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(54) **Drawer locking device in a coin-processor change distributor**

(57) The invention relates to a drawer-locking device in a coin-processor change distributor inserted in industrial machines, in particular in automatic vending machines. In such devices, products can be removed only after a token has been inserted into the machine. This device includes a group of electromechanical mechanisms and electronic devices conceived to recognise the tokens or coins inserted into the coin-processor, and to divide them according to their characteristics. The device is characterised for the fact that the release action between the machine and drawer in which the tokens are stored is obtained by means of electronic type.

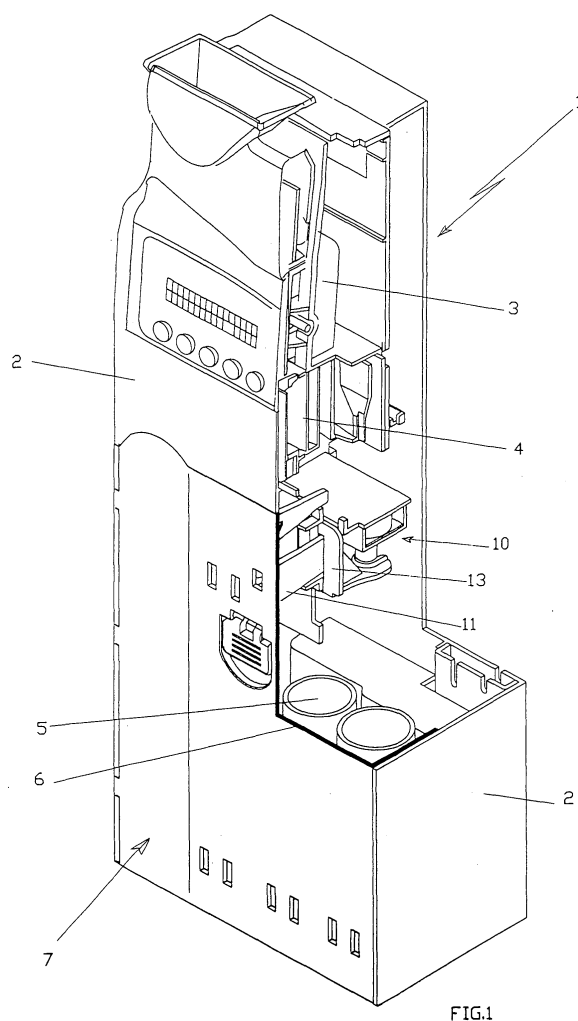


FIG.1

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Description

[0001] The present invention relates to a drawer-locking device in a coin-processor change distributor, as described according to the general part of claim 1.

[0002] Industrial machines, and in particular, automatic vending machines where products can be removed only after a token, generally in the form of a metal coin, has been introduced into the machine, are equipped with a device called "coin-processor" designed to collect the tokens inserted into the machine by the user, and possibly also with a "change distributor", which dispenses any change to the user.

[0003] This device is basically composed of a group of electromechanical mechanisms and electronic devices conceived to recognise the tokens or coins introduced into the coin-processor, and to divide the coins and tokens according to their characteristics which, in the case of coins, are defined by the coin value, and to distribute said coins into specific containers for storage.

[0004] Further electromechanical mechanisms and electronic devices extract the tokens or coins from these containers in quantities established by the control electronics, in order to dispense any change.

[0005] In common embodiments, said storage containers are composed of plastic material tubes with varying diameters according to the type of token or coin to be contained therein, and are housed and fixed to a removable container called a "tube-holder drawer".

[0006] In current technical state of the art, the tube-holder drawer is fixed to the body of the machine using elastic hooks or mechanical attachments, which however, all present the same disadvantage, in that all can be subject to unauthorised drawer opening.

[0007] The aim of the present finding is to construct a coin-processor wherein the tube-holder drawer can be fixed to the body of the machine in a stable manner, and which can be opened exclusively by previously authorised persons.

