



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 589 501 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.10.2005 Bulletin 2005/43

(51) Int Cl.7: **G07F 17/32**

(21) Application number: **04257146.3**

(22) Date of filing: **18.11.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK YU

(72) Inventor: **Lyons, Martin c/o
Lane Cove, NSW 2066 (AU)**

(74) Representative: **Driver, Virginia Rozanne et al
Page White & Farrer
54 Doughty Street
London WC1N 2LS (GB)**

(30) Priority: **20.11.2003 AU 2003906432**

(71) Applicant: **Aristocrat Technologies Australia Pty.
Ltd.
Lane Cove, NSW 2066 (AU)**

(54) **Gaming machine with system for displaying outcomes**

(57) A system for displaying an outcome on a gaming machine includes a display for displaying images of a game played on the gaming machine. A controller controls the display of the images on the display. The system further includes a simulation engine comprising a first part for imparting a simulation of at least one force acting on elements of the images so that the elements move as if in response to the at least one force and a second part which, on a selected element of the image, imparts a simulation of a different force so that the selected element behaves in a different manner to the remaining elements, the selected element having been selected by the controller as a part of the outcome.

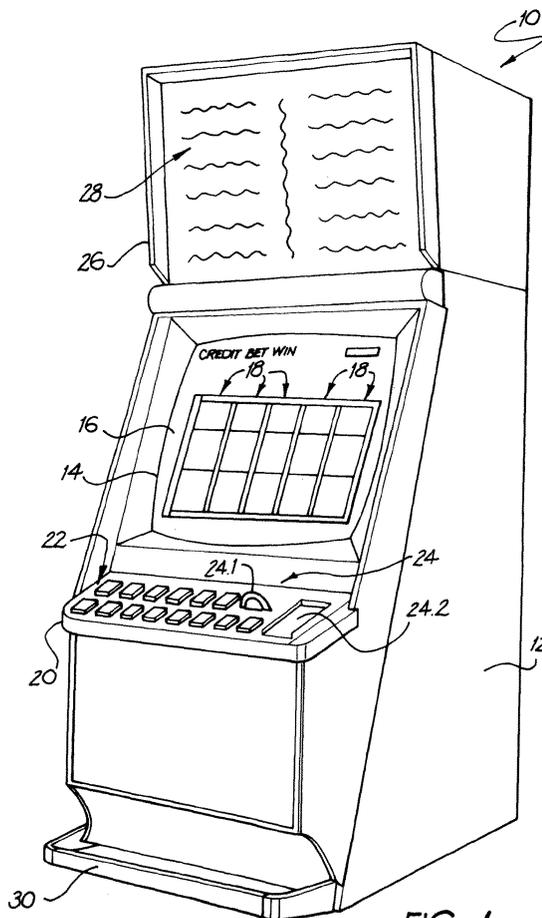


FIG. 1

EP 1 589 501 A1

Description

[0001] This invention relates to gaming machines. More particularly, the invention relates to a system for, and method of, displaying an outcome on a gaming machine.

[0002] One of the requirements for designing a gaming machine is that an outcome of the game is deterministic and is generated by a random number generator (RNG). This is a requirement since an RNG can be extensively tested for bias and predictability. If an alternative method of generating outcomes were to be used, the game would have to be submitted for extensive testing to ensure that there were no bias or other predictability problems associated with the simulation. With the increasing power of processors used in gaming machines, the ability arises for presenting outcomes in an attractive and entertaining way using simulations.

[0003] According to a first aspect of the invention, there is provided a system for displaying an outcome on a gaming machine, the system including:

a display for displaying images of a game played on the gaming machine;

a controller for controlling the display of the images on the display; and

a simulation engine comprising

a first part for imparting a simulation of at least one force acting on elements of the images so that the elements move as if in response to the at least one force; and

a second part which, on a selected element of the image, imparts a simulation of a different force so that the selected element behaves in a different manner to the remaining elements, the selected element having been selected by the controller as a part of the outcome.

[0004] The different force imparted to the selected element may operate in such a way that, to a viewer, it is not apparent that a different force is acting on the selected element.

[0005] The physics-based simulation used in the controller of the gaming machine may be used in any image where elements are required to move in the image.

[0006] For ease of explanation, the invention will be described with reference to its application to keno balls in a transparent container.

[0007] The outcome may be represented by a selection of at least some of the plurality of the elements, or symbol carriers, such as the balls of a set of keno balls, the elements initially being displayed in a representation of a container in such a way that the elements are visible to a player of the gaming machine.

[0008] Initially, all the elements in the container are subjected to the at least one force in the form of a first set of forces. The first set of forces may encompass forces associated with a fluid stream so that the elements

appear to be floating in the container and moving with a random, or Brownian, motion, colliding randomly with each other and against walls of the container.

[0009] The fluid stream simulation may be effected through a representation of a conduit having a first end which opens out into a floor of the container. Thus, the first part of the simulation engine may simulate the fluid stream, which may be invisible, which enters the container through the conduit into the interior of the container so that the elements are subjected to fluid flow and float about within the interior of the container with the apparently random motion.

[0010] When an outcome has been determined by the controller, i.e. a random number has been generated by a random number generator (RNG) of the controller, a simulation run by the simulation engine may select a first one of the elements, a symbol on the element constituting a first part of the outcome. When that element has been selected, the different force may be imparted to the selected element so that the selected element does not respond to the effects of the first set of forces, the remaining elements continuing to be subjected to the first set of forces.

[0011] The second force may, for example, be a simulation of a suction force which sucks the selected symbol carrier towards and into the conduit to be discharged into a receptacle, forming part of the image, the receptacle being arranged at a second end of the conduit.

[0012] The process may be repeated until all the elements constituting the outcome have been selected and discharged from the container into the receptacle.

[0013] It will be appreciated that, therefore, two different physics-based simulations are used. Preferably, the simulations are performed simultaneously but, as the effects of the second force are not readily visible to the viewer, it appears as if only one simulation were taking place to provide an appearance of apparently random selection of the symbol carriers constituting the outcome.

[0014] According to a second aspect of the invention, there is provided a method of displaying an outcome on a gaming machine, the method including

displaying an image comprising a plurality of elements on a display of the gaming machine;

applying a physics-based simulation to the elements so that the elements move as though being affected by at least one force;

selecting one of the elements to be a part of the outcome; and

applying a different force to the selected element so that it behaves differently from the remaining elements of the image.

[0015] The method may include imparting the different force to the selected element in such a way that, to a viewer, it is not apparent that a different force is acting on the selected element.

