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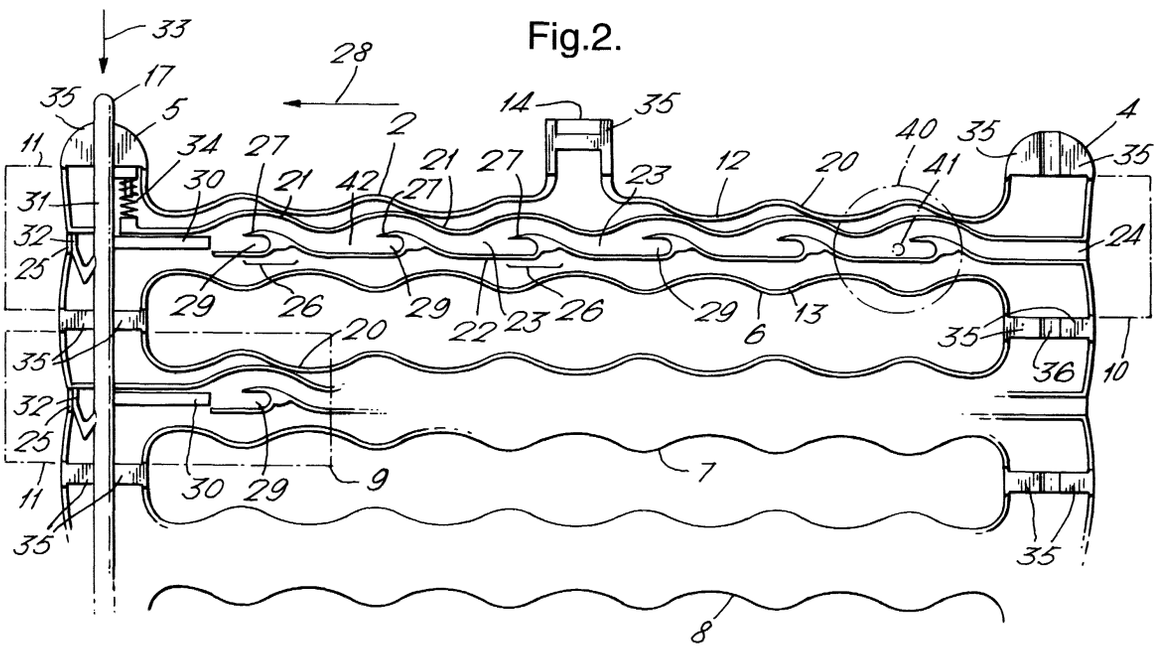
(54) Apparatus for playing a game

(57) Apparatus for playing a game is provided having a number of game pieces (40) and a support structure (1), the support structure having a number of channels (23) and non-return elements (26) located along the channels. The channels (23) are arranged to co-operate with parts (41) of the game pieces (40), such that the game pieces may be guided along the channels in a first direction (28). The non-return elements (26) are located along the channels (23) at non-return positions and are arranged to prevent the movement of the game pieces (40) past the non-return positions only in a direction opposed to the first direction (28).

Fig.2.



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Description

[0001] This invention relates to an apparatus for playing a game, and in particular a game of the type known as "noughts and crosses".

[0002] The game of "noughts and crosses" (also known as "tic-tac-toe") has enjoyed a wide popularity for many years. The game in its simplest form can be played with a pen and paper. In general two players take turns at marking positions within a matrix. The object of the game is to achieve a line of markings, for example 3, and the first player to do so is the winner.

[0003] There have been a number of physical representations of this game in which the paper is replaced by a structure for holding game pieces. Usually, each player is given a set of identical game pieces which generally differ from those of the other player in some way, for example by colour.

[0004] A particularly successful prior art example of such apparatus is the game of "Connect Four" (RTM). In this game the structure defining a planar matrix is oriented vertically and the players are constrained to add pieces to the matrix only from the top. The matrix in this case is defined as an array of parallel vertical channels.

[0005] A further aspect of game play is provided in that the pieces fall to the lowest unoccupied position within a channel, that is either at the bottom or abutting a previously inserted game piece. During game play, the number of game pieces within the channels build up from the bottom as they are progressively added from the top.

[0006] An extra level of game difficulty is provided by the game rules which require that four pieces rather than three must be aligned in order to win.

[0007] Prior art game apparatus also contains extensions of this concept into three dimensions, for example a number of structure of the type described may be arranged so as to provide a three dimensional matrix.

[0008] As consumers demand new games of ever increasing complexity, it is desirable to provide a new game apparatus which combines the popular concept of "noughts and crosses" with new aspects of game play and additional levels of skill.

[0009] In accordance with one aspect of the present invention we provide an apparatus for playing a game comprising:

a number of game pieces;

a support structure having at least one channel wherein the channel is arranged to co-operate with at least part of the game piece, such that the game piece may be guided along the channel in a first direction; and

at least one non-return element located along the channel at a non-return position and arranged to prevent the movement of the game piece past the non-return position only in a direction opposed to the first direction.

[0010] The invention therefore provides additional possibilities for game play in games such as "Connect Four"(RTM) by allowing game pieces to be guided along a channel in the first direction whilst preventing them from returning past specific points along the channel in the reverse direction.

[0011] In general a number of channels will be provided and arranged in parallel as a set. Typically the channels will be arranged in a plane although other configurations are possible. For example the channels themselves may be nonlinear or their respective ends might be arranged in a nonlinear manner, such as along a curve. The invention is not limited to the channels being of a particular configuration and examples include tubes, grooves or parallel guides. However, typically the channels will comprise first and second walls which are adapted to guide at least part of the game piece along the respective channel.

