MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963
Convention Application for a Patent

I, GUIDO KÄLIN,

of Langackerstrasse 49, 3957 Spreitenbach, Switzerland

hereby apply for the grant of a Patent

for an invention entitled "CUSTOMER OR ACCOUNT IDENTIFICATION ARRANGEMENT FOR SELF-SERVICE DISPENSING ARRANGEMENTS AND THE LIKE".

which is described in the accompanying complete specification.

This application is a Convention application and is based on the application numbered 12055/73 for a patent or similar protection made in Switzerland on 22nd August, 1973.

My address for service is: CALLINAN & NEWTON, Patent Attorneys, of 48-50 Bridge Road, Richmond, State of Victoria, Commonwealth of Australia.

Dated this 19th day of August, 1974.

GUIDO KÄLIN
By his Patent Attorneys: CALLINAN AND NEWTON

To The Commissioner of Patents.
COMMONWEALTH OF AUSTRALIA
Patents Act 1952-66

Declarations in Support of
(a) A Convention Application
(b) An Application
for a Patent or Patent of Addition

In support of the Application/Convention Application made by

GUIDO KÄLIN

for a patent/patent of addition for an invention entitled:
"CUSTOMER OR ACCOUNT IDENTIFICATION ARRANGEMENT FOR
SELF-SERVICE DISPENSING ARRANGEMENTS AND THE LIKE".

I/We) GUIDO KÄLIN

of (i) Langackerstrasse 49, 8957 Spreitenbach, Switzerland.
do solemnly and sincerely declare as follows:—

1. (a) I am/we are the applicant(s) for the patent/patent of addition or

(b) I am/ we are the actual inventor(s) of the invention referred to in the basic application.

(2) The basic application(s) as defined by Section 141 of the Act was/were made in Switzerland on the 22nd day of August, 1973
by Guido Kälín

3. (a) I am/we are the actual inventor(s) of the invention or

(b) I am/ we are the actual inventor(s) of the invention referred to in the basic application.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

(a) Declared at Spreitenbach, this 5th day of August, 1974.

SIGN

HERE

To: The Commissioner of Patents.
GUIDO KALIN

Langackerstrasse 49, 8957 Spreitenbach, Switzerland

GUJIDO KALIN

Care of CALLINAN AND NEWTON, Patent and Trade Mark Attorneys, of 48-50 Bridge Road, Richmond, in the State of Victoria, Australia.

Complete Specification for the invention entitled: "CUSTOMER OR ACCOUNT IDENTIFICATION ARRANGEMENT FOR SELF-SERVICE DISPENSING ARRANGEMENTS AND THE LIKE".

The following statement is a full description of this invention, including the best method of performing it known to me:

"Note: The description is to be typed in double spacing, pica type face, in an area not exceeding 9½" in depth and 6½" in width, on tough white paper of good quality and it is to be inserted inside this form.
The invention relates to a customer or account number identification arrangement for self-service dispensing arrangements, tellerless cashier set-ups, and the like.

More particularly, the invention relates to identification arrangements of the type wherein a key issued to a credit-worthy customer is employed to generate an electrical identification signal associated with the key and recognizable by the dispensing arrangement or by the automatic cashier as belonging to a credit-worthy customer or not.

In known arrangements of this general type, the key issued to the customer in place of a credit card has the conventional form of a long flat plate provided with an edge portion having a rippled configuration defined by projections and recesses of different size, adapted to activate a mechanical lock arrangement, and furthermore provided with a row of information locations which store units of information which together represent, for example in binary code, a number associated with the customer to whom the key has been assigned. In the prior-art arrangements of this type, the key is first inserted into an electromechanical information reading arrangement which converts the identification information on the key into an electrical identification signal. If the identification signal is determined to be one of those assigned to credit-worthy customers, the electromechanical information reading arrangement causes an electrical circuit to permit unlocking of the mechanical locking arrangement by the key. Since two separate information reading arrangements
are in effect required – i.e., the mechanical lock which is activated in the ordinary manner by the key and, secondly, the electromechanical information reading arrangement which permits or prevents the key from activating the mechanical lock – the known arrangement is inherently space-consuming.

It is a general object of the invention to provide a novel arrangement for generating electrical identification signals for use in self-service dispensing arrangements, tellerless cashier arrangements, and the like.

