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Goto

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[54] **ARTICLE DISPENSING WHICH ARRANGES ARTICLES SO THAT SEVERAL MAY BE VIEWED AT ONE TIME FOR SIMULTANEOUS APPROVAL OF THE OPERATOR**

[75] Inventor: **Hideyuki Goto,** Osaka, Japan

[73] Assignee: **Omron Tateisi Electronics Co.,** Kyoto, Japan

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[51] **Int. Cl.** **G07f 7/02**

[58] **Field of Search** .....221/155, 10, 119–122, 221/206, 207; 194/4, DIG. 9 B

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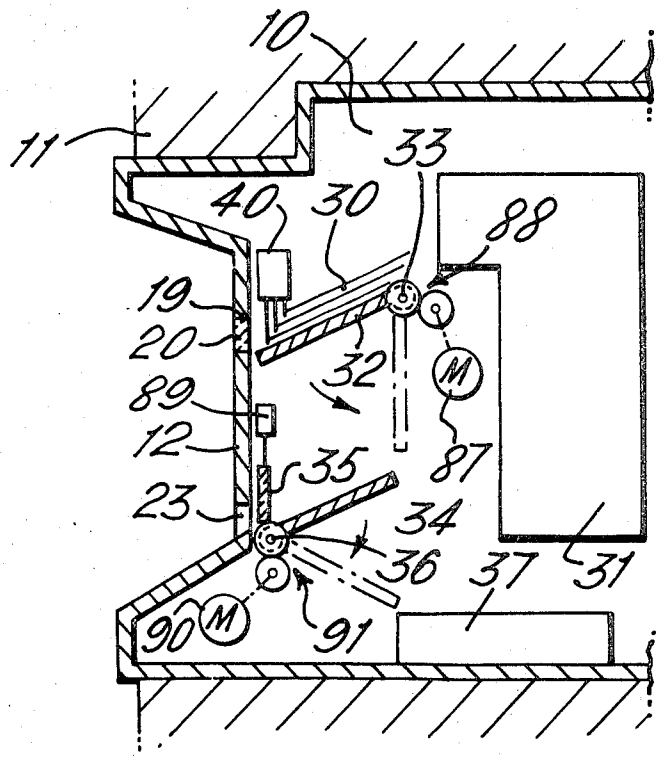
Primary Examiner—Robert B. Reeves
Assistant Examiner—Thomas E. Kocovsky
Attorney—Christensen & Sanborn

[57] **ABSTRACT**

Apparatus for dispensing articles such as bills or envelopes containing money or other articles, wherein the articles to be dispensed are temporarily positioned inside a window formed in the front panel of the apparatus so that they can be looked at and checked from outside for confirmation by the user of the apparatus before they are dispensed.

13 Claims, 6 Drawing Figures



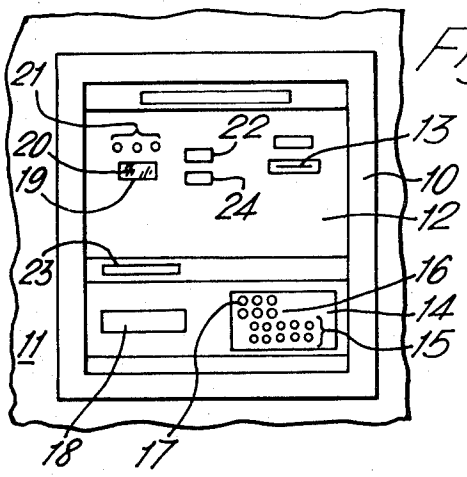


Fig. 1.

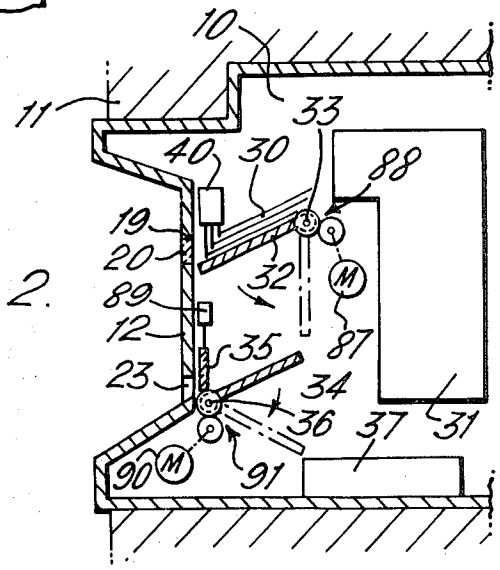


Fig. 2.

