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(71) Applicant: **Bell-Fruit Manufacturing Company Limited**
Leen Gate Lenton
Nottingham NG7 2ND(GB)

(72) Inventor: **Muncaster, Hilton**
13 Harrington Drive
Nottingham(GB)

(74) Representative: **Duncan, Angus Henry et al,**
Barker, Brettell & Duncan 138 Hagley Road
Edgbaston Birmingham, B16 9PW(GB)

(54) **Amusement apparatus.**

(57) The basic idea is that a device for playing games should be controlled by players without physical contact with the device, to allow a greater flexibility in the control and use of the device. To this end, each player is provided with a terminal unit 22 which is unconnected to the main device 21 except by means of waves transmitted through the atmosphere, e.g. radio, sound or light waves. The player can operate the unit 22 so as to control some function which eventually leads to the result of the game being recorded, for example on a display 23 on the terminal unit. The terminal unit may transmit signals to the device 21 to allow the player to control the start and/or the playing of the game, but a form of apparatus is described in which the player is able to participate actively in a game using a terminal unit which receives signals sent out by the main device and does not need to be equipped with a transmitter.

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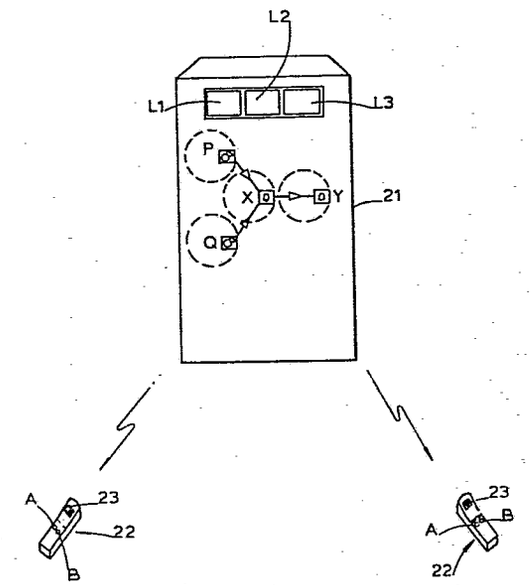

FIG 2

AMUSEMENT APPARATUS

This invention relates to the control of amusement apparatus for playing games, whether intended purely for amusement or for gaming purposes.

In some amusement arcades or other centres there is a central monitor console operated by a cashier. The console is wired to a number of amusement machines to enable the cashier to receive information on the state of play in each machine so that cash payouts, or at least those above a certain figure, can be made only by the cashier. In this layout, and in fact with all known amusement apparatus of the kind to which this invention relates, the machine is actually operated by the player standing in front of the machine and manipulating the appropriate controls on the machine. What is now proposed is that at least some of the functions normally performed by the player should, effectively, be possible without physical contact between the player and the machine.

According to the invention, in its broadest aspect, an amusement apparatus comprises a device adapted for playing games, recording means capable of recording the results of those games, and a terminal unit remote from and physically unconnected to the device, the device and the terminal unit being adapted to communicate one with the other by waves transmitted through the atmosphere,

and the terminal unit being provided with player-operable means for controlling an event which leads to a result being recorded by the recording means.

This basic idea gives rise to a considerable increase in flexibility in the use and control of amusement apparatus as will become clear from the following description. Despite this, and although amusement machines of various kinds have been in existence for many decades, and radio-control systems have been in use for at least thirty years, as far as the applicants are presently aware nobody has yet made a serious proposal of the kind which is now being put forward.

Communication between the main device and the terminal unit, or vice versa, may be achieved by use of, for example, radio wave transmissions (including inductive loop techniques), ultrasonic waves, or infra-red emissions. Information may be transmitted by amplitude or frequency modulation. Pulse position modulation is preferred because of its immunity to noise and multipath reflections. Where several sets of apparatus are to be installed in close proximity, e.g. in an amusement arcade, each set of apparatus can be arranged to operate on its own particular frequency or frequencies.

As one example of what is meant by an event which leads to a result being recorded by the recording means, the event may be the actual

playing of a game. In that case, the terminal unit would be capable of transmitting control signals to the device, e.g. for controlling the position of a "bat" on the screen in a video tennis game. As another example, the event could be the commencement of an otherwise automatic game, e.g. rotation of the reels in a so-called fruit machine. In a further example, the event could simply be the activation of the recording means to enable it to record a result.

One practical application of the invention lies in amusement machines installed in public houses. In such cases the player no longer has to leave his companions in order to operate the machine but can remain at the table or the bar whilst operating the terminal unit which could conveniently be a small hand-held unit, rather like a pocket calculator.

