

Sept. 9, 1952

J. C. KOCI
PIN BALL GAME

2,610,059

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2 SHEETS—SHEET 1

Fig. 1

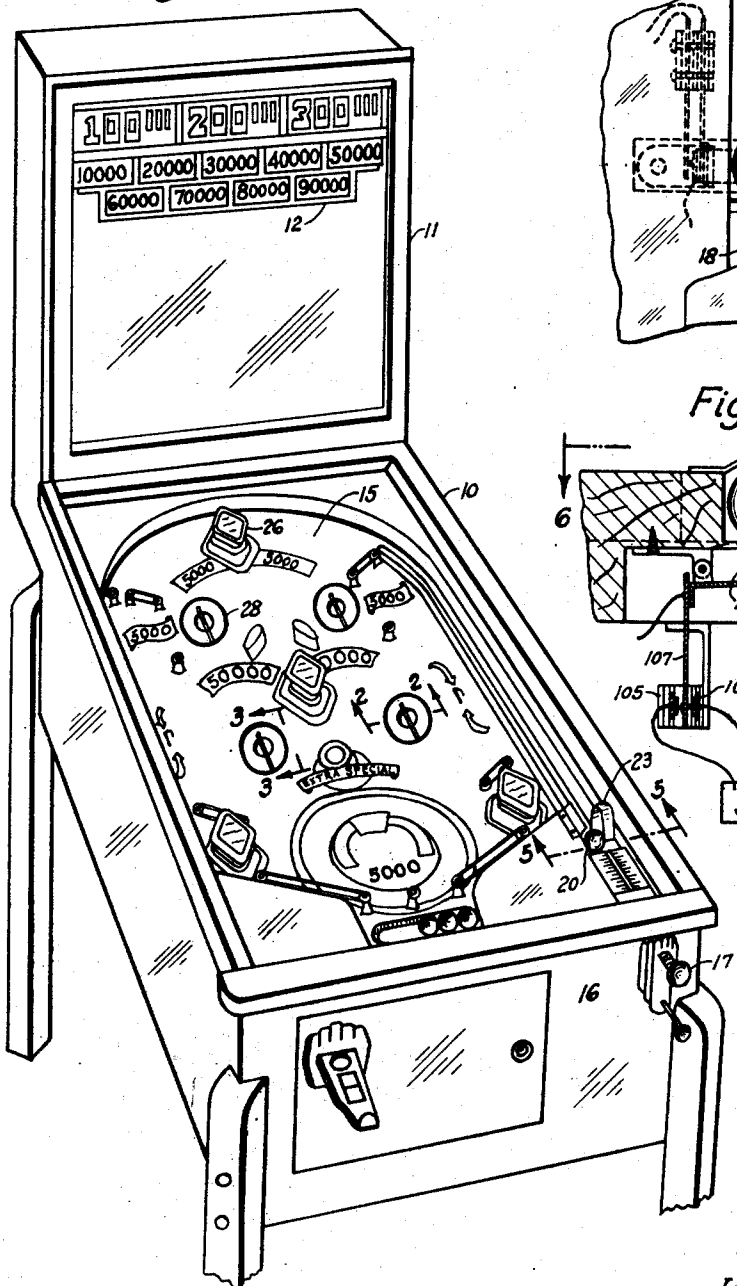


Fig. 6

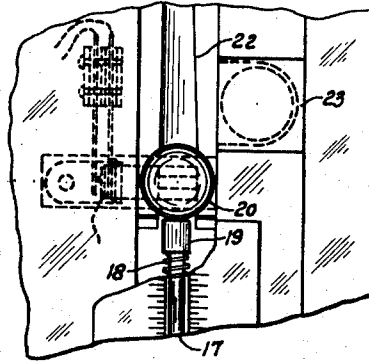
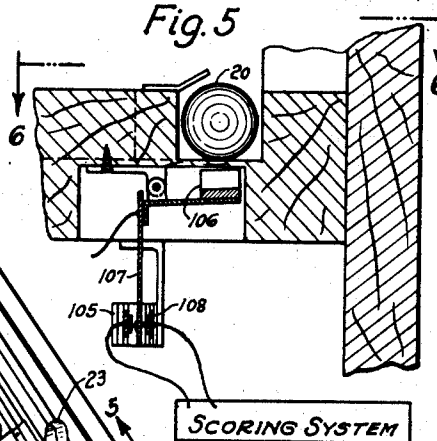


