

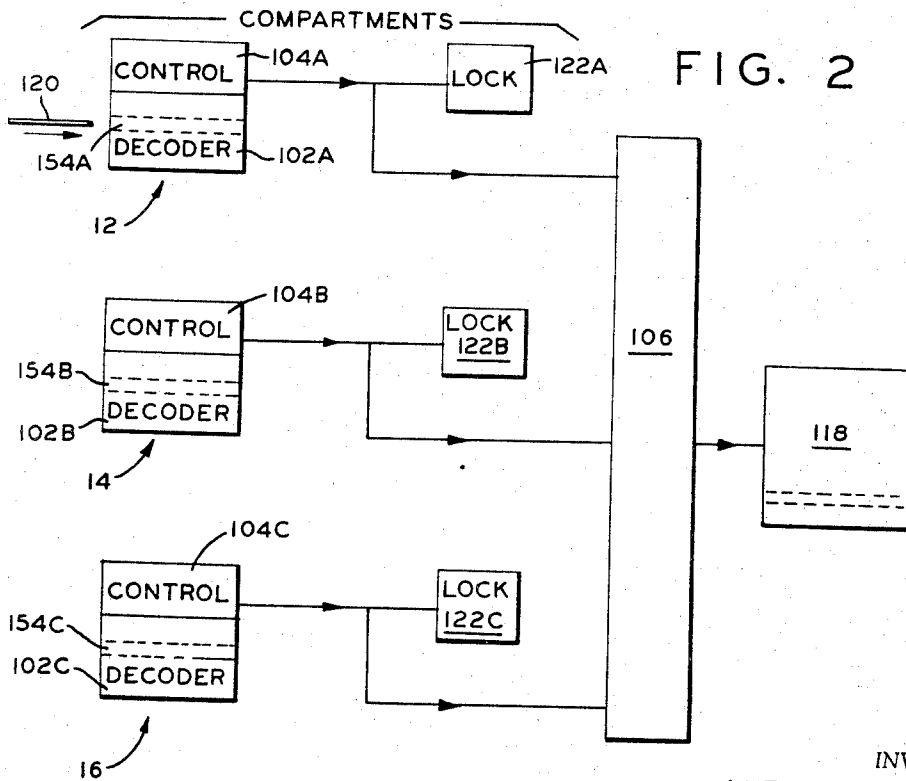
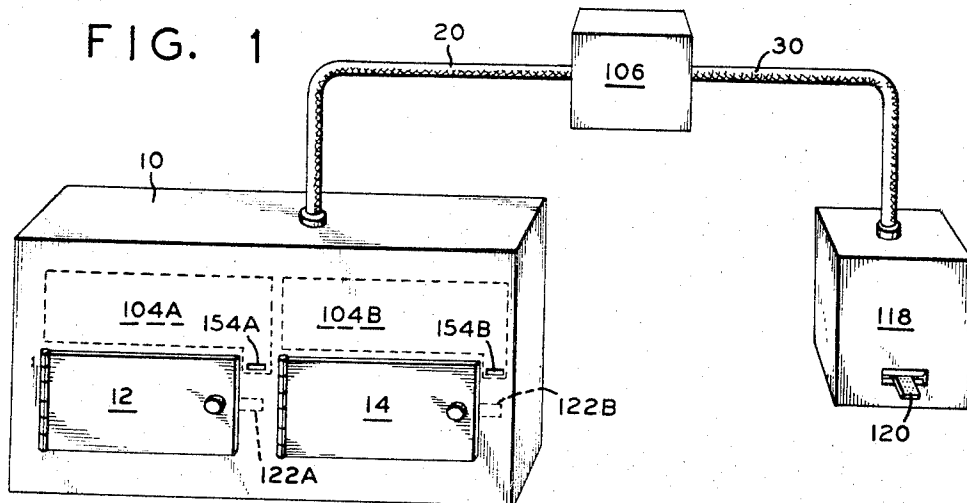
Oct. 29, 1968

