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A VIDEO PICTURE DISPLAY APPARATUS AND A GAME FACILITY USING IT
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- (57) Claim

1. A video picture display apparatus having a monitor for displaying a video picture including:

first and second video players for playing video picture stored in each memory medium thereof and outputting video picture signal;

a switching circuit operatively connected to said first and second video players for switching an output from the video players to provide the monitor with the corresponding video picture signal;

a memory for storing a program; and

a processor unit, operatively connected to said first and second video players, the program memory, and the switching circuit, for executing said program store in said program memory,

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said processor unit, based on said program, controlling the second video player to access a second video picture stored in the memory medium thereof at a predetermined address at a predetermined timing while the first video player plays a first video picture, and said processor unit controlling said switching circuit to switch into the second video picture signal output by the second video player from the first video picture signal in response to an access completion signal provided from the second video player,

wherein the video picture from said first and second video player is displayed on said monitor alternately.

AUSTRALIA

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A VIDEO PICTURE DISPLAY APPARATUS AND A GAME FACILITY USING IT

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The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

TITLE OF THE INVENTION
A VIDEO PICTURE DISPLAY APPARATUS
AND A GAME FACILITY USING IT
BACKGROUND OF THE INVENTION

5 This invention relates to a video picture display apparatus and a game ride using it. Especially, the present invention relates a video picture display apparatus that comprises first and second video players, replays video picture stored in a memory medium, like a
10 video disk, through the first and second video players alternately and displays the video picture on a monitor, like a screen. The present invention further relates to a game ride using the video picture display apparatus.

 According to an advancement of a technology, like
15 a high speed of a computer and a high capacity of a memory, recently a video game device as one of a video picture display apparatus becomes widely popular. Further, it is a trend that the video picture display apparatus is used not only at a home but also at a game
20 ride in an amusement park or theme park.

 Generally, the video game used at home comprises a semiconductor ROM as a memory medium that stores a video picture and a game program, because of one of its requirements, a small size. In the video game device
25 using the semiconductor ROM, since the ROM is randomly accessible, it is possible to read the video data by an electrical address selection. Further, it is more useful

because of its high speed read and write feature and its flexibility of access. However, it needs very high capacity to store a motion picture in ROM. Therefore, it becomes very expensive as a memory media.

5 On the other hand, it is introduced that a video picture not only drawn by a computer graphic but also including a real picture as a background. Further, a video picture is displayed interactively between the player or operator and a video game device. In these
10 video picture, the semiconductor ROM does not have enough capacity. In case of 29 inches monitor, for example, it is possible to generate an appropriate motion picture on it by using the semiconductor ROM. In case of large scale game ride using a large screen, for example 200
15 inches, however, it becomes necessary to use a video picture of NTSC, National Television Standard Committee.

 Then, there is a video game device that uses a video disk like Laser Disk (the registered trademark of Pioneer) or CRV (the trade name of Sony) or a video tape
20 recorder (VTR) with RS-232c cable as the memory medium and plays the video picture of NTSC.

 However, in the video player like the video disk or VTR, a physical access structure like a movement of the reading head or a rotation of the tape is necessary
25 to access. Since the physical access structure requires a certain access time or seek time, there is a drawback that a video picture is interrupted for about 0.5 through

1.0 second between a video picture at one address and a video picture at another address when moving from one address to another address.

5 FIG. 16 shows an example of a conventional video picture display apparatus using the video disk player.

FIG. 16 (1) shows a schematic structure of the video picture display apparatus using the video disk player.

10 In FIG. 16 (1), the control circuit 100 sends to the video disk player 101 an address at which an video picture is stored, reads out the video picture data from the video disk player 101, and sends the video picture data to the monitor 102 to display the video picture.

15 In this kind of the conventional video picture display apparatus, access time is necessary at a shift from one video picture to another video picture at different addresses like shown in FIG. 16 (2) so that an interruption of the video picture is the drawback. That is, FIG. 16 (2) shows an example time chart that the

20 video picture B stored at different address from the video picture A within the same video disk player is displayed after the video picture A. When the video picture B is accessed after the display of the video picture A, physical time τ is necessary from the end of the video picture A to the completion of the access to
25 the video picture B. Therefore, the interruption of the video picture is

inevitable between the video picture A and B.

On the other hand, regarding a game apparatus or a game ride in a theme park, it is desired that an interactive video picture is presented to a player as one of its attractions.

5 ~~With the forgoing in mind, it is the first object~~
of the present invention to provide a new video picture display apparatus that resolves the problem of the interruption of the video picture as explained above in the conventional apparatus using the video player with address controllable medium like the video disk or VTR.

10

It is an object of the present invention to provide a video picture display apparatus that comprises a first and second video player playing video picture from the memory medium and switches these video players alternately so as to avoid the video picture interruption.

15

Further, it is an object of the present invention to provide a video picture display apparatus that has an input means for inputting a trigger signal operated by a player so that the player can change video picture interactively.

20

Further, it is an object of the present invention to provide a game apparatus that includes a video picture display apparatus and a large screen projected a video picture from the video picture display apparatus.

25

Further, it is an object of the present invention to provide a game facility that the video picture display



According to one aspect of the present invention there is provided a video picture display apparatus having a monitor for displaying a video picture including:

first and second video players for playing video picture stored in each memory medium thereof and outputting video picture signal;

5 a switching circuit operatively connected to said first and second video players for switching an output from the video players to provide the monitor with the corresponding video picture signal;

a memory for storing a program; and

10 a processor unit, operatively connected to said first and second video players, the program memory, and the switching circuit, for executing said program store in said program memory,

said processor unit, based on said program, controlling the second video player to access a second video picture stored in the memory medium thereof at a predetermined address at a predetermined timing while the first video player plays a first video picture, and said processor unit controlling said switching circuit to switch into the second video picture signal output by the second video player from the first video picture signal in response to an access completion signal provided from the second video player,

20 wherein the video picture from said first and second video player is displayed on said monitor alternately.

According to a further aspect of the present invention there is provided a game facility including:

a ride ridden by a game player of a game and having a beam emission device provided thereon;

25 a course on which said ride moves; and

a video picture display apparatus having a monitor screen installed at said course for displaying a video picture for the game player riding on the ride,

first and second video players for playing video picture stored in each memory medium thereof and outputting video picture signal,

30 a switching circuit operatively connected to said first and second video players for switching an output from the video players to provide the monitor screen with the corresponding video picture signal,



a memory for storing a game program, and
a receiver circuit for receiving a trigger signal;

5 a detection device, provided close to said monitor screen and operatively
connected to said receiver circuit, for detecting the beam of said trigger signal
emitted from said beam emission device on the ride through an operation of the
game player and for providing said trigger signal with said receiver circuit;

a processor unit, operatively connected to said first and second video
players, the program memory, said receiver circuit and the switching circuit, for
executing said game program store in said program memory,

10 said processor unit, based on said game program, controlling the second
video player to access a second video picture stored in the memory medium
thereof at a predetermined address when the timing of said trigger signal
operatively provided by said receiver circuit coincides with a predetermined timing
while the first video player plays a first video picture,

15 and said processor unit controlling said switching circuit to switch into the
second video picture signal output by the second video player from the first video
picture signal in response to an access completion signal provided from the
second video player, wherein the video picture from said first and second video
player is displayed on said monitor screen alternately.

20 A preferred embodiment of the present invention will now be described
with reference to the accompanying drawings wherein:-



~~video picture. Therefore, the game facility can provide
an interactive video picture and game to the player.~~

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of the video picture
5 display apparatus of the embodiment of the present
invention.

FIG. 2 is a drawing that shows a video picture
display control according to the present invention.

10 FIG. 3 is a drawing that shows an example of the
switching of the video picture.

FIG. 4 is a operation flow of the display control
according to the present invention.

15 FIG. 5 is an overview of an example of the game
facility using the video picture display apparatus of the
present invention.

FIG. 6 is an overview of the game facility of the
present invention.

20 FIG. 7 is a drawing that shows a relation between
the video picture display apparatus and the game
facility.

FIG. 8 is a drawing that shows three part views
of a ride in the game facility.

FIG. 9 is a plane view of a turn table in the
game facility.

25 FIG. 10 is a front view of the turn table in the
game facility.

FIG. 11 is a side view of the ride of the game



facility.

FIG. 12 is a front view of the ride of the game facility.

FIG. 13 is a drawing for explaining the video picture displayed on the screen.

FIG. 14 is a block diagram showing an example of a structure of a control circuit 9 in FIG. 1.

FIG. 15 is a block diagram showing an example of a structure of a ride control circuit in the ride.

FIG. 16 is a drawing showing the conventional apparatus.

DETAILED DESCRIPTION

The present invention will now be described more fully with reference to the accompanying drawings, in

15 ~~which an illustrative embodiment of the invention is~~

~~shown.~~ ^{present} The invention can ~~however~~ be embodied in many

different forms and ~~the present invention~~ should not,

~~therefore~~ be construed as being limited to the

embodiment set forth herein. Rather, the specific

20 embodiment which is illustrated and described herein is provided for the purposes of illustration and in order to fully convey to those skilled in the art the broad scope of this invention and how it is capable of being used.

FIG. 1 is a block diagram of an example of the structure that the video picture display apparatus of the present invention is applied. In FIG. 1, 1 is CPU (Central Processing Unit) that reads out and executes a



program, like a shooting game program, stored in ROM (Read Only Memory) 8. The CPU 1 is connected to a common bus 2 so that the CPU 1 can communicate to other element as explained later.

5 The embodiment of the video picture display apparatus includes first and second video disk player 3 and 4. The video disk player is, for example, Laser Disk player or CRV (). In stead of the video disk player, a controllable video picture display
10 apparatus like VTR (Video Tape Player) with RS-232C cable can be used. These video player stores video picture in NSTC and can play video picture stored at any address by specifying the address.

The first and second video disk players 3, 4 are
15 connected to the common bus 2 through the parallel and serial converter circuits 13, 14 respectively. And the outputs of the video disk players 3, 4 are received by the selector circuit 5. The selector circuit 5 switches the video picture signal from the video disk players 3, 4
20 based on a switch control signal sent from the CPU 1 via Input and Output circuit 6. Then the selector circuit 5 outputs the designated video picture signal to the monitor 5 for display. The monitor 7 is a large screen with 200 inches in the embodiment. The monitor 5
25 displays the video picture according to the video picture signal sent from the selector circuit 5 in synchronous to a clock signal CLK sent from the CPU 1. This clock

signal CLK is the synchronous signal that makes the video
disk player 3, 4 and Video board, not shown, in
synchronous condition under NTSC system. An internal
clock signal of the CPU 1 is different from the clock
5 signal CLK.