[0008] A further aim of the invention is to provide a coin-processor. In particular, of the change distributor type which eliminates the possibility of any fraudulent behaviour by dishonest users attempting to remove small amounts of coins.

[0009] A further aim of the invention is to provide a coin processor with controlled access, wherein the tokens, and especially coins, cannot be inserted manually into the machine, but wherein they must pass through an identification system that not only recognises the coin, but also counts the number of tokens or coins stored in the collector tubes.

[0010] These aims are achieved with a coin processor wherein the tube-holder drawer is fixed to the machine structure by means of a mechanical attachment, on which a locking device acts, characterised in that the release action of the aforesaid device is of electronic type and can occur by using different methods that must be performed with the coin processor connected to a power

supply, and that involves user recognition followed by saving the system release in a non-volatile memory such as EPROM, by the user responsible for the release action, as well as the date and time the operation was performed.

[0011] As far as construction is concerned, the locking device according to the invention basically involves the locking of the tube-holder drawer on the coin-processor structure by means of a hook element fixed to and projecting from the body of said drawer, that penetrates into the slot of a bracket attached to the body of the coin processor; said bracket being able to slide in a perpendicular direction in relation to the direction of the aforesaid hook catch.

[0012] The operation is performed by the user closing the tube-holder drawer, wherein the aforesaid projecting hook element penetrates inside the said bracket, raising it so that when the hook element has passed through the slot of the bracket, through gravity, and if necessary also by means of a thrust spring, the bracket drops again into the original position, preventing the return of the aforesaid hook element, thus locking the total drawer in a locked position.

[0013] The lock release is possible only by raising the bracket high enough to slide the hook element out of the slot, and said raising action is made possible by means of an electromagnet whose core is attached to the said bracket.

[0014] In particular, in order to perform the "foreseen" release of the drawer, the electromagnet command is an electronic type, and can be activated only when the machine is switched on (connected to the power supply) using various means, preferably by using an enabled key or inserting a keyboard code.

[0015] Alternatively, other release methods can be applied using mechanisms common to current technical state of the art such as:

- a combination of different keys;
- a serial protocol towards the exterior (PC, audit, network module, and other similar equipment);
- a call via GSM, GPRS and other similar methods;
- a key enabling several passwords;
- attaining a maximum coin level in the tubes;
- timer-controlled opening action;
- a special command transmitted through the existing communication system with the distributor.

[0016] The invention will be defined more clearly through the description of a possible embodiment, provided only as an example which is by no means limiting, aided by the appended drawings, wherein:

- Figure 1 (table I) shows a view in perspective of a partial cross-section of a coin-processor according to the finding;
- Figures 2 - 3 (table II) show two front elevations in cross-section of the coin-processor shown in figure

1 in open and closed position of the tube-holder drawer, respectively;

- Figures 4 - 5 (table III) show two views in perspective of the tube-holder drawer.

[0017] As shown in figure 1, the coin processor identified throughout by the numeral 1, comprises a structure 2, containing the coin identification and separator unit 3, wherein electromechanical and optical devices examine the inserted coin, which if not considered valid, is sent to a specific return channel; vice versa if the coin is accepted, it is sent to the separator unit 4 underneath, where by means of a hopper and slide system, the identified coins are classified and dropped into the storage containers for use as change, or into a container referred to as "till", where the coins can be removed by the proprietor of the vending machine.

[0018] The token or coin containers are composed of tubular elements 5 fixed to a rigid wall 6, thus forming a single structure called a "coin processing drawer" and identified throughout by the numeral 7.

[0019] This unit is already common to current technical state of the art and is not included in the claims.

[0020] The innovative characteristic of the invention lies in the fact that the coin processor is equipped with an actuator, identified throughout by numeral 10 that guarantees the locking of drawer 7 on structure 2 of the coin processor in question.

[0021] Figure 2 shows the hook catch composed of a hook shaped element 11, that projects from the internal part of the tube-holder drawer (see figure 4) for insertion into slot 12 of a bracket 13 located on the coin processor structure 2.

