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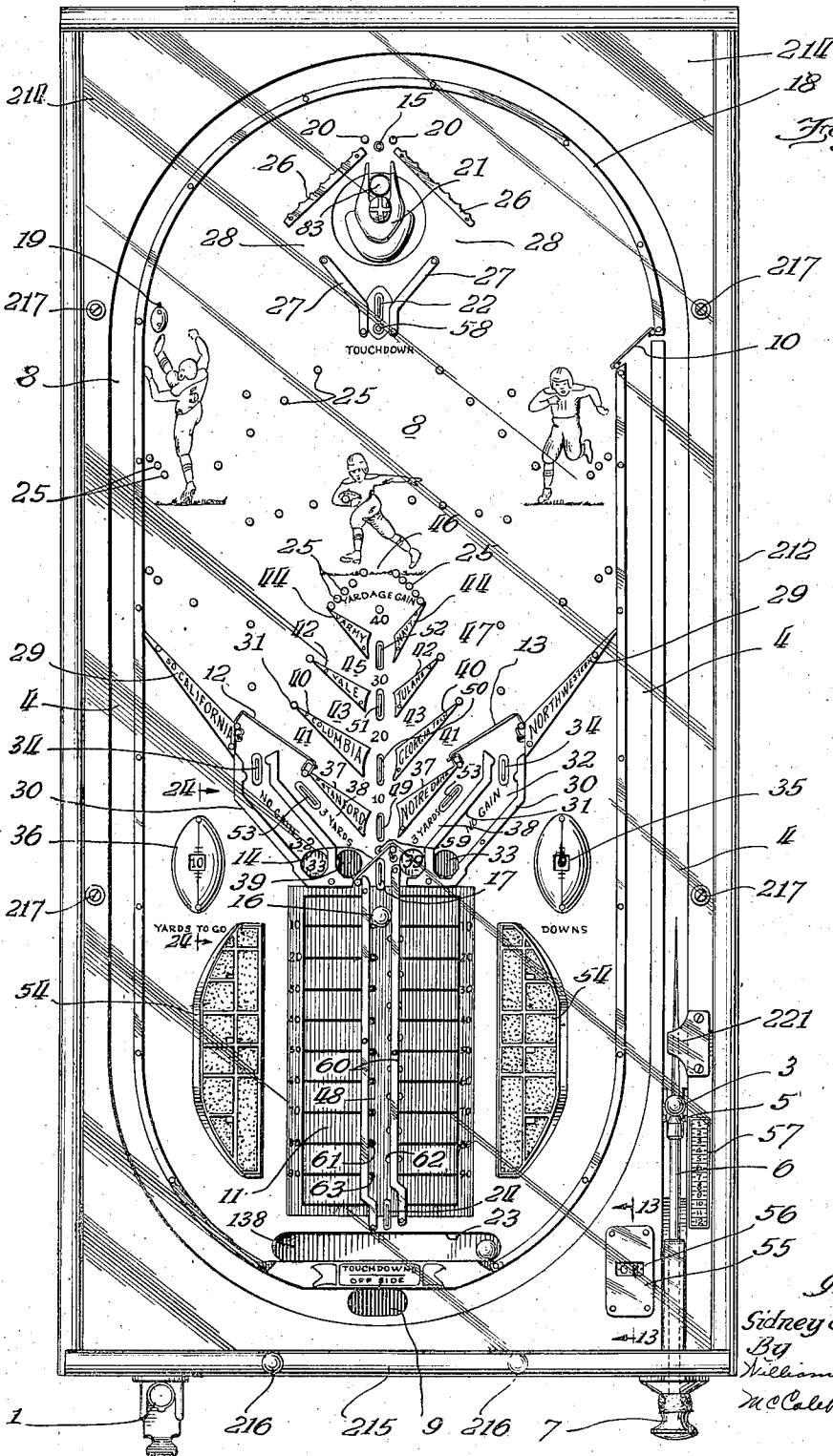
S. E. VAN TUYL

2,139,783

GAME

Filed March 8, 1935

11 Sheets-Sheet 1



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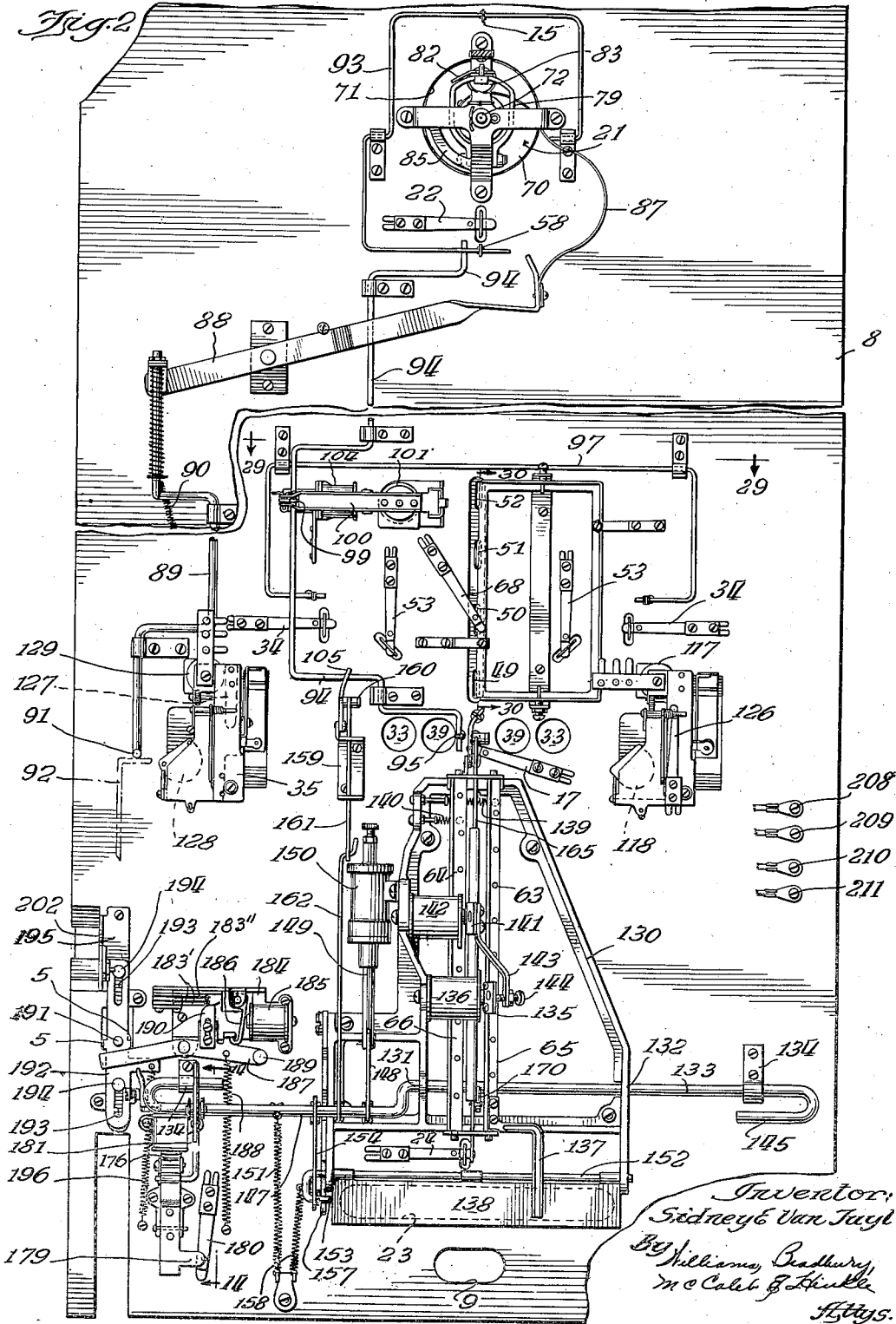
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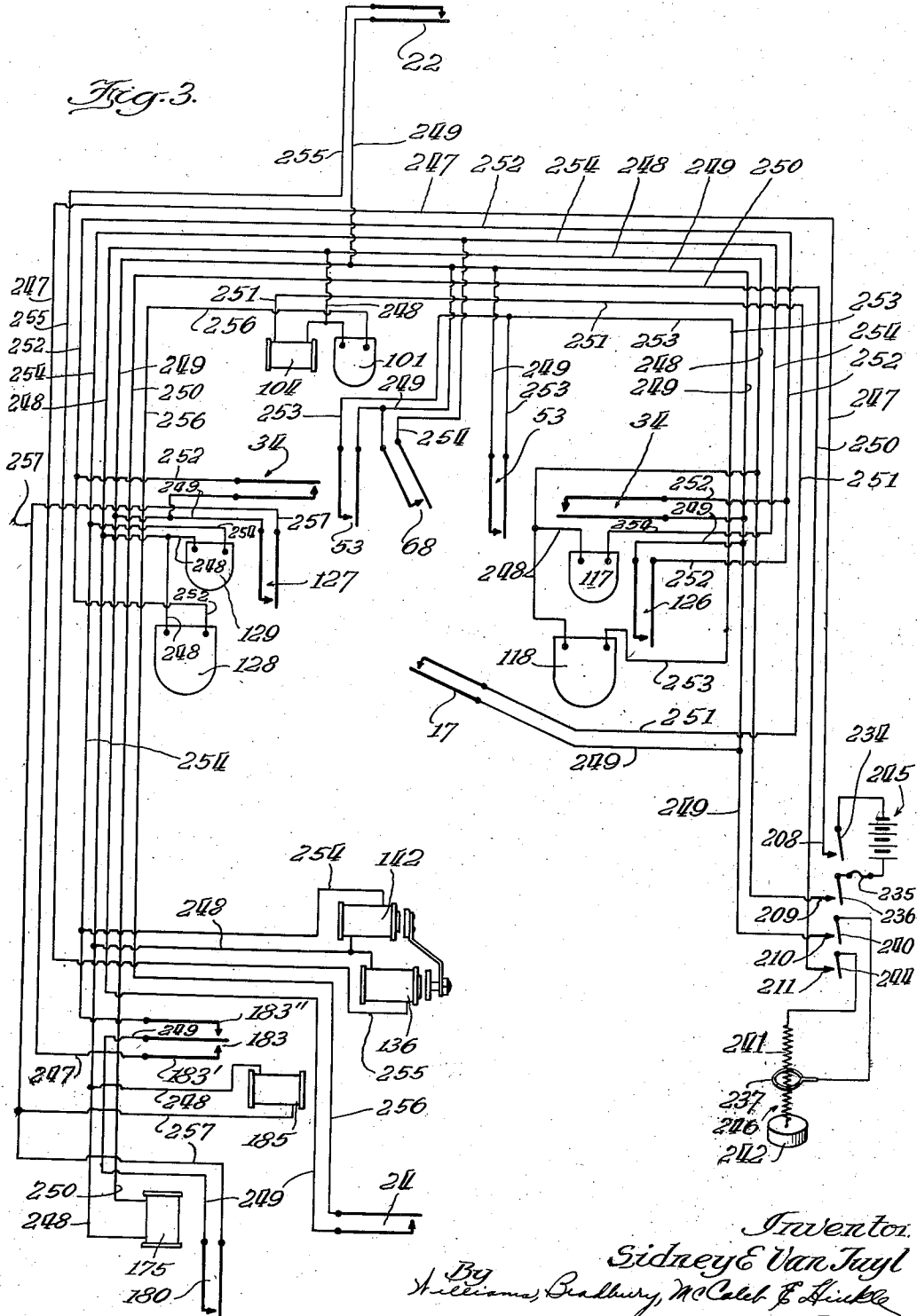
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11 Sheets-Sheet 3