[0016] Further, the method may include representing a game outcome by a selection of at least some of the

plurality of the elements and initially displaying the elements in a representation of a container in such a way that the elements are visible to a player of the gaming machine. The method may include, initially, subjecting all the symbol carriers in the container to the at least one force in the form of a first set of forces.

[0017] Then, the method may include simulating the first set of forces to represent forces associated with a fluid stream so that the elements appear to be floating in the container and moving with a random motion, colliding randomly with each other and against walls of the container.

[0018] The method may include effecting the fluid stream simulation through a representation of a conduit having a first end which opens out into a floor of the container. Thus, the method may include simulating the fluid stream entering the container through the conduit into the interior of the container so that the elements are subjected to fluid flow and float about within the interior of the container with the random motion.

[0019] The method may include, when an outcome has been determined by the controller selecting a first one of the elements, a symbol on the element constituting a first part of the outcome. When that element has been selected, the method may include imparting the different force to the selected element so that the selected element does not respond to the effects of the first set of forces, the remaining elements continuing to be subjected to the first set of forces.

[0020] The method may include repeating the process until all the elements constituting the outcome have been selected.

[0021] According to a third aspect of the invention, there is provided a simulation engine for simulating a system to which the laws of physics are applied for displaying a game outcome on a gaming machine, the simulation engine including

a first part for simulating the imparting of at least one physical force to symbol carriers, at least some of which are used in displaying the game outcome; and

a second part for simulating the imparting of at least one further, different force to each of those symbol carriers selected to represent the game outcome.

[0022] The simulation engine may be implemented in a controller associated with the gaming machine.

[0023] The invention extends also to a gaming machine including a system as described above.

[0024] The invention is now described by way of example with reference to the accompanying drawings in which:

Figure 1 shows a three dimensional, perspective view of a gaming machine, including a system for displaying an outcome, in accordance with the invention;

Figure 2 shows a block diagram of a control circuit of the gaming machine;

Figures 3-8 show various screen displays of a phys-

ics-based simulation for displaying the outcome on the gaming machine of Figure 1; and

Figure 9 shows a flow chart of the physics-based simulation.

[0025] In Figure 1, reference numeral 10 generally designates a gaming machine, including a game, an outcome of which is displayed in accordance with the invention. The machine 10 includes a console 12 having a display in the form of a video display unit (VDU) 14 on which a game 16 is played, in use. The video display unit 14 may be implemented as a cathode ray screen device, a liquid crystal display, a plasma screen, or the like. A midtrim 20 of the machine 10 houses a keypad 22 for enabling a player to play the game 16. The midtrim 20 also houses a credit input mechanism 24 including a coin input chute 24.1 and a bill collector 24.2.

[0026] The machine 10 includes a top box 26 on which artwork 28 is carried. The artwork 28 includes paytables, details of bonus awards, etc.

[0027] A coin tray 30 is mounted beneath the console 12 for cash payouts from the machine 10.

[0028] Referring to Figure 2 of the drawings, a controller or control circuit 32 is illustrated. A program which implements the game and user interface is run on a processor 34 of the controller 32. The processor 34 forms part of a controller 36 that drives the screen of the video display unit 14 and that receives input signals from sensors 38. The sensors 38 include sensors associated with the bank 22 of buttons and touch sensors mounted in the screen of the video display unit 14. The controller 36 also receives input pulses from the mechanism 24 to determine whether or not a player has provided sufficient credit to commence playing. The mechanism 24 may, instead of the coin input chute 24.1 or the bill collector 24.2, or in addition thereto, be a credit card reader (not shown) or any other type of validation device.

[0029] Finally, the controller 36 drives a payout mechanism 40 which, for example, may be a coin hopper for feeding coins to the coin tray 30 to make a pay out to a player when the player wishes to redeem his or her credit.

[0030] The game 16 played on the gaming machine 10 is, in this example, a keno game. In the keno game, a plurality of elements or symbol carriers, in the form of balls 50 (Figure 3), are selected and placed in a container 52 as shown in Figure 3 of the drawings. Hence, an initial display 54 on the VDU 14 of the gaming machine 10 shows the balls 50 being deposited into the container 52.

[0031] In the modelling of the keno style game, if it were to be modelled on a computer system, a three dimensional representation of a keno machine, complete with a set of keno balls would be provided. Using a three dimensional visualisation system in combination with a physics-based simulation engine of the controller 32, it is possible to animate the keno balls as if they were affected by forces such as forces arising from a wind or

fluid generator. This causes the balls 50 to move in an apparently random manner colliding with each other and the container 52.

[0032] However, using a true physics-based simulation, the balls 50 that would be selected by the processor 34 of the gaming machine 10 would be derived purely from the motions and collisions of the balls 50. This would not result in the generation of a determinable random number and could possibly exhibit bias. Furthermore, it is possible that the desired outcome of the game be predetermined and it would therefore be necessary to make an exact choice of balls 50.

[0033] In order to achieve the desired result, the balls 50 in the container 52 are subjected to a simulation of forces generated by the physics-based simulation engine. The forces impart effects to the balls 50 as though the balls 50 were in a fluid stream such as would result from a wind generator.

[0034] Therefore, as shown in Figure 4 of the drawings, once all the balls 50 have been deposited in the container 52, they lie on a floor 56 of the container.

[0035] A simulation of a wind generator being started is then effected so that the balls 50 rise from the floor 56 of the container under the effect of an invisible fluid stream, as shown in Figure 5 of the drawings, and begin moving randomly about in the container 52. The fluid stream is discharged through an end 58.1 of a conduit 58, the end 58.1 of the conduit 58 opening out into the floor 56 of the container 52.

[0036] The conduit 58 has a second end 58.2 which overlies a receptacle 60.

[0037] The simulation of the wind generator uses "real world" physics so that the balls 50 in the container 52 appear to move with apparently random motion, colliding with each other and with the walls of the container 52.

[0038] When the outcome of the game has been determined by the processor 34 of the gaming machine 10, each of the balls to be selected for the outcome is subjected to a simulation of a different force to the remaining balls 50. For the sake of illustration, it is to be noted that a ball 62 of the set of balls 50 has a different shading from the remaining balls in the example illustrated in Figures 3-8 of the drawings. This ball 62 is assumed to be the first ball of the outcome, in other words, the first selected ball.