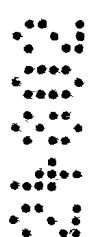
In FIG. 1, the video picture display apparatus
further includes a control circuit 9, a receiver circuit
10, a transmitter circuit 16, and a modulator circuit 15
and a demodulator circuit 11 connected to the transmitter
10 16 and the receiver circuit 10 respectively. The
modulator 15 and the demodulator 11 are connected to the
common bus 2 so as to communicate with the control
circuit 9 under the control by the CPU 1. The receiver
circuit 10 and the transmitter circuit 16 are the
15 circuits for receiving a trigger signal emitted under the
control of the player and for transmitting a response
signal from the CPU 1.

FIG. 2 is the drawing for explaining contents of
the displaying video picture in the embodiment according
20 to the video picture display apparatus shown in FIG. 1.
FIG. 2 shows video pictures of a shooting game as an
example. In this shooting game, an enemy is shot down at
every time when the shooting timing of the player
coincides with a predetermined timing so that the video
25 picture is transferred to the lower ones.

In FIG. 2, A1 through A6 shows each video picture
scene or frame for a video picture A. In the embodiment,

the scenes A1 through A6 of the video picture A are the same picture of the enemy. The scenes A1 through A6 are repeatedly read out and displayed on the screen. Each video picture B through M basically comprises initial scene that includes an explosion scene and is different from other following scenes. The following scenes are similar scene to the video picture A.

A story of the shooting game of FIG. 2 is further explained. In the embodiment, two players play the game at the same time. If either player can successfully shoot the enemy in the scene A1, the displaying video picture is changed to the explosion scene B1 or C1. In case the first player shoot down the enemy, a red explosion scene like B1 is displayed. In FIG. 2, the red explosion is described as broken line for convenience. In case the second player shoot down the enemy, a blue explosion scene like C1 is displayed which is described as solid line for convenience. After that, the video picture is changed like scene B2, B3, B4, and B5, or C2, C3, C4, and C5. These series of scenes of B and C are the same except for the initial scene B1 and C1. Further, if the enemy is shot in the scenes A2, B2, or C2, the video picture is changed to either the scene D1 or E1 depending upon which player shoot the enemy. It is the same things in the scenes F1 and G1, J1 and K1, H1 and I1, L1 and M1. And the scene L1 and M1 is a big explosion scene. If the player can reach to the big



explosion scene L1 or M1, the player can get a big victory in the shooting game. The scene H1 or I1 is smaller explosion that means just a victory in the game.

5 As explained above, in this game the displaying video picture is switched to the explosion scene right after the enemy is shot down.

FIG. 3 is a drawing that shows an example of the switching of the scene in the video picture. The video picture A through M are stored in the same video disk as shown in FIG. 3. However, the video picture A through M is stored at different addresses each other. Further, in FIG. 3, (1) is the video picture stored in the video disk played by the first video disk player 3 and (2) is the video picture stored in the video disk played by the second video disk player 4.

As understood from FIG. 3, each video disk corresponding to the first and second video disk players 3 and 4 stores the identical video picture that includes the video picture A through the video picture M.

Backing to FIG. 2 again, it is now assumed that the video picture A is playing through the first video disk player 3. In this case, if there is a trigger signal generated by player's shooting at a predetermined timing in the first flame A1 in the video picture A, it is accessed to the address of the video picture B or C is accessed in the second video disk player 4 from that

timing. Which video picture B or C is determined based on which player shot a target.

As an example, it is now explained the case where the first and second video disk players 3 and 4 are
5 switched in control so that the series of the scene are from the scene A1 in the video picture A, the first scene B1 and the second scene B2 in the video picture B, the first scene F1 in the video picture F, and to the first scene K1 in the video picture K. And If the trigger
10 signal is given at a predetermined timing at the first scene K1 in the video picture K, the video picture M is displayed as the final scene.

An operation of the above series of the scene is now explained with reference to FIG. 3. In FIG. 3, as
15 explained already, (1) is the video picture A through M stored in the video disk of the first video disk player 3 and (2) is the video picture A through M stored in the video disk of the second video disk player 4.

When a trigger signal from the player is input at
20 the timing a1 during playing the scene A1 of the video picture A at the first video disk player 3, CPU 1 sends access signal to the second video disk player 4 according to the program stored in ROM 8 so as to access to the address of the video picture B that is played next.
25 Concretely, a search signal (SE) with the address of the video picture B is sent to the second video disk player 4 as the access signal. When the access to the video

picture B is completed in the second video disk player 4,
an access completion signal is returned to CPU 1 through
the parallel-serial conversion circuit 14. Then CPU 1
sends a switching signal to the selector circuit 5
5 through I/O circuit 6. At the same time or at some time
earlier, a play signal (PL) is sent to the second video
disk player 4 by CPU 1.

Therefore, the selector circuit 5 is controlled
to output the video picture B that is played by the
10 second video disk player 4 as substitute for the video
picture from the first video disk player 3.

This is shown in FIG. 3. As shown in FIG. 3 (3),
first, the scene A1 of the video picture A is displayed.
And the access signal is sent to the second video disk
15 player 4 according to the trigger signal generated at the
timing a1. At this time, for the access period t_s until
the completion of the access, the video picture A from
the first video disk player 3 is still being played. And
when the access to the video picture B is completed at
20 the second video disk player 4, the selector 5 switches
into the video picture B from the second video disk
player 4 as substitute for the video A from the first
video disk player 3.

Then, at the second video disk player 4, after
25 the scene B1 of the video picture B is finished, another
trigger signal is given at the timing b2 during the next
scene B2. Again, CPU 1 send another access signal to the

first video disk player 3 via the parallel-serial conversion circuit 13 so that the address of the video picture F is accessed. After the access time t_s , the selector circuit 5 switches to the video picture F from the first video disk player 3 as substitute for the video picture B from the second video disk player 4 so that the video picture F is displayed at the monitor 7.

Next, at the first video disk player 3, next trigger signal is given at the timing f_1 during the video picture F is displayed. Again, according to the program stored in ROM, CPU 1 send the next access signal to the second video disk player 4 via the parallel-serial conversion circuit 14 so that the address of the video picture K is accessed. When the access to the video picture K is completed after the access time t_s , the selector circuit 5 switches to the scene K1 of the video picture K from the second video disk player 4 so that the scene K1 of the video picture K is displayed at the monitor 7.

Again, at the second video disk player 4, next trigger signal is given at the timing k_1 during the scene K1 of the video picture K is displayed. Like above, CPU 1 sends the next access signal to the first video disk player 3 via the parallel-serial conversion circuit 13 so that the address of the video picture M is accessed. After the access time t_s , the selector circuit 5 switches to the video picture M from the first video disk player 3

so that the video picture M with a big explosion is displayed at the monitor 7.

As explained above, the video picture display apparatus of the embodiment comprises the first and second video disk player 3 and 4 that are controlled to be switched alternately so as to play appropriate video picture. Therefore, as shown in FIG. 3 (3), the different video pictures are displayed by the first and second video disk players 3 and 4 alternately so that the signal for the video picture can be sent to the monitor 7 without any interruption. Therefore, the video picture is displayed at the monitor 7 without any interruption.

In the above shooting game, as shown in FIG. 3, the first scene B1 in the video picture B, the first scene F1 in the video picture F, and the first scene K1 in the video picture K include an explosion scene in which an enemy is shot down. Further, the final video picture M includes a big explosion as a whole scene. When the player can reach to the big explosion, the player can make a big victory in the game. However, if the player can not provide the trigger signal at the predetermined timing a1 through k1 unlike the above explanation, only the same video picture without the explosion scene is repeated. Therefore, the player can not get any explosion scene in the game. In this case, the input timing of the trigger signal by the player does not coincide with the predetermined timing as already

selected in the game so that the player is unsuccessful in the game and can not see any explosion scene.

FIG. 4 is a flow chart of the operation of the video picture display apparatus as explained above for
5 being easily understood.

In FIG. 4, when the video picture display apparatus is started, the first video disk player 3 starts playing a video picture under the control of CPU 1 and according to the program stored in ROM 8 (step S1).
10 Then, the video picture from the first video disk player 3 is displayed at the monitor 7 (step S2). When a trigger signal is input at predetermined timing, it is decided if the timing of the trigger signal coincide with the predetermined timing in the video picture being
15 displayed or the predetermined coordinate address in the video picture (step S3). This will be explained in detail later. If it does not coincide, then it is decided if the video picture from the first video disk
20 player 3 finishes or not (step S4). If it does not finish, returning to the step S2, the video picture from the first video disk player 3 is being displayed continuously. If it does finish at the step S4, the video display by the video picture display apparatus is finished.

25 Back to the step S3, if the timing of the trigger signal coincides with the predetermined timing or the predetermined coordinate address, the access to the

second video disk player 4 is initiated (step S5). For the initiation, according to the program stored in ROM 8, CPU 1 sends the search signal with the address signal to the second video disk player 4 through the parallel-serial conversion circuit 14. When the access at the second video disk player 4 is completed based on the access signal, the access completion signal is returned to CPU 1 (step S6).

10 In response to the access completion signal, CPU 1 sends the play signal to the second video disk player 4 and the switch control signal to the selector circuit 5 via I/O circuit 6. Then, the selector circuit 5 switches into the video picture output from the second video disk player 4 so as to sent it to the monitor for displaying (step S7).

15 In the same manner, when the other trigger signal is given during playing the video picture at the second video disk player 4, it is decided if the trigger timing coincides with the predetermined timing or the predetermined coordinate address (step S8). If it does not coincide, then it is decided if the video picture from the second video disk player 4 finishes (step S9). If it finishes, the video picture display apparatus finishes the operation at the time. If it does not finish, back to the step S7, the second video disk player 25 4 continues its output of the video picture that is displayed at the monitor 7.

Again returning to the step S8, if the trigger signal timing coincides with the predetermined timing or the predetermined coordinate address, the access at the first video disk player 3 is initiated (step S10). When the access at the first video disk player 3 is completed (step S11), back to the step S2, the output from the first video disk player 3 is sent to the monitor 7 via the selector circuit 5 in order to display the video picture.

10 FIG. 5 is a drawing for explaining the game facility using the video picture display apparatus showing a part of the facility.

 In FIG. 5, 40 shows a course comprised by a pair of rails. A further extended course is omitted at the right hand side in FIG. 5. A ride runs on the course 40 from the enter in the direction of the arrow. When the ride reaches to a turn table 41, the direction of the ride is reversed so that the ride continues running on the course 40. Therefore, the ride moves backward after the turn table 41. 401 is the part of the course that has a up slope for the backward moving of the ride. The ride is moved up by a driving means, not shown, and moves down through a down slope 402 under the acceleration based on its own weight.

25 At the next up slope portion 401, the ride is moved up again by a driving means and moves down again after the peak of the course along the down slope 402

under the acceleration because of its own weight. And the ride runs to the exit through the curve portion 402 of the course. In FIG. 5, screens 42 are provided. The screens 42 are provided at two sites facing to the up slope portions 401. The screens 42 is about 200 inches large screen to which video picture is projected in stead of the monitor 7.