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CHECK CONTROLLED LOCK

3,407,914

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3 Sheets-Sheet 1



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3 Sheets-Sheet 2

FIG. 3

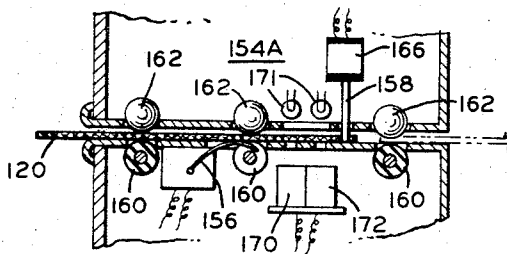
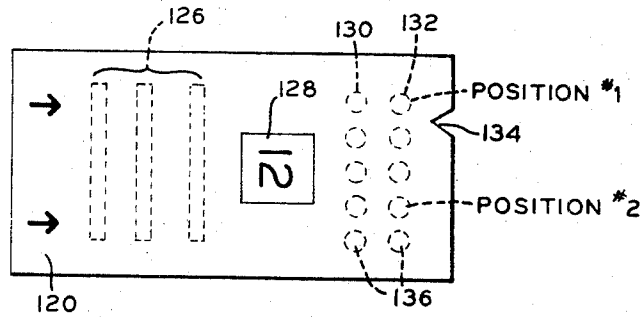


FIG. 4

FIG. 5

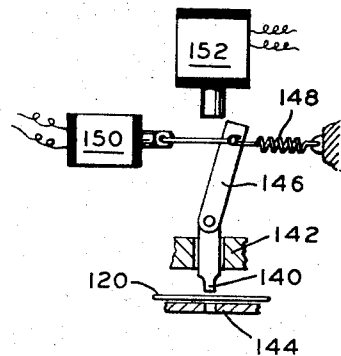
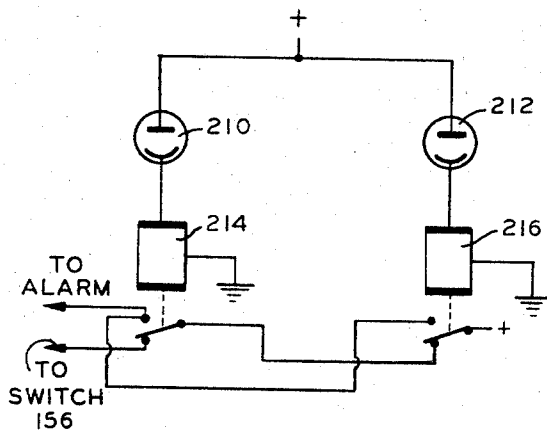


