

Nov. 25, 1952

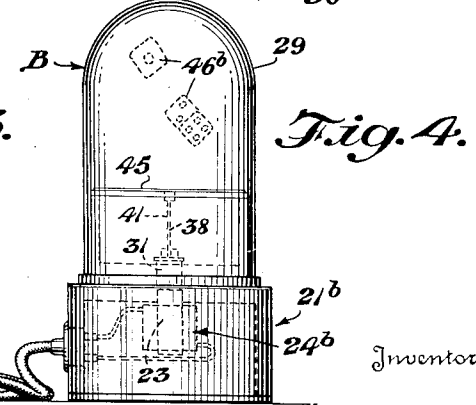
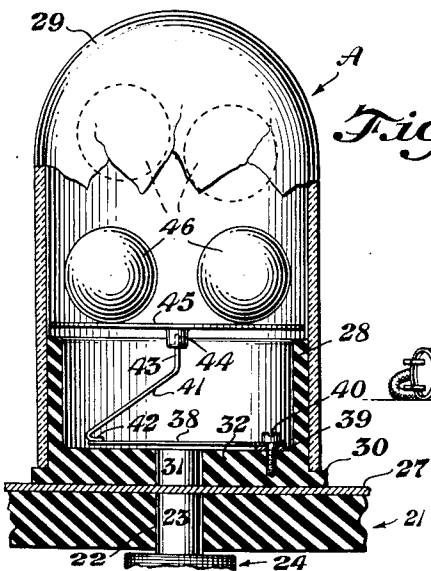
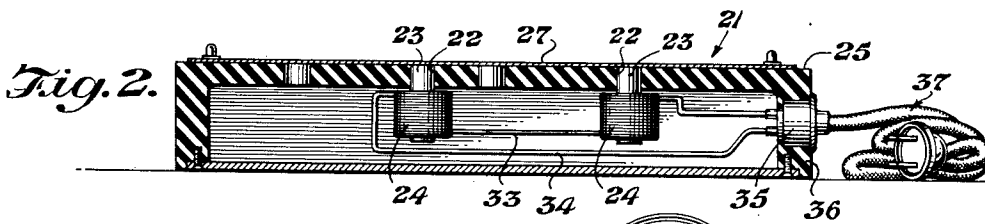
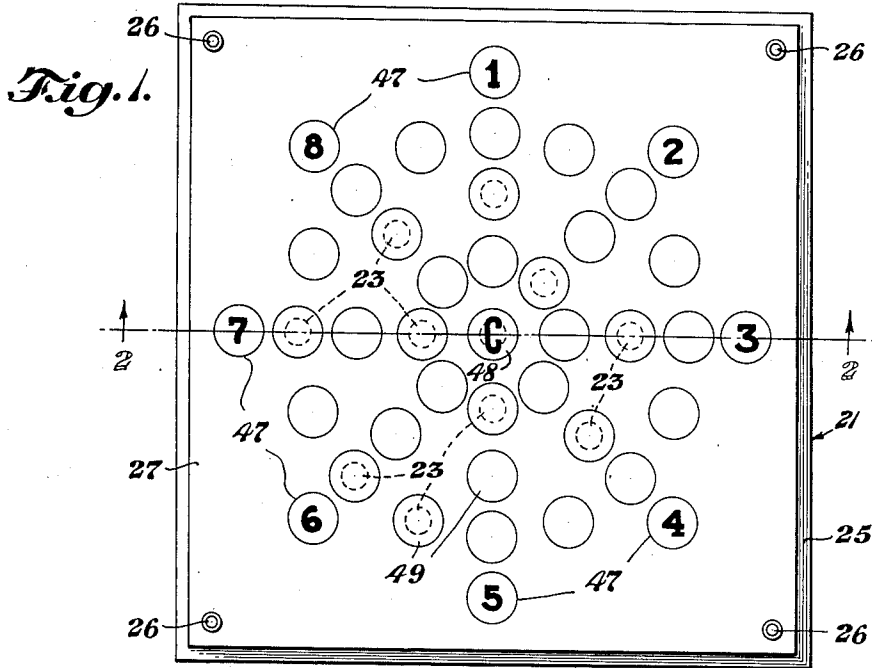
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2,619,349

MAGNETICALLY OPERATED GAME APPARATUS

Filed Jan. 2, 1947

5 Sheets-Sheet 1



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MAGNETICALLY OPERATED GAME APPARATUS

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5 Sheets-Sheet 2

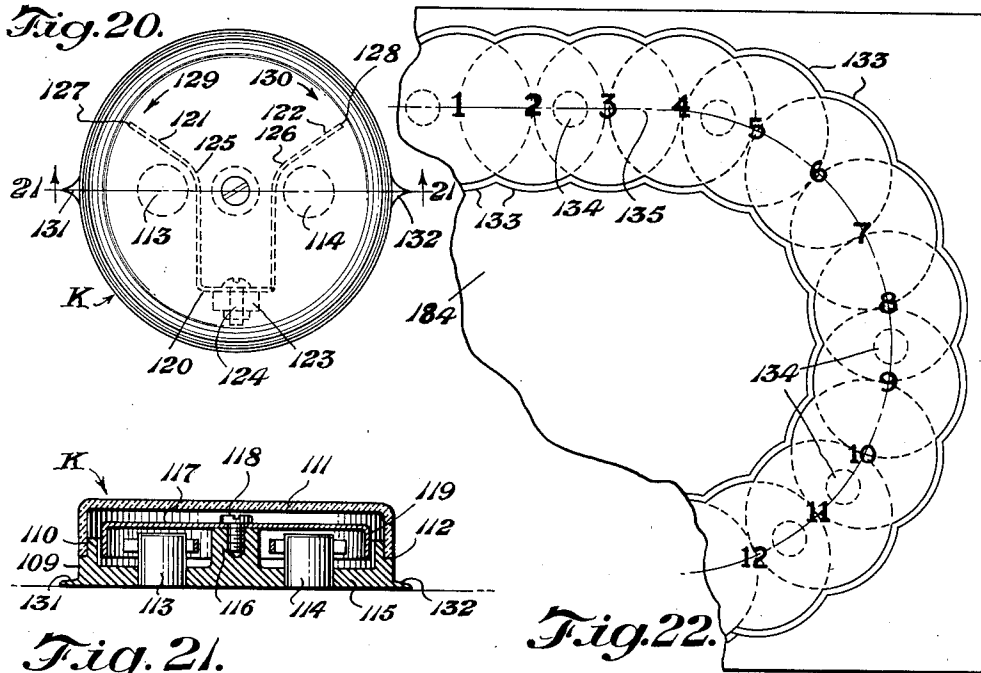


Fig. 21.

Fig. 22.

