 1



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BALL GAME WITH PROJECTOR AND AUTOMATIC BALL SUPPLYING AND RACKING MEANS

Filed Nov. 13, 1961 3 Sheets-Sheet 2

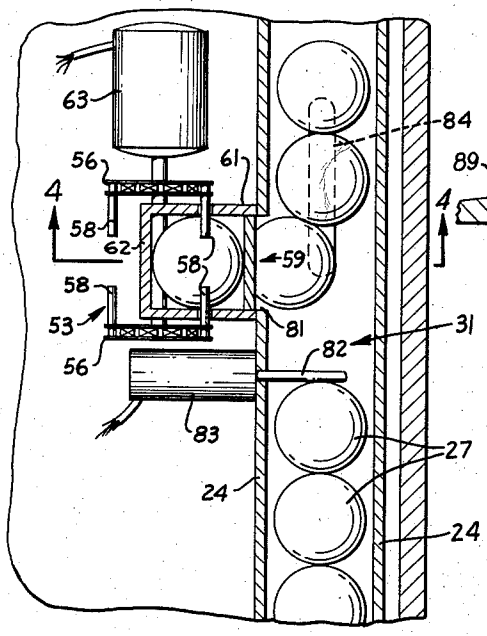


FIG. 3.

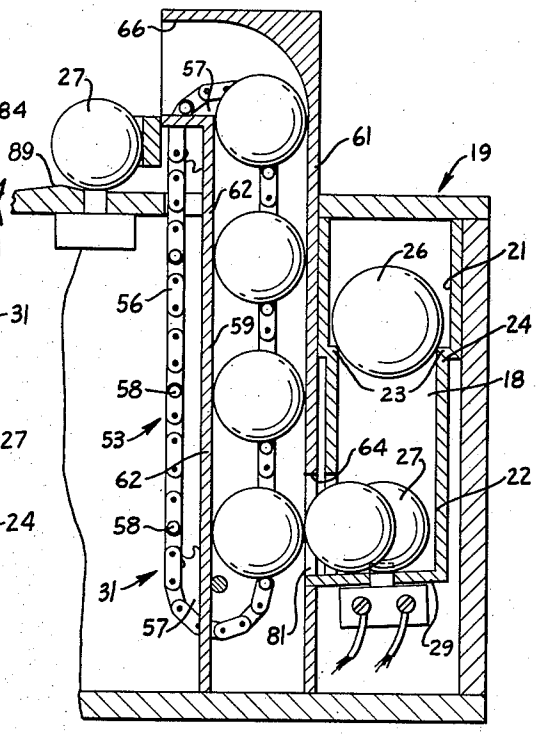


FIG. 4.

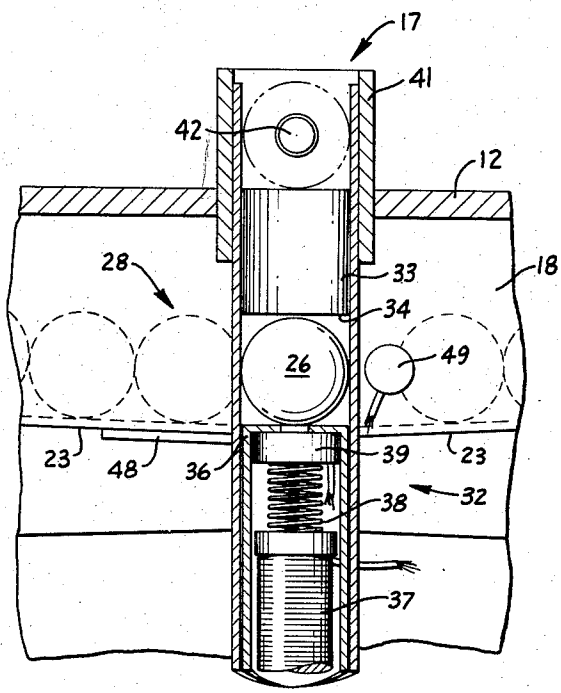


FIG. 5.

