

Sept. 15, 1953

T. S. SKILLMAN ET AL
ARTICLE DISPENSING SYSTEM

2,652,301

Filed April 27, 1949

3 Sheets-Sheet 1

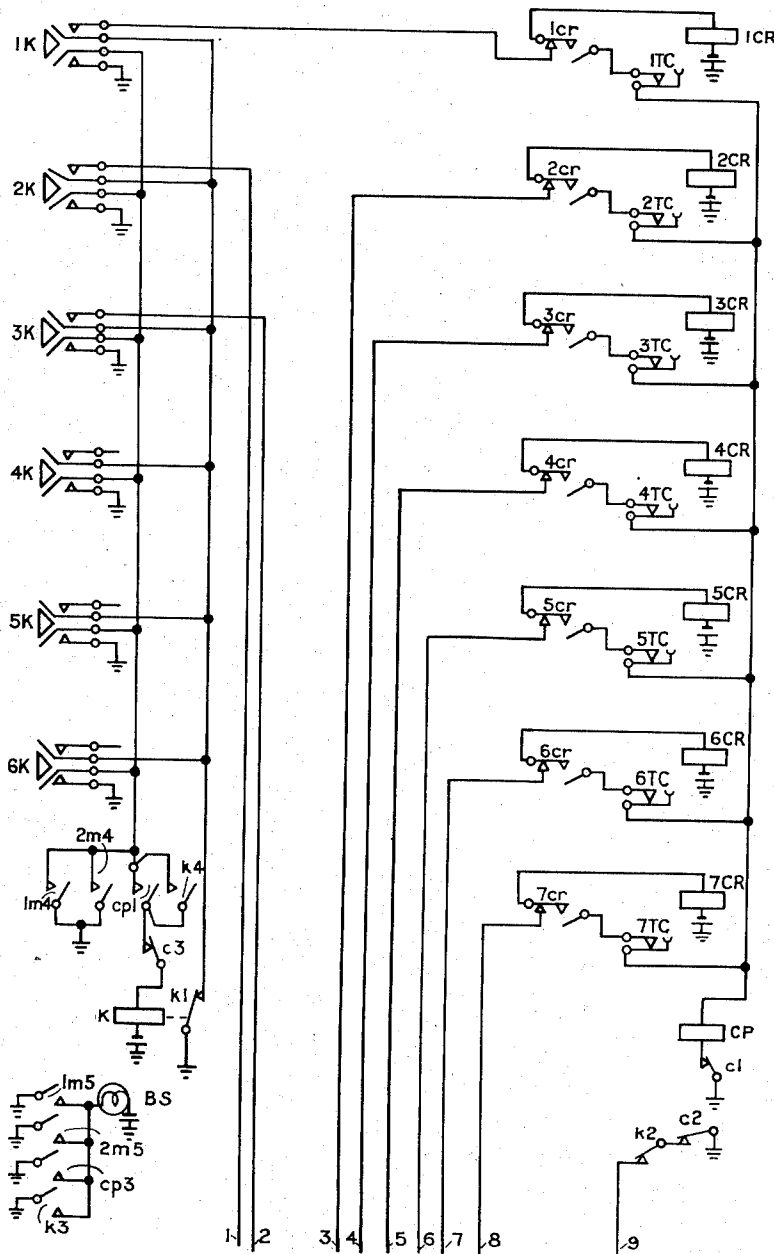


FIG. 1

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3 Sheets-Sheet 2

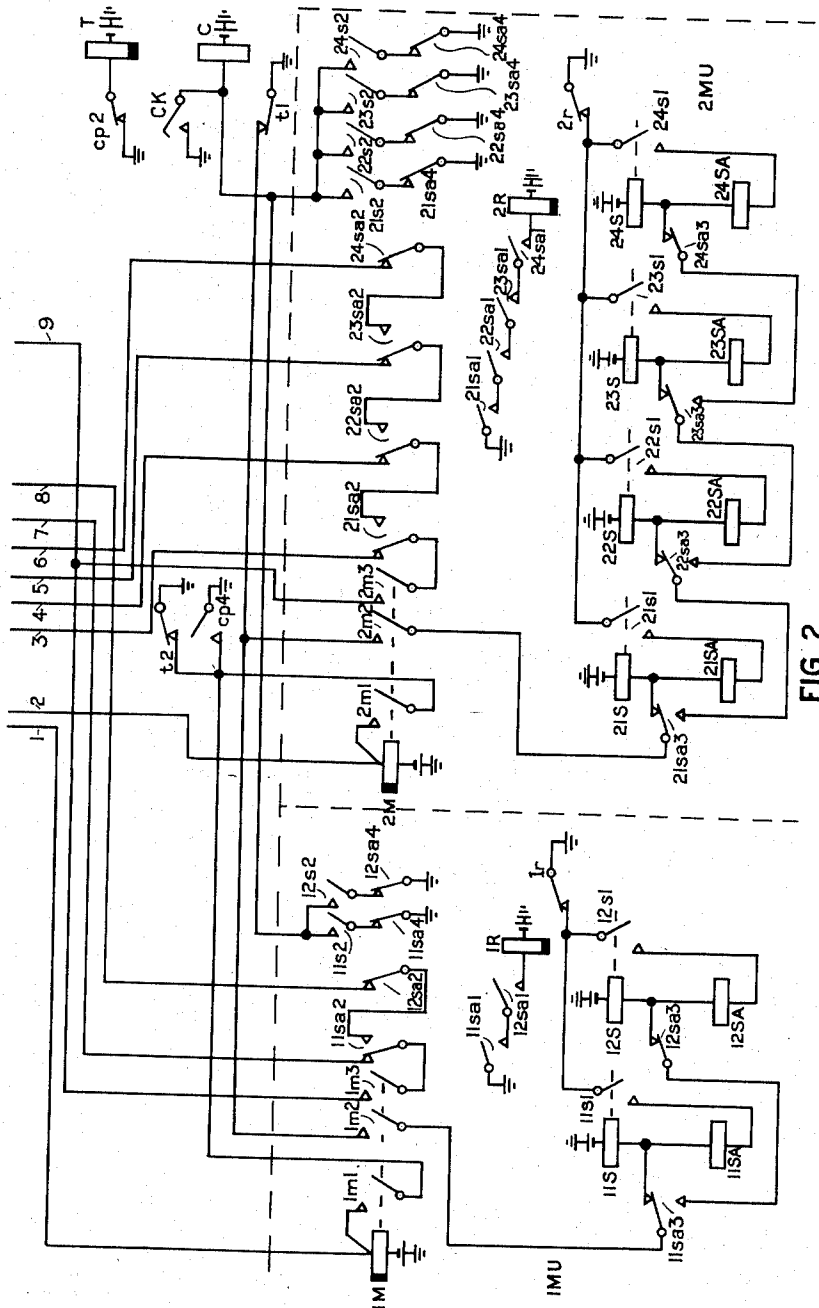


FIG. 2

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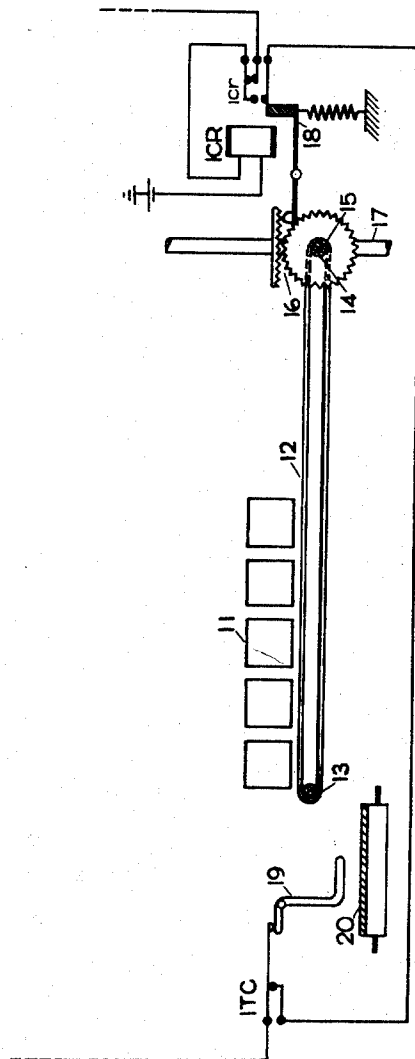
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UNITED STATES PATENT OFFICE

2,652,301

ARTICLE DISPENSING SYSTEM

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Application April 27, 1949, Serial No. 89,896
In Australia May 12, 1948

9 Claims. (Cl. 312—35)

1

The invention relates to article dispensing systems and more particularly to arrangements for selecting the same kind of article from a plurality of bins, shelves or the like.

The invention is particularly applicable to article dispensing systems of the character disclosed in a copending application of T. S. Skillman, Serial No. 643,945, filed January 28, 1946, now Patent No. 2,627,941, February 10, 1953, to which reference is made herein.

