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71 Applicant: **BARCREST LIMITED**
Margaret Street
Ashton-under-Lyne Lancashire OL7 0QQ (GB)

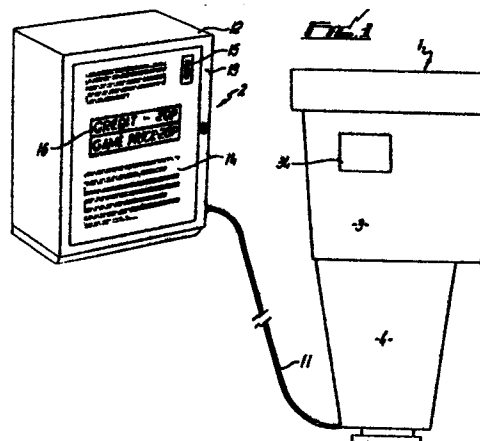
72 Inventor: **Wain, John Laurence**
74 Southdown Crescent
Cheadle Hulme Cheshire (GB)

Marshall, John Corrigan
Northgate House Honley
Huddersfield West Yorkshire (GB)

74 Representative: **Quest, Barry et al**
M'CAW & CO. 41-51 Royal Exchange Cross Street
Manchester M2 7BD (GB)

54 Operating system for a coin-free machine.

57 A coin-free machine such as a pool table has a coin mechanism (17) and a control unit (2) which is linked to an operating device (9) and is arranged to actuate the machine (1) when sufficient coins have been inserted into the coin mechanism (17). The coin mechanism (17) is in the control unit (2) and the control unit (2) is located remote from the machine. A link (11), such as an electric cable, is provided between the unit (2) and the machine (1). The unit (2) may monitor and store data relating to operation of the coin mechanism (17), and provision may be made for transferring this to a data recorder (28). The unit (2) may include a timer (18b) so that the valve of coins required to actuate the machine (1) can automatically change at different times of the day.



Description

OPERATING SYSTEM FOR A COIN-FREED MACHINE

This invention relates to an operating system for a coin-freed machine particularly although not exclusively a coin-freed pool table. The term coin as used herein includes both coins and tokens.

A known kind of coin-freed pool table has a ball rack concealed within the table. In order to play a game it is necessary to release the balls from the rack so that they run along runways to an access opening at one end of the table. This is effected by inserting a coin into an aperture in a coin mechanism slide and then pushing the slide in to cause the ball rack to tilt.

This known arrangement is of a wholly mechanical nature and is of limited versatility. Thus, the coin mechanism cannot readily be modified to allow for changes in game price, nor can it accommodate coins of a range of different denominations. Also, in practice, there are limited possibilities for collection of statistical data relating to use of the table.

Electronic coin mechanisms are available but there is the problem of incorporating these into tables, especially in the case of existing tables, without requiring undue constructional modification and such that the desired versatility can in fact be achieved in a convenient manner. Thus, if the coin mechanism is to be operatively connected to the ball rack to effect automatic tilting then it would be necessary either to run a power cable to the table or to provide a sufficiently powerful internal battery, neither of which arrangements would be generally acceptable in practical terms. Also, incorporation of the coin mechanism into the table to meet the requirements of: easy operational access for the player, good protection against vandalism and theft, and easy access to authorised personnel for maintenance, coin removal and data retrieval, would inevitably involve major restructuring of the table.

An object of the present invention is to provide a versatile operating system for a coin-freed machine which is convenient to install and use.

According to one aspect of the present invention therefore there is provided an operating system for a coin-freed machine, said system having a control unit, a link between the control unit and the machine, an operating device within the machine operable when actuated to put the machine into an operational state, and a coin mechanism operable to actuate the device when coins to a predetermined value have been inserted into the mechanism, characterised in that the control unit is at a location remote from the machine, and the coin mechanism is provided within the unit whereby the device is arranged to be actuated by the coin mechanism via the link between the machine and the control unit.

