

[54] **AMUSEMENT AND GAME BOARD WITH
AUTOMATIC DICE CASTING MEANS**

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[58] **Field of Search**..... 273/145 E, 145 R, 145 A,
273/145 B, 145 C, 145 CA, 145 D, 144 R,
144 A, 144 B, 138 A, 134 D, 134 A, 135 E

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[57] **ABSTRACT**

An amusement and game board specifically incorporating an automatic dice shaking and casting device comprising in combination a dice shaking and casting section disposed with the head portion thereof to be exposed in one corner of the playing surface of the game board, wherein the dice casting section has an opening on the upper side thereof and also on one lateral side thereof facing the playing surface and a rotary disc disposed in the interior of that section to be driven by an electric motor in such a manner that it can start rotation in immediate response to the presence of a set of dice thrown thereupon by a switch adapted to serve to automatically close an electric circuit for the motor, a cam operated shutter adapted to normally close the side opening is appropriately correlated with the rotating motion of the motor so as to automatically open the side opening of the dice casting section and close it again, and another switch adapted to serve to automatically maintain the electric circuit for one complete operation and then open the electric circuit, thereby to accomplish the complete dice operation of the game board.

2 Claims, 7 Drawing Figures

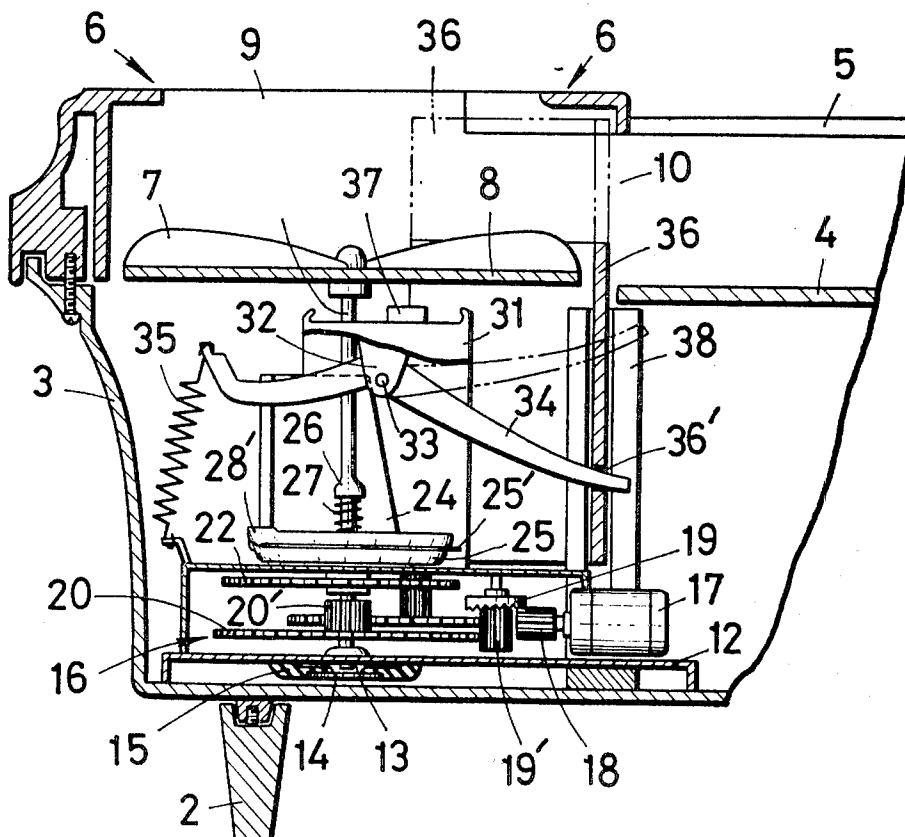


FIG. 1

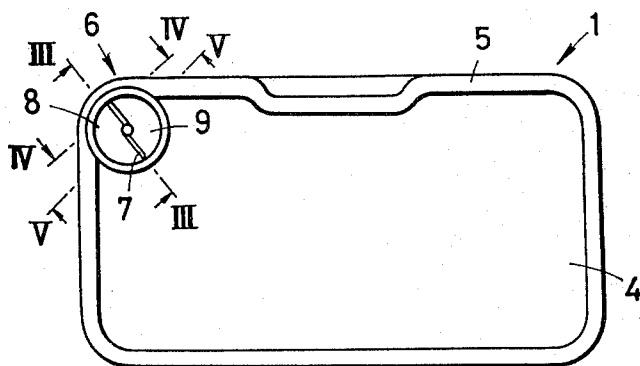


FIG. 2

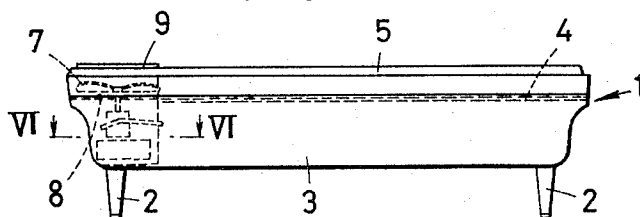


FIG. 3

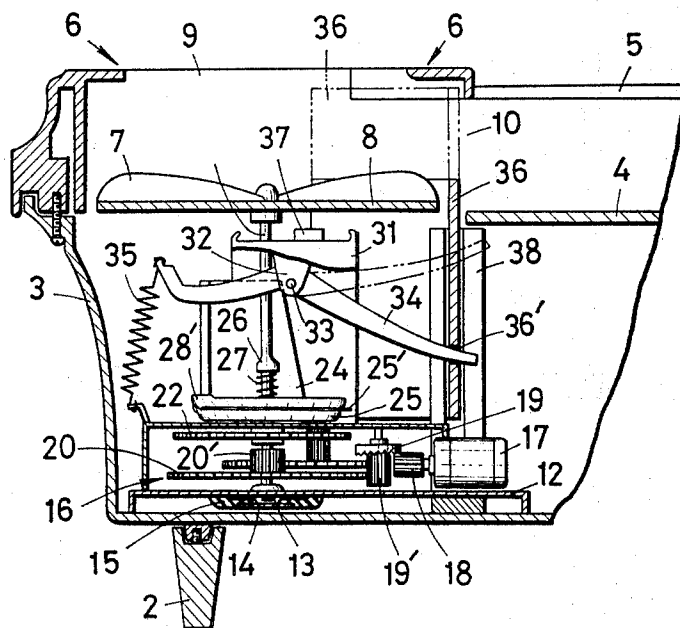


FIG. 4

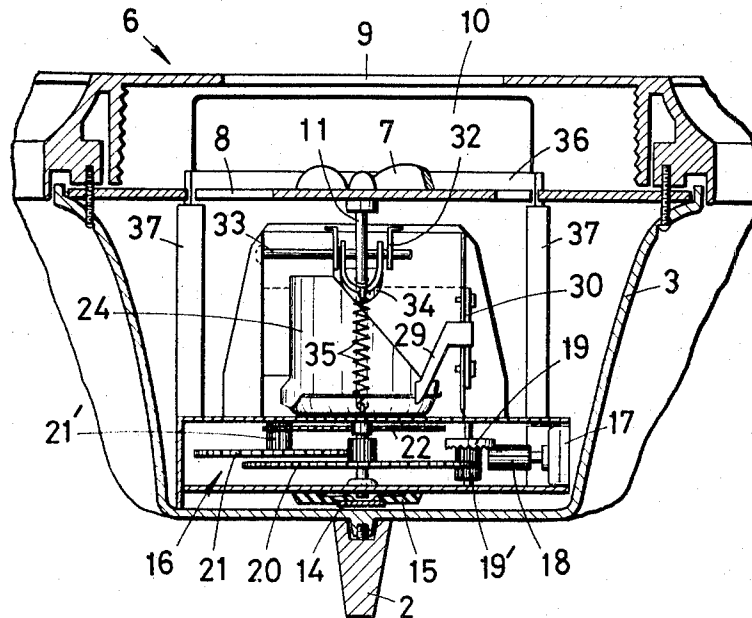


FIG. 5

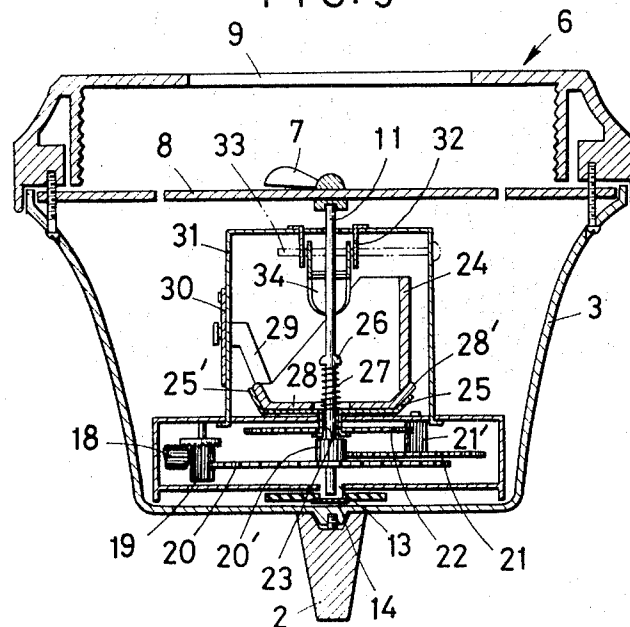


FIG. 6

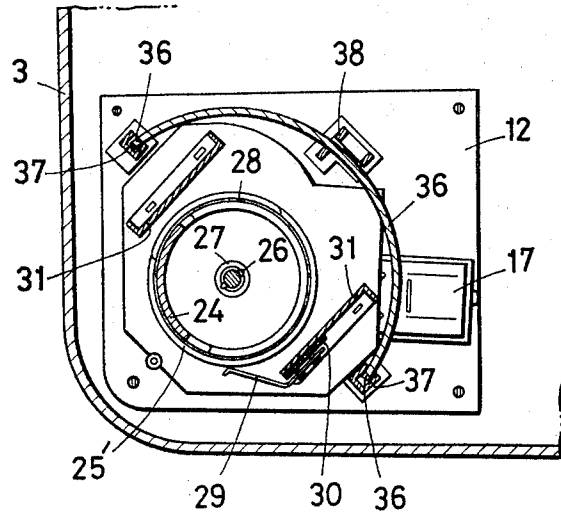
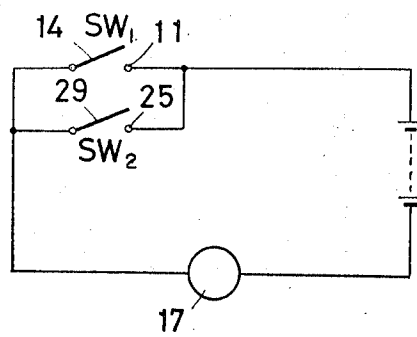


FIG. 7



AMUSEMENT AND GAME BOARD WITH AUTOMATIC DICE CASTING MEANS

BACKGROUND OF THE INVENTION

The present invention relates to an art in the field of the private indoor amusement and game means, and particularly to a novel and improved apparatus which is applicable to the amusement and game board for playing the games by using a chance mechanism such as a set of dice. More particularly, this invention is concerned with a compactly constructed device for shaking and casting a set of dice, which is designed to be incorporated in the amusement and game board in such a manner that there is provided a dice casting section which may be disposed appropriately in one corner of the game board, and equipped with automatically operable shutter means, and there is further provided a rotary disc in the interior of the above mentioned shutter means which disc is designed to automatically start rotation upon the manual casting of the dice in appropriate set, thereby to shake in rotation and cast the dice out to the game board so as to play the games by determining the total of the dice's spots appearing by chance.

A variety of private indoor amusements and games, such as Corinthian board game, baseball play game, or the like, have been well known, however, so far as the games of the type using a game board are concerned, no games have practically been known of board type games to be played by casting a set of dice to assess the total spot number of such dice as they may appear by chance upon casting.

This invention is, in consideration of the above described fact, intended for realizing a new and practical amusement and game which includes a set of dice to be shaken and cast out to the game board to in play by counting the total number of the dice's spots appearing by chance. It is a common practice for a set of dice of appropriate number to be manually shaken and cast by the game operator, either one of the participants in the game or the professional personnel of the gaming house, and a game is played by means of counting the total number of the dice's spots appearing by chance upon casting.