In article dispensing systems in which articles of various character are stored in storage devices like shelves or bins and are selected by the operation of suitable selecting mechanisms difficulties arise from the fact that some kinds of articles are in much greater demand than others.

In some systems of this kind the articles are allotted stock numbers or codes which can be keyed up on an operator's panel to select the wanted article. In other systems a separate key can be provided for each kind of article to effect the release of this kind of article. When one of the articles is in great demand, the shelf or bin containing this article will be empty much quicker than shelves or bins containing other kinds of articles, thus necessitating a re-loading of the bin in rapid succession. A further disadvantage can be seen in the fact that quite often a much wanted kind of article cannot be dispensed because the re-loading of the bins cannot be done quickly enough.

It is the object of the invention to overcome these disadvantages and to provide in an article dispensing system the possibility to key up articles in great demand without interference caused by the frequent emptying and re-loading of the corresponding storage devices.

It is a feature of the invention to allot a plurality of storage devices to articles of the same character, which are in great demand, and to provide arrangements whereby the selecting mechanism is automatically switched over from one storage device to the next one, when the first storage device is empty. As many storage devices as seem necessary can be connected in that manner, so that by using only one stock number or one key for one kind of article, this article will be dispensed from a plurality of storage devices, thus furthermore enabling a re-loading of the empty storage devices without disturbing the flow of selected articles.

According to another feature of the invention a timing circuit is inserted which makes the switching over from one storage device to the other storage device dependent on a certain time

2

delay to enable the selecting mechanism and testing circuit to function properly.

It is another feature of the invention to provide arrangements whereby the selecting mechanism is automatically switched back to the first storage device when the last storage device holding the same kind of articles has become empty. This arrangement has the further advantage that articles stored in these storage devices can never become stale as the dispensing of these articles follows the cycle of re-loading.

These and other features of the invention will be more clearly understood from the following description in connection with the annexed drawings showing one embodiment of the invention wherein:

Fig. 1 shows part of the selecting arrangement in an article dispensing system.

Fig. 2 shows the circuit necessary for the automatic change-over from one storage bin to the other.

Fig. 3 is an example of one type of storage device that may be used in the article dispensing system.

The Figs. 1 and 2 are connected as indicated by the leads 1, 2, 3, 4, 5, 6, 7, 8, and 9. In the circuit the "detached contact" method is used whereby each relay contact is not necessarily shown next to the corresponding relay but wherever it is used in the circuit. The relays are marked with capital letters and the contacts of these relays are indicated by corresponding small letters followed by the number of the contact. All relay contacts are shown in the unoperated position.

The example shown in the drawings gives the circuit for dispensing three different kinds of articles. One kind of article is stored only in one bin, another kind of article is stored in two bins with automatic switch-over from one to the other, and a third kind of article is stored in four bins with an automatic and progressive switch-over from one bin to the next one and from the last of the four bins back to the first one.

It must be understood, however, that any number of bins can be connected in the same manner depending only on the respective requirements.

In Fig. 3 is shown one type of storage device with which the various bins may be equipped. Articles 11 are stored on an endless belt 12. The belt 12 passes around rollers 13 and 14 which are normally stationary. The roller 14 is fixed to the shaft 15 which may be coupled by means of a clutch 16 to a constantly running shaft 17. The clutch 16 is engaged by an extension of the armature 18 of clutch relay (CR) which also operates

3
contact 1cr. The engagement of the clutch 16 causes roller 14 to drive the belt 12 forward until one of the articles 11 topples off over the roller 13. The article so released from the bin hits the arm 19 which operates the trip contact 1TC, which releases the clutch magnet 1CR as will be described later. The article may then be conveyed to a delivery point by any desired means, such as the conveyor belt 20.

Although in Fig. 3 only one storage device is shown, there will be one such device for each bin in which articles are to be stored.

In Fig. 1 six keys, 1K . . . 6K are shown which can select six different kinds of articles. Full connections are shown only for the first three keys 1K, 2K and 3K, but the other keys can be connected in the same manner. The key 1K is used for the selection of articles from one bin, and the selecting mechanism operating releasing means for the corresponding bin is indicated by the relay 1CR. The key 2K selects articles from two bins, the selecting mechanisms being shown as relays 6CR and 7CR. By operating the key 3K the same kind of article can be selected from four different bins indicated by the relays 2CR, 3CR, 4CR, and 5CR. The respective switching arrangements (multiple units) for the switching-over from one bin to the other or for the operation of four bins in rotation are shown in Fig. 2 within the dotted squares 1MU and 2MU respectively.