[0039] When the ball 62 has been determined by the processor 34 as being a selected ball, the ball 62 is subjected to the different force which is a suction force, once again, using a "real world" physics stimulation effected by an exception component, or a second part, of the simulation engine of the controller 32. The suction force imparted to the ball 62 is a suction force applied at the outlet end 58.1 of the conduit 58 but only has an effect on the selected ball 62. Thus, as shown in Figures 6 and 7 of the drawings, the ball 62 is drawn towards the outlet end 58.1 of the conduit 58.

[0040] Thereafter, the selected ball 62 is drawn into

the conduit 58 and is discharged through the end 58.2 of the conduit 58 into the receptacle 60 as the first selected ball.

[0041] The process is repeated on the remaining balls 50 by subjecting each of the other selected balls for that outcome to the effects of the exception component while the remaining balls 50 in the receptacle 52 continue to be subjected to the first set of forces.

[0042] It will be appreciated that the second, suction force is applied to the selected balls in such a manner that, to a viewer, it is not apparent that the suction force is being imparted to the selected ball. Both the wind generator forces and the suction force are applied concurrently to impart an appearance of randomness to the motion of the balls 50 in the container 52.

[0043] Accordingly, it is an advantage of the invention that a system of, and method for, displaying a game outcome are provided which, on the face of it, appear to result in random selections. However, due to the concurrent application of the two physics-based simulations, a predetermined outcome is effected thereby minimising problems associated with bias and predictability. This obviates the need for the game to be submitted for extensive testing to ensure that bias and predictability problems are not present in the game.

[0044] It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

Claims

1. A system for displaying an outcome on a gaming machine, the system including:
 - a display for displaying images of a game played on the gaming machine;
 - a controller for controlling the display of the images on the display; and
 - a simulation engine comprising
 - a first part for imparting a simulation of at least one force acting on elements of the images so that the elements move as if in response to the at least one force; and
 - a second part which, on a selected element of the image, imparts a simulation of a different force so that the selected element behaves in a different manner to the remaining elements, the selected element having been selected by the controller as a part of the outcome.
2. The system of claim 1 in which the different force imparted to the selected element operates in such

a way that, to a viewer, it is not apparent that a different force is acting on the selected element.

3. The system of claim 1 or claim 2 in which the outcome is represented by a selection of at least some of the plurality of the elements, the elements initially being displayed in a representation of a container in such a way that the elements are visible to a player of the gaming machine. 5
4. The system of claim 3 in which, initially, all the elements in the container are subjected to the at least one force in the form of a first set of forces. 10
5. The system of claim 4 in which the first set of forces encompasses forces associated with a fluid stream so that the elements appear to be floating in the container and moving with a random motion, colliding randomly with each other and against walls of the container. 15
6. The system of claim 5 in which the fluid stream simulation is effected through a representation of a conduit having a first end which opens out into a floor of the container. 20
7. The system of claim 6 in which the first part of the simulation engine simulates the fluid stream which enters the container through the conduit into the interior of the container so that the elements are subjected to fluid flow and float about within the interior of the container with the random motion. 25
8. The system of claim 7 in which, when an outcome has been determined by the controller, a simulation run by the simulation engine selects a first one of the elements, a symbol on the element constituting a first part of the outcome. 30
9. The system of claim 8 in which, when that element has been selected, the different force is imparted to the selected element so that the selected element does not respond to the effects of the first set of forces, the remaining elements continuing to be subjected to the first set of forces. 35
10. The system of claim 9 in which the process is repeated until all the elements constituting the outcome have been selected. 40
11. A method of displaying an outcome on a gaming machine, the method including 45
 - displaying an image comprising a plurality of elements on a display of the gaming machine;
 - applying a physics-based simulation to the elements so that the elements move as though being affected by at least one force;
 - selecting one of the elements to be a part of

the outcome; and

applying a different force to the selected element so that it behaves differently from the remaining elements of the image.

12. A simulation engine for simulating a system to which the laws of physics are applied for displaying a game outcome on a gaming machine, the simulation engine including
 - a first part for simulating the imparting of at least one physical force to symbol carriers, at least some of which are used in displaying the game outcome; and
 - a second part for simulating the imparting of at least one further, different force to each of those symbol carriers selected to represent the game outcome.
13. The simulation engine of claim 12 which is implemented in a controller associated with the gaming machine.
14. A gaming machine including a system as claimed in any one of claims 1 to 10.

