

[54] **HOCKEY GAME WITH MAGNETIC CONTROL MEMBERS**

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310/103, 273/129

[51] Int. Cl. **A63f 9/00**

[58] Field of Search **273/85 F, 85 R, 85 AB,**
273/94 F, 94 R, 94 A, 94 B, 1 M, 67 A;
46/240; 310/103

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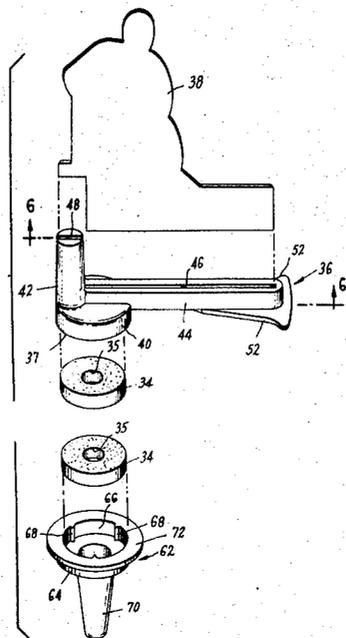
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[57] **ABSTRACT**

Game apparatus utilizes player pieces and control members which have disposed therein multipolar magnets of circular cross-section having at least four alternately arranged regions of opposite polarity circumferentially positioned thereabout, and which are slidably operable upon a nonferrous playing board with their axes extending perpendicular to the playing surface of the board. The magnet in the player piece is annular and the player piece has a downwardly extending contact element provided by a stud on the base portion of the player piece which extends through the central aperture of the magnet and therebelow to provide limited contact between the body of the player piece and the playing surface of the board. The striking portion of the player piece extends laterally outwardly from the base portion in contact with the upper surface of the board and the player piece is supported upon the contact element and the striking portion. The striking portion desirably comprises an elongated arm extending laterally along the upper surface of the playing board and it has a flared configuration adjacent its free end provided by wing portions which extend outwardly from each side of the arm and which define curvilinear striking surfaces diverging from one another and increasing in curvature towards the free end to control the direction of an object propelled thereby. Interaction between the magnets of a player piece and of a control member through the playing board enables sliding and sharp pivoting movement of the player piece upon the game board, upon manipulation of the control member therebelow.