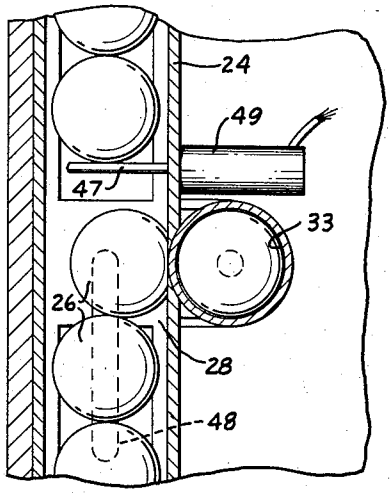


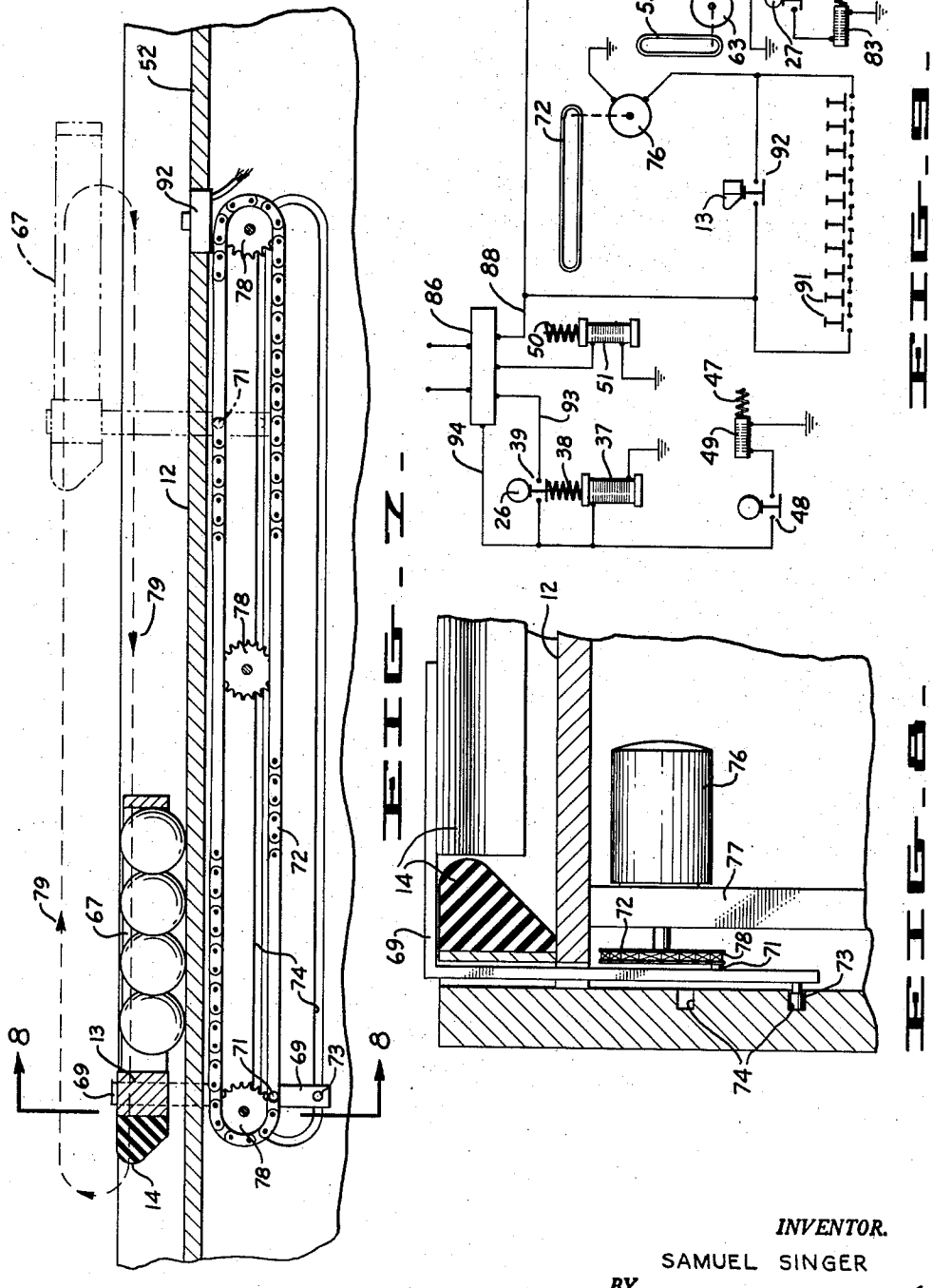
FIG. 6

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BALL GAME WITH PROJECTOR AND AUTOMATIC BALL SUPPLYING AND RACKING MEANS

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BALL GAME WITH PROJECTOR AND AUTOMATIC BALL SUPPLYING AND RACKING MEANS

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Filed Nov. 13, 1961, Ser. No. 151,614
9 Claims. (Cl. 273—11)

The present invention relates to improvements in an apparatus for playing a game and more particularly to an apparatus for playing simulated pocket billiards or "pool" game.

Pool is a popular and entertaining game which has been enjoyed by many players. The game is generally played on a flat playing surface on which balls are provided. The game has many variations, most of which involve knocking a playing ball into a pocket with an aimed cue ball.

The game of the present invention also contains these characteristics, but differs from conventional pool in a number of ways. For example, means other than a cue stick is used to propel the aimed cue balls, and ordinarily a plurality of cue balls are used. Instead of a cue, the present invention preferably utilizes a spring-loaded plunger similar to that used in pin-ball or bagatelle games. In addition, the plunger of this invention is mounted so as to provide an aimed propulsion.

Accordingly, it is seen that popular features of two well known and well liked games are combined into a novel game which is adapted to be embodied in a single apparatus. Other minor variations from the obvious counterparts and additional valuable features will be apparent as the description proceeds.

It is a primary object of this invention to provide an apparatus for playing a game which simulates conventional pool and which also contains mechanical devices that provide a pin-ball type shooter and other mechanical devices designed to render the set-up and motions of the machine automatic.

Another object of the invention is to provide an apparatus of the character described which may be coin operated.

A further object of this invention is to provide an apparatus for playing a game using cue balls and playing balls that separates the two classes of balls after they have been played and holds them at their respective stations until ready for use in another game.