[0012] In cases where the channels are not enclosed tubes or bores, it is not necessary for every part of a game piece to be located within the channel. The game pieces may therefore not be limited to a particular shape as long as at least part of them may be located within the channel so as to allow the game piece as a whole to be guided along the channel.

[0013] The non-return elements may take one of a number of forms although preferably each will comprise a protrusion which extends into the channel and co-operates with one of the channel walls or base (if present), to form a recess. The part of the game piece within the channel may therefore be guided around the protrusion and recess when moved in the first direction. Generally the recess will face the first direction such that the part of the game piece will be guided into the recess when approaching from the opposite direction along the channel.

[0014] Other examples of non-return elements include elements adapted to deform elastically or move only through a fixed angle, allowing movement past them only in one direction. For example such elements might comprise projections or tines angled along the first direction which deform or move towards the sides of the channel when a game piece moves past in the first direction but which are moved together to block the channel when forced in the opposite direction. Similarly magnetic elements might be employed to deflect suitable game pieces into recesses or against co-operating lips.

[0015] Preferably the channels are not enclosed but have at least one open side along their length such that one edge of each of the first and second walls lies in an exposed plane.

[0016] Entry of the game piece into the channel may be achieved by providing a first opening at one end allowing the game piece to enter the channel in the first direction. A corresponding second opening may be provided at the opposite end of the channel to allow the game piece to exit whilst moving in the first direction.

[0017] In order to prevent the game pieces from leav-

ing the second opening the apparatus may typically further comprise a channel stop which is arranged to block the channel and is preferably positioned adjacent the second opening to prevent a game piece from either exiting the channel or entering it through the second opening.

[0018] The channel stop may be advantageously arranged to be movable between a first position to block the channel, and a second position to allow a game piece to enter or exit the channel. A biassing device may be provided to bias the channel stop in the first position. The biassing device may be arranged to allow the stop to be moved to the second position by a player.

[0019] The game pieces may take one of a number of forms which may in part be determined by the form of the channel. Preferably however they will take the form of a disc having first and second opposed surfaces and a projection positioned centrally upon one of the surfaces and extending in a direction generally normal to the surface.

[0020] Typically the apparatus will further comprise a second set of channels similar to the first set and arranged to overlie the first set in parallel and separated therefrom by a gap defining a plane, such that the one edge of the walls of the first set of channels face one edge of the walls of the second set of channels across the planar gap. In this case the channels may be considered as being arranged in parallel opposing pairs.

[0021] The apparatus may also be arranged such that the support structure has tubular members arranged to separately enclose each pair of opposing channels, wherein the tubular members have slits along each side positioned to correspond to the planar gap between the channels, such that the planar gap is extended outside of the tubular members.

[0022] Advantageously the gap between the first and second sets of channels may be arranged to be of a sufficient width to allow passage of a game piece along the channels when the projection of the game piece is within the channel, wherein the channel walls and/or edges of the slits of the tubular members prevent the projection of the game piece from leaving the channel other than via the first or second openings. With this arrangement, when only part of the game piece is located within the channel, the other part may pass along the gap as the projection is guided along the channel.

[0023] Although the second set of channels may have their corresponding first directions aligned with those of the first set, typically the first set of channels will have the first direction opposed to that of the second set. Of course alternatively a number channels within either set could be arranged to have first directions that are opposed to other channels within the same set.

[0024] When the apparatus comprises two sets of channels, each set having aligned first directions, then each set of channels may have corresponding channel stops such that when the channel stops are in their first positions, the game pieces may only be inserted in the first set of channels at one end of the structure and the game pieces may only be inserted in the second set of channels from the other end of the structure.

[0025] In addition to the alignment of the first and second sets of channels, the non-return elements of the first set of channels will be typically positioned opposite the corresponding elements of the second set of channels.

[0026] Either or both of the non-return elements or channels may be positioned having an equal spacing. Typically the non-return elements and the channels will be equally spaced so as to form a matrix of game piece positions. In general, when the game pieces are provided at least in part as discs, this spacing may correspond approximately to the diameter of the discs.

[0027] The apparatus may also be arranged such that, in use, the channels are arranged substantially vertically within the support structure and the apparatus may be provided with a suitable pivot such that the structure may be rotated about a horizontal axis so as to invert the channels. This is particularly advantageous when provided in association with two sets of channels having opposed first directions as the apparatus may be inverted to add game pieces from either end. The structure may alternatively be rotated about two diagonal axes in order to invert it.

[0028] The arrangement of the channels having at least a vertical component allows the game pieces to be guided along the channels under the action of gravity.

[0029] The invention is not limited by the number of channels provided or by the number non-return elements provided within the channels although it will be appreciated that large numbers of channels and non-return elements provide the scope for more complex game play. Although the apparatus and game pieces may be formed from any suitable material, they will preferably be constructed from a plastics material and have a set of game pieces for each player which may be distinguished from each other by their colour.

[0030] Some examples of apparatus according to the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a general view of the support structure of a first example;

Figure 2 is a plan view, partly in section of the support structure, showing one set of channels;

Figure 3 is a plan view of a game piece of the first example;

Figure 4 is a side view of the game piece of the first example;

Figure 5 is a view of one end of the support structure of the first example; and

Figure 6 is a illustration of an electronic game of a second example.