It is another object of the invention to provide a novel self-service dispensing arrangement, for the dispensing of wares or cash, making use of the inventive arrangement for generating electrical identification signals.

It is a further object to provide an arrangement of the type in question which is inherently less space-consuming than prior-art arrangements.

It is another object to provide an arrangement so designed that the key employed will inherently have a very great capacity for information storage.

This object, and others which will become clearer from the description, below, of specific embodiments, can be met, according to one advantageous concept of the invention, by providing, in an arrangement for generating electrical identification signals, in combination, a mechanical lock arrangement provided with a keyhole and including blocking means for preventing unlocking of said mechanical lock arrangement by a key inserted into said keyhole unless the
key inserted into said keyhole has portions of a predetermined configuration; a key configurated to be insertable into said keyhole and having portions of said predetermined configuration and movable when in said keyhole to a first position in which said key unlocks said mechanical lock arrangement and back to a second position in which said key relocks said mechanical lock arrangement; and electromechanical information reading means, the key being provided with information which can be read by the electromechanical information reading means and converted by the latter into an electrical identification signal, and the electromechanical information reading means being so arranged relative to said lock arrangement as to convert the information on said key into an electrical identification signal only when the key is in said keyhole and is in said first position.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing, wherein:

FIG. 1 is a perspective view of a first embodiment partly exploded;

FIG. 2 is a section through the key shown in FIG. 1 taken along line II-II in FIG. 1;
FIG. 3 is a longitudinal section through the arrangement shown in FIG. 1, taken along the line III-III of FIG. 4;

FIG. 4 is a transverse section through the arrangement shown in FIG. 1, taken along the line IV-IV of FIG. 3;

FIG. 5 depicts the lock cylinder of the embodiment of FIGS. 1-5;

FIG. 6 is a perspective view of a second embodiment; and

FIG. 7 is a schematic diagram of an inventive self-service dispensing arrangement.

FIGS. 1-4 depict a first embodiment of the invention: An information carrier is designed in the form of a key 1. The key 1 is so configured as to carry a plurality of units of information at different respective information locations on the key. The key 1 co-operates with a cylindrical lock 2. The cylindrical lock 2 is comprised of a lock housing 3 and a lock cylinder 4 provided with a key-receiving channel 5. The cylindrical lock 2 is provided with means for sensing or reading the units of information located at different respective information locations on the key 1. These reading means are in part purely mechanical and in part electro-mechanical.

Inside the cylinder housing 3 there are arranged two rows of tumbler pins, namely the row 6 and the row 7. These tumbler pins are operative for either locking or releasing the lock cylinder 4 in the lock housing 3 - i.e., they are operative for either permitting turning of lock cylinder 4
in the housing 3 or alternatively for prevention such turning.

FIG. 2 depicts the key 1 of FIG. 1 in transverse cross-section. The key 1 is comprised of a shaft portion 8 of five-cornered or pentagonal cross-sectional configuration. The shaft portion 8 of the key 1 is comprised of two mutually inclined faces 10 and 11 provided with respective bores 12 and 13. The bores 12 and 13 correspond with respective ones of the tumbler pins 6 and 7. The tumbler pins 7 co-operate with the bores 13 in the shaft face 11, whereas the tumbler pins 6 co-operate with the similar bores 12 in the shaft face 10. The bores 12 and 13 on the shaft face 10 and 11 accordingly constitute units of information serving to unlock or release the lock cylinder 4.

The shaft portion 8 of the key 1 is provided with three further faces 14, 15 and 16. These three faces are provided with a plurality of information locations adapted to contain binary information of a first type and binary information of a second type. The binary information of the first type is stored in the form of projections 17, projecting outwardly from respective ones of the three shaft faces 14, 15, 16. The binary information of the second type is stored in the form of cut-outs or slots 18 formed intermediate adjoining projections 17.

To read out the binary information represented by the projections 17 and slots 18, there is provided an electro-mechanical reading arrangement comprised of six rows 19, 19a,
20, 20a, 21, 21a of microswitches. The six rows are arranged in pairs of adjoining rows, namely 19 and 19a, 20 and 20a, and 21 and 21a. Each of the six rows 19, 19a, 20, 20a, 21, 21a is comprised of four microswitches, so that a total of twenty-four microswitches are provided on the lock housing.