Fig. 5



SCORING SYSTEM

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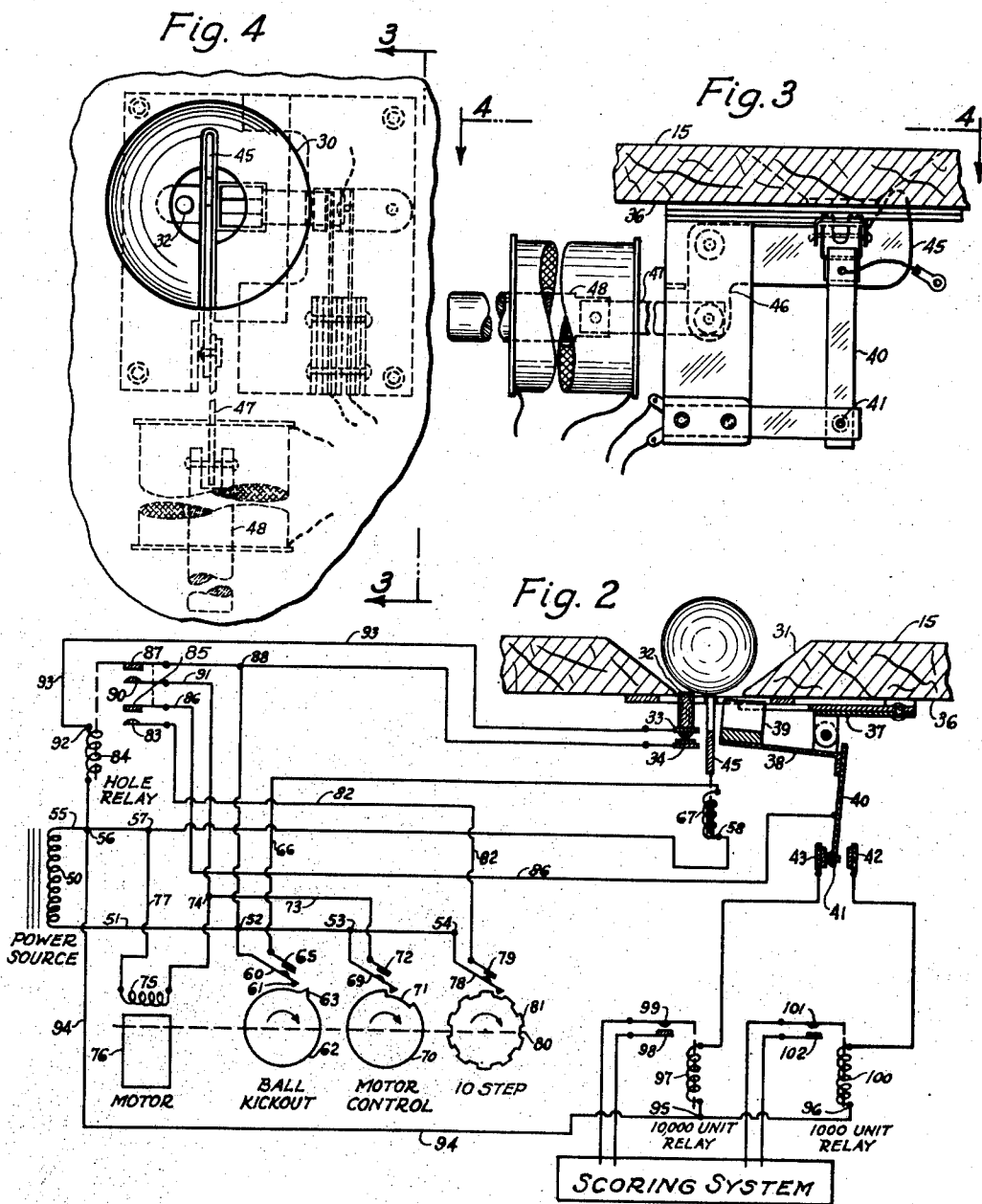
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2 SHEETS--SHEET 2



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PIN BALL GAME

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This invention relates to a game apparatus and particularly relates to that type of game apparatus wherein balls are used for playing purposes. Such game apparatus utilizes balls of suitable size, usually having a diameter of about three-fourths of an inch. Such balls may be projected manually or by spring means under the control of a player and cooperate with various pockets, apertures, bumpers and the like for scoring purposes.