Still another object of the invention is to provide an apparatus for playing a game which places one cue ball at a time in shooting position in a player-operated shooter.

A still further object of the invention is to provide a game of the character described in which pool balls are placed in a triangular formation by a mechanical racking procedure at the proper position of the playing surface.

Yet another object of the invention is to program the various mechanical functions of the game to provide automatic sequential operation of the various components.

Further objects and advantages of my invention will be apparent as the specification progresses, and the new and useful features of my apparatus for playing a game will be fully defined in the claims attached hereto.

The game of the invention is played on a table similar to a pool table having a rectangular playing surface, resilient cushions on each side of the rectangle, and six holes recessed in the cushions with one at each of the four corners and one in the middle of each long side. The game is played by racking up the playing balls in formation at a position near the rear of the playing surface and shooting cue balls at them by means of a shooter recessed in the front cushion of the table.

The shooter is preferably a spring-operated plunger that has a handle at one end which the player pulls back

to load the spring and propel the ball on release of the handle. Thus control of the propelling force is within the skill of the player. In addition the shooter is mounted so as to be aimed by the player to control the direction of the cue ball. In this way, the player tries to knock the playing balls into the pockets or accomplish any other type shot that is desirable according to the rules of the game.

The actual game played may vary considerably, and the apparatus is capable of many different games or variations of any particular game. For example, points may be scored simply by knocking playing balls into the holes or pockets, and points may be scored or subtracted by knocking or playing a cue ball into a pocket. In addition, different credits can be given for knocking balls into pockets of varying difficulty or credit may be given or required for "called" bank shots and the like.

