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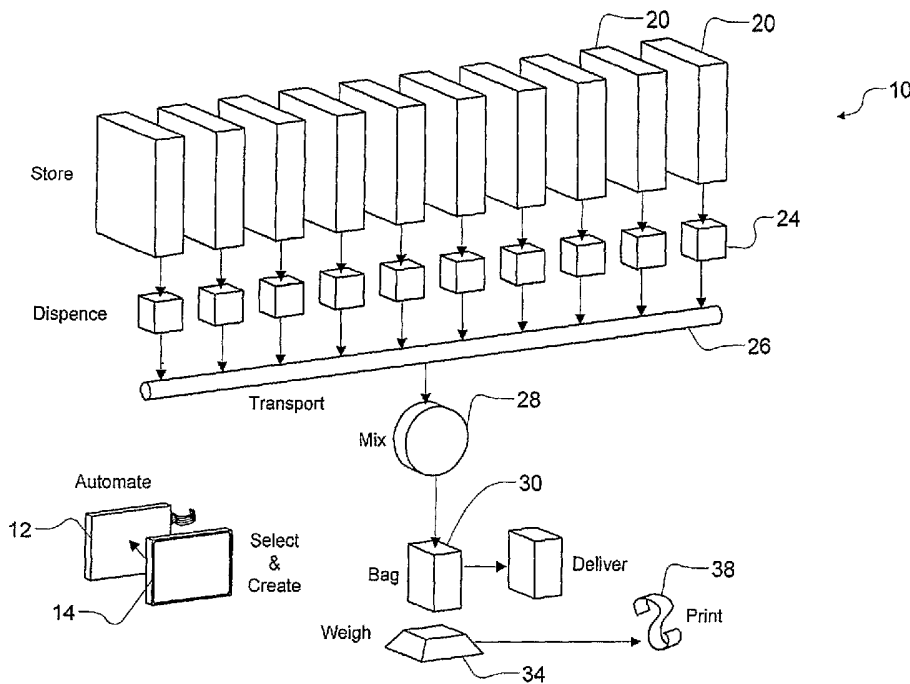
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(54) Title: SYSTEM AND METHOD FOR DISPENSING BULK PRODUCTS



(57) Abstract: A dispensing system (10) and method is used to dispense a bulk product or to mix and to dispense bulk products on site and to price the products according to the quantity and distribution thereof. The dispensing system (10) preferably provides automated merchandising by providing up-to-date product information and by allowing customers to select and purchase one or more bulk products. The dispensing system can be located inside or outside and is preferably designed for self-service and cash-less transactions.

WO 2005/040014 A2



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## SYSTEM AND METHOD FOR DISPENSING BULK PRODUCTS

### CROSS REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of Provisional Patent Application Serial  
5 No. 60/513,867 filed October 23, 2003, which is incorporated herein by reference.

### TECHNICAL FIELD

The present invention relates to dispensing products and more particularly, to a  
system and method that dispenses bulk products and mixes of bulk products.  
10

### BACKGROUND INFORMATION

Consumer bulk products, such as liquid and granular products, are typically  
prepackaged and stacked on shelves or prepackaged and delivered via a vending machine.  
Consumer education concerning such bulk products usually depends on package labels,  
15 advertising, or trained store personnel. The marketing and distribution of such prepackaged  
bulk products, including bulk pet foods, has presented numerous challenges. The heavy and  
cumbersome nature of such prepackaged bulk products has created costly problems  
throughout the distribution channel (i.e., the manufacturer, distributor and retailer).  
Ultimately, these problems result in higher prices for consumers.

20 Distribution channel problems are first incurred by manufacturers. The  
manufacturers typically must produce packages in sizes that fit on retailer shelves and  
conform to a certain shape, thus requiring custom packaging equipment. The manufacturers  
also must design packages to be attractive and functional to the consumer. Manufacturers  
selling directly into the retail channel must also deliver packages in quantities that can be  
25 readily inventoried and merchandised.

Distribution channel problems are also incurred by distributors. The distributors  
typically must break bulk products into quantities acceptable for retail if it has not been  
done by the manufacturer. This activity requires labor to pick and pack the bulk product.  
Also, given the nature of certain bulk products if they are prepackaged, the packaging may  
30 become worn and ripped as it moves through the channel. As a result, the product does not  
appear new and is often returned. Thus, the packaging used to prepackage bulk products  
must be provided in different sizes and must be durable enough to withstand storage and  
handling.