FIG. 6 is a perspective view for showing the relation between the turn table 41 and the up slope 401 in FIG. 5. In FIG. 6, 40 is the course and the ride 50, i.g. a truck, runs along the course 40 installed in the game facility. The ride 50 moves forward along the course 40 in the arrow direction first. At the turn table 41, the ride 50 is reversed through the 90 degree rotation of the turn table 41 along the arrow 43. Then, the ride 50 moves backward along the up slope 401 as shown in FIG. 6 by a driving means that is not shown. After reaching to the top, the ride 50 goes down along the down slope 402 with the acceleration by its weight.

As understood from the structure of the game facility shown in FIG. 6, the player riding the ride 50 goes down backward along the down slope 402 so that the player is given its speed and its tension from the speed and enjoy the facility more excitingly. Further, since the speed becomes moderate during the period of the backward and upward movement along the up slope 401, it is intended to have the player enjoy an interactive game

by using the video picture display apparatus of the present invention. That is, the screen 42 is installed so that the player 51 on the ride 50 can face to the screen 42 on the way of the up slope 401.

5 FIG. 7 is a side view for schematically showing the relation among the up slope 401, the screen 42, and the ride 50. That is, the ride 50 goes up along the arrow on the up slope 401 backward. On the way, the player 51 faces to the screen 42.

10 The video picture output from the video disk player 3 or 4 is projected and displayed on the screen 42 by the projector 52. The ride 50 includes at the front an infrared device portion 501 that comprises an infrared emitting device and an infrared detection device. A gun imitation 502 is installed at the front of the ride 50. The ride 50 also has button switch that is operated by the player as an ignition of the imitated gun imitation 502. When the player 51 pushes down the button switch, infrared is emitted from the infrared emitting device of the infrared device portion 501. The infrared is received by the detection device 421 that comprises an infrared emitting device and an infrared detection device so that the trigger signal is detected. A ride control circuit 500 is provided in the ride 50. The ride control circuit 500 controls the infrared device portion 501 to emit the infrared and to receive the infrared from the infrared detection device of the detection device 421

provided at the lower portion of the screen 42. The structure and the operation of the control circuit 500 will be explained latter.

5 FIG. 8 shows an overview of an example of the structure of the ride 50 in FIG. 7. In FIG. 8, (1) is a plan view of the ride 50, (2) is a front view, and (3) is a sectional view at the central line of the plan view. In FIG. 8 (1) - (3), unrelated portions to the present embodiment are omitted.

10 501 is the infrared device portion that includes the infrared emitting device and the infrared detection device and is provided at the front of the ride 50. 502 is the gun imitation that is extended forward at the front of the ride 50. In FIG. 8, the gun imitation 502 has a pair of gun imitations. Therefore, a pair of gun operation portions 503a, 503b are provided corresponding to the gun imitations 502. A pair of players sitting on the seat 504 of the ride 50 can operate each gun operation portion 503a, 503b. Each gun operation portion 15 503a, 503b has a switch button not shown. 505a, 505b are display portions that show a situation of the operation of the switching button and etc..

20 506 are coil springs that give the gun imitations 502 and the gun operations 503a, 503b vibration by elastic power of the coil springs 506 that is driven by 25 not shown driver according to the player's pushing down of the switch button in the gun operations 503a, 503b.

The players 51 can feel a response of the gun ignition through the vibration.

In FIG. 8, 40 is the parallel rail that comprises the course. Rubber rollers 1401, 1402, 1403 are provided to attach to the rail 40 from upper, lower, and outer directions. Therefore, the ride 50 can run along the course 40 by rolling of the rubber rollers. 404 are imitation wheels that match to the design of the ride 50.

In FIG. 9, 10, 11, and 12, a structure of the turn table 41 is now explained below.

FIG. 9 is a plan view of the turn table 41 in the embodiment. 1102 is a parallel rail portion that has a stopper 1103 at the terminal thereof. A motor 1105 is provided at the central position of the pair of the rail portion 1102. The rotation of the motor 1105 is converted to another motion at a rotation transfer structure 1107. That is, the rotation of the rotation axis of the motor 1105 that is in horizontal direction is converted to the rotation of a pair of axes 1114 that is in perpendicular direction. The rotation transfer structure 1107 is structured so that the pair of the perpendicular axes 1114 rotate in reverse direction each other. 1106 are a pair of driving wheels that rotate in reverse direction by transferring the rotation of the perpendicular axes 1114 through belts 1112. The surface of the driving wheels 1106 is preferably a surface with large friction, like a rubber of a tire.

Further, in FIG. 9, 1108 is a hydraulic cylinder that is provided at a position shifted from the central portion of the pair of the rail portions 1102. The hydraulic cylinder 1108 gives a rotation driving force to the rail portion 1102. This rotation becomes clear through the following explanation with reference to FIG. 10.

In FIG. 10, the rail portion 1102 and the stopper 1103 is fixed to a base 1110 via plural poles 1113. The motor 1105, the rotation transfer structure 1107, the driving wheel 1106, and the belt 1112 are provided on the base 1110. It is already explained that the driving wheel 1106 rotates by the rotation of the motor 1105 with reference to FIG. 9. The base 1110 is rotatably held in rotatable by the pole 1111 through a bearing.

In FIG. 10, the hydraulic cylinder 1108 is connected to the crank 1109 that is also connected to the base 1110. As explained in FIG. 9, the hydraulic cylinder 1108 is in the position shifted from the central portion of the parallel rails 1102. The driving the crank 1109 toward the axes of the cylinder by the hydraulic cylinder 1108 gives a rotation force to the base 1110.

After the ride 50 comes in the rail portion 1102 toward the stopper 1103 from the course 40, the base 1110 is rotated so that the rail portion 1102 is connected to another course 401. Then the ride 50 is pushed in the

reverse direction to the first coming direction and runs on another rail 401 backward. The drawing the ride 50 into the rail portion and the pushing out the ride 50 from the rail portion is done by the driving wheel 1106.

5 This is explained below in FIG. 11 and 12 with reference to the structure of the rail of the course 40 and the ride 50.

FIG. 11 is a side view of the ride 50. The outside view of the ride 50 can be designed in appropriate one that complies with the content of the game facility. This design is omitted for simplifying the explanation of the invention. The ride 50 has a bumper 507 at the front. The bumper 507 bumps against the stopper 1103 provided at the end of the rail portion 1102 in the turn table 41 in FIG. 10 so that the ride 50 stops at the middle portion of the rail portion 1102 appropriately. 1104 is a plate that is provided at the button of the ride 50 and is parallel to the rail 40. The function of the plate 1104 is explained with reference to FIG. 12.

FIG. 12 is a front view of the ride 50. The design of the outside view is made appropriately as explained above. The rubber roller 1403 positioned under the rail 40 is detachable via the nut 1115. When the lower rubber roller 1403 is detached from the rail 40, the ride 50 as a whole can be detached from the rail 40. And when the whole ride 50 is put on the rail 40, the

ride 50 is fixed to the rail 40 by fixing the lower
rubber roll 1403 with the nut 1115. Further, the plate
1104 is sandwiched between the driving wheels 1106 as
5 direction of the driving wheel 1106, the ride 50 is drawn
into the rail portion 1102 of the turn table 41 and is
pushed out therefrom.

FIG. 13 is a drawing for explaining a video
picture that is displayed on the screen 42 at the course
10 40 by a scan projection from the projector 52 in the same
manner of a scanning method in TV monitor. On the screen
42, an actually taken video picture 420 with perspective
is displayed as a background scene and a picture of a
monster 421 is added to the background scene. In the
15 game, the monster 421 is moving around the screen 42.
The screen 42 is the large one with 200 inches and 320
dots in X direction and 228 dots in Y direction. 422 on
the screen are explosion picture. The explosion video
picture 422 is displayed in the first scene, when the
20 first and second video disk players 3, 4 are switched to
each other, as the sign of successfully shooting down the
enemy, that is monster 421.

A decision of whether the enemy or the monster
421 is shot down by the player 51 or not is carried out
25 in several method.

The first method for such decision is as follows.
The monster 421 and a cursor for aiming the gun imitation

502, not shown, are moved on the screen 42 according to a predetermined program. And the monster 421 and the cursor are overlapped at several timing. When the player 51 pushes down the switch button of the gun operation 503a, 503b at the overlapping timing or within a certain period before and after the overlapping timing, it is decided that the monster 421 is shot down. In this method, the gun imitation 502 is fixed. And when the player 51 pushes down the button switch in the gun operation portion 503a, 503b at the predetermined timing as explained above, the video disk players 3, 4 are switched so that the player 51 can see the explosion picture 422 on the switched video picture. The player 51 can realize the appropriate shoot timing of the gun enjoyably. CPU 1 only have to watch the button timing on a time axis.

As explained in FIG. 2 and 3, the switch from the scene A1 of the video picture A to the video picture B or C is depending on which switch button of the gun operation portion 503a or 503b is pushed down. The trigger signal with information of which button is pushed down is realized. And the video picture B or C is selected.

The second method for deciding if the player 51 shoots down the monster 421 is as follows. That is, it is decided whether the switch button is pushed down when the aiming direction of the gun imitation 502 matches to

the monster 421, for example the left eye of the monster. According to the method, the player has to operate to move the gun imitation 502. The second method is carried out by using X counter 901 and Y counter 902 and an apparatus shown in the block diagram of FIG. 14.

The X and Y counters 901, 902 is included in XY counter 90 in a control circuit 9 that is installed in the video picture display apparatus as explained later. The X and Y counters 901, 902 output each perpendicular and horizontal counter number that corresponds to the scanning coordinates of the video picture projected on the screen 42. For instance, when the scanning point is on the left eye of the monster 421 in FIG. 13, the X counter 901 for perpendicular outputs X1 and the Y counter 902 for horizontal outputs Y1 as the scanning coordinates.

FIG. 14 is a block diagram of the control circuit 9 in the video picture display apparatus shown in FIG. 1. FIG. 9 shows the relation among the control circuit 9 and CPU 1 and etc.. The control circuit 9 comprises XY counter 90, decoders 91, 92 and AND gates 93, 94. In FIG. 14, CPU 1, I/O circuit 6, ROM 8, demodulator 11, modulator 15, receiver 10, transmitter 16, and parallel serial circuit 13, 14 have the identical reference number as shown in FIG. 1. Although these elements are connected through the common bus 2, the common bus is omitted in FIG. 14. The XY counter 90 in the control

circuit 9 comprises the X and Y counters as shown in FIG. 13. The XY counter 90 outputs X and Y coordinates that correspond to the perpendicular scanning and the horizontal scanning in synchronous to the synchronous clock CLK.