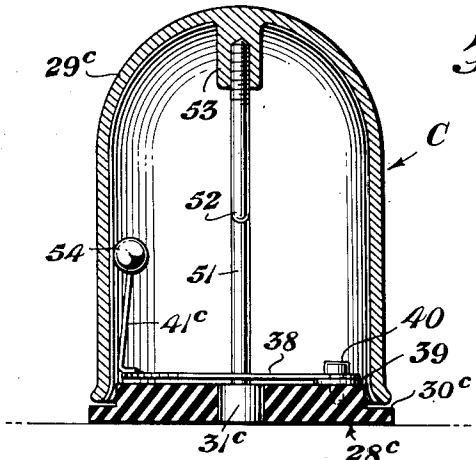


Fig. 5.

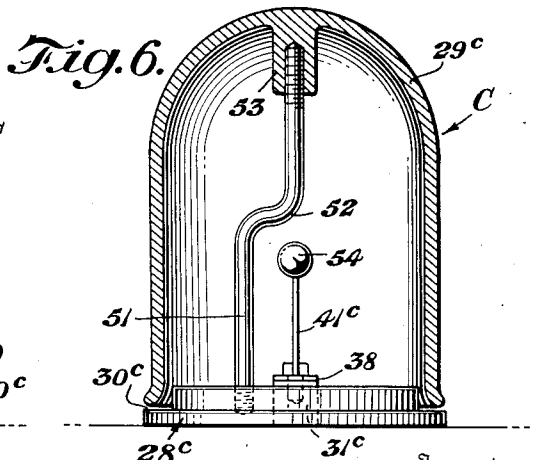


Fig. 6.

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MAGNETICALLY OPERATED GAME APPARATUS

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5 Sheets-Sheet 3

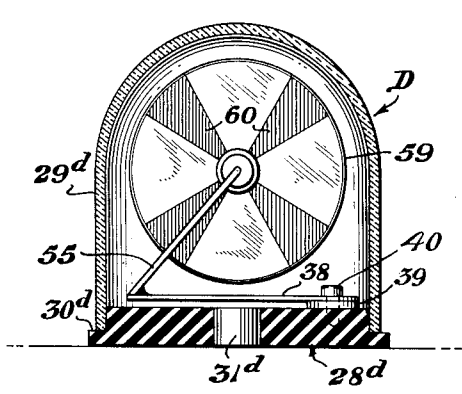


Fig. 7.

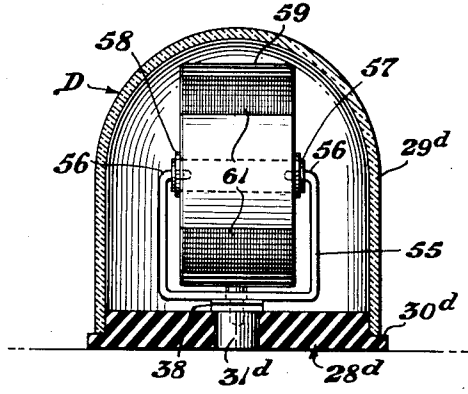


Fig. 8.

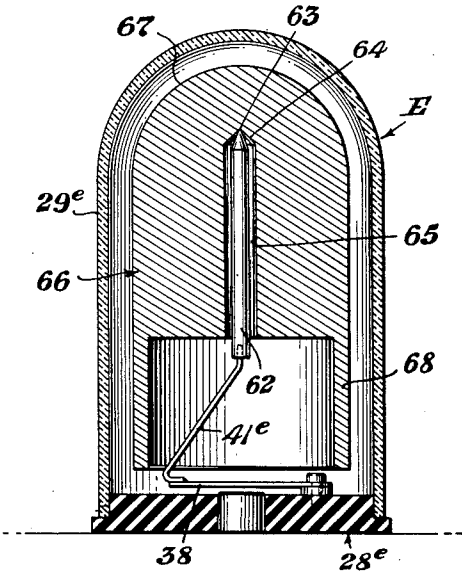


Fig. 9.

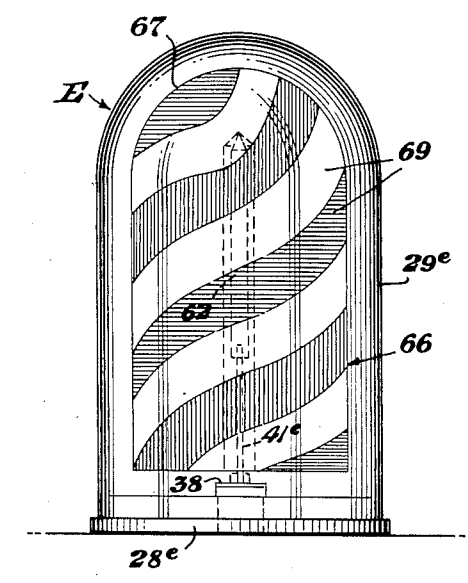


Fig. 10.

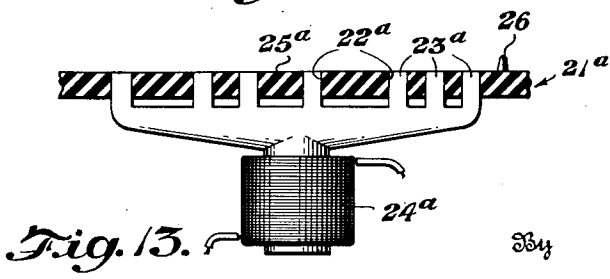


Fig. 13.

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Filed Jan. 2, 1947

5 Sheets-Sheet 4

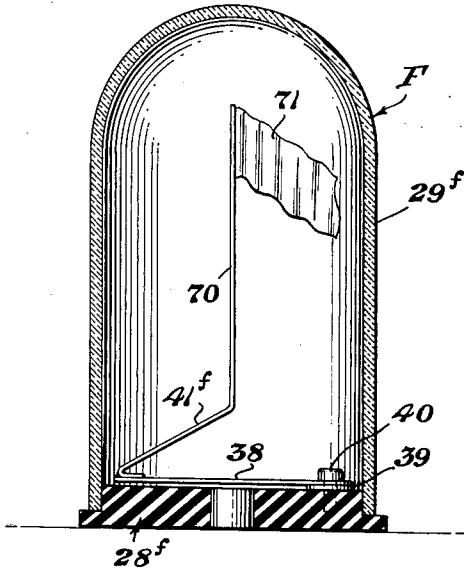


Fig. 11.

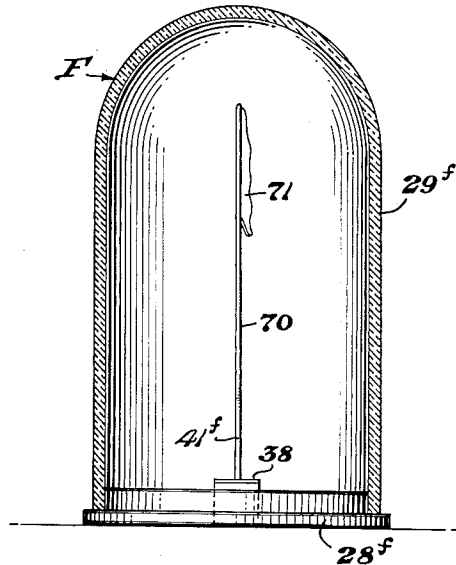


Fig. 12.