[0031] Apparatus according to a first example of the invention is shown in Figure 1. A support structure generally indicated at 1 is formed from two component

halves indicated at 2 and 3 respectively. The two halves of the structure 2 and 3 are overlaid and attached together at a number of points. The support structure 1 effectively comprises two end pieces 4 and 5 connected by a series of parallel cross members 6,7,8.... The two halves of the support structure 2 and 3 are formed such that, when connected together, a series of passages 9 are formed passing through the support structure 1. Each cross member 6,7,8... has a corresponding passage 9 passing through it and each passage 9 extends through the end pieces 4 and 5 to terminate in openings 10 and 11 respectively in each end piece. The openings 10,11 of the passages 9 have a width larger than the cross members 6,7,8. To achieve this, each cross member has corresponding slits 12 and 13 positioned upon each side within the plane of the structure and running along their length such that a flat item such as a disc having a diameter almost as wide as the opening 10 or 11, may pass along the cross members despite their narrower width by protruding from each side of the slits 12,13.

[0032] The apparatus is intended for use in an orientation such that the passages 9 are arranged vertically within a plane. Therefore, the cross members will normally be arranged vertically with the corresponding end pieces being positioned one above the other.

[0033] The support structure 1 is also provided with two pivots 14 (only one shown in Figure 1), upon which the support structure 1 may be rotatably mounted to a stand 15 (not shown). The pivots 14 are provided at positions half way along the end most cross members at either end of the support structure 1 and thereby provide an axis of rotation in the horizontal plane about the pivot points 14. The pivots 14 also contain corresponding slots 16 running through the pivots, which extend the passage 9 through the pivots so as to allow an item to pass down the passage 9 in the end most cross member.

[0034] Buttons 17 are provided at one end of the end pieces 4,5. The buttons are arranged to operate moveable channel stops and entry stops, to be described in more detail below.

[0035] The two halves 2,3 of the support structure 1 are identical in form, allowing ease of manufacture. When connected together, the support structure 1 therefore exhibits two-fold rotational symmetry about an axis passing through the pivot points 14.

[0036] Figure 2 shows the appearance of one half 2 of the support structure with the second half 3 removed. Each cross member 6,7... has an outer casing 20 providing a smooth external appearance to the apparatus. Within each cross member, first and second walls 21,22 are provided defining a channel 23 running along the passages 9 between the first and second ends openings 10,11. The edges of the casing 20 lie within the same plane as the edges of the walls 21,22, the edges of the casing 20 providing the edges of the slits 12,13 which run along each cross member between the two halves of the support structure 2,3. As can be seen from the Figure, the openings 10 and 11 are elongate in the plane of the structure and are wider than the width of the cross members in the plane. An item which may pass through the openings 10,11 may be passed along the cross member by passing over the edges of the walls of the casing and channel 20,21,22. When the two halves of the structure are connected there is a gap between the edges of the walls of the two halves and this gap forms the slits 12, 13.

[0037] The channel 23 provides an extension to the passage 9 into the plane of the Figure. In each case, the passage 23 extends across the cross member and both end pieces 4,5, the channel ending in channel openings 24,25 respectively which form part of the larger openings 10,11. The channel openings 24,25 are also visible in Figure 1 where the overlying of the two halves of the support structure provides correspondence between the openings 24 and 25 of the two halves respectively. The openings 10,11 of the passages 9 are therefore elongate openings within the plane having symmetrical recesses (channel openings) provided above and below their centre in a direction normal to the plane.

[0038] Returning to Figure 2, a number of non-return elements 26 are positioned at equal spacings along the channels 23. The non-return elements in each case are formed by a protrusion 27 which extends into the gap between the walls 21 and 22. The edges of the protrusions 27 similarly align with the edges of the walls 21,22 and the casing 20. The protrusions 27 are angled in a downstream direction within the cross members, such that an object moving along the channel 23 from channel opening 24 to the channel opening 25 will be directed by the protrusion along the wall 21 and around its downstream point and will continue further down the passage 23. Such a direction defines a first direction of movement for the channels 23. During normal use of the apparatus, the support structure will be arranged such that when an object is allowed to enter the opening 24 this first direction will be aligned with that of gravity. The first direction is shown by an arrow 28 in Figure 2.

[0039] The channels 23 are effectively diverted around the protrusions 27 as each protrusion extends downstream and away from the second wall 22. A recess 29 is provided between the tip of each protrusion and the second wall 22. In general, the channel 23 is aligned with the first and second channel openings 24,25 apart from at the points of the non-return elements in their respective non-return positions, where the protrusions 27 form one wall of the channel and direct the channel out of line with the two openings and around the recesses 29. The recesses 29 are therefore provided in a line between the first and second openings and the channel in each case is brought back into line with these openings between consecutive non-return positions.

[0040] When the apparatus is inverted by rotation about the pivot points 14, such that the force of gravity

is directly opposed to the first direction 28, an object within the channel will be directed in this opposed direction into one of the recesses 29. The non-return elements are provided in this manner at a number of non-return positions along each cross member. Corresponding channels and non-return elements are provided in each cross member such that the positions of the non-return elements form a matrix, preferably of equal spacing.

[0041] A suitable shaped object inserted with the channel 23 through the channel opening 24 will, when the force of gravity is aligned with the first direction 28, be transported down the channel around each of the respective non-return elements. In order to prevent such an object exiting the channel at the point 25, a channel stop component 30 is provided for each channel. The channel stop 30 simply extends into the channel and blocks it at a point just beyond the last recess 29. For each channel of one half of the support structure, channel stops 30 are provided at a similar position and are connected together to a component 31. In each case, a second channel entry stop 32 (Figures 1,2) is provided to cover each of the openings 24 but not the wider opening 11. This prevents the direct insertion of objects only into the channel openings 25.