Additional problems in the distribution channel are incurred by retailers. The retailer often must break down blended pallets of packages, check in the packages, remove all damaged packages, and price tag individual packages. Inadequate stock rotation and improper handling of the packages can damage the packaging and degrade the quality of the bulk products contained therein. All of these problems increase the cost of the prepackaged bulk products.

In addition to creating higher prices for consumers, a consumer's choices are limited to those package sizes that the manufacturers, distributors and retailers make available. Most bulk products come in standard sized packages and do not always fit the needs of the consumer. Thus, the consumer's purchasing decisions are limited, and the consumer cannot customize the product.

Consumers also do not receive adequate education about prepackaged bulk products. Retail store personnel are often not properly trained to give a customer the information needed about such products to make informed purchasing decisions. The information printed on the packages is often difficult to read when the packages are on the shelves. Moreover, the product information printed on the prepackaged bulk products is static and cannot be changed or updated after the product has been packaged and sent to the store. The presentation of the packages by the store can also mislead the consumer and prevent the consumer from making an informed purchasing decision.

Accordingly, there is a need for a dispensing system and method for use by a consumer in purchasing bulk products that allows the consumer to learn about bulk products, to customize both the quantity and type of bulk product or mix of bulk products being purchased, and to obtain quality bulk products.

## SUMMARY

One preferred embodiment of the present dispensing system includes a plurality of inventory containers for storing different bulk products. It also includes a user interface for displaying information on the stored bulk products and for receiving a customer's selection of specified quantities of one or more of the stored mixed bulk products. A selective dispensing means is coupled to each of the inventory containers for selectively dispensing a measured quantity of the bulk product stored in the inventory container. A computer responsive to the user interface controls the dispensing means based on the customer's selections. A transporting means is coupled to the dispensing means for transporting the

dispensed quantities of bulk products to a blending/filling means for blending the dispensed quantities of bulk products and for filling a container with the dispensed quantities of bulk products. A measuring means then measures the dispensed quantities of bulk products to determine the aggregate price thereof.

5 One preferred embodiment of the present method of dispensing bulk products includes the steps of storing one or more bulk products in individual containers and displaying product information on the stored bulk products; receiving a customer selection of specified quantities of one or more of the stored bulk products; and conveying the customer's selection to a computer that controls the dispensing of the stored bulk products.  
10 The embodiment includes the further steps of dispensing the specified quantities of one or more of the bulk products as selected by the customer; transporting the specified quantities of one or more of the bulk products; filling a container with the specified quantities of one or more of the bulk products; and measuring the specified quantities of one or more of the bulk products to determine a price thereof depending upon the weight and distribution  
15 thereof.

According to another preferred embodiment of the present method of dispensing bulk products, the method further comprises the step of blending the mix specified quantities of selected bulk products before filling the container. Another further preferred embodiment of the present method comprises the step of storing product information  
20 describing the specified quantities of one or more of the bulk products selected by the customer.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 These and other features and advantages of the present invention will be better understood by reading the following detailed description of preferred embodiments, taken together with the drawings wherein:

FIG. 1 is a functional block diagram illustrating a dispensing system, according to one embodiment of the present invention;

30 FIGS. 2-4 are schematic block diagrams of matrices representing product and inventory data stored in a database of the dispensing system, according to one embodiment of the present invention;

FIG. 5 is a schematic block diagram of a matrix representing customized product data stored in a database of the dispensing system, according to one embodiment of the present invention;

5 FIG. 6 is a perspective view of the outside of one embodiment of the dispensing system, according to one embodiment of the present invention;

FIG. 7 is a schematic diagram of the dispensing system, according to one embodiment of the present invention;

FIG. 8 is a schematic diagram of a dispensing means used in the dispensing system shown in FIG. 7;

10 FIG. 9 is a schematic diagram of blending/filling and weighing means used in the dispensing system shown in FIG. 7; and

FIG. 10 is a schematic diagram of the a blending/filling mechanism used in the dispensing system shown in FIG. 7.

## 15 DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIG. 1, a preferred embodiment of a bulk product dispensing system 10 is described. The preferred embodiment of the system 10 is used to select specified quantities of one or more of certain stored bulk products, to dispense such bulk products on site, and to price the dispensed bulk products. The price of the dispensed bulk product may  
20 depend on the distribution of the bulk products and the quantities of the bulk products, measured by weight or volume. The system 10 preferably provides automated merchandising by providing up-to-date product information on the bulk products it dispenses and by allowing customers to select and purchase a bulk product or to create and purchase customized mixes of bulk products. The dispensing system 10 can be located  
25 inside or outside and is preferably designed for self-service and cash-less transactions. In the preferred embodiment, the bulk products are granular products including, but not limited to, bird seed, pet food, nuts, coffee, fertilizers, and grass seed. The bulk products can also be liquid products or any other product capable of being stored in bulk, blended and dispensed.