The recording means may, for example, be installed in the main game playing device or at a cashier's console, but preferably the recording means is incorporated in the terminal unit. The recording means may be in the form of a visual display or a non-visible recording, e.g. in a digital memory, or both. Thus the player has with him a record of his own results. When he no longer wishes to play he can pass the terminal unit to a cashier who reads the recorded information (using a suitable read-out device in the case of a non-visible recording) and then makes an appropriate cash adjustment with the player.

Although the possibility is envisaged of the main device being in communication with only a single terminal unit used by a single player, the invention is of particular value in games involving two or more participants. Thus the apparatus preferably includes two or more such terminal units for operation by different players. The apparatus could be arranged to allow the players to use the game playing device one at a time, as with conventional fruit machines, or simultaneously as in video tennis games. A particular advantage of having several terminal units is that maximum use can be made of the amusement device, which is an important consideration where the apparatus is used for commercial as distinct from domestic purposes. In addition a substantial number of people, each having a terminal unit, can compete one against the others so adding to the excitement provided by the apparatus.

The recording means could record separately the results of a series of games, but preferably the recording means is adapted to record the results of two or more games by adding credit units to a recorded total whenever one of those games results in a win. This enables the player to maintain a running total of his results, which may correspond directly with the value of his winnings. For example, a winning result to the value of 10p could lead to 10 credit units being recorded, and a winning result to the value of 50p could lead to 50 credit units being added to the recorded total. A losing result could lead to a deduction from the recorded total, or no alteration at all.

Preferably the recorded total of credit units is reduced, usually by a fixed amount, whenever the player-operable means is operated. This reduction represents a notional payment by the player for use of the apparatus, and is thus automatically taken into account in the final recorded total. As a practical example, a player wanting to participate in a game could apply to a cashier for a terminal unit, possibly making a payment to the cashier who, in return, enters an appropriate number of credit units in the terminal unit. Alternatively he could pay a fixed deposit, or nothing at all initially. He plays the game using the terminal unit and a display on the box shows his state of credit at any moment. When he no longer wishes to play he returns the terminal unit to the cashier and settles any outstanding credit or debit. The cashier returns the recorded total to zero, for example by the use of a key, ready to hand the terminal unit to another player. A cumulative account, which cannot be re-set to zero by the cashier, may be kept in the terminal unit for security and checking purposes.

Preferably the apparatus is arranged such that the waves transmitted through the atmosphere are transmitted only from the device to the terminal unit, and not the other way.

Whilst the basic idea of the invention is applicable to a wide variety of amusement apparatus such as fruit machines, pin tables, horse racing games and video games, the invention has been developed particularly for use in apparatus of the kind in which the game playing device is

adapted to produce a random result, and the device includes means for comparing each such result with one or more predetermined winning results in order to determine whether the result is a winning or a losing one. In some countries, e.g. West Germany, there is an official requirement that with apparatus of this kind, the device should run for a statutory minimum time, typically 15 seconds, before the random result is produced. With conventional apparatus, the player often finds this waiting period extremely tedious. There have been proposals to modify known apparatus so that the player can insert sufficient coins or tokens to pay for several games in advance. The idea is that he then operates controls on the apparatus to start a series of games which are then played off automatically, during which the player can leave the apparatus and participate in other activities. After an appropriate time the player returns to see what, if anything, he has won. The main disadvantage of this previous proposal is that the player gets no feeling of involvement in the games. With the present invention, the player can keep the terminal unit to hand whilst he has a drink or talks to his friends, and the apparatus can be adapted to allow the player to participate in the games at certain points without him having to return to the main amusement device.

In a preferred form of the apparatus, the recording means is incorporated in the terminal unit and the device is adapted to play automatically a series of games and the player-operable means is adapted such that operation thereof activates the recording means to record a result.

Thus it is not necessary for the terminal unit to transmit any signals and the player can simply elect the games in which he wishes to participate by activating the recording means at the appropriate times. Furthermore, a substantial number of people can use the machine at the same time and, by exercising their judgement as to which games to participate in, they can effectively compete against the other players.

The game playing device preferably transmits a signal at the commencement of each game and the recording means is activated by the signal only if the player-operable means is operated at the same time. Thus a player can elect to join a game only during a certain period at the commencement of each game.

The invention will now be further illustrated, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a block diagram of a video game apparatus incorporating the basic idea,

Figure 2 shows another kind of amusement apparatus embodying the invention,

Figure 3 is a logic diagram showing how the amusement device of Figure 2 operates, and

Figure 4 is a block diagram of one of the terminal units shown in Figure 2.