According to such a common manner of casting the dice during the games, there should inevitably be substantial risks of the partiality or inequity in the chance appearance of the dice spots in combination, which may often spoil the interest and the pleasures of the game, because of contingent differences in the proficiency in the dice manipulation of the individual shakers or rather of unfair designs by the professional operators in the gaming house. Such risks can never be prevented as far as the game of this character is subjected to manual dice shaking and casting operations.

SUMMARY OF THE INVENTION

In consideration of the above described inconveniences and problems which are inherent to the performance of the game which are contested by manually shaking and casting a set of dice, it would be advantageous to provide a game board to play with a set of dice as used in the standard playing manner which is specifically designed with an automatic dice shaking and casting device.

It is therefore a primary object of the present invention to provide a game board which is equipped with an

automatic dice shaking and casting device in order to cope with the above mentioned problems by entirely eliminating the necessity of manual dice shaking and casting operations, and instead, by performing such dice operations automatically the amusement and game may be prevented from such risks of the partiality or inequity in the chance appearance of the dice spots in combination, which are likely to occur due to involuntary differences of the participants or sometimes intentional designs of the professional operators in the dice shaking and casting operations, whereby as a result the accidentalism in the chance appearance of the dice spots will be positively assured and the interest and the pleasures of the games will therefore be established properly.

According to the present invention, briefly summarized, there is provided an amusement and game board specifically incorporating an automatic dice shaking and casting device comprising in combination: a dice shaking and casting section disposed with the head portion thereof to be exposed in one corner of the playing surface of the game board, wherein the dice casting section has openings on the upper side thereof and also on one lateral side thereof facing the playing surface and a rotary disc disposed in the interior of that section to be driven by an electric motor in such a manner that it can start rotation in immediate response to the presence of a set of dice thrown thereupon, switch means adapted to serve to automatically close an electric circuit for the motor, shutter means adapted to be appropriately correlated with the rotating motion of the motor so as to automatically close and open the side opening of the dice casting section, and another switch means adapted to serve to automatically open the electric circuit, thereby to accomplish the complete dice operations of the game board.

BRIEF DESCRIPTION OF THE DRAWING

The nature, principle, and utility of the present invention, as well as characteristics and advantages thereof, will become more apparent from the following detailed descriptions with respect to a preferred embodiment of the invention when read in connection with the accompanying drawings, in which like parts are designated by like reference numerals, and in which:

FIG. 1 is a plan view showing one example of an amusement and game board embodying the present invention, particularly showing one exemplary location of an automatic dice shaking and casting device;

FIG. 2 is an elevational view showing the same example of an amusement and game board as in FIG. 1;

FIG. 3 is an enlarged side elevational view showing an automatic dice shaking and casting device according to this invention, in longitudinal section taken along the plane indicated by line III—III in FIG. 1;

FIG. 4 is an enlarged front elevational view showing the same dice shaking and casting device as in FIG. 3, in longitudinal section taken along the plane indicated by line IV—IV in FIG. 1, which line being at right angles with line III—III;

FIG. 5 is an enlarged front elevational view showing the same dice shaking and casting device as in FIG. 4, in longitudinal section taken along the plane indicated by line V—V in FIG. 1, which line being parallel to line IV—IV;

FIG. 6 is a fragmentary sectional view showing the same dice shaking and casting device as in FIG. 3 in transversal section taken along the plane indicated by line VI—VI in FIG. 2; and

FIG. 7 is a circuit diagram for the dice shaking and casting device used with a game board shown in FIG. 1.

DETAILED DESCRIPTION

Referring to FIGS. 1 and 2 showing a preferred embodiment of the amusement and game board according to the invention, there is provided a game board 1 complete for playing with a set of dice which is designed to be held horizontally by an appropriate set of legs 2. The game board 1, in this preferred embodiment, comprises a base 3 having a smooth playing surface 4, and a surrounding rim 5 being disposed at an appropriately higher level than the playing surface 4. On the playing surface 4, there may be provided drawings, patterns, lines, characters and/or figures which will be necessary for the performance of the games. The above mentioned surrounding rim 5 is so designed so as to prevent the dice being violently cast onto the playing surface from rebounding out of the surface. There is further disposed a casting section 6 for automatically shaking and casting a set of dice onto the playing surface in one corner of the playing surface 4, which is as one example designed to a square shape. This casting section 6 comprises a rotary mechanism and a shutter mechanism as main components thereof, the former is mechanically associated with a prime mover or an electric motor, in which the rotary mechanism is provided with the following arrangement.