With this arrangement considerable versatility is possible in that it is possible to use an electronic or other desired coin mechanism, and this can be achieved in a convenient manner, even where the operating system is fitted to an existing machine, in so far as installation of the system need not require extensive structural modification to the machine and

access to the coin mechanism can be achieved as conveniently as desired by appropriate design of the control unit. Moreover, the link being disposed between the machine and the remote control system can be constructed as desired to meet requirements with regard to the nature of the link and the nature and location of the power source. In one embodiment, the link comprises a radiation link. In this case the operating device may be an electromechanical device, and the link may be a low voltage cable link where it is desired to avoid the inconvenience of a battery power source within the table or the inconvenience and possible risk of a high voltage (e.g. a.c. mains) power cable. Where a battery or other power source within the table is acceptable it is feasible to use a radiation link e.g. an ultrasonic or infra-red link. It is even possible to use a non-radiation non-electrical link e.g. a pneumatic or hydraulic line with which a suitable operating device in the machine can be operated by change in fluid pressure in the line effected by suitable apparatus in the control unit. A pneumatic/hydraulic power source may be provided in the unit and/or the machine. The arrangement of the invention can be advantageous over known systems even where an internal battery source or other power source is provided in so far as the control unit can be powered separately from the power source (e.g. from a local mains source) whereby any failure of the battery need not involve failure of the coin mechanism or of any associated control devices contained in the control unit.

A further advantage of the use of the remote control unit is that this can be conveniently constructed, independently of the construction of the machine, to give good security with easy access for authorised personnel.

In a preferred embodiment, where the machine is a coin-freed pool table or other floor-standing game-playing machine, the control unit may be housed in a box structure mounted on a nearby room wall.

The said operating device may be an electromechanical device for example comprising a solenoid or motor. Where the machine is a pool table, the device may be arranged to tilt the usual ball rack or take other action to release balls to make these accessible to the player.

The control unit preferably incorporates, in addition to the coin mechanism, electronic circuitry arranged to monitor and record data pertaining to the usage of the machine, for example, the number of times the machine is used, the value of coins inserted, the frequency of use at different times of the day. This data may be made available for access to an authorised person in any suitable manner. In particular, the data may be stored so that it can be collected electronically for subsequent assessment at a central control location. Thus, and in accordance with a second aspect of the present invention there is provided an operating system for a coin-freed

machine, said system comprising a control unit, an operating device within the machine operable when actuated to put the machine into an operational state, a coin mechanism operable to actuate the device when coins to a predetermined value have been inserted into the mechanism, characterised in that the coin mechanism is provided within the unit and electronic circuitry is provided within the unit connected to the coin mechanism arranged to monitor and store data relating to operation of the mechanism, and an interface is provided via which said stored data can be transferred to data receiving equipment.

The arrangement may be such that portable data receiving equipment is plugged into the interface to receive the data, and the equipment is then transported to a remote central control location at which the data in the equipment is transferred to a computer for storage and analysis.

The data received by the equipment may additionally include site information e.g. identifying the machine and/or its location. This site information may be derived from a plug-in key or the like which is inserted into the control unit which may therefore be of standardised form. For security reasons, before data can be received by the equipment it may be necessary for the person collecting the data to identify himself or herself to the control unit e.g. by insertion of a plug-in key into the unit.

The system of the second aspect of the invention may have all of the features of the first aspect of the invention.

The aforesaid electronic circuitry of the control unit may also act to control operation of the coin mechanism and/or the machine in accordance with a predetermined operational program. In particular the circuitry may include a real time clock and the arrangement may be such that, in the case of a game-playing machine, the price per game is varied at different times so that the price is reduced at less popular playing times.

Thus and in accordance with a third aspect of the present invention, which may be combined with the first and/or second aspect, there is provided an operating system for a coin-freed machine, said system comprising a control unit, an operating device within the machine operable when actuated to put the machine into an operational state, and a coin mechanism which is pre-set to actuate the operating device when coins to a predetermined value have been inserted into the mechanism, characterised in that the coin mechanism is provided within the unit, and electronic circuitry is provided within the unit connected to the coin mechanism, said circuitry including a real time clock and being arranged to change the said pre-setting so as to change the predetermined value of coins required to actuate the device at predetermined times.