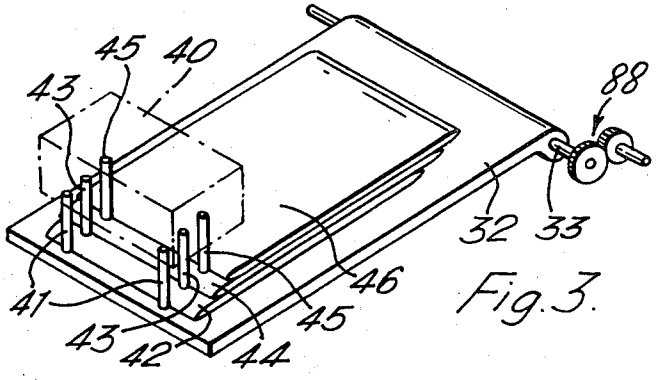


Fig. 3.

INVENTOR
HIDEYUKI GOTO
BY
Christensen & Sanborn
ATTORNEYS

Fig. 4.

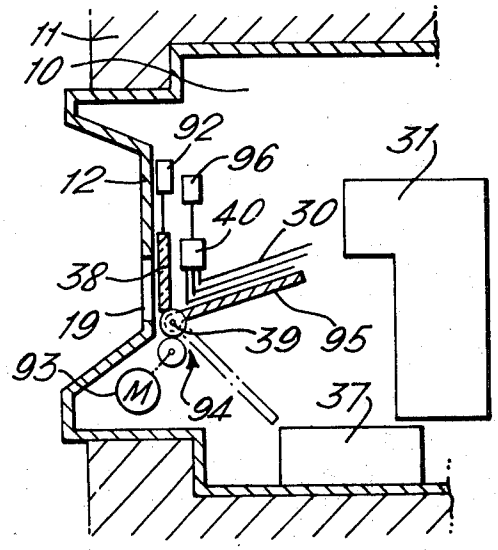


Fig. 5.

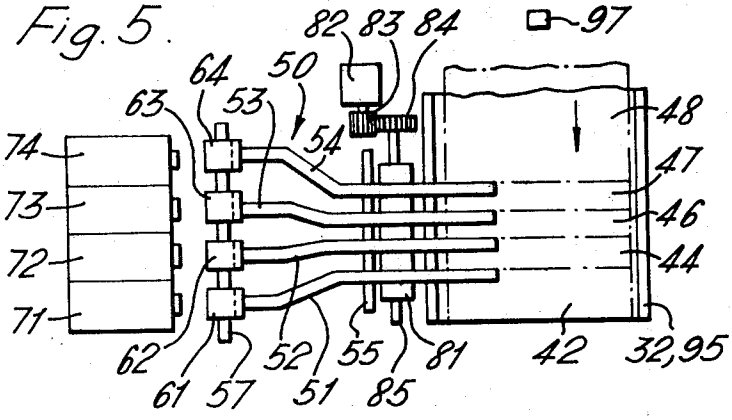
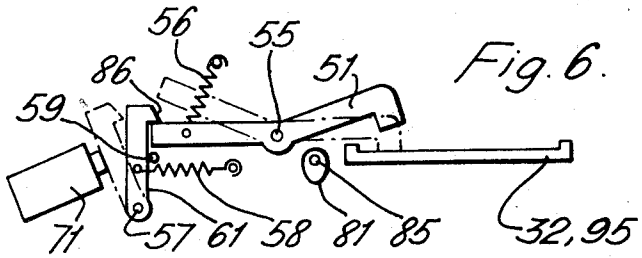


Fig. 6.



INVENTOR
HIDEYUKI GOTO
BY
Christensen & Santora
ATTORNEYS

ARTICLE DISPENSING WHICH ARRANGES ARTICLES SO THAT SEVERAL MAY BE VIEWED AT ONE TIME FOR SIMULTANEOUS APPROVAL OF THE OPERATOR

This invention relates to an apparatus for dispensing articles such as cash money.