Below, with particular reference to FIGS. 3 and 4, there will be explained the construction of the cylindrical lock, which constitutes the first and purely mechanical part of the information read out arrangement, and of the microswitch arrangement, which constitutes the second and electromagnetic part of the information read out arrangement.

The lock 2, constituting the first or purely mechanical part of the information read out arrangement, serves to lock and release the second or electromagnetic part of the information read out arrangement. The lock 2 is comprised of the lock cylinder 4 with the key-receiving channel 5. The lock cylinder 4 is turnably mounted in the lock housing 3. The lock housing 3 is comprised of an inner tubular portion 24 surrounded by an outer sleeve portion 23 and closed off at one axial end by a collar portion 25. The lock cylinder 4 is provided in its peripheral surface with three axially extending recesses 190, 200, 210 circumferentially spaced from each other. When the key 1 is inserted into the key-receiving channel 5, its projections 17 are received into the recesses 190, 200, 210.

In the lock housing 3 and in the lock cylinder 4 there are two rows, namely row 6 and row 7, of five two-part
tumbler pins each. The tumbler pins 6, 7 spring-biased and project with their pointed ends into the key-receiving channel 5. The tumbler pins 6 and 7 respectively co-operate with the bores 12 and 13 in the shaft portion 8 of the key 1. If the key 1 matches the lock 2 - i.e., if the information constituted by the presence and absence of bores 12 and 13 on the shaft faces 10 and 11 corresponds with the information prestored in the mechanical part of the information read out arrangement - then the tumbler pins 6 and 7 are displaced so that their joint faces become co-planar with the surface of the portion 24, and as a result the lock cylinder 4 can be turned in the lock housing 3.

The second or electromechanical part of the information read-out arrangement is comprised of an annular body 26 mounted on the tubular portion 23. The annular body 26 carries the microswitches 19, 19a, 20, 20a, 21, 21a. Each of the twenty-four microswitches in the six rows 19 to 21a is provided with a sensing pin 22 serving to activate the respective microswitch. The sensing pins 22 are mounted for longitudinal sliding movement through corresponding bores in the lock housing 3 and in the annular body 26. Each sensing pin 22 is provided with a respective annular rib portion 27 against which presses a respective axial compression spring 28 elongated in the direction of the respective sensing pin 22 and surrounding the respective sensing pin 22. The helical springs 28 press at axially outer ends against an abutment 29 provided the annular body 26. The sensing
pins 22 are guided through the respective helical springs 2o, so that the radially outer ends of the pins 22 press against the associated pushbuttons of the respective micro-switches 19 to 21a. The sensing pins 22 of a pair of rows of microswitches, e.g. the pair of rows 19, 19a, the pair of rows 20, 20a, or the pair of rows 21, 21a, project with their inner end portions into the associated one of the recesses 190, 200, 210.

If now a key 1 is inserted into the key-receiving channel 5, and if such key is provided on its shaft faces 10 and 11 with the correct number of properly disposed bores 12, 13, that is, with the correct encoded information, then the tumbler pins 6, 7 assume such positions that the lock cylinder 4 is released and can now be turned relative to the lock housing 3. If now the key 1 is turned, the projections 17, constituting units of binary information of the first type, come into contact with the inner ends of the sensing pins 22. During further turning of the lock cylinder, each projection 17 pushes the associated sensing pin 22 radially outwards, as a result of which the radially outwards end of each outwardly pushed pin 22 presses against the associated pushbutton of the respective microswitch, thereby generating an electrical signal by closing the circuit of the respective microswitch. The plurality of electrical signals thusly generated, and representative of binary-coded information, are applied to a non-illustrated storage for binary signals, for example by means of a plurality of separate lines each
connected between the output of a respective one of the
twenty-four microswitches and a respective one of twenty-four
inputs of the just-mentioned storage. The binary-coded
information in such storage, for example representing an
identification or account number, is compared with one or
more preselected reference numbers or other reference inform-
ation, and for example initiates a cash pay-out operation, or
the like. For example, the amount of cash to be paid out can
be applied in the form of a signal to the storage by the
pay-out arrangement of such an automatic cashier.