In games of the prior art, the nature of the material of which the balls were made has made no difference in scoring, and the entire score resulted from the path taken by the ball. To provide added zest to a game, it is advantageous to have one or more balls score differently than the remainder of the balls apart from the factor of path of travel. This invention provides a game wherein some of the balls are of magnetic material and cooperate with magnetically responsive switches for altering normal scoring action. Thus, in a game embodying the present invention, it is possible for a plurality of balls to be used, some of them of steel or iron and magnetic, and some of them of brass or plastic material and non-magnetic, and provide two different scoring effects even though the paths taken by the balls be the same. The invention, in general, contemplates the use of ferromagnetic or magnetized balls and the use of switches having magnetic or electromagnetic armatures cooperating with ferromagnetic balls to close a switch.

In order that the invention may be fully understood, reference will now be made to the drawing wherein Figure 1 shows a perspective view of a game apparatus embodying the present invention. Figure 2 is a sectional view on line 2-2 of Figure 1 and includes a diagrammatic showing of a scoring system. Figure 3 is a sectional view on line 3-3 of Figure 1. Figure 4 is a plan view on line 4-4 of Figure 3. Figure 5 is a section on line 5-5 of Figure 1. Figure 6 is a plan detail of the game apparatus showing a ball in starting position.

The game may comprise cabinet 10 having rear wall 11 containing scoring panel 12. Scoring panel 12 may have any desired scoring system consisting of lights or other means for indicating a score attained during a game.

Cabinet 10 has playing surface or panel 15 upon which a game may be played. Cabinet 10 has front portion 16 provided with plunger 17 biased by spring 18 to a normal "in" position. Plunger 17 has head 19 adapted to co-

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operate with ball 20 for striking the ball and starting it along runway 22. Individual balls for the plunger may be supplied from pocket 23 in a manner well known in the art.

Panel 15 may have any desired scoring position means for cooperating with individual balls for scoring action. Thus, as shown here, panel 15 has provided a plurality of bumper-operated scoring means 26 which are adapted to provide a suitable scoring action when struck by a ball. Such bumper scoring means are well known in the art, one for example being disclosed and claimed in my Patent 2,294,603.

Panel 15 is also provided with one or more pockets 28 into which a ball may drop temporarily for scoring purposes. While such pockets may be made in a number of ways, an exemplary construction is shown wherein panel 15 has the material, usually wood, shaped to form circular aperture 30 having counter-sunk sides 31. Disposed within aperture 30 is contact finger 32 carrying movable contact 33 cooperating with fixed contact 34. When a ball is resting in a scoring pocket, the weight of the ball presses finger 32 down to close a scoring circuit. Finger 32 is operated by any ball irrespective of whether or not the ball is magnetic.

In accordance with this invention, any one or more of the scoring pockets may be additionally provided with a scoring switch selectively responsive to the magnetic condition of the ball. Thus, panel 15 may carry on bottom face 36 thereof bracket 37 on which is pivotally mounted arm 38 carrying magnet 39. Magnet 39 comprises a small block of magnetic material, as Alnico V and may thus be quite small and light, though powerful.

Arm 38 carries finger 40 with movable contact 41 at the free end thereof. Under normal conditions, the weight of magnet 39 biases finger 40 in one position so that movable contact 41 may rest against fixed contact 42. In the attracted position of the magnet, movable contact 41 cooperates with fixed contact 43.

It will be evident that means must be provided for ejecting a ball out of a pocket. This means may assume a variety of forms and, as shown here, comprises finger 45 forming part of bell crank 46 connected for actuation to lever 47 and armature 48. Irrespective of the nature of a scoring ball, one scoring means, as indicated by finger 32 and associated means, is operated by every ball. In addition, ball ejecting means are also operative irrespective of the nature of the ball. In accordance with the inven-

tion, special scoring means are provided which may indicate a higher or lower score as desired in the event that the ball happens to be magnetic.

A simple circuit diagram illustrating the action of a scoring system is herewith shown. Thus, winding 50 may be considered as a source of alternating current power for energizing the system, this winding being part of a transformer or any other source of power. Winding 50 has one terminal connected to line 51 going to junction points 52, 53, and 54. Winding 50 has its other terminal connected to line 55 going to junction points 56, 57 and 58. Junction point 52 is connected to movable contact 69 having tip 61 for cooperation with cam 62 provided with finger 63. Contact 60 cooperates with fixed contact 65 connected by wire 66 to one terminal of solenoid 67 forming part of the ball-ejecting means. Solenoid 67 is adapted to cooperate with armature 48 for providing a ball-ejecting action.