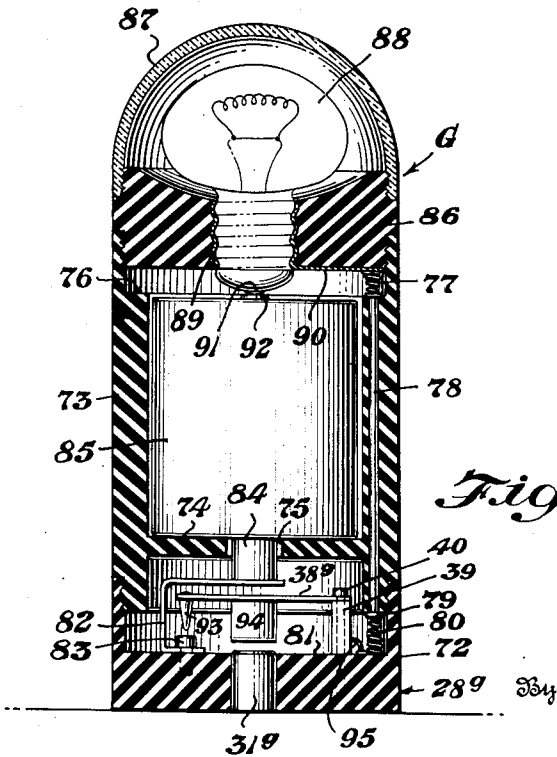


Fig. 14.

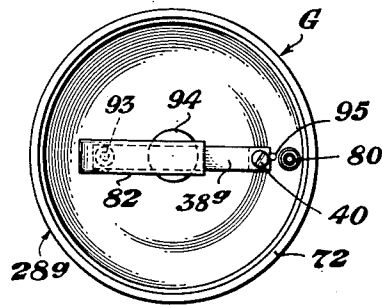


Fig. 15.

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MAGNETICALLY OPERATED GAME APPARATUS

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5 Sheets-Sheet 5

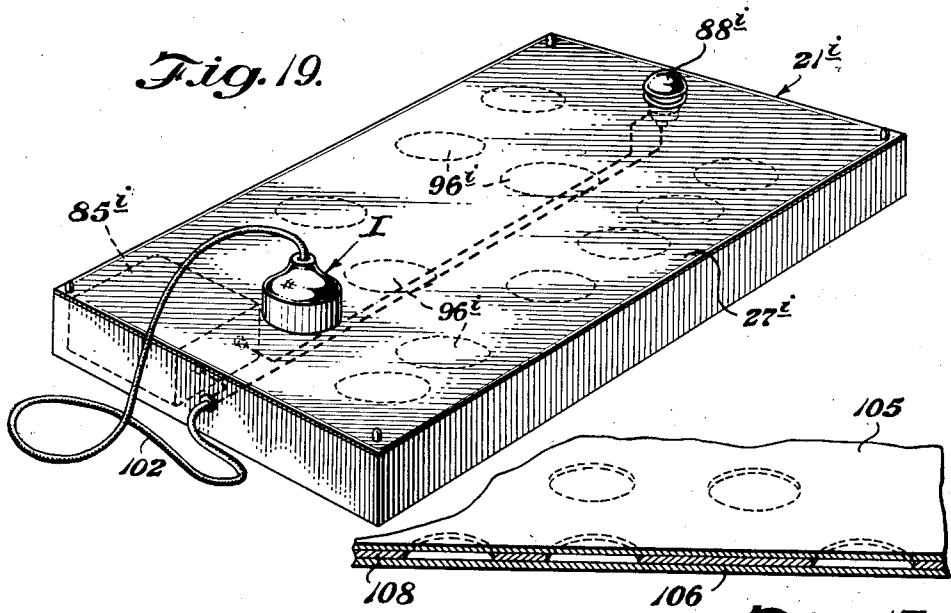


Fig. 19.

Fig. 17.

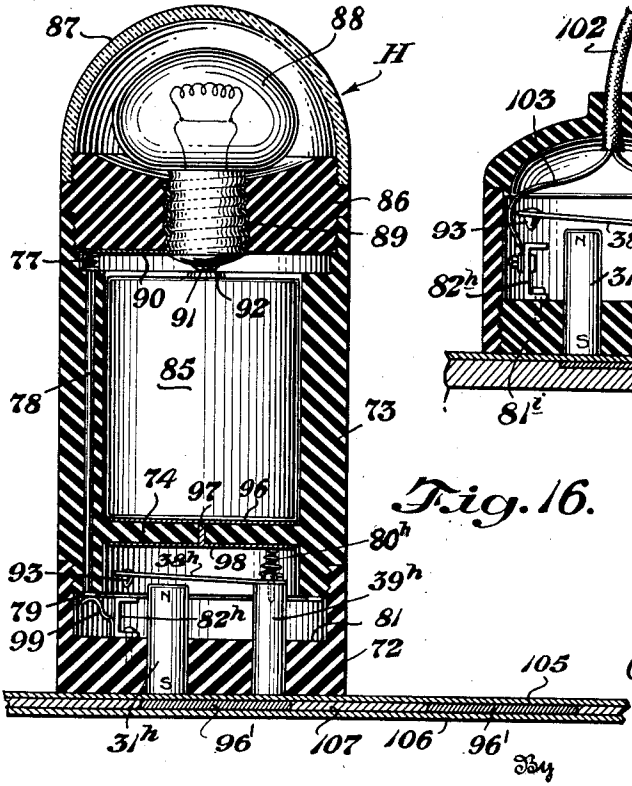


Fig. 16.

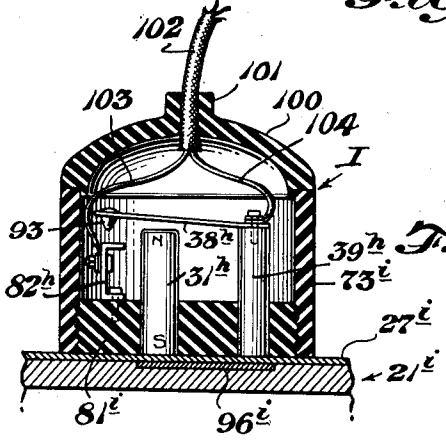


Fig. 18.

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# UNITED STATES PATENT OFFICE

2,619,349

## MAGNETICALLY OPERATED GAME APPARATUS

Edmund Abrahamson, Baldwin, N. Y.

Application January 2, 1947, Serial No. 719,661

14 Claims. (Cl. 273—131)

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This invention relates to improvements in electromagnetic apparatus of the type employable in the construction and operation of games, amusement and educational devices, advertising display devices, and the like, the primary object of the invention being to provide devices involving magnetizable elements which become endowed with or produce visible or audible activity, upon the establishment, either momentary or prolonged, of a magnetic circuit between such elements and a permanent magnet or an electromagnet located in a supporting surface over which the devices are moved, such as a gameboard or other platform or base.

