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(54) **AMUSEMENT MACHINE**

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(57) **ABSTRACT**

A coin pusher amusement machine with a playfield **2,** coin pusher **4** and win chute **21** is provided with a robotic arm **5** for taking items from reservoir **6** and placing them as desired on the playfield **2** and/or in the win chute **21.**

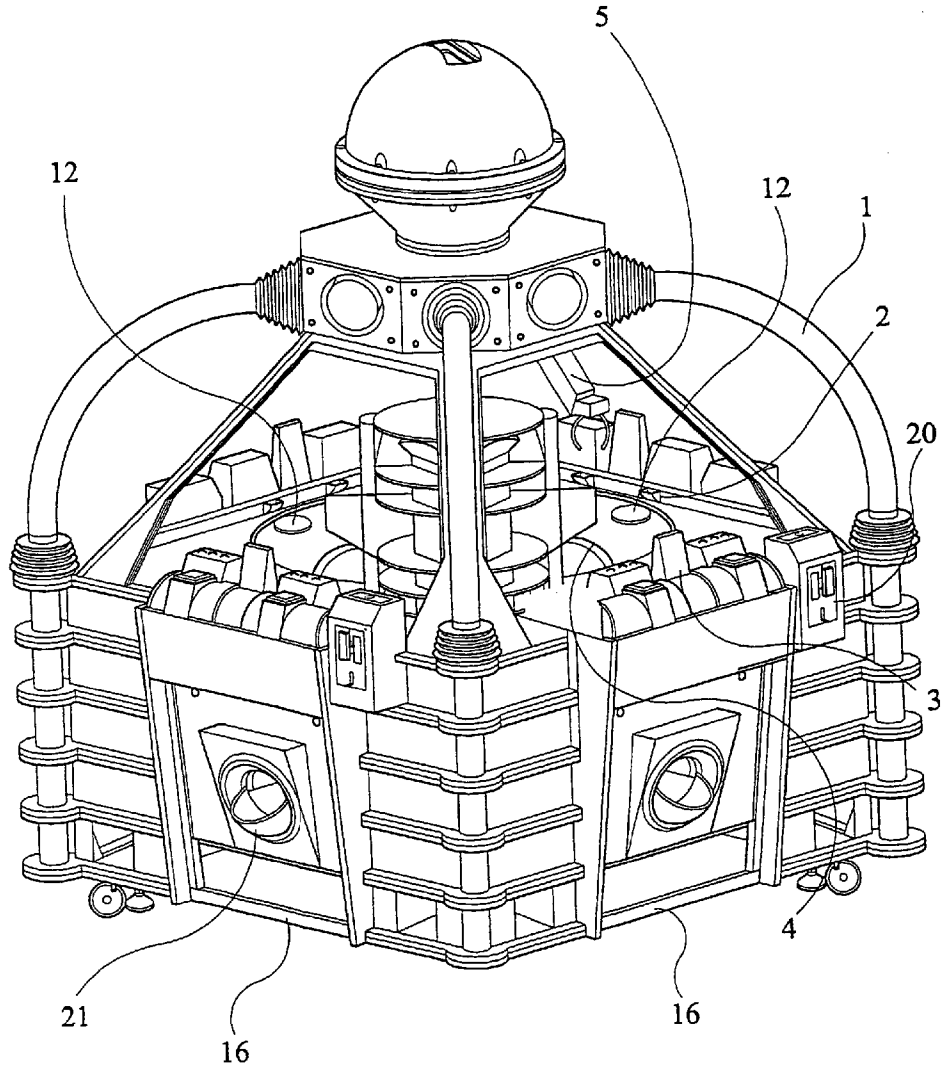


FIG 1

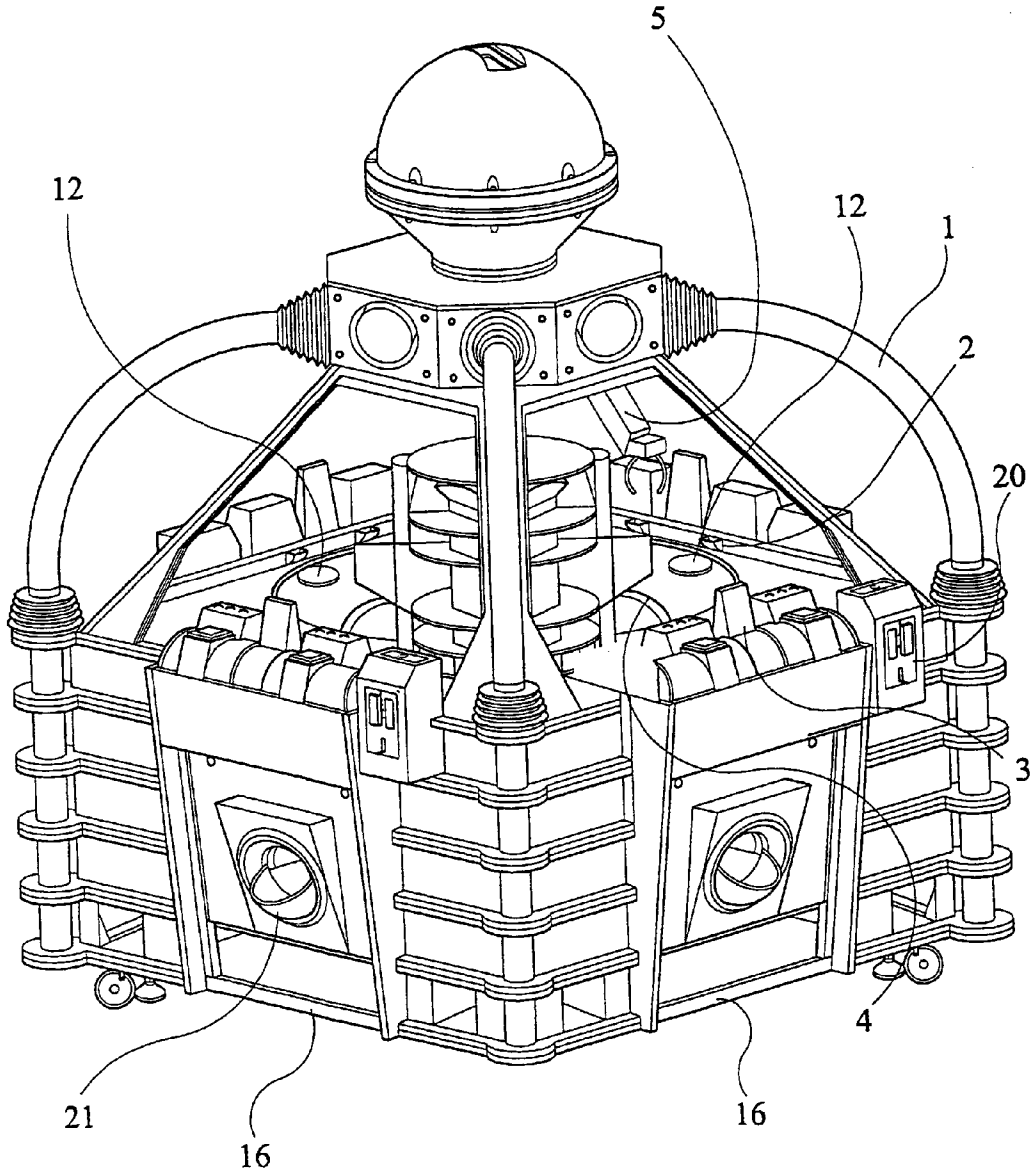


FIG 2