Although in the example shown a separate key is provided for the selection of each kind of article, the circuit arrangement can be used in the same manner when for example a key set of ten keys is used for the selection of articles of various character, whereby each kind of article is represented by a stock number or code keyed up in known manner on the key set.

The operation of the circuits will now be described in detail:

If, for example, the key 1K is pressed to release an article from the corresponding storage device (bin, shelf or the like), the circuit is closed from earth over contact k1, key 1K, contact 1cr, relay 1CR, battery to earth. The relay 1CR operates its make-before-break contact 1cr which closes a locking circuit for the relay 1CR over contact 1cr, trip contact 1TC, relay CP, contact c1 to earth. The relay CP operates by closing its contacts cp1, cp3, and cp4 and opening its contact cp2 (Fig. 2), thus interrupting the circuit for the slow releasing relay T, which is normally operated and only releases with a certain time delay, for example, three seconds. This time delay is determined by the time which is necessary for the safe release of an article from a selected bin. The relay T is only used in connection with the multiple units as will be described later. The contact cp3 (Fig. 1) closes a circuit for the busy lamp BS to indicate to the operator that the selection is in progress, and the contact cp1 establishes a circuit for the relay K from earth via the operated key 1K, operated contact cp1, contact c3, relay K to battery. The contact cp4 (Fig. 2) which is connected with circuits of the multiple units 1MU and 2MU does not fulfil any functions yet as these multiple units 1MU, 2MU are only used in connection with the keys 2K and 3K as will be described later.

The relay K (Fig. 1) has four contacts. The contact k1 interrupts the operating circuit for the relay 1CR which in the meantime has closed the locking circuit for itself as described above.

The contact k2 is connected over lead 9 with the multiple units 1MU and 2MU (Fig. 2) respectively and does not fulfil any functions in connection with a selection of articles through the key 1K. The contact k3 (Fig. 1) closes another circuit for the busy lamp BS parallel to the contact cp3 and the contact k4 closes a circuit by-passing the contact cp1.

The relay 1CR, when operated, initiates the release of an article from the corresponding bin and this article while being discharged from the bin operates under gravity for a short moment the trip contact 1TC in the manner for example described in said Skillman application, thus breaking the locking circuit for the relay 1CR and the relay CP. Both relays thus release. The relay 1CR cannot operate again even if the operator still keeps the key 1K depressed, because its original circuit is interrupted at the contact k1. Although through the release of relay CP the contacts cp1 and cp3 are open again, the circuits established by these contacts are kept closed by the contacts k4 and k3 respectively as mentioned before. Thus the relay K provides the means to prohibit the release of more than one article at a time in case the operator presses the key longer than necessary.

As the release of an article takes less time than the de-energising of the slow releasing relay T (Fig. 2), the contact cp2 is closed again before the relay T has released, so that this relay will remain in the operated state. When the operator has released the key 1K, relay K (Fig. 1) releases as well. At contact k4 it interrupts its own circuit, and over contact k1 it restores earth to the various keys 1K . . . 6K. At contact k3 it opens the circuit for the busy lamp BS, thus indicating that the whole circuit is ready for the next selection.

In case the bin is empty, so that no article falls out of the bin, the relay CP remains operated as trip contact 1TC does not open. The busy lamp BS remains lighted, and the operator releases the circuit by pressing the cancel key CK (Fig. 2) which closes a circuit for relay C. The relay C operates its three break contacts c1, c2, and c3. At contact c1 (Fig. 1) the circuit for the relays CP and 1CR is interrupted, contact c3 breaks the circuit for relay K and the contact c2 interrupts a circuit leading to the multiple units 1MU and 2MU. This contact is used in connection with the selection of articles from more than one bin as will be described hereafter.

As mentioned before the key 2K is used for the keying up of articles which are dispensed from two bins, so that when one bin is empty, an automatic switch-over takes place to the next bin. These two bins are indicated in Fig. 1 by the two corresponding relays 6CR and 7CR. Instead of operating the relay 6CR directly from the key 2K, a group relay 1M in the multiple unit 1MU (Fig. 2) is operated, when the key 2K is pressed, from earth via break contact k1 (Fig. 1), key 2K, lead 1 (Fig. 1 and Fig. 2), relay 1M to battery. This relay closes its five contacts 1m1 . . . 1m5. Over contact 1m3 a circuit is closed for the relay 6CR from earth via contact c2 (Fig. 1), contact k2, lead 9 (Figs. 1 and 2), operated contact 1m3, break contact 1isa2, lead 1 (Figs. 1 and 2), make before break contact 6cr, relay 6CR to battery. The relay 6CR operates and closes a locking circuit over its contact 6cr, trip contact 6TC, relay CP, contact c1 to earth. The operation of relay CP has the same effect as described before for the selection of an arti-