The video game shown in Figure 1 is a video tennis game comprising a main game playing device 1 and a pair of terminal units 2 for use by two players. The terminal units 2 are identical so only one is shown, together with the relevant portions of the game playing device.

The main device 1 comprises a conventional game generator 3 connected to a TV monitor 4 and having a control signal input 5 and a win signal output 6. Each terminal unit 2 has a start button 7, operation of which by a player generates a start signal which is passed to an encoder 8 which modulates a radio transmitter 9 with an appropriately encoded signal. The modulated output of the transmitter is then transmitted through the atmosphere from an aerial 10 on the terminal unit to an aerial 11 at the game playing device 1. The received signal is next fed through a receiver 12 to a decoder 13 which converts the signals into a form suitable for controlling the game generator 3. A start signal received at input 5 causes a game to commence and the players control the game generator by each manipulating a joystick 14 which generates control signals which are fed via the encoder 8, transmitter 9, receiver 12 and decoder 13 to the control signal input 5.

Eventually the game produces a winning result for one of the players and a losing result for the other. In the event of a win, a signal is generated at the output 6 which is fed via a win signal encoder 15, of which the output is used to modulate a further transmitter 16 which operates on a

different frequency to the transmitter 9 of the terminal unit. The modulated output of the transmitter 16 is fed to the aerial 11 where it is transmitted to the aerial 10 of the terminal unit. The received signal is then fed via a receiver 17 and a decoder 18 to a visual counter 19 which records the win.

Successive wins are added to the total on the counter to allow the player to maintain a record of his score. If a game produces a losing result for a player, nothing is added to his counter.

The apparatus could be arranged so that the score recorded on the counters is reduced by a set amount each time a game is initiated. Also, the counter 19 could be incorporated in the main device 1 and the portions of the circuit concerned with transmitting information from the main device to the terminal unit could be omitted.

The actual details of the circuitry are not important as far as the present invention is concerned, so full details have not been given. They will present no problem to people having ordinary skills in this field.

The apparatus shown in Figure 2 includes an amusement machine 21 containing a set of four rotatable discs P, Q, X and Y. The discs all carry a number of symbols around their peripheries, and when the discs are stationary a selected one of the symbols on each disc is visible through a respective window in the front of the machine. The machine also has three panels L1, L2 and L3,

which light up at appropriate times during a game, as will be described in detail below. The machine is connected to an inductive loop which, although not shown, runs around the entire area which the players occupy when they are using the machine.

Each player is issued with a hand-held terminal unit 22. One or more players may participate in a game, but by way of example two terminal units are illustrated in Figure 2. All the terminal units are substantially identical. Each terminal unit has two buttons, A and B, a liquid crystal numerical display 23, and a socket P (not shown in Figure 2).

Operation of the apparatus will now be described in detail with reference to Figures 3 and 4. Microprocessors are presently in widespread use for controlling amusement machines, and the flow diagram shown in Figure 3 is basically the programme by which a microprocessor controls the machine. As long as the machine is switched on, it automatically runs through a succession of game cycles irrespective of whether any players are participating or not. When a player wishes to use the apparatus he goes to a cashier and pays a deposit, and in return the cashier enters an appropriate number of credit units into a terminal unit using the socket P. This is achieved by feeding signals along connection 24 to an up/down counter 25. The credit units thus stored in the counter are shown on the display 23. The cashier then hands the unit to the player.

At the start of a normal game cycle panel L1 lights up and the machine sinultaneously transmits a coded signal I via the inductive loop. Provided the player is within the field of the loop, his terminal unit receives this signal via an internally mounted pick-up loop 26. The signal is then fed via a receiver 27 to a decoder 28 which produces a signal at an appropriate signal I output. This signal is fed to a participation latch 29, and whilst panel L1 is lit, if he wishes to participate in the game the player can, by pressing button A, operate the latch to remove an inhibit potential at output 30 and at the same time produce a signal at a further output 31 which decrements the counter 25 by a fixed amount. Removal of the inhibit potential allows an inhibit device 32 to pass signals II to VI as and when they are produced at the respective outputs of the decoder 28. Once the participation latch 29 has been set in this way, the inhibit potential is not reinstated until the latch is reset as described below.

If button A is not pressed at the appropriate time the inhibit device 32 remains inhibited by the potential at output 30, so that signals II to VI cannot be passed to the rest of the circuitry.