In the dice shaking and casting section 6, there is provided a rotary disc 8 at the same level as that of the playing surface 4, which rotary disc has an appropriate number of projections 7 on the surface thereof so that the rotary disc may shake and eject out the dice through the shutter means when opened.

For a better understanding of the mechanisms and construction of the device according to this invention, a cross-reference is occasionally made also to FIGS. 3, 4, 5 and 6 in the further explanation herein. The dice casting section 6 incorporating the driving mechanism therein is, as shown in FIGS. 4 and 5, made up with a cylindrical frame structure which is molded as a unit with the surrounding rim 5, and furthermore, there is provided an inlet opening 9 for throwing-in the dice on the upper surface thereof. On the side of the dice casting section 6 facing the playing surface 4, as shown in FIGS. 3 and 4, there is provided an opening 10 designed to be entirely closed by shutter means, which will be described in more details hereinafter. The above mentioned rotary disc 8 is provided with a vertical shaft 11, as now shown in FIGS. 3 and 5, on which there is provided a contracted coil spring 27 so that the shaft may constantly tend to move upwardly by function of the resilient force of the coil spring. For more descriptions in details, there is provided a bearing hole 13 for the shaft 11 on the chassis 12, which bearing hole is designed to hold the shaft rotatably and axially slidably at the lower end thereof, so that when the shaft encounters the weight of the dice, the shaft will be lowered by this weight of the dice axially downwardly until the lower end of the shaft contacts with a contact 14 which is mounted on the chassis 12 through an appropriate insulating member 15.

The shaft 11 is provided with a large gear 20 and a pinion 20' of unitary or monoblock construction, as shown in FIG. 5, with which large gear driving gears 18, 19 are arranged to mesh directly or indirectly. At the same time, the pinion 20' is in mesh with another gear 21 for reducing a rotating speed with which a gear 22 for driving a cylindrical cam 24 is arranged to engage through a large gear 21', both gears 21 and 21' being of unitary construction. In summary, there are two series of gear trains for power transmission in this exemplary gearing arrangement, i.e., one train comprising gears 18, 19 and 20 for reducing the rotating speed of a prime mover or an electric motor for the purpose of producing a required torque, and the other comprising gears 20', 21, 21' and 22 for further reducing the rotating speed for the other purpose as will be described hereinafter. The gear 22 is installed on a sleeve shaft 23 which is mounted independently rotatably onto the shaft 11, therefore, when the gear 22 is driven to rotate, there occurs a rotation of the sleeve shaft 23 at a much slower rotational speed than that of the shaft 11 by function of the reduction gearing arranged inbetween.

At the upper end of the sleeve shaft 23, there is mounted a rotary frame 25 of metal stamped to a dish form and a cylindrical cam 24 is mounted concentrically on the upper surface of the rotary frame. There is provided a mounting seat as designated at 28 on the cylindrical cam 24 which seat is formed unitarily on the cam cylinder, and there is further provided an annular projection 28' on the outer circumference thereof. There is projected a stop 26 on the middle portion of the shaft 11 for stopping the coil spring 27 which is to be compressively installed between this stop and the above mentioned rotary frame 25, so that the shaft 11 may be upwardly lifted positively and constantly by function of the resilient effort of the compressed spring. In such a manner, when the shaft 11 is constantly held upwardly, in other words, there is no weight of the dice to lie on the shaft, the shaft is electrically insulated from the chassis 12, since the lower end of the shaft does not contact at all with the above mentioned contact 14.

On the other hand, when there is the weight of the dice on the shaft 11 by the dice being cast onto the rotary disc 8, there will occur a lowering motion of the shaft due to the weight of the dice enough to overcome the resiliency of the spring 27, then the lower end of the shaft will contact with the contact 14, thereby causing electric current to pass through the shaft, and the shaft 11 and the chassis 12 are now electrically connected with each other. In this way, there occurs a switching function between the shaft 11 and the contact 14.