30 Referring still to FIG. 1, the preferred embodiment of the dispensing system 10 includes a computer 12 for storing product and customer information and a user interface 14 for interacting with customers. The computer 12, which can be a PC or Apple personal computer or any other dedicated processing system, includes a database for storing product

and inventory data related to the bulk products to be dispensed by the system and customer data related to the customers purchasing the bulk products. The computer 12 also calculates the price of the dispensed bulk products based on the distribution and quantity thereof. The computer system 12 also controls and monitors the operation of the dispensing system 10.

5 Alternatively, the computer system 12 may be replaced by an electro-mechanical controller (not shown) of a type known to those skilled in the art for controlling the operation of the dispensing system 10.

The user interface 14 provides product information and advertising and marketing messages, concerning the bulk products to be dispensed directly to the customer at the point  
10 of sale. The user interface 14 also allows the customer to select the bulk product, or mixed bulk products, to be dispensed and the quantity thereof. One embodiment of the user interface 14 is an interactive color monitor providing a touch screen graphical user interface (GUI). Other forms of user interfaces are also contemplated, including a monitor and keyboard and other user interfaces known to persons skilled in the art. The user interface  
15 14 can also include a payment interface for receiving payment from the customer, for example, in the form of cash or cashless forms of payment such as debit cards, credit cards or smart cards.

In the preferred embodiment of the dispensing system 10, the computer system 12 is connected by either a wireless or wired connection to a network (e.g., the Internet) to allow  
20 remote access to the dispensing system 10 by customers or the operator of the dispensing system 10. Using the network, the computer system 12 can download updated product information, advertising messages, promotions, and new pricing. The computer system 12 can also be accessed over the network to obtain customer information, for example, to track a customer's purchases per location for creating a customer loyalty program. The computer  
25 system 12 can also be accessed over the network to check inventory and system status.

Referring still to FIG. 1, the preferred embodiment of the dispensing system 10 also includes one or more inventory containers 20 for storing one or more bulk products. The dispensing system 10 also includes one or more selective dispensing means 24 such that one dispensing means 24 is coupled to each of the inventory containers 20 selectively to  
30 dispense a quantity of bulk product from the inventory container 20 based upon the quantity of bulk product or quantities of bulk products selected by a customer. A transporting means 26 transports the bulk product or bulk products dispensed from the selective dispensing means 24 to a blending /filling means 28, which are combined in this exemplary

embodiment but may be separate means in other embodiments. If more than one bulk product is dispensed from the dispensing means 24, the blending means 28 mixes the plurality of bulk products to form a desired mix of bulk products. The blending /filling means 28 then fills a container 30 (e.g., a bag) with the bulk product or bulk products. A  
5 measuring means 34 measures the bulk product or bulk products to determine the price. The measuring means may be a simple spring scale or other means known to those skilled in the art for measuring bulk products by weight or by volume. A printer 38 prints out a receipt and, if desired, product information. The selective dispensing means 24, the transporting means 26, the blending/filling means 28, the measuring means 34 and the  
10 printer 38 are all controlled by the computer 12.

Referring then to FIGS. 2-5, examples of the product and inventory data that can be stored in the database of the computer 12 in another preferred embodiment of the dispensing system 10 are described in greater detail. As shown in FIG. 2, the database can include store mix data 40 defining one or more predefined bulk product mixes (e.g., defined by the  
15 operator of the dispensing system 10). The mix data 40 includes an identifier or identification code for the user who created the mix (e.g., UserID), an identifier or identification code for the mix (e.g., a BlendID), a name for the mix (e.g., BlendName), and a description of the bulk products contained in the mix (e.g., Description). This store mix data 40 is typically entered by the operator of the dispensing system 10.

As shown in FIG. 3, the database can include inventory data 44 describing the bulk product stored in each inventory container 20. The inventory data 44 includes an identifier for the inventory container (e.g., the box or bin number), an identifier for the bulk product stored in the container (e.g., the SeedName), and a quantity of product in the inventory container (e.g., Quantity). This inventory data 40 is typically entered by the operator of the  
20 system 10. The quantity of product in the inventory containers 20 can also be monitored automatically.