The recent trend in banking business is the automation of various kinds of office work. For example, a machine has come to be used to automatically dispense cash money at the request of a customer to withdraw a certain amount of money from his or her account. Such automatic cash dispensing machines are generally actuated by a card. When a customer inserts his card into a slot provided on the machine for the purpose, the identification number invisibly recored on the card is automatically read by the machine. On the other hand, the customer operates a keyboard provided on the machine to enter into the machine a secret number known previously to him. The machine then compares the two numbers and if there is a predetermined correspondence between the two numbers, the user of the card is recognized as its proper owner so that the machine dispenses the requested amount of cash money. The cash money is usualy contained in an envelope. There are stored in the machine many such envelopes containing the same amount of money, one of which is dispensed upon every proper operation of the machine. In some cases, the arrangement is such that the user can withdraw as much money, that is, as many envelopes as he desires. The arrangement has various defects: Suppose that the user of the machine notifies the bank which instals the machine that despite the required operation performed on the machine, it dispensed no envelope or a less number of envelopes than the required amount. Since there is no attendant to the machine on the spot, it is impossible for the bank to determine whether the user has mede an error in operating the machine, or the machine is in disorder, or the user is deceiving. The same problem arises in the type of machine in which cash is dispensed without being contained in an envelope.

Accordinly, it is one object of the invention to provide an apparatus for dispensing articles such as cash money, which prevents any trouble between the user of the machine and its owner.

Another object of the invention is to provide such an article dispenser as aforesaid, wherein the user of the machine can check the article or the amount of money to be dispensed by looking at it from outside the machine, and when the article or amount has been approved by the user, the article or money is dispensed so that there will be no trouble or dispute about the article or amount dispensed between the user and the owner of the machine.

Another object of the invention is to provide such an article dispenser as aforesaid, wherein the articles to be dispensed are arranged one piled upon another and each a slightly displaced from the adjacent ones so that the user of the machine can easily look at them through a window and check the amount to be dispensed.

The invention will be explained below as applied to a cash dispenser, but it should be noted that the invention is never restricted to the cash dispenser.

In one embodiment of the invention, the dispenser is provided with a window on the front panel of the housing, through which the interior of the housing can be seen. The window has a strong glass pane fitted therein. When the user of the machine has input the machine data corresponding to the amount of money he wishes to withdraw, the corresponding number of bills or envelopes containing the amount of money are placed inside the window. In this specification and claims, the bills and envelopes containing bills and/or coins to be dispensed will sometimes be referred to simply as bills. It should be understood, however, that the term "bill" denotes a check, and an envelope containing a predetermined amount of money, checks or the like. The user of the machine then looks at the bills through the window and confirms the number or value of the bills, and if the value agrees with that he wishes to withdraw, he presses an "approval" push-button on the front panel of the machine, whereupon an approval signal is produced to cause the bills to be dispensed out of the machine to the user.

In one embodiment, the bills are placed on a plate or shelf provided inside the window so as to be pivotable at its one edge. When the approval signal has been produced, the shelf is turned about the pivot so that the bills thereon drop into a chute provided below the shelf. The chute extends aslant down to an outlet opening formed in the front panel, so that the bills slide on the chute onto the outlet opening. This opening is normally closed by a shutter but is opened simultaneously with the pivotal movement of the shelf, so that the bills are dispensed through the opening.

The chute is pivotable so as to extend in the opposite direction down to a receptacle. When the user of the machine confirms that the bills on the shelf disagree with the amount he wishes to withdraw, he presses a "disapproval" push-button, whereupon the shelf is turned to drop the bills onto the chute, and at the same time the chute is pivoted toward the receptacle, into which the bills on the chute slide down so as not to be dispensed out of the housing.

In another embodiment of the invention, a transparent shutter is provided inside the window to normally close it. The bills to be dispensed are placed on a shelf behind the shutter. The user of the machine looks at the bills on the shelf through the transparent shutter and checks them. If the amount on the shelf agrees with the amount he desires to withdraw, he presses the approval button, whereupon the shutter is raised to open the window, through which the bills are delivered out of the machine. In this embodiment the window serves also as the outlet of bills.