The game is particularly suited for coin operation and may be placed in any public place where amusement machines are likely to be played by the general public. The game is also suited for use by one or any number of players competing for high scores, that is, either a high score per se or a competitive high score.

The preferred form of my invention is illustrated in the accompanying drawings forming part of this application, in which:

FIGURE 1 is a plan view of a typical apparatus for playing the game of the invention, with portions broken away to illustrate internal parts;

FIGURE 2, a sectional elevation of the apparatus of FIGURE 1 taken substantially in the plane of line **2—2** of FIGURE 3;

FIGURE 3, a partial plan section taken in the plane of line **3—3** of FIGURE 2;

FIGURE 4, a partial sectional elevation taken in the plane of line **4—4** of FIGURE 3;

FIGURE 5, a partial sectional elevation taken in the plane of line **5—5** of FIGURE 2;

FIGURE 6, a partial plan section taken in the plane of line **6—6** of FIGURE 2;

FIGURE 7, a partial sectional elevation taken in the plane of line **7—7** of FIGURE 1;

FIGURE 8, a partial sectional elevation taken in the plane of line **8—8** of FIGURE 7; and

FIGURE 9 is a schematic view illustrating a control system utilized for automatic operation of the apparatus shown in FIGURES 1 through 8.

While I have shown only the preferred forms of my invention, it should be understood that various changes or modifications may be made within the scope of the claims attached hereto without departing from the spirit of the invention.

Referring to the drawings in detail, it is seen that this invention includes a table **11** having a rectangular playing surface **12**, whereon a game of pool or similar game may be played. The playing surface **12** is defined by upwardly extending cushions **13** having a resilient edge **14**. Holes, or pockets **16** are provided in the playing surface and are recessed in the cushions. Preferably, the pockets are positioned at the corners of the rectangle and midway of its long sides. It can be seen that the table thus described is similar to the geometry of a standard pool table.

A shooter **17** is pivotally mounted at the front end of the table midway of one of the short sides of the rectangle. In actual play, cue balls are shot from the shooter at the pool balls. The usual plays of pool may be practiced, such as rebounding a ball off the cushions into other balls, or the pocket. If all goes well the ball or balls will fall into one of the pockets **16**.

Below the playing surface and running in communication with the pockets is a pair of inclined troughs **18**

which also serve as a classifier **19** and as passages through which the balls roll. The troughs, as best seen in FIGURE 4, are generally U shaped, with the U being constructed to form an upper trough **21** and a lower trough **22**, the troughs being separated by shoulders **23** in side walls **24** of troughs **18**.

In the embodiment illustrated, the classifier **19** is constructed to classify or separate balls of different diameters. Thus cue balls **26** are of a larger diameter than playing balls **27**, and cue balls **26** are held in the upper trough **21** while playing, or pool balls **27** drop down into the lower trough **22**.

The classifier therefore has a U-shaped channel having upper walls spaced apart a distance larger than the diameter of the cue balls, and lower side walls spaced apart a distance smaller than the diameter of the cue balls but larger than the diameter of the playing balls. However, other forms or types of size classifiers could be used without departing from the spirit of the invention. In its broad form, for example, the invention could use balls of the same diameter, but of different weight and utilize a classifier adapted to separate balls of different weights.

Although different types of classifiers could be used, it is an important feature that a classifier is used to provide automatic operation of the apparatus. The classifier illustrated is preferred because of its simple construction and reliability of operation.

As best seen in FIGURE 2, the bottom of upper trough **21** as defined by shoulders **23** is inclined toward the front of the table and leads to a first receiving station **28** where the cue balls are collected under the playing surface of the table near the shooter **17**. Similarly the lower trough **22** has a bottom **29** which is inclined toward the back of the table in communication with a second receiving station **31** where the playing balls are collected.