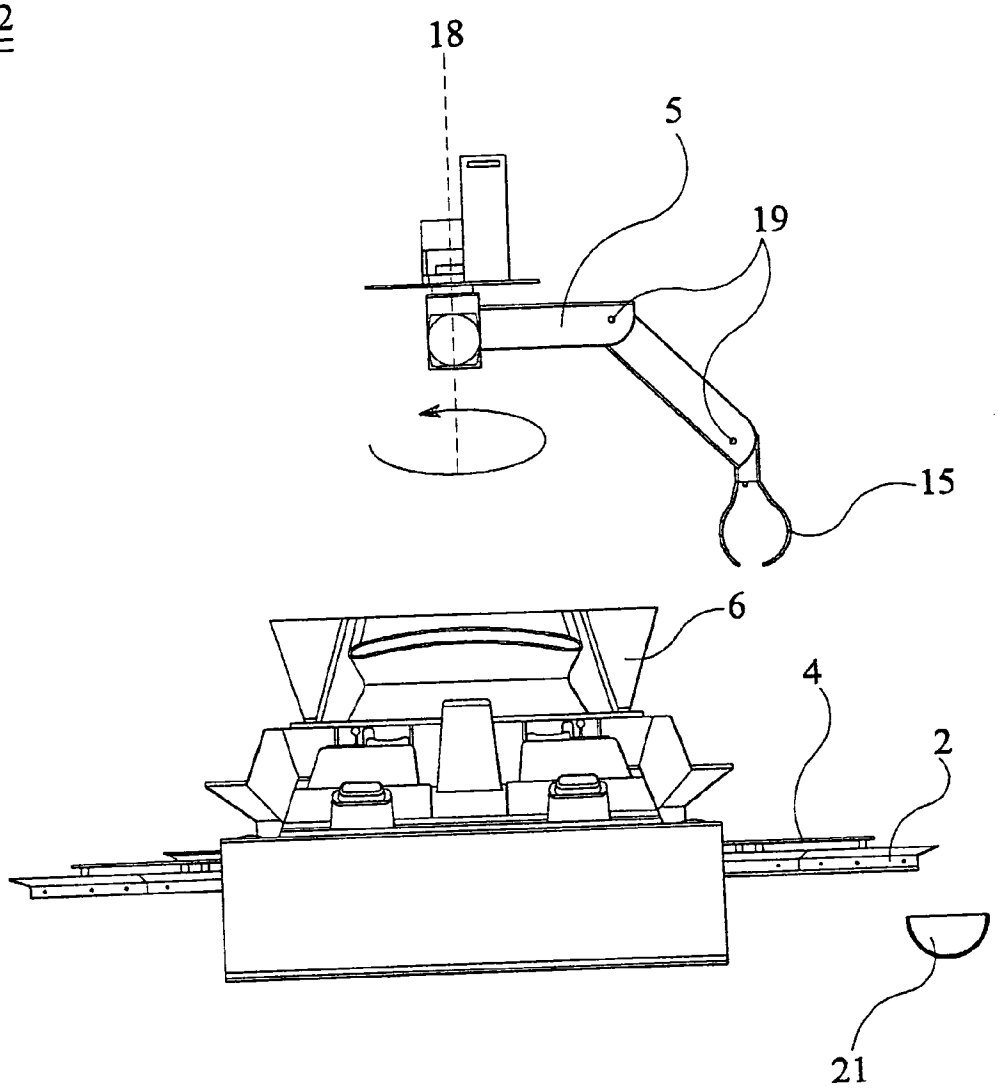


FIG 3

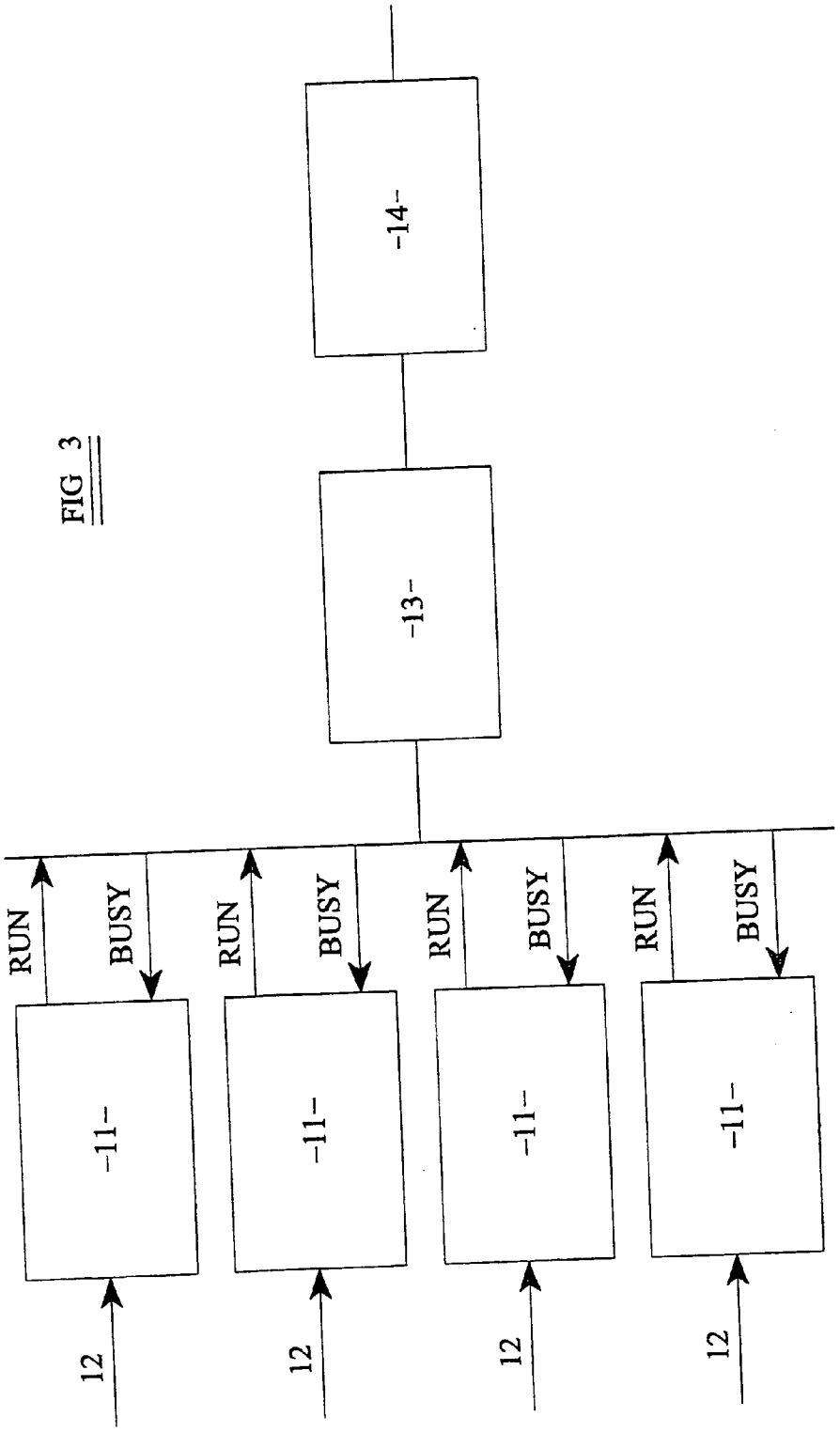


FIG 4

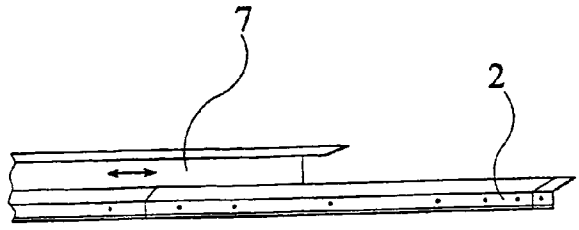
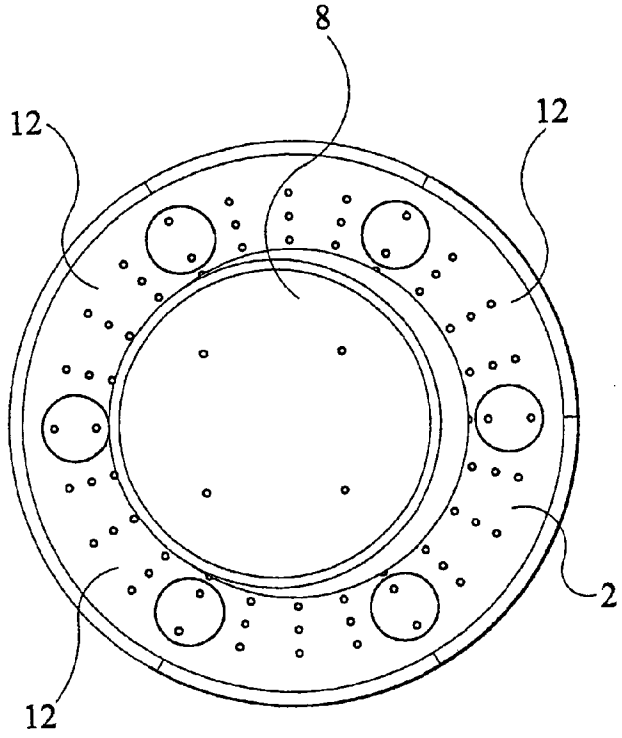