If the amount on the shelf disagrees with the amount the user desires to withdraw, he presses the disapproval button, whereupon the shelf is inclined toward a receptacle, into which the bills on the shelf are put so as not to be dispensed out of the housing.

When a plurality of bills are placed on the shelf, it will be easier for the user of the machine to check the amount or number of the bills if each of them lies stepwise one upon another, that is, the one above being displaced from the one beneath it. The arrangement of the invention is such that as each bill is delivered onto the shelf, it is stopped on the previous bill, with its forward edge being a little displaced backwardly from the forward edge of the previous bill on the shelf. To effect such displacement, a plurality of engaging members are arranged along the length of the shelf inwardly from the

window. As a first bill slides down on the shelf, that one of the engaging members which is nearest to the window is caused to move downwardly toward the surface of the shelf as far as the bill has its forward edge arrested by the engaging member and is held at the position. When the next bill comes, its forward edge is engaged by the other of the engaging members next nearest to the window so that the bill is placed on the previous bill, but a little displaced backwardly therefrom. Thus, the bills are placed stepwise on the shelf, each a little displaced backwardly from the one immediately beneath it, so that the user of the machine can easily check the number of bills on the shelf.

It may sometimes happen that the bill cannot be arrested. To prevent this, the arrangement may be such that each engaging member is brought into contact with the upper surface of the bill to hold it by pressing it against the surface of the shelf or that of the bill previously placed thereon.

The engaging members may be in the form of pins or levers. The pins are movable toward and away from the shelf and the levers are pivotable, so that bills are successively arrested by engagement with the pins or levers when the former are moved near to the shelf or the latter are pivoted in one direction. When the approval signal has been produced, the pins are raised or the shelf is turned, or the levers are pivoted in the opposite direction thereby releasing the bills to be dispensed out of the machine.

The invention will become more apparent from the detailed explanation of some preferred embodiments thereof with reference to the accompanying drawings, wherein:

FIG. 1 is a front view of one embodiment of the cash dispenser;

FIG. 2 is a sectional side view of FIG. 1, illustrating the interior mechanism of the machine;

FIG. 3 is a perspective view, on an enlarged scale, of a shelf on which the articles to be dispensed are placed, together with article arresting pins;

FIG. 4 is a view similar to FIG. 2 but showing another embodiment of the invention;

FIG. 5 is a top plan view of the article arresting levers which can be used in the cash dispenser of the invention, and

FIG. 6 is a side view of the principal portion of FIG. 5.

Referring to the drawings, there is shown a cash dispenser generally designated by 10, which is securely fitted into a recess formed in the outside wall 11 of the building of a bank or the like establishment. The machine 10 has a front panel 12 which outwardly faces the user of the machine. The panel 12 is provided with a slot 13 through which a card is introduced into the machine. The card has necessary data recorded thereon as is well known. When it has been introduced into the machine, a card reader of a well known type (not shown) reads the data. The card number included in the data is memorized in the reader.

The panel 12 is also provided with a keyboard 14 including a first set of keys 15 for entering the secret number and a second set of keys 16 for entering the amount of money the user wishes to withdraw from the machine. A plurality of lamps 17 are provided just above the keys 16, each lamp corresponding to one of the keys. The first set of keys 15 includes ten keys having the numbers 0 through 9, respectively, indicated thereon. Operating these keys, the user of the machine who has introduced his card thereinto now enters the secret number of the card previously known to him. The secret number thus entered is compared with the card number read from the card and now memorized in the card reader. If the two numbers agree or there is a predetermined correspondence or relation therebetween, the user of the card is recognized as its proper owner, so that permission is given to dispense cash.

The second set 16 includes three keys, in the illustrated embodiment, which corresponed to, say $100, $200 and $300, respectively, from left to right. These keys are provided to enter the amount of money it is desired to withdraw. Thus, when the $200 key has been pushed, the machine is prepared to dispense $200, with the corresponding one of the lamps 17 being illuminated.

The front panel 12 has a window 18 in which the operating instructions to the user are successively indicated — that is, when the user has finished one step of the operation, the next step is indicated.