According to the second method, when the switch button of the gun operation 503a, 503b is pushed down as an ignition while the gun portion 502 directs to a predetermined direction, all white video picture is scanned on the whole screen 42 right after the ignition. This scanning is carried out during 1 sixtieth ($1/60$) second. At the timing when such scanning starts, the XY counter 90 is reset by a reset signal from CPU 1. And the count number of the XY counter 90 is incremented according to the scanning of the all white video picture. On the other hand, a light detection device attached to the gun imitation 502, not shown, detects the white when the all white scanning is passed on the site of the screen to which the gun muzzle directs. And the trigger signal is received from the ride control circuit in the ride at the receiver circuit 10 through the infrared emitting device of the ride and the infrared detection device on the screen 42. The trigger signal is decoded by the decoder 92 so that which player a or b initiated the trigger signal is decoded. And the trigger signal is forwarded to the AND gate 93 or 94 depending upon player a or b. At this timing, the count number in the XY

counter 90 is forwarded to CPU 1 through AND gate 93 or 94. That is, the coordinates of the site on the screen 42 that the gun muzzle is aimed to is finally input to CPU 1. When the received coordinate number coincides
5 with the coordinate number of the left eye that CPU 1 knows through the game operation, CPU 1 decides that the monster 421 is shot down.

When CPU 1 recognizes the hit of the shooting according to either method explained above, CPU 1 sends
10 the access signal to the first video disk player 3 or the second video disk player 4 through the parallel serial circuit 13 or 14. After CPU 1 receives the access completion signal from the corresponding video disk player 3, 4, CPU 1 sends the control signal to the
15 selector circuit 5. The selector circuit 5 is controlled to switch from the video picture signal of the then outputting video disk player 3 or 4 into that of another video disk player 3 or 4 in which the access is completed. And the monitor 7 displays the switched video
20 picture.

Simultaneously, CPU 1 outputs the response signal through the modulator 15 that shows the recognition of the hit of the shooting. The transmitter circuit 16 sends the response signal to the player 51. The response
25 signal is transferred to the detection device 421 provided at the lower portion of the screen 42 as shown in FIG. 7. The response signal is converted into an

infrared output at the infrared emitting device in the
detection device 421 and emitted. The emitted infrared
as the response signal is detected by the infrared
detection device in the infrared device portion 501 that
5 is attached on the front of the ride 50.

FIG. 15 shows an example of the ride control
circuit 500 installed in the ride 50, especially a
circuit portion for processing the signal for the
infrared emitting device and the infrared detection
10 device in the infrared device portion 501. 505 is CPU,
501R is infrared detection device, and 501T is infrared
emitting device. 501D is demodulator that demodulates an
infrared signal emitted from the infrared emitting device
of the detection portion 421 and received at the infrared
15 detection device 501R. And the demodulator 501D outputs
either signal a or b and sends the signal to CPU 505.
The CPU 505 sends a display signal to either display
device 505a or 505b that corresponds to the signal a or b
sent from the demodulator 501D. The response of the
20 successful shooting out is now displayed at each display
on the ride 50.

Now the whole process of the generation of the
signal a and b as the output from the demodulator 501D is
explained bellow.

25 First, in FIG. 15, CPU 505 receives a signal a or
b that corresponds to the operation portion 503a or 503b
whichever the switch button is pushed down. The CPU 505

sends the corresponding signal a or b to the modulator 501M that also outputs the corresponding modulated signal therefrom. 501T is the infrared emitting device that emits the modulated trigger signal as the infrared toward the detection device 421 attached to the screen 42. The signal received at the infrared detection device in the detection device 421 is transferred to the decoder 92 in the control circuit 9 as the trigger signal through the receiver circuit 10 and the demodulator 11 in the main body as shown in FIG. 14.

Then, in FIG. 14, the decoder 92 decodes the trigger signal and outputs the signal a or b that corresponds to the original switching into the gate 93 or 94. It is already explained before that CPU 1 sends the response signal that corresponds to a or b through the modulator 15 and the transmitter 16 when CPU 1 decides the successful shot down. Then, the response signal a or b is received by the demodulator 501D in FIG. 15 so that the CPU 505 drives the corresponding display 505a or 505b to feed back such successful shot down to the player.

Returning to FIG. 15, it is now explained that when the player pushes down the switch button, the vibration is given to the gun operation portion as virtual reality response. CPU 505 sends a driving signal to either the driving circuit 506a or 506b responding to the signal from the gun operation portion 503a or 503b. Then the driving circuit 506a or 506b provides driving

power to the coil 506 shown in FIG. 8 (2) so that the corresponding steering of the gun operation portion 503a or 503b vibrates as the response vibration of the ignition. In this manner, the player can feel the sense of virtually operating the gun imitation. In case of the second method as explained before, when the white light is detected by the light detection device attached on the top of the fun imitation 502, not shown, the detection signal is received by CPU 505 so that CPU 505 send the detection signal to the control circuit 9 in the main display apparatus.

As explained above, according to the present invention, interruption of the video picture when the video picture is switched from one at one address to one at another address. Further, the game facility with the video picture display apparatus can give an interactive video game to the player riding on the ride of the facility without being bored.

The claims defining the invention are as follows:
~~WHAT IS CLAIMED IS:~~

1. A video picture display apparatus having a monitor for displaying a video picture including:

5 first and second video players for playing video picture stored in each memory medium thereof and outputting video picture signal;

10 a switching circuit operatively connected to said first and second video players for switching an output from the video players to provide the monitor with the corresponding video picture signal;

a memory for storing a program; and

15 a processor unit, operatively connected to said first and second video players, the program memory, and the switching circuit, for executing said program store in said program memory,

20 said processor unit, based on said program, controlling the second video player to access a second video picture stored in the memory medium thereof at a predetermined address at a predetermined timing while the first video player plays a first video picture, and said processor unit controlling said switching circuit to switch into the second video picture signal output by the second video player from the first video picture signal in response to an access completion signal provided from
25 the second video player,

wherein the video picture from said first and second video player is displayed on said monitor alternately.



2. A video picture display apparatus according to claim 1, further comprising:

5 a receiver circuit operatively connected to said processor unit for receiving a trigger signal and providing said processor unit with said trigger signal, and

10 said processor unit controlling the video players to access the corresponding video picture stored in the memory medium thereof when the timing of the trigger signal coincides with said predetermined timing.

3. A video picture display apparatus according to claim 2, wherein

15 said monitor comprises a screen on which the video picture from the first and second video player is projected,

20 and said video picture display apparatus further comprising a detection device provided close to the screen for detecting a signal initiated by an operation of an operator and for providing said receiver circuit with said detected signal as said trigger signal.

4. A video picture display apparatus according to claim 3, wherein

25 said detection device further includes a transmission device for emitting a response signal provided by said processor unit when said trigger signal coincides with said predetermined timing to said operator.

5. A game facility including:

a ride ridden by a game player of a game and having a beam emission device provided thereon;

a course on which said ride moves; and

5 a video picture display apparatus having

a monitor screen installed at said course for displaying a video picture for the game player riding on the ride,

10 first and second video players for playing video picture stored in each memory medium thereof and outputting video picture signal,

15 a switching circuit operatively connected to said first and second video players for switching an output from the video players to provide the monitor screen with the corresponding video picture signal,

a memory for storing a game program, and

a receiver circuit for receiving a trigger signal;

20 a detection device, provided close to said monitor screen and operatively connected to said receiver circuit, for detecting the beam of said trigger signal emitted from said beam emission device on the ride through an operation of the game player and for providing said trigger signal with said receiver circuit;

25 a processor unit, operatively connected to said first and second video players, the program memory, said receiver circuit and the switching circuit, for executing said game program store in said program memory,



said processor unit, based on said game program,
controlling the second video player to access a second
video picture stored in the memory medium thereof at a
predetermined address when the timing of said trigger
5 signal operatively provided by said receiver circuit
coincides with a predetermined timing while the first
video player plays a first video picture,

and said processor unit controlling said switching
circuit to switch into the second video picture signal
10 output by the second video player from the first video
picture signal in response to an access completion signal
provided from the second video player, wherein the video
picture from said first and second video player is
displayed on said monitor screen alternately.

15 6. A game facility according to claim 5, wherein
said ride is able to be ridden by a pair of
players, and

said ride further comprises a ride control
circuit for providing said beam emission device with said
20 trigger signal including an information of which player's
operation,

said processor unit controls said corresponding
video player for accessing a corresponding video picture
depending upon the information of which player's
25 operation included in said trigger signal.

7. A game facility according to claim 6, wherein
said ride further comprises a beam detection

device,

5 said detection device provided close to said
monitor screen further includes a beam emission device
for emitting a beam of a response signal which said
processor unit outputs when the timing of the trigger
signal coincides with said predetermined timing, said
response signal including an information of which
player's operation generates said corresponding trigger
signal and

10 said ride control circuit, in response to
receiving said beam of the response signal at the beam
detection device on the ride, identifies said information
and notifies to the game player the information.

15 8. A game facility according to claim 5, 6, or
7, further comprising

20 a turn table, provided on the way of said course
and before the site where said monitor screen is
installed, for receiving said ride coming on said course,
turning around the ride to the reverse direction of the
ride, and sending out the ride to said course with said
installed monitor screen in a reverse direction for the
game player.

25 9. A game facility according to claim 8, wherein
said course on which the ride moves in said reverse
direction for the game player includes an up slope with
respect to said moving direction.

10. A game facility according to claim 9, wherein

said course includes a pair of rails on which said ride moves,
said ride includes a plane plate parallel to said rails at the center portion of
the bottom thereof,

said turn table includes

5 a pair of rail portions complying to said pair rails of the course and
having a length longer than said ride,

a pair of driving wheels provided between said pair of rail portions,

a base, on which said pair rail portions and pair driving wheels are
provided, held in rotatable by a supporting pole,

10 a rotation driving means for rotating said base, and

a wheel driving means for driving said pair of driving wheels so that
the plane plate of the ride is sandwiches therebetween and the ride is drawn into
the turn table and is pushed out from the turn table.

15 11. A video picture display apparatus substantially as herein described with
reference to Figs. 1-15 of the accompanying drawings.

12. A game facility substantially as herein described with reference to Figs. 1-
15 of the accompanying drawings.

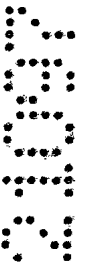
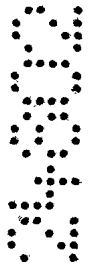
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DATED: 1 October, 1997

PHILLIPS ORMONDE & FITZPATRICK

Attorneys for:

25 SEGA ENTERPRISES, LTD.



ABSTRACT

The video picture display apparatus having a monitor for displaying a video picture of the present invention comprises first and second video players for playing video picture stored in each memory medium thereof and outputting video picture signal, a switching circuit operatively connected to the video players for switching an output from the video players to provide the monitor with the corresponding video picture signal, a memory for storing a program, and a processor unit, operatively connected to the video players, the program memory, and the switching circuit, for executing the program, the processor unit, based on the program, controlling the second video player to access a second video picture stored in the memory medium thereof at a predetermined address at a predetermined timing while the first video player plays a first video picture, and the processor unit controlling the switching circuit to switch into the second video picture signal output by the second video player from the first video picture signal in response to an access completion signal provided from the second video player, wherein the video picture from the first and second video player is displayed on the monitor alternately. The game facility has a ride, a course for the ride, and the video display apparatus installed on the way of the course so that the player can enjoy a video game on the course.