5 Claims, 7 Drawing Figures



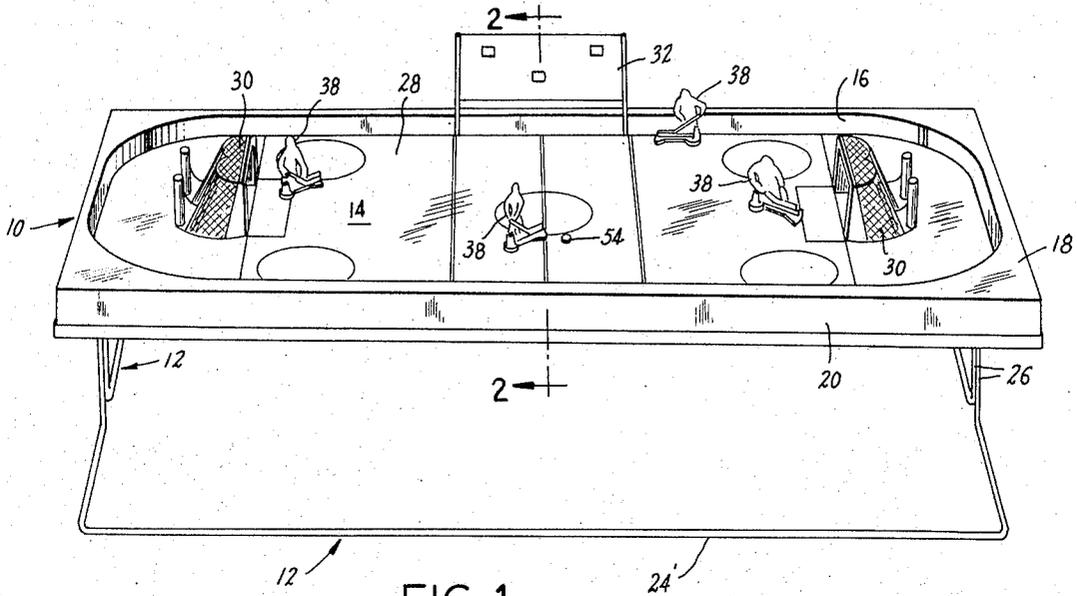


FIG. 1

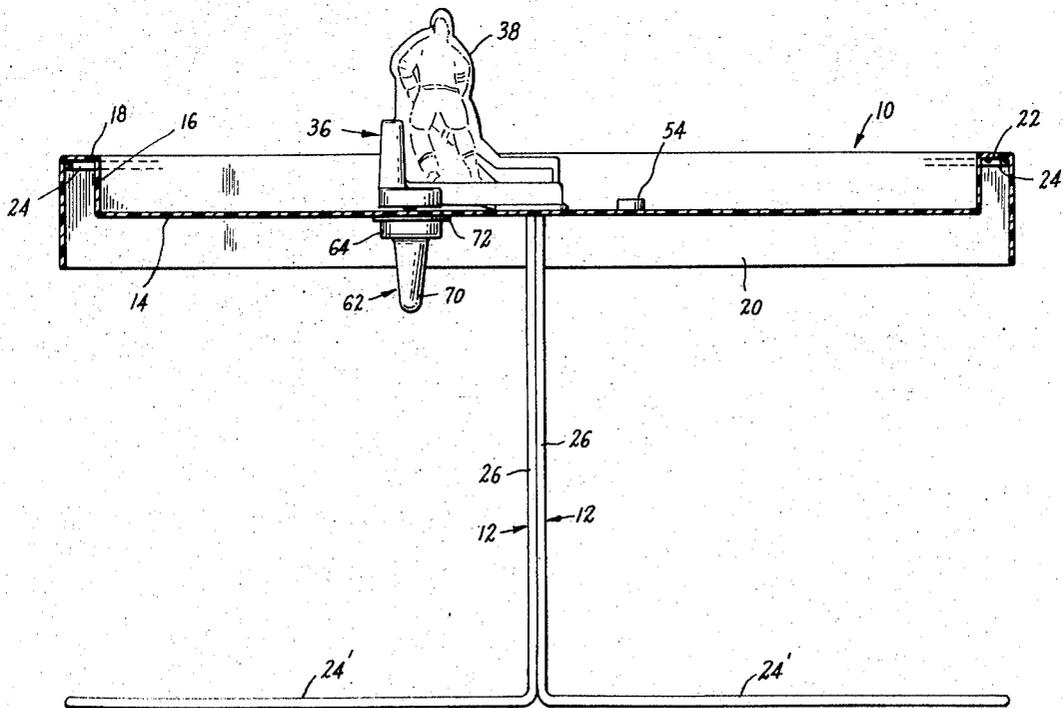


FIG. 2

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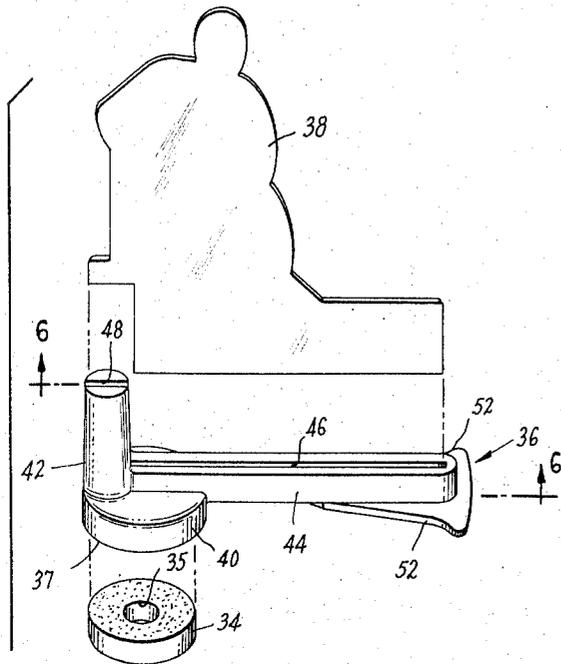