In the front panel 12 there is also formed a peeping window 19 having a glass pane 20 fitted therein. The glass pane must be so strong as not to be easily broken or damaged. The cash to be dispensed is temporarily positioned inside the window 19. The cash may be paper money or coins, or enclosed in an envelope in a predetermined amount. Every time a bill, a coin or an envelope is delivered, one of the lamps 21 after another is turned on. Suppose for example that the amount to be withdrawn is $200. Two $100 bills or envelopes each containing $100 bills and/or coins come to the position inside the window 19 one by one, so that two of the lamps 21 are turned on. Thus, by the amount to be withdrawn as entered by the keys 16 and the number of the lamps 21 that have turned on it is possible to see whether the machine has correctly read the amount the user of the machine wishes to withdraw, and by looking through the window 19 and counting the bills, coins or envelopes that have come to the inside of the window, it is possible to check whether the machine has operated correctly to be ready to dispense the amount of money required to be withdrawn.

When the user of the machine has confirmed that the correct amount of money he desires is now placed in the window 19 ready to be dispensed, he pushes an OK or approval button 22 provided on the front panel 12, whereupon an OK or approval signal is produced in a suitable control circuit (not shown) so as to actuate a suitable mechanism to send the bills out of the machine through an outlet 23 formed in the front panel 12.

When the user looks at the bills inside the window 19 and find the amount different from that he desires to withdraw, he presses a disapproval button 24, whereupon a disapproval signal is produced in the control circuit to cancel all the operations that have until then been performed and the bills are collected into the machine. The user may operate the machine from the start again, or call an engineer in charge to check the machine to see if it is in disorder.

Turing to FIG. 2, a chamber or box 31 contains a number of bills, or envelopes enclosing a predeter-

mined amount of money. In the following description it is assumed that the money to be dispensed is enclosed in an envelope, and these envelopes will be referred to simply as envelopes. Inside the window **19** in the front panel **12** there is provided a plate or shelf **32** inclined downwardly toward the window **19**, so that each envelope **30** sent out of the box **31** by a known suitable mechanism will slide down on the upper surface of the shelf **32**. When the previously mentioned approval signal has been produced, a motor **87** is energized to turn the shelf through a gear train **88** about a shaft **33** counter-clockwise in FIG. **2** so that the envelope or envelopes **30** thereon drop onto a chute **34** provided below the shelf. A cash dispensing opening **23** is normally closed by a shutter **35** but is opened by a suitable mechanism including an electromagnet **89** upon production of the approval signal, so that the envelopes **30** on the chute **34** are delivered out through the outlet **23**.

If the previously mentioned disapproval signal is produced instead of the approval signal, the shelf **32** is turned in the same manner as when the approval signal is produced. However, the shutter **35** is kept closed and a motor **90** is energized to turn the chute **33** through a gear train **91** about a shaft **36** clockwise in FIG. **2**. As a result, the envelopes on the chute **34** slide in the opposite direction into a receptacle **37**. The required movement of the shelf, the shutter and the chute may be effected by any other suitable device.

FIG. **4** shows another embodiment of the invention wherein the same reference numerals as in FIG. **2** denote corresponding parts, so that no explanation will be given to these corresponding parts. In FIG. **4** the window **19** is used as the outlet through which the envelopes are dispensed. To this end, the window **19** has no glass pane therein, but a transparent shutter **38** is provided inside the window **19** to normally close it. When the approval signal has been produced, the shutter **38** is raised by means of a suitable divece including an elctromagnet **92**, whereupon the envelopes **30** on the shelf **95** slide thereon to come out through the window **19**. When the disapproval signal has been produced, the shutter **38** is kept closed and the shelf **95** is turned by a motor **93** and a gear train **94** about a shaft **39** clockwise in FIG. **4**, so that the envelopes **30** on the shelf **95** slide thereon down into the receptacle **37**.