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

Figure 1 is a diagrammatic representation of one form of an operating system according to the present invention connected to a coin-freed pool table;

Figure 2 is a block circuit diagram of the arrangement of Figure 1; and

Figure 3 shows equipment for use in obtaining data from the system of Figure 1.

With reference to the drawings, Figure 1 shows a coin-freed pool table 1 connected to a remote control unit 2. The pool table 1 is generally of conventional form and comprises a large box structure body 3 mounted on floor-standing legs 4. The body 3 supports a top playing surface and within the body beneath this surface there is an elongate ball rack 5 (Figure 2) which is connected via runways to pockets at the periphery of the playing surface and also to an outlet aperture at one end of the table.

The ball rack 5 has a support surface 6 on which the usual pool object balls can be retained in a row when this surface is disposed generally horizontally. The rack 5 can be tilted to allow the balls to escape from the surface 6 over one longitudinal edge 7 thereof to run to the outlet aperture in the table 1 and this tilting is effected by longitudinal movement of a rod 8 connected to the rack 5 at one end thereof. With a conventional all-mechanical table, the rod 8 is connected to a slide-operated coin mechanism. A coin of the requisite denomination is inserted into the slide which projects from the front side of the table, and the slide is pushed in so that the coin falls into an internal cash box and the rod 8 is moved to tilt the rack. The slide is then pulled out whereupon the balls are allowed to run to the outlet aperture and the rack is returned to the horizontal position ready to retain pocketed object balls.

With the arrangement shown in the drawings, in place of the mechanical coin mechanism there is an electromechanical actuator for example comprising an electric motor 9 connected via a crank linkage 10 to the rod 8. Rotation of the motor acts to move the rod 8 axially backwards and forwards in like manner to the action of the conventional coin slide.

The motor 9 is connected to the control unit 2 via a low voltage cable 11. The unit 2 is mounted at a convenient position, for example, on a nearby wall of the room in which the table is located, and the cable 11 is suitably installed in a protected/concealed manner down one leg of the table, along the floor, and up the room wall.

The control unit 2 comprises a box structure 12 having a locked front door 13 containing a display panel 14. On the display panel 14, in addition to printed instructions and the like, there is a coin slot 15 and an alphanumeric LED display 16. Within the box structure 12 there is an electronic coin mechanism 17 connected to the coin slot 15 and electronic control circuitry 18 connected to the display 16 to the coin mechanism 17 to mains supply 19 to an interface arrangement 20 and to a triac switching circuit interposed between a transformer 21a connected to mains supply the low voltage cable 11, and to the cable 11 itself. The electronic control circuitry 18 includes a programmed microprocessor-based control circuit 18a and a real time clock 18b. The circuitry 18 is further connected to a door switch 32 and an audible alarm 33.

The electronic coin mechanism 17 is of a known kind. It is capable of receiving and validating coins of

a range of denominations and it is arranged to produce an electrical signal at an output 22 representative of the value of validated coins. The control circuit 18 is arranged to store the level of credit and an output signal is fed to the switch 21 when a predetermined level of credit is reached. This predetermined level can be changed as explained hereinafter. Verified coins are discharged into a cash box locked within the box structure 12.

As coins are inserted, the credited value is indicated on the display 16. This display 16 also provides information (e.g. the price of a game). When the requisite level of credit has been attained the signal from the control circuit 18 causes the triac switch 21 to be actuated so as to cause low voltage to be supplied to the motor 9 via the cable 11 thereby to cause the rod 8 to be moved to tilt the ball rack 5. A limit switch (not shown) may be connected to the cam link 10 so that supply of power is interrupted after tilting of the rack has been completed thereby to allow the rack to return to the horizontal position under the influence of a spring. The load across the cable 11 is monitored by the control circuit 18 and the switch 21 is deactuated when the motor circuit is opened by the limit switch. Also, the control circuit 18 can monitor the load and take appropriate action (e.g. by switching off the coin mechanism 17 and preventing further use of the pool table) if there is a fault in the motor circuit.