As described in the foregoing, the rotary frame 25 is made of metal which has a good electrical conductivity, and further there is provided a contact element 25' by making a projection at one point on the outer circumference thereof. On the contrary, the cylindrical cam 24 is made of an insulating material such as plastic resin and the profile thereof is made to form a trapezoidal profile, as shown in FIGS. 3, 4 and 5, so as to let a cam lever 34 following slidably the profile of the cam cylinder, as will further be described in the following, i.e., the cylindrical cam and the cam lever are arranged in such a mutual functional relationship that at any moment when the dice are thrown onto the rotary disc 8 so as to start the rotation of the motor, the shorter arm

side of the cam lever 34 is lowered down to bottom position off the straight uppermost rim of the trapezoidal profile of the cylinder, or in other words, the longer arm side of the cam lever is kept in an elevated position as viewed in FIG. 3 by the function of the spring 35 so that the shutter 36 may be lifted upwardly so as to close the side opening 10 of the dice casting section.

On the other hand, the functional relationship between the annular projection 28' on the cylindrical cam 24 and the annular contact element 25' on the rotary frame is such, as illustrated in FIG. 6, that either of the annular projection or the annular contact element will always be projected radially outwardly. There is provided a contact shoe 29 which is disposed so as to correspondingly contact from outside with either annular projection or annular contact element. This contact shoe is installed on the chassis 12 electrically insulated through a mounting member 30 and a holding frame 31, and is arranged to become electrically active upon contact with the contact element 25A of metal as the cylindrical cam 24 rotates in the meantime. In such a manner, there is provided an electric switching function between the rotary frame 25 and the contact shoe 29 which is operable according to the rotating motion of the cylindrical cam 24.

As described hereinbefore, the cylindrical cam 24 having a profile of trapezoidal shape is designed to correspondingly cooperate in functional relationship with the cam lever 34, wherein the cam lever 34 is pivotally mounted on a bearing 32 which is installed above the holding frame 31 by means of an axis 33 to let the cam lever move swingably thereby. There is also provided a coil spring 35 at the leading end of the shorter arm section of the cam lever 34, while the outer free end of the longer arm section on the lever is engaged with an engaging hole 36' being provided on a sectorlike shutter plate. This shutter 36 is designed, as described hereinbefore, so as to entirely close or open the whole area of the opening 10 of the frame structure which forms the dice shaking and casting section 6. In FIG. 6, the shutter 36 comprises a sector-shaped plate when viewed in plan, and the both ends thereof are held in position by guide frames 37, 38, etc. so that the shutter may be slidably moved up and down, more particularly, the shutter may be lifted upwardly to close and lowered downwardly to open the opening 10 of the dice casting section 6 to the level of the playing surface 4 when so required during the course of the play. There is provided an electric motor as designated at 17 which is driven by electricity from a power source, for example, such as a dry battery. This battery is appropriately housed inside the game board 1, and the electric power is to be supplied to the motor 17 by a typical circuit as shown in FIG. 7, which includes two appropriate single-throw type switches being disposed in parallel as indicated at SW₁ and SW₂. In more detail, the switch SW₁ comprises the shaft 11 and the contact 14, while the other switch SW₂ comprises the rotary frame 25 and the contact shoe 29 corresponding thereto.

While the present invention has been described above for an example of an amusement and game board with respect to the construction thereof, the functions and effects of the game board according to this invention will now be described as follows:

When starting the play of the game board, the shutter 36 in the dice casting section 6 is to be priorly set at a state of closing opening 10, and then an appropriate set

of dice will be thrown into the dice throwing-in opening 9. When a set of dice of appropriate number as ruled according to the kind of game being played are thrown into the dice throwing-in opening 9, the dice are now placed onto the rotary disc 8, then the rotary disc 8 will be lowered according to a given weight of the dice together with the shaft 11 down to a lower position overcoming the resilient force of the coil spring 27. The lower end of the shaft 11 will then be caused to contact with the contact 14, thereby to close the circuit including the switch SW₁ therein, as shown in FIG. 7, and start the rotating motion of the electric motor 17. When there occurs a rotation of the motor, this rotating motion will be picked up by the gear 18 which is directly mounted on the motor shaft and further transmitted to large gear 20 through the gear 19. The rotation of the gear 20 is immediately transmitted to the shaft 11 which is directly installed on the gear 20, therefore, the shaft 11 is rotated at a given high speed, thereby to rotate the rotary disc 8 at the same speed. Consequently, the dice on the rotary disc 8 will be fully shaken while being impinged and tossed by the projections 7 which are disposed on the rotary disc 8.

