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(54) COIN SENSOR SYSTEM FOR VENDING MACHINES

(57) Coin sensor system for automatic vending machines, used preferably in all automatic machines and apparatus which are operated by inserting coins and which are power supplied by batteries. The sensor system comprises a metal body (3) integral with the structure of the selector (1) arranged in relation to the introductory slot of coins into the selector wherein the coins bump into each other. Sensor means are provided to detect the mechanical vibrations of the collisions or impacts of coins with the metal part in order to transform such mechanical vibration into an electric vibration, means for cleaning the square wave provided by the comparator, means for activating the switch for supplying power to the electronic coin control and measuring system, and means for desactivating the power supply switch to the electronic control and measuring system.

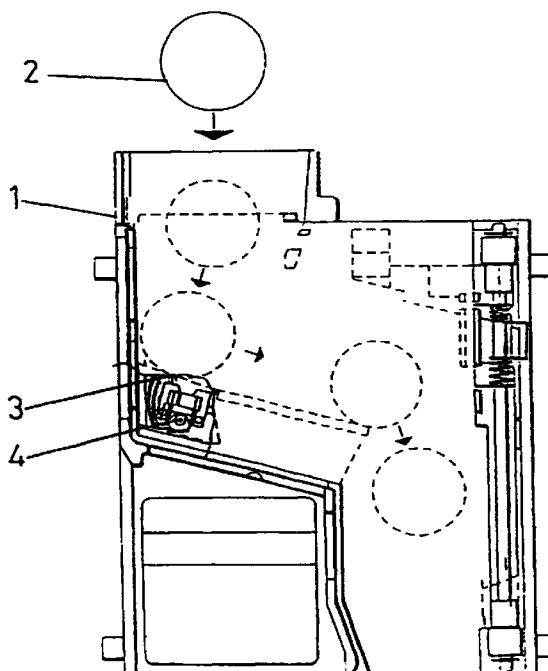


FIG.1

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Description

OBJECT OF THE INVENTION

[0001] As expressed in the title of the present specification, the following invention consists of a coin sensor system for vending machines, which is mainly useful for inclusion in automatic machines or apparatus, that are coin operated and whose energy is supplied by batteries, in such a way that by means of the existing sensor system, there is a constant sensor for the detection of the passing of coins and a minimum energy consumption.

[0002] The coin sensor system is arranged close to the coin slot in the selector, and the same is based on a sensor that detects and measures the vibration produced by the dropping of the coins upon a metal piece, integral to the structure itself of the selector, in such a way that the sensor upon detecting that the coin must be validated, generates a signal in order to apply a supply to the rest of the electronic coin control and measuring system.

[0003] Hence, the sensor system acts in relation to the hardness of the coin, in such a way that if the element inserted into the selector does not have a certain hardness, the vibration produced will be below a reference threshold and the system will remain in standby the inserted element being directly returned, whereby there is a first selection of the elements inserted in accordance with the hardness thereof.

FIELD OF APPLICATION

[0004] The coin sensor system that is presented is especially applicable in automatic machines or apparatus, that are coin operated and whose energy is supplied by batteries.

BACKGROUND OF THE INVENTION

[0005] In connection with coin operated automatic machines or apparatus, one can differentiate first of all those that due to the energy consumption there is no inconvenience that certain systems are continuously energized, such as all of them that are connected to the mains, and those machines and apparatus in which it is necessary that energy consumption is reduced to the maximum, given the consumption of the apparatus or machine and that the energy is supplied by batteries.

[0006] In this way, in certain apparatus or machines, above all if the energy is supplied thereto by batteries, an attempt is made to keep the major electric and/or electronic systems energized the minimum time possible, and that these systems are supplied with energy only when they have to operate, while the rest of the time the system is kept in standby, and does not consume energy.

[0007] Thus, in certain automatic apparatus and

machines that are coin operated, close to the coin slot in the selector, there are some photodiodes, upon which the coin operates directly or by means of a mechanism operable by the coins themselves, that makes the electronic system activate so that the coins are validated.

[0008] Starting from these premises, the materialization of the activating mechanism, can be carried out in many different forms, and thus in general outline we can consider that mechanism that is defined by an L-shaped strip that rotates with regard to its vertex, in such a way that one of its legs is above the coin slot and its other leg is interposed between a pair of diodes, the rotation thereof being caused by the passing of the coins.

[0009] With this general structure, in order to have an energy saving, what is done is that the photodiodes are not continuously activated, but rather the activation thereof is produced each interval of time for the purpose of producing an energy saving, but at the same time the deactivation periods are so short that they permit the detection of the presence of any coin. In short, they do not represent a totally ideal system for those apparatus or machines whose energy is supplied by batteries.