The control circuit 18 includes a memory device which is powered with a rechargeable battery or is otherwise of a non-volatile nature. Data relating to use of the pool table is stored in the memory device, such data comprising for example (but not necessarily limited to) number of games played, value of coins inserted into and credited by the coin mechanism, frequency of games played at different times of the day.

The interface arrangement 20 includes a jack socket 24 and two multi-pin sockets 25, 26. One socket 25 contains a site identifying key 27. This comprises a removable plug the pins of which are interconnected in a predetermined pattern unique to the site at which the pool table is located.

Periodically, when the door 13 is unlocked and coins are collected from the cash box in the unit 2, the collector can also collect data with equipment 28 as shown in Figure 3. The equipment 28 comprises a portable battery-powered unit containing a memory device and having a keyboard 29 and an alphanumeric display device 30. There is a trailing jack plug 31 which can be inserted into the socket 24. When the door is unlocked the door switch 32 is actuated and the audible alarm device 33 is triggered in the control unit 2. In order to silence the alarm and enable transfer of data from the memory device of the control circuit 18 into the memory device of the equipment 28 it is necessary for the collector to insert an identifying plug into the other multi-pin socket 26. The identifying plug has its pins interconnected in a predetermined pattern unique to the collector. Data representing the game-playing information stored in the memory device and also representing the site and collector identification codes (and possibly a code identifying the table

which may be programmed into the control circuit 18 or may be defined by the site key 27 in the socket 25) is then transferred serially from the interface 20 to the memory in the equipment 28. Data relating to date and time of collection and also information relating to machine faults, attempt at tampering with the unit, incidences of opening of the door 13 etc. may also be transferred. The transfer operation can be controlled using the keyboard 29 in correspondence with prompts appearing on the display 30. Other data can also be entered via the keyboard and stored in the memory. In particular, the value of collected coins can be entered.

The collected coins and the equipment are then taken to a central control location where the data stored in the equipment memory is transferred via the jack plug 31 to a computer for analysis purposes. For example, the cash collected can be compared with the cash credited on the coin mechanism.

The arrangement described above permits great versatility. The coin mechanism 17 can be used with coins of a range of different denominations and there is the possibility of storing credit so that two or more games can be purchased in advance. The circuit 18 can be pre-set for a desired price per game and the pre-setting can be readily changed, to allow for changes in game pricing, as desired. In particular, the game pricing may change in accordance with the time of day and the day of the week (as determined from the real time clock) so that the game price is less expensive at less popular times and more expensive at very popular times. The pattern of price changing may be selected for the particular site and may be programmed into the control unit by means of press buttons or a keyboard within the unit utilised in conjunction with the alphanumeric display 16. Alternatively the programming may be effected automatically when the site identifying plug is inserted into the unit as determined by the coded wiring of the plug.

It will be appreciated that the system described above can be fitted to an existing pool table in a particularly simple and convenient manner. Thus, it may only be necessary to remove the usual coin mechanism, fit the actuator within the table, close the coin mechanism aperture with a suitable plate 34, and run the cable 11 to the nearby control unit 2. Extensive structural modification of the table is not required. Moreover, it will be understood that a standardised control unit 2 can be used with different pool tables, differences in requirements being accommodated by differences in programming of the circuit 18 derived from the coding of the site key 27 and/or as entered on setting up the unit 2 with press buttons or the like as mentioned above.

The coded plug 27 inserted into the socket 25 and the plug inserted into the socket 26 are described as wired plugs but alternatively (and preferably) one or both (preferably both) may include a readable memory device (e.g. ROM) additionally or alternatively (preferably alternatively) to the coded wiring.

Additionally or alternatively to transfer of data using the portable device 28, the control circuit 18 may be arranged to be connected to the remote central computer via a telephone line or other data

link so that data can be transferred remotely. Such a link may also be used to transmit data or instructions to the circuit 18 e.g. instructions for the changing of the price per game.