Another important object of this invention is to provide a novel arrangement of magnetically cooperating gameboard and game pieces, in which the gameboard is provided with magnets or iron pieces in either fixed or changeable locations, and/or with changeable game charts or cards overlying and concealing the magnets or iron pieces and adapted to be changed to prevent the player's memorizing the locations of the magnets or iron pieces and being guided thereby in subsequently moving the game pieces over the gameboard.

Another important object of this invention is to provide an arrangement of gameboard and game pieces of the character indicated above, in which the game pieces are self-contained and have magnetizable elements adapted to vibrate when actuated, and transmit their motion mechanically in such a way as to impart vibratory or other continuous or discontinuous movement to other components of the game pieces for the purpose of endowing said components with or substantially increasing, the visibility or audibility of said components, and/or changing their positions relative to each other or to other portions of the game piece, as in the case of dice or the like, when any game piece is moved or placed to occupy a position over a cooperatively arranged magnet in the gameboard or other platform or base.

Another important object of this invention is to provide game pieces, or exhibitors of the character indicated above which are self-energizing, that is, which contain batteries for the energization of their visible and/or audible components, such as lamps, buzzers, and the like; and whose magnetizable elements control switches for closing and/or opening the circuits between the batteries and said components.

Other important objects and advantageous features of this invention will be apparent from

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the following description and the drawings appended thereto, wherein merely for purposes of illustration, specific but non-limiting embodiments of this invention are set forth.

5 In the drawings:

Figure 1 is a top plan view of a game board in accordance with the present invention;

Figure 2 is a transverse vertical section taken on the line 2—2 of Figure 1;

10 Figure 3 is a front elevation of an electric game piece in accordance with this invention, being a ball shaker, part of the game piece and of the gameboard with which it is associated being shown in section;

15 Figure 4 is a side elevation, taken at right angles to Figure 3 of a similar game piece, being a dice shaker, showing it associated with an individual base, instead of a gameboard;

Figure 5 is a transverse vertical section taken through an electric buzzer form of a game piece;

20 Figure 6 is a similar section taken at right angles to Figure 5;

Figure 7 is a transverse vertical section taken through a horizontal axis rotating wheel or drum form of a gamepiece;

25 Figure 8 is a similar section taken at right angles to Figure 7;

Figure 9 is a transverse vertical section taken through a vertical axis rotating cylinder form of a game piece;

30 Figure 10 is a side elevation taken at right angles to Figure 9, and showing certain internal parts, shown in dotted lines;

Figure 11 is a transverse vertical section taken through a flag waving form of a game piece;

35 Figure 12 is a transverse vertical section taken at right angles to Figure 11;

Figure 13 is a fragmentary vertical transverse section taken through a gameboard in accordance with the present invention, showing employment of a single electromagnet having a plurality of pole pieces, instead of a single pole piece arranged in the board;

40 Fig. 14 is a transverse vertical section taken through an electric lamp form of a game piece;

Fig. 15 is a top plan view of the base portion thereof;

45 Fig. 16 is a transverse vertical section taken through another type of an electric lamp game piece and through the game board with which it is associated, the game piece having a permanent magnet and the game board being equipped with concealed soft iron pieces for actuation of the game piece;

50 Figure 17 is a perspective illustration of a

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modified form of the game board associated with the game piece of Fig. 16, part of the game board being shown in transverse vertical section;

Figure 18 is a transverse vertical section, on an enlarged scale, taken through a magnetically operated switch, similar to that employed in the game piece of Figure 16, adapted to be used in connection with the game board shown in Figure 19;

Figure 19 is a top perspective view of a question-and-answer type of game board in accordance with the present invention, in the operation of which the magnetically operated switch of Figure 18 is selectively moved over the surface of the game board, containing concealed soft iron pieces for actuating the switch;

Figure 20 is a top plan view of another form of a game piece in accordance with the present invention, said game piece having a disc rotating in the one or the other direction when actuated;

Figure 21 is a transverse vertical section through the game piece of Fig. 20 taken on the line 21-21;

Figure 22 is a top plan view of a preferred form of a game board to be associated with the game piece shown in Figs. 20 and 21.

Referring to the drawings in detail, and first to Figures 1, 2 and 13 thereof, the numerals 21 and 21a generally designate platforms, bases, or gameboards of suitable insulated material, which may be provided with openings 22 and 22a respectively, accommodating pole pieces 23 and 23a, respectively, of electromagnets 24 and 24a, respectively, with the upper ends of the pole pieces either flush with or slightly below the top of the top surfaces 25 and 25a, respectively. In the case of gameboards, the corners or other suitable locations of the top surfaces 25 and 25a may have projecting pins 26 to enter holes in and removably retain detachable game cards or charts 27 in selected positions on such surfaces.

In order to prevent the players from memorizing the positions of the pole pieces with reference to the different significant areas of any game card or chart 27 and to provide games of varied nature and procedure, a plurality of interchangeable cards or charts may be provided, which can be exchanged at will upon the gameboard 21 or altered in relative position thereon. For the same purpose the magnets 24 may be changed in position by placing the pole pieces 23 in different ones of the holes 22 provided in the board.

In Figures 1 and 2 a plurality of electromagnets 24, having single pole pieces 23 are employed; while in Figure 13 a single electromagnet 24a is employed, having a plurality of pole pieces 23a, for insertion in the holes 22 and 22a, respectively.

The game pieces or exhibitors and the above described gameboards, platforms or bases, can be of a variety of forms, as will occur to qualified persons, other than those specifically shown herein.

One form of game piece or exhibitor A, shown in Figure 3, comprises a cup-shaped base 28 of insulating material, over which is sleeved a glass or other suitable transparent material globe 29 whose lower end abuts a ledge 30 on the base. A soft iron or other magnetizable core 31 is centrally mounted through the bottom wall 32 and substantially flush with the underside thereof, for registry with any of the pole pieces 23 of the gameboard or the like 21, to establish a magnetic circuit therebetween, the coils of the electromagnets 24 or 24a being connected either in series

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or in parallel by wires 33 and 34 with a fitting 35, preferably mounted in the side wall 36 of the gameboard or the like 21, as shown in Figure 1, and connected by a suitable cord and plug 37 to a suitable source of alternating current or of pulsating direct current.

A horizontal flat spring steel armature 38 is fixedly mounted at one end at one side of the upper surface of the bottom wall 32 of the base 28 on a spacer 39 by means of a screw 40, so as to project above and across the core 31, with its opposite or free end positioned near the opposite wall of the base. With this arrangement energization of the electromagnet 24 or 24a by alternating or pulsating current will cause the armature 38 to vibrate up and down in a well known manner as long as the current is applied to the electromagnet.

The said opposite or free end of the armature 38 is bent upwardly and inwardly or, as shown in the drawings, is provided with an upwardly and inwardly angulated spring wire or other suitable material arm 41, which has a foot 42 secured to the upper side of the said free end by soldering, welding or other suitable means. The angulation of the arm 41 relative to the armature 38 is relatively acute as shown, and the arm 41 reaches inwardly to a position over the magnetizable core 31, at which point the arm has a substantially perpendicular upward extension 43 reaching above the base 28, and anchored in a fixed boss 44 at the center of the underside of a vibratory table 45, in the nature of a flat thin disk of suitable relatively rigid material, capable of supporting thereon while at rest at least one ball 46 of light weight material, such as elder pith, balsam wood etc., and of projecting said ball upwardly thereabove within the globe 29 as indicated in dotted lines, while the table is vibrating.