FIG. 7



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3 Sheets-Sheet 3

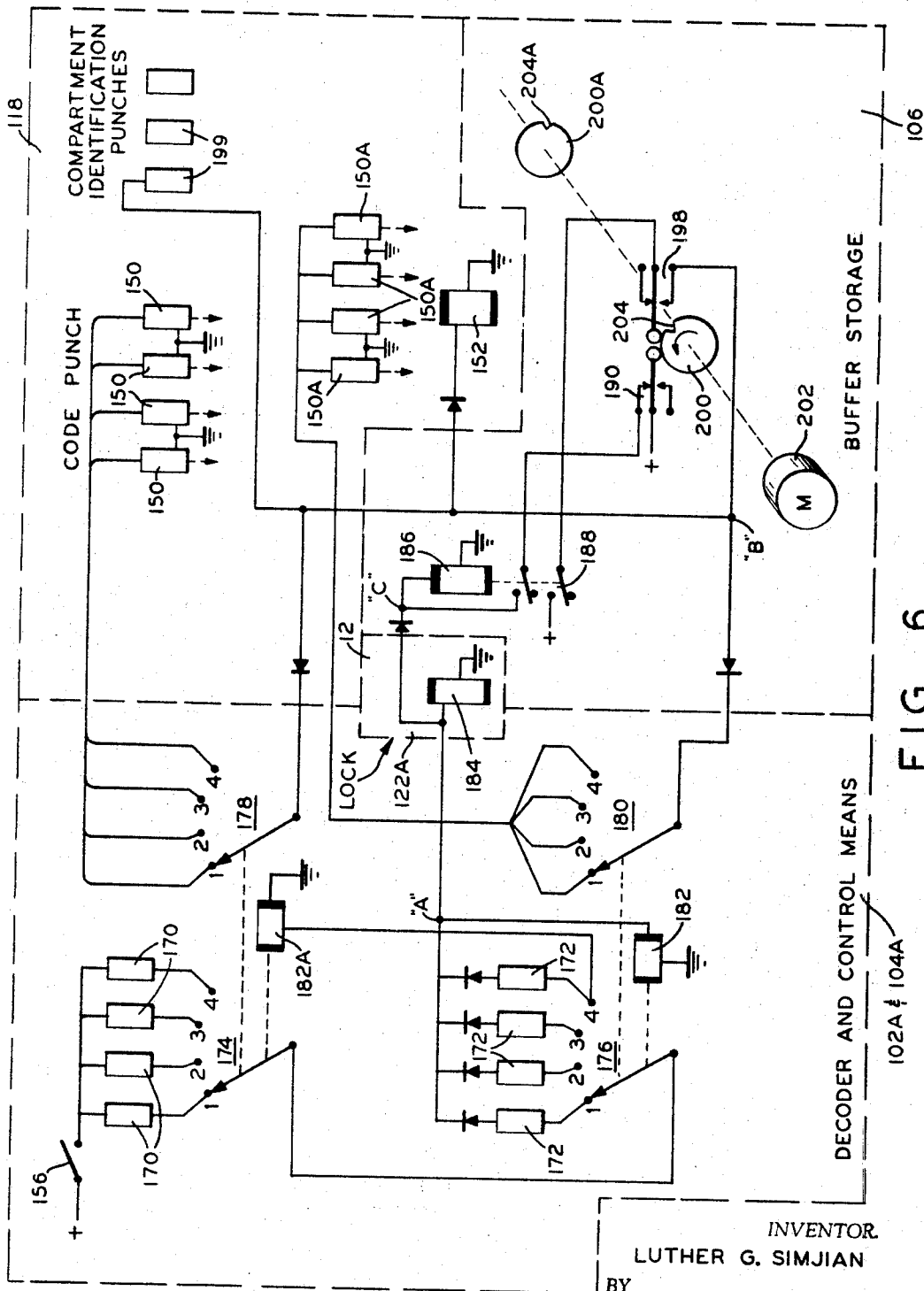


FIG. 6

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1

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CHECK CONTROLLED LOCK

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ABSTRACT OF THE DISCLOSURE

A lock operable by a code bearing check wherein the code necessary to operate the lock is changed after each operation, thereby obsoleting the check which caused the preceding operation of the lock. In order to cause this condition, the lock is associated with adjustable control means whose setting, denoting a code condition, is changed after each operation of the lock. Means are provided to issue checks whose code correlates with the code condition of the lock.

This invention refers broadly to a check controlled lock. More specifically, this invention refers to a lock adapted to be operated by a code bearing check and includes means for requiring the use of checks whose code changes in a predetermined pattern. Still further, the operation of the lock is tied to means controlling the issuance of suitably coded checks so as to enable sequential operation of the lock while controlling the availability of checks. A check controlled lock of this type will be found useful in combination with locker-type article delivery systems as disclosed, for instance, in U.S. Patent No. 3,130,395 dated Apr. 21, 1964, and in my copending applications Ser. No. 598,027 filed Nov. 30, 1966, and Ser. No. 529,556 filed Feb. 23, 1966, entitled, "Article Delivery System," now U.S. Patent No. 3,339,671 issued Sept. 5, 1967.

One of the principal objects of this invention, is therefore, the provision of a novel check controlled lock.

Another important object of this invention is the provision of a check controlled lock which is provided with means for assigning a code to the lock and such code being subject to change.