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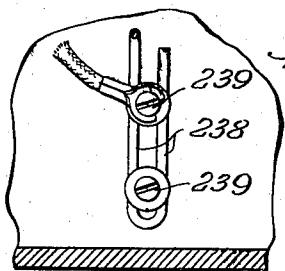
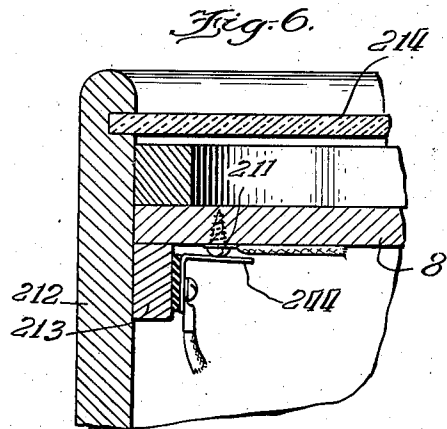
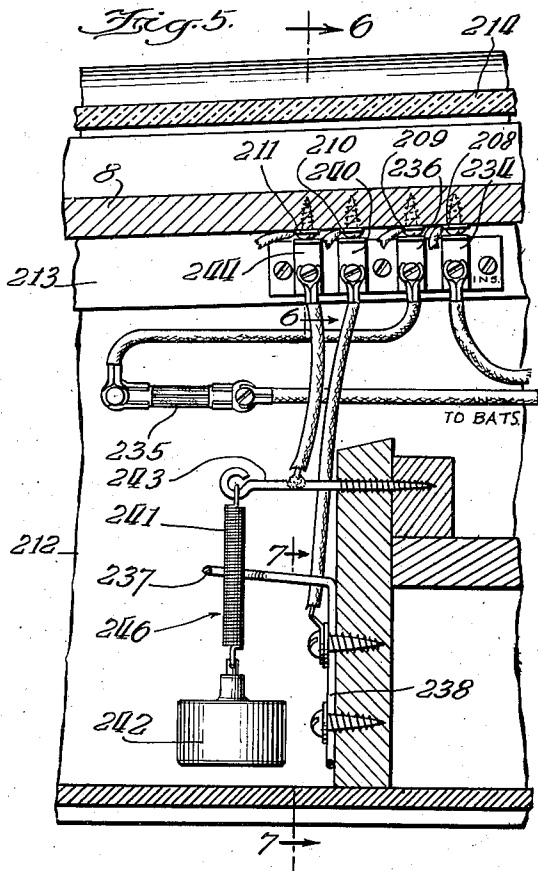
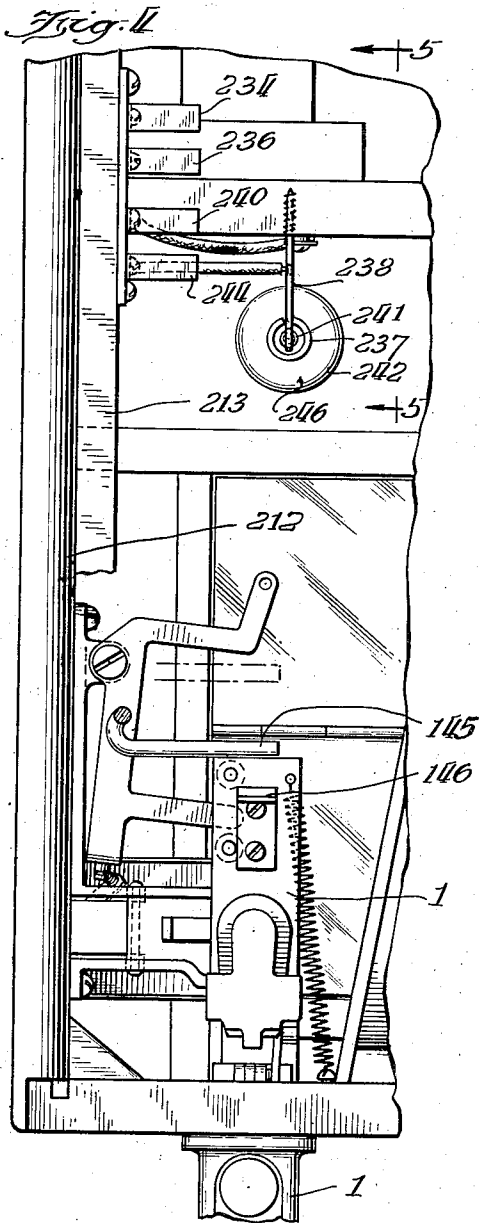
S. E. VAN TUYL

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11 Sheets-Sheet 4



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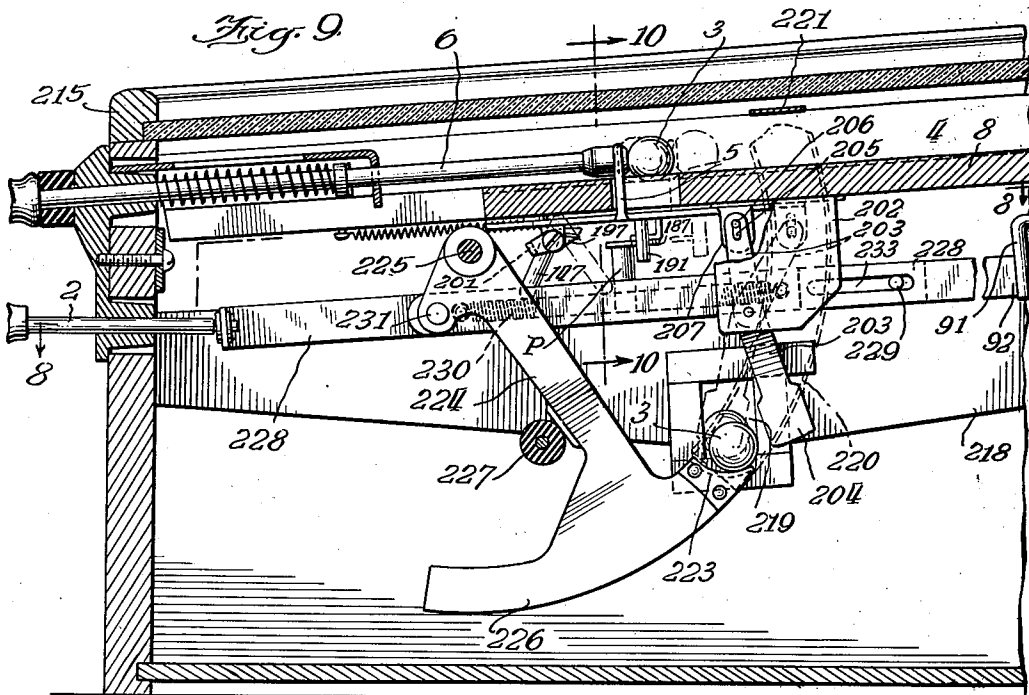
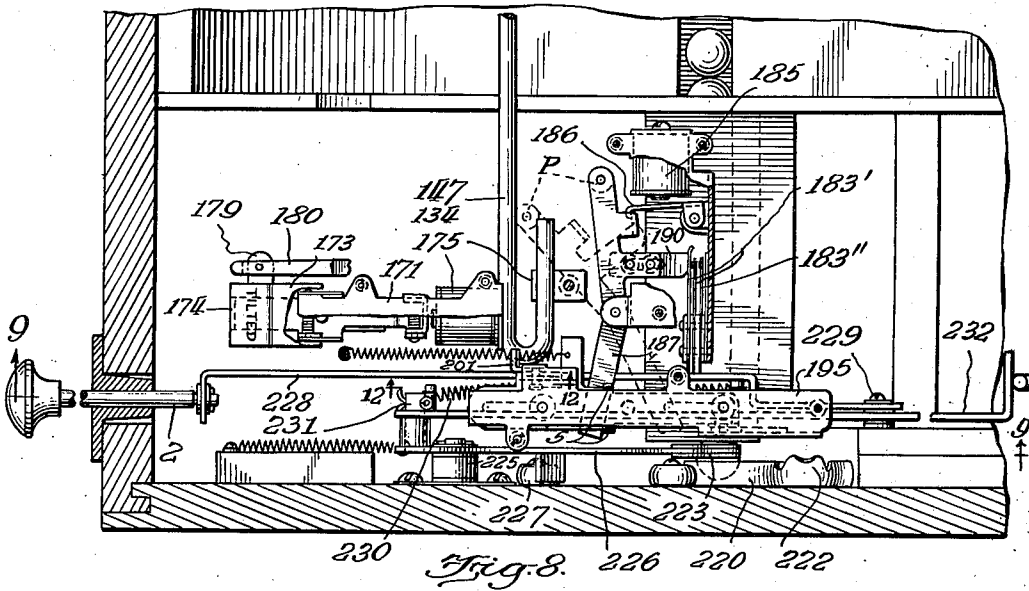
S. E. VAN TUYL

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11 Sheets-Sheet 5



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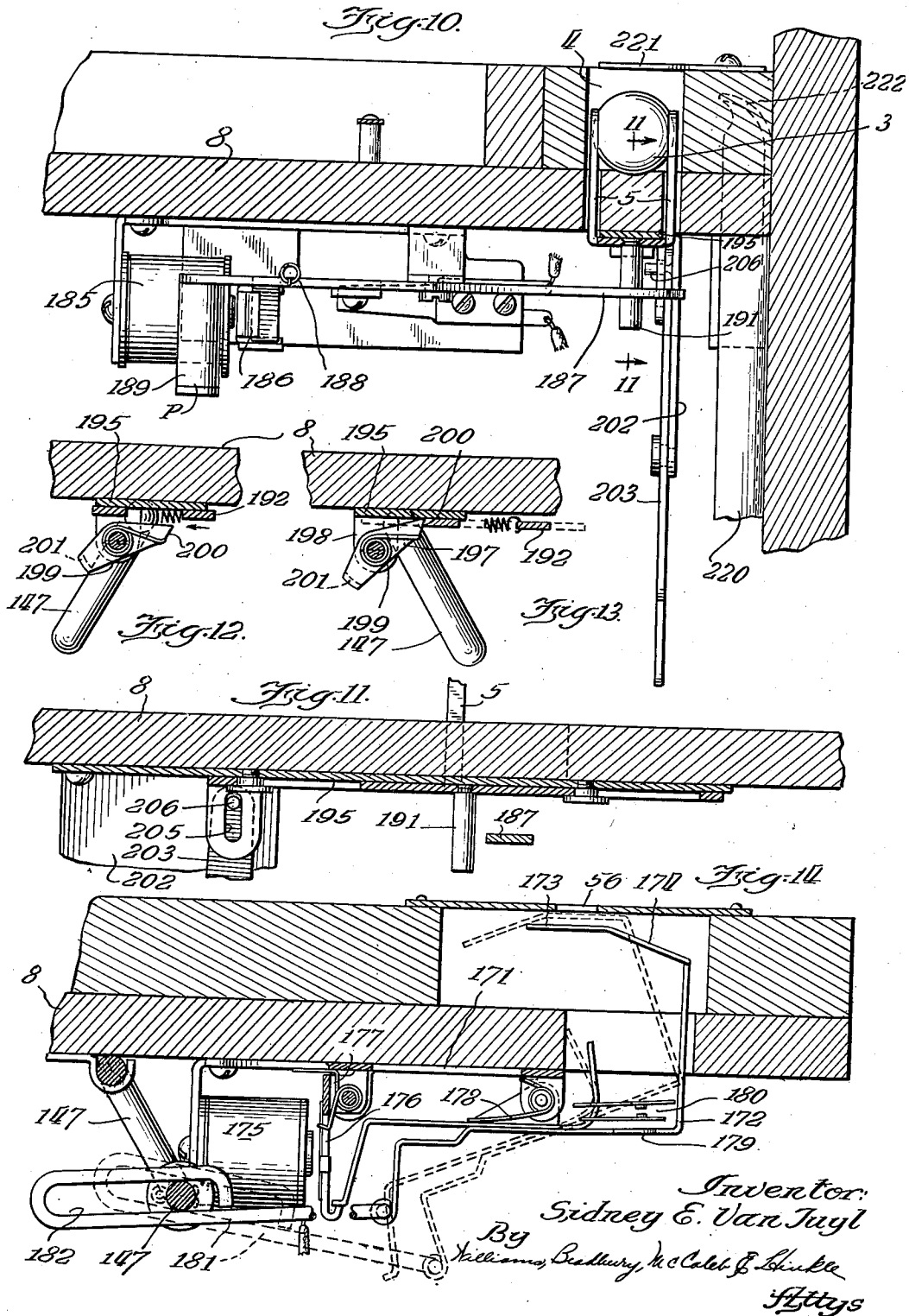
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11 Sheets-Sheet 6