FIGS. 5 and 6 depict a second embodiment. Here, the
key 1' has a six-cornered or hexagonal cross-sectional con-
figuration. Two of the faces of the key shaft 8' serve to
store units of binary information in the form of bores 13'
for the unlocking or release of the lock cylinder 4'. The
remaining four faces of the key shaft 8' are provided with
projections 17' representing units of binary information
stored in a first form, and with cut-outs or slots 18'
representing units of binary information stored in a second
form. The cross-sectional configuration of the key-receiving
slot 5' corresponds to the configuration of the key 1'. In
the embodiment of FIGS. 5 and 6, the annular body 26' is
provided with a fourth pair 30, 30a of microswitches, making
a total of thirty-two microswitches, in contrast to the
twenty-four microswitches employed in the embodiment of FIGS.
1-4. In other respects, the structure and operation of the
embodiment of FIGS. 5 and 6 is analogous to that of FIGS.1-4.
FIG. 7 depicts in schematic manner a self-service no-
cash gasoline-station gas pump arrangement incorporating the
identification arrangement according to the invention. In
place of a credit card, the chain of gasoline stations which
owns the gas pump arrangement in question issues a special
key, such as the ones described above. Each customer receives
one such key. Each gas pump 31 is provided with an identify-
ing arrangement 32 of the type described in greater detail
above. In the illustrated embodiment, the identifying arrange-
ment 32 is supplemented by an electronic lock 33 and a key-
board 34.

The identification arrangement 32 and the electronic
lock 33 are connected to a D.C. voltage source 35. If the
key 1" is inserted into the identification arrangement 32
and turned, such turning will cause an associated electric
switch 36 to close thereby connecting the electronic lock
arrangement 33 to the D.C. voltage source. The electrical
signals generated by the electromechanical information read
out arrangement contained within unit 32, eg., the twenty-
four or thirty-two microswitches described above, is applied
to the electronic lock arrangement 33. In FIG. 7, a single
arrow is depicted leading from unit 32 to unit 33. However,
it will be understood that, as on possibility, there may in
fact be as many connecting lines as there are individual
microswitches in the electromechanical information read out
arrangement in the unit 32. If the electrical signals
generated by the unit 32 are thusly applied in parallel form -
to unit 33, they can be converted to serial form — in the unit 33, or can remain in parallel form and be processed in parallel form in the unit 33. This will be understood by persons skilled in the computer art. The number conveyed in parallel binary form, or in other form, from the unit 32 to the unit 33, may be a simple account number, or may represent the first several letters of the customer's last name plus an account number, or the like.

In the embodiment of FIG. 7, there is further provided a keyboard 34, which the customer employs to feed in additional identifying information, for example a four-digit number assigned to the customer at the time of issuance of the key and known only to him, to prevent unauthorized use of the key by a person finding the key but ignorant of the additional identification number. These identification numbers are fed by the electronic lock 33 to a data processing unit 37. The data processing unit 37 can be a single unit provided at the gas station in question, or a remotely located unit serving a large geographical district; for example the unit 37 can be a very large central unit connected to the individual gas pumps of the many gas stations in the chain by means of telephonic hook-ups or the like. The data processing unit 37 is operative for comparing the identification numbers fed into the unit 33 against a very large list of identification numbers belonging to customers to whom identification keys have been issued. Unless the numbers fed into the unit 33 are identical to prestored identification numbers, gas will
not be dispensed. However, if the fed-in identification numbers correspond to those of a credit-worthy customer, the remotely located or otherwise provided data processing unit 37 sends back to electronic lock 33 a signal which causes the lock to become released, thereby rendering a triac 38 conductive, and accordingly connecting the gas pump 31 to power. The customer then pumps gas into the tank of his vehicle. Upon completion of the filling operation, a volumetric flowmeter provided in the gas pump 31, or the equivalent, sends to data processing unit 37 a signal indicative of the amount of gas dispensed, and the corresponding cost is charged to the account corresponding to the identification number or numbers in question. Although the showing of components in FIG. 7 is very schematic, persons skilled in the computer art will have no difficulty in providing the necessary equipment, given the basic explanation of the operation above.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of circuits and constructions differing from the types described above.