[0010] Hence, it is a question of reducing energy consumption, for which purpose an attempt has been made to increase the disconnection intervals of the photodiodes, there being the inconvenience that any coin inserted and undetected because the photodiodes that detect the presence of the coin and that energize the electronic validation system are disconnected, the coin is therefore directly returned in such a way that the reduction of energy output has been reduced to "milliamperes".

DESCRIPTION OF THE INVENTION

[0011] The present specification describes a coin sensor system for vending machines, which is especially useful in all those automatic apparatus and machines, that are coin operated, and whose energy is supplied by batteries, the sensor system being basically constituted by a metal body integral to the structure itself of the selector, which is in relation to the coin slot in the selector, and upon which all the coins upon being introduced therein knock, there being means to detect the mechanical vibration of the knocking of the coins against the metal piece, in order to convert this vibration into electric vibration, means to clean the square wave provided for by the comparator, means to activate the switch of energy supply to the electronic coin control and measuring system, and means to deactivate the switch of energy supply to the electronic control and measuring system.

[0012] The sensor means of the mechanical vibration of the knocking of the coins against the metal piece, in order to convert this vibration into electric vibration, are defined by a sensor placed close to said metal piece, considering the electric signal as valid, as long as the signal is above a reference level (Uref) defined by the

comparator that the sensor system includes, so that the system is not activated by mechanical vibrations unattributable to the insertion itself of the coins.

[0013] The means for cleaning the square wave provided for by the comparator are defined by a Schmitt device that cleans it on the sides, given that when coins are inserted, the coins bounce against the metal piece itself, in such a way that the bounces produced are thus eliminated.

[0014] The means to activate the switch that supplies energy to the electronic coin control and measuring system are defined by a bistable device that is activated by the Schmitt device switching it at the same time that it activates the switch, feeding the CPU while it operates.

[0015] The deactivating means of the switch that supplies energy to the electronic control and measuring system are defined by the bistable device that upon being reset by the electronic system itself, once the control and measuring operation has ended, deactivates the switch, the electronic control and measuring system going to the standby state.

[0016] In order to complete the description that is going to be made hereinafter, and for the purpose of providing a better understanding of the characteristics of the invention, the present specification is accompanied by a diagram, in whose figures in an illustrative and non-restrictive manner, the most characteristic details of the invention are represented.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Figure 1 shows a front view of the rear part of the coin passage channel, one being able to see the representation of the sensor arranged in relation to the metal body upon which fall the coins for the purpose of detecting the vibration of the coins themselves when they knock against the metal body, integral to the structure itself of the selector.

Figure 2 shows a schematic block diagram, regarding the activation of the electronic system to validate coins, which is activated by the sensor upon picking up the vibration of the corresponding coins upon falling on the metal body placed in relation to the coin slot of the selector.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0018] In view of the cited figures and in accordance with the numbering used therein, we can see how the selector (1) has a slot for the coins (2) to be validated, all of the coins falling on a metal body (3), close to a piezoelectric sensor (4), for the purpose of converting the mechanical vibration into electric vibration.

[0019] For this purpose, the sensor system has a comparator (5) for the purpose of establishing a minimum reference level (Uref) necessary to consider as

valid the electric signal of the piezoelectric sensor (4). Thus, a minimum threshold level necessary to accept the operation of the rest of the electronic coin control and measuring system is established.

[0020] Likewise, the sensor system includes connected to the comparator (5) a Schmitt device (6) so that in the event that the vibration produced by the knocking of the corresponding coins (2) against the metal body (3), above the reference threshold the square wave provided for by the comparator (5) to the Schmitt device, the Schmitt device cleans it on the sides and activates the bistable device (7) putting it in the switched state and activating the switch (8) (on) that supplies the electronic measuring system defined by a CPU (9) with the logic circuit and the analogic circuit.

[0021] In this way, the bistable device (7) stays activated while the validation of the corresponding coins takes place, and once the system has finished operating, the same will retrigger or reset the bistable device (7) deactivating the switch (8) and with this cutting off the supply to the electronic coin control and measuring system.

[0022] In figure 2 one can see the block that is continuously supplied, that is to say, the sensor (4), the comparator (5) and the Schmitt device (6) and the bistable device (7), achieving a reduction of energy output down to microamperes, with the big advantage that this represents, above all for all those machines and apparatus whose energy is supplied by batteries.