A further object of this invention is the provision of a check controlled lock requiring the use of differently coded checks for successive operation of the lock.

A still further object of this invention is the provision of a check controlled lock requiring the use of serially coded checks for successive operation of the lock.

Further and still other objects of this invention will be more clearly apparent by reference to the following description when taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a schematic block diagram of the entire arrangement;

FIGURE 2 is a more detailed block diagram of the arrangement;

FIGURE 3 is a plan view illustrating a typical check for operating the lock;

FIGURE 4 is a cross sectional view through the check acceptance device;

FIGURE 5 is a section through a punch adapted to provide the check per FIGURE 3 with a code;

FIGURE 6 is a schematic electrical circuit diagram pertaining to the operation of one compartment, and

FIGURE 7 is a schematic circuit diagram of an anti-cheating device which may be incorporated in the circuit per FIGURE 6.

Referring now to the figures and FIGURE 1 in particular, there is shown a structure 10 having a pair of compartments 12 and 14, each compartment being provided with an access door for controlling access to a

2

normally locked space which may contain one or more articles to be issued. Each of the compartments or compartment doors is associated with a respective lock 122A and 122B which, depending on its condition, provides or bars access to the respective compartment. Disposed above each of the respective locks is an aperture of a check acceptance means 154A, 154B for receiving therein a code bearing check which, if properly coded, causes operation of the lock, i.e. changes the lock from its locked condition to its unlocked condition. If the check is not properly coded, the lock remains locked.

Each of the locks is associated, as will be more clearly apparent from the following description, with a respective control means 104A, 104B. The different control means are connected via a cable 20 to a buffer storage unit 106 which, in turn, is connected via a cable 30 to a check providing means 118. The check providing means is adapted to sequentially issue coded checks, such as the check 120 illustrated. A check provided by the unit 118 is suitably coded to cause upon insertion in a respective aperture 154A or 154B operation of the particular lock. Additional compartments may be provided as is seen in FIGURE 2.

Referring now to FIGURE 2, there are shown schematically three compartments 12, 14 and 16, each compartment having a respective control means 104A, 104B and 104C, a respective check decoding or check code reading means 102A, 102B and 102C, and a respective electrically operated lock 122A, 122B and 122C. Information in the form of electrical signals generated responsive to the insertion of a check 120 in the check acceptance aperture 154A, 154B or 154C, is directed by the associated control means to flow first to the associated lock and then to the buffer storage system 106. The buffer storage system sequentially releases the information to a coding mechanism, such as a punch, disposed in the check providing means 118, for providing a suitably coded check which enables the bearer to cause subsequent operation of a respective lock. A plurality of compartments, such as compartments 12, 14 and 16, each having a respective check decoding means 102A, 102B and 102C, a respective control unit 104A, 104B and 104C, and an associated lock 122A, 122B and 122C are used in conjunction with a common buffer storage unit 106 and with a check providing means 118.

Considering now one compartment, such as the compartment 12: When a suitably coded check 120 is inserted in the aperture of the check acceptance means 154A, a signal is generated and controlled in such a manner as to operate the associated lock 122A. At the same time a code determining means associated with the decoder unit 102A is changed to a new code condition so that the previously used check is rendered obsolete and will no longer operate the same lock. When the signal is released for operation of the lock 122A, the check providing means 118 is operated to provide a new check having a code which now correlates with the changed code condition in the decoder 102A.

FIGURE 3 is a plan view of a typical check means 120, such as a ticket or card. The check is provided with arrows showing the direction of insertion into the appropriate aperture of units 154A, 154B, 154C, with informational printing 126, a compartment designation 128, and two lines 130 and 132 denoting hole positions, indicated by dashed circles. Also shown is an index notch 134 for rendering the check invalid in any compartment except the one corresponding to the identifying number imprinted at location 128. Each line 130, 132 has five hole positions. The last hole position 136 in each of the lines 130 and 132 is reserved for checking purposes while the remaining four hole positions in each line are used

for providing the check with appropriate code. Using one of the four holes in each of the lines results in sixteen possible combinations, but the quantity of combinations may be varied by using more or fewer holes in each line. It will be apparent, of course, that instead of punched holes, magnetic characters or other code providing means may be used without deviating from the basic principle of providing a code bearing check.