In playing a game utilizing the above described apparatus, each player has a game piece like A; or any of the other game pieces described herein, and this is placed upon the gameboard 21 in, for example an appropriate one of the starting positions designated by the numbered circles 47 formed on the chart or card 27; and then in turn, each player's game piece is moved step-by-step circumferentially or inwardly toward the goal designated by the center circle 48, by way of radially or circumferentially intermediate circles 49. In the course of these movements of the game pieces, which may be initially dictated by any desired arbitrary arrangement, some of the game pieces will become registered with circles or spots 49 which overlie the positions of electromagnetic pole pieces 23 in the board 21, and the fact will be signalled by, in the instance of the game piece or exhibitor A, the repeated rise and fall of the ball 46 in a bouncing manner, which is instantly visible to all of the players and may signify that the particular player is entitled to make additional moves on the game card or is penalized a certain number of moves therein.

As exhibitor B for advertising and exhibiting purposes other than the playing of games of the character indicated above, is readily provided in the form shown in Figure 4, wherein the structure handling the dics 46b is the same as described in connection with Figure 3, but the actuating means is in the form of a suitable compact base or platform 21b, taking the place of the gameboard 21, and containing only a single electromagnet 24b. This device may be used either

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as a manual dice shaker by removing the globe 29 from the base or platform 21a and shaking it by hand or as a mechanical shaker by energizing the electromagnet 24b with the globe in place on the base or platform 21b. The dice shaker B may be used as a game piece in the same manner as the game piece A in association with the game board 21 shown in Figure 1. The number and character of the additional or penalizing moves to which the player is entitled may be indicated by the showing of the dice 46b as they come to rest upon the table 45 when the game piece B is removed from the underlying magnetic areas of the board for that purpose. In addition other uses may be made of the indicating or exhibiting properties of this device, such as an electrically operated signal.

A still further similarly employable game piece or exhibitor C, shown in Figures 5 and 6, comprise a flat circular insulating material base portion 28c having a central magnetizable core 31c, from one side of which a support rod 51 rises from the base and has its upper part displaced, as indicated at 52, to rise in axial alignment above the core 31c. A globe 29c, preferably of metal, such as bronze, plastic, or other suitably resonant material has a central depending lug 53, preferably threaded into the upper end of the rod 51, whereby the globe 29c constitutes a bell or buzzer, with its lower edge spacedly surrounding the base 28c and closely spaced upwardly from a ledge 30c, encircling the base 28c. The armature 38 is the same in structure and mounting as in forms A and B, but the spring wire arm 41c differs from those of forms A and B in being less acutely angulated, and in terminating in a bell tongue 54, arranged to strike the adjacent side of the globe 29c as the armature 38 is vibrated, and thereby give forth an audible signal. It is obvious that in this case also the device C is adaptable to purposes other than acting as a game piece for a magnetic gameboard, as well as to such use.

Another form of game piece or exhibitor to be used on the new gameboard is designed in accordance with the principal features of the indicator disclosed and claimed in this inventor's copending patent application Serial No. 613,778, filed August 31, 1945, now U. S. Patent No. 2,438,958, issued April 6, 1948. This gamepiece or exhibitor D, shown in Figures 7 and 8, comprises a base portion 28d, similar to the base 28c of form C, with a vertically foreshortened transparent material globe 29d fitting the base and resting upon the ledge 30d. The armature 38 is again present and has fastened to its free end, instead of the single spring wire arms of the preceding forms, a U-shaped spring wire loop 55, arranged crosswise of the armature and angulated upwardly and inwardly to a position aligned above the core 31d, with the upper ends of the sides turned laterally upwardly, as indicated at 56, into the opposite ends of a bearing shaft 57 on which the bearing tube 58 of a drum 59 of relatively light material is rotatably supported. The diameter of the bearing opening through the drum 59 in which the bearing tube 58 is inserted is preferably about  $\frac{1}{2}$  of an inch wider than the outer diameter of said bearing tube. The sides and circumference of the drum 59 may be provided with markings 60 and 61, respectively, to enhance visibility through the globe 29d. In this case, when the armature 38 is vibrated, the loop and the bearing shaft 57 are vibrated, thereby causing the drum 59 to rotate at relatively high speed in accordance with the operating principle

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of the indicator of the afore-mentioned U. S. Patent No. 2,438,958.

The form E, shown in Figures 9 and 10, is constructed and operating in accordance with a modified indicator likewise disclosed and claimed in said just mentioned U. S. Patent. This game-piece E has a base portion 28e similar to the base portions of forms C and D, and a vertically elongated transparent globe 29e similar to the globes of forms A and B, but having the upper end supportably secured in the lower end of a perpendicular shaft 62 instead of supporting a vibratory table. The upper end of the shaft 62 is provided with a sharp bearing point 63 to rotatably engage in the conical upper end 64 of an axial bore 65 formed in a preferably solid cylindrical rotor 66 of relatively light material, whose upper part is hemispherical as indicated at 67 and whose lower part is cylindrically recessed to define the depending peripheral skirt 68 which spacedly surrounds and encloses the arm 41e and the space immediately above the armature 38. The exterior of the rotor 66 may have stripes 69 like a barber's pole, if desired, to heighten the visual effect of the rotor's rotation. Such rotation is produced, when the armature 38 is vibrated, by frictional contact of the lower end of the bore 65 of the rotor 66 with the sides of the shaft 62 while the shaft is vibrating.

A further form of game piece or exhibitor F, shown in Figures 11 and 12, includes the vertically elongated transparent globe 29f and flat base portion 28f, and armature 39 of forms of C, D and E, with a spring wire arm 41f acutely angulated like the arm 41 of forms A and B, but unlike them, terminating in a fine preferably steel wire perpendicular flag pole 70 having a flexible flag 71 of thin and light material at its upper end, which flaps and waves as the vibration of the armature 38 is transmitted through the flag pole.

A still further form of game piece or exhibitor G, shown in Figures 14 and 15, comprises a vertically elongated cup-shaped base portion 28g of insulating material, composed of the lower cup-like part 72, and the upper cylindrical tube part 73 threaded into the upper end of the lower part 72 and formed with a partition 74 spaced slightly above the upper end of the lower part 72 provided with a central hole 75. The upper end of upper part 73 is internally recessed to define the annular shoulder 76, forming a rest for a spiral spring contact 77 which has a conductor rod 78 extending downwardly through the wall of the part 73 and terminating at its lower end in a contact point 79, with which is engaged the upper end of a spiral conductor spring 80 resting on the bottom wall 81 of the lower part 72. The bottom wall 81 is provided with a central magnetizable core 31g.