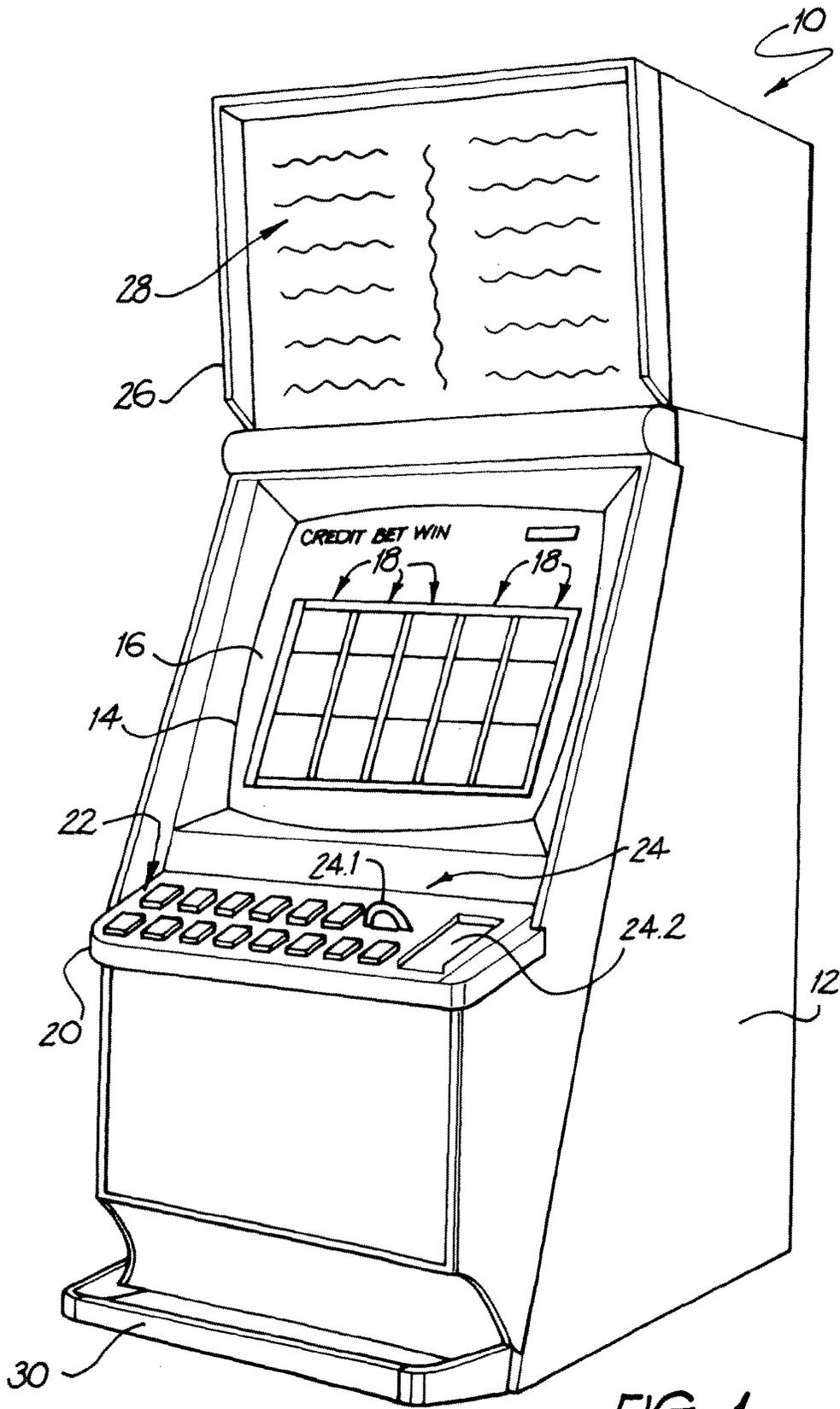


FIG. 1

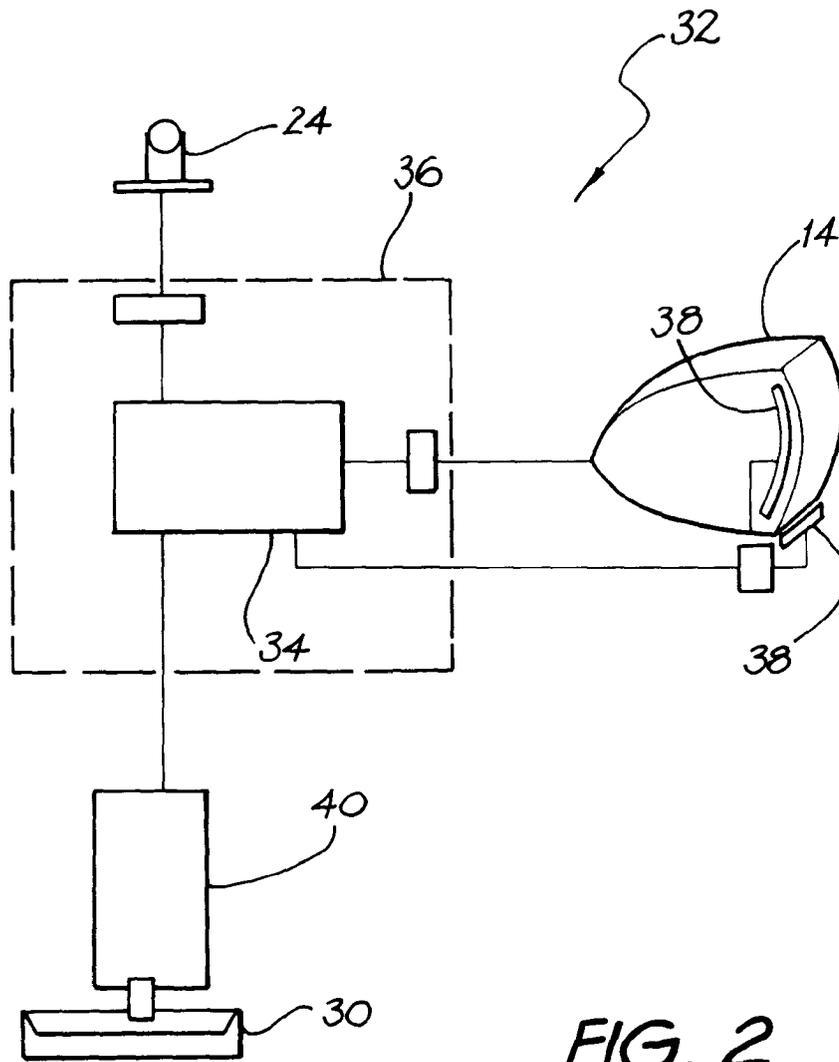


FIG. 2

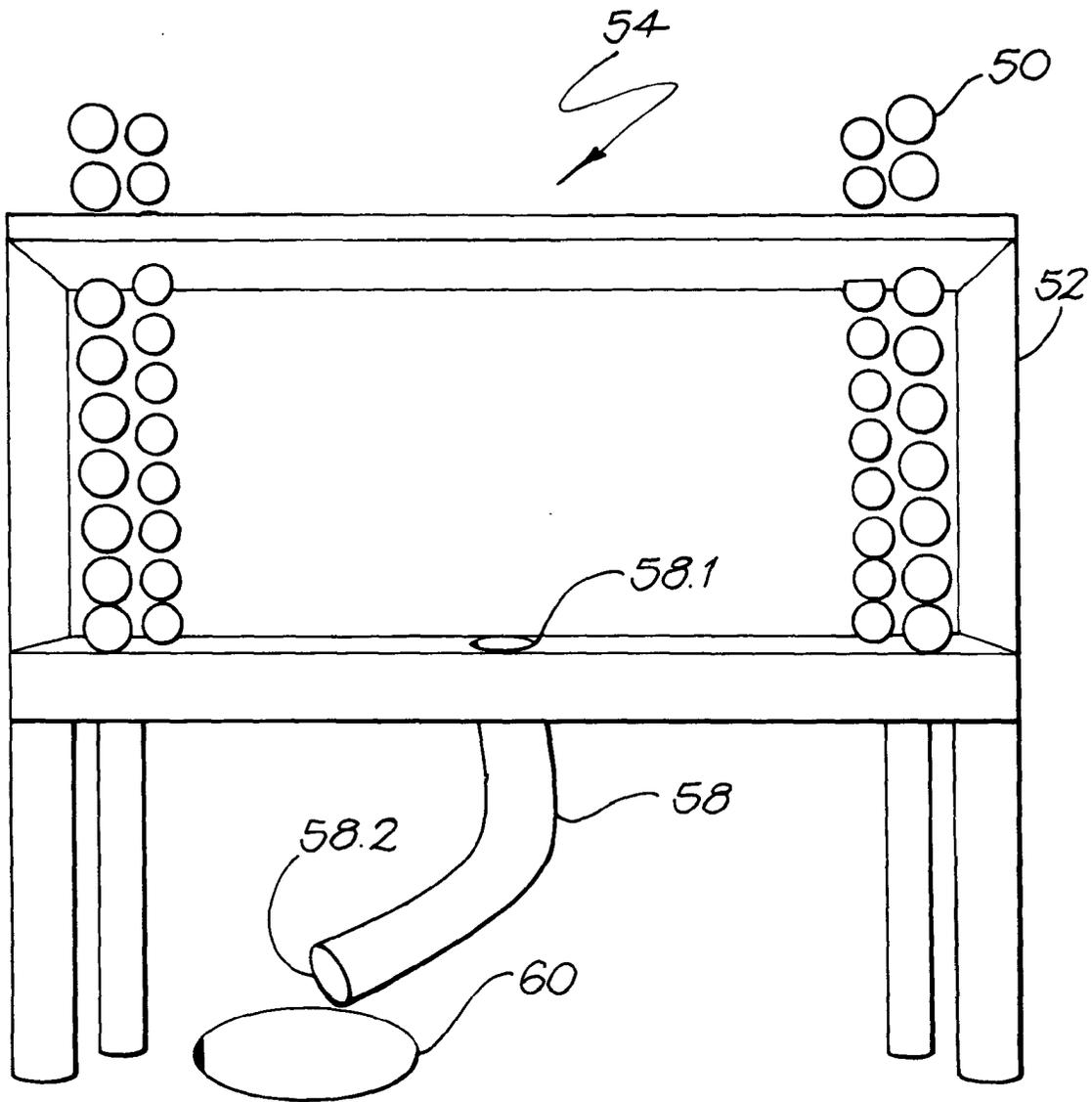


FIG. 3

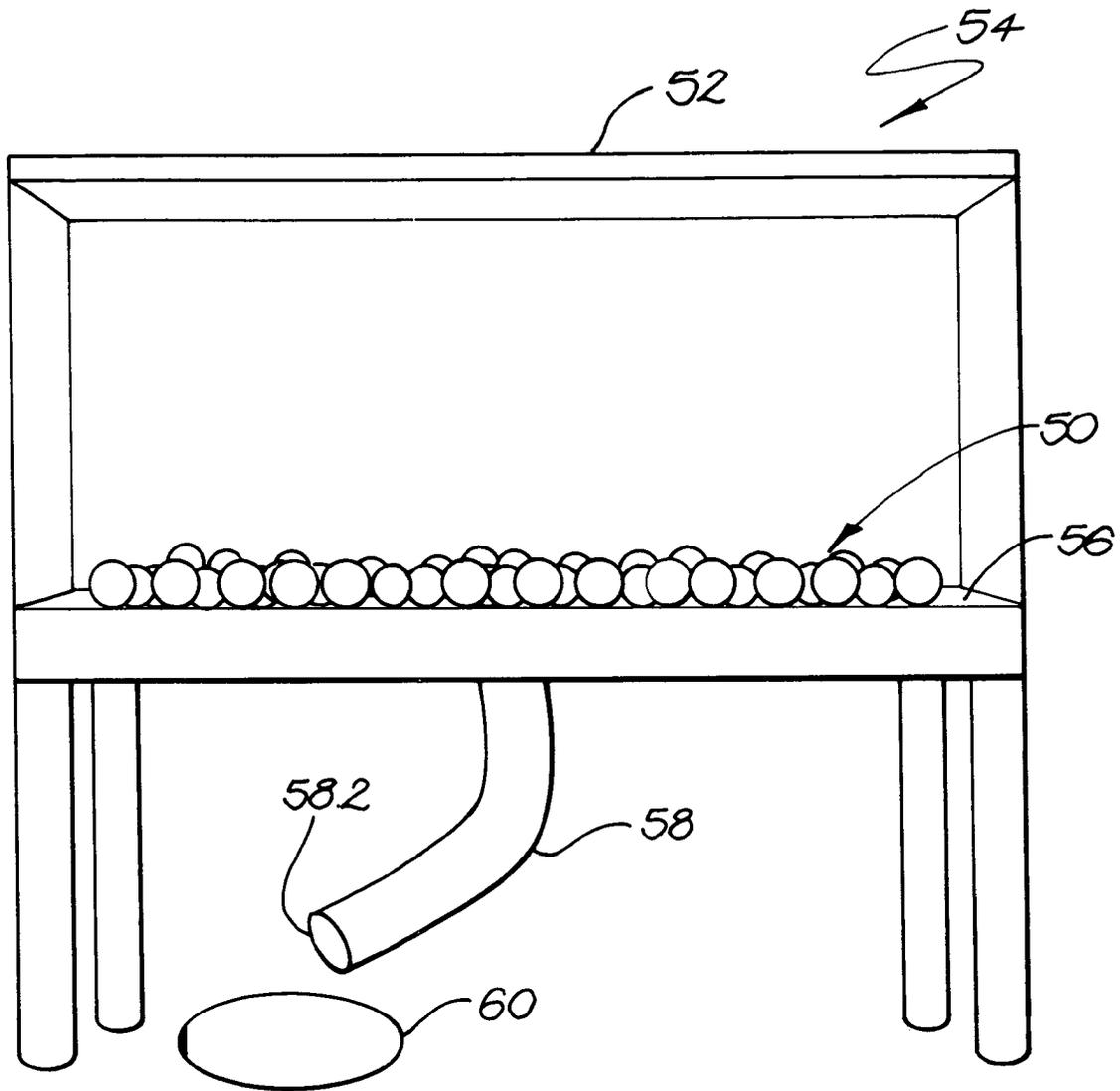


FIG. 4

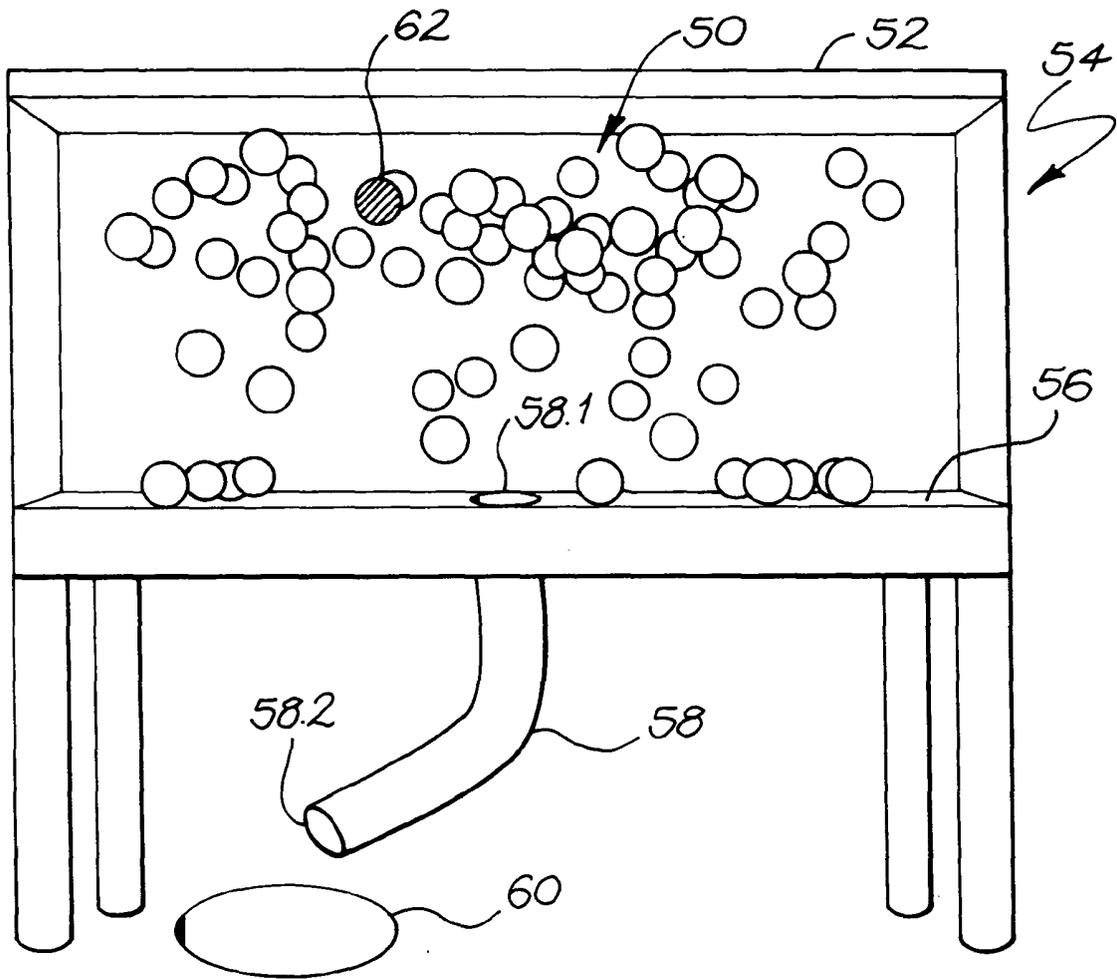


FIG. 5

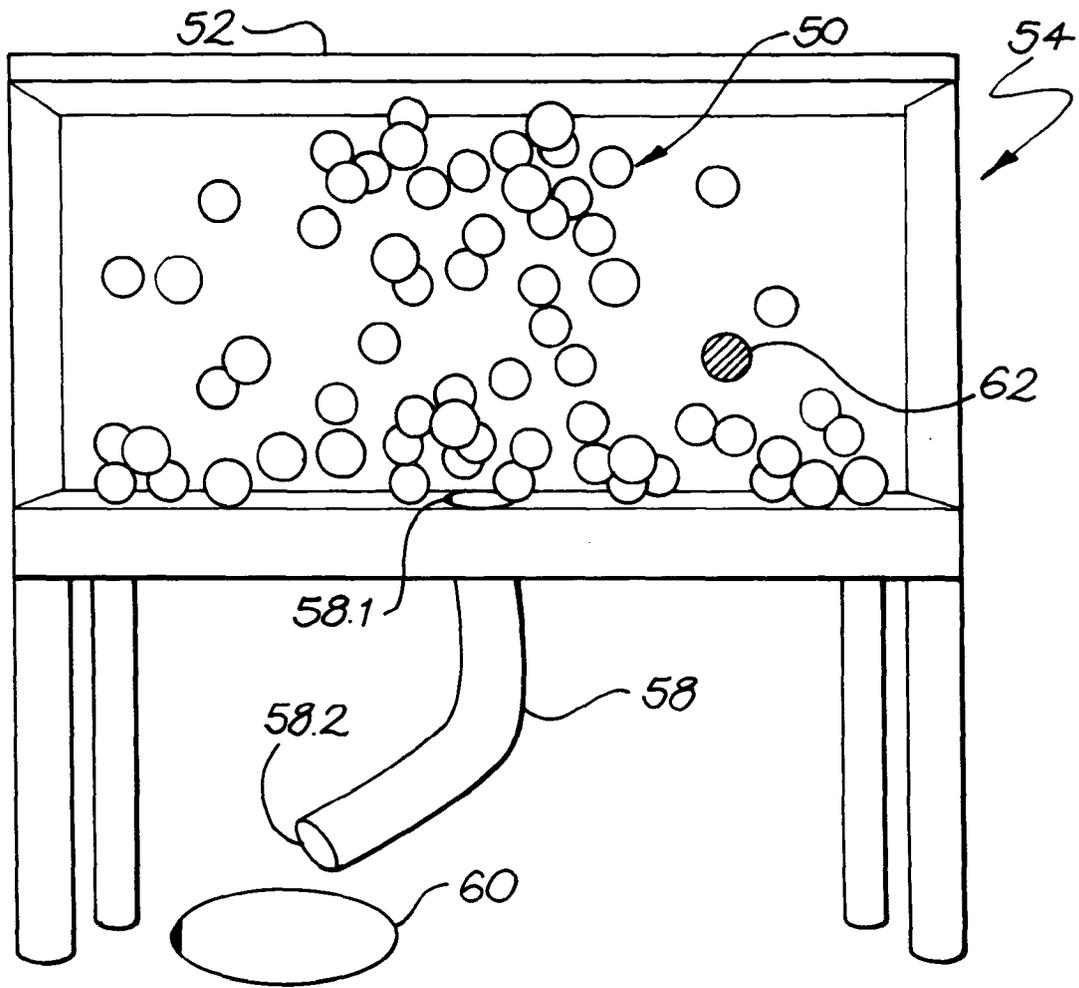


FIG. 6

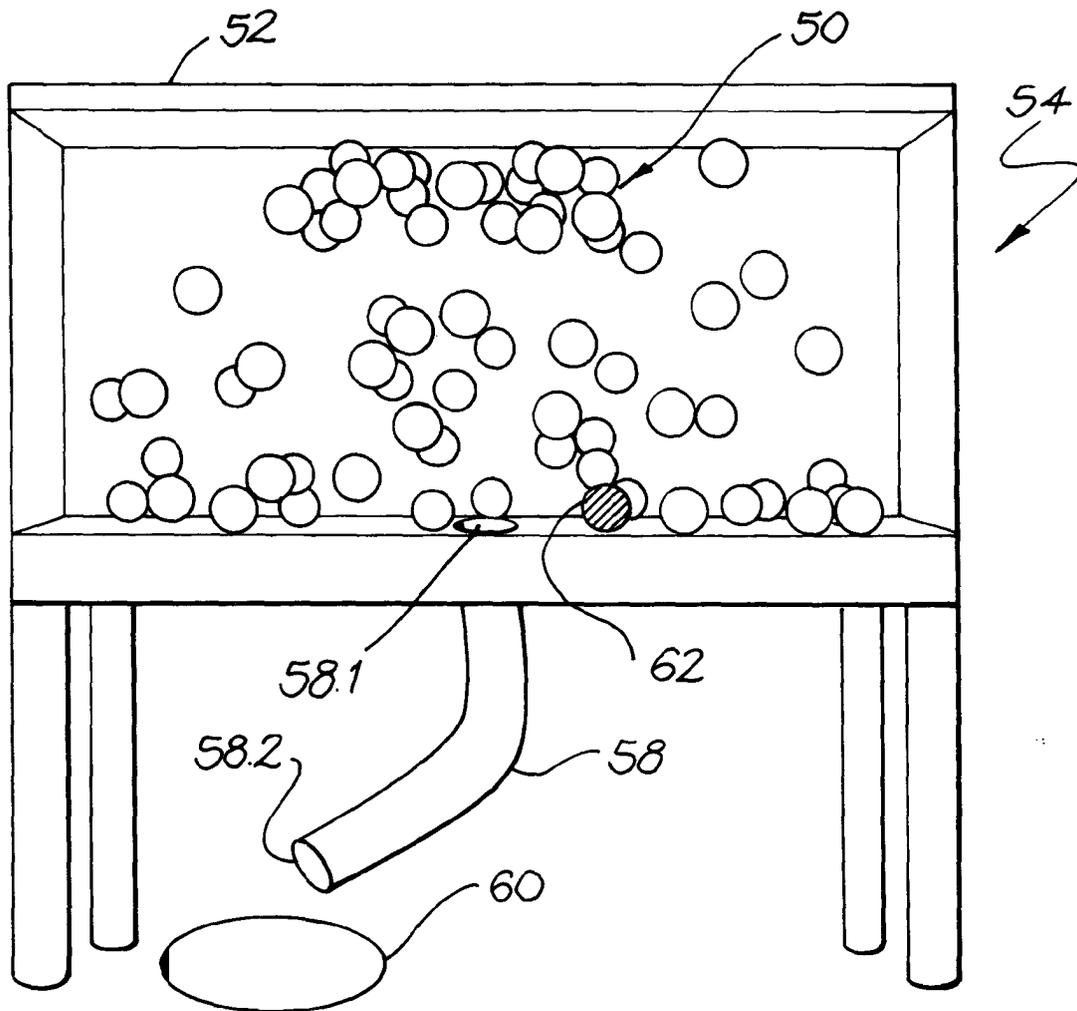


FIG. 7

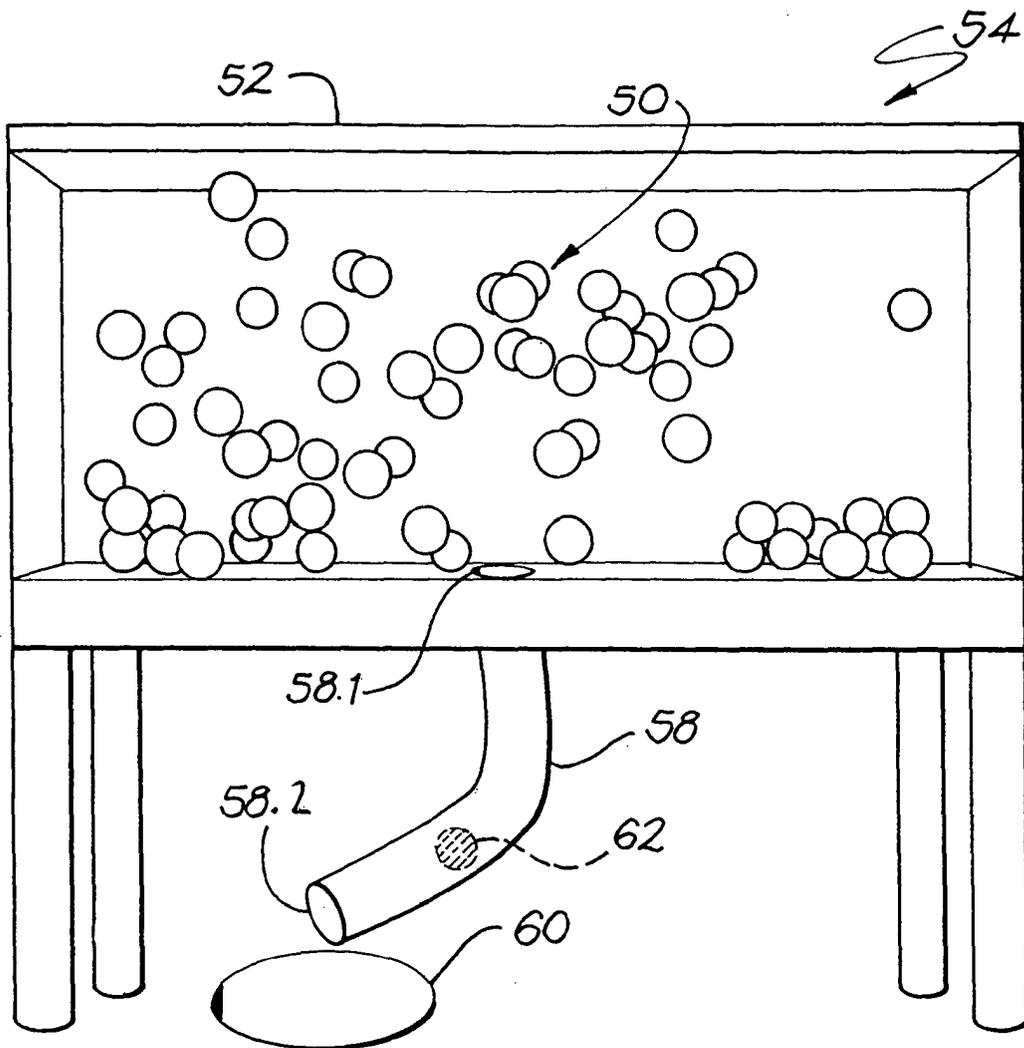


FIG. 8

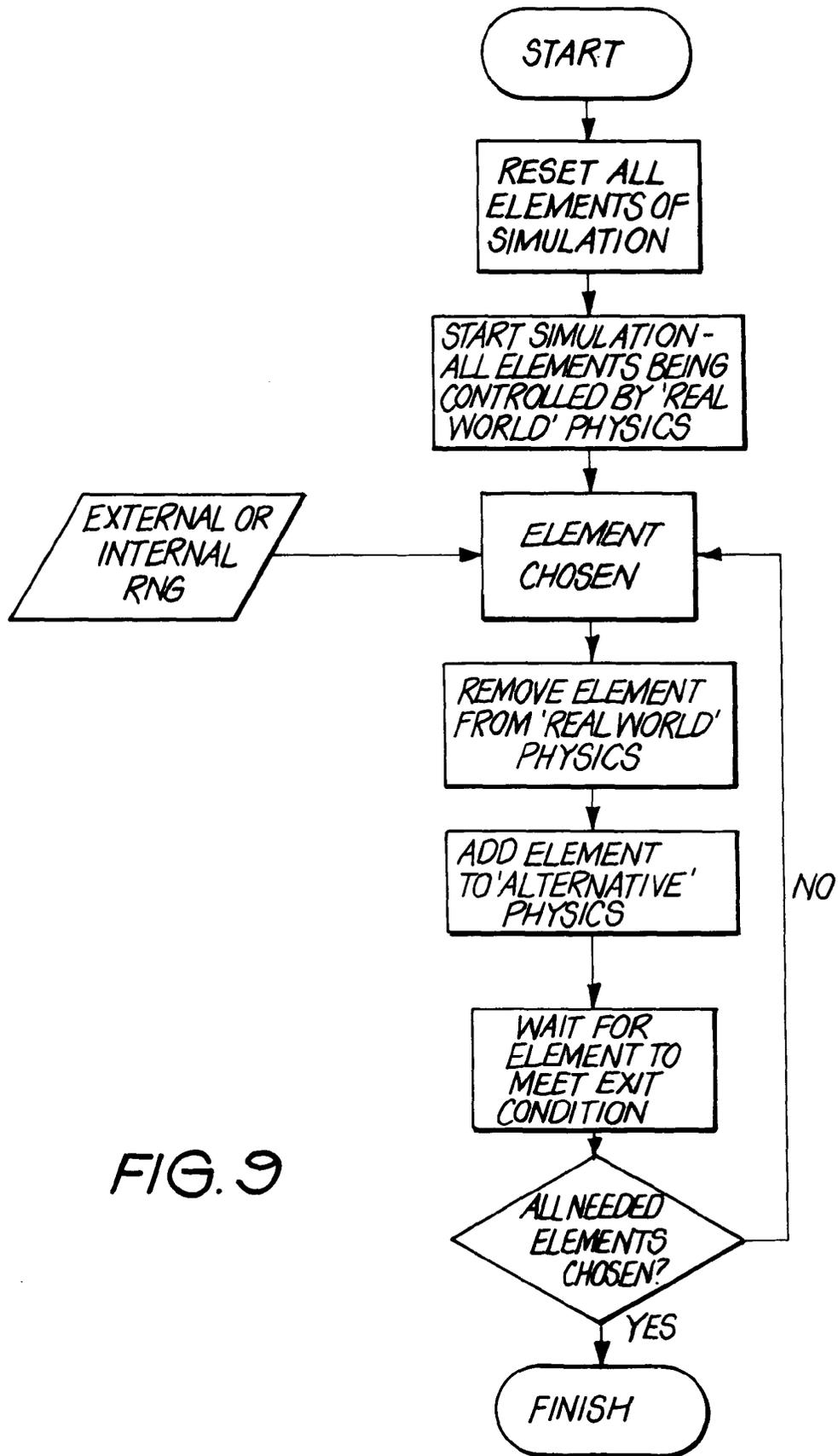