In the present arrangement the hole positions 136 are never punched but are used as a verification means. If a check is made which utilizes all of the hole positions, e.g. a person intending to cheat the device, insertion of such a check in the decoding means will not operate the appropriate lock since a valid check requires that the hole positions 136 remain unpunched while having suitably punched hole positions in each of the lines 130 and 132. A later discussion of the circuit diagram illustrates this anti-cheating feature in greater detail. Again, as above, other well known anti-cheating means may be used.

FIGURE 4 is a cross sectional view through the check code sensing means, one such means being associated with each of the individual compartments. Typical is the sensing means 154A associated with the compartment 12. A check 120 is entered into the sensing means through the entry aperture. The leading edge of the check on entering actuates the switch 156 which, in turn, energizes the decoding means associated with the control means. The leading edge of the check is positioned up to the vertical rod 158. If the rod 158 engages the notch 134 in the check 120, FIGURE 3, then the check is valid for the particular compartment and the hole positions are positioned over the photocells 170, 172 and decoding can take place. Light means 171 disposed in line with the hole positions and above the photocells 170, 172 provide suitable illumination. The electrical circuit applicable to the photocells will be described in connection with FIGURE 6.

The checking reading and decoding means can be of a type wherein the patron withdraws the check manually after the check has served its function. Alternatively, the check may be removed automatically by the operation of a set of three drive rollers 160 and associated spherical weights 162 which act to keep the check in contact with the rollers and provide the frictional force for driving the check. The vertical rod 158 is coupled to the solenoid 166 which retracts the rod, thereby allowing the check to be driven through and out of the code sensing means. The check may be fed to a storage receptacle (not shown) which maintains an accepted check inaccessible to a patron who supplied the check to the unit.

FIGURE 5 is a section through a punch means for providing holes which serve as a code in the check 120. There is one punch for each possible hole position, except for the hole positions 136 which positions normally remain unpunched. The punch 140, which is typical, is positioned in a guide plate 142 above an apertured die plate 144. Attached to the punch is a bail 146 which is biased to one side by a spring 148 and movable in the opposite direction by a solenoid 150. Located above the punch is a punch solenoid 152 which is positioned to act upon any punch whose bail is in position for being actuated by the solenoid. The punch solenoid 152 is coupled to a bar (not shown) which covers all bails who are in position responsive to the actuation of their respective solenoids 150. When a bail solenoid 150 is energized, the associated bail 146 is moved to a position which is in line with the punch bar operated by the solenoid 152. All the bails which are thus actuated are driven downward, forcing the associated punch through the check 120 whereby to provide the appropriate coding. The check providing means 118 (FIGURES 1 and 2) contains a supply of pre-printed checks requiring only the addition of code holes and compartment number 128 to cause the check to be ready for use.

FIGURE 6 is a schematic circuit diagram which shows the operation of the check code sensing means and the

means for changing the code associated with the respective lock as well as the means for providing a code upon the check at the appropriate time.

Numerals 170 refers to four photo-conductive cells, one each for the possible punched hole locations on line 130 of the check 120, see FIGURE 3. Similarly, numeral 172 points to four photo-conductive cells corresponding to the hole locations on line 132 of the check 120. The photocells 170 are connected to the stationary contacts of the first deck of a four-position electrical stepping switch 174 and the photocells 172 are connected in a like manner to a first deck of a similar stepping switch 176. Both stepping switches 174 and 176 have a second deck identified by numerals 178 and 180 respectively.