As shown in FIG. 4, the database can include product data 48 describing the specific bulk products in detail. In one exemplary embodiment where the product is bird seed, the product data 48 includes data defining characteristics of the seed, such as the seed name,  
30 cost, mark-up, sell price, quantity, location, protein content, fat content, and fiber content. This product data 48 is typically entered by the operator of the dispensing system 10.

As shown in FIG. 5, the database can include custom mix data 50 describing custom mixes created by customers. In one exemplary embodiment where the product is bird seed,

the custom mix data 50 includes a user identifier, a name for the mix, a mix identifier, and the percentages of the different types of seeds used in the mix. When a customer creates a custom mix using the dispensing system 10, the customer has the option of storing the custom mix data 50. Alternatively, the customer can create a customer mix at a remote  
5 location and upload the custom mix data 50 to the database in the computer 12 on the dispensing system 10.

Referring to FIGS. 6-11, another preferred embodiment of the dispensing system 10 is shown and described in greater detail. As shown in FIG. 6, the dispensing system 10 is enclosed in a housing 100 having door panels 102a-c. The housing 100 is preferably  
10 designed for durability, especially for systems that are used outside in potentially extreme environmental conditions. The housing is also preferably designed for easy access and replacement of the electronic and mechanical parts housed therein.

In addition, the housing 100 preferably includes a container dispenser 104 for dispensing containers, such as bags, and a container holder 106 for holding the container  
15 during filling. One embodiment of the container holder 106 is an automatic delivery drawer including bag sensors to indicate proper bag installation. The user interface 14 can be built in to one of the door panels 102a-c in a location that is easily accessible to customers.

As shown in FIG. 7, one embodiment of the inventory containers 20 is individual storage bins 110 located within the housing 100 for storing the bulk products to be  
20 dispensed. The storage bins 110 are preferably configured to facilitate the feeding of the bulk products downward by gravity. Other shapes and configurations are also contemplated. In one example used for bird seed, the system 10 includes ten storage bins 110, each having a 200 lb. storage capacity. Each of the storage bins 110 also preferably includes one or more ports 112, 114 for loading the storage bin with bulk product. The  
25 storage bins 110 are preferably made of stainless steel when storing food products but can also be made of other suitable materials. The storage bins 110 can also be temperature controlled and humidity controlled as needed to preserve the quality of the bulk products being stored. In this embodiment, the selective dispensing mechanisms 24 are located at a bottom region of each of the storage bins 110 such that gravity or other means feed the bulk  
30 products to the dispensing mechanisms 24.

As shown in FIG. 8, one embodiment of a selective dispensing means 24 is a volumetric escapement metering device 120. The volumetric escapement metering device 120 receives the bulk product from the inventory container to which it is attached through

an aperture 124 in a top plate 126 and into a measuring compartment 128 having a predefined volume. The metering device 120 rotates to dispense the measured quantity (i.e., dose) of bulk product through an aperture 130 in a bottom plate 132. The total quantity of bulk product dispensed is controlled by the rotation of the metering device 120. A fan 134  
5 is used to provide air flow and cooling within the housing 100. Other embodiments of a selective dispensing means 24 for measuring bulk products by volume or by weight that are known to those skilled in the art are also contemplated.

As shown in FIGS. 7-8, one embodiment of the transporting means 26 is a collection manifold 140 coupled to each of the apertures 130 in the metering devices 120 and a  
10 collection vacuum hose 142. The collection vacuum hose 142 has one end 144 that is connected to the blending /filling mechanism 28. Other embodiments of the transporting means 26 that are known to those skilled in the art for transporting bulk products, including without limitation, conveyor belts, are also contemplated.

As shown in FIG. 9, one embodiment of the blending /filling means 28, which are  
15 combined in this exemplary embodiment but may be separate, is located on the inside of the door panel 102b above the container holder 106, which is above the measuring means 34. The container holder 106 (e.g., the drawer) preferably provides a built-in overflow system. The container dispenser 104 and the computer system 12 can also be located on the inside of the door panel 102b.

As shown in greater detail in FIG. 10, one embodiment of the blending /filling  
20 means 28 includes rotating paddles 156 for blending bulk products within a blending chamber 154. A product outlet 158 allows the blended bulk products to fill a container located in the container holder 106. The blending /filling mechanism can also include a motorized dispensing spout (not shown) that adjusts to the bag or container height to ensure  
25 precise fill levels with minimal spills. Other embodiments of the blending/filling means known to those skilled in the art are also contemplated.