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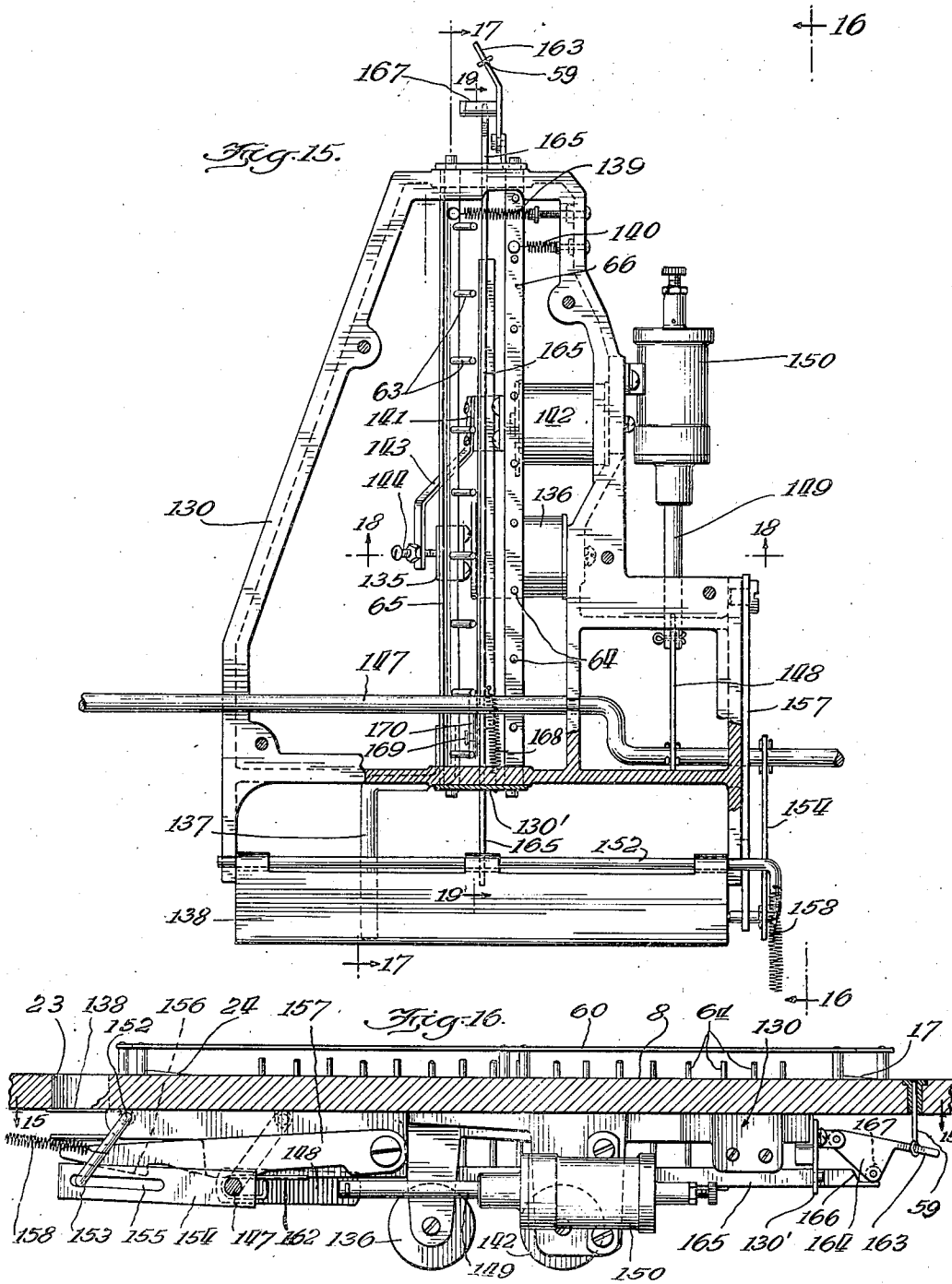
S. E. VAN TUYL

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GAME

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11 Sheets-Sheet 7



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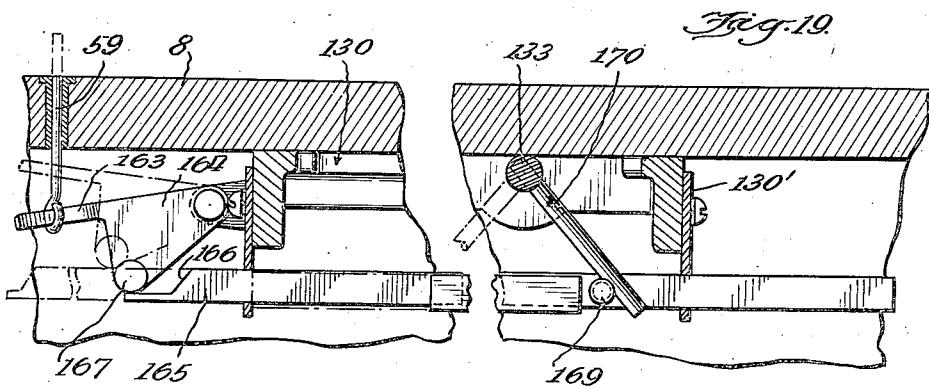
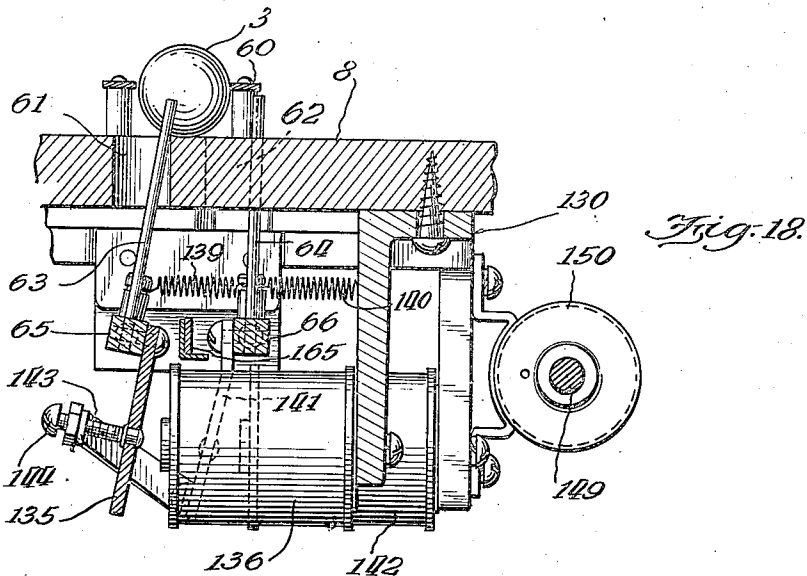
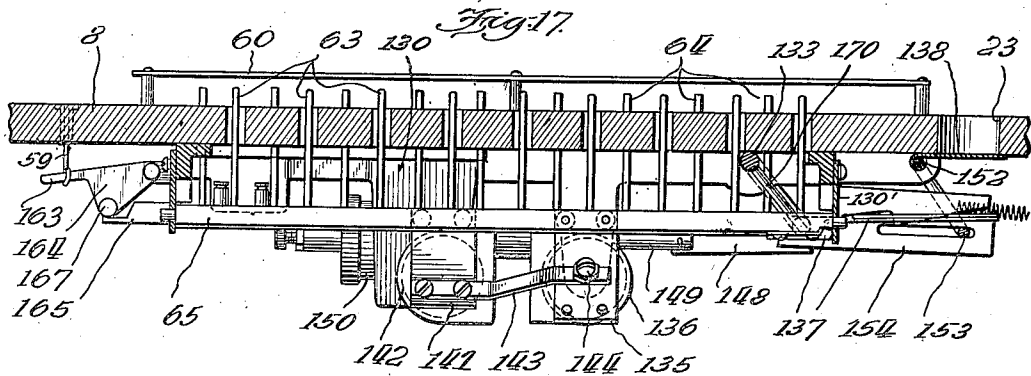
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GAME

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11 Sheets-Sheet 8



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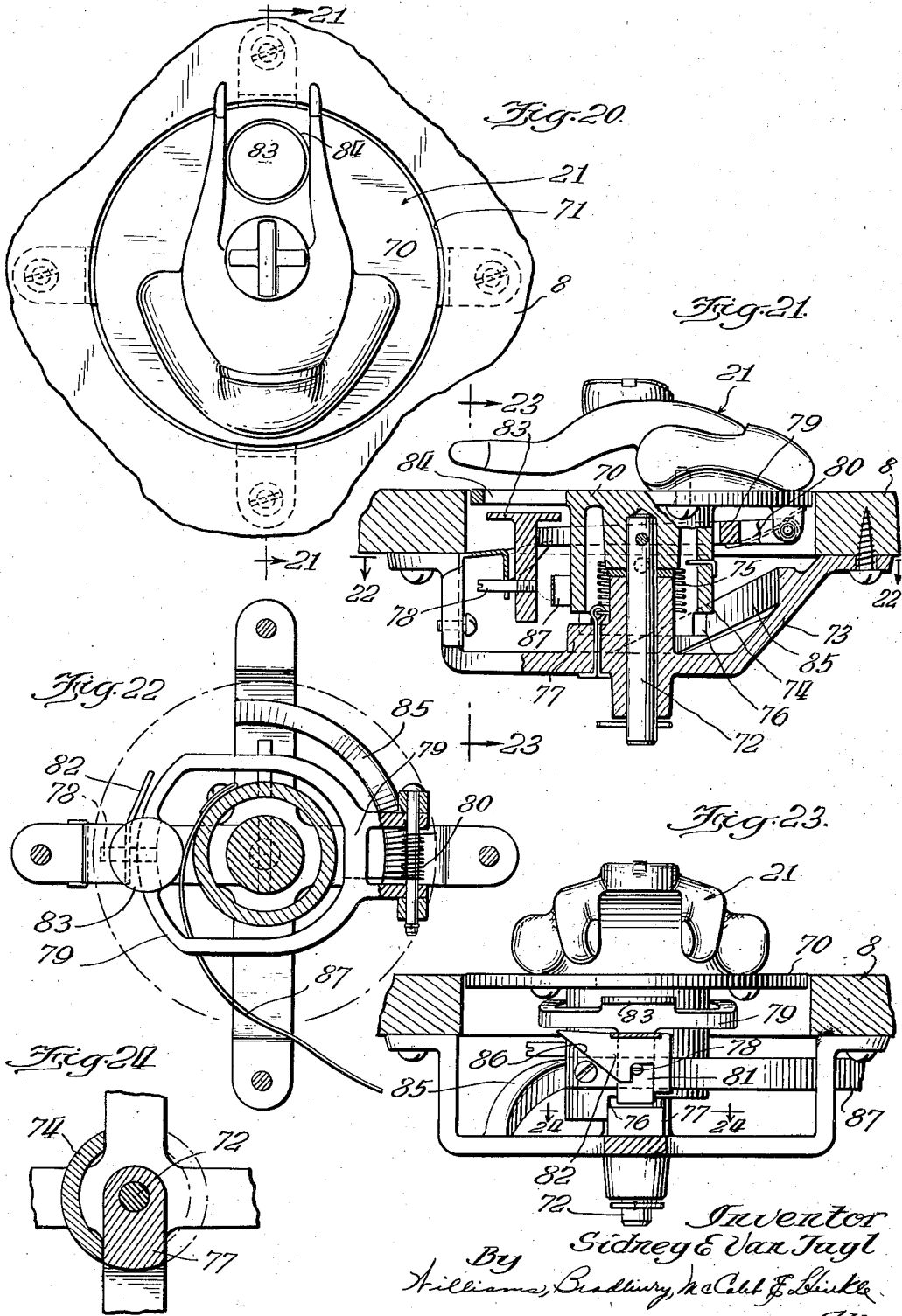
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GAME