A reclining L-shaped conductive spring bracket 82 is anchored as indicated at 83 to the bottom wall 81 and reaches to a point directly above the core 31g at which the bracket carries a cylindrical contact 84 which it presses through the partition hole 75 into contact with the metallic bottom of a flashlight cell 85 fitting the interior of the base upper part 73 with its upper end substantially on a level with the shoulder 76. A cylindrical block 86 acting as a miniature electric lamp bulb socket is threaded into the upper end of the part 73 and has threaded on the upper part thereof a transparent or translucent dome or globe 87, spacedly surrounding a lamp bulb 88 having its base threaded down-



wardly through a conductive socket 89 connected as indicated at 90 with the spring contact 77, so as to engage its end contact 91 with the central upper terminal 92 of the battery 85, against the upward tension of the spring bracket 82. The mentioned bracket anchoring means 83 may be in the form of a contact screw for engagement by the contact point 93 which depends from the free end of the spring armature 38g in spaced relation thereto. The armature is mounted from its opposite end by a spacer 39 by means of a screw 40 anchored in the lower base part 72 so as to extend horizontally beneath the bracket 82 and across the magnetizable core 38g and has a depending magnetizable armature element 94 vertically aligned with the core 38g. The lower spring contact 80 is connected as at 95 with the spacer 39, so that when the game piece or exhibitor G is brought into an electromagnetic field of sufficient strength the armature element 94 and the armature 38g are attracted by the case core 31g and thereby the contact point 93 is caused to engage with the contact point 83. As a result of this, an electric circuit will be closed involving the battery 85 and lamp bulb 88, so as to cause the bulb to light, thereby indicating that the base core 31g is positioned upon or close to a pole piece of an electromagnet energized by an alternating current or direct current. It will be obvious that this particular form G is especially adaptable to certain testing operations, as well as to use as a magnetically operated game piece and exhibitor.

A form H, shown in Figure 16, in the nature of a modification of Form G, for actuation by registry with soft iron pieces, such as discs 96i rather than an electromagnet equipped game board or the like, has a substantially similar insulated casing or housing including the lower part 72, the upper part 73, the lamp bulb support block 86 holding the bulb 88 and the transparent dome 87, the upper spring contact 77 and its connection 90 with the bulb socket 89, and its rod 78 presenting a contact point at its lower end. Also, the upper terminal 92 of the battery 85 engages the bulb contact 91. Other than this, the battery case engages a conductor strip 96, on the upper side of the partition 74 and is connected at 97 to a conductive strip 98 on the underside of said partition.

The contact point 79 is engaged by a spring finger 99 anchored in contact with a contact bracket 82h anchored in the bottom wall 81 of the lower casing part 72 near the contact point 79 at the opposite side of said lower part from a vertically elongated spacer 39h to the upper end of which is fastened one end of a generally horizontal spring armature 38h having on its free end a depending contact point 93 for engagement with the bracket 82h. A spiral spring connector 80h connects the conductive strip 98 with the armature 38h. The armature 38h and its post or spacer 39h are preferably of soft iron so as to exhibit a practical minimum of residual magnetism.

Positioned beneath and close to the underside of the free end of the armature 38h is a vertical bar permanent magnet core 31h, which like the post or spacer 39h, extends through to substantially flush with the underside of the casing bottom wall 81. The permanent magnet 31h is arranged, for example, with one (north) pole up and its other (south) pole down. When the device is registered with one of the soft iron pieces

or discs 96i in the game board or other surface 21h, the gap in the magnetic circuit between the lower ends of the soft iron post 39h and the permanent magnet 31h will be closed. This results in an increase of the magnetic field strength acting on the armature 38h which will be attracted by the magnet 31h, i. e. said armature swings downwardly and closes the battery lamp bulb circuit and lights the lamp bulb 88.

Instead of the soft iron pieces 96i, small permanent magnets may be provided in the game board or other surface. When the game piece or exhibitor H is registered with one of these permanent magnet pieces, the armature 38h will be attracted by the magnet 31h only if the lower pole of the permanent magnet 31h in the game piece or exhibitor registers with a pole of opposite polarity of said permanent magnet piece in the game board or other surface, because in other positions of the game piece or exhibitor H with respect to said permanent magnet piece in the game board the magnetic field acting on the armature 38h is decreased or changed in direction so that said armature will rather be repelled than attracted by the permanent magnet 31h. In other words, the game piece or exhibitor H has to be placed on each of the permanent magnets in the game board or other surface in one definite position to actuate the switch closing the circuit of the lamp bulb 88, so that in case of a game the chances are made additionally dependent upon the relative positions of the game piece and the significant areas. The exhibitor H may also be used as indicator means to indicate the direction of magnetic field lines or the polarity of a magnetic field pole.

The game board in Figure 16 comprises three layers of wood, card board, plastic or other suitable material, i. e. two outer layers 105 and 106, and an intermediate layer 107, the latter being provided with a plurality of apertures into which the soft iron or permanent magnet pieces 96i are inserted. The three layers are glued together or combined to an integral structure in any other manner. The outer surfaces of the two outer layers may be printed with circles or other designs to indicate the playing positions of the game pieces, so that both sides of the structure can be used as game surface.

A modification of the game board structure shown in Figure 16 is illustrated in Figure 17. The two outer layers 105 and 106 are the same as in Figure 16, while the intermediate layer 108 consists of an iron or steel sheet in which a large number of perforations or cut-outs of preferably circular shape is provided. The three layers are combined to a unitary structure in the same manner as in the game board in Fig. 16. The game board of Figure 17 has active or significant areas all over the surface, except at places where the perforations or cut-outs are provided in the intermediate sheet.

In Figures 18 and 19 is shown a question-and-answer gamepiece adaptation I of the invention involving a suitable rearrangement of the components of form H in relation to a gameboard 21i, having soft iron discs or plates 96i inserted in the surface thereof, in positions corresponding to correct answers to questions appearing on the replaceable charts or cards 27i. This rearrangement includes displacement of the lamp bulb 88i to a position at the head or other desirable location of the game board 21i, the installation of the battery 85i within the game board, with the remainder of the game piece H changed to mount

the permanent magnet core 31*h*, the soft iron armature post 39*h*, the soft iron armature 38*h*, and contact points 93 and 82*h* in an insulated casing or housing consisting of a disc 81*i* into which is threaded a tubular upper part 73*i*, whose upper end is closed by a cap 100 having a neck 101 through which extends a flexible conduit 102, containing the necessary leads 103 and 104 to the armature and contact point 82*h*, and connected to the battery 85*i* and the lamp bulb 88*i*. The gamepiece I being freely movable by a player over the surface of the card 27*i* on the question-and-answer board 21*i*, will, if registered with one of the soft iron discs or plates 96*i* underlying a correct answer area, produce lighting of the lamp bulb 88*i* thereby visually indicating the correctness of the player's response to a given question. The questions appearing on the replaceable charts or cards 27*i* call for answering "yes" or "no." Consequently two answer areas, marked "yes" and "no," respectively, have to be provided for each question printed on said chart or card 27*i* adjacent said areas, for example, therebetween. If, for example, the question between one "yes" and one "no" areas reads "Did Alexander Graham Bell invent the telephone?" the correct answer is "yes," and therefore the player is expected to place the gamepiece I on the adjacent "yes" area to answer this question correctly. In this case, one of the soft iron discs or plates is concealed under the said "yes" area and consequently the gamepiece I becomes energized and the lamp bulb 88*i* lights up to indicate the correctness of the answer. If the player should answer the question incorrectly and place the gamepiece I on the "no" area having no soft iron disc or plate in the present case, no energization of the gamepiece I takes place and the lamp does not light up, indicating that the answer was incorrect.