In order to transfer the cue balls from the first receiving station **28** to the shooter in position to be played, there is provided an elevator **32**, see FIGURES 5 and 6. The elevator includes an elevator shaft **33** having an opening **34** communicating with the receiving station **28**, thereby permitting a cue ball to roll into the elevator shaft. An elevator platform **36** is slidable within the shaft and extends around a solenoid **37**. Solenoid **37** is capable of pulling the platform **36** down against the force of a compression spring **38** when actuated by pressure switch **39**, see FIGURE 9.

In operation, after a cue ball has been shot, pressure switch **39** is closed allowing solenoid **37** to pull down the platform **36**. A cue ball then rolls into the shaft **33** through opening **34**, which opens pressure switch **39** by pressure-sensitive means on the platform (not shown), thus closing the circuit that actuates the solenoid. The solenoid then allows the spring **38** to push the platform and ball up to the shooting position, while the sides of the platform close opening **34** and prevent entry of another cue ball.

Journaled at the top of the elevator shaft **33** is a semicircular housing **41** carrying the shooter **17**, which is preferably of the spring plunger type. As best seen in FIGURES 1 and 2, the shooter comprises a pin or plunger **42** within a spring **43** and having a handle **44** at one end. The spring and pin are housed in a tube **46** with the assembly arranged so that the spring compresses as the handle **44** is drawn back, and the spring drives the pin forward within the tube **46** when the handle is released. In this way, the forwardly advancing pin strikes a cue ball in shooting position and propels it out onto the playing surface.

It is seen that the spring-loaded pin or plunger drives the ball according to the compressive force supplied by the player. In addition, the shooter **17** is pivotally mounted, as shown in FIGURE 1, and the player can position the shooter in any position between the positions shown in phantom. In this way the player supplies the aim as well as the speed imparted to the cue ball.

In the embodiment shown in the drawings, it is seen that cue balls feed into the elevator through opening **34** from two directions at the receiving station **28**. To keep the balls from jamming in front of the opening **34**, a gate **47** is provided, see FIGURE 6, whereby only one side of the receiving station is open when there are any balls on the other side of opening **34**. This is accomplished by a pressure switch **48** which actuates a gate solenoid **49** when no balls are on the switch to cause it to open. The pressure switch is long enough so that it will not actuate the solenoid while there are any balls in any position on the switch side of the gate.

After all of the cue balls have been shot from the shooter, the game is completed. In order to begin another game, the cue balls are returned to their receiving station and the playing balls are racked up. Usually balls remain on the playing surface of the table at the completion of the game, and these balls are first removed and sent through the classifier and to their respective receiving stations.

Removal of the balls is accomplished by pulling the playing surface **12** of the table downward as shown in phantom in FIGURE 2 so that the balls will roll into troughs **18** at the front of the table. The playing surface is pulled down by a solenoid **51** against the force of spring **50** which normally supports the surface in a level position. This clears the playing surface and causes all of the balls to roll into the receiving stations where the cue balls are ready to be fed into the elevator and the playing balls are ready to be conveyed into a racking device. The solenoid is then deactivated, and the spring returns the playing surface to its normal position.

As seen in FIGURES 2, 3 and 4, the playing balls in receiving station **31** are in a position behind the playing surface of the table under an extension **52** of the surface and adjacent to a vertical conveyor **53** mounted within the extension. In operation, the conveyor conveys the pool balls or playing balls **27** from the receiving station to a rack **54** on extension **52**.

The conveyor comprises a pair of chains **56** riding on sprockets **57**, and having pins **58** extending into conveyorway **59** housed in housing **61** and back plate **62**. The chains are driven by motor **63** through one of the sprockets. As the pool balls fall through opening **64** in housing **61**, the pins **58** form seats which push the ball up above the playing surface and out through opening **66** into a triangular rack member **67**.

The rack is carried on the rear cushion by means of brackets **68**, as shown in FIGURE 1. The rear cushion is supported by L-shaped arms **69**, see FIGURES 1 and 7. Each arm extends below the playing surface where it is pivotally carried by pin **71** extending from chain **72**. A roller **73** extends from the distal end of arm **69**, and rides in groove **74** to keep arm **69** in a vertical position at all times.