Junction 53 is connected to movable contact 69 for actuation by cam 70 having drop 71 along part of the periphery. Movable contact 69 cooperates with fixed contact 72, this being connected by lead 73 to junction 74. Junction 74 is connected to winding 75 of motor 76, the other terminal of the winding being connected by lead 77 to junction 57. Junction 54 is connected to movable contact 78 cooperating with fixed contact 79. Movable contact 78 cooperates with cam 80 having a plurality of teeth 81 thereon. Fixed contact 79 is connected by lead 82 to fixed contact 83 of a relay having winding 84. Cooperating with fixed contact 83 is movable contact 85 connected by lead 86 to movable contact 41 of the magnetically responsive switch.

Relay winding 84 has movable contact 87 connected to junction 88, which junction is connected respectively to junction 52 and fixed contact 34. Cooperating with movable contact 87 is fixed contact 90 connected by lead 91 to junction 74. Relay winding 84 has terminal 92 connected by lead 93 to movable contact 33. Junction 56 of the relay is connected by lead 94 to junctions 95 and 96. Between junction 95 and contact 43 is connected relay winding 97, this relay having contacts 98 and 99 going to suitable scoring means. Between junction 96 and contact 42 is connected winding 100 of a relay, this relay having contacts 101 and 102. Contacts 101 and 102 go to the scoring system and are adapted to indicate suitable scoring values.

Cams 62, 70 and 80 are all carried on one shaft for actuation by motor 76. Under normal conditions, the position of the cams is substantially as shown with the cam contacts being open. Assume now that a ball is in the pocket. Irrespective of whether or not the ball is magnetic, finger 32 is depressed to close contact 33 against contact 34. A circuit from winding 50 along lead 51 to junction 52, thence to junction 88 through switch contacts 34 and 33, along line 93 through relay winding 84 to junction 56 is established. Relay 84 is energized and contacts 87 and 85 are pulled down against their cooperating fixed contacts 90 and 83 respectively. The closure of contact 87 against 90 establishes a circuit as follows—junction 57 along lead 77 through motor winding 75 thence to junction 74, along lead 91 through contacts 90 and 87 to junction 83 down to junction 52. Thus, the motor circuit is established, and cams 62, 70 and 80 begin to turn. These cams are turned so that their movement is clockwise as seen in the drawing. It is under-

stood that motor 76 is geared down for turning the cams.

When contacts 85 and 83 are closed, the following circuit is established—contact 79, lead 82 through contacts 83 and 85, lead 86 and movable contact 41. It is evident that movable contact 41 will bear against either fixed contact 42 or 43, depending upon whether the ball is magnetic or non-magnetic. In either event, a circuit from movable contact 41 may be established alternatively through contact 42 or 43 as the case may be and through relay 100 or 97 to lead 94 and thence to junction 56. As cam 80 is turned, alternate opening and closing of switch contact 78 against contact 79 will thus complete the circuit across transformer 50 since contact 79 will thus be alternately connected to and disconnected from lead 51. When contacts 78 and 79 are closed, one of relays 100 and 97 will be actuated to close its corresponding relay contacts for scoring action.

The movement of motor 76 turning cam 70 results in contact 69 closing against contact 72. When this occurs, the following circuit is established—junction 53 to contact 69 thence to contact 72, lead 73 to junction 74, motor winding 75, lead 77 to junction 57. Cams 62, 70 and 80 are geared down so that, during one cycle of operation, these cams are turned through 360 degrees by motor 76. It is thus clear that, once the motor has started, rotation of cam 70 will keep the motor energized until the cam has made a complete turn at which time movable contact 69 will fall in cam drop 71. Rotation of cam 80 will alternatively open and close contacts 78 and 79. When cam 62 has made almost a complete turn, finger 63 momentarily closes contact 60 against fixed contact 65. This closes a circuit from junction 52 through the switch contacts and lead 66 through winding 67 to junction 58 and thence to junction 57. Thus, at the instant that contacts 60 and 65 are closed, the ball is ejected by the action of winding 67 on armature 48. When the ball is ejected, finger 32 is freed and opens contacts 33 and 34 thus opening the circuit for relay winding 84. The timing is such that the ball is ejected at the time when contact 69 falls in drop 71 of cam 70. Thus, motor 76, after going through a cycle, is stopped and the system reverts to its original condition.