If a plurality of envelopes **30** are delivered out of the storage box **31** onto the shelf **32** or **95** it will be easier to look at and confirm them if they are piled, one a little displaced inwardly from the window **19** upon another. FIG. **3** shows an arrangement which enables such displaced piling of the envelopes. Above the forward end of the shelf **32** there is provided a support **40** from which depend a plurality, say, three paired pins **41, 43** and **45** toward the upper surface of the shelf **32**. The first pair of pins **41** which are positioned nearest to the forward edge of the shelf and consequently the window **19** have their lower tips positioned nearest to the upper surface of the shelf **32**. Therefore, the first envelope **42** that has been delivered out of the box **31** onto the shelf **32** has its forward edge arrested by the first pair of pins **41**. The second pair of pins **43** are positioned a little inwardly of the machine from the first pair **41** and have their lower tips spaced from the upper surface of the shelf **32** a distance a little greater than the thickness of the envelope. With this arrangement, the forward edge of the first envelope **42** can pass through the gap between the lower tips of the second pair of pins **43** and the upper surface of the shelf, but the second envelope **44** has its forward edge arrested by the second pair of pins **43**. Thus, the second envelope is piled on the first, with its forward edge a little displaced inwardly from the forward edge of the first envelope.

The third pair of pins **45** are positioned a little farther inwardly from the second pair and have their lower tips spaced from the upper surface of the shelf **32** a distance a little greater than twice the thickness of the envelope. It will be easily seen that when the third envelope **46** is sent out of the storage box **31** onto the second envelope **45**, its forward edge is arrested by the third pair of pins **45**. Thus, the three envelopes **42, 44** and **46** are piled on the shelf **32**, each envelope a little displaced inwardly from the lower one, so that it becomes easier to look at the envelopes through the window and check their number.

The arresting pin arrangement of FIG. **3** can of course be applied to the embodiment of FIG. **4**. In this case, when the shutter **38** is raised, the support **40** with their pins **41, 43** and **45** are raised by a solenoid **96** therby to release the envelopes to be delivered out through the window **19**.

FIGS. **5** and **6** show a different device **50** for piling the envelopes on the shelf in the above-mentioned mutually displaced manner. The device **50** comprises a plurality, say, four levers **51 – 54** provided at one side of the shelf **32** (or **95**). The levers are arranged side by side along the length of the shelf **32** and extend transversely thereof as far as their outer (right-hand) ends are disposed above the shelf. Each lever is pivotably supported by a shaft **55** and spring-biased as at **56** clockwise in FIG. **6**. The opposite (left-hand) end of each lever is engaged by a claw **61, 62, 63, 64**, pivoted as at **57** so that each lever is held at the position shown by real ine in FIG. **6** against the biasing force of the spring **56**. Under the condition, the right-hand end of the lever is kept spaced above the upper surface of the shelf **32**. Four electromagnets **71–74** are provided, corresponding to the claws **61 – 64**, respectively. When energized, each electromagnet pulls its opposed claw so that the claw is turned conter-clockwise about the shaft **57** against the biasing force of a spring **58**. This releases the lever **51** to be turned clockwise by the force of the spring **56** to the position shown by dot-and-dash line as far as the right-hand end of the lever **51** lowers into contact with the upper surface of the shelf **32**. Presently, the electromagnet **71** is deenergized, whereupon the claw **61** is turned clockwise by the spring **58** as far as it abuts on a stopper **59** at the original position.

A cam **81** mounted on a shaft **85** is used to restore the levers **51 – 54** to their original lifted position. When a motor **82** is energized, its rotation is transmitted to the shaft **85** through gears **83** and **84** so as to cause one revolution of the cam **81** from the position shown in FIG. **6**. During the course of revolution, the rise on the cam hits on and turns the levers **51 – 54** counterclockwise about the shaft **55**. As each lever is thus turned, its left-hand end hits and slides down on the

slope 86 on the top of the claw 61 – 64, thereby pushing the claw to turn counter-clockwise about the shaft 57 until the left-hand end of the lever passes the slope 86, whereupon the claw is pulled back a little by the spring 58 into engagement with the left-hand end of the lever 51. When the previously mentioned approval signal has been produced, as many envelpes as correspond to the amount of money to be withdrawn are sent out of the storing box 31 onto the shelf 32 one by one. As the envelopes come to the shelf, a detector 97 detects them. The detector 97 comprises a light source and a photosensor spaced therefrom so as to receive the light from the source. The envelope passes between the light source and the photosensor thereby intercepting the light entering the photosensor, whereupon the photosensor produces an output.