It is of course to be understood that the invention is not intended to be restricted to the above details which are described by way of example only. For example, alternatively or additionally to controlling release of balls from a ball rack as described, the control circuit 18 may act to control playing time using the timing facility incorporated in the circuit 18. Thus, after accumulation of sufficient credit for a game, the balls may be released e.g. by lifting of a barrier whereby pocketed balls are returned to the player until a predetermined time has elapsed whereupon the barrier is lowered and balls are retained as they are pocketed. Any other suitable time-based control procedure may be utilised. Alternatively or additionally, auxiliary functions may be time controlled, such as lighting of the table. Thus, the usual overhead canopy light may be switched on at the start of a game and switched off after a predetermined time.

The control unit may be arranged to give a bonus credit if a predetermined amount of money is inserted; e.g. insertion of £1.00 may give £1.20 game playing credit.

Claims

1. An operating system for a coin-freed machine, said system having a control unit (2), a link (11) between the control unit (2) and the machine (1), an operating device (9) within the machine (1) operable when actuated to put the machine (1) into an operational state, and a coin mechanism (17) operable to actuate the device (9) when coins to a predetermined value have been inserted into the mechanism (17), characterised in that the control unit (2) is at a location remote from the machine, and the coin mechanism (17) is provided within the unit (2) whereby the device (9) is arranged to be actuated by the coin mechanism (17) via the link (11) between the machine (1) and the control unit (2).

2. A system according to claim 1, characterised in that power is supplied along the link (11) from the control unit (2) to the operating device (9) for powering operation thereof.

3. A system according to any one of claims 1 or 2, characterised in that the said machine (1) is a pool table.

4. A system according to claim 3, characterised in that the operating device (9) is arranged to release balls from a storage rack (5) of the table.

5. A system according to any one of claims 1 to 4, characterised in that the control unit further incorporates electronic circuitry (18) arranged to monitor and record data pertaining to the usage of the machine (1).

6. An operating system for a coin-freed machine, said system comprising a control unit

(2), an operating device (9) within the machine (1) operable when actuated to put the machine into an operational state, a coin mechanism (17) operable to actuate the device (9) when coins to a predetermined value have been inserted into the mechanism (17), characterised in that the coin mechanism (17) is provided within the unit (2) and electronic circuitry (18) is provided within the unit connected to the coin mechanism arranged to monitor and store data relating to operation of the mechanism, and an interface (20) is provided via which said stored data can be transferred to data receiving equipment (28).

7. A system according to claim 6, characterised in that portable data receiving equipment (28) is arranged to be plugged into the interface (20) to receive the data.

8. A system according to claim 6 or 7, characterised in that the receiving equipment (28) is arranged additionally to receive site information data.

9. A system according to claim 8, characterised in that the site information is derived from a plug-in key inserted into the control unit (2).

10. A system according to any one of claims 6 to 9, characterised in that data can only be received by the said equipment (28) after insertion of a plug-in identification key into the unit.

11. A system according to any one of claims 6 to 10, which is also a system according to any one of claims 1 to 5.

12. A system according to any one of claims 1 to 11, characterised in that the control unit (2) contains electronic circuitry (18) arranged to control operation of the coin mechanism (17) and/or the machine (1) in accordance with a predetermined operational program.

13. An operating system for a coin-freed machine, said system comprising a control unit (2), an operating device (9) within the machine (1) operable when actuated to put the machine into an operational state, and a coin mechanism (17) which is pre-set to actuate the operating device (9) when coins to a predetermined value have been inserted into the mechanism (17), characterised in that the coin mechanism is provided within the unit, and electronic circuitry (18) is provided within the unit connected to the coin mechanism, said circuitry including a real time clock (18b) and being arranged to change the said pre-setting so as to change the predetermined value of coins required to actuate the device (9) at predetermined times.

14. A system according to claim 13, which is also a system according to any one of claims 1 to 12.