Filed March 8, 1935

11 Sheets-Sheet 9



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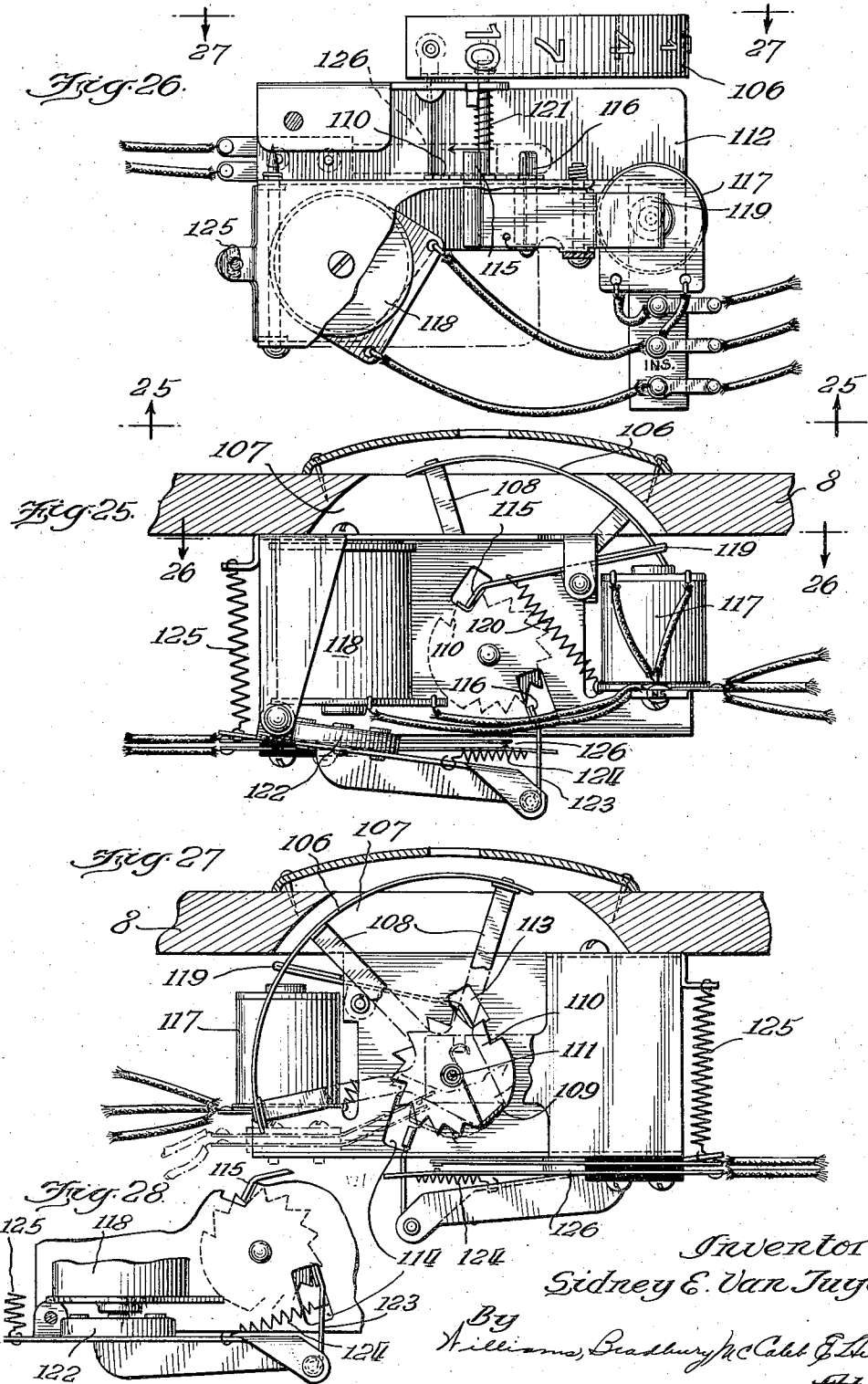
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11 Sheets-Sheet 10



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2,139,783

GAME

Filed March 8, 1935

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Fig. 29.

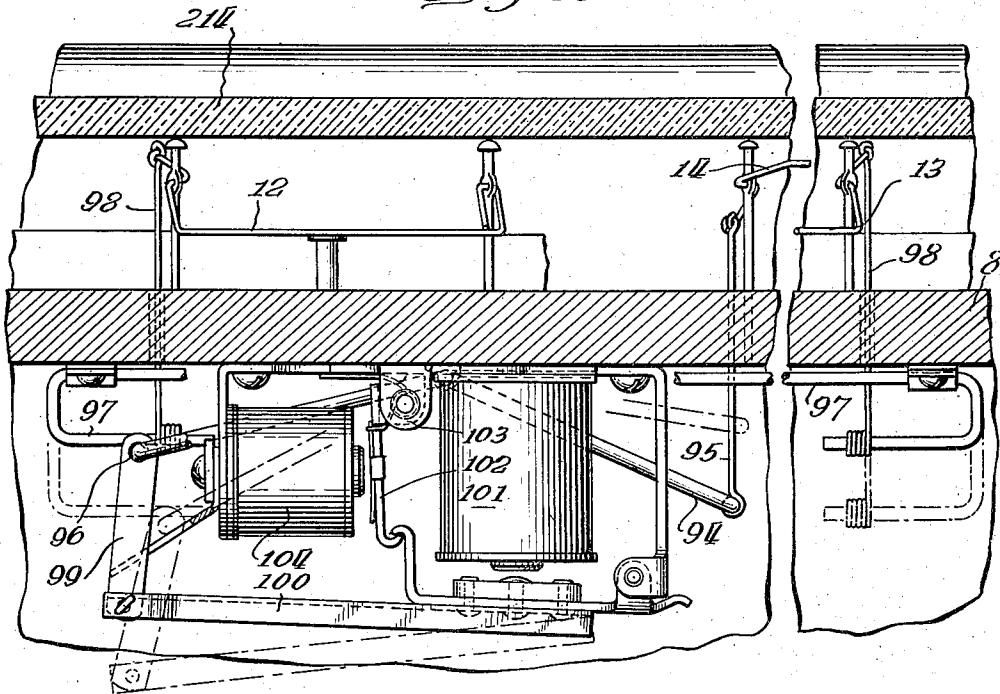


Fig. 30.

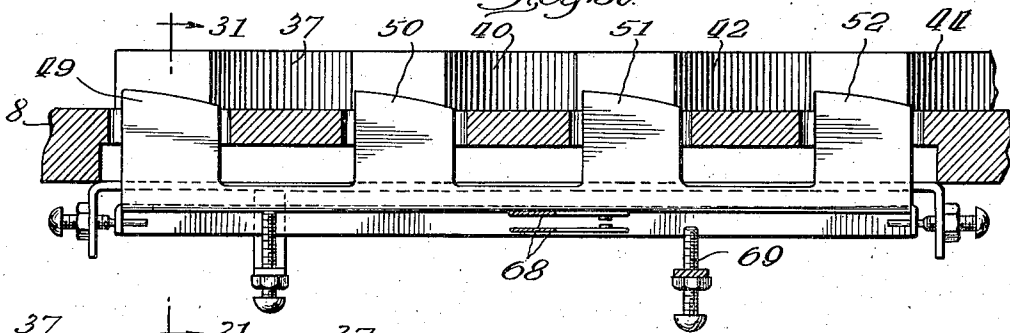
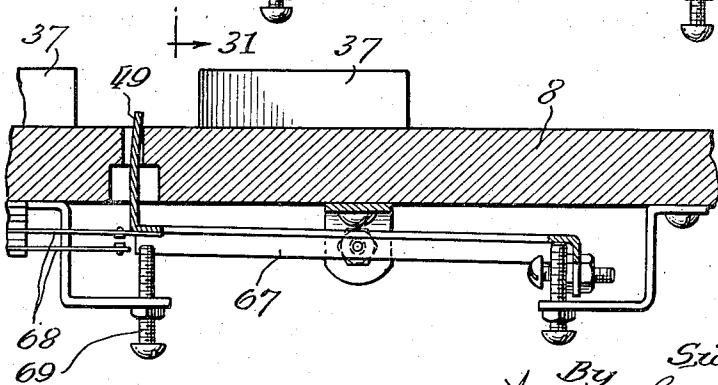


Fig. 31.



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UNITED STATES PATENT OFFICE

2,139,783

GAME

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Application March 8, 1935, Serial No. 9,992

12 Claims. (Cl. 273—121)

This invention relates to a game played on a board or table, of the general type called a "pin board" or "pin game". Such games are usually played with balls by means of a spring-pressed plunger manually released, with the object of placing the balls in certain desired positions or pockets upon the table.

The principal object of the invention is to provide an improved game of this type which simulates football.

A further object of the invention is to provide improved mechanism for use in such games.