The end 144 of the collection vacuum hose 142, as shown in FIG. 7, connects to a vacuum inlet 150 on the blending /filling means 28, as shown on FIG. 10. A vacuum 152 is coupled to the blending /filling means 28 for drawing air into the blending chamber 154  
30 through the vacuum inlet 150 to feed bulk products to the blending chamber 154. The vacuum feeding provides a relatively quiet operation.

In using a preferred embodiment of the dispensing system 10, a customer views product information on the user interface 14, selects specified quantities of one or more bulk

products using the user interface 14, and places a container in the container holder 106. Based upon the customer's selection, the computer 12 causes one or more of the selective dispensing mechanism 24 to dispense a measured quantity of bulk product according to the bulk product selected, or the bulk products selected, by the customer. If the customer  
5 selects more than one bulk product, the bulk products that are selected are dispensed in the appropriate quantities or doses. To approximate a desired weight of the bulk product or bulk products selected by the customer, the number of doses of bulk product dispensed by the selective dispensing mechanisms 24 can be determined based on the density of a given bulk product. The vacuum 152 draws the bulk products through the vacuum hose 142 and  
10 into the blending chamber 154. The blending /filling means 28 mixes the bulk products and allows the bulk products to fill the container through outlet 158. The computer 12 monitors the measuring means 34 after the container is filled to determine the price of the product according to the distribution and quantity thereof.

While the principles of the present invention have been described herein, it is to be  
15 understood by those skilled in the art that this description is made only by way of example and not as a limitation as to the scope of the invention. Other embodiments are contemplated within the scope of the present invention in addition to the preferred embodiments shown and described herein. Modifications and substitutions by one of ordinary skill in the art are considered to be within the scope of the present invention, which is not to be limited except  
20 by the following claims.

## CLAIMS

The invention claimed is:

1. A system for dispensing bulk products comprising:
  - one or more inventory containers for storing one or more bulk products;
  - a user interface for displaying information on the stored bulk products and for receiving a customer's selection of specified quantities of one or more of the stored bulk products;
  - one or more selective dispensing means, such that each one is coupled to one inventory container, for selectively dispensing a specified quantity of the bulk product stored in the inventory container;
  - a computer that is coupled to the user interface and that controls the dispensing means to dispense the customer's selection of specified quantities of one or more of the stored bulk products;
  - a transporting means coupled to the dispensing means for transporting the specified quantities of one or more of stored bulk products;
  - a filling means coupled to the transporting means for filling a container with the specified quantities of one or more of the stored bulk products; and
  - a measuring means coupled to the computer for measuring the specified quantities of one or more of the stored bulk products in the container to determine the price thereof.
2. The system of claim 1 wherein the specified quantity of the bulk products that is dispensed is measured by volume.
3. The system of claim 1 wherein the specified quantity of the bulk products that is dispensed is measured by weight.
4. The system of claim 1 wherein the measuring means measures the specified quantities of one or more of the stored bulk products by volume.

5. The system of claim 1 wherein the measuring means measures the specified quantities of one or more of the stored bulk products by weight.
6. The system of claim 1 further comprising a blending means for blending the customer's selection of specified quantities of one or more of the stored bulk products.
7. A system for dispensing bulk products comprising:
  - one or more inventory containers for storing one or more bulk products;
  - a user interface for displaying information on the stored bulk products and for receiving a customer's selection of specified quantities of one or more of the stored bulk products;
  - one or more selective dispensing means, such that each one is coupled to one inventory container, for selectively dispensing a specified quantity of the bulk product stored in the inventory container;
  - a computer that is coupled to the user interface and that controls the dispensing means to dispense the customer's selection of specified quantities of one or more of the stored bulk products;
  - a measuring means coupled to the computer for measuring the specified quantities of one or more of the stored bulk products in the container to determine the price thereof.
8. A method of dispensing bulk products comprising:
  - storing one or more bulk products in individual inventory containers;
  - displaying information on the stored bulk products on a user interface;
  - receiving on the user interface a customer's selection of specified quantities of one or more of the stored bulk products;
  - conveying the customer's selection of specified quantities of one or more of the stored bulk products to a computer controlling the dispensing of the stored bulk products;
  - dispensing the customer's selection of specified quantities of one or more of the stored bulk products;

filling a container with the specified quantities of one or more of the desired bulk products and measuring the specified quantities of one or more of the bulk products in the container to determine the price thereof.