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FIG. 1

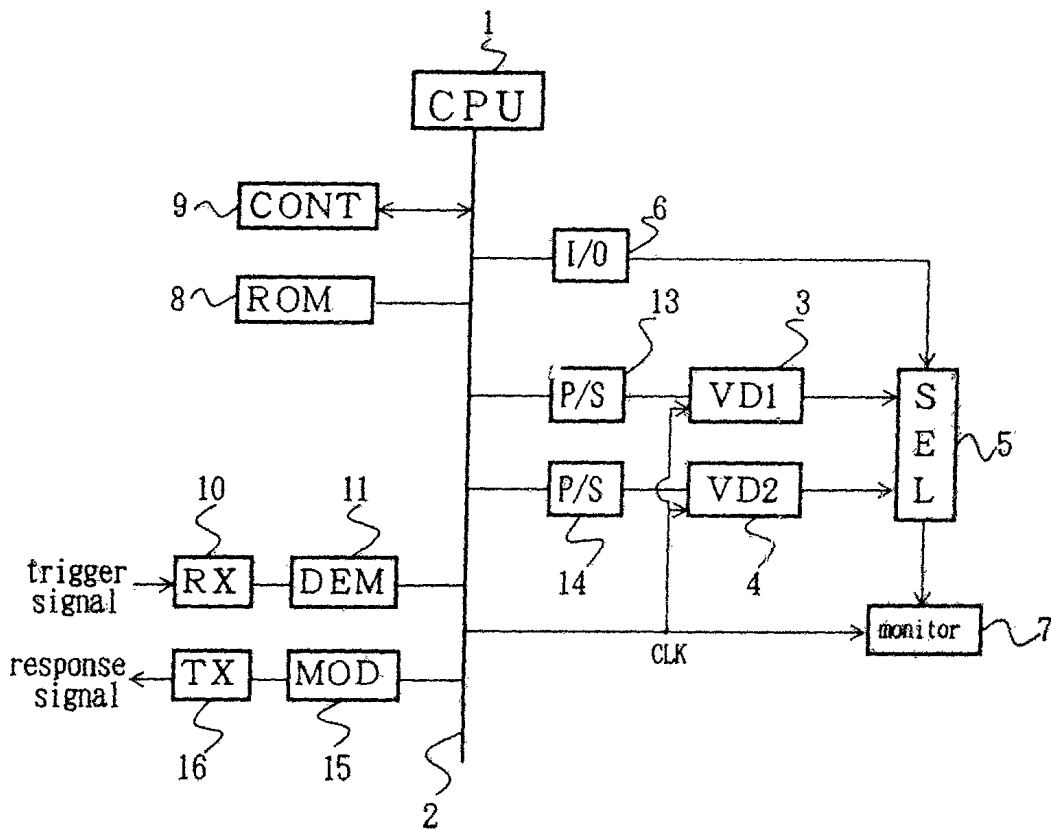
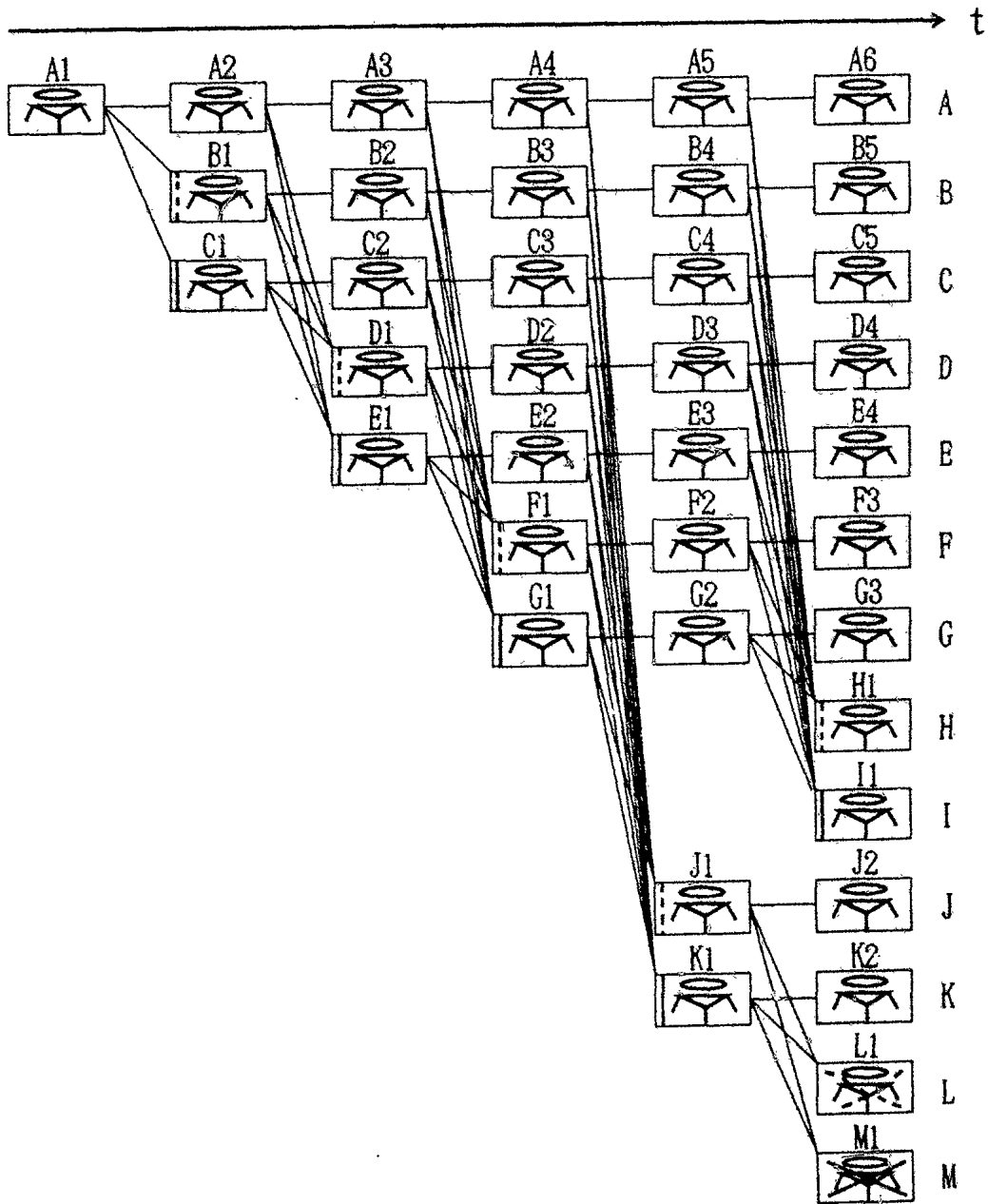
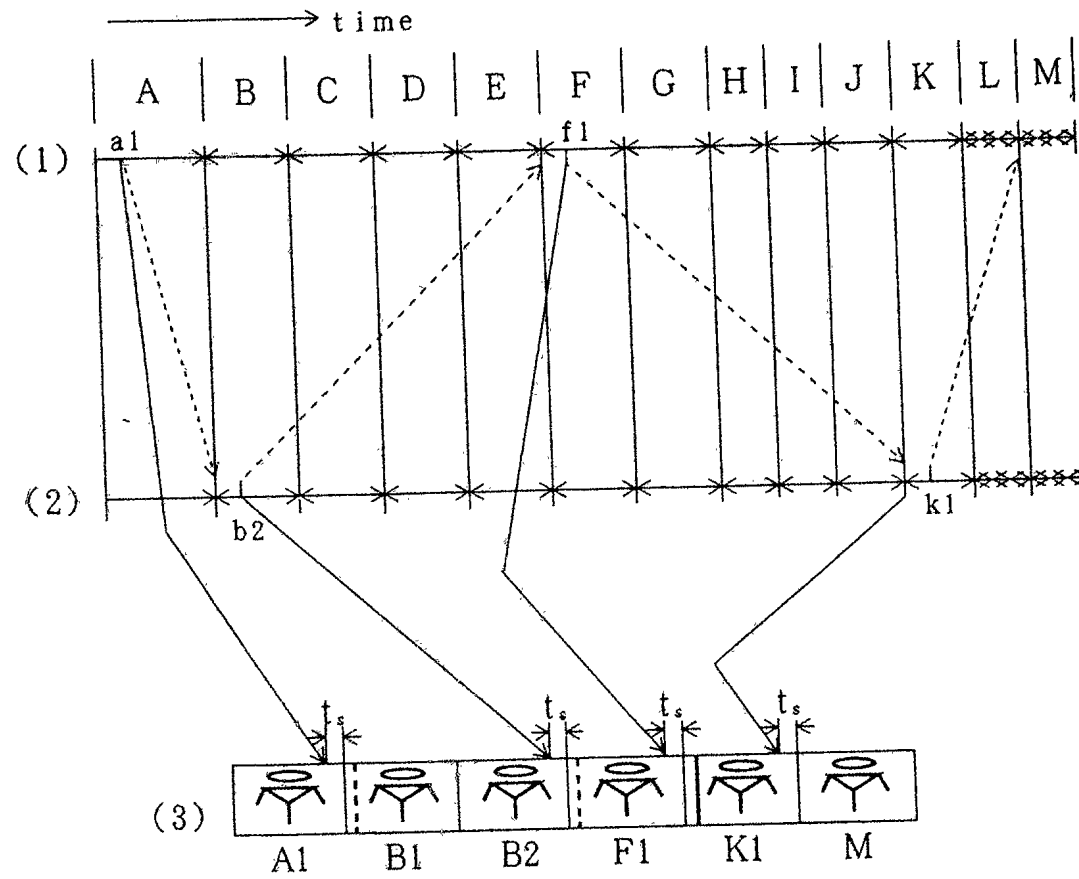