The next stage is the commencement of a game. The discs P, Q, X and Y are set in rotation and after a certain time the disc P is stopped in a random position. There are two possible forms of winning combinations, one represented by three selected symbols on the discs P, X, and Y, and the

other represented by a combination of symbols on the discs Q, X and Y. Panel L2 now lights up and a signal II is transmitted. The player can now, by pressing button B, elect to participate in the game determined by the discs Q, X and Y. The received signal II is passed to a game choice latch 33 and if button B is pressed the latch operates an electronic game switch to connect the signal IV output from the decoder to the "count up" input of counter 25. If button B is not pressed at the appropriate time the signal III output is connected to the counter, and the player thus participates in the game determined by the discs P, X and Y.

On termination of signal II, discs Q, Y and X stop in random positions in that order, disc X being the last to stop and carrying a jackpot symbol which, in combination with any symbols on the other discs, results in a win. This holds the player's interest until the very last disc stops rotating. The machine includes a conventional arrangement (not shown) for comparing the positions in which the discs stop, with certian predetermined winning positions. Appropriate signals are produced to indicate whether or not the discs have stopped in those winning positions. Signals III and IV are then transmitted, one after the other, to convey the results of games PXY and QXY respectively. Depending on the state of game switch 34 one signal only is fed to the counter 25 so that if the elected game results in a win, the counter is incremented by an amount which depends on the size of the win. The player can read his updated state of credit, recorded in

the counter, on the display 23. If disc X stops on the jackpot symbol, both signals III and IV transmit information to enable the appropriate number of jackpot credit units to be added to the counter. If a game PXY or QXY produces a losing result, and disc X does not stop on the jackpot symbol, the corresponding signal III or IV is not transmitted so that no credit units are added to the counter.

Whenever the elected game results in a win, an enable signal is generated by a second output 35 of the game switch 34. This signal primes a bonus latch 36 to a condition in which it is reponsive to a bonus signal V which may be transmitted at the end of a winning game, to indicate that the next game will be the first game of a bonus series.

A bonus game is one in which only the disc X rotates, the others remaining stationary, and there is thus a much higher chance of a win. A series of bonus games is awarded as a result of certain combinations being obtained in a normal game.

If the next game is not a bonus game a signal VII is transmitted and this is used to reset the participation latch 29 (and so inhibit passage of signals II to VI), game choice latch 33, game switch 34 and bonus latch 36 (but not the counter 25). A new game cycle then starts automatically.

If bonus signal V is transmitted to indicate that the next game is a bonus one, and the bonus latch 36 has been primed by the game switch 34, the bonus latch is set to permit a signal VI to be passed to the counter. The panel L3 lights to indicate to the player that a bonus game is about to commence. The bonus game is then played and the result is communicated by signal VI which adds an appropriated number of credit units to the counter if the bonus game results in a win. If the next game after that is one of a bonus series, a bonus signal is again transmitted and the bonus game cycle is repeated, but if the bonus series has ended the reset signal VII is transmitted and the next game is a normal one.

The number of bonus games in a particular bonus series depends upon the winning combination that resulted in the award of the bonus series. A bonus series may consist of as many as fifty games.

A player has freedom of choice as to whether or not he joins in a normal game but he can only do so whilst panel L1 is lit up. A game may result in a net loss or gain in his credit with the additional possibility of winning extra credit as a result of a bonus series. A player can compete against other players for the highest credit total by exercising his judgement as to whether a game will be likely to result in a win, although, of course, the results are completely random. The display enables the player to keep with him at all times a visual record of his state of credit.

When a player no longer wishes to participate he returns his terminal unit to the cashier who transfers the contents of the counter to a central credit register for security purposes via connection 37 and socket P, and resets the counter to zero via connection 38. The player then makes a cash settlement with the cashier according to his state of credit as read from the counter.

There is virtually no upper limit to the number of players who can participate in a game on one machine at a particular time. Furthermore the terminal units are all passive devices in that they do not transmit control signals to the machine.

In a further development, the bonus series may be played simultaneously with further normal games. For example, all the discs may spin on each such combined game and the bonus awards are decided by whether or not one or more of the discs stop on a bonus symbol.

Although an inductive loop transmission system has been used in the apparatus described above, other systems of wave transmission can be used. Again, there is nothing in the circuitry which could not easily be produced by a skilled person in the light of the foregoing description. An SL 490 transmitter integrated circuit has been used successfully with this apparatus, together with an ML 926 receiver and SL 480 pre-amplifier, all available from Plessey Semiconductors Limited.

CLAIMS

1. An amusement apparatus comprising a device (1,21) adapted for playing games, recording means (19,23) capable of recording the results of those games, and player-operable means (7,14; A,B) for controlling an event which leads to a result of one of those games being recorded by the recording means, characterised in that the player-operable means (7,14; A,B) is provided on a terminal unit (2,22) which is remote from and physically unconnected to the device (1,21), the device and the terminal unit being adapted to communicate one with the other by waves transmitted through the atmosphere.