[0042] Each of the entry stops 32 is also connected to the component 31 and is arranged such that when the channel 23 is blocked by the channel stop 30, the corresponding channel opening 25 is also blocked by the entry stop 32.

[0043] The stops 30,32 and the component 31 are shaped such that the main part of the passage 9 remains unobstructed even when the channel is blocked.

[0044] The component 31 and the attached stops may be deflected in a horizontal direction from a first rest position to a second position. As shown in Figure 2, the end of the wall 22 is positioned such that the channel stop 30 may move past it in a direction indicated by the arrow 33. Similarly, the entry stop 32 may move past the edge of the channel opening 25. The end of the component 31 extends out of a hole in the support structure 1 and forms a button 17 which may be depressed by a game player. A spring 34 is provided between a projection attached to the component 31 and an extension to the wall 21 in order to hold the component when at rest so as to block the channel 23.

[0045] When a player presses the button 17 the component 31 moves in the direction of the arrow 33 by compression of the spring 34. The movement of the component allows access to the channel and corresponding channel opening.

[0046] When the force of gravity is aligned with the first direction 28, an item resting against the end of the channel stop will be allowed to pass out of the apparatus through the channel opening 25. However, when the apparatus is inverted and the opening 25 forms the top of the channel, the entry to the channel of an item will only be allowed if the button is depressed.

[0047] It is important to note that the two halves 2,3 of the structure 1 are identical and are not mirror images of each other. Therefore, when the second half of the structure 1 is overlaid onto the first half, the first direction, the protrusions 27 and the first and second ends of the channel are all reversed. Referring to Figure 2, whereas the first half shown in the Figure has a first direction and protrusions directed to the left hand side of the diagram, the second half of the structure overlaid onto the Figure such that the sets of channels face each other, would have a respective first direction and protrusions directed to the right.

[0048] Therefore, the component 31 is provided in the opposite end piece of the structure. Each cross member and end piece therefore has a passage 9 passing along its centre. However, along the side of each passage in the respective halves of the structure lie channels and non-return members having opposed directionality.

[0049] The two halves of the support structure are joined at a number of points 35 in Figure 2 (also shown in Figure 1). It should be noted in Figure 2 that the end piece 4 of the half structure not containing the component 31 has a central raised portion 36, lying between the two channels. When the second half is placed upon the first half, the central portions 36 hold the components 31 within their corresponding recesses.

[0050] Figure 3 shows a game piece for use in association with the apparatus, as viewed from above. The game piece 40 comprises a flat circular disc having a projection 41 arranged centrally and extending out of the plane of the disc. This is shown more clearly in the side view of Figure 4.

[0051] Figure 5 shows the appearance of the support structure 1 when viewed from one end in a direction along the channels. The openings 10 of the passages 9 in the end piece 4 are shown, including the additional channel openings 24 and 25 from the respective halves of the structure 2,3 forming part of the opening 10. The passages 9 pass completely through the structure from the openings 10, the passages at all points having a cross-section equal to at least the cross-section of the major elongate rectangular portions of the openings 10.

[0052] In each channel opening 25 the entry stops 32 are visible. These openings are shown corresponding to the lower half of the structure in the Figure. The button 17 is also shown in the Figure, forming the end of the component 31 which, when depressed, moves the internal channel stops and the corresponding entry stops 32 clear of the openings 25.

[0053] It will be appreciated therefore that were the apparatus to be viewed from the other end, the position of the button would be reversed and the entry stops would be present in the upper rather than the lower channel openings.

[0054] Referring to Figures 4 and 5, the game piece 40 may only be inserted in one orientation into the end of the apparatus as shown in Figure 5. That is, with the main body of the game piece passing through the large

rectangle 10 whereas the projection 41 passes through the upper channel opening 24 into the channel. However, the dimensions of the openings 10,11 are only just larger than the corresponding disc thickness. Therefore if two game pieces were added to the same passage from opposite ends so as to move along the two respective opposed channels, they would not be able to pass one another. This is advantageous as the walls of the channel and casing on the opposite side of the cross member guide the game pieces and prevent them from falling out of the channel

[0055] When the apparatus is oriented such that the end piece shown in Figure 5 is at the top of the apparatus and the passages are oriented vertically, the game piece will fall by the action of gravity towards the bottom of the apparatus. The majority of the game piece will pass unhindered through the apparatus. The projection 41 is formed of suitable dimensions such that it remains located within the channel as the game piece moves along the cross member in question under the action of gravity.

[0056] Any game piece which is held within the channels is visible externally to the game players as the diameter of the game pieces is larger than the width of the cross members. The game pieces therefore simply protrude from both slits on either side of the cross members.

[0057] Referring to Figure 2, a game piece inserted into the right hand side of the apparatus through the channel opening 24 will be moved in the first direction by gravity along the channel, bypassing the non-return positions and eventually abutting the end of the channel stop 30. A second game piece added to the channel 23 will move down the channel until it abuts the first game piece. The non-return elements are spaced at a distance approximately equal to the diameter of the game pieces such that, when the first game piece abuts the channel stop 30, the projection of the second game piece will be located at an approximate position marked 42 in the Figure.

[0058] If the apparatus is then inverted such that gravity acts in a direction opposed to the first direction 28, the game pieces will be compelled to move in a direction directly opposed to the first direction. The projections lying within the channels will therefore move a short distance until they are held within the recesses 29 of the non-return elements. Therefore, during a game, a game piece added to the top of the apparatus will be guided to the lowest point available, that is either with its projections resting against the channel stop, or with its main body periphery resting against that of another game piece. The inversion of the apparatus causes all of the pieces which were added from the former upper end to fall into corresponding recesses.