FIG. 2



4 07 95 2400

FIG. 3



24802/95

FIG. 4

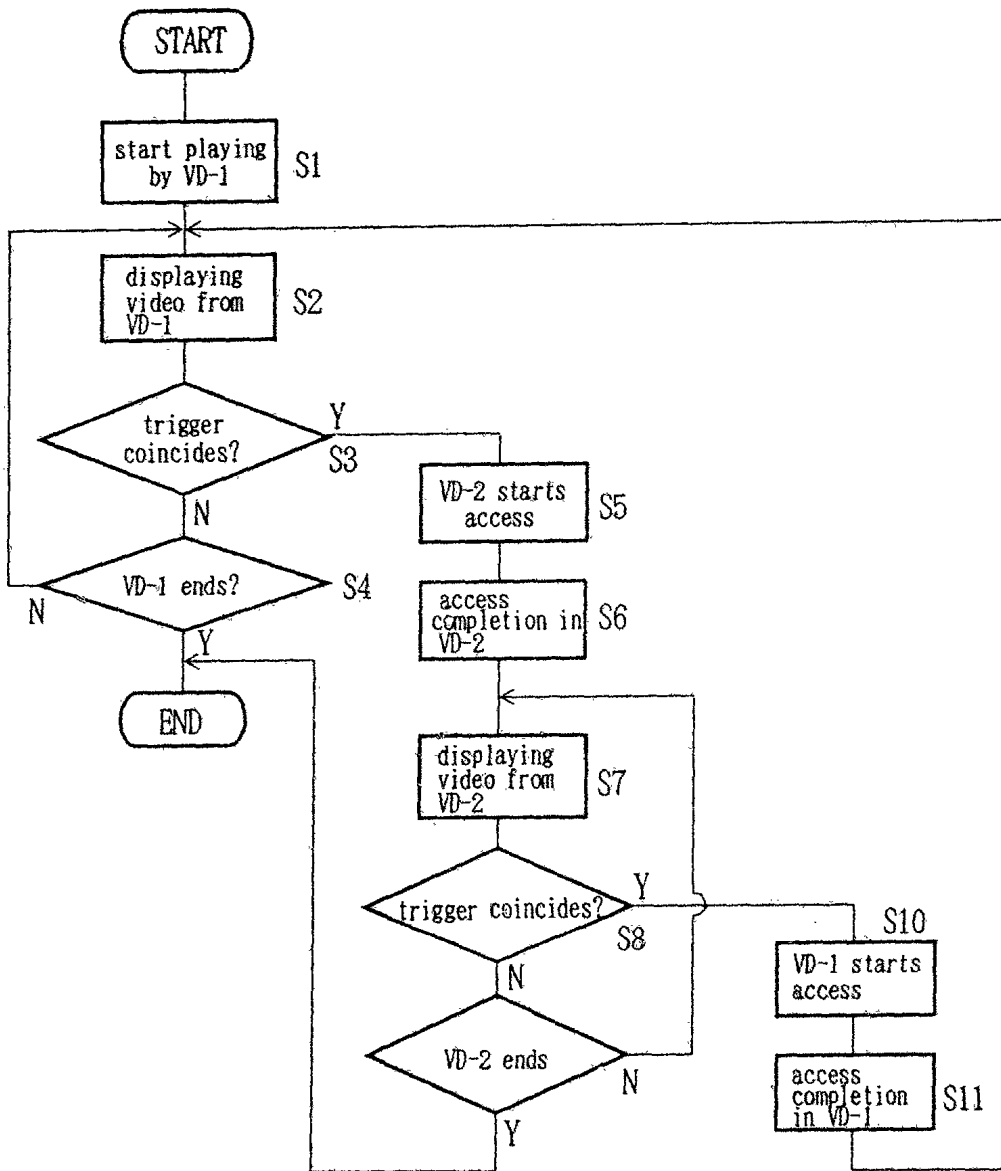
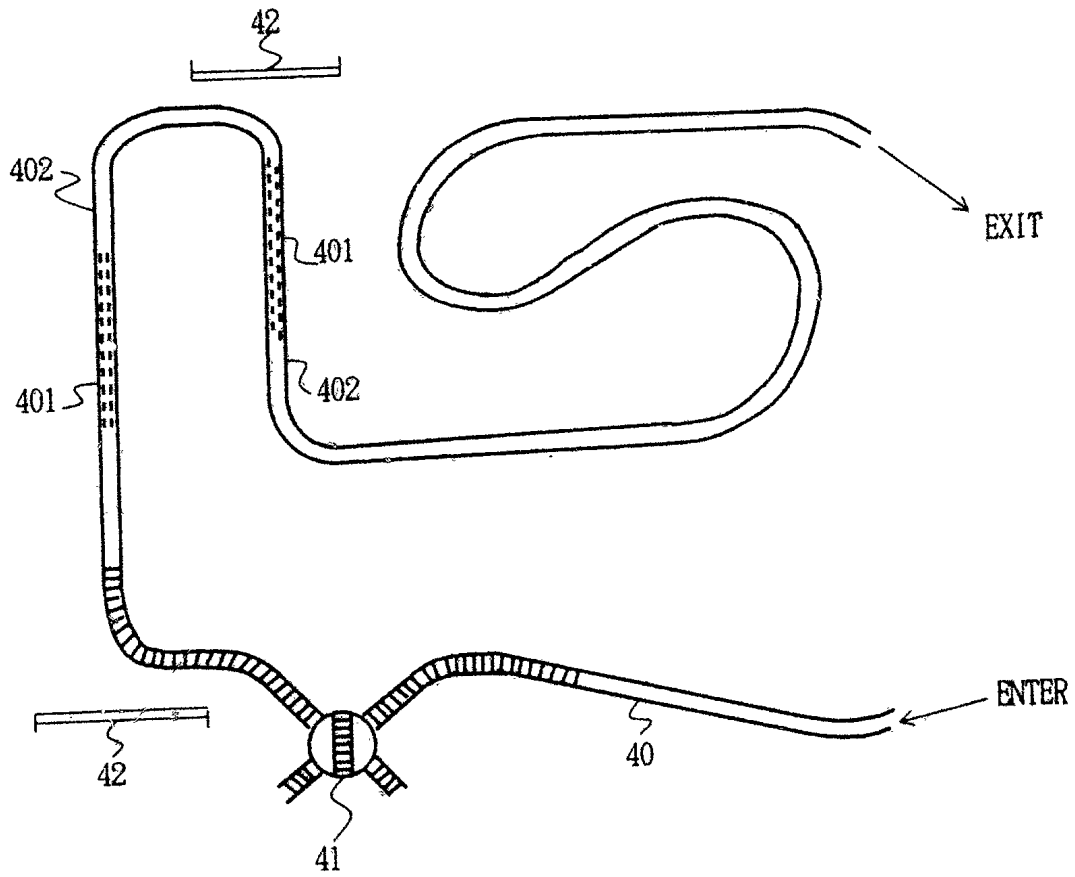
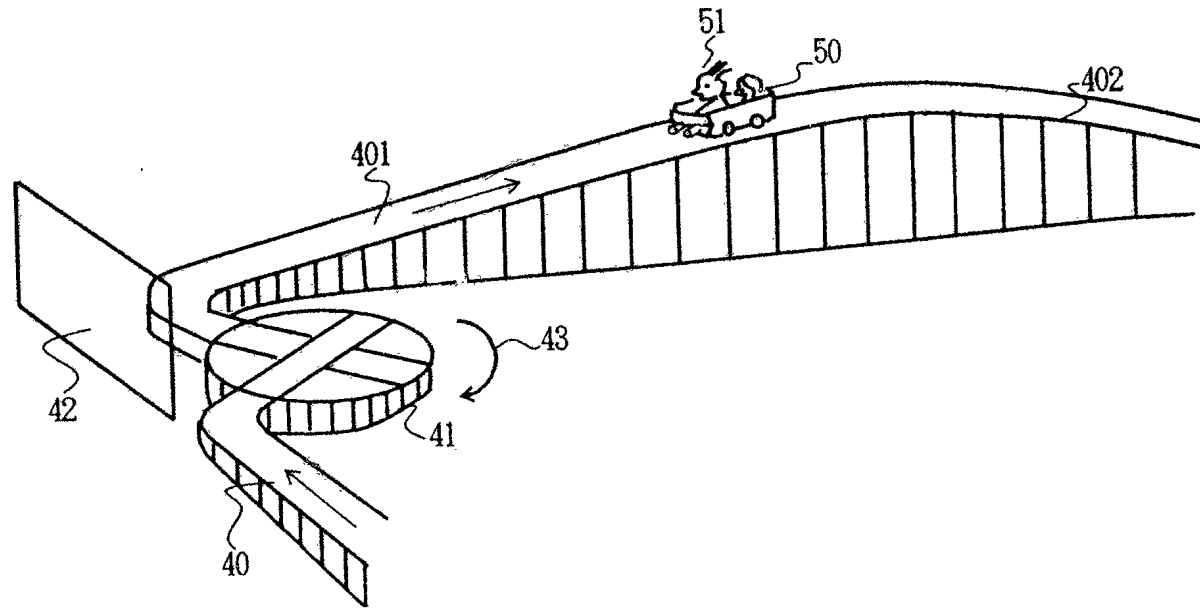