While the invention has been illustrated and described as embodied in an identification arrangement, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully
reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.
CLAIMS
The claims defining the invention are as follows:

1. An arrangement for generating electrical identification signals, including a mechanical lock arrangement provided with a keyhole and including releasable blocking means for preventing unlocking of said mechanical lock arrangement by a key inserted into said keyhole unless the key inserted into said keyhole has portions of a predetermined configuration; a key configurated to be insertable into said keyhole and having portions of said predetermined configuration and movable when in said keyhole to a first position in which said key unlocks said mechanical lock arrangement and back to a second position in which said key relocks said mechanical information reading means, said key being provided with information which can be read by said electromechanical information reading means and converted by the latter into an electrical identification signal, said electromechanical information reading means being so arranged relative to said lock arrangement as to convert the information on said key into an electrical identification signal only when said key is in said keyhole and is in said first position.

2. An arrangement as defined in claim 1, wherein said mechanical lock arrangement is a cylindrical lock provided with a lock cylinder having said keyhole and turnable when said key is in said keyhole, between said first and second positions, and wherein said blocking means comprises a plurality of tumbler pins operative for preventing turning of
said lock cylinder except when displaced to predetermined positions by a key inserted into said keyhole.

3. An arrangement as defined in claim 1, wherein the information provided on said key and convertible into an electrical identification signal by said electromechanical information reading means is stored in the form of projections on said key.

4. An arrangement as defined in claim 1, wherein the information provided on said key and convertible into an electrical identification signal by said electromechanical information reading means is stored in the form of recesses on said key.

5. An arrangement as defined in claim 1, wherein the information which is provided on said key and which is convertible into an electrical identification signal by said electromechanical information reading means is stored in the form of projections and recesses on said key.

6. An arrangement as defined in claim 1, wherein said electromechanical information reading means is comprised of a plurality of spring-biased sensing pins projecting into said keyhole and displaceable by an inserted key to different positions dependent upon the surface configuration of the inserted key, and a plurality of electrical switch means, each associated with a respective one of said sensing pins and activated by the displacement of the respective one of said sensing pins.
7. An arrangement as defined in claim 6, wherein the information provided on said key and convertible into an electrical identification signal by said electromechanical information reading means is stored on predetermined portions of said key, and wherein said predetermined portions of said key engage and displace said sensing pins only when said key is located in said keyhole and is moved from said second to said first position.

8. An arrangement as defined in claim 1, wherein said key is comprised of an elongated shaft portion having a polygonal transverse cross-sectional configuration and has at least four faces, and wherein said key is provided on predetermined ones of said faces with portions configurated to effect releasing of said blocking means and is provided on other predetermined ones of said faces with portions configurated to represent said information.

9. In a self-service dispensing system of the type comprised of controllable dispensing means, a device activatable by the customer for generating an electrical identification signal, data processing means for determining whether the electrical identification signal generated by the customer belongs to a predetermined group of different identification signals assigned to cruddy-worthily customers, and control means operative for causing said dispensing means to perform a dispensing operation when the identification signal generated by the customer is determined by said data processing means to belong to said group, the improvement residing in the fact that said device comprises a mechanical lock arrangement pro-
vided with a keyhole and including blocking means for preventing unlocking of said mechanical lock arrangement by a key inserted into said keyhole unless the key inserted into said keyhole has portions of a predetermined configuration; a key configurated to be insertable into said keyhole and having portions of said predetermined configuration and movable when in said keyhole to a first position in which said key unlocks said mechanical lock arrangement and back to a second position in which said key relocks said mechanical lock arrangement; and electromechanical information reading means, said key being provided with information which can be read by said electromechanical information reading means and converted by the latter into an electrical identification signal, said electromechanical information reading means being so arranged relative to said lock arrangement as to convert the information on said key into an electrical identification signal only when said key is in said keyhole and is in said first position.

10. An arrangement for generating electrical identification signals constructed and arranged to operate substantially as herein described and with reference to Figs. 1 to 5 or Fig. 6 or Fig. 7 of the accompanying drawings.

DATED this 19th day of August, 1974.

GUIDO KALIN
By his Patent Attorneys:
CALLINAN AND NEWTON
DRAWINGS
Fig. 7

Diagram with labeled components:

- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 31