[0059] It is then possible to add further game pieces to the apparatus from the new upper end. Because the non-return elements hold any game pieces in their former positions, it is not possible to add a game piece to a passage which has already had a game piece inserted from the opposite end, as such a game piece will be held at the top of the apparatus, blocking the passage 9.

[0060] Therefore, the game pieces can only be effectively added to either previously unused passages or ones in which any added game pieces were added from the same end.

[0061] The entry stop 32 prevents the addition of game piece projections to channels where they would simply fall into the first recess and therefore any pieces added to the top of the apparatus will always descend to the lowest unoccupied position.

[0062] At the end of a game, the game pieces may be removed from the apparatus by depressing the lowermost button 17 when the apparatus is oriented in one of its two vertical orientations. Any pieces which were added to the opposite end of the apparatus with respect to the component 31 will therefore fall from the bottom of the apparatus due to the movement of the channel stop. It may therefore then be necessary to invert the apparatus and perform a similar action to release game pieces occupying the recesses.

[0063] Each channel in a set is substantially identical and by providing the apparatus with a large number of parallel cross members, each having a large number of non-return elements, a challenging game may be created.

[0064] Generally, the game will be played by two or more players each having for example a specific set of coloured game pieces. The object of the game may be similar to that of Connect Four(RTM) in that the winning player will be the one who first aligns four game pieces of the same colour in either a vertical, horizontal or diagonal direction. Therefore, the cross members will generally be spaced such that game pieces in adjacent cross members may pass one another without touching, however the spacing of game pieces in either horizontal or vertical directions will be approximately similar so as to create a matrix effect regardless of whether the pieces are simply abutting under gravity or are each held in respective non-return elements.

[0065] The apparatus may therefore be used in a similar manner to a conventional Connect Four(RTM) game by maintaining the game structure in one vertical orientation. However, in most cases a great deal of further complexity may be added by allowing either of the game players to choose an orientation in which to add the game pieces to the passages. In this way, game pieces may be added from either end of adjacent passages such that eventually there may be lines formed having component game pieces which have been added to the apparatus from opposite ends of the structure.

[0066] One example of a game that may be played in accordance with the present invention will now be described with reference to two players denoted player 1 and player 2.

[0067] The game is a development of Connect Four (RTM). The object of the game is to be the first player to arrange their game pieces in a line of at least four

pieces. Such a line may be arranged horizontally, diagonally or vertically with respect to the vertically arranged parallel channels of the game.

[0068] Generally the game will be played by two players, each having a corresponding set of game pieces. At the start of the game the players each choose a set of game pieces which may be distinguished by colour, for example one set being red for player 1 and the other yellow for player 2.

[0069] Player 1 begins the game by selecting a red game piece from their set. The channels are aligned in a vertical direction according to a first orientation. This may be either of two possible starting vertical orientations. Player 1 inserts the game piece into the top of one of the channels. The game piece is guided to the bottom of the channel by gravity and comes to rest at the bottom of the channel.

[0070] Player 2 then selects a yellow game piece from their set. Player 2 now has two options according to the game rules. Firstly, player 2 may insert their game piece into the top of any one of the channels, including the one selected earlier by player 1. In this case, the game piece of player 2 is guided down the selected channel and either comes to rest at the bottom of the channel, or if the channel is that selected earlier by player 1, the yellow game piece is guided downwards until it abuts the red game piece of player 1.

[0071] The second and alternative option available to player 2 is to "flip" the channels such that they become inverted. The inverted channels adopt a second orientation with respect to the first orientation. Inverting between the first and second orientations and vice versa may be performed any number of times whilst the players are selecting a channel in which to place a game piece. If this option is chosen, the game piece of player 1 that was at the bottom of the channel in the first orientation will now be positioned at the top of the channel in the second orientation. Player 2 may now add their game piece to the any of the channels in the second orientation except the one containing the game piece of the player 1 (as this will block the opening). The game piece of player 2 will then be guided to the bottom of the channel (in the second orientation).

[0072] Player 1 may then add a game piece to the channels in either orientation as long as their respective openings are not blocked by a game piece added earlier.

[0073] The game continues in this manner with each player taking turns to add a game piece. At any time, all game pieces added by either player at an earlier time are maintained in the position in which they came to rest under the action of gravity, regardless of whether the channels are in their first or second orientation.

[0074] As the game pieces added in either orientation are visible externally when located within the channels, the game is won when one player first achieves a line of four of their game pieces anywhere within the matrix of possible game piece positions. This can therefore be seen.

[0075] The number of games won by each player may be indicated by a suitable device. For example an unused game piece may be inserted in one of a number of slots. A set of numbered slots may be provided for each player, the number of the slot in which the piece is contained denoting the number of games won by the respective player.

[0076] It will be appreciated that the apparatus for playing the game as described above can be represented at least in part as an electronic game.

[0077] A second example will now be described with reference to Figure 6. An electronic game system is provided with a control processor 50. A display 51 is provided upon which the game apparatus and game pieces are represented under the control of the processor. A store 52 is arranged to communicate with the processor and contains data associated with the game. Interaction between one or more users of the game system and the processor is provided using an input device 53. Appropriate sound effects are provided to accompany the game through the speaker 54 under the control of the processor. The game software is stored in non-volatile memory 55, for example on one or more suitable ROM devices.

[0078] The apparatus may be provided as a dedicated game device or might generally represent a computer such as a personal computer in which the game is represented as software.