cle via the key 1K. Via the contact *cp4* (Fig. 2) a locking circuit for the relay 1M is closed from earth via operated contact *cp4*, operated contact *1m1*, relay 1M to battery. Thus the group relay 1M remains operated even after the operator has released the key 2K. While the key 2K is still depressed, the relay K (Fig. 1) is brought up in the usual manner to fulfil the same functions as described before. The contact *k2* breaks the circuit over lead 9 and the contacts *1m3* (Fig. 2) and *11sa2*, but this circuit is already interrupted at the contact *6cr* (Fig. 1). In case the bin is loaded with articles, the article released from the bin operates momentarily the trip contact *6TC* and thus restores the whole circuit to normal in the manner described above, the contact *cp4* (Fig. 2) interrupting the locking circuit of the relay 1M thus releasing this relay in the multiple unit 1MU. As the relay 1M is a slow release relay as will be explained later on, care must be taken that the relay K is kept operated until relay 1M has released, otherwise the bin relay 6CR would be operated again, when the key 2K is released. To keep relay K in the operated position until the relay 1M has opened its contacts, a locking circuit for relay K is provided from earth over contact *1m4* (Fig. 1) of relay 1M, operated contact *k4*, contact *c3*, relay K to battery.

If the bin represented by the relay 6CR had been empty, the trip contact *6TC* is not operated within a certain time period and thus the slow releasing relay T (Fig. 2) is de-energized as the contact *cp2* is held open for a longer time than the release period of this relay. The relay T therefore closes now its contacts *t1* and *t2* which were normally held open by this relay. Contact *t2* connects earth, in parallel to contact *cp4*, to the locking circuit of relay 1M, so that this relay remains locked when the relay CP releases. Over contact *t1* a circuit is closed for the relay 11S from earth via contact *t1*, operated contact *1m2*, contact *11sa3*, relay 11S to battery. The relay 11S closes its contact *11s1*, but the relay 11SA cannot operate in series with the relay 11S, because it is short-circuited over the contact *t1*. The closing of the contact *11s2* operates the relay C from earth via contact *11sa4*, operated contact *11s2*, relay C to battery. Relay C releases at its contact *c1* (Fig. 1) the bin relay 6CR and the relay CP and at its contact *c3* the relay K. At the contact *c2* the energising circuit for the relay 6CR is interrupted as well so that this relay cannot operate again.

The busy lamp BS still lights up over the contact *1m5*. The further contact *1m4* of the relay 1M puts earth on the lead from the key 2K to relay K when this relay is brought up again later on.

When relay CP has released as described above, relay T is operated again over the contact *cp2* (Fig. 2) and thus breaks its contacts *t1* and *t2*.

The relay 1M is a slow release relay so that this relay does not break its contacts until such time that relay 11SA and the bin relay 7CR and relay CP have operated and the relay C has been de-energised. Therefore the relay 1M does not fall off at the first de-energising of relay CP, when relay T has been operated over the contact *cp2* and has broken its contact *t2*.

As the earth is now removed at contact *t1* from the relay 11S, the relay 11SA can operate from earth via contact *1r*, operated contact *11s1*, relay 11SA, relay 11S to battery. Relay 11SA closes its contact *11sa1* which prepares a circuit for a

future operation of the relay 1R. Contact *11sa2* switches over thus disconnecting at lead 7 the bin relay 6CR and connecting the lead 8 of the bin relay 7CR of the following bin over contact *12sa2* with the contact *1m3* and lead 9. The contact *11sa3* prepares a circuit from contact *t1* to relay 12S. Finally the contact *11sa4* interrupts the circuit for relay C which thus releases closing its contacts *c1*, *c2*, and *c3*.

As soon as contact *c2* (Fig. 1) of relay C is closed again, a circuit is closed for the operation of the relay 7CR from earth via contact *c2*, contact *k2*, lead 9 (Figs. 1 and 2), contact *1m3*, contact *11sa2*, contact *12sa2*, lead 8, contact *7cr* (Fig. 1), relay 7CR to battery. The relay 7CR closes a locking circuit in the usual manner over contact *7cr*, thus operating relay CP and re-establishing a locking circuit for relay 1M over contact *cp4*.