FIG 5



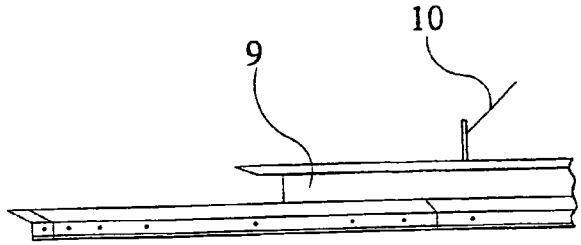


FIG 6

AMUSEMENT MACHINE

FIELD OF THE INVENTION

[0001] The present invention relates to amusement machines, in particular to an amusement machine of the coin pusher type.

BACKGROUND ART

[0002] Coin pusher amusement machines are well known. Such machines include a horizontal playfield on which a large number of coins are distributed. The pattern of coins on the playfield is periodically disturbed by a coin pusher, which may be in the form of a movable stage which periodically sweeps across part of the playfield surface. Coins are pushed to the edge of the playfield and some may be pushed over the edge into a "win chute". From this they pass into a receptacle and may be recovered by the user of the machine, or may otherwise trigger the release of a prize or reward for the user. The user is able to introduce additional coins onto the playfield via coin slots or other conventional means. The object of the user of the machine is to introduce additional coins onto the playfield surface with the hope that a larger number of coins will be pushed over the edge into the win chute. In such conventional machines the playfield is stationary and the coin pusher is moveable over the playfield surface. This is a highly competitive field for which there is a continual need to develop games which will keep the user interested and result in more of these amusement machines being sold.

[0003] GB 2226766 discloses a coin pusher amusement machine having a vertically extending tube for depositing one of a stack of cylindrical boxes on a play area. However, this arrangement lacks flexibility, both in that the tube only delivers cylindrical boxes and in that the tube only deposits the boxes in one location.

STATEMENT OF THE INVENTION

[0004] According to one aspect of the present invention, there is provided an amusement machine comprising a playfield, a coin projection device for projecting coins onto the playfield, a coin pusher which is moveable relative to the playfield, a reservoir and a robotic arm for automatically dispensing objects from the reservoir onto the playfield.

[0005] The term "robotic arm" is used in the present specification to refer to a controlled arm of the type used, for example on industrial robots, and should not be understood to require any form of artificial intelligence on the part of the arm controller.

[0006] In the present invention, a user may cause coins to be projected from the coin projection device onto the playfield either directly or indirectly. The robotic arm automatically dispenses objects, such as coins or prizes, onto one of more of the playfield, coin pusher and win chute (see below) in response to some predetermined event such as a win or a random event which, for example, may occur when the number of coins on the playfield increases beyond a threshold amount. This predetermined or random event introduces a further element of chance and surprise into this form of amusement machine.

[0007] The coin pusher may co-operate with the playfield, in use, to alter the distribution of coins on the playfield surface, whereby some of the coins are pushed over an edge of the playfield surface.

[0008] A win chute may be provided to catch coins or prizes falling off the edge of the playfield. The win chute may be directly accessible by the user; alternatively, coins, tokens or other items falling into the win chute may cause corresponding coins, tokens and items to be provided to a user from a separate supply.

[0009] Thus, in some instances the coins are passed through a hopper before being paid to the user or may trigger the release of a prize. There may be openings provided on the playfield surface itself leading to chutes to enable coins to be retained within the machine either to fill up hoppers which may be recovered by the user or directed to a cashbox. The coin pusher surface may also be part of the playfield surface and support coins in play.

[0010] By using a robotic arm it is possible to pick up and deliver objects not merely to a single predetermined location but to any of a number of locations, for example including different locations on the playfield or into the win chute. The objects may have a variety of different shapes and sizes. The arm may be controlled by an arm controller that may be reprogrammed easily without requiring a new machine.