[0022] Figure 3 shows the bracket 13 is set on the fixed base 14 and arranged to slide vertically along the channel 15, to be raised during the insertion of the hook 16, and to drop back to its original position when the hook element is completely inserted in the slot to create the required locking action.

[0023] To perform the successive release action, the bracket is raised by means of an electromagnet 17, whose core 18 is anchored on the foot 19 of the bracket 13.

[0024] Advantageously, a spring 20 could be used as a thrust element during the operation to maintain the bracket in hooked position when the electromagnet 17 is not activated.

[0025] Naturally different forms of embodiment are possible according to the size and the functional and constructive characteristics of the drawer and the coin processor, while remaining within the context of the description in the following claims.

Claims

1. DEVICE FOR DRAWER-LOCKING DEVICE IN A COIN-PROCESSOR CHANGE DISTRIBUTOR, in-

serted in industrial machines, in particular in automatic vending machines, where the product can be removed only after the insertion into the machine of a token, consisting of, for example, metal coins, conceived to collect the tokens inserted into the machine by the user and possibly also into the "coin processor change distributor", to provide the same user with change, and equipped with a group of electromechanical mechanisms and electronic devices conceived to identify the tokens or coins inserted in the coin processor and divide them according to their characteristics, which in the case of coins consists of their value, and to send them for storage in specific containers composed, in a common embodiment, of tubes of different diameters, according to the type of token or coin to be contained therein, and which are housed and fastened in a removable container called "tube-holder drawer", anchored to the machine structure by means of a mechanical attachment on which a locking device acts, said locking device being **characterised** for the fact that the release action of the aforesaid device is electronic, and can be performed according to different methods which must be activated while the coin processor is connected to the power supply, and which involves an identification of the user and a subsequent saving in a non-volatile memory such as EPROM of the system release action performed by the user, as well as the date and time said action was performed.

2. DRAWER-LOCKING DEVICE according to claim 1, **characterised in that** the locking action of the tube-holder drawer (7) on the structure (2) of the coin processor (1) is performed by means of the insertion of a hook element (11), fixed to and projecting from the body (6) of said drawer, which is engaged in a bracket (13) maintained on the body of the coin processor and conceived to slide in a direction perpendicular to the direction of said hook element, wherein the action of said bracket is controlled by an electromechanical actuator (10).
3. DRAWER-LOCKING DEVICE according to claim 2, **characterised in that** the command to activate the "foreseen" release of the drawer is performed by the insertion of an enabled key or a keyboard code.
4. DRAWER-LOCKING DEVICE according to claim 2, **characterised in that** the command to activate the "foreseen" release of the drawer is performed according to methods using mechanisms common in current technical state of the art such as:

- a combination of keys;
- a serial protocol towards the exterior (PC, audit, network module, and other similar equipment);
- a call via GSM, GPRS and other similar methods;

- a key enabling several passwords;
- attaining a maximum coin level in the tubes;
- timer-controlled opening action;
- a special command transmitted through the existing communication system with the distributor.

5. COIN PROCESSOR according to previous claims, comprising a structure (2) in which the identification and separation unit (3) is inserted, equipped with electromechanical and optical devices which examine the inserted coin, that if not considered valid is sent into a specific return channel, and on the other hand, if accepted, is delivered to the separation unit (4) underneath, where by means of a hopper and slide system, the identified coins are distributed to storage containers, to be used as change, or into a container referred to as a "till" from which they can be removed by the proprietor of the vending machine, said containers being composed of tubular elements (5) fixed to a rigid wall (6) to form a single structure called "coin processor drawer" (7), said coin processor (1) **characterised in that** it is provided with an actuator (10) that ensures the locking of the drawer (7) on structure (2) of the coin processor in question.
6. COIN PROCESSOR according to claim 5, **characterised in that** the hook device (10) is composed of a hook element (11) projecting from the internal part of the drawer for insertion into the slot (12) of a bracket (13), located in the structure (2) of the coin processor, said bracket (13) being set on the fixed base (14) and being susceptible to sliding vertically along a channel (15), said bracket being lifted during the insertion of the hook (16) and then falling to its original position when the latter is completely inserted in the slot, thus creating the required locking.
7. COIN PROCESSOR according to claim 5, **characterised in that** the release action of the drawer (7) requires lifting the bracket (13), which occurs by means of an electromagnet (17) whose core (18) is anchored on the foot (19) of the aforesaid bracket.
8. COIN PROCESSOR according to one or more of the previous claims, **characterised in that** a spring (20) acts on the actuator (10), spring acting as a thrust element during the operating step to maintain the bracket (13) in a hooked position when the electromagnet (17) is deactivated