FIG. 5

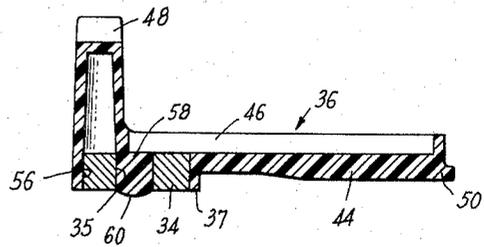


FIG. 6

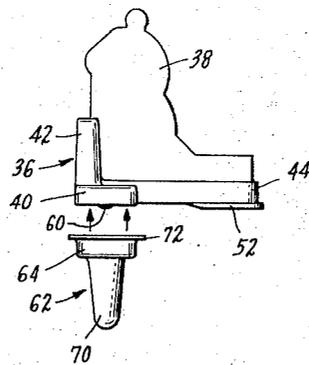
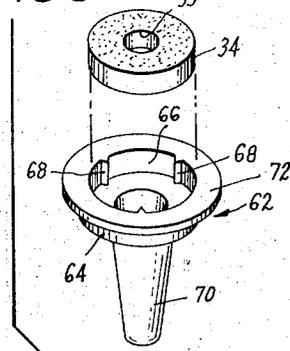


FIG. 3

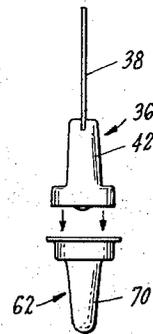


FIG. 4

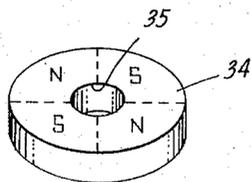


FIG. 7

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HOCKEY GAME WITH MAGNETIC CONTROL MEMBERS

BACKGROUND OF THE INVENTION

Magnetic interaction has previously been employed in various games to effect and control the movement of playing pieces upon a game board surface. Abrupt movement of the playing pieces and effective sharp or abrupt pivoting thereof by appropriate manipulation of a magnetic control member beneath the playing area has been a problem in most, if not all, such prior games due to limitations in the magnetic attraction. As will be appreciated, the ability to sharply pivot the playing pieces is especially desirable in a toy baseball game to simulate batting, and in a toy hockey game to simulate striking the puck.

Accordingly, it is the primary object of the present invention to provide novel game apparatus in which the playing pieces may be both moved abruptly and also pivoted sharply upon the upper surface of a playing area by appropriate manipulation of a control member therebeneath.

It is also an object of the invention to provide such apparatus wherein rotation of a stationary playing piece upon initial interaction with a magnetic control member is minimized.

Another object is to provide such apparatus which is relatively simple and inexpensive to manufacture and which is relatively durable to afford a long useful life.

SUMMARY OF THE DISCLOSURE

It has now been found that the foregoing and related objects are readily attained in apparatus including a game board member having a relatively thin, substantially planar playing portion fabricated of nonferrous material and having means on the upper surface thereof defining a playing area. Support means extending downwardly from the game board member may be provided to elevate the game board member above a planar support surface, and to afford substantially unobstructed access to the bottom surface of the playing portion. A player piece is slidably seated upon the upper surface of the playing portion and has a base portion, a striking portion along the playing portion of the game board extending laterally, and a multiple permanent magnet having therein a multiplicity of alternating regions of opposite polarity. The magnet is so disposed in the base portion that magnetic flux lines from each of the regions of opposite polarity thereof intersect the upper surface of the game board in a direction generally normal thereto. A control member is also provided, and is slidably movable along the bottom surface of the playing portion. The control member comprises a handle element and a multipole permanent magnet, which also has a multiplicity of alternating regions of opposite polarity and is disposed in the handle element with magnetic flux lines from each of the regions intersecting the bottom surface in a direction generally normal thereto. The flux lines of the magnets of the control member and player piece extend through the game board playing portion and are alignable to provide firm magnetic interengagement of the several poles thereof, with the control member being slidably beneath the playing portion to move the player piece therealong

and being pivotable sharply to provide sharp pivoting of the player piece upon the upper surface.

In the preferred embodiments of the invention, the magnets are of generally circular cross section and have the regions of polarity circumferentially positioned thereabout. The axes of such magnets are perpendicular to the playing portion; preferably each of the magnets has four of such regions of polarity. It is especially desirable that the player piece has a downwardly extending element with an end of relatively small surface area to space the body of said player piece from, and to provide limited contact with, the upper surface of the playing portion. In such a case, the magnet of the player piece may be annular with the contact element being provided by the outer end of a stud on the base portion projecting downwardly through the central aperture of the magnet and therebelow. Most desirably, the striking portion of the player piece extends laterally outwardly from the base portion and is in contact with the upper surface of the playing portion, with the player piece being supported upon the contact element and the striking portion thereof.