9. The method of claim 8 wherein the specified quantity of the bulk products that is dispensed is measured by volume.
10. The method of claim 8 wherein the specified quantity of the bulk products that is dispensed is measured by weight.
11. The method of claim 8 wherein measuring the specified quantities of one or more of the bulk products is done by volume.
12. The method of claim 8 wherein measuring the specified quantities of one or more of the bulk products is done by weight.
13. The method of claim 8 further comprising blending the customer's selection of specified quantities of one or more of the stored bulk products.
14. The method of claim 8 further comprising storing in the computer for future use the customer's selection of specified quantities of one or more of the stored bulk products.

1/9

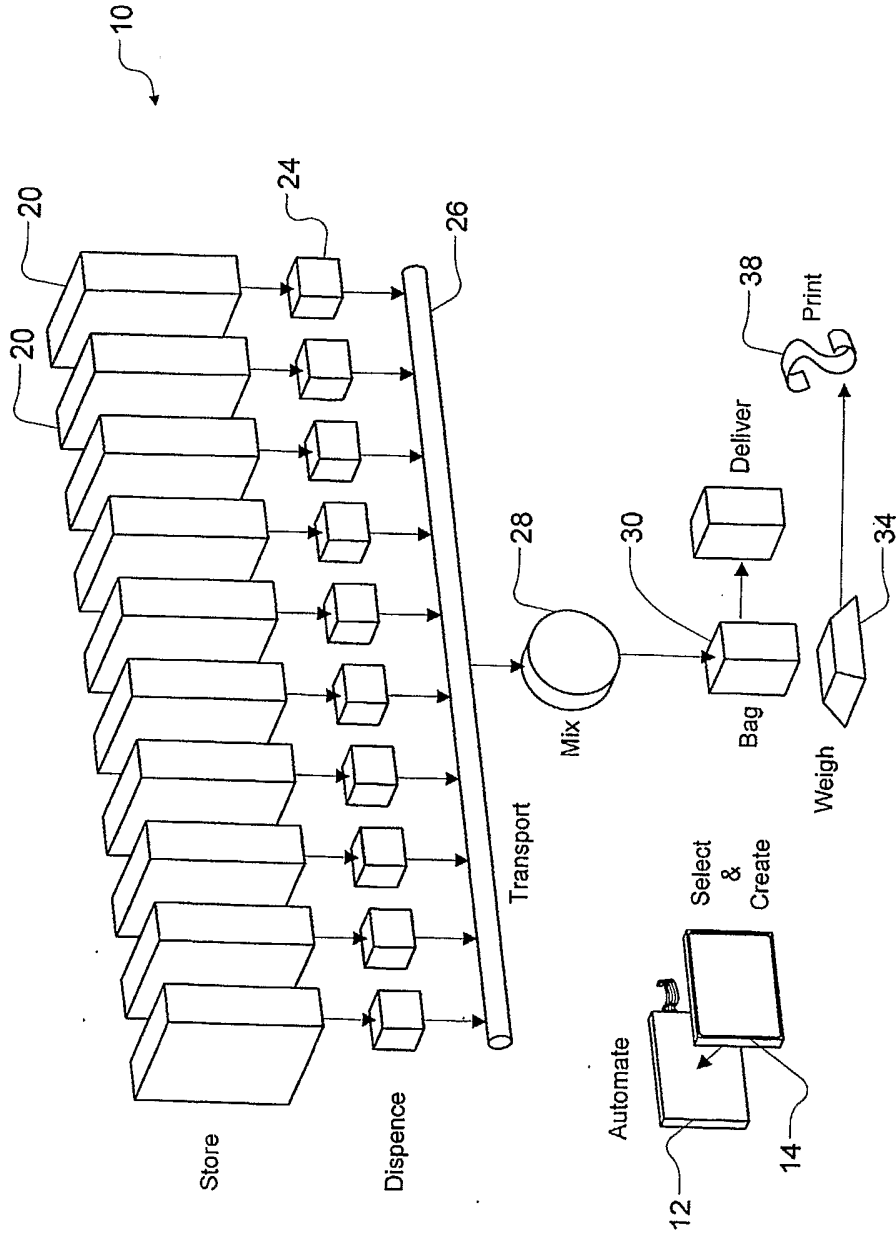


FIG. 1

2/9

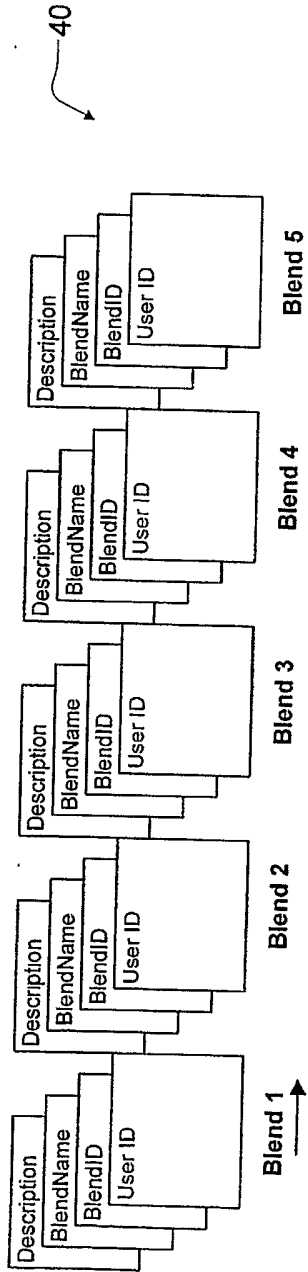


FIG. 2

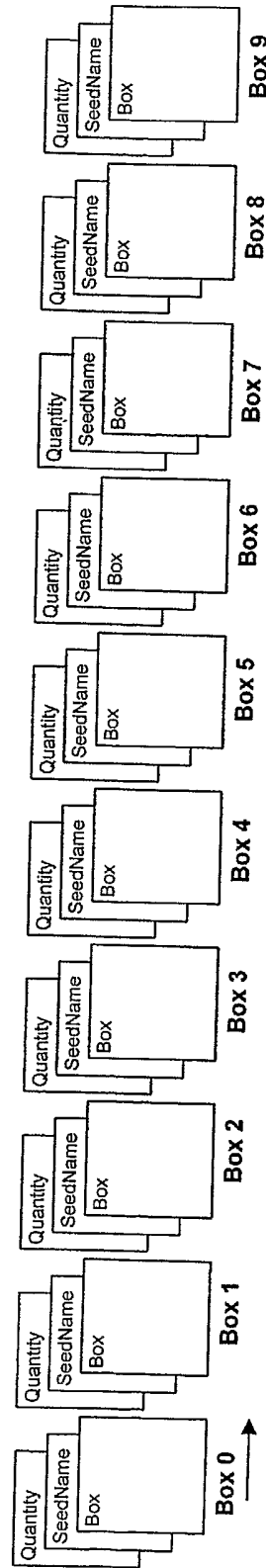


FIG. 3

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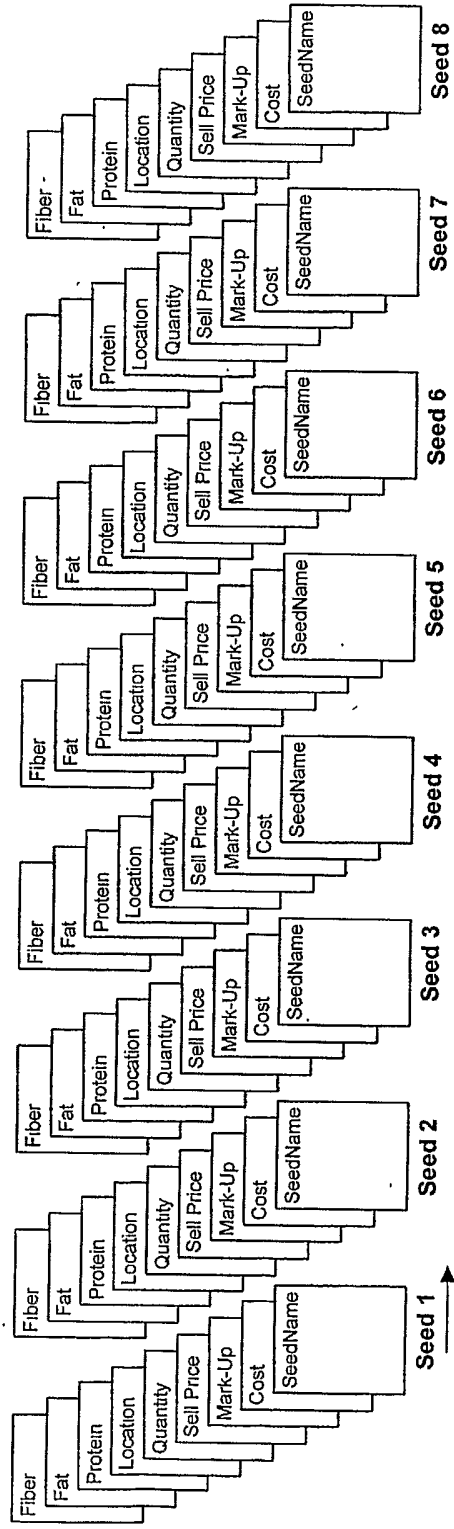