Upon inserting a check 120 having a hole punched at position 1 (FIGURE 3) of both the line 130 and the line 132 into the sensing unit, FIGURE 4, the switch 156 is closed and, with the stepper movable switch contacts disposed in the position as shown in FIGURE 6, a voltage will appear at the junction point A since the respective photocells due to light excitation are in their conductive condition. From this point A, the voltage appearing between there and ground potential performs three functions as follows:

(a) Operates the stepper switch solenoid 182 of the stepper switch 176, thereby causing the switch to advance to its second position (to the right) when the check is removed from the sensing unit;

(b) Operates the solenoid 184 of lock 122A to cause access to the interior of the compartment 12;

(c) Operates the relay 186 which remains energized via the contact 188 and the closed switch contact 190.

When the stepper switch 176 reaches its "4" (right) position and is returned to its "1" (left) position, relay coil 182A is energized to index the wiper arm by one position toward the right, i.e. number "2" position. In this way there exists 16 positions.

The contacts on the second deck of each of the stepping switches 178 and 180 are connected respectively to small bail solenoids 150 and 150A in the check providing means 118. The movable wiper arm of the second deck 178, 180 of each switch is connected to the open contact of the switch 198.

A series of cams 200, 200A are driven by a constantly rotating motor 202. There is one cam for each of the compartments provided. Each of those cams has a notch 204, 204A and the notches are arranged circumferentially so that none are in line with each other. Each cam operates two switches disposed on the periphery of a respective cam and shown in the schematic circuit diagram for the one cam 200 only as switches 190 and 198. As the cam 200 rotates counterclockwise, its notch actuates the switch 198 and since the relay 186 is energized, a voltage appears at the junction point B where it performs three functions:

(a) Responsive to the respective position of both wiper arms of the switches 178 and 180, energizes a particular bail solenoid 150 and 150A in lines 130 and 132, FIGURE 3, of the check punch section. The bail solenoids 150 and 150A are small, fast acting and perform their function before the punch solenoid 152 operates. When the punch solenoid 152 operates a new code is punched into a check corresponding to the position of the stepper switches 178 and 180. This provides a new check for subsequent operation of the lock 122A of compartment 12.

(b) Operates the punch solenoid 152 whereby a new code is punched into a check corresponding to the position of the stepping switch contacts associated with the decks 178 and 180 of the switches 174, 176. This provides a new code bearing check for subsequent operation of the lock 122A of compartment 12.

(c) Energizes an associated print solenoid 199 which prints the compartment identification 128, FIGURE 3, upon the check.

5

As the cam 200 rotates further, its opens switch 190 which, in turn, removes the voltage from the relay 186, permitting the relay 186 to return to its normally open position.

This completes one cycle of operation beginning with the insertion of a code bearing check 120 into the entrance slot of the unit 154A associated with the compartment 12 through the decoding stage, unlocking of the compartment and the providing of a new code bearing check having a code which differs from the previous code.

It is apparent that motor 202 can rotate continuously and cams 200, 200A can operate their associated switches continuously since, if a compartment is not operated, the relay 186 in the buffer storage 106 is not energized and, therefore, no voltage is applied to the check providing means 118.

As shown in the circuit per FIGURE 6, the portion of the electrical circuit 102A and 104A and the lock 122A are duplicated in each compartment, see FIGURE 2, whereas the buffer storage 106 and the check providing means 118 are common to a plurality of compartments.

FIGURE 7 illustrates one embodiment of an anti-cheating means. If all of the hole positions are punched, the photocells 210 or 212, aligned with hole positions 136 (FIGURE 3), conduct current and energize the relays 214 or 216. Operation of either one of these relays may be used to remove the primary voltage to the code sensing unit and at the same time such operation of the relays can be used to sound an alarm or to activate a lock-out relay for precluding operation of the lock.

It will be apparent, therefore, that the above invention describes a lock means which is operable by a check suitably coded to a particular lock. Additionally, the code combination which causes the lock to be operable is changed after each operation of the lock, thus requiring the use of a new check provided with a new code combination which matches the newly changed lock code. As described heretofore, the code itself may comprise any of the known and commonly used indicia, symbols or other means, visible or concealed, normally used for coding a particular check.