The striking portion of the player piece may comprise an elongated arm extending laterally along the upper surface of the playing portion from the base portion thereof, and may have a flared configuration adjacent its free end provided by wing portions which extend outwardly from each side of the arm along the upper surface, and which have curvilinear striking surfaces thereon. The striking surfaces diverge from one another and increase in curvature toward the free end to control the direction of an object propelled thereby during play of the game. The playing area defining means on the playing portion may desirably simulate hockey ice and may have goal structures positioned at opposite ends thereof to serve as targets for a puck member. In such an embodiment, the player piece will represent a hockey player and the striking portion thereof will represent the blade of a hockey stick. The combination will additionally include a disk-shaped puck member that is freely slidable upon the upper surface of the playing portion by propulsion through the blade, with sharp pivoting of the hockey player being for the purpose of propelling the puck member over the ice, as in a hockey shot. Most desirably, the game board member is fabricated of a synthetic thermoplastic resinous material.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a hockey game embodying the present invention;

FIG. 2 is a vertical sectional view along the line 2—2 of FIG. 1, drawn to an enlarged scale and omitting various removable parts for clarity of illustration;

FIG. 3 is a side elevational view of the player piece and control handle illustrated in FIG. 2, and diagrammatically indicating the attractive interaction occurring therebetween;

FIG. 4 is a view similar to FIG. 3 but with the player piece rotated 90° to diagrammatically illustrate the repulsive interaction occurring therebetween;

FIG. 5 is an exploded perspective view, to an enlarged scale, of the player piece and control handle of FIGS. 2—4;

FIG. 6 is a vertical sectional view of the base of the player piece along the line 6—6 of FIG. 5; and

FIG. 7 is a perspective view of the annular magnets shown in FIG. 5, drawn to a further enlarged scale and designating the regions of polarity thereof.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Turning now in detail to the appended drawings, FIGS. 1 and 2 illustrate a hockey game apparatus embodying the present invention and including a rectangular game board, generally designated by the numeral 10, supported upon a stand consisting of a pair of wire brackets, each generally designated by the numeral 12. The game board 10 has a recessed central or "ice" portion 14, which is of generally curved-corner rectangular configuration and which is surrounded by a low peripheral wall 16. A rim portion 18 extends outwardly from about the upper edge of the peripheral wall 16 and a rectilinear skirt portion 20 depends therefrom. As can be seen in FIG. 2, the peripheral wall 16, rim portion 18 and skirt portion 20 define a downwardly opening channel 22 of generally U-shaped cross section about the periphery of the game board 10.

Each of the brackets 12 is integrally formed and bent to provide parallel upper and lower U-shaped elements 24, 24', which are interconnected at the ends of the legs thereof by perpendicular upright elements 26. The brackets 12 are positioned in a mirror image relationship with their upright elements 26 adjacent to one another, so that the lower elements 24 cooperatively define a rectangular base, and the upper elements 24' similarly define a rectangular frame. The game board 10 is mounted on the brackets 12 with the upper elements 24' of the latter seated in the peripheral channel 22 about the ice portion 14, thereby supporting the board 10 in an elevated position and providing substantially unobstructed access to the area therebeneath. To complete the game board 10 for hockey-type play, field markings are provided on the upper surface 28 of the ice portion 14, goal net structures 30 are affixed near each end thereof, and a scoreboard 32 is centrally mounted on the rim portion 18; the function of these features will be obvious.

With particular reference now to FIGS. 3-7, the player piece (of which additional variations may be provided to designate different hockey team positions) consists of a base generally designated by the numeral 36, player figure insert 38, and an annular multipole magnet 34. The base 36 of the player piece consists of a circular housing portion 40 having an axially upwardly projecting, radially offset post 42 and an elongated arm 44 which projects radially from the post 42 to a distance well beyond the housing portion 40. The arm 44 and the post 42 have upwardly opening slots 46, 48 formed therein which seat the player figure 38 (depicting a hockey player in this embodiment). Normally, frictional engagement will suffice to secure the insert 38 in the base 36 to permit facile replacement thereof, although adhesives and the like may be used if so desired to provide more permanent engagement. A wing element 50 is provided along the bottom edge of the arm 44 adjacent its free end, and has curvilinear striking surfaces 52 which diverge from one another and are of increasing curvature toward the free end of the arm 44. The curvilinear striking surfaces 52 serve to deflect the puck 54 (shown in FIG. 1) and to afford directional control therefor. Although they are not completely visible, it can be seen in FIG. 5 that the control surfaces

52 are present on both sides of the arm 44 to facilitate striking the puck by pivoting the player piece 36 in either direction.