Chain **72** is driven by motor **76**, see FIGURE 8, through a gear reducer **77** and one of the sprockets **78**. The chain moves the arm and the cushion and rack attached thereto through a flat ellipse, substantially as defined by arrows **79**. In this way the racked balls will be deposited in front of the rear cushion **13** in playing position, as shown in phantom in FIGURE 1.

As best seen in FIGURES 3 and 4, the second receiving station **31** that receives the playing balls as they leave the playing surface of the table is adjacent to the conveyor **53** with the balls going from the station to the conveyor through hole **81**. As shown in the drawing, balls travel toward the hole from opposite directions. In order to keep the balls from interfering with each other, gate **82** is provided to hold the balls on one side whenever balls are present on the other side. The gate is controlled by solenoid **83** which closes the gate when balls are on pressure switch **84**, and opens it when no balls are on the switch.

Although both receiving stations have the cue balls and playing balls coming from opposite directions to the elevator and conveyor respectively, it is also possible to classify either or both types of balls into a single channel that directs them through the corresponding receiving station from one direction. In such cases, gates **47** and **82** may be eliminated.

The apparatus is particularly adapted to be coin operated through a control box **86**, see FIGURE 9, because the operating parts are electrically activated and are contained in a closed housing **87** below the table, see FIGURE 2. In such a situation, control box **86** preferably will also contain a conventional counter (not shown) to count the number of cue balls played and stop operation when play has run out. Another coin is then required to activate the control box.

Referring particularly to FIGURE 9, it is seen that the control box **86** activates the various solenoids. As the game is started, the playing surface is first tilted by activation of solenoid **51** which is on for a timed period. At the end of the period, spring **50** returns the playing surface to its normal position, and the timer then provides current to line **88**. Activation of line **88** causes the motor **63** to drive the conveyor **53** and operate gate **82** and gate solenoid **83** so that all of the playing balls are delivered to the rack.

As the balls are delivered to the rack, they tend to roll toward the front of the rack until the front is filled. Then the balls are directed to the side corners by a raised portion at **89** on the extension of the table. In this way, the entire rack is filled. As each ball finds its place, it comes to rest over a pressure switch **91**, see FIGURES 2 and 9. When all of the switches **91** are closed, motor **76** is activated and it begins to drive the rack forward. As the rack goes forward, switches **91** open, but switch **92** closes to keep the motor **76** energized. Switch **92** is held open, by rear cushion **13** when the cushion is in normal position, but as the cushion is moved forward along with the rack, the switch closes and keeps motor **76** operating until the cushion and rack move through their elliptical path shown by arrows **79** and the cushion is brought back down on switch **92**. Motor **76** is then shut off.

After the balls have been racked up, the timer then activates line **93** and deactivates line **88**. Line **93** remains activated until a counter within the control box **86** receives a fixed number of impulses through line **94** with each impulse corresponding to action of pressure switch **39**. Switch **39** opens each time a cue ball is shot so it is seen that one complete game is controlled automatically with the control box being shut off on completion of the programmed number of shots.

In the embodiment shown, ten playing balls are used along with ten cue balls. However, other numbers of balls and other modifications of the game may be made as desired, and still provide a game having a high amusement value with automatic operation of the moving parts.

I claim:

1. An apparatus for playing a simulated pool game utilizing a plurality of cue balls and a plurality of playing balls having a diameter smaller than the cue balls, comprising a table having a flat playing surface, a front cushion, a rear cushion, two side cushions, said cushions being of a resilient material and having recessed portions, and holes in the playing surface and within the recessed portions of the cushions according to the geometry of a conventional pool table, a classifier under the playing surface adapted to receive balls passing through said holes, said classifier being a U-shaped channel having upper side walls spaced apart a distance larger than the diameter of the cue balls, lower side walls spaced apart a distance smaller than the diameter of the cue balls but larger than the diameter of the playing balls, and a shoulder portion between said upper and lower side walls adapted to carry cue balls while the bottom of the U-shaped channel is adapted to carry playing balls, a first receiving station for receiving cue balls from the classifier, a second receiving station for receiving playing balls from the classifier, a shooter for directing cue balls out onto the playing surface, elevator means for moving balls from said first receiving station into shooting position in said shooter, conveyor means for moving playing balls from said second receiving station upwardly, a rack attached to the rear cushion, said rack constructed to receive the playing balls from said conveyor means and position the balls on the playing surface, an extension at the rear of the playing surface of the table for holding the rack and balls while the rack is being loaded with the playing balls from the conveyor means, and means for moving the rear cushion so as to move the loaded rack into the playing position on the playing surface, raise the rack from the balls, and move the empty rack back to an out of play position on the extension at the rear of the playing surface.

2. The apparatus defined in claim 1, in which the shooter is pivotally mounted at the front end of the table and in which the shooter contains a spring-loaded plunger for propelling balls from the shooting position according to the aim and spring tension provided by the player.

3. The apparatus defined in claim 1, in which the elevator means comprises a housing, a platform mounted for vertical movement within the housing, and drive means for raising and lowering the platform.

4. The apparatus defined in claim 1, which also comprises receiving means at one end of the table for receiving balls and directing them to the classifier, and means for tilting the playing surface of the table an amount sufficient to cause the balls to roll into said receiving means.

5. The apparatus defined in claim 1, which also comprises first electrical drive means for actuating the elevator means, second electrical drive means for moving the conveyor means, and control means for controlling said first and second drive means according to a prearranged program.

6. The apparatus defined in claim 5, which also comprises a coin-operated switch operative to actuate said control means.

7. An apparatus for playing a simulated pool game utilizing a plurality of cue balls and a plurality of playing balls having a diameter smaller than the cue balls, comprising a table having a flat playing surface, a front cushion, a rear cushion, two side cushions, said cushions being of a resilient material and having recessed portions, and holes in the playing surface and within the recessed portions of the cushions according to the geometry of a conventional pool table, a classifier under the playing surface adapted to receive balls passing through said holes, said classifier being a U-shaped channel having upper side walls spaced apart a distance larger than the diameter of the cue balls, lower side walls spaced apart a distance smaller than the diameter of the cue balls but larger than the diameter of the playing balls, and a shoulder portion between said upper and lower side walls adapted to carry cue balls while the bottom of the U-shaped channel is adapted to carry playing balls, a first receiving station for receiving cue balls from the classifier, a second receiving station for receiving playing balls from the classifier, a shooter for directing cue balls out onto the playing surface, said shooter comprising a semicircular housing pivotally mounted on the front cushion for horizontal rotation, the shooter also containing a spring loaded plunger for propelling cue balls from a shooting position according to the aim and spring tension provided by the player, elevator means for moving balls from said first receiving station into shooting position in said shooter, a rack adapted to receive playing balls and position the balls on the playing surface, conveyor means for moving playing balls from said second receiving station to the rack, said rack being of a triangular con-

figuration, an extension at the rear of the playing surface of the table for holding the rack and balls while the rack is being loaded with playing balls from the conveyor means, a triangularly shaped raised portion on said extensions at the position where the conveyor means delivers balls into the rack to cause the balls to roll away from the point of delivery, and means for moving the rear cushion so as to move the loaded rack into the playing position on the playing surface, raise the rack from the balls, and move the empty rack back to and out of play position on the extension at the rear of the playing surface.

8. The apparatus defined in claim 7, which also comprises first electrical drive means for actuating the elevator means, second electrical drive means for moving the conveyor means, third electrical drive means for driving the rear cushion and the rack to position the playing balls on

the table and return the rack and rear cushion to normal playing position, and control means for controlling said first, second and third drive means according to a prearranged program.

9. The apparatus defined in claim 8, which also comprises a coin-operated switch operative to actuate said control means.

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