When an article is now released from the bin corresponding to the relay 7CR, the trip contact *7CT* is interrupted for a short moment, thus breaking the locking circuit for relay 7CR and relay CP. At contact *cp4* (Fig. 2) the locking circuit for relay 1M is interrupted so that this relay releases after a short time. The relays 11S and 11SA, however, remain operated in series over the circuit described, so that when another selection is made via the key 2K and relay 1M, a circuit is closed for the relay 7CR from earth over contact *c2* (Fig. 1), contact *k2*, lead 9 (Figs. 1 and 2), contact *1m3*, contact *11sa2*, contact *12sa2*, contact *7cr*, relay 7CR to battery. Thus it can be seen that now all the articles called up at the key 2K are released from the second bin carrying these articles.

Provision is made to switch the circuit back to the first bin for this kind of article (which is reloaded in the meantime), whenever the bin corresponding to relay 7CR is empty.

In case the trip contact *7TC* has not been operated within a certain time period because the corresponding bin is empty, the T relay will operate again in the manner described before. Over the contact *t1* a circuit is now established from earth via contact *t1*, operated contact *1m2*, operated contact *11sa3*, contact *12sa3*, relay 12S to battery so that this relay operates and closes its contacts *12s1* and *12s2*. Contact *12s1* prepares a circuit for the relay 12SA which however cannot operate yet as it is still short-circuited over the circuit operating the relay 12S. Over the contact *12s2* relay C is operated again which, in the manner described above, breaks the contact for the relays CP and 7CR at its contact *c1* (Fig. 1). Over the contact *cp2* (Fig. 2) which closes again when relay CP releases, relay T operates again and at contact *t1* takes earth off the connection between the relays 12S and 12SA.

Relay 12SA is now operated in series with relay 12S from earth over contact *1r*, contact *12s1*, relay 12SA, relay 12S to battery. The relay 12SA disconnects the lead from contact *t1* at its contact *12sa3*. Furthermore, it interrupts lead 8 coming from the bin relay 7CR at its contact *12sa2*. At contact *12sa4* the circuit for the relay C is interrupted again, so that this relay de-energises closing its contacts *c1*, *c2*, and *c3*. Over the contact *12sa1* a circuit is closed from earth via operated contact *11sa1*, operated contact *12sa1*, relay 1R to battery. This relay then operates its contact *1r* interrupting the locking circuits for the relays 11SA and 11S and the relays 12SA and 12S. These relays de-energise and thus the whole circuit is now reverted back to the release of

articles from the bin represented by the relay 5CR. As soon as an article is now released from this bin in the manner described above, the locking circuit for the relay 1M is interrupted as both contacts *t2* and *cp4* are open and thus the circuit is ready for the next selection.

Instead of having two bins only for the same kind of article which are alternatively called up for the release of these articles, any number of bins can be used for the same kind of article which work them in rotation. The circuit is in principle the same as described so far with the only exception that the relay train shown in the multiple unit 1MU by the relays 11S, 11SA and relays 12S and 12SA is enlarged adding two more relays for each new bin.

A circuit of this kind is for example shown in connection with the key 3K (Fig. 1) which can select articles from four different bins indicated by the relays 2CR, 3CR, 4CR and 5CR. The corresponding relay arrangement is shown in the multiple unit 2MU (Fig. 2) which includes the group relay 2M fulfilling the same functions as the relay 1M in the multiple unit 1MU, the relay 2R corresponding to relay 1R and the enlarged relay train 21S, 21SA; 22S, 22SA; 23S, 23SA; 24S, 24SA. The function of this relay train is the same as described before with the only exception that the relay 2R is only operated after all four relay groups have been operated instead of the two relay groups in the multiple unit 1MU. All the relay contacts relating to the various relays are marked in the same manner as in multiple unit 1MU with the exception that the prefix is changed from "1" to "2."

It may be mentioned, however, that when further multiple units have to be added, an additional contact of each group relay M has to be added to the busy lamp circuit as well as at the lead to the various keys in parallel to the contacts *1m4*, *2m4*, and *1m5*, *2m5* respectively.

Although a separate multiple unit has to be provided for each group of bins which shall work together operated from the same key, the timing circuit is common to the whole system. The same relates to the cancel key CK which is operated any time the operator wants to release the circuit, either because the bin was empty and no other bin was provided with the same kind of article or because he wants to cancel the selection before the article is delivered.

The invention described above shows one example only and it must be understood that many modifications are possible within the scope of this invention. It was already mentioned before that instead of releasing the articles by separate individual keys, a common keyboard can be provided and the articles or the respective bin mechanism can be selected in any known manner by stock numbers or codes keyed up on the keyboard. Instead of using a slow release relay for the timing circuit a slow operating relay can be provided which in this case would be operated by a make contact of common relay CP, or any other method to establish a time delay in the switching operation can be used instead. Alternatively the operation of the multiple units can be controlled by manually operated contact means.