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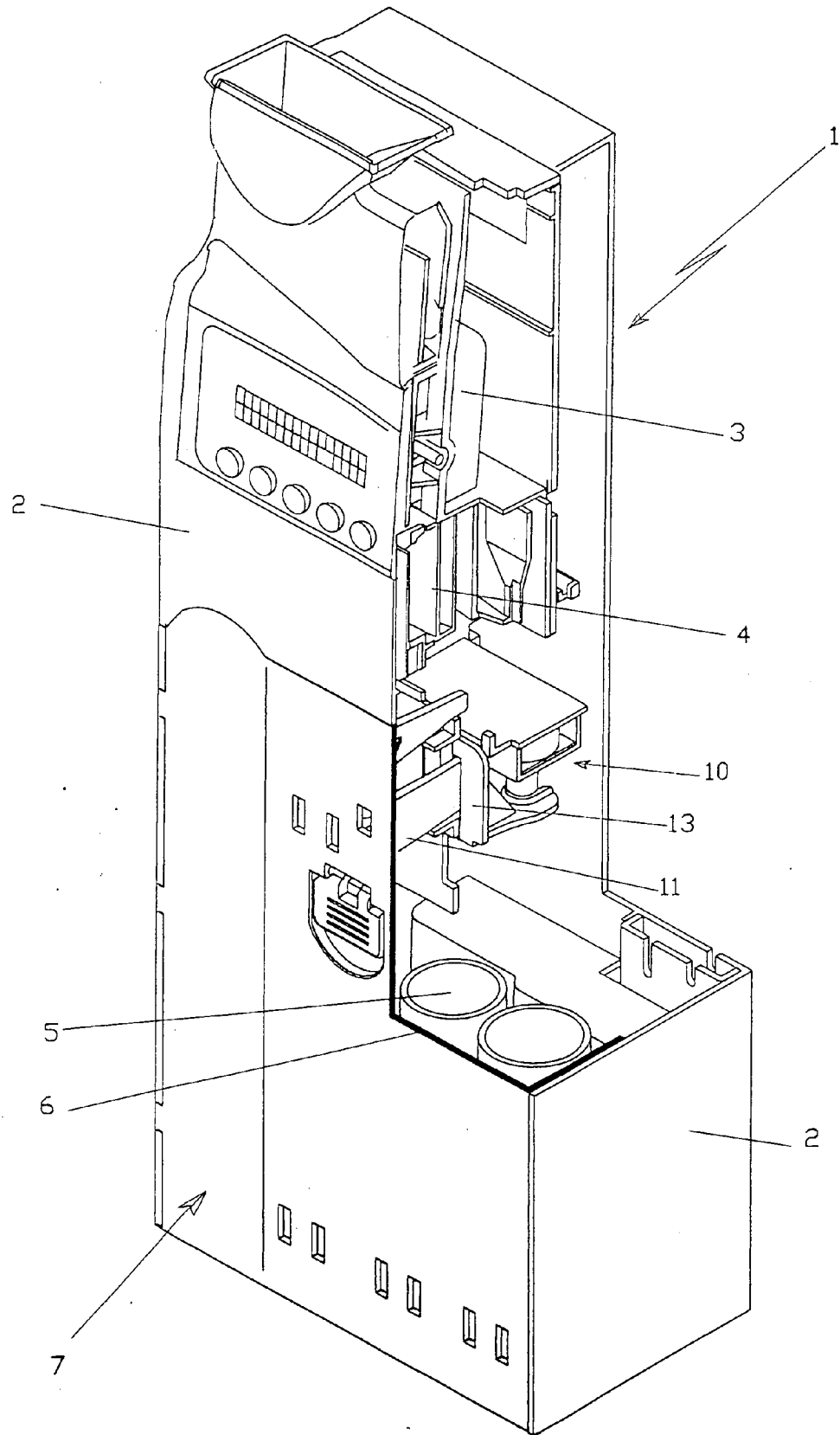
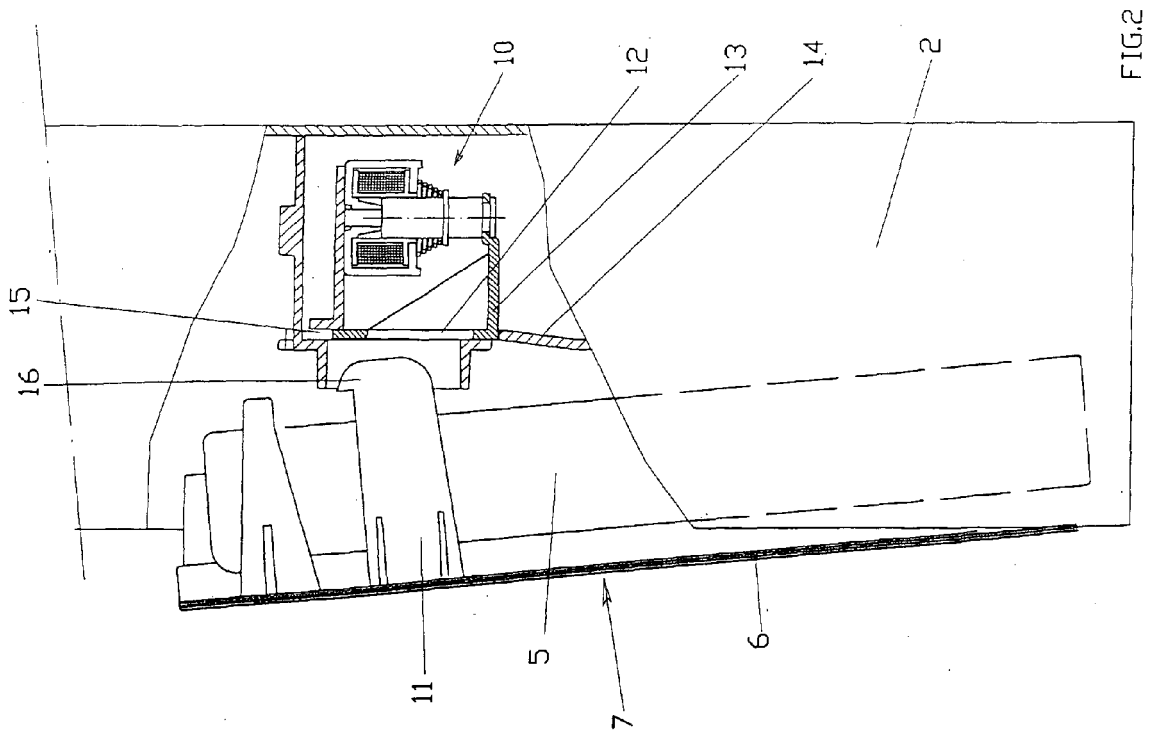
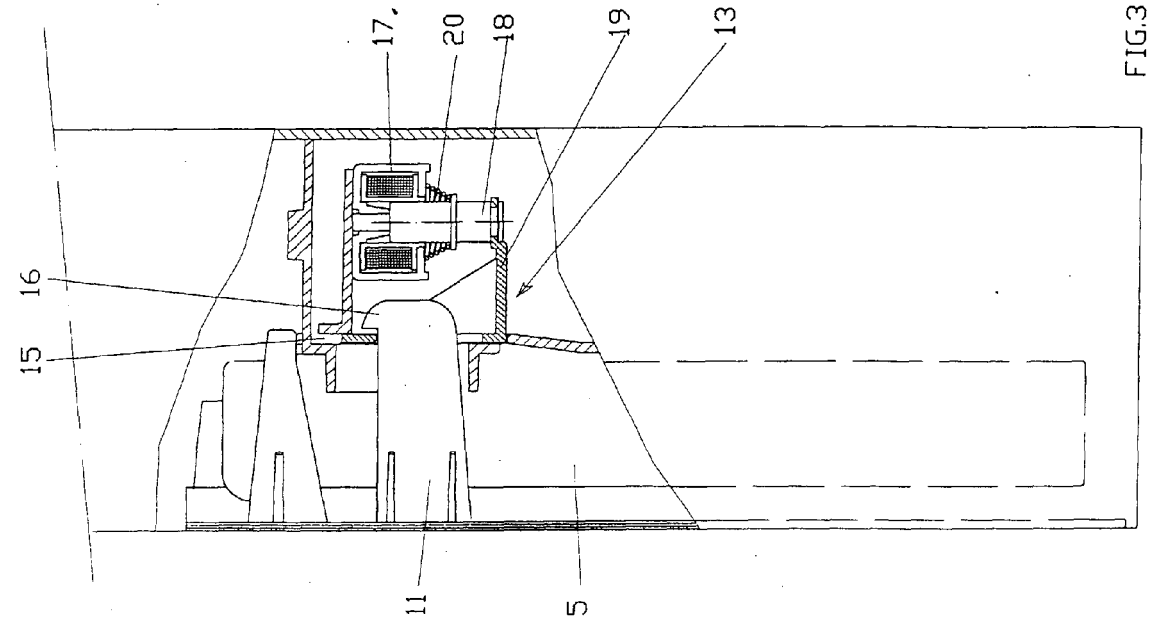