[0023] In short, the new sensor system of the presence of coins represents a big advantage, and the same is a result of logical development, given that the owner of the present application, is also owner of Patent of Invention P9602334 which presents a coin discriminating system, which is based on the inclusion of a solid body inlaid integrally in one of the walls of the passage channel of the coins to be validated projecting slightly with regard to the level of the wall towards the passage channel in such a way that all the coins knock against the cited solid body that has a curved surface in order to allow the coins to continue rolling, the mechanical vibration produced during the knocking of the coins being converted into electric vibration by means of a sensor or transducer in order to validate the coins.

Claims

1. Coin sensor system for vending machines, which is preferably useful in all those automatic machines and apparatus that are coin operated and whose energy is supplied by batteries, characterized in that the sensor system comprises a metal body (3) integral to the structure of the selector (1) arranged in relation to the coin slot in the selector, upon which knock the coins upon entering the same, having means to detect the mechanical vibration of the knocking of the coins, against the metal piece in order to convert this vibration into electric vibration,

means to clean the square wave provided for by the comparator, means to activate the switch of energy supply to the electronic coin control and measuring system, and means to deactivate the switch of the supply of energy to the electronic control and measuring system. 5

2. Coin sensor system for vending machines, according to claim 1, characterized in that the means to detect the mechanical vibration of the knocking of the coins against the metal piece (3), in order to convert this vibration into electric vibration, are defined by a sensor (4) arranged close to the metal piece (3), considering as valid the electric signal, as long as it is above a reference level (U_{ref}) defined by the comparator (5). 10 15
3. Coin sensor system for vending machines, according to claim 1, characterized in that the means to clean the square wave provided for by the comparator (5) are defined by a Schmitt device (6) that cleans it on the sides. 20
4. Coin sensor system for vending machines, according to claim 1, characterized in that the means to activate the switch (8) of energy supply to the electronic coin control and measuring system (9) are defined by a bistable device (7) that activates the Schmitt device switching it at the same time that the switch (8) is activated. 25 30
5. Coin sensor system for vending machines, according to claim 1, characterized in that the means to deactivate the switch (8) of supply of energy to the electronic control and measuring system (9) are defined by the bistable device (7) that upon being reset by the electronic system itself (9), once the control and measuring operation has been completed, deactivates the switch (8). 35 40

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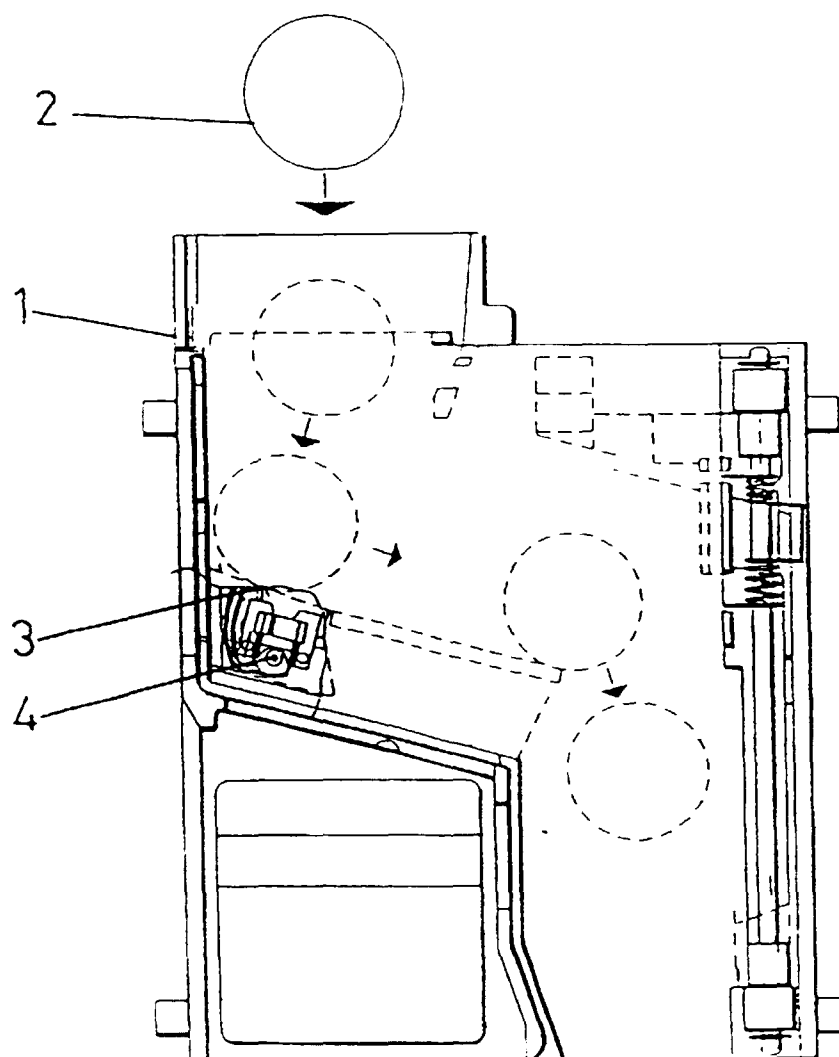