2. An apparatus according to Claim 1, in which the recording means (19,23) is incorporated in the terminal unit (2,22).

3. An apparatus according to Claim 1 or 2, which includes two or more such terminal units (2,22).

4. An apparatus according to any preceding claim, in which the recording means (19,23) is adapted to record the results of two or more games by adding credit units to a recorded total whenever one of those games results in a win.

5. An apparatus according to Claim 4, in which the recorded total is reduced whenever the player-operable means (7,14; A,B) is operated.

6. An apparatus according to any preceding claim, in which the apparatus is arranged such

that the waves transmitted through the atmosphere are transmitted only from the device (1,21) to the terminal unit (2,22).

7. An apparatus according to any preceding claim, in which the device (1) is adapted to produce a random result and the device includes means for comparing each such result with one or more predetermined winning results in order to determine whether the result is a winning or a losing one.

8. An apparatus according to Claim 7, in which the recording means (23) is incorporated in the terminal unit (22) and the device (21) is adapted to play automatically a series of games and the player-operable means (A) is adapted such that operation thereof activates the recording means (23) to record a result.

9. An apparatus according to Claim 8, in which the device (21) transmits a signal (I) at the commencement of each game and the recording means (23) is activated by the signal only if the player-operable means (A) is operated at the same time.

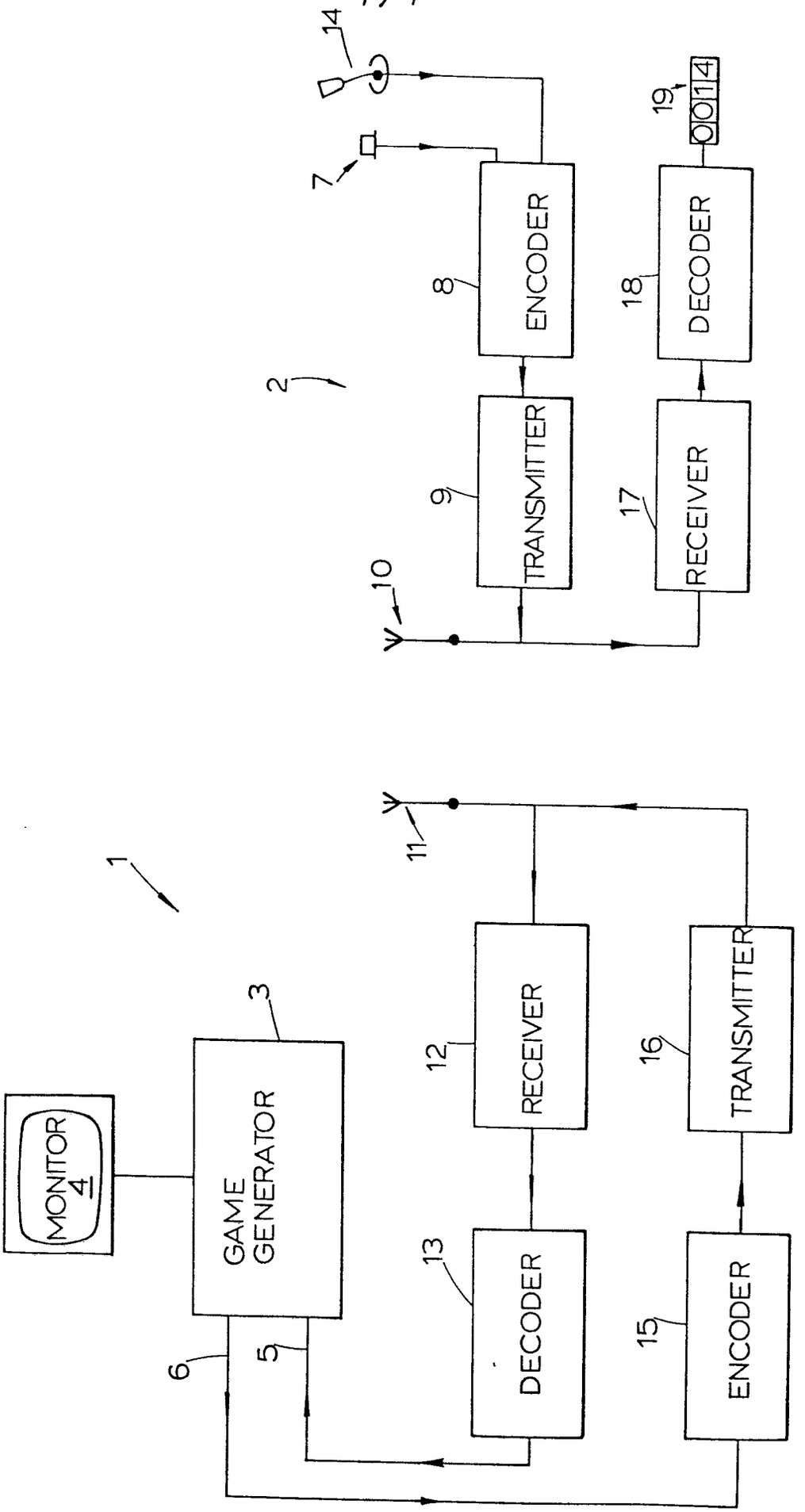
1
MONITOR 4
GAME GENERATOR
3
5
6
11
12
RECEIVER
13
DECODER
15
ENCODER
16
TRANSMITTER
2
7
8
ENCODER
9
TRANSMITTER
10
14
17
RECEIVER
18
DECODER
19
0014