FIG. 5



4 07 95 2400

FIG. 6



4 07 95 24002

FIG. 7

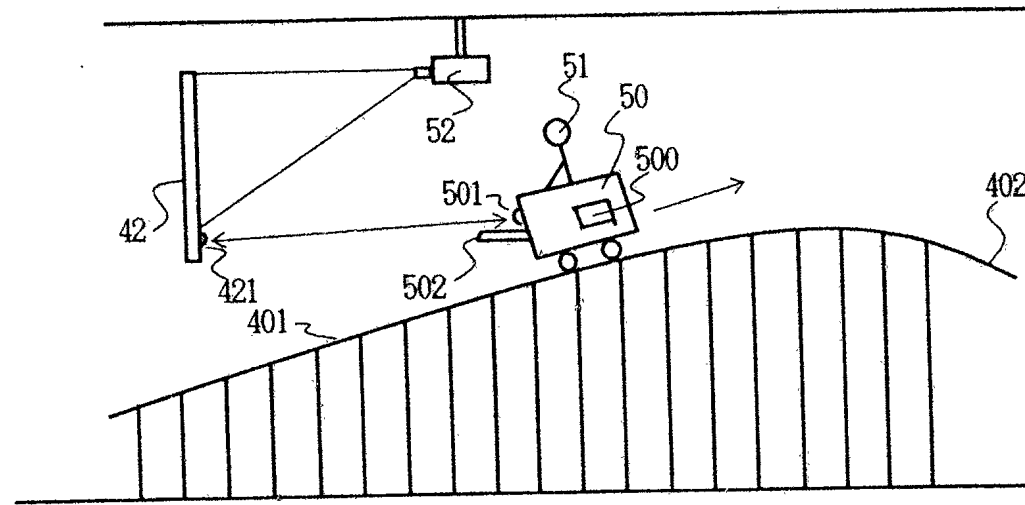


FIG. 8

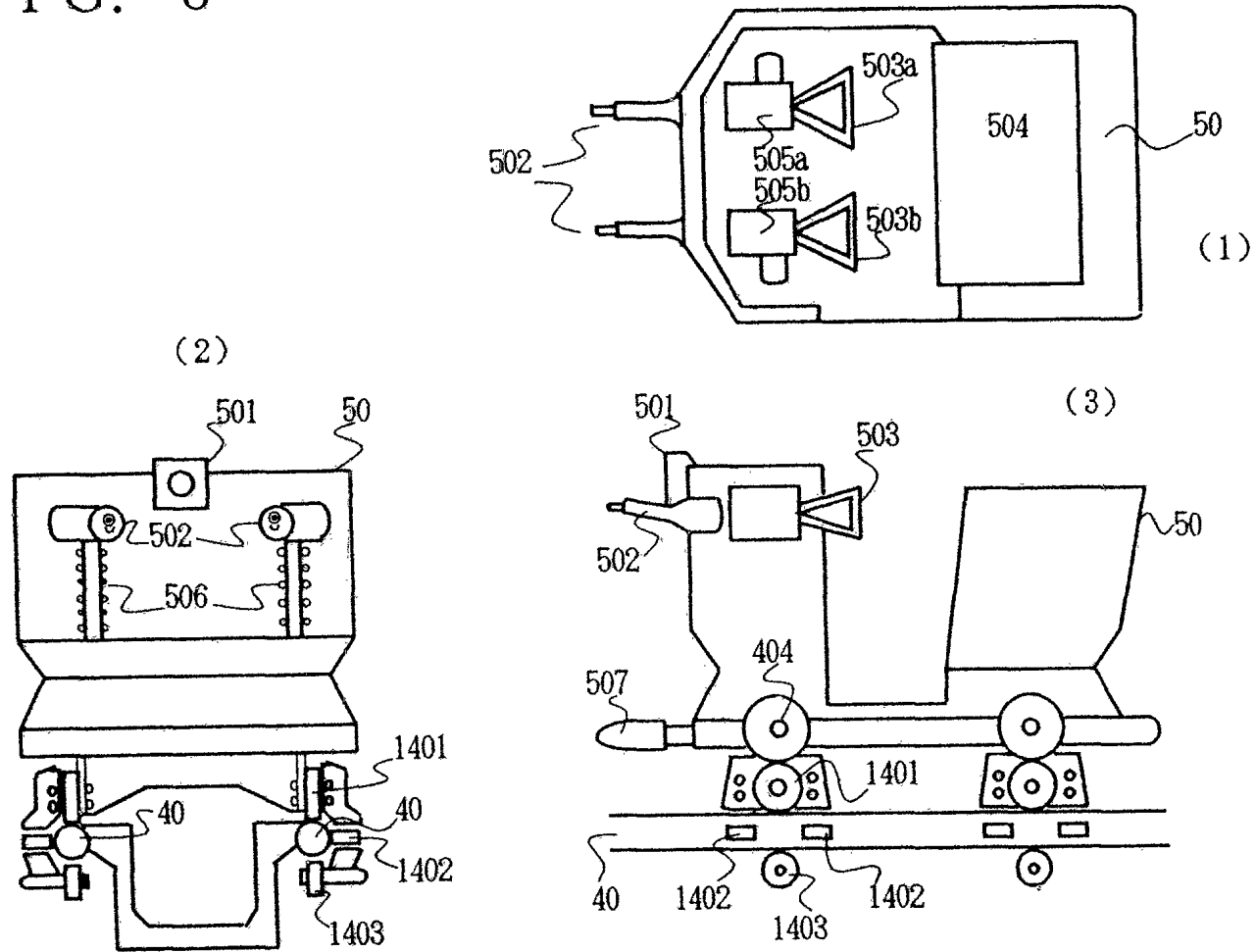
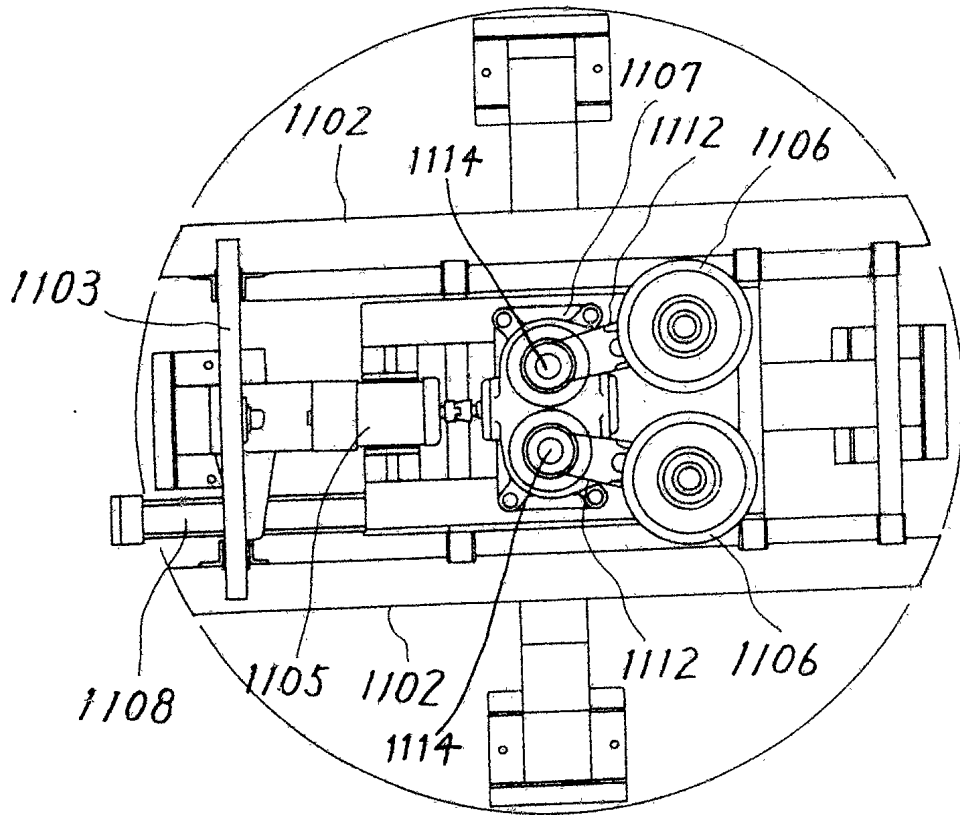


FIG. 9



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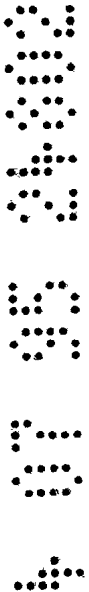
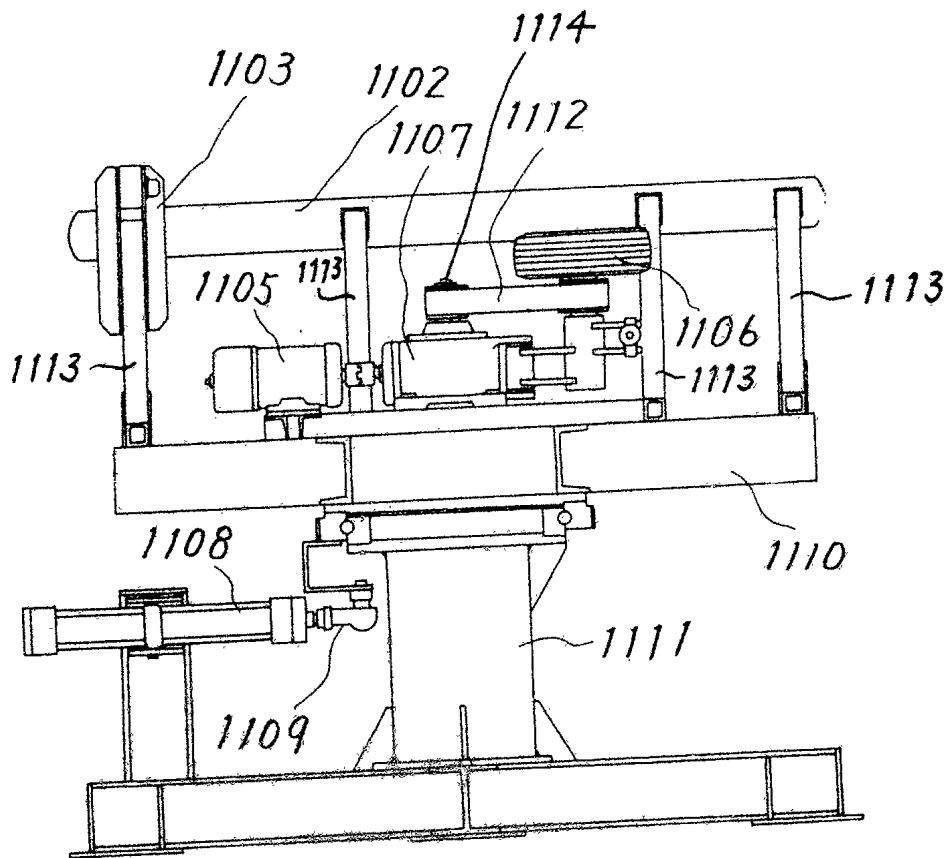