We claim:

1. In an article-dispensing system of the character described: a group of storage devices for storing articles of a given character, each device including an electrically actuated releasing means for discharging said articles therefrom, and electrical contact means actuated by discharge of said articles; switch-actuated selecting means

for establishing a connection to energize the releasing means of one said device; and electrical switching means for automatically transferring said connection from said storage device if empty to another of said storage devices containing said articles, said means including a locking circuit for the releasing means of each device and containing the electrical contact means thereof, said contact means upon actuation interrupting said locking circuit; an energizing connection common to all said locking circuits containing the winding of a first relay and contacts of a second relay; a slow release relay responsive to said first relay; further switching means including additional relays individual to said storage devices for actuating and releasing said second relay in response to release and actuation, respectively, of said slow release relay, and further contact means actuated by said additional relays for transferring said connection as aforesaid.

2. In an article-dispensing system of the character described: a group of storage devices for storing articles of a given character, each device including an electrically actuated releasing means for discharging said articles therefrom, and electrical contact means actuated by discharge of said articles; switch-actuated selecting means for establishing a connection to energize the releasing means of one said device; and electrical switching means for automatically transferring said connection from said storage device if empty to another of said storage devices containing said articles, said means including a locking circuit for the releasing means of each device and containing the electrical contact means thereof, said contact means upon actuation interrupting said locking circuit; an energizing connection common to all said locking circuits containing the winding of a first relay and contacts of a second relay; a slow release relay responsive to said first relay; and further switching means including a pair of serially connected relays for each storage device, for actuating and releasing said second relay in response to release and actuation respectively of said slow release relay, and further contact means actuated by said relay pairs for transferring said connection as aforesaid.

3. In an article-dispensing system of the character described: a group of storage devices for storing articles of a given kind, each device including an electrically actuated releasing means for successively discharging said articles; switch-actuated group selecting means including a slow release group relay, for establishing a connection to actuate the releasing means of one said storage device; and means including contacts of said group relay for automatically switching said connection after predetermined time intervals step by step to the releasing means of the remaining said devices in succession, said automatic switching means including a locking circuit for the releasing means of each device, a first relay common to all said locking circuits, a slow release relay responsive to energization of said first relay, a pair of serially connected relays for each said device and means for progressively energizing the same in response to successive releases and energizations of said slow release relay, a second relay and means for energizing the same in response to energization of one relay of each said pair and for thereafter releasing the same in response to energization of the other relay of each said pair, and means responsive to energization of said second relay for opening said locking circuit and releasing said first relay; and electrical contact

means associated with each said storage device and interposed in said locking circuits, said contact means being arranged in the path of articles released from a corresponding storage device and operable thereby to interrupt the circuit for a corresponding releasing means and to prevent further operation of said automatic switching means.

4. In an article-dispensing system of the character described: a plurality of groups of storage devices, each group for storing articles of a given character different from the others, each device including an electrically actuated releasing means for releasing said articles and electrical contact means actuated by discharge of said articles; a selecting mechanism including for each said group, a group relay for establishing a connection to energize the releasing means of one storage device in a selected group; and electrical switching means common to the storage devices of each said group for automatically transferring said connection from said storage device if empty to another device of said selected group containing said articles, said means including a locking circuit for the releasing means of each device and containing the electrical contact means thereof, said contact means upon actuation interrupting said locking circuit; an energizing connection common to all said locking circuits containing the winding of a first relay and contacts of a second relay; a slow release relay responsive to said first relay; means including additional relays individual to said storage devices and arranged in corresponding groups for actuating and releasing said second relay in response to release and actuation, respectively, of said slow release relay, and further contact means actuated by said additional relays for transferring said connection as aforesaid.

5. In an article-dispensing system of the character described: a plurality of groups of storage devices, each group for storing articles of a given character different from the others, each device including an electrically actuated releasing means for releasing said articles and electrical contact means actuated by discharge of said articles; a selecting mechanism including, for each said group, switching means and a group relay for establishing a connection to energize the releasing means of one storage device in a selected group; and electrical switching means common to the storage devices of each said group for automatically transferring said connection from said storage device if empty to another device of said selected group containing said articles, said means including a locking circuit for the releasing means of each device and containing the electrical contact means thereof, said contact means upon actuation interrupting said locking circuit; an energizing connection common to all said locking circuits containing the winding of a first relay and contacts of a second relay; a slow release relay responsive to said first relay; and means including a pair of serially connected relays for each storage device and being arranged in corresponding groups, for actuating and releasing said second relay in response to release and actuation respectively of said slow release relay, and further contact means actuated by said relay pairs for transferring said connection as aforesaid.