FIG. 4

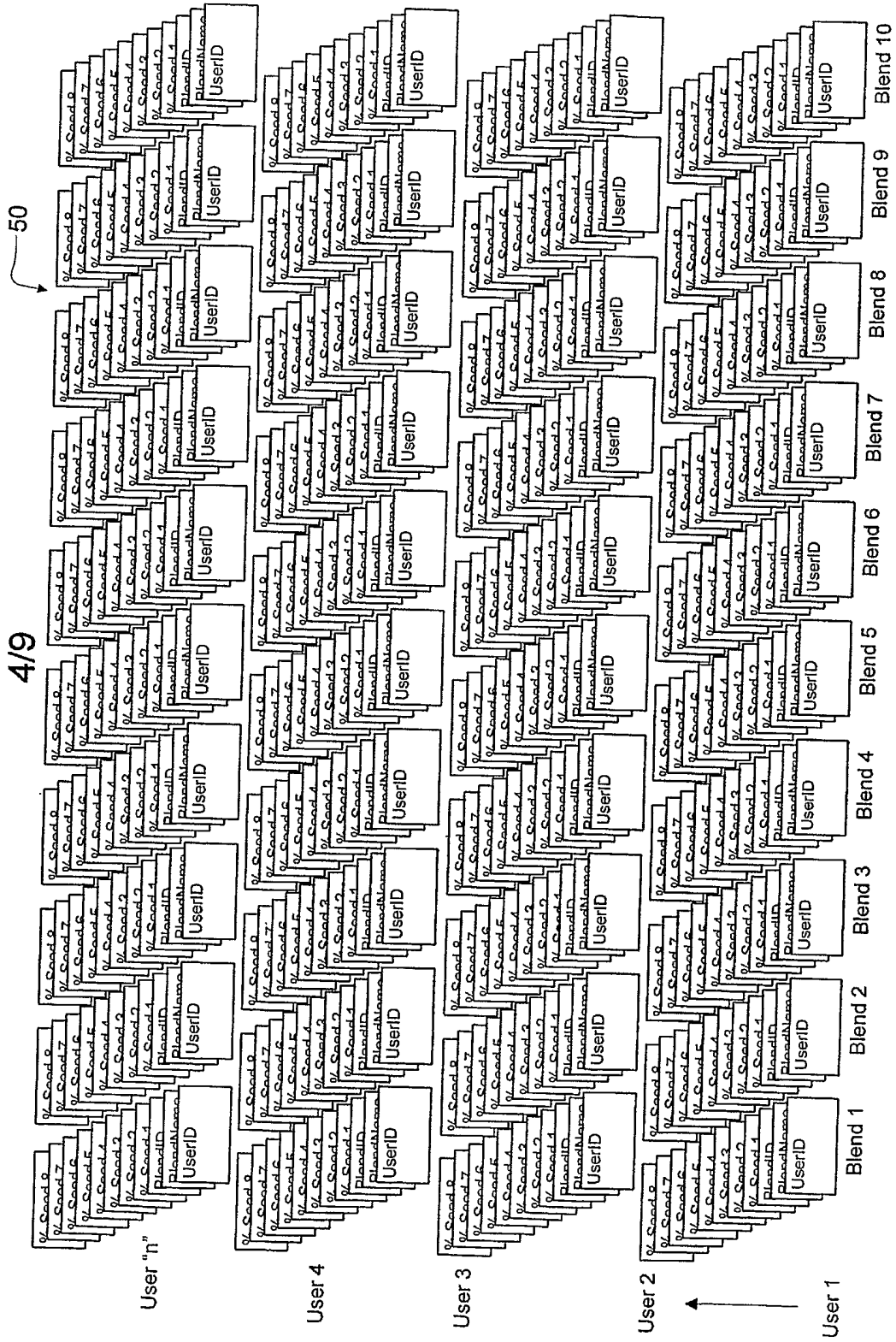


FIG. 5