Other objects, advantages, and capabilities of the invention will appear from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, in which

Figure 1 is a plan view of a game apparatus embodying my invention;

Fig. 2 is a rear view of the game board showing the mechanism mounted thereon;

Fig. 3 is a wiring diagram showing the electrical system and associated parts in the same relation as in Fig. 2;

Fig. 4 is a fragmentary plan view of one corner of the cabinet with the glass cover and the playing board removed showing the coin chute and tilting switch and related parts;

Fig. 5 is a vertical sectional detail view, taken on the line 5—5 of Fig. 4, with the playing board and glass cover in position;

Fig. 6 is a sectional detail, taken on the line 6—6 of Fig. 5;

Fig. 7 is a sectional detail view, taken on the line 7—7 of Fig. 5;

Fig. 8 is a fragmentary sectional plan view, taken on the line 8—8 of Fig. 9;

Fig. 9 is a fragmentary sectional view, taken on the line 9—9 of Fig. 8;

Fig. 10 is a sectional detail view, taken on the line 10—10 of Fig. 9;

Fig. 11 is a sectional detail view, taken on the line 11—11 of Fig. 10;

Fig. 12 is a sectional detail view, taken on the line 12—12 of Fig. 8, on a larger scale;

Fig. 13 is a similar view showing the parts in a different position;

Fig. 14 is a fragmentary sectional detail view, taken on the line 14—14 of Fig. 2, on a considerably larger scale;

Fig. 15 is a plan view of the mechanism for controlling the movement of the ball on the grid-iron, the same being taken on the line 15—15 of Fig. 16;

Fig. 16 is a side view thereof, taken on the

line 16—16 of Fig. 15, showing the playing board in section;

Fig. 17 is a sectional detail view, taken on the line 17—17 of Fig. 15;

Fig. 18 is a sectional detail view, taken on the line 18—18 of Fig. 15;

Fig. 19 is a sectional detail view, taken on the line 19—19 of Fig. 15;

Fig. 20 is a plan view of the quarterback;

Fig. 21 is an elevational view of the quarterback, the mechanism associated therewith being shown in section, taken on the line 21—21 of Fig. 20;

Fig. 22 is a detail plan view, taken on the line 22—22 of Fig. 21;

Fig. 23 is a front elevational view of the quarterback showing the mechanism therebeneath in section, taken on the line 23—23 of Fig. 21;

Fig. 24 is a sectional detail view, taken on the line 24—24 of Fig. 23;

Fig. 25 is a side view of the yardage meter or indicator, the game board being shown in section;

Fig. 26 is a plan view of the indicator, taken on the line 26—26 of Fig. 25;

Fig. 27 is an elevational view of the other side of the indicator, the game board being shown in section;

Fig. 28 is an elevational detail showing parts illustrated in Fig. 25 in a different relation;

Fig. 29 is a sectional detail view, taken on the line 29—29 of Fig. 2, on a considerably larger scale;

Fig. 30 is a sectional detail view, taken on the line 30—30 of Fig. 2, on a considerably larger scale, and

Fig. 31 is a sectional detail view, taken on the line 31—31 of Fig. 30.

In order to facilitate understanding of the invention, the manner in which the game is played will be first described. The machine is freed for play by the insertion of the appropriate coin in the coin slide 1. The ball elevating handle 2 is then pressed forwardly to place a ball 3 in playing position in the chute 4. The fork 5 is moved forwardly by the coin insertion mechanism so that the ball can be played by the plunger 6. The plunger 6 is spring pressed towards the ball 3 and can be drawn forwardly by a handle 7. When the handle is released, the forward end of the plunger strikes the ball 3 a forcible blow which carries it around the chute 4. The chute 4 extends around the board 8 and its final length lies parallel to its initial length, as best seen in Fig. 1. The portions of the chute 4 on each side are connected by substantially semi-circular

portions, as best seen in Fig. 1, and an opening 9 is provided in the lowermost position of the front semi-circular portion. It may here be pointed out that the board is located at a slight inclination to the horizontal so that the ball may roll over the field of play towards the player, under the influence of gravity.

The outlet of the chute 4 is provided with a light gate 10 which is normally held closed by gravity but can readily be opened by a ball with sufficient speed to allow the ball to pass into the field of play. Immediately the ball passes out of the chute, the gate 10 closes and prevents its re-entry into the chute 4. It will be understood that in order for the ball to run around the chute 4 and emerge through the gate 10 into the field of play, it must be struck a substantial blow by the plunger 6. If the impact is not sufficiently forcible, the ball will not emerge by the gate 10, but will roll downwardly into the opening 9.

The first ball which emerges into the field of play rolls downwardly into the gridiron 11, so-called because of its resemblance to a football field. This is insured by the closed condition of gates 12 and 13, the open condition of gate 14, the upward projection of a pin 15 and the withdrawn condition of the pin 58. As will appear from the detailed description of the mechanism on the board, the ball must inevitably move into the position of the ball shown at 16. The pin 15 is moved upwardly, the gates 12 and 13 are closed, and the gate 14 is opened by the coin insertion mechanism. In entering into the position 16, this ball passes over a switch 17 which has the effect of closing the gate 14, opening the gates 12 and 13 and withdrawing the pin 15. The next ball is the first play ball and it emerges from the gate 10. Normally it emerges with some speed so that it is carried around on the inside of a rail 18, which is the inside wall of part of the chute 4, and strikes a spring buffer element 19 from which it rebounds. However, it may emerge from the gate 10 with insufficient way to carry it around into contact with the buffer 19. In either case, the ball rolls under gravity down towards the player.

As in all football, the prime aim is to make touchdowns and this may be done by directing the ball between pins 20 over the position of the pin 15 into the arms of a quarterback 21. Immediately the quarterback receives the ball, he turns around through an angle of 180 degrees and releases the ball to roll downwardly onto the switch 22. Here the ball is arrested by a pin 58 which projects upwardly from the board. The pins 15 and 58 are operatively connected so that when one is up the other is down. The closing of the switch 22 by the ball delivered by the quarterback has the effect of freeing the ball on the gridiron so that it may run downwardly into a well 23 and in so doing this ball passes over a switch 24, which has the effect of opening the gate 14, closing the gates 12 and 13, and projecting the pin 15 upwardly and withdrawing the pin 58. The ball delivered by the quarterback consequently moves into the position 16. As before, this ball passing over the switch 17 has the effect of withdrawing the pin 15, projecting the pin 58, opening the gates 12 and 13 and closing the gate 14. The next ball is consequently in play.

As is common in games of this type, various projections, such as pins 25, are located over the board at positions which render the attainment of the desired result of varying difficulty. To render the scoring of touchdowns by passing the

ball over switch 22, comparatively difficult, I place bars 26 in the oblique direction on either side of the quarterback 21. I protect the switch 22 by means of bars 27. I prefer to leave gaps 28 between the bars 26 and 27 so that a skillful player may pass a ball through these gaps and score a touchdown without passing the ball to the quarterback 21. I also provide bars 29 which extend obliquely and outwardly from the center of the board for the purpose of bringing all balls into a central zone immediately beyond the gridiron 11.

As continuations of the bars 29, I provide bars 30 and I also provide bars 31 which form with bars 30 a pair of chutes 32. At the bottom of these chutes I provide opening 33 for the escape of balls which may pass into these chutes. Owing to the location of these two chutes and the relation of obstructions, such as pins 25 and bars 29, it is comparatively easy to get a ball to pass into them. These chutes are "no gain" chutes and the ball passing into one of them corresponds to a play in which the team on offense fails to advance the ball. In passing into one of these chutes 32, the ball passes over a switch 34 which records the play on the indicator 35. The indicator 35 records the number of downs or plays made, up to four until a touchdown or a ten-yard gain is made, whereupon the registry of the indicator returns to zero. The number of downs indicated by the indicator informs the player of the number of shots he has left within which he must make a ten-yard gain or a touchdown, in order to remain in play. If he fails to make a ten-yard gain or a touchdown with four play shots, the fork 5 moves forwardly so as to prevent the play of any further balls and a switch cuts the supply of energy away from the switches on the board. This indicator shows zero at the beginning of a game. The switches 34 have no effect on the yardage meter 36, which at the beginning of the game indicates that there are ten yards to go.

Wedge-shaped bars 37 define with bars 31 two chutes 38 which correspond to a gain of three yards. It can readily be seen in Fig. 1 that it is much more difficult to place a ball in one of the chutes 38 than it is to place the ball in one of the chutes 32, because balls going to either side of the field of play have a tendency to strike the bars 29 and drop into the chutes 32. At the bottom of the chutes 38 are provided openings 39 whereby the balls may drop through the board. In passing through the chutes 38, a ball passes over a switch 53 which records one down on the downs meter or indicator 35 and reduces the yardage indicated by the yardage meter or indicator 36 to seven, or to four, or to one, as the case may be. Rearwardly of the bars 37, which bars diverge rearwardly from the center line of the board, are provided similarly diverging bars 40. The bars 37 and 40 define chutes 41. Rearwardly of the bars 40 I provide similar diverging bars 42 which, with the bars 40, define chutes 43. Rearwardly of the bars 42 I provide similar bars 44 which, with the bars 42, define chutes 45. The bars 40, 42 and 44 are progressively shorter so that the balls have a certain opportunity, if skillfully directed, to pass into the chutes 43 and 45. Rearwardly of the bars 44 are provided two rows of pins which define a central rearward opening 46. The bars 37, 40, 42 and 44 terminate at their lower, or forward, ends so as to provide a central passage 47 in alignment with the opening 46 and in alignment with the passage 48 provided for the ball on the gridiron 11.

In the passage 47 I provide switches 49, 50, 51 and 52 located respectively between the inner or forward ends of bars 37, 40, 42 and 44. A ball entering one of the chutes 41 passes over the switch 49 and is diverted by the closed gate 14 into one of the openings 39. The closing of the switch 49 has the effect of actuating the mechanism of the gridiron so that the ball at the initial position 16 is moved forward ten yards on the gridiron. A ball entering one of the chutes 43 passes over the switches 50 and 49, with the result that the mechanism on the gridiron is actuated twice and the ball on the gridiron is advanced twenty yards. It may here be remarked that there is only one ball on the gridiron at a time. A ball entering one of the chutes 45 actuates the three switches 51, 50 and 49 and the ball on the gridiron is advanced thirty yards. Finally, a ball entering the opening 46 passes over the four switches 52, 51, 50 and 49 and the ball on the gridiron is advanced forty yards. When a ball is advanced in this way progressively, it eventually is released by the mechanism on the gridiron and passes into the well 23. The presence of a ball in the well 23 corresponds to a touchdown. By passing over the switch 24 this ball effects the opening of the gate 14, the closing of the gates 12 and 13, the upward projection of the pin 15 and the withdrawal of the pin 58, and the next ball is inevitably directed to the position 16 on the gridiron. In passing to this position it closes the switch 17 and the gate 14 closes, the gates 12 and 13 open, the pin 15 is withdrawn and the pin 58 is pushed upwardly again. The passage of a ball over any of the switches 49, 50, 51 or 52, has the effect of returning the downs meter or indicator 35 to zero. When the gate 14 is closed, any ball passing over any of the switches 49, 50, 51 and 52 passes into one of the openings 39.

When four play balls, that is, balls other than those which are inevitably directed to position 16 on the gridiron, are played without the actuation of any one of the switches 22, 49, 50, 51 or 52, the machine becomes locked against play and the fork 5 moves rearwardly so as to keep any ball in the chute 4 out of contact with the plunger 6.

In order to enhance the resemblance of the game to college football, I prefer to place on the board pictures of football players in typical football attitude, which should harmonize with the quarterback 21 which is formed to resemble a football player in uniform and in the attitude of a quarterback ready to receive the ball. I also prefer to make the bars 29, 37, 40, 42 and 44 of pennant shape and to decorate them with the insignia and colors of well-known college teams. Furthermore, the indicators or recorders 35 and 36 may be made to resemble a football in shape and color. The gridiron 11 is preferably green with white lines and numbers, and on each side I provide castings 54 made to resemble grandstands full of spectators.

As will hereinafter appear, I provide this machine with a mechanism actuated by tilting which has the effect of locking the machine against further play in the event that a player tilts the cabinet in an unfair effort to divert the ball from the course determined by the impact given it by the plunger 6. On the face of the board I provide a tilting indicator 55 which is provided with a window 56 through which means are visible which indicate "Tilted" or "O. K.," as the case may be.