On the other hand, there is provided the pinion 20' on the shaft 11, which pinion is in mesh with the further reduction gear train including the gears 21, 21' and 22, as described hereinbefore. Through the function of this gear train, there occurs a further reduced rotation on the sleeve shaft 23 in comparison with that of the shaft 11, whereby this further reduced rotation will be transmitted to the sleeve shaft 23 which is concentrically sleeved onto the shaft 11. When this rotary frame 25 is set to rotary motion, there occurs a rotating motion of the cylindrical cam 24 accordingly, and simultaneously the both annular projection 28' and the contact element 25' are likewise rotated. Prior to this rotating motion on such driven mechanism, particularly the cylindrical cam 24, the contact shoe 29 is set in an insulated state from the chassis 12, i.e., the contact shoe 29 is in a conductive state with the annular projection 28', therefore the switch SW₂ is in an opened state.

Under such a circuit position, the motor 17 is kept in rotation by electricity through a circuit route established by the closing of the switch SW₁ which is set closed by the shaft 11 under the weight of the dice. When the rotary disc 8 is kept rotating for a moment, however, the tossing motion of the dice being impinged by the projections 7 of the rotary disc will become so active and violent that the weight of the dice on the rotary disc may now be kept or departed away from the disc surface until the shaft 11 does not dowel stably on the contact 14, thus resulting in unstable on-and-off contacts on the part of the contact maker 14, or unstable power supply to the motor.

On the contrary, prior to such unstable contact occurring on the part of the switch SW₁, there occurs a proper contact junction between the contact shoe 29 and the contact element 25' on the outer circumference of the rotary frame 25, which constitutes the switch SW₂, owing to the rotating motion of the cylindrical cam 24 in the meantime, thereby to close the circuit route including the switch SW₂, and provide a parallel stable power supply to the motor, therefore, the rotary disc 8 will continue a smooth rotating motion.

On the other hand, there is a continuous rotating motion compatibly on the part of the cylindrical cam 24, whereby there will occur a slidably lifting function on

the cam lever 34 in such a manner that as the cylindrical cam 24 rotates at a lower speed, there occurs a corresponding lateral travel of the sloping side on the trapezoidal profile of the cylindrical cam, and the shorter arm side of the cam lever 34 which is slidably set along the upper rim surface of the sloping side of the cylindrical cam 24, therefore, the cam lever 34 is caused to be lifted upwardly, more particularly, moved rotatably clockwise around the axis 33 in FIG. 3, according to that lateral travel of the sloping side of the cam against the contractive effort of the coil spring 35 which is disposed at the leading end of the shorter arm side of the cam lever. By this lowering motion of the cam lever 34 on the longer side thereof, there will occur a motion of the shutter 36 downwardly along the guide frames 37,38. When the shutter 36 is lowered to a lowermost position, the opening 10 of the dice casting section 6 will be entirely set open. For more details, when the shorter arm of the cam lever 34 is placed slopewise to an uppermost position along the upper rim surface of the cylindrical cam 24 is trapezoidal profile, the shutter 36 is caused to be lowered downwardly to a lowermost position by the free end of the other longer arm section of the cam lever 34, which is cooperatively disposed to engage in the hole 36' on the surface of the shutter plate, thus the opening 10 is entirely set open.