When the first envelope 42 from the storing box 32 is detected by the detector 97, none of the electromagnets 71– 74 are energized, so that the envelope 42 slides on the shelf 32 as far down as its forward edge is stopped by the shutter 38 (in FIG. 4) or the window pane 20 (in FIG. 2). When the detector 97 detects the second envelope 44, however, it produces an output to energize the electromagnet 71, whereupon the claw 61 is attracted out of engagement with the lever 51, which is turned so that its right-hand end drops onto the upper surface of the first envelope 42 then already on the shelf 32. Under the condition, the second envelope 44 sliding over the first 42 comes to have its forward edge arrested by the outer end of the lever 51 now already on the first envelope 42. Thus, the second envelope 44 is piled on the first 42, with the forward edge of the former envelope being a little displaced inwardly or backwardly from the forward edge of the latter envelope. In a similar manner, the third, fourth and fifth envelopes 46, 47 and 48 have their respective forward edges arrested by the levers 52, 53 and 54, respectively, falling on the previously piled envelope, so that all the envelopes sent out from the storage box 31 are piled on the shelf 32 each a little displaced inwardly from the previously piled envelope.

When the arrangement of FIGS. 5 and 6 is applied to the device of FIG. 2, the motor 82 is energized to restore the levers 51 – 54 to their original position after the shelf 32 is turned to drop all the envelopes thereon; while when it is applied to the device of FIG. 4, the motor 82 is energized either when the shutter 38 is raised or after the shelf 95 is turned to put the envelopes into the receptacle.

What I claim is:

1. Article dispensing apparatus comprising: a housing having a front panel; a window formed in said front panel so that the interior of the housing can be seen through said window from outside said housing; means for storing articles; means for supporting articles received from said storing means so that said articles may be viewed through said window; arranging means associated with said supporting means for arranging articles on said supporting means so that each of said articles is piled upon another a little displaced therefrom such that said articles can be identified through said window by the user of the apparatus; and dispensing means operable upon approval of said articles to cause the same to be dispensed out of said housing.

2. The apparatus of claim 1, wherein said arranging means includes a plurality of engaging members arranged in the direction in which said articles come onto said supporting means, each said engaging member being spaced from the adjacent one inwardly of said housing from said window so that each said article is engaged by one of said engaging members to be held on said supporting means at a position displaced from the position where the previous one of said articles has been engaged and held by the adjacent one of said engaging members.

3. The apparatus of claim 2, wherein each said engaging member comprises a pair of depending pins disposed above said supporting means and having their lower ends spaced therefrom across a gap greater than the adjacent pair nearer to said window.

4. The apparatus of claim 2, wherein each said engaging member is a pivoted lever extending generally transversely of said supporting means and having one end normally spaced therefrom across a gap and adapted to be brought into engagement with an article on said supporting means to hold the same thereon.

5. The apparatus of claim 1, wherein said supporting means operates upon approval of said articles by the user of said apparatus to cause said articles to gravitate onto said dispensing means.

6. The apparatus of claim 5, wherein said dispensing means includes an outlet formed in said front panel through which said articles are dispensed.

7. The apparatus of claim 5, further including receptacle means in said housing; and means operable upon disapproval of the articles to cause them to be moved from said dispensing means into said receptacle means so as not to be dispensed out of said housing.

8. The apparatus of claim 7, wherein said dispensing means is capable of causing said articles thereon to be moved selectively in two directions, so that upon approval of the articles, they are moved in one of said directions so as to be dispensed out of said housing, while upon disapproval of the articles, they are moved in the other direction to be put into said receptacle means.

9. The apparatus of claim 1, wherein said dispensing means operates upon approval of said articles by the user of said apparatus to cause said articles to be dispensed out of said housing directly from said supporting means.

10. The apparatus of claim 9, wherein said articles are dispensed through said window.

11. The apparatus of claim 10, further including a transparent shutter adapted to normally close said window and is opened upon approval of the articles so that they are dispensed through said window.

12. The apparatus of claim 9, further including receptacle means in said housing; and means operable upon disapproval of the articles to cause them to be moved from said supporting means into said receptacle means so as not to be dispensed out of said housing.

13. The apparatus of claim 12, wherein said supporting means is capable of causing said articles to be moved selectively in two directions, so that upon approval of the articles, they are moved in one of said directions so as to be dispensed out of said housing, while upon disapproval of the articles they are moved in the other direction to be put into said receptacle means.

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