FIG. 9



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	CA 2 343 870 A1 (INTERNATIONAL GAME TECHNOLOGY) 19 October 2001 (2001-10-19) * page 6 - page 8 * * page 13, line 20 - page 14, line 6 * * page 17, line 24 - page 20, line 25 * -----	1-14	G07F17/32
A	US 2002/119815 A1 (LYONS MARTIN) 29 August 2002 (2002-08-29) * the whole document * -----	1-14	
A	US 2003/083122 A1 (BEAULIEU NICOLE) 1 May 2003 (2003-05-01) * paragraph [0086] - paragraph [0092]; figures 16,17 * -----	1,11,12, 14	
A	US 5 380 007 A (TRAVIS ET AL) 10 January 1995 (1995-01-10) * column 1, line 6 - column 2, line 26 * * column 5, line 31 - line 36 * -----	1-14	
P,X	US 2004/063491 A1 (BANYAI FRANK B ET AL) 1 April 2004 (2004-04-01) * paragraph [0009] - paragraph [0035] * -----	1-14	
P,X	US 2004/053686 A1 (PACEY LARRY J ET AL) 18 March 2004 (2004-03-18) * paragraph [0033] - paragraph [0046] * -----	1-14	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G07F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 August 2005	Examiner Reino, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

2

EPO FORM 1503 03.82 (P/04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 25 7146

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-08-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CA 2343870	A1	19-10-2001	US 6769982 B1	03-08-2004
			US 2005020341 A1	27-01-2005

US 2002119815	A1	29-08-2002	AU 7934001 A	02-05-2002
			NZ 514800 A	28-03-2003
			ZA 200108542 A	17-04-2003

US 2003083122	A1	01-05-2003	AU 2924202 A	03-04-2003

US 5380007	A	10-01-1995	AU 679332 B2	26-06-1997
			AU 1685495 A	08-08-1995
			CA 2173740 A1	27-07-1995
			WO 9519825 A1	27-07-1995

US 2004063491	A1	01-04-2004	NONE	

US 2004053686	A1	18-03-2004	AU 2003247983 A1	01-04-2004

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82