It is understood that contacts 98 and 99 on the one hand or contacts 101 and 102 on the other hand may go to suitable score-indicating means for indicating scoring values, depending upon the position of the pocket in the cam. Thus, the shaft of motor 76 may have any number of units of three cams 62, 70 and 80 thereon.

A complete scoring system, as disclosed in my Patent 2,165,059 may be used in connection with the invention.

In addition to the magnetically responsive switches and the various ball pockets on playing panel 15, additional switching means may be provided to be controlled by a ball in the starting position.

Thus, referring to Figures 1, 5 and 6, ball 20 is shown in the starting position at runway 22. Below the runway is a magnetically responsive switch generally indicated by numeral 105, the switch being otherwise similar to the magnetically responsive switch associated with ball pocket 30. Thus, switch 105 includes magnet 106 and arm 107 carrying a movable contact. This arm may move the contact between fixed contacts as shown, or may cooperate with con-

tact 103 only for altering the scoring action in case ball 20 is ferromagnetic. It is preferred to have the panel material extend between the magnet and ball so that no physical contact between the magnet and ball is possible. While the magnet may have some slight retarding effect on a ferromagnetic ball, this may be generally disregarded or may even be compensated for by the operator in case the ball indicates that it is ferromagnetic. Thus, the ferromagnetic balls may be finished in a special color. It is understood, of course, that the movable and fixed contacts of the switch are suitably connected in to alter the scoring. A game provided with a magnetically responsive runway switch may additionally have magnetically responsive switches disposed at one or more playing positions on the panel as distinguished from the playing position at the start of the runway.

It is understood, of course, that various modifications of the magnetically responsive scoring system may be made. Thus, the pockets may be eliminated and the magnetically responsive switch be disposed below the panel to be affected by a passing ball. It may be necessary to counter-sink the bottom of the panel to permit the magnet to approach close enough to a ball so that proper response will result.

The balls may all be made the same weight and may have the same appearance so that a player need not necessarily know which ball or balls are magnetic.

What is claimed is:

1. In a pin ball game, an electrically-actuated scoring system, said system including scoring means, electro-magnetic actuating means controlled by said scoring means for producing scoring effects upon said system, said scoring means including circuits having mass-responsive switches and magnetic-responsive switches connected therein, said game having a playing panel provided with scoring regions, some scoring regions each having a mass-responsive switch and other scoring regions each having a magnetic-responsive switch, playing balls including at least one ferromagnetic ball and at least one non-magnetic ball, the balls being adapted to range over the playing panel during play, whereby a ferromagnetic ball and a non-magnetic ball, pursuing the same path over the panel, will operate different switches in said scoring regions and result in different playing scores.

2. In a pin ball game, an electrically-actuated scoring system, said system including two scor-

ing means, electro-magnetic actuating means controlled by said scoring means for producing two different scoring effects upon said system, said scoring means including circuits having mass-responsive switches and magnetic-responsive switches connected therein, said game having a playing panel provided with a plurality of scoring regions, each scoring region having a scoring switch, certain switches being mass-responsive and other switches being magnetic-responsive, at least some of said scoring regions having one additional switch, the two switches, for any scoring region having them, being respectively mass and magnetic-responsive and being respectively connected to said different scoring means, playing balls including at least one ferromagnetic ball and at least one non-magnetic ball, the balls being adapted to range over the playing panel during play, whereby a ferromagnetic ball and a non-magnetic ball pursuing the same path over the panel, will operate different switches and result in different playing scores and whereby a ball operating both switches for any particular scoring region thus equipped will result in a different score than if only the mass-responsive switch were operated.

3. The game according to claim 1, wherein said game has a runway along which balls are initially propelled to put them on the playing panel, a magnetic-responsive switch disposed beneath the runway surface, connections between said magnetic-responsive switch and said electro-magnetic actuating means whereby a ferromagnetic ball at the very beginning of a game will register a different score than a non-magnetic ball.

4. The game according to claim 1, wherein at least one scoring region has a recess into which a ball may fall and wherein means are provided in said recess responsive to the presence of said ball for ejecting the ball from said recess so that the ball may continue on the playing panel.

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