Alongside the plunger 6 I prefer to provide an

indicator 57 to aid the player in his positioning of the plunger 6 so as to give him a chance to duplicate his good shots and improve on his poor ones.

It will be understood that when the coin release mechanism 1 is actuated, the floor of the well 23 moves downwardly so as to release the balls contained therein. The tilting indicator 55 is returned to "O. K." condition, if it was left in tilted indicating position. At the same time the coin release mechanism releases the ball on the gridiron, allows the fork 5 to move forwardly, projects the pin 15, withdraws the pin 58, closes the gates 12 and 13, opens the gate 14 and returns the downs meter 35 to zero and the yardage meter 36 to ten yards to go.

Immediately behind the switch 17 I provide a pin 59 in the board 8, which is caused to project upwardly therefrom by the inward movement of the coin slide 1. The pin remains in its projected position until the coin slide 1 is released and allowed to move backwards to its initial position. The pin 59 prevents any ball or balls from being passed onto the gridiron without the coin chute 1 being released and the whole mechanism put into normal play.

The passage 48 on the gridiron is constituted by rails 60 which extend longitudinally of the gridiron 11. Beneath these rails are provided in the board 8 short transverse slots 61 and 62 which are staggered in the longitudinal direction of the gridiron, as best seen in Fig. 1. The slots 61 and 62 extend somewhat inwardly of the rails 60 and they are adapted to receive the teeth 63 and 64 of rake members 65 and 66 so as to constitute an escapement whereby the ball on the gridiron may be fed forward the proper amount, depending upon the plays which advance the ball.

Having described the apparatus on the upper face of the board, I will now proceed to describe the mechanisms mounted on the under side of the board, omitting for the time being any reference to the wiring which connects the various electrical devices.

Referring more particularly to Fig. 2, it may first be noted that the switches 17, 22, 24, 34, 53 each comprise a piece of flat stock which projects through a metal socket beyond both faces of the board 8. The portion projecting below the under face of the board 8 is provided with an opening which receives a resilient leaf carrying a contact. When the piece of stock is depressed by a ball passing over it, the leaf is also depressed, bringing its contact into engagement with a contact on an adjacent leaf. In order to avoid complexity, I use a single numeral to designate each one of these switches as a whole.

As best shown in Figs. 30 and 31, the switch elements 49, 50, 51 and 52 are lugs which are integral portions of a frame 67 pivotally mounted on the under side of the board. When any of the elements 49, 50, 51 or 52 is depressed by a ball passing over them, two resilient switch leaves 68, with one of which the frame 67 engages, are moved towards each other so as to make contact between them. It will thus be noted that if the ball passes over the four switch elements 49, 50, 51 and 52, contact between the switch leaves 68 will be made four times in succession. If the ball passes over the three elements 49, 50 and 51, the switch leaves 68 will complete the circuit three times, and so forth. The swinging of the frame 67 is controlled by adjustable abutments 69 and as best shown in Fig. 31, the frame is normally biased so that the

elements 49, 50, 51 and 52 project above the surface of the board 8 and at the same time the leaves 68 are separated.

Referring more particularly to Figs. 20 to 24 inclusive, it will be noted that the quarterback 21 is in the form of a crouching human figure having outstretched arms between which a ball is adapted to be received. The figure is mounted upon a circular plate 70 which occupies an opening 71 in the board 8. The plate 70 is rotatably mounted by means of a shaft 72 upon a spider 73 which is secured to the under side of the board 8. The plate 70 carries a depending enlarged hub 74, to which is connected one end of a coil spring 75, the other end of which is secured to the spider 73. The spring 75 tends to bias the quarterback into ball-delivering position, that is, a position 180 degrees away from the position shown in Fig. 1.

Abutments 76 and 77 on the hub 74 and on the spider engage when the quarterback has turned into that position so as to prevent movement beyond that position. When the quarterback is in ball-receiving position, as shown in Figs. 1 and 20 to 23 inclusive, it is locked against movement by the action of the spring 75. The locking is effected by the entrance of a pin 78 carried by a yoke 79 which is pivotally mounted on the plate 70 and is biased upwardly by a spring 80. The pin 78 enters a downwardly directed slot 81 in a latch element 82.

The yoke 79 carries a small platform 83 in alignment with an opening 84 between the arms of the quarterback 21. It will readily be understood that when a ball passes between the pins 20 and is received by the quarterback, it is arrested in the opening 84 and depresses the platform 83 so that the pin 78 is depressed below the latch member 82. When thus released, the quarterback is rotated by a spring 75 into ball-delivering position so the ball goes into play in the manner hereinbefore described. It may be noted that the latch member 82 holds the platform 83 somewhat below the level of the plate 70 so that the ball may be effectively arrested by the opening 84.

As the quarterback moves through 180 degrees from ball-receiving to ball-delivering position, the pin 78 engages an inclined ramp 85 on the spider 73 so that the platform 83 is elevated substantially into the plane of the plate 70 so that the ball carried by the platform 83 may roll freely therefrom. It is to be noted that the latch member 82 is provided with an inclined surface 86 which engages the pin 78 so as to depress the yoke 79, to enable the quarterback to be locked in ball-receiving position. After the quarterback has delivered a ball, it must be moved back into ball-receiving position against the action of the spring 75. This may be done by means of a metal strap 87 which winds up on the exterior of the hub 74 as the quarterback moves to ball-delivering position. The strap 87 is drawn rearwardly by means of a lever 88 (Fig. 2) which has a resilient connection with a rod 89 slidably mounted on the under side of the board 8. The rod 89 is normally biased towards the front or playing end of the machine by means of a spring 90 and it has a downwardly turned end 91 which is engaged by an element 92 (Figs. 2 and 9) which is a part of the ball elevating mechanism and is moved forwardly each time a ball is elevated.

The lower ends of pins 15 and 58 are provided with eyes through which pass portions of a frame 93, pivotally mounted on the underside of the

board 8 between these two pins, so that one pin is projected upwardly when the other is retracted, and vice versa.

The frame 93 is actuated by means of a crank arm which forms part of a rocking frame 94, also pivotally mounted on the underside of the board 8. At its opposite end the rocking frame 94 is provided with another crank arm which passes through an eye on the lower end of a small rod 95. The rod 95 projects through an opening in the board and is operatively connected to the gate 14, as best seen in Fig. 29. The frame 94 comprises an intermediate length 96 displaced from its pivotal axis, which length engages a frame 97 also pivotally mounted on the under side of the board 8. At its opposite ends the frame 97 comprises crank arms which receive eyes of small rods 98 which project through openings in the board 8 and are operatively connected to the gates 12 and 13, as best seen in Fig. 29.

The intermediate length 96 of the rocking frame 94 is connected by means of a link 99 to the armature 100 of an electromagnet 101. A latching element 102 is provided which locks the armature 100 adjacent the electromagnet 101, when moved into that position, either mechanically or by magnetic attraction. The armature 100 tends to move away from the latched position by gravity. The latching member 102 is biased towards latching position by means of a spring 103. It may be moved into unlatching position by the attraction of the electromagnet 104, when energized, the latching element 102 being the armature of this magnet. The relation of the frames 93, 94 and 97 shown in the drawings, is such that when the armature 100 is in latched position the pin 15 is projected, the pin 58 is retracted, the gate 14 is opened and the gates 12 and 13 are closed. In other words, the latched position of the armature 100 sets the board for the free passage of the first ball to the position 16.

It may here be noted that the armature 100 is moved to latched position in two ways. First, mechanically by the manual operation of the coin chute which causes a bell crank lever 105, mounted on the board 8, to engage the frame 94 and swing it sufficiently to enable the latching element 102 to engage the armature 100. Secondly, by the passage of a ball over the switch 24 which, as will hereinafter be more fully explained, energizes the electromagnet 101 with the result that the armature 100 is attracted thereby and becomes locked by the latching element 102. The armature 100 becomes unlatched when a ball rolls over the switch 17, which, as will hereinafter be pointed out, has the effect of energizing the electromagnet 104.

The downs counter or indicator 35 and the yardage meter 36 are of substantially the same construction, which construction will be readily understood with reference to Figs. 25 to 28 inclusive, in which the yardage meter is shown. This meter being adapted to record the number of three-yard gains made is provided with a scale 106 which carries the numbers 10, 7, 4, 1, in series which are adapted to appear in series through the window in the football-like fitting mounted on the surface of the board 8. In the case of the downs meter or recorder the scale is numbered 0, 1, 2, 3, 4, in series. The indicator or meter is mounted on the under side of the board 8 and an arcuate recess 107 is formed in this board below said fitting for the purpose of accommodating the scale 106.

The scale 106 is of arcuate shape and is mounted on a spider 108. This spider is preferably formed of sheet metal and is integrally connected by means of a bar-like portion 109 with a ratchet 110 which lies parallel to the spider 108 and in spaced relation thereto. The spider 108 and ratchet 110 are rotatably mounted upon a shaft 111. The shaft 111 is mounted in vertical walls provided in the frame 112 of the meter or indicator. This frame may be suitably formed from a sheet of flat stock bent to provide horizontal and vertical webs for the support of the various mechanisms.

The ratchet 110 is located adjacent the central vertical wall of the frame, which is provided with openings 113 and 114 for the passage there-through of a pawl 115 and an actuating tooth 116 respectively. On the other side of the central wall from the ratchet 110 are mounted electromagnets 117 and 118 respectively. The pawl 115 is pivotally mounted on a frame 112 and is part of an armature 119 of the electromagnet 117. This armature is normally held away from the electromagnet and the pawl 115 is maintained in engagement with the ratchet 110 by means of a spring 120. With reference to Fig. 25, it will be readily understood that when the electromagnet 117 is energized, the pawl 115 will be elevated out of contact with the ratchet 110. A coil spring 121 located around the shaft 111 and secured to the frame at one end and to the bar 109 at the other end, returns the scale 106 to its initial position when the pawl 115 is thus elevated.

The armature 122 of the electromagnet 118 is pivotally mounted on the frame 112 and at its free end pivotally carries a pawl 123 of which the tooth 116 is a part. The pawl 123 is connected to the armature 122 by means of a spring 124 so as to keep the tooth 116 in contact with the ratchet 110. A spring 125 is provided for moving the armature 122 downwardly when the electromagnet is deenergized.

It will readily be understood, particularly with reference to Fig. 25, that every time the electromagnet 118 is energized, the armature 122 moves upwardly, feeding one tooth of the ratchet 110 past the pawl 115. As best shown in Fig. 28, the tooth 116 is closely engaged on either side by a tooth of the ratchet 110 and an edge of the opening 114 when the magnet 118 is energized. This relation effectively prevents the feeding of more than one tooth at a time.

In the case of the yardage meter, a switch 126 is provided which is actuated each time the armature 122 moves upwardly. This switch may suitably comprise a pair of contact bearing leaves which are adapted to be engaged by the projecting end of the pivot carrying the pawl 123. It will readily be understood from Fig. 25 that every time the armature 122 moves upwardly, the two leaves of the switch 126 will come into contact, resulting in the actuation of the downs meter; as will hereinafter be more readily understood when the electrical system is described in full.

In the case of the downs meter, a switch 127 is provided, likewise consisting of a pair of contact bearing leaves, which leaves are caused to make contact with each other by engagement of them by the bar 109. The leaves are located with relation to the bar 109, so that the switch 127 is closed after the electromagnet 128 of the downs meter 35 has been actuated four times. The result of the closing of the switch 127 is to lock the machine against further play, until a further coin is inserted, as will more fully be

explained by the description of the electrical system. The location of the leaves of the switch 127 for the attainment of this result is suggested in dotted lines on Fig. 27. The downs meter also comprises an electromagnet 129 which has a function similar to that of the electromagnet 117 in the case of the yardage meter, that is, when the electromagnet 129 is energized, the downs meter returns to its initial position.