A still further form of game piece or exhibitor K, shown in Figures 20 and 21, comprises a base portion 109 of insulating material having a vertically projecting rim portion 110 over which is sleeved a glass or other suitable transparent material cup 111 whose lower end abuts a ledge 112 on the base portion 109. Two soft iron or other magnetizable cores 113 and 114 are mounted through the bottom wall 115 of the base portion 109 at places symmetrical with respect to the vertical center line of said base portion and substantially flush with the underside of the base for registry with any of the pole pieces of the game board or the like, in particular with the game board shown in Figure 22. A centrally located raised portion of the base 109 forms a hub 116 supporting a horizontal disc or rotor 117 rotatably mounted on the hub 116 by means of a screw 113. The disc or rotor 117 has a downwardly projecting rim or flange 119, which is so short that it cannot contact the bottom 115 of the base portion 109.

A spring member 120 having a U-shaped middle portion and two free straight ends 121 and 122 is centrally mounted on a boss or stud 123 forming a raised portion of the base 109 by means of a bolt 124. The straight ends 121 and 122 of said spring member 120 are bent at 125 and 126 outwardly toward the rim or flange 119 of the rotor 117 in opposite directions substantially coinciding with radii of the rotor disc. The curved or bent portions at 125 and 126 of the spring member 120 are located opposite the magnetizable cores 113 and 114, which when magnetized by an alternating or pulsating current

cause the spring member 120 to vibrate. The straight spring ends 121 and 122 are of such length that their tips 127 or 128, respectively, engage slightly the inner surface of the rim or flange 119 of the rotor 117, when said spring ends are caused to vibrate under influence of magnetic fields induced by alternating or pulsating electric currents in the magnetizable cores 113 or 114, respectively. In the rest positions of the spring ends 121 or 122, i. e. when said ends are not vibrated, the tips 127 and 128, respectively, are out of contact with the rim or flange 119 of the rotor 117.

Actually, game piece K has two driving systems causing the rotor 117 to rotate in the one or the other direction, respectively. When the left-hand spring end 121 is vibrated by means of the left-hand core 113, the disc 117 is rotated in the direction of the arrow 129, i. e. to the left, the right-hand spring end 122 being at rest, so that its tip 128 cannot engage the rim 119 and stop the rotor 117. When the right-hand spring end 122 is vibrated under the influence of the right-hand core 114, and the left-hand spring end 121 is at rest, the rotor 117 is driven in the direction indicated by the arrow 130, i. e. to the right. If both magnetizable cores 113 and 114 are simultaneously caused to vibrate their associated spring ends 121 and 122 with equal power, no rotation takes place, because the two driving forces acting in opposite directions on the rotor 117 compensate each other. If both cores are simultaneously magnetized and one of the magnetizing forces should outweigh the other, the rotor will rotate in the direction in which the system of greater power actuates the rotor.

Pointers or indicating means 131 and 132 are provided at the outside of the base portion 109 at diametrically opposite places of its circumference on a line leading through the centers of the cores 113 and 114 and the center of the base portion 109 itself. Said indicating means show the players how the game piece K has to be properly placed on the game board.

A game board preferably associated with the game piece K is illustrated in Figure 22. In said game board constituting a modification of the game board shown in Figures 1 and 2 the same electromagnets as shown in Figure 2 are employed. Only the location or distribution of said electromagnets in the board and the design on the board surface indicating the positions for the game pieces are different from the arrangement shown in Figures 1 and 2. Circles 133 on the game board top 134 or on an interchangeable chart attached to the game board designate the places for the game pieces K. These circles 133 are partially overlapping each other and their centers are located on a line of any curvature. Significant areas are provided within some of the circles 133, indicated by circles or spots 134 overlying the concealed positions of electromagnetic pole pieces 23, as shown in Fig. 2. These significant areas are eccentrically displaced with respect to the center of the circles 133 to the same extent as the cores 113 and 114 are displaced from the center of the game piece K. The playing positions designated by the circles 133 are consecutively numbered 1, 2, 3, 4, 5, etc. on the game board. In the even-numbered circles 133, the significant areas 134 have the opposite locations as in the uneven-numbered circles 133.

In playing a game utilizing game pieces K as

shown in Figures 20 and 21 and a game board according to Figure 22, each player places his game piece K upon one of the circles 133 in such a manner that the pointers or indicating means 131 and 132 substantially coincide with the curved line 135 going through the centers of all circles 133 and 134.

As a result of the location of the significant areas 134, in a game piece K properly placed in one of the uneven-numbered circles 133 the "left" system will be energized, because the left core 113 is magnetized as it registers with the electromagnet underlying said significant area. Thus the rotor rotates to the left. When a game piece K is placed in one of the even-numbered circles 133, the "right" system is energized by the underlying electromagnet and the rotor is driven to the right. The rotating directions in both cases can be reversed, if the game piece K is placed on the circles after being turned 180 degrees about its vertical axis.

Numbers 6 and 7 of the circles 133 have no significant areas, so that the rotor will stop when the game piece is placed thereon. The rotor would also remain at rest when the game piece K is placed in a circle 133 having two significant areas 134 overlying electromagnets energizing the two driving systems in the game piece K to impart driving impulses of equal force and opposite directions to the rotor.

As the game piece K is provided with a rotor turning either to the right or to the left, the right-hand rotation may signify that the particular player is entitled to make additional moves, while the left-hand rotation may signify that the player is penalized and has to go back or start the game anew. Of course, any other provisions may be made in the rules of the game.

It will be understood that the arrangement of Figures 1 and 2 could also be devised to permit question-and-answer operation of the "yes" and "no" type involved in and described in connection with form I of the invention, and that any of the forms of game pieces or exhibitors disclosed herein and their permissible variants could be employed in either arrangement, or for the other purposes mentioned herein, without departure from the present invention.

I claim:

1. Magnetically operated game apparatus comprising a gameboard including a playing surface having significant areas and non-significant areas, some of which significant areas have stationary pulsating current energized magnet means positioned therein, and at least one game piece selectively movable over said surface with reference to said areas, said gamepiece comprising a casing, a signal element and magnetizable means in said casing for operating said signal element, said magnetizable means being constructed and arranged to be intermittently actuated by any of said magnet means when said gamepiece is moved on the gameboard to a position of substantial registry with a significant area having such magnet means.

2. Magnetically operated game apparatus according to claim 1, wherein said magnet means comprise an electromagnet having at least one pole piece energized by said pulsating current so as to contain a pulsating magnetic flux, and wherein said magnetizable means comprises a vibratory armature arranged to be vibrated by said pulsating magnetic flux, when said game piece is in substantial registry with any of said significant areas.