[0011] The amusement machine may include a number of play stations to allow a number of users to play at the same time. The play stations may be arranged around the playfield in a square, hexagon, circle, or any other convenient arrangement. This allows a number of players to play together on the amusement machine. The flexibility of the robotic arm allows objects to be moved from a reservoir to the playfield in a location in front of any of the play stations rather than requiring separate supplies for each play station. Objects may be provided randomly to the playfield or the location to which the robotic arm delivers the item may be determined as required. For example, the robotic arm may distribute objects to locations on the playfield corresponding to a play section where a large number of credits have been input.

[0012] The robotic arm may be moveable in multiple directions, with both rotational and pivotal movement. The robotic arm may be a multiple jointed arm. The arm may be mounted on a central substantially vertical pivot axis at its and have at least two joints. The joints may allow movement about substantially horizontal axis. Alternate arrangements are possible. For example, the arm may be mounted on a track to provide motion along the track, or include a telescopic component. The distal end of the arm may be provided with a grabber, preferably hinged to the arm. It should be noted that the grabber preferably reliably picks up objects and places them where required, in contrast to the grabbers of crane-type prize dispensing games which are often arranged to provide some element of chance.

[0013] The robotic arm may conveniently be mounted above the reservoir. In embodiments, the playfield underneath and/or around the reservoir and a number of play stations each with a coin input, win chute and any other required controls may be provided at the periphery of the playfield.

[0014] Preferably, the coin pusher and playfield are moveable relative to each other. The playfield may be moveable and the coin pusher may be stationary.

[0015] The reservoir may be a single central reservoir, or hopper, visible to player so that the players can see which

prizes may be won. The use of a robotic arm delivery system permits an open hopper of attractive shape to be used, since there is no need for the hopper to itself incorporate a delivery system.

[0016] In the context of this specification, the term "coins" should be understood as including any similar discs, tokens, medals or the like.

[0017] In a preferred example, the amusement machine comprises a coin pusher eccentrically mounted for rotation relative to the playfield. Preferably, the coin pusher is an eccentrically mounted disc. Eccentric mounting of the coin pusher means that the shape of the peripheral coin-pushing edge of the coin pusher constantly changes, so that the distribution of coins on the playfield is disturbed, coins are gradually urged by the coin pusher towards a peripheral edge of the playfield and, occasionally, depending on the amount of coins on the surface, some coins will be pushed over a edge of the playfield.

[0018] In another preferred example, the amusement machine comprises a horizontal playfield and a coin pusher which reciprocates across part of the playfield to disturb coins distributed on it. Preferably, the coin pusher is a coin pusher box or a moveable stage mounted above and adjacent to the playfield.

[0019] In yet another preferred example, the amusement machine comprises a coin pusher having a rod and a stage moveable relative to each other, wherein the periodic movement of the rod and/or the stage across the playfield disturbs coins on the playfield.

[0020] The amusement machine of the present invention may be a multi-player game where the playfield is divided into different sections to allow a number of users to play the game.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Examples of the present invention will now be described in detail with reference to the accompanying drawings, in which:

[0022] **FIG. 1** is an example of an amusement machine in accordance with the present invention;

[0023] **FIG. 2** is a simplified side elevation of an amusement machine according to the present invention;

[0024] **FIG. 3** is a block diagram of a control mechanism for the robotic arm according to the present invention;

[0025] **FIG. 4** is another example of the present invention;

[0026] **FIG. 5** is a further example of the present invention; and,

[0027] **FIG. 6** is a further example of the present invention.

DETAILED DESCRIPTION

[0028] The coin pusher amusement machine shown in to **FIG. 1** includes a cabinet I within which a rotatable circular playfield **2** having a flat horizontal upper surface and defined by a peripheral edge. As will be described below, coins are distributed on the upper surface of the playfield.

[0029] The machine may be adapted for use by, for example, up to six players when housed in a hexagonal cabinet (not shown) or up to eight players. A play station **16** is provided for each player, on each side of the cabinet, around the periphery of a corresponding section **12** of the playfield **2**. A coin projection device **3** is present on each play station **16** for the projection of coins by the users onto the playfield **2** surface. The coin projection device comprises a coin firing mechanism, a coin insert **20** and may also comprise a playfield stop button. There is also a coin pusher **4** positioned above the playfield and a robotic arm **5** positioned above the coin pusher. Coins are introduced through coin slot **20** on each play station **16**.