[0079] In a dedicated game device, the display may comprise a number of lights 56,57,58... arranged in a matrix to represent each possible position of the game pieces in the channels. A game piece may therefore be represented by an illuminated light and respective game pieces for each player may be represent by different coloured lights under the control of the processor 50. Two lights of different colours may therefore be provided at each possible game piece location. More advanced displays may be provided by the use of liquid crystals or other known devices.

[0080] Whilst the non-volatile memory 55 contains the instructions to control the processor, the store 52 is arranged to store data relating to the positions of the game pieces during the game, along with game preferences and high scores. Any suitable recordable memory storage device may be used for this purpose.

[0081] The game is controlled using the input device 53. Typically this will contain buttons allowing a player to select a column in which to place a game piece, a button to indicate the end of a player's turn, along with a "flip" button to invert the virtual apparatus. Other mode, ON/OFF, and menu buttons may be provided to allow easier control of the game. For example one mode may not allow the inversion of the virtual apparatus, thereby reverting the game to that of conventional Connect Four(RTM).

[0082] A game is initiated once a player presses the ON button. A single or two player mode may then be selected in accordance with the display, along with fur-

ther options. In the single player mode, the processor replaces the second player and the user is able to choose a specific skill level for the opponent represented by the processor.

[0083] In a two player game, the first player is asked to select a column in which to place a piece. In this example a button is placed below each column indicated on the display. Pressing the button below a column causes the processor to switch on and off the coloured lights from the "top" of the column in sequence from the top of the display to the lowest unoccupied position. This represents a piece falling down the column. For the first game piece to be added, this position will be at the bottom of the respective column, for example position 60 in the Figure. Only the lights representing the first player are used and once the game piece has reached the lowest unoccupied position, the light at that location of the player's assigned colour remains illuminated.

[0084] After pressing the button to indicate the end of their turn, the game piece position (as represented by the illuminated lights) and the player to whom it belongs is stored in the store 52. The second player then chooses a column in the same way. The processor recognises the change of player as an instruction to operate the lights of the second colour in response to a column selection.

[0085] The second player may add a game piece to any column which does not have game piece at the top (as indicated by a light, for example light 61). Alternatively by pressing the "flip" button the player may invert the virtual apparatus such that the piece already indicated by a glowing light becomes positioned at the top of the channel rather than the bottom. The new position is determined by the processor in accordance with the data in the store. The addition of a piece by the second player is represented by the appropriate lights being operated in sequence to represent a game piece falling within a channel.

[0086] The game continues in turn with each player being given the option to either add a game piece or to invert the virtual apparatus and then add a piece. Whenever the "flip" button is pressed, the virtual apparatus is inverted and the game pieces are held in their respective new positions as they would be in reality by the non-return elements.

[0087] The processor assesses the data in the store at the end of each player's turn. When the processor determines that a player has aligned four pieces then the winning player is indicated and a score may be assigned, for example based upon the time elapsed or the number of pieces added.

Claims

1. Apparatus for playing a game comprising:

a number of game pieces;

a support structure having at least one channel wherein the channel is arranged to co-operate with at least part of the game piece, such that the game piece may be guided along the channel in a first direction; and

at least one non-return element located along the channel at a non-return position and arranged to prevent the movement of the game piece past the non-return position only in a direction opposed to the first direction.

2. Apparatus according to claim 1, wherein the channels are arranged in parallel as a first set of channels.

3. Apparatus according to claim 1 or claim 2, wherein each channel has first and second walls adapted to guide at least part of the game piece along the channel.

4. Apparatus according to claim 3, wherein the non-return element comprises a protrusion which extends into the channel and co-operates with one of the walls to form a recess.

5. Apparatus according to claim 4 wherein the recess is arranged to face the first direction such that at least part of the game piece may enter the recess only when moving in a direction opposed to the first direction.

6. Apparatus according to any of claims 3 to 5, wherein each channel is open along its length such that the one edge of each of the first and second walls lie in a plane.

7. Apparatus according to any of the preceding claims, wherein the channel has a first opening at one end such that at least part of the game piece may enter the channel in the first direction.

8. Apparatus according to claim 7, wherein the channel has a second opening at the end of the channel opposed to the first opening, such that at least part of the channel may exit the channel in the first direction.

9. Apparatus according to claim 8, further comprising a channel stop arranged to block the channel and prevent at least part of a game piece from entering or exiting the second opening.

10. Apparatus according to claim 9 wherein the channel stop is arranged to be movable between a first position to block the channel, and a second position to allow at least part of a game piece to enter or exit the channel.

11. Apparatus according to any of the preceding claims, wherein the game piece is formed as a disc having first and second opposed surfaces and has a projection positioned centrally upon one surface and extending in a direction generally normal to the surface.

12. Apparatus according to any of the preceding claims when dependent upon claims 2 and 3, further comprising a second set of channels similar to the first set and arranged to overlie the first set in parallel and separated from them by a gap defining a plane, such that one edge of the walls of the first set of channels face one edge of the walls of the second set of channels across the planar gap.

13. Apparatus according to claim 12, wherein the support structure has tubular members arranged to separately enclose each pair of opposing channels and wherein the tubular members have slits along each side positioned to correspond to the planar gap between the channels, such that the planar gap is extended outside of the tubular members.

14. Apparatus according to claim 13 when dependent upon claim 11, wherein the gap between the first and second sets of channels is of a sufficient width to allow passage of a game piece along the channels when the projection of the game piece is within the channel, wherein the channel walls and/or edges of the slits of the tubular members prevent the projection from leaving the channel other than via the first or second openings.

15. Apparatus according to any of claims 12 to 14, wherein the first set of channels has the first direction opposed to the first direction of the second set of channels.