FIG. 1

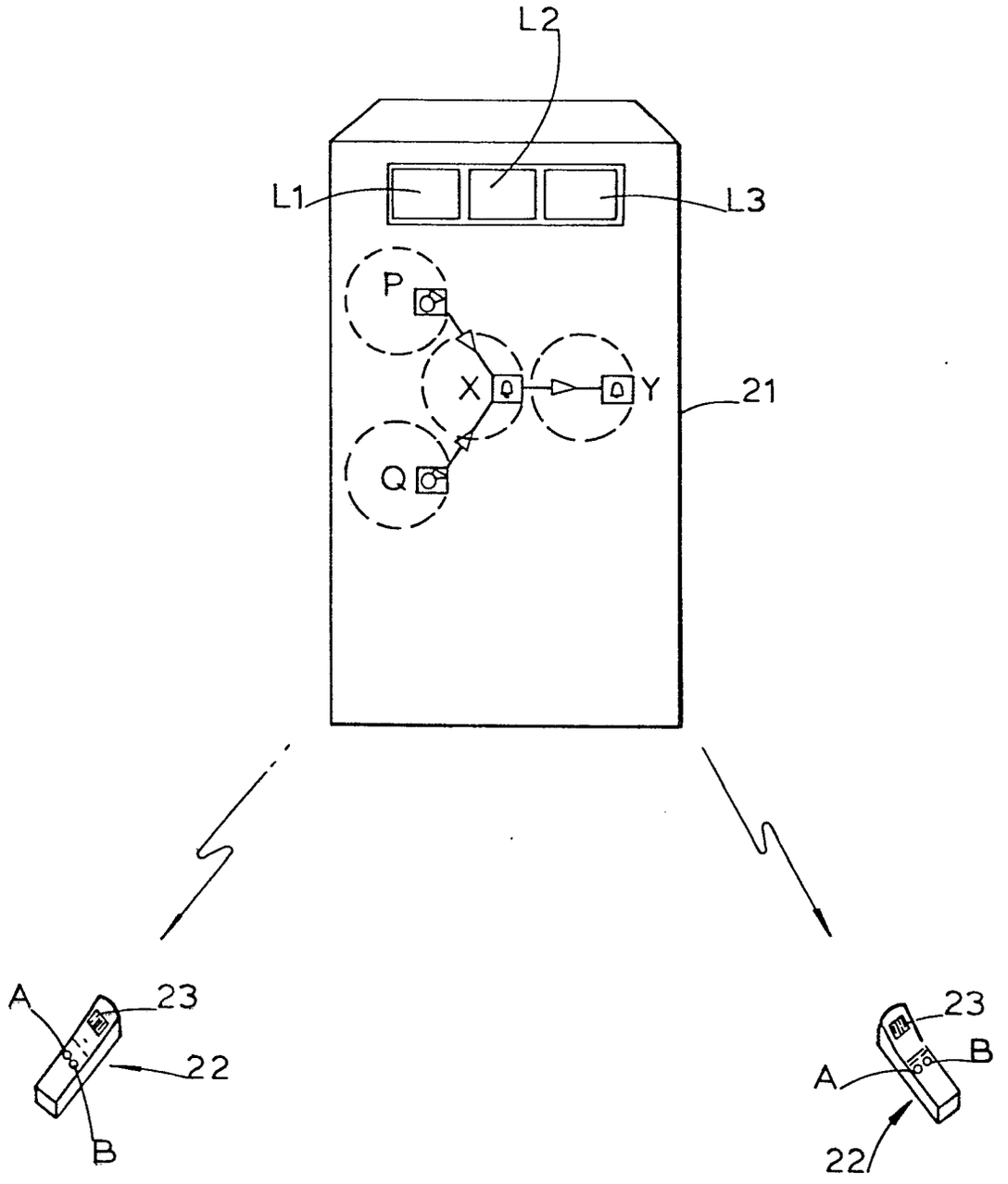

FIG. 2

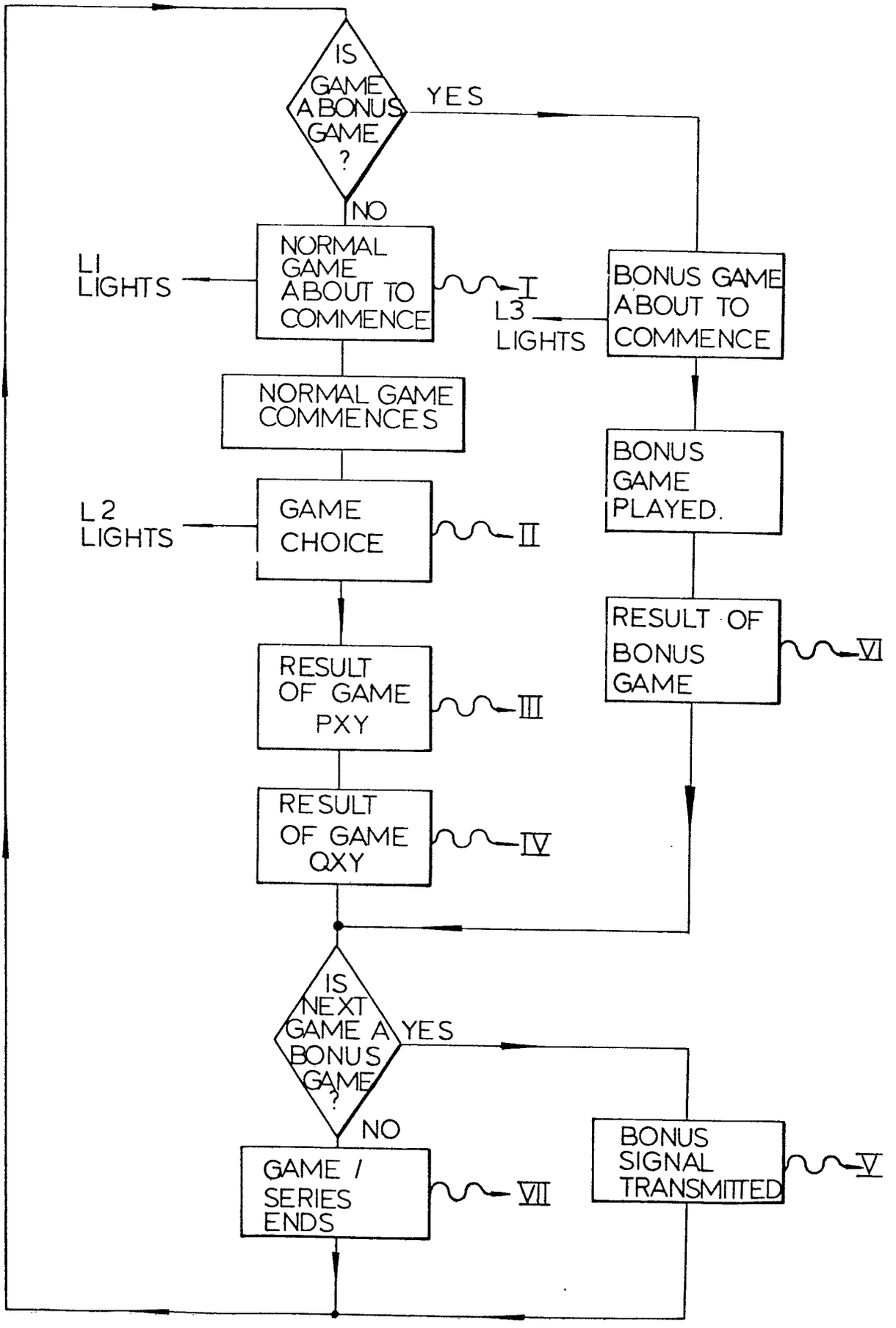
IS GAME A BONUS GAME ?
YES
NO
L1 LIGHTS
NORMAL GAME ABOUT TO COMMENCE
I
L3 LIGHTS
BONUS GAME ABOUT TO COMMENCE
NORMAL GAME COMMENCES
BONUS GAME PLAYED.
L2 LIGHTS
GAME CHOICE
II
RESULT OF BONUS GAME
VI
RESULT OF GAME PXY
III
RESULT OF GAME QXY
IV
IS NEXT GAME A BONUS GAME ?
YES
NO
BONUS SIGNAL TRANSMITTED
V
GAME / SERIES ENDS
VII