[0030] **FIG. 2** is a side elevation showing a coin pusher **4** positioned above and adjacent to the playfield **2** which is moveable with respect to the playfield **2**. When the coin pusher **4** moves the distribution of the coins on the playfield surface is altered. There is a robotic arm **5** positioned above the coin pusher **4** which, in response to a predetermined or random event, automatically dispenses a coin or prize onto the playfield. The coins or prizes are held in a reservoir, in the form of a central bowl **6**. Suitable predetermined events which trigger the movement of the robotic arm include random events such as a win or the detection that the number of coins on the playfield has increased above a predetermined threshold level.

[0031] The robotic arm can operate in a number of axes. It can rotate through 360 degrees about a vertical axis **18**. The arm is split into two members which are pivotally hinged about joints **19** and each member may be controlled independently and hence provide a plurality of positions. The movement is controlled by stepper motors, which extend or retract the arm into the position required.

[0032] The addition of coins onto the playfield **2** by the user together with the movement of the coin pusher **4** and playfield **2** may cause some coins or objects to be pushed over the edge of the playfield into a win chute **21** and these coins may either trigger the release of a prize or the user may be able to obtain these coins directly. Additionally, the user may obtain a prize dispensed onto the playfield by the robotic arm **5** if a predetermined/random event dispenses a prize onto the playfield and subsequently pushed over the edge of the playfield **2** or if the prize is placed directly into the win chute **21**.

[0033] Coins introduced into slot **20** may be directly directed by coin projection device **3** onto the playfield **4**. Alternatively, insertion of a coin into slot **20** may cause another coin or coins to be introduced onto the playfield **4**.

[0034] **FIG. 3** is a block diagram of the control mechanism for the robotic arm. There are a defined number of sections **12** to the amusement machine, the number of sections **12** dependant on the number of players the amusement machine is designed for and each section **12** has a respective play station **16** control board **11**. The control boards **11** can receive an external signal **12** which results in the activation of the robotic arm controller **13** to provide controlled movement of the robotic arm grabber **15**. The external signal which initiates the arm into action may be generated by a counter which detects the number of coins on the playfield. Such an external signal may also include a series of lights or light tower visible to the user, which may light up according to the amount of coins entered or ran-

domly flash at different sections. If a coin is entered when a particular section is illuminated, this will activate the control board for that particular section and hence the robotic arm controller **13** may cause the robotic arm **5** to deliver a prize from the reservoir **6** to the playfield **2** in that section. In an alternative method a switch may be activated by, for example, a coin passing through an aperture or by directly hitting a moving target. This sends a signal to the robotic arm controller **13** via control board **11** for that section **12** and initiates the arm into action for that particular section.

[**0035**] **FIG. 4** is directed to a further embodiment of the invention where the coin pusher is a movable stage **7** which reciprocates across the playfield surface and periodically sweeps across the playfield **2** and depending on the distribution of coins on the playfield occasionally coins will be swept off the playfield surface **2** into the win chute.

[**0036**] **FIG. 5** is directed to a further embodiment of the present invention wherein the coin pusher is an eccentrically mounted disc **8** positioned above and adjacent to the playfield **2**. The disc **8** is rotatable with respect to the playfield **2** and due to the eccentric mounting of the coin pusher the distribution of the coins on the playfield constantly changes and coins are pushed to the peripheral edge of the playfield. Depending on the amount of coins on the playfield surface some of these coins may be pushed over the edge into a win chute. The embodiment of **FIG. 5** has six sections **12** and accordingly six play stations in contrast to the four play stations of **FIG. 1**.

[**0037**] **FIG. 6** is directed to a further embodiment of the present invention wherein the coin pusher is a rod **9** and stage **10** moveable relative to each other and positioned above the playfield **2**. The coin pusher reciprocates across the playfield and depending on the distribution of the coins on the coin pusher and playfield coins are occasionally pushed over the edge of the playfield and into the win chute.