16. Apparatus according to any of claims 12 to 15 when dependent upon claim 9, wherein each set of channels has corresponding channel stops, such that when the channel stops are in their first positions, the game pieces may only be inserted in the first set of channels at one end of the structure and the game pieces may only be inserted in the second set of channels from the other end of the structure.

17. Apparatus according to any of the preceding claims when dependent upon claim 12, wherein the non-return elements of the first set of channels are positioned opposite the corresponding elements of the second set of channels.

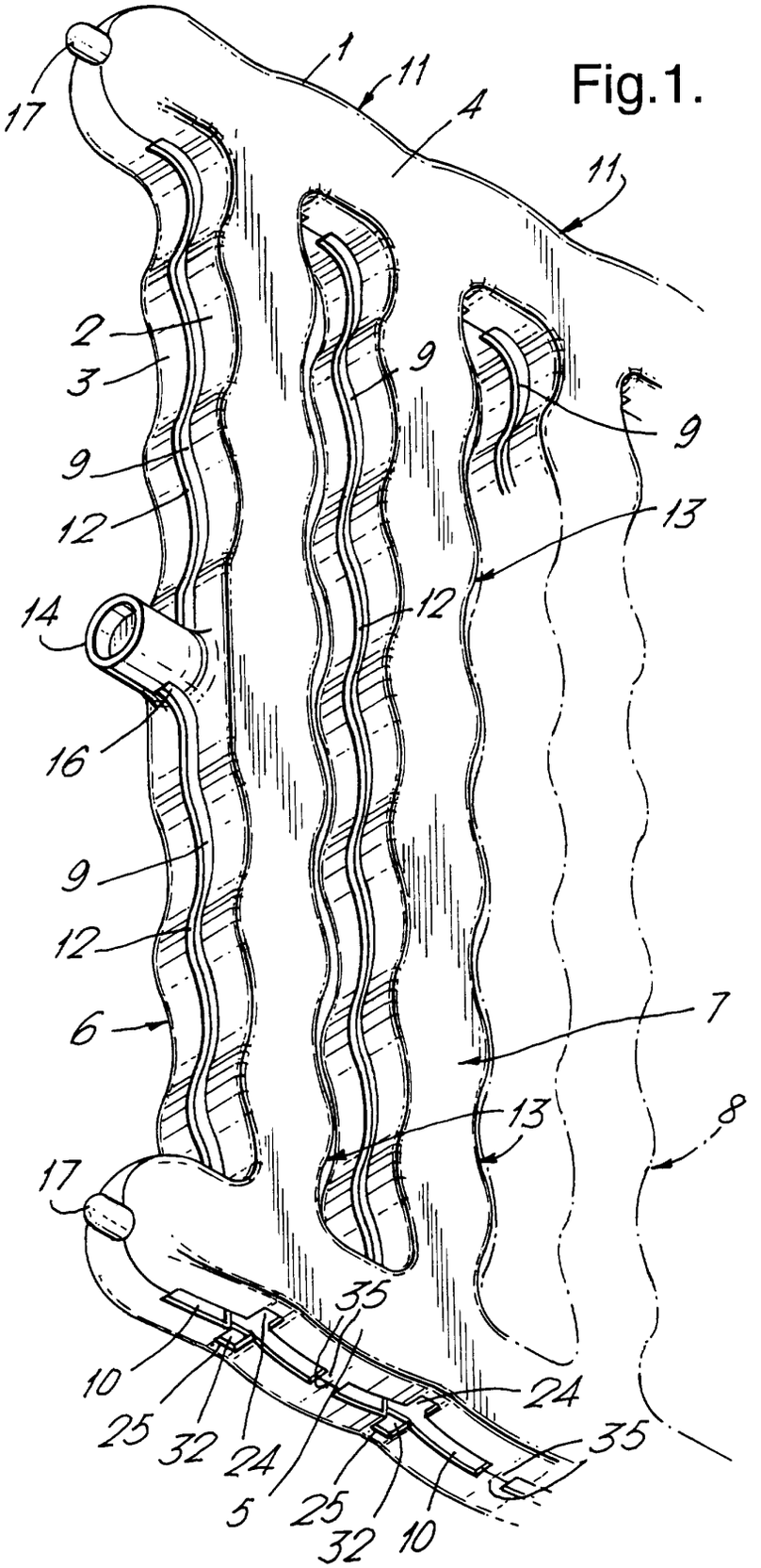
18. Apparatus according to any of the preceding claims, wherein the non-return elements and the channels are spaced at intervals of approximately equal spacing, so as to form a matrix of game piece positions.

19. Apparatus according to any of the preceding claims, wherein the channels are arranged substantially vertically within the support structure, and wherein the apparatus further comprises a pivot such that the structure may be rotated about an axis so as to invert the channels.

20. Apparatus according to any of the preceding claims, wherein the game pieces may be guided along the channels under the action of gravity.

21. Apparatus according to any of the preceding claims, wherein the support structure and/or the game pieces are fabricated from a plastics material.