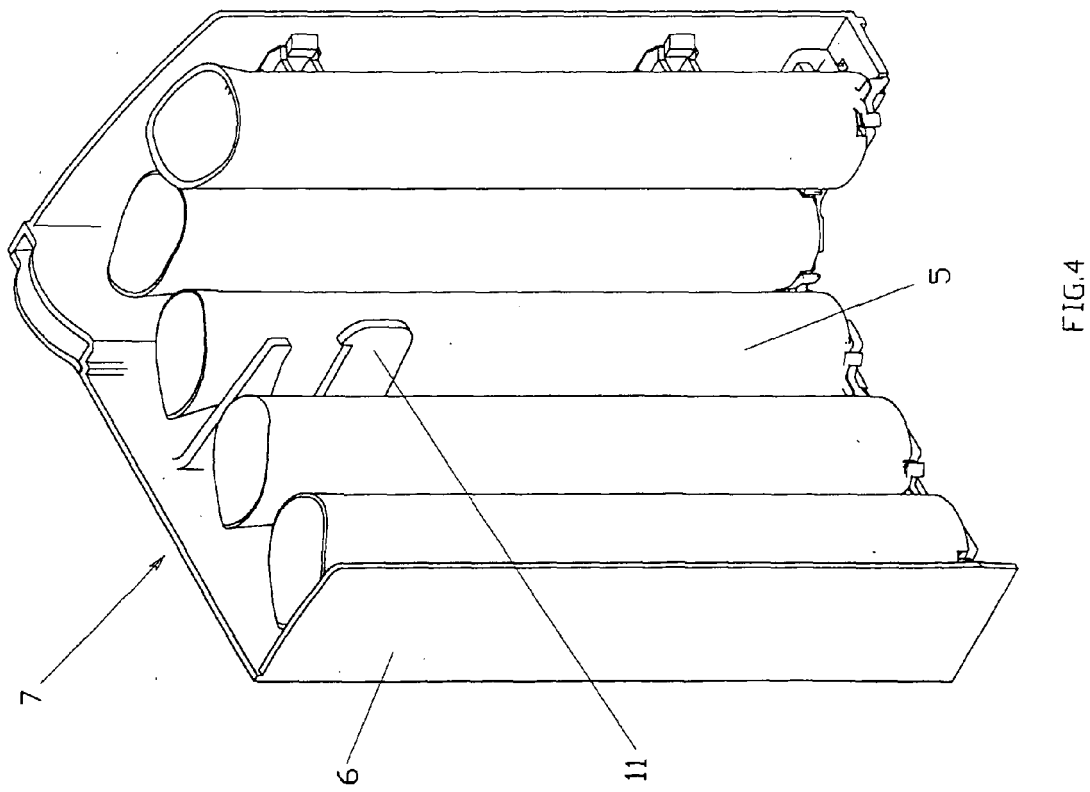
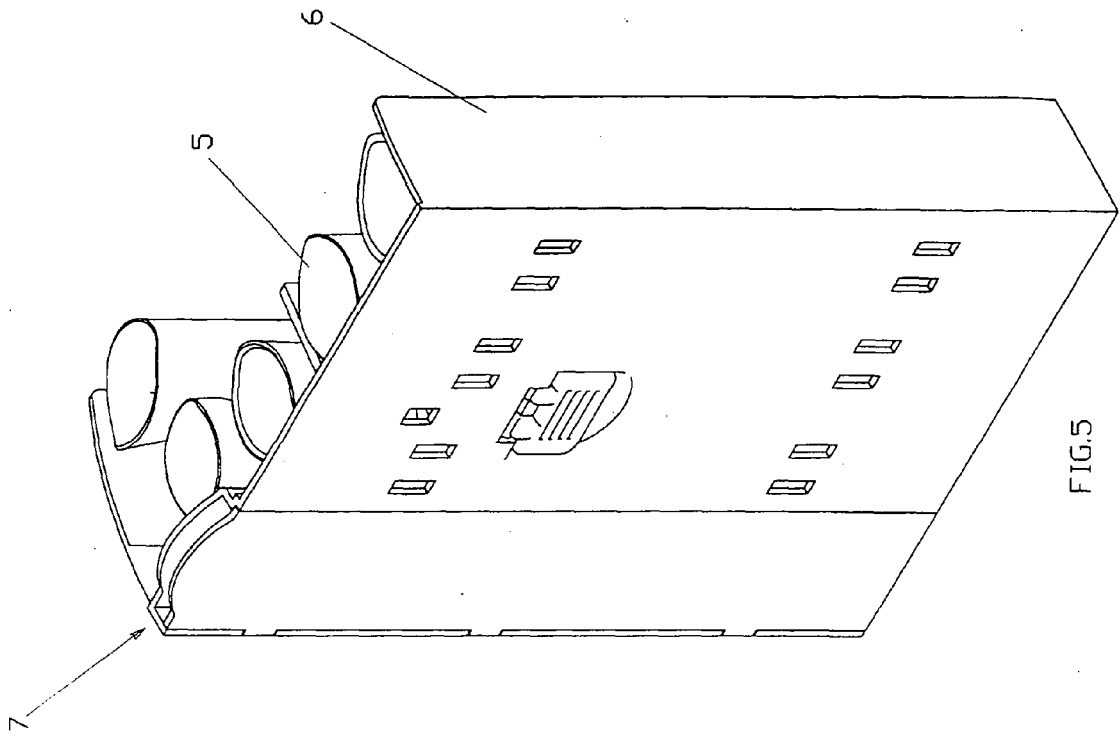


FIG.1







European Patent
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Application Number
EP 07 00 2422

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Place of search Munich		Date of completion of the search 29 May 2007	Examiner Liendl, Martin
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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