3. Magnetically operated game apparatus according to claim 1, wherein said magnet means comprise an electromagnet having at least one pole piece energized by said pulsating current so as to contain a pulsating magnetic flux, wherein said magnetizable means comprises a core arranged to be magnetized by said pulsating magnetic flux, when said game piece is in substantial registry with any of said significant areas, and wherein a vibratory armature is mounted in said casing to be actuated by said core.

4. Magnetically operated game apparatus according to claim 1, wherein said magnet means comprise an electromagnet having at least one pole piece energized by said pulsating current so as to contain a pulsating magnetic flux, wherein said magnetizable means comprises a core arranged to be magnetized by said pulsating magnetic flux, when said game piece is in substantial registry with any of said significant areas, wherein a vibratory armature is mounted in said casing to be actuated by said core, wherein an oscillatory platform is supported by said armature, and wherein at least one projectile is resting upon said platform and is adapted to be thrown upwardly within said casing by oscillation of said platform.

5. Magnetically operated game apparatus according to claim 1, wherein said magnet means comprise an electromagnet having at least one pole piece energized by said pulsating current so as to contain a pulsating magnetic flux, wherein said magnetizable means comprises a core arranged to be magnetized by said pulsating magnetic flux, when said game piece is in substantial registry with any of said significant areas, wherein a vibratory armature is mounted in said casing to be actuated by said core, wherein a platform is flexibly mounted on said armature, and wherein at least one die is freely supported on said platform to be tossed in said casing by oscillatory motion of said platform caused by vibration of said armature.

6. Magnetically operated game apparatus according to claim 1, wherein said magnet means comprise an electromagnet having at least one pole piece energized by said pulsating current so as to contain a pulsating magnetic flux, wherein said magnetizable means comprises a core arranged to be magnetized, when said game piece is in substantial registry with any of said significant areas, wherein an armature is mounted in said casing within the magnetic field of said core so as to be vibrated by the induced pulsating magnetic flux apparent in said core, wherein an oscillatory element is provided in said casing, and wherein a mounting means supports said oscillatory element in said casing and operatively connects said element to said armature.

7. Magnetically operated game apparatus according to claim 6, said mounting means comprising a spring arm fixed at one end to said armature and supportably connected at its opposite end to said oscillatory element.

8. Magnetically operated game apparatus according to claim 6, said oscillatory element constituting a substantially horizontal platform, said mounting means comprising a spring arm fixed at one end to said armature and supportably connected at its opposite end to said oscillatory element.

9. Magnetically operated game apparatus according to claim 1, said magnet means comprising an electromagnet having at least one pole piece energized by said pulsating current so as to

contain a pulsating magnetic flux, said magnetizable means in each casing comprising at least one core magnetizable by the pulsating magnetic flux of any of said magnet means corresponding to a significant area with which said game piece 5 may be registered, armature means in form of spring means mounted in said casing and positioned within the magnetic field of each of said cores, said armature spring means being adapted to be vibrated by said pulsating magnetic flux 10 induced in said cores, when said game piece is in substantial registry with any of said significant areas, a rotor having an annular portion, said armature spring means having free ends frictionally engaging said annular portion of said rotor, 15 when said spring means is vibrated, whereby rotating impulses are imparted to said rotor.

10. Magnetically operated game apparatus according to claim 9, wherein two magnetizable cores and two spring armature means are provided, each of said spring means being associated with one of said cores, respectively, the free ends of said spring means being adapted and arranged to frictionally engage said annular portion of said rotor at opposite sides of its circumference, when 25 said spring means are vibrated to impart rotating impulses to said rotor, the rotating impulses by the one of said spring means caused by the energization of the one of said cores driving the rotor in the one direction, the rotating impulses 30 by the other of said spring means caused by the energization of the other of said cores driving the rotor in the other direction.

11. Magnetically operated game apparatus comprising a gameboard including a playing surface having significant and non-significant areas shown thereon, stationary, alternating current energized electromagnets positioned in some of said areas, at least one gamepiece selectively movable over said playing surface into 40 registry with any of said areas, said gamepiece comprising a casing containing a core magnetizable by the alternating flux of any of said electromagnets corresponding to a significant area with which said gamepiece may be registered, an 45 armature in said casing positioned within the magnetic field of said core to be vibrated by the induced alternating flux apparent in said core, an oscillatory element also in said casing, and means operatively connecting said armature to 50 said oscillatory element, said connecting means comprising a spring arm fixed at one end to said armature and supportably connected at its opposite end to said oscillatory element, said oscillatory element comprising a bell tongue adapted 55 to engage a portion of said casing to produce a sound.

12. Magnetically operated game apparatus comprising a gameboard including a playing surface having significant areas and non-significant areas, some of which significant areas 60 have stationary, alternating current energized electromagnetic means positioned therein, and at least one gamepiece selectively movable over said surface with reference to said areas, said 65 gamepiece comprising a casing, a signal element and magnetizable means in said casing for operating said signal element, said magnetizable means being constructed and arranged to be intermittently actuated by any of said electromagnetic means when said game piece is moved on the gameboard to a position of substantial registry with a significant area having such electro- 70 magnetic means.

13. Magnetically operated game apparatus comprising a gameboard including a playing surface having significant areas and non-significant areas, some of which significant areas have stationary, pulsating current energized magnetic means positioned therein, and at least one game piece selectively movable over said surface with reference to said areas, said gamepiece comprising a casing, a signal element and magnetizable 10 means in said casing for operating said signal element, said magnetizable means being constructed and arranged to be intermittently actuated by any of said magnetic means when said gamepiece is moved on the gameboard to a position of substantial registry with a significant area having such magnetic means, said signal 15 element comprising an electric lamp bulb, said magnetizable means comprising a normally open magnetically operable switch in said casing arranged to be intermittently closed by the pulsating magnetic flux of any of said magnetic means when registered therewith, and a circuit in said casing including a battery, said lamp bulb, and 20 said switch for flashing said lamp bulb as said switch is intermittently closed by registration of said gamepiece with one of said significant areas of said playing surface.

14. Magnetically operated game apparatus comprising a gameboard including a playing surface having significant areas and non-significant areas, some of which significant areas have stationary, pulsating current energized electromagnetic means positioned therein, and at least one gamepiece selectively movable over said surface with reference to said areas, said gamepiece comprising a casing, a signal element and magnetizable means in said casing for operating said signal 30 element, said magnetizable means being constructed and arranged to be intermittently actuated by any of said electromagnetic means when said gamepiece is moved on the gameboard to a position of substantial registry with a significant area having such electromagnetic means, said signal element comprising an electric lamp bulb, 35 said magnetizable means comprising a normally open magnetically operable switch in said casing arranged to be intermittently closed by the magnetic flux of any of said electromagnetic means when registered therewith, and a circuit in said casing including a battery, said lamp bulb, and said switch for flashing said lamp bulb as 40 said switch is intermittently closed by registration of said gamepiece with one of said significant areas of said playing surface.

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