Fig.1.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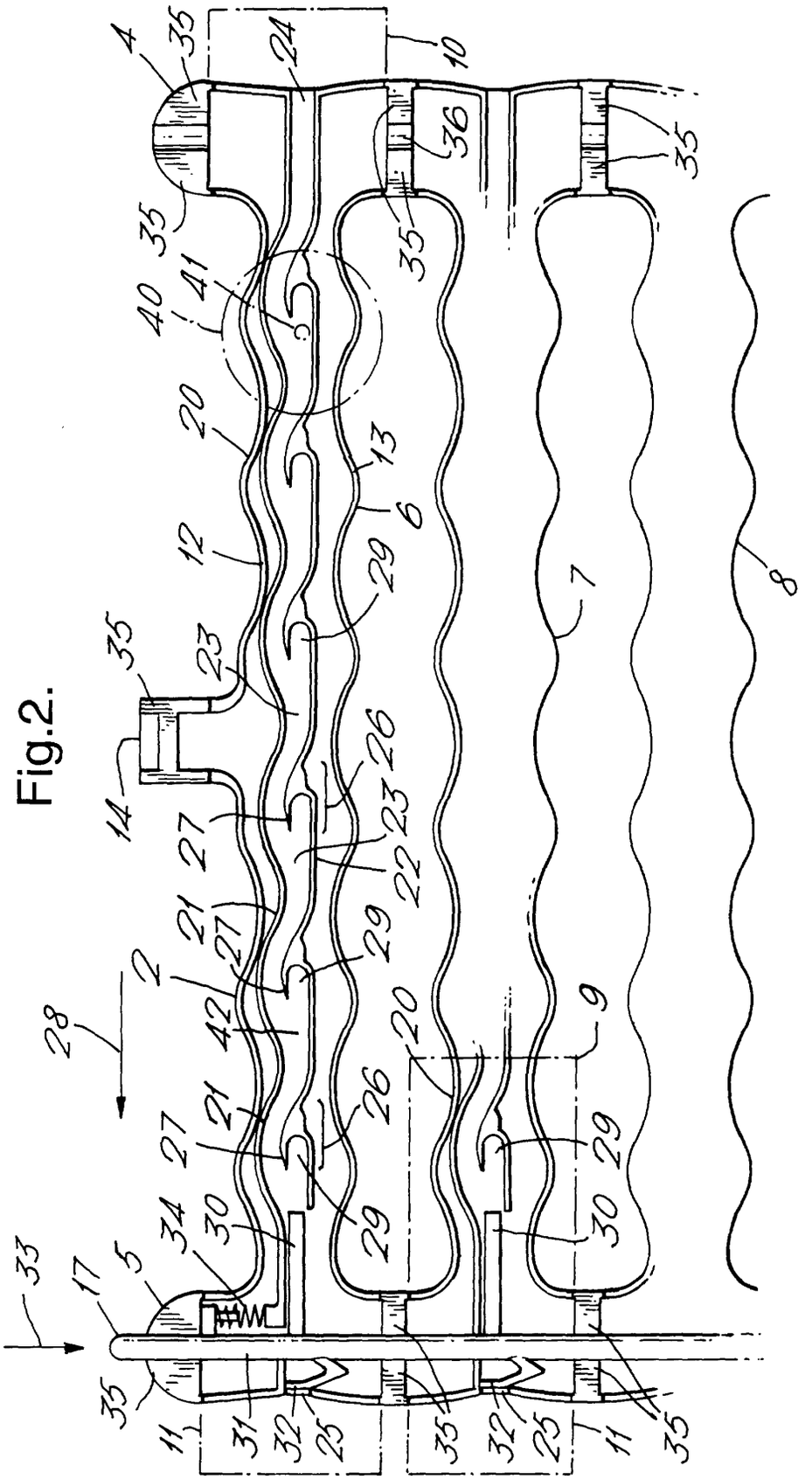

Fig.2.

Fig.3.

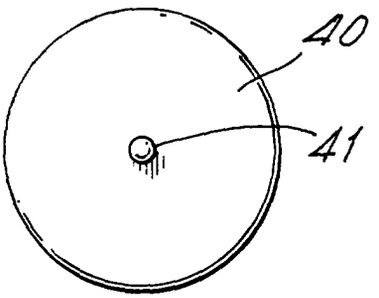

Fig.4.

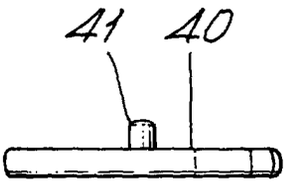

Fig.5.

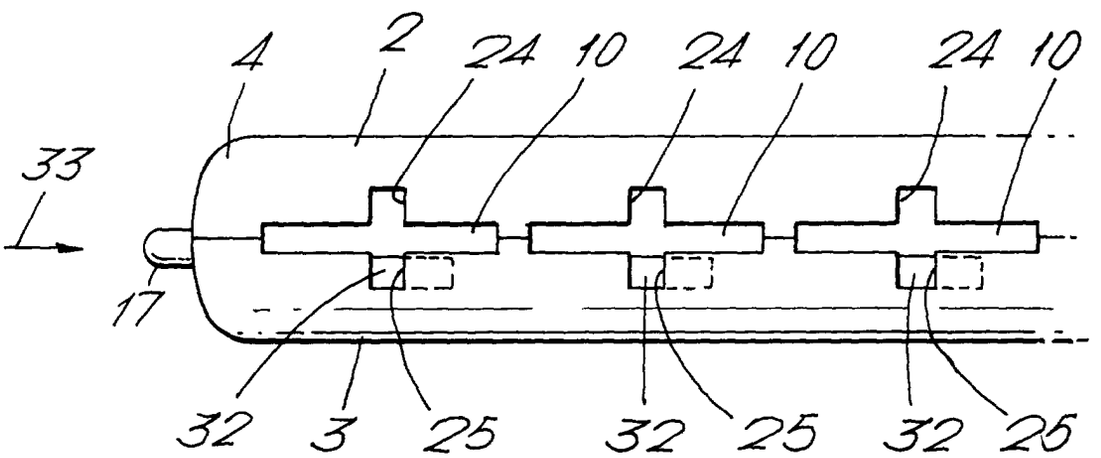

Fig.6.