The rake members 65 and 66 which carry the teeth 63 and 64 are pivotally mounted in plates 130' carried by a casting 130 which is secured to the under side of the board 8. On its upper face the casting 130 provides bearings at 131 and 132 for a main actuating bar 133 which is directly actuated by the coin chute 1 at the beginning of play. This bar is provided with other bearings 134 secured to the underside of the board 8. The rake member 65 carries an armature 135 which is adapted to be attracted by an electromagnet 136, when energized, which, as will hereinafter be described, occurs whenever the switch 22 is energized by a ball sitting upon it waiting for the pin 58 to depress, as hereinbefore described. When a ball is in that position, the teeth 63 of the rake member 65 are moved from their normal position in the passage 48 into a position beneath the adjacent bar 60. The teeth 64 of the rake member 66 are normally below the other bar 60 so that any ball on the gridiron is free to roll into the well 23. In doing so it passes over the switch 24, with the results hereinbefore described. It may be remarked that when the ball rolls off the switch 22, the electromagnet 136 is immediately deenergized and the teeth 63 move into the passage 48 so as to arrest the ball rolling down the board 8 at the position 16, as shown in Fig. 1.

The rake member 65 carries a rearwardly extending crank arm 137 which is adapted to be contacted and depressed by a gate 138, which forms the bottom of the well 23, when that gate is opened, with the result that the teeth 63 are removed from the passage 48. The gate 138 is opened at the commencement of play and is held open long enough so that any ball on the board 8 may roll downwardly over the gridiron, into the well 23 and past the gate 138 before that gate closes. Immediately the gate 138 closes, the teeth 63 return into their normal position in the passage 48 so as to stop the first ball at the position 16 in Fig. 1. This return is effected by means of a spring 139 secured to the rake member 65 and to the casting 130. The manner in which the gate 138 is opened will hereinafter be more fully described.

The rake member 66 is normally held by a tension spring 140 with its teeth 64 outside the passage 48. This rake member carries an armature 141 which is arranged to be attracted by an electromagnet 142, when energized. The electromagnet 142 is energized each time the switch 68 is closed, that is, every time a 10-yard gain is made. The armature 141 carries an arm 142 which is provided with a set screw 144. This set screw is adapted to engage the armature 135 of the rake member 65. Consequently, each time the switch 68 is closed the teeth of both rake members 65 and 66 move to the left, as viewed in Fig. 1, and then to the right as viewed in this figure. The result is that the teeth 63 and 64 serve as an escapement to advance the ball upon the gridiron an amount corresponding to ten yards.

The main actuating bar 133 is provided at one

end with a crank portion 145 which engages a projecting member 146 on the coin slide 1 (Fig. 4). When the coin slide 1 is pressed inwardly, the projection 146 causes the bar 133 to rotate. The bar 133 comprises a major crank portion 147 adjacent its other end. The crank portion 147 is connected by a link 148 to the piston rod 149 of the dashpot 150, which is mounted on the casting 130. The crank portion 147 is returned to its initial position by a tension spring 151 which is connected to this crank portion and also to the board 8. It will readily be understood that this return is relatively slow, owing to the action of the dashpot 150. The time of the return can be controlled by suitable adjustment of the dashpot. The gate 138 is rigidly mounted on a pivot bar 152 which is provided with bearings in the casting 130. One end of the pivot bar 152 is a crank 153, which crank is connected by a link 154 to the major crank portion 147 of the main actuating bar 133.

As best seen in Fig. 16, the crank 153 extends into a relatively long slot 155 in the link 154. When the coin slide 1 is pushed rearwardly, the crank 147 draws the link 154 and the crank 153 rearwardly past the tooth 156 of a latch member 157 pivotally mounted upon the casting 130. When this occurs the latch member 157 falls downwardly and the gate 138 is held open for a substantial period of time, notwithstanding the gradual and continuous return movement of the crank 147 and link 154. (Figs. 15 and 16.) When, however, the crank 147 has practically returned to its initial position, it engages the latch 157, as best seen in Fig. 16, and releases the crank 153. A spring 158 secured to this crank and to the board 8 quickly snaps the gate 138 closed.

The bell crank lever 105 previously referred to is mounted upon a bracket 159 secured to the board 8. The bell crank lever 105 carries a roller 160 which is adapted to be contacted by the cammed end of a bar 161 slidably mounted on the bracket 159. The bar 161 is pivotally connected to a link 162, the forward end of which is in the form of a loop around the crank 147. The actuation of the pins 15 and 58 and gates 12, 13 and 14 which is thus effected by the forward movement of the coin slide has heretofore been described, likewise the manner in which the position of these elements becomes changed at the start of play.

The lower end of the pin 59 is in the form of an eye which receives an arm 163 of a bell crank lever 164 pivotally mounted on a lug projecting from one of the adjacent plates 130'. These plates are provided with openings which serve as a bearing for a longitudinally slidable rod 165. The rear end of this rod is provided with a cam 166 which engages a roller 167 on the lever 164. As best seen in Fig. 16, the rearward movement of the bar 165, that is, movement to the right as viewed in this figure, will have the effect of projecting the pin 59 above the surface of the board 8. When the bar 165 moves to the left, as viewed in this figure, the pin 59 will be moved downwardly by gravity. The bar 165 is drawn forwardly by a spring 168 secured to the bar and the adjacent plate 130'. The spring is best seen in Fig. 15. The bar 165 carries near its forward end a roller 169 which is adapted to be engaged by a pin 170 mounted radially in the main actuating bar 133, as best seen in Fig. 19. With reference to this figure it will be understood that when the bar 133 is rotated by the coin slide 1, the pin 59 is projected upwardly, and that the pin

is maintained in projected condition as long as the coin slide is held inwardly. When the coin slide 1 is released, the bar 133 returns to its initial position gradually and the spring 168 moves the bar 165 forwardly and allows the pin 59 to retract.

The bar 133 controls the re-setting of the tilting indicator 55, which mechanism will now be described in detail. The tilting indicator 55 comprises a frame 171 upon which is pivotally mounted a member 172. This member is provided with two faces 173 and 174, one of which is visible at all times through the window 56. The face 173 bears the letters "O. K.", while the face 174 bears the word "Tilted". An electromagnet 175 is mounted on the frame 171. The armature 176 of the magnet 175 is normally pressed by a spring 177 away from the magnet 175 and its lower end is conformed to enable it to engage a portion of the member 172 and latch the same in the "O. K." indicating position. When the magnet 175 is energized, the armature 176 is attracted into unlatching position and the spring 178 moves the member 172 from the position shown in full lines in Fig. 14 into the position shown in dotted lines in that figure. In thus moving, a projection 179 on the member 172 engages the leaves of a switch 180, which leaves are mounted on the under side of the board, with the result, as will hereinafter be more fully described, that the main switch of the machine is opened and further operation is rendered impossible until the machine is again set by means of the coin chute 1.

When the coin chute 1 is pressed forwardly and the main actuating bar 133 is rotated, the main crank portion 147 of this bar effects the resetting of the tilting indicator. This resetting is effected by means of a link 181 pivotally connected to the member 172. The link 181 has a slot 182 at one end through which the main crank portion 147 of the bar 133 passes. By reference to Fig. 14, it will readily be seen that the actuation of the crank 147 will move the link 181 and member 172 from the dotted line position to the full line position, on which they will be held until the electromagnet 175 is again energized.

The main switch 183 of the machine comprises a pair of leaves 183' and a third leaf 183''. These leaves are insulated from each other and are mounted on a frame 184 which carries an electromagnet 185. The armature 186 of the electromagnet 185, which is pivoted on the frame 184, serves as a latch for a lever 187 also pivoted on the frame 184. A spring 188 tends to draw the lever 187 into unlatched position. The lever 187 carries a roller 189 which is adapted to be engaged by the main crank portion 147 of the bar 133, when the bar 133 is actuated by the coin chute 1 so as to move the lever 187 into latched position. The lever 187 carries a projection 190 of insulating material which holds the leaves 183' in engagement when the lever 187 is in latched condition. One end of the lever 187 is adapted to engage a pin 191 which projects downwardly from a plate 192 which is slidably mounted by means of slots 193 and pins 194 upon a plate 195 secured upon the under side of the board immediately below the beginning of the chute 4. The plate 192 carries the fingers 5 which project upwardly through suitable slots in the board 8 into the chute 4. With reference to Figs. 2, 8 and 9, it will readily be seen that when the lever 187 is unlatched, the plate 192 is moved rearwardly and the fingers 5 move the ball out of the range of the plunger 6. In Fig. 9, the two posi-

tions of the fingers 5 are shown in full and dotted lines.

When the lever 187 is unlatched, the three leaves 183', 183' and 183'' are separated. When the coin chute 1 is operated the three leaves are brought into contact by the projection 190. When the coin chute is released, the lever 187 moves forwardly slightly to latched position and the leaves 183' move away from contact 183'', the leaves 183' remaining in contact until the magnet 195 is again energized.

When the lever 187 is relatched by the actuation of the coin chute, the plate 192 tends to move forwardly under the action of a spring 196. The return of the fingers 5 is, however, delayed until the door 138 is closed and the rest of the mechanism is prepared for play. This delay is effected by means of a pawl 197 pivotally mounted on a lug 198 of the plate 195, as best seen in Figs. 12 and 13. The pawl 197 is biased by a spring 199 so that it tends to enter in front of an edge 200 on the plate 192 as that plate is moved rearwardly and thereby prevents forward movement of this plate, which is necessary for the return of the fingers 5 to game playing position.

The pawl 197 carries a laterally extending arm 201 which is adapted to be engaged by the crank 147 near its fully returned position. As already explained, the return of the crank 147 to initial position is delayed by the dashpot 150, and near the end of this delayed movement or return of the crank 147, that crank engages the arm 201 and moves it from the position shown in Fig. 13 into the position shown in Fig. 12. The plate 192 is thus freed and is drawn rapidly forward by means of the spring 196 so that the ball may be played.

The plate 195 carries a downwardly projecting flange 202 on which is pivotally mounted a lever 203. At its lower end the lever 203 is provided with a gate 204, the purpose of which will hereinafter be described. At its upper end, the lever 203 is provided with a slot 205 which receives a pin 206 carried by a depending lug 207 which is integral with the plate 192. It will be noted that when the fingers 5 are in the full-line position, as shown in Fig. 9, the gate 204 is likewise in its full line-position. The corresponding positions of these elements, when the plate 192 is moved rearwardly, are shown in dotted lines in this figure. On the under side of the board 8 are provided four electric contacts 208, 209, 210, 211, preferably arranged in a row, which will be more fully described in connection with the wiring diagram shown in Fig. 3.

The board 8, which, together with the mechanism mounted thereon, has been described above in considerable detail, is mounted within a cabinet 212, being supported therein upon rails 213 at the requisite slope to enable the balls to roll downwardly by gravity towards the front or playing end of the machine. The board is firmly held in place by screws 217. The surface of the board 8 is protected from interference by a sheet of glass 214 which is slid into grooves in the walls of the cabinet and secured in place by a removable front bar 215 which is secured to the cabinet by bolts 216. The coin slide 1, the ball elevating handle 2 and the plunger 6, previously mentioned, are mounted on the front wall of the cabinet.