FIG 3

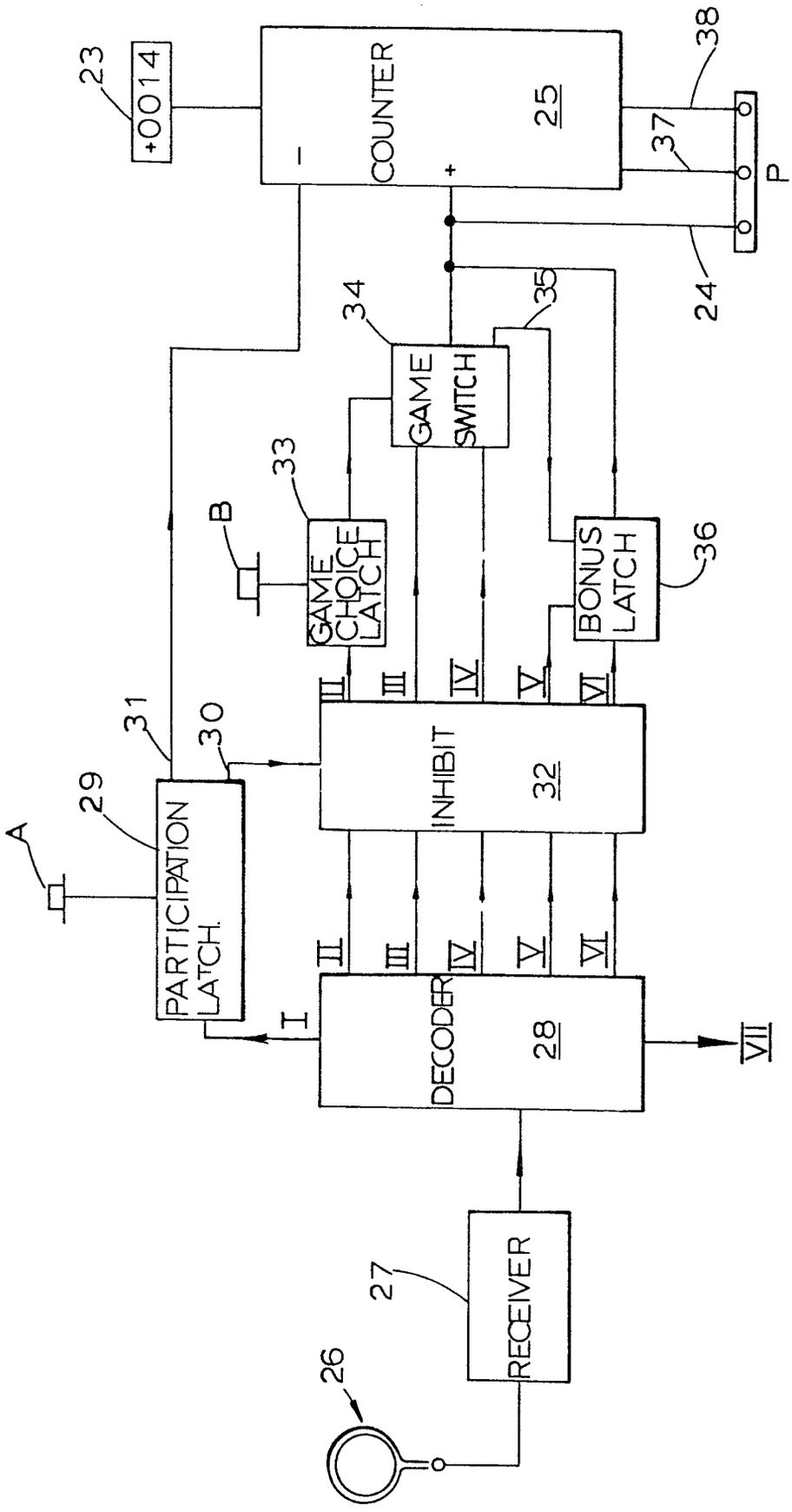
23
+0014
COUNTER
25
38
37
P
24
34
GAME SWITCH
35
33
B
GAME CHOICE LATCH
BONUS LATCH
36
II
III
IV
V
VI
31
30
29
A
PARTICIPATION LATCH.
INHIBIT
32
I
DECODER
28
VII
27
RECEIVER
26

FIG. 4