At this particular moment, the dice being violently tossed around on the rotary disc 8 within the dice casting section 6 will then be rushed out to the playing surface 4 from the above mentioned opening 10 owing to the high-speed rotating motion of the rotary disc 8 which has been continuously kept throughout the above described operating stages. In such a manner, the dice are rushed out to the playing surface 4 so that upon stopping there turn out to be specific spots of the dice in combination by chance with a proper accidentalism entirely free from any artificial control. Even after the dice are rushed out to the playing surface 4 of the game board, the rotary disc 8 will continue its rotating motion, with which there continues rotation of the cylindrical cam 24 accordingly until the cam lever 34 will at last drop out of the uppermost rim surface of the cylindrical cam 24 at the cliff-out end of such surface. At this moment, the cam lever 34 will abruptly be caused to get lowered, more particularly, moved rotatably counter-clockwise around the axis 33 in FIG. 3, by function of the extended coil spring 35, whereby the shutter which was then kept lowered to the level of the playing surface 4 will be simultaneously lifted upwardly so as to entirely close the opening 10. When the shutter 36 is lifted upwardly to close the opening 10, the contact shoe 29 is caused to meet with the annular projection 28' of non-conductivity material, thereby to set open the switch SW₂ so as to cut away the power supply to the motor 17, then the whole driving mechanism of the dice casting section 6 is caused to stop.

As has been described fully on a preferred embodiment of the present invention, the present invention is intended for providing a new and improved apparatus for amusement and games using a set of dice, which features such advantageous characteristics as follows:

By virtue of this automatic dice shaking and casting operations, the necessity of manual dice shaking and casting operations will be entirely eliminated, and the accidentalism in the chance appearance of the dice's spots in combination will therefore be positively and

impartially assured, and furthermore, the interest and the pleasures of the game will be obtained much more than the conventional amusement and games. Moreover, the games to be realized by this invention will assure effective functions to prevent such risks of the partiality or inequity in the chance appearance of the dice's spots, which may often spoil the interest and pleasures of the games, because of contingent differences in the proficiency in the dice manipulations of the individual shakers or rather of unfair designs by the professional operators in the gaming house, thus the fair chances of the games will be established properly.

It should be understood, as previously indicated herein, the preferred embodiment as shown herein by way of descriptions and illustrations is not meant for any restrictions of the present invention in any ways, but on the contrary, many changes, variations and modifications of the constructional details may further be derived by applying such as electro-mechanical arrangement including microswitches, photoelectric or other means for the purpose of detecting the throwing-in and ejection-out of the dice on and out of the rotary disc, respectively, so as to accordingly start and stop the rotating operation thereof at such instances, whereby the advantageous characteristics of the present invention may be realized and restored without departing from the spirit of the invention as set forth hereunto in the claims.

I claim:

1. A dice shaking and casting device in an amusement and game board comprising a game board having a horizontal playing surface, a set of dice of appropriate number, an automatic dice shaking and casting section disposed in the head portion of the game board and exposed in one corner of said playing surface, said dice casting section having an opening on the upper side thereof and an opening on one lateral side facing said playing surface, an electric motor, a rotary disc connected to and to be driven by said electric motor, said rotary disc being rotatably and slidably supported, resilient means tending to raise said disc, but capable of being lowered in immediate response to the presence of the set of dice thrown on said disc; first switch means capable of automatically closing the electric circuit for said motor and operable by the lowering of said disc upon throwing of said dice thereon so as to actuate said motor and rotate said rotary disc; shutter means disposed adjacent to and normally closing said opening and operatively connected to said motor for being appropriately correlated with the rotating motion of said motor so as to automatically open the side opening area of said dice casting section at an appropriately predetermined interval after the dice are well shaken and to automatically close upon casting the dice out to said playing surface; and another switch means operatively connected to said motor in said electric circuit for maintaining actuation of said motor and capable of automatically opening said electric circuit to stop said motor after ejection of the dice according to the rotating function of said motor so that the complete disc operations of the game board may be accomplished.

2. A dice shaking and casting device according to claim 1 wherein a shaft is connected to said disc, said first switch means comprises the lower end of said shaft of said rotary disc and a contact positioned for being engaged by said shaft to close said circuit to start said

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motor by a lowering motion of said rotary disc shaft under the weight load of the dice upon throwing there-upon, and wherein there is provided a mechanical cam arrangement operatively connected to said other switch means and said motor for opening and closing the side opening of said dice casting section comprising

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a cylindrical cam having a trapezoidal profile and a cam lever operatively connected to said cam and said shutter means for opening and closing said side opening at an interval and timing as required.

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