FIG. 10



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4 07 95 2402

FIG. 11

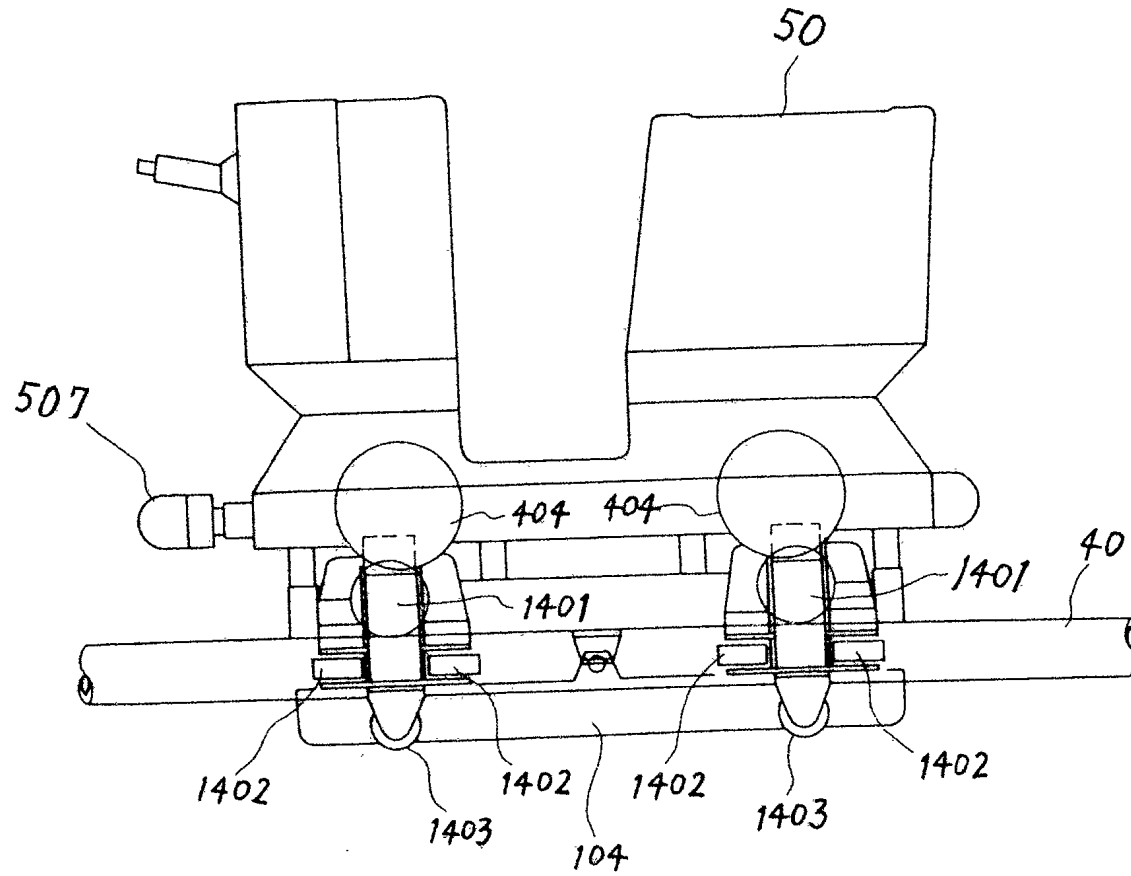


FIG. 12

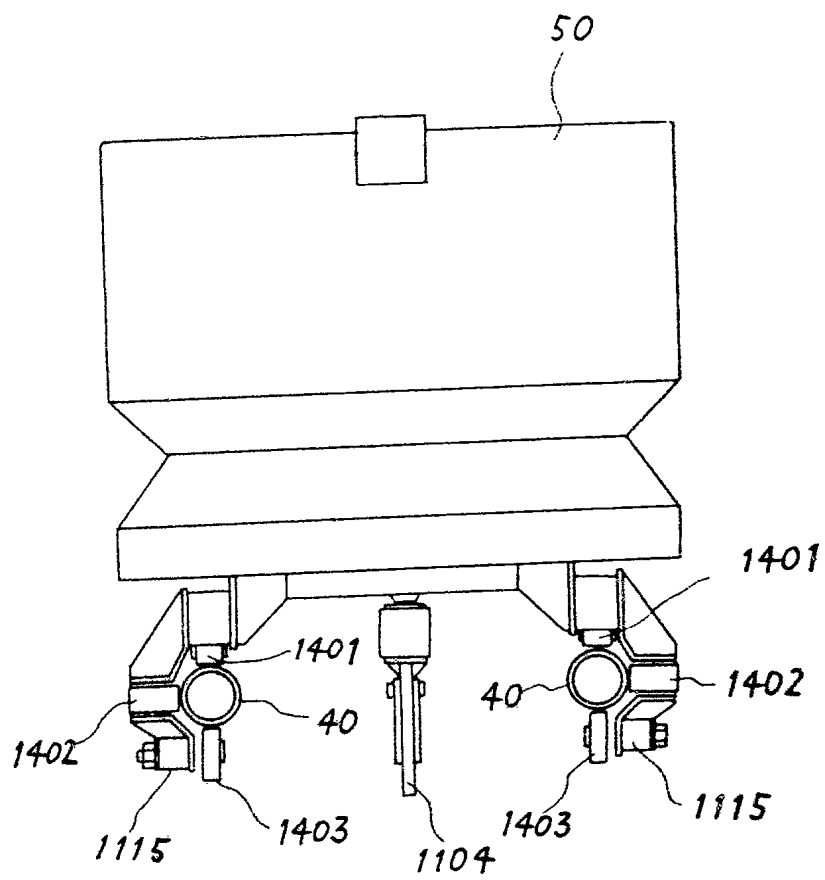


FIG. 13

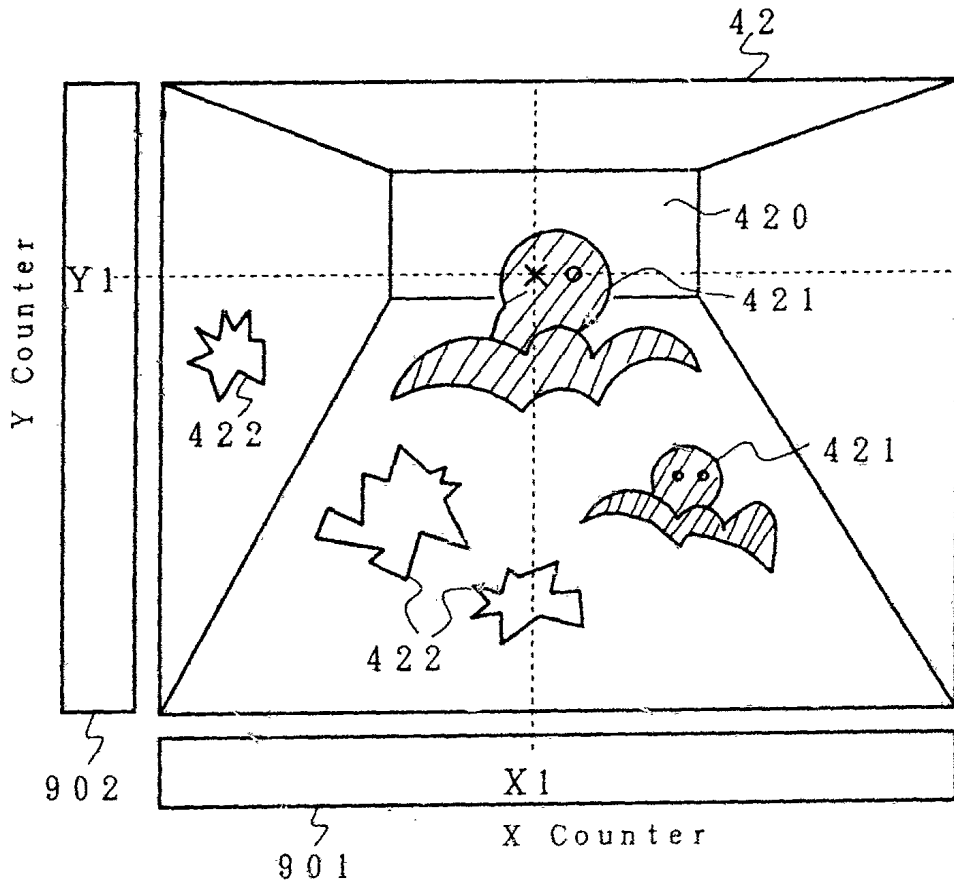


FIG. 14

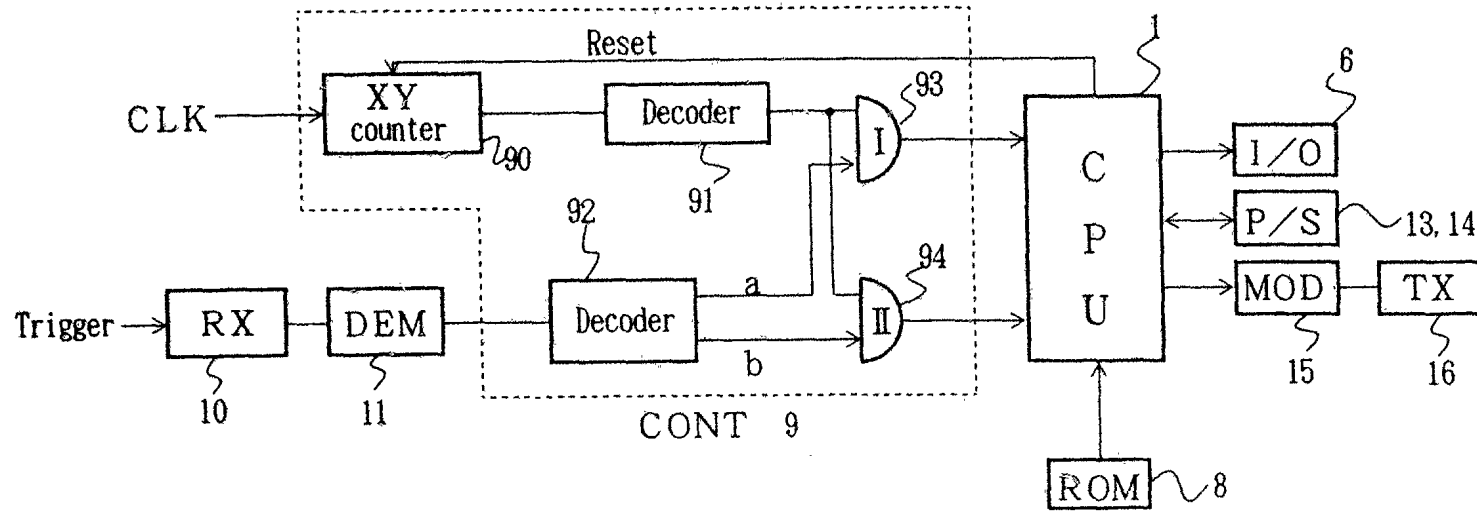


FIG. 15

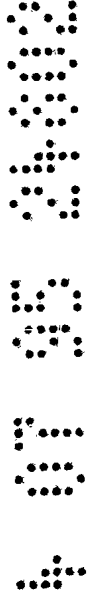
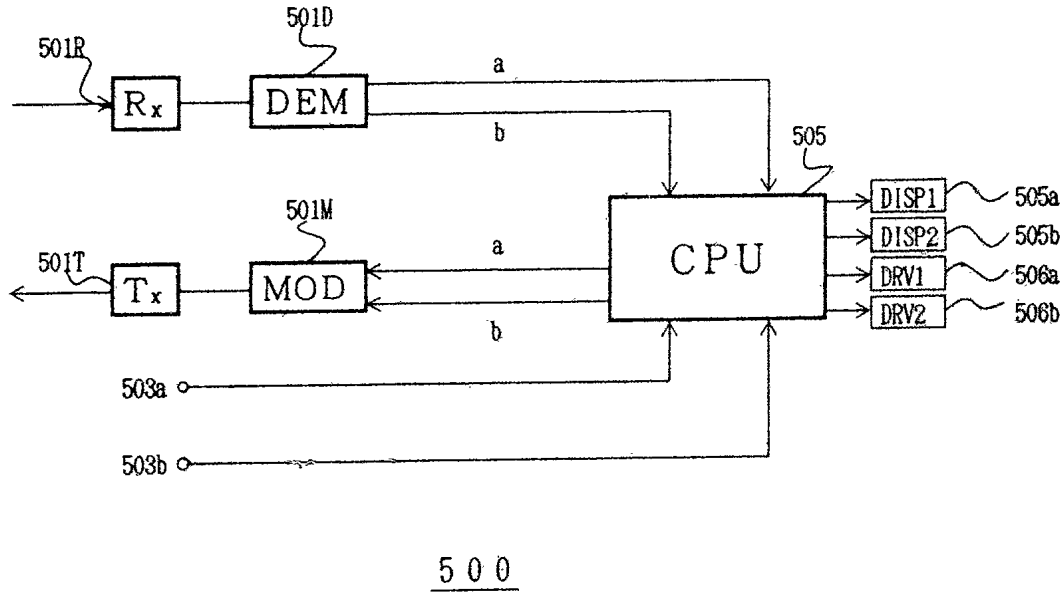


FIG. 16 PRIOR ART