6. In an article-dispensing system of the character described: a group of storage devices for storing articles of a given character, each device including an electrically actuated releasing means for discharging said articles therefrom; switch-

actuated selecting means and electrical connections therefrom selectively connectable with said releasing means to energize the releasing means of one said device; switching means common to said group of storage devices and including a timing device and electrical connections therefrom to said switch-actuated selecting means and each of said releasing means to transfer said first mentioned electrical connections after a predetermined time interval from one releasing means to the following releasing means; and contact means associated with each said storage device, and electrical connections therefrom to said releasing means and to said timing device, said contact means being operable upon the release of each article from any of the storage devices of said group to deenergize the corresponding releasing means and to restore said timing device to its original position.

7. In an article-dispensing system of the character described: a group of storage devices for storing articles of a given character, each device including an electrically actuated releasing means for discharging said articles therefrom; switch-actuated selecting means including a group relay having a plurality of contacts operated thereby and electrical connections therefrom selectively connectable with said releasing means to energize the releasing means of one said device; switching means common to said group of storage devices and including a timing device and electrical connections therefrom to said contacts of said group relay and said releasing means to transfer said first mentioned electrical connections after a predetermined time interval from one releasing means to the following releasing means; and contact means associated with each said storage device and electrical connections therefrom to said releasing means and to said timing device and being operable upon the release of each article from any of the storage devices of said group to deenergize the corresponding releasing means and to restore said timing device to its original position.

8. In an article-dispensing system of the character described: a group of storage devices for storing articles of a given kind, each device including an electrically actuated releasing means for successively discharging said articles; switch-actuated group selecting means including a slow release group relay, for establishing a connection to actuate the releasing means of one said storage device; means including contacts of said group relay for automatically switching said connection after predetermined time intervals step by step to the releasing means of the remaining said devices in succession, said automatic switching means including a locking circuit for the releasing means of each device, a first relay common to all said locking circuits, a slow release relay responsive to energisation of said first relay, a pair of serially connected relays for each said device and means for progressively energising the same in response to successive releases and energisations of said slow release relay, a second relay and means for energising the same in response to energisation of one relay of each said pair and for thereafter releasing the same in response to energisation of the other relay of each said pair, and means responsive to energisation of said second relay for opening said locking circuit and releasing said first relay; further means for automatically switching said connection after a predetermined time interval from the releasing means of the last of said devices

back to the releasing means of the first of said devices, said further means including a releasing relay, an operating circuit adapted to operate said releasing relay on operation of all said pairs of serially connected relays, and contacts of said releasing relay adapted on operation thereof to release all said pairs of serially connected relays; and electrical contact means associated with each said storage device and interposed in said locking circuits, said contact means being arranged in the path of articles released from a corresponding storage device and operable thereby to interrupt the circuit for a corresponding releasing means and to prevent further operation of said automatic switching means.

9. In an article dispensing system of the character described: a plurality of groups of storage devices, each group for storing articles of a given character different from the others, each device including an electrically actuated releasing means for discharging said articles therefrom; switch-actuated group selecting means, including a slow release group relay for each of said groups of storage devices, for establishing a connection to actuate the releasing means of one storage device of any of said groups; means for each of said groups of storage devices, including contacts of the corresponding group relay, for automatically switching said connection after predetermined time intervals step by step to the releasing means of the remaining said devices of the corresponding group in succession, said automatic switching means including a locking circuit for the releasing means of each device, a first relay common to all said locking circuits, a slow release relay responsive to energisation of said first relay, a pair of serially connected relays for each said device and means for progressively energising the same in response to successive releases and energisa-

tions of said slow release relay, a second relay and means for energising the same in response to energisation of one relay of each said pair and for thereafter releasing the same in response to energisation of said second relay for opening said locking circuit and releasing said first relay; further means for each of said groups of storage devices for automatically switching said connection after a predetermined time interval from the releasing means of the last of said devices back to the releasing means of the first of said devices, said further means including a releasing relay, an operating circuit adapted to operate said releasing relay on operation of all said pairs of serially connected relays, and contacts of said releasing relay adapted on operation thereof to release all said pairs of serially connected relays; and electrical contact means associated with each said storage device and interposed in said locking circuits, said contact means being arranged in the path of articles released from a corresponding storage device and operable thereby to interrupt the circuit for a corresponding releasing means and to prevent further operation of said automatic switching means.

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