[**0038**] The invention is not intended to be limited to the arrangements of the above embodiments, which are provided purely by way of example. In particular, the use of the term "coin" is not intended to refer only to coins that may be used as legal tender, but as mentioned above the term is intended to include tokens, medals, discs, or other shapes, whether flat or three dimensional. Furthermore, where only a single component is described it will be appreciated that in general a plurality of such components may be provided, and the use of the term "a", singular nouns and singular verbs are not intended to exclude the plural.

[**0039**] Coins introduced into slot **20** may be directly directed by coin projection device **3** onto the playfield **4**. Alternatively, insertion of a coin into slot **20** may cause another coin or coins to be introduced onto the playfield **4**.

[**0040**] **FIG. 3** is a block diagram of the control mechanism for the robotic arm. There are a defined number of sections **12** to the amusement machine, the number of sections **12** dependant on the number of players the amusement machine is designed for and each section **12** has a respective play station **16** control board **11**. The control boards **11** can receive an external signal **12** which results in the activation of the robotic arm controller **13** to provide controlled movement of the robotic arm grabber **15**. The external signal which initiates the arm into action may be generated by a counter which detects the number of coins on the playfield. Such an external signal may also include a series of lights or light tower visible to the user, which may light up according to the amount of coins entered or randomly flash at different sections. If a coin is entered when a particular section is illuminated, this will activate the control board for that particular section and hence the robotic arm controller **13** may cause the robotic arm **5** to deliver a prize from the reservoir **6** to the playfield **2** in that section. In an alternative method a switch may be activated by, for example, a coin passing through an aperture or by directly hitting a moving target. This sends a signal to the robotic arm controller **13** via control board **11** for that section **12** and initiates the arm into action for that particular section.

[**0041**] **FIG. 4** is directed to a further embodiment of the invention where the coin pusher is a movable stage **7** which reciprocates across the playfield surface and periodically sweeps across the playfield **2** and depending on the distribution of coins on the playfield occasionally coins will be swept off the playfield surface **2** into the win chute.

1. An amusement machine comprising:

a playfield;

a coin projection device for projecting coins onto the playfield;

a coin pusher which is moveable relative to the playfield;

a reservoir; and

a robotic arm for automatically picking up and dispensing objects from the reservoir onto the playfield, the robotic arm being provided with a grabber at its distal end for picking up objects and releasing them.

2. An amusement machine according to claim 1 further comprising a plurality of play stations each located in front of a corresponding section of the playfield, wherein the robotic arm is arranged to deliver objects to any of the sections of the playfield.

3. An amusement machine according to claim 2 wherein the robotic arm is mounted above the reservoir, the playfield is located around the reservoir and a plurality of play stations each including a separate win chute and coin input are provided around the periphery of the playfield.

4. An amusement machine according to any preceding claim wherein the robotic arm is pivotally mounted on a substantially vertical pivot axis and includes at least two joints allowing flexing of the arm about a substantially horizontal axis.

5. An amusement machine according to any preceding claim further comprising a win chute located at the periphery of the playfield wherein objects falling down the chute are accessible from outside the amusement machine.

6. An amusement machine according to any preceding claim further comprising a controller that is triggered by a predetermined event to control the robotic arm to pick up an object from the reservoir and deliver it to a predetermined location.

7. An amusement machine according to any preceding claim wherein the coin pusher is eccentrically mounted for rotation relative to the playfield.

8. An amusement machine according to claim 7 wherein the coin pusher is an eccentrically mounted disc.

9. An amusement machine according to any of claims 1 to 6 wherein the coin pusher reciprocates across part of the playfield to disturb the distribution of the coins on the playfield surface.

10. An amusement machine according to claim 9 wherein the coin pusher is a moveable stage mounted above and adjacent to the playfield.

11. An amusement machine according to any of claims 1 to 6 wherein the coin pusher comprises a rod and stage movable relative to each other.

12. An amusement machine according to any preceding claim wherein the coin pusher is rotatable around a substantially vertical axis.

13. An amusement machine according to any preceding claim wherein the playfield is rotatable around a substantially vertical axis.

14. An amusement machine according to any preceding claim comprising two or more coin pushers.

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