The cabinet is provided with a ball collecting hopper 218 which extends below the openings 9, 23, 39, and below the well 23, so that all the balls pass into the hopper. The hopper is provided with a discharge outlet 219 which is adapted to

be closed by the gate 204 when the fingers 5 move rearwardly into a position where the ball cannot be played by the plunger 6. As a ball passes from the opening 219 of the hopper it abuts against an arcuate channel-shaped guide 220 which extends upwardly through the board 8 and is adapted to guide a ball into the chute 4 through an opening in the board 8.

A plate 221 is provided on the board for preventing the ball being elevated from striking against the glass 214. The upper end of the guide 220 is bent inwardly towards the chute 4, as indicated at 222. A ball discharged from the opening 219 falls against the guide 220 and rests upon a concave formation 223 at the end of a lever 224, which is pivoted to the cabinet at 225. The lever 224 is provided with a long arcuate tail 226 which closes the opening 219 during the time when the lever 224 is elevating the ball. A resilient stop 227 is provided for maintaining the lever 224 in ball-receiving position. The ball elevating handle 2 is slidably mounted in a suitable bearing carried by the cabinet and its inner end is somewhat loosely secured to a link 228 which is provided with a slot in its rear end whereby the same is guided upon a bolt 229 mounted on the cabinet. The link 228 is operatively connected by means of a relatively long spring 230 to a pin 231 carried by the lever 224. A bar 232 is pivotally mounted on the pin 231 and extends rearwardly in a direction substantially parallel with the link 228. The bar 232 is provided with a slot 233 through which the bolt 229 passes and has its rear end bent laterally to provide the element 92, which has been previously described, and which engages the downwardly turned end 91 of the rod 89. It will thus be seen that the operative means for the ball elevating lever 224 is resilient and that the rod 89 is actuated every time that a ball is elevated.

An electric battery 245 (Fig. 3) may be mounted within the cabinet, for the actuation of the electrical devices hereinabove described. One pole of the battery is connected to a resilient contact 234. The other pole is connected through a fuse 235 to a similar contact 236.

A novel tilting switch 246 is provided for rendering the machine inoperative in the event an attempt is made to divert a ball under play into a more advantageous position. The tilting switch 246 is preferably provided within the cabinet and it may comprise a ring 237 adjustably mounted within the cabinet by means of a slotted arm 238 which is held in desired position by means of screws 239. One of the screws 239 and consequently the ring 237, is connected by means of a conductor to a resilient contact 240. A coil spring 241 is normally located within the eye 237. This coil spring carries at its lower end a weight 242 and at its upper end it is supported by a screw 243. The screw 243 is connected to a resilient contact 244. The eye 237 is slightly larger than the maximum diameter of the spring 241. When the cabinet is tilted, the spring makes contact with the eye 237, with an effect which will appear hereinafter in the following description. The contacts 234, 236, 240 and 244 are arranged in series and may suitably take the form of angle pieces of resilient metal. They are so located that they are engaged by the contacts 208, 209, 210 70 and 211 respectively, when the board 8 is applied to the cabinet.

Referring to Fig. 3, it is to be noted that the contact 208 is exclusively connected, by a conductor 247, to one of the leaves 183' of the main

switch 183. Consequently, whenever the main switch 183 is open, no energy can be supplied to any of the electrical devices on the machine. The contact 209 is connected by a conductor 248 to each of the electromagnets 117, 118, 101, 104, 129, 128, 142, 136, 175 and 185, this being the return wire for all the electromagnets of the machine. The contact 210 is connected by means of a conductor 249 to the switches 17, 126, both switches 34, both switches 53, switch 68, switch 22, switch 127, switch 24, the other leaf 183' of main switch 183, switch 180, that is, all of the switches on the board 8, and it may here be noted that through the contact 210, the conductor 249 is connected with one pole of the tilting switch 246. Since the conductors 247 and 249 are put in electric communication when the main switch 183 is closed, it will be noted that all the switches other than the main switch 183 are energized when the main switch 183 is closed. The contact 211 is connected by conductor 250 to the electromagnet 175, the other side of which is connected to the contact 209, as hereinbefore pointed out.

The switch 17 is connected by a conductor 251 to the magnet 104. The switch 126, and both switches 34, are connected by conductor 252 to the magnet 128. Both switches 53 are connected by conductor 253 to the electromagnet 118. Contact 183' of the main switch and switch 68 are connected by a conductor 254 to electromagnets 117, 129 and 142. The switch 22 is connected by conductor 255 to the electromagnet 136. The switch 24 is connected by conductor 256 to electromagnet 101. The switches 127 and 180 are connected by conductor 257 to electromagnet 185.

Assuming that the main switch 183 is closed, then if the tilting switch 246 is closed, a circuit is completed through the battery 245, conductor 247, conductor 249, conductor 250, electromagnet 175 and conductor 248. The energization of the electromagnet 175 releases the tilting indicator 55 and closes the switch 180. The closing of this switch results in the energization of electromagnet 185 and the opening of the main switch 183. The machine is now dead until again set by the coin chute 1.

Again assuming the main switch 183 to be closed, when the switch 17 is closed, which occurs when a ball rolls onto the gridiron, the magnet 104 is energized, with the result that the pin 15 is retracted, the pin 58 is projected, the gates 12 and 13 are opened and the gate 14 is closed, as has been previously described. When the switch 22 is closed, which occurs whenever the player has succeeded in directing a ball into the arms of the quarterback 21, the magnet 136 is energized with the result that the teeth 63 of the rake member 65 are withdrawn from the path 48 on the grid-iron, in the manner above described.

When the switch 24 is closed, which is occasioned by a ball passing from the gridiron into the well 23, as a result of repeated energizations of electromagnet 136 or a single energization of magnet 142, the magnet 101 is energized and, as a result the pin 15 is projected, the pin 58 is retracted, and the gates 12 and 13 are closed and the gate 14 is opened. The retraction of the pin 58 allows the ball sitting on switch 22 to roll downward over the board to position 16, passing over contact 49, thus closing the switch 68, and over switch 17, with the results indicated above. When the switch 68 is closed, as a result of a ten-yard or greater play, the electromagnets 117, 129 and 142 are energized. The yardage and

downs meters 36 and 35 are thereby returned to initial reading and the rake members 65 and 66 are actuated to advance the ball on the gridiron an amount corresponding to ten yards. The yardage and downs meters 36 and 35 are also returned to initial reading when the leaves 183' are momentarily forced into contact with the leaf 183' during operation of the coin chute 1 at the beginning of play. When a ball closes either of the switches 34, corresponding to a no gain play, the electromagnet 128 is energized, causing the down to be recorded in the downs meter 35. When either of the switches 53 is closed, corresponding to a three-yard gain, the electromagnet 118 is energized and the yardage meter is actuated to record the gain. Every time the yardage meter is thus actuated, the switch 128 is closed, which energizes magnet 128 with the result that the play is counted by the downs meter. When the downs meter is actuated four times before a ten-yard gain or a touchdown is made, the switch 127 on the downs control meter closes, the electromagnet 185 is energized and the main switch 183 is opened.

Although the invention has been disclosed in connection with the specific details of a preferred embodiment thereof, it must be understood that such details are not intended to be limitative of the invention except in so far as set forth in the accompanying claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a game apparatus, a board having a field of play, means for projecting a ball onto said field, means to prevent operation of said projecting means, a member having an initial position adapted to be moved therefrom to release said projecting means for operation and a pin in said board adapted to be projected thereabove to prevent said ball from entering said field, said pin and said movable member being connected so that the pin retracts when the releasing member is returned to initial position.

2. In a game apparatus, a board, a ball receiving and delivering device mounted on said board and adapted to swing between ball receiving and ball delivering positions, a latch for holding said device in ball receiving position adapted to be released by a ball in received position, means for elevating a ball on to said board, and means connecting said ball elevating means to said device whereby a ball is elevated and the device is returned to ball receiving position by the same actuation.

3. In a game apparatus, a board, a ball receiving and delivering device mounted on said board and adapted to swing between ball receiving and ball delivering positions, a latch for holding said device in ball receiving position adapted to be released by a ball in received position, and a spring tending to move said device to ball delivering position.

4. In a game apparatus, a board, a ball receiving and delivering device including a plate adapted to swing between ball receiving and ball delivering positions, said plate having an opening adapted to receive the ball, and a door adapted to be moved into said opening, and means for moving the door into ball ejecting position when the plate moves to ball delivering position.

5. In a game apparatus, a board having a field of play, means thereon defining a path for a ball on said field, and a rake member having teeth normally located in said path to arrest the pas-

sage of a ball therethrough, said rake being movable to bring the teeth out of said path to permit the ball to move along said path, means for moving said rake member momentarily to permit the ball to move step by step from tooth to tooth, and means for moving said rake member out of said path for a longer time to permit the ball to move past said rake member.

6. In a game apparatus, a board having a field of play, means thereon defining a path for a ball on said field, a rake member adjacent one side of said path having teeth normally located in said path to arrest the passage of a ball therethrough, said rake member being adapted to move to bring the teeth out of said path, a rake member adjacent the other side of said path having teeth normally located out of said path, last said rake member being adapted to move to bring said teeth into said path to arrest the passage of a ball therethrough, and means connecting said rake members whereby they may be actuated together to permit the ball to move a definite distance upon said path.

7. In a game apparatus, a board having a field of play, means thereon defining a path for a ball on said field, a rake member adjacent one side of said path having teeth normally located in said path to arrest the passage of a ball therethrough, said rake member being adapted to move to bring its teeth out of said path, a rake member adjacent the other side of said path having teeth normally located out of said path, last said rake member being adapted to move to bring its teeth into said path to arrest the passage of a ball therethrough, means for actuating the first said rake member independently to provide unlimited movement for the ball on said path, and means for actuating both rake members simultaneously to provide limited movement for the ball on said path.

8. In a game apparatus, a sloping board having a field of play simulating a football gridiron, means adapted to move on said field adapted to impede the movement of a ball thereon and op-

erable to release the ball for progressive movement to one end of the gridiron, other means on said board for receiving a ball played thereon, obstacles adapted to move on said board adapted to divert a ball moving over said board from said other receiving means onto said field, and means actuated by said ball entering said field to move said obstacles to inoperative position.

9. In a game apparatus, a ball chute, a plunger adapted to strike a ball therein, and means in said chute adapted to engage the ball, said means being movable to a position to keep the ball out of reach of the plunger.

10. In a game apparatus, a ball chute, a plunger adapted to strike a ball therein, means for elevating a ball into said chute, a fork having furcations extending into said chute on either side thereof, said fork being adapted to move, means for moving said fork to a position to keep the ball out of the range of the plunger, means for moving said fork away from said position, and a gate connected to said fork to prevent delivery of balls to said elevating means while the fork is in said position.

11. In a game apparatus, a board, means thereon defining an enclosure for a ball, an obstruction adapted to be moved for controlling the inlet to said enclosure, an obstruction adapted to be moved for controlling the outlet from said enclosure, a member within said enclosure adapted to be actuated by a ball therein, and means controlled by said member for actuating said obstructions to open the outlet and close the inlet of said enclosure.

12. In a game apparatus, a board having an opening for allowing played balls to pass through the board, a door closing said opening, manually operable means for opening said door, means for effecting the gradual return of said manually operable means, and a latch for holding said door wide open, said latch being engaged by said manually operable means after said means has substantially returned to its initial position.

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