As is seen in FIG. 6, the circular housing 40 provides a downwardly opening annular recess 56 in which the magnet 34 is mounted about a central stud 58, such as by frictional engagement or adhesive bonding. The stud 58 has a rounded tip portion 60 which projects below the lower edge 37 of the sidewall of the housing 40 and magnet 34 to provide a pivot point of limited surface contact.

The hand-held control member, generally designated by the numeral 62, consists of a generally annular housing portion 64 providing a generally circular recess 66 with a multiplicity of axially extending ribs 68 spaced thereabout, and an axially extending stem or handle portion 70. An annular multipole magnet 34 is seated within the recess 66 and is frictionally engaged by the ribs 68. The housing portion 64 may be so dimensioned that its circumferential lip 72 is elevated slightly above the exposed surface of the magnet 34 to render the lip 72 the effective contact surface for the control member 62 (as is seen in FIG. 2). This will normally facilitate sliding of the control 62 over the bottom surface 74, and will protect the magnet 34 thereof against the demagnetizing effect of frictional contact, no matter how rough or smooth the surface 74 may be.

In FIG. 7, the annular magnet 34 bears "N" and "S" notations thereon, with the dotted lines suggesting the limits of four areas of generally discrete polarity; it will be appreciated that these markings on the magnet are merely for the purpose of illustration.

Due to the disposition of the regions of polarity in the magnets 34, two positions of repulsion and two positions of attraction exist within the 360° of rotation of the player piece 36 relative to the control member 62. Thus, pivoting the player piece 36 through an angle of about 90° from the position of FIG. 3 to that of FIG. 4 causes the magnetic effect to change from one of attraction to one of repulsion. Accordingly, use of the multipole magnets not only increases the strength of the magnetic interaction between the player piece 36 and control member 62, but it also increases the number of relative positions thereof at which coupling will occur. Strengthening the interaction greatly enhances the effectiveness with which abrupt rotational moments may be transmitted to the player piece 36 and thereby the effectiveness of "shooting" by abrupt twisting or twirling of the contact member 62; furthermore, undesirable disorientation or rotation of a stationary player piece 36 upon initial interaction with a control member 62 will also be minimized as a result of the increased number of coupling positions thereabout. In view of these factors, it will be appreciated that the presence of more than four regions of different polarity in each of the magnets may afford additional benefits. The magnets will normally be of a sintered powder construction, although cast metallic magnets may also be employed. If so desired, the magnets may utilize spaced pole pieces to isolate and concentrate the magnetic fields of each of the regions, and to thereby increase the overall field strength of the magnet.

As regards the construction of the game board member, attachments and pieces used therewith, and of the player pieces and control members (other than the magnets), the configuration and material employed may vary considerably and variations will be quite ap-

parent to those skilled in the art. The playing portion of the game board should be constructed of a nonferrous material permitting the magnetic flux lines to pass therethrough, and should be of a thickness providing strength without undue attenuation of the magnetic forces.

To a large degree, design features will be dictated by the type of game that is to be simulated by the apparatus and, although a hockey game embodiment has been illustrated and specifically described herein, it will be appreciated that the present concept is not limited thereto and may be applied equally well to baseball as well as to other types of table games in which it is desired to produce pivotal or sliding movement of a piece by magnetic coupling.

Plastic construction may be used advantageously for many of the parts of the apparatus because it is economical and practical from a manufacturing standpoint; furthermore, the parts produced therefrom are nonferrous and therefore unaffected by the magnets of the player pieces and control members. By way of example, suitable materials broadly include the thermosetting resins, which may be of the phenol-formaldehyde type, and the thermoplastic resins such as the polycarbonates, long-chain polyamides, polyesters (e.g., polyethylene terephthalate resins), polyolefins (e.g., polyethylene, polypropylene, etc.), vinyl and vinylidene resins (e.g., polystyrene, polyvinylchloride, styrene/acrylonitrile copolymers, high impact polystyrene, etc.), and the like. The playing portion of the game board member is desirably fabricated from a cellulosic product such as fiberboard or from a suitable synthetic resinous material of the type listed hereinbefore; the entire game board member illustrated may conveniently and relatively inexpensively be provided as a one-piece, integrally formed unit of a molded thermoplastic. Aside from the player inserts, which are desirably but not necessarily made of printed sheet-metal, and the parts of the support stand, which are conveniently, but again, not necessarily produced from relatively heavy gauge wire stock, the remaining portions of the apparatus may most appropriately also be of plastic construction.