FIG.1

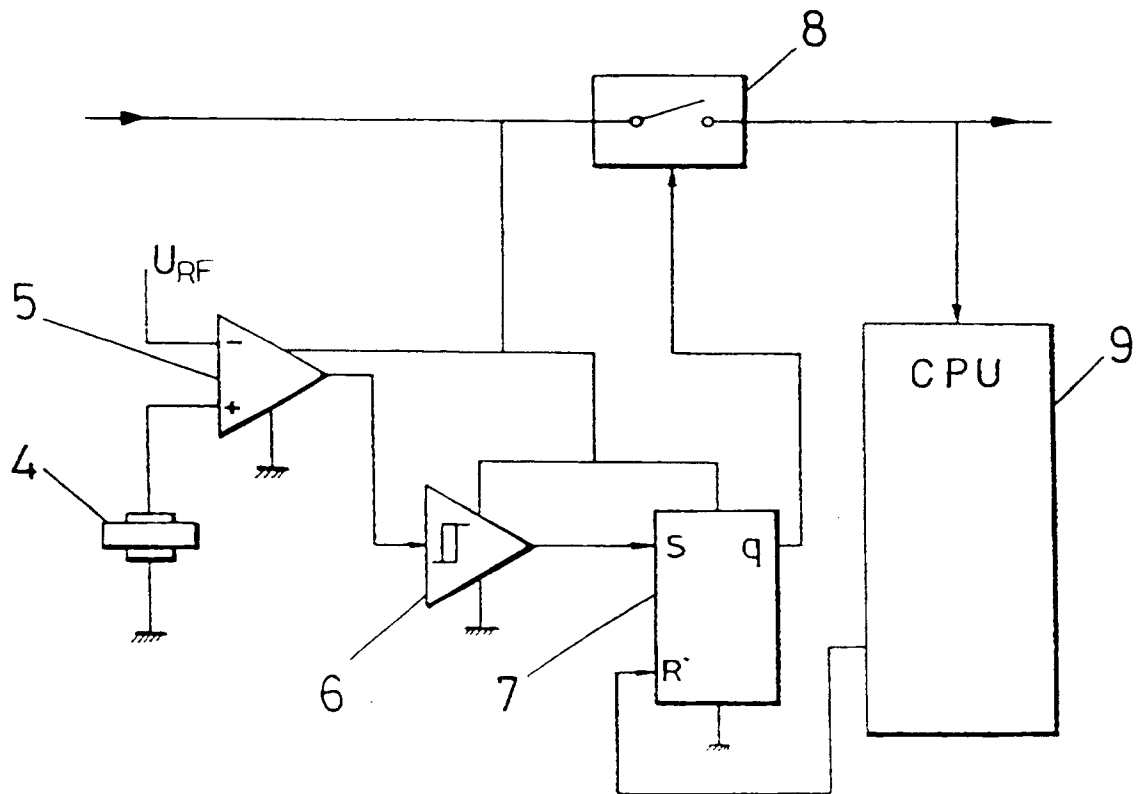


FIG.2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 98/00100

A. CLASSIFICATION OF SUBJECT MATTER		
IPC 6 G 07 F 3/02		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC 6 G 07 F, G 07 D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, 5 407 049, A (JACOBS) 18 March 1995 (18.03.95) column 4, line 21-line 35; column 5, line 30-line 65; figures 3, 6a, 6b	1,2
A	GB, 2 173 624, A (QONAR CORPORATION) 15 October 1986 (15.10.86) page 2, line 25-line 51; figures 1,3,6c,6d	1,2
A	US, 5 036 966, A (KASPAR et al) 6 August 1991 (6.08.91) column 5, line 20-line 43; figures 9,10	1
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
29 June 1998 (29.06.98)		3 July 1998 (03.07.98)
Name and mailing address of the ISA/ S.P.T.O.		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT
 Information on patent family members

 International Application No
PCT / ES 98 / 00100

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-5 407 049	11-06-86	US-5 642 119 US-5 570 771 US-5 454 461 WO-9504336 AU-7404894	24-06-97 05-11-96 03-10-95 09-02-95 28-02-95
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US-5 036 966	06-08-91	WO-9016050 AU-5843290	27-12-90 08-01-91