While in the arrangement hereinabove it is described that a newly coded check is provided in response to the operation of a particular lock, whereby rendering the used check obsolete, it will be apparent that checks may be pre-coded and stored in sequence in a check providing means 118, and that such check providing means may be controlled to release in sequence, correlated with the operation of the lock, a newly coded check from the stored supply of pre-coded checks.

While there have been described and illustrated certain specific embodiments of this invention, it will be apparent to those skilled in the art that various further changes and modifications may be made without departing from the broad principle and intent of this invention.

What is claimed is:

1. The combination of:

a lock adapted to be operated responsive to a signal; control means coupled to said lock for receiving a code bearing check and

being capable of assuming one of several conditions, each such condition correlating with a particular check code;

means coupled to said control means for providing a signal for operating said lock responsive to the code of a received check correlating with the assumed one condition of said control means;

further means coupled to said control means for causing said control means to assume another one of said conditions in response to the provision of said signal for operating said lock, whereby such change in condition effectively obsoletes, at least temporarily, the code bearing check which caused operation of said lock, and

6

means for providing, responsive to the operation of such lock, a code bearing check whose code correlates with said another one condition of said control means.

2. The combination as set forth in claim 1 including a plurality of locks, each having an associated control means, and a check providing means for coding checks coupled to said plurality of control means by a buffer storage device to code checks in sequence in response to the operation of respective locks.

3. The combination as set forth in claim 2 wherein the code on a check comprises punched positions and each check additionally is keyed to a particular lock.

4. The combination as set forth in claim 1, said means for providing a code bearing check including coding means which are controlled to provide on a check a code which is correlated with said another one of said conditions.

5. The combination of:

(A) a lock;

(B) a control means coupled to said lock, said control means including:

(1) adjustable means for denoting a code responsive to the condition of said adjustable means;

(2) check acceptance means for receiving a code bearing check;

(3) decoding means operatively associated with said check acceptance means for sensing and determining the code of a check received by said acceptance means;

(4) means coupled to said adjustable means and to said decoding means for causing operation of said lock responsive to the correlation of the codes denoted by said adjustable means and determined by said decoding means;

(5) further means for changing the condition of said adjustable means to denote a new code in response to the operation of said lock, and

(C) check providing means coupled to said control means and operative responsive to the operation of said lock for consecutively providing a code bearing check whose code correlates with the changed condition of said adjustable means,

(1) said check providing means including means for coding a check prior to it being provided.

6. The combination of:

(A) a lock;

(B) a control means coupled to said lock, said control means including:

(1) adjustable means including settable electrical means whose setting denotes a code;

(2) check acceptance means for receiving a code indicia bearing check;

(3) decoding means operatively associated with said check acceptance means and including electrically energized means for sensing the code indicia disposed on a check received by said check acceptance means;

(4) means coupled to said adjustable means and to said decoding means for causing operation of said lock responsive to the correlation of the codes denoted by said adjustable means and determined by said decoding means;

(5) further means for changing the condition of said adjustable means to denote a new code in response to the operation of said lock, and

(C) check providing means for providing code bearing checks whose code correlates with the condition of said adjustable means.

7. The combination of:

(A) a lock;

(B) a control means coupled to said lock, said control means including:

(1) adjustable means for denoting a code responsive to the condition of said adjustable means;

- (2) check acceptance means for receiving a code bearing check;
- (3) decoding means operatively associated with said check acceptance means and including light responsive means for sensing and determining the code of a check received by said acceptance means;
- (4) means coupled to said adjustable means and to said decoding means for causing operation of said lock responsive to the correlation of the codes denoted by said adjustable means and determined by said decoding means;

- (5) further means for changing the condition of said adjustable means to denote a new code in response to the operation of said lock, and
- (C) check providing means for providing code bearing checks whose code correlates with the condition of said adjustable means.

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SAMUEL F. COLEMAN, *Primary Examiner.*