Established rules and regulations, such as those of the National Hockey League, may be applied or modified as appropriate to control procedure of play. In the case of the hockey game, each of the two participants will normally be provided with two control members for the manipulation of three players constituting his team, one player being characterized as a goalie and the other two as forwards.

Thus, it can be seen that the present invention provides a novel game apparatus in which the playing pieces may be moved rapidly along the playing area and sharply pivoted thereon by appropriate manipulation of a control member therebeneath. Rotation of a stationary playing piece upon initial interaction with a magnetic control member is minimized, and the apparatus is relatively simple and inexpensive to manufacture and yet relatively durable to provide a long useful life.

I claim:

1. In a game apparatus, the combination comprising: a game board having a relatively thin, substantially planar playing portion fabricated of a nonferrous material and having means on the upper surface thereof defining a playing area; a player piece slidably seated upon said

upper surface of said playing portion and having a base portion, a striking portion extending laterally outwardly from said base portion along said playing portion of said game board and in contact with said upper surface thereof, said striking portion of said player piece comprising an elongated arm extending laterally along said upper surface of said playing portion from said base portion and having a flared configuration adjacent its free end provided by wing portions which extend outwardly from each side of said arm along said upper surface and which have curvilinear striking surfaces thereon, said striking surfaces diverging from one another and increasing in curvature toward said free end to control the direction of an object propelled thereby during play of the game, and a multipole permanent magnet having at least four alternating regions of opposite polarity disposed in said base portion with magnetic flux lines from each of said regions intersecting the plane of the upper surface of said game board in a direction generally normal thereto, said magnet of said player piece being of annular configuration and said base portion having a depending stud thereon projecting downwardly through the central aperture of said annular magnet and therebelow, said stud having an end of relatively small surface area and spacing the body of said player piece from said upper surface of the board to provide limited contact therewith, said player piece being supported upon said stud and said striking portion; and a control member slidably movable along the bottom surface of said playing portion, said control member comprising a handle element and a multipole permanent magnet having at least four alternating regions of opposite polarity disposed in said handle element with magnetic flux lines from each of said regions intersecting said bottom surface in a direction generally normal thereto, the flux lines of said magnets of said contact member and player piece extending through said game board playing portion and alignable to provide firm magnetic interengagement of the several opposite poles thereof, said control member being slidable beneath said playing portion to move said player piece therealong and being pivotable sharply to produce sharp pivoting of said player piece upon said upper surface, said magnets of said player pieces and control members both being of generally circular cross section with said alternating regions of polarity being positioned circumferentially thereabout and with the axes of said magnets being perpendicular to said playing portion.

2. The combination of claim 1 wherein there is included support means extending downwardly from said game board member for elevating said game board member above a planar support surface and affording substantially unobstructed access to the bottom surface of said playing portion.

3. The combination of claim 1 wherein said game board member is fabricated of a synthetic thermoplastic resinous material.

4. In a game apparatus, the combination comprising: a game board having substantially planar playing portion and having means on the upper surface thereof defining a playing area; a player piece slidably seated upon said upper surface of said playing portion and having a base portion and a striking portion extending laterally along said playing portion of said game board, said striking portion of said player piece comprising an elongated arm extending laterally along said upper sur-

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face of said playing portion from said base portion and having a flared configuration adjacent its free end provided by wing portions which extend outwardly from each side of said arm along said upper surface and which have curvilinear striking surfaces thereon, said striking surfaces diverging from one another and increasing in curvature toward said free end to control the direction of an object propelled thereby during play of the game; an object to be propelled on said board upper surface and freely slidable therealong; and means for sharply pivoting said player piece to cause said striking portion to propel said object in a controlled direction.

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5. The combination of claim 4 wherein said playing area defining means on said playing portion simulates hockey ice and includes a pair of goal structures at opposite ends of said ice to serve as targets for a puck member, wherein said player piece represents a hockey player and said striking portion thereof represents the blade of a hockey stick, and wherein said object is a disk-shaped puck member freely slidable upon said upper surface by propulsion through said blade, sharp pivoting of said hockey player being for the purpose of propelling said puck member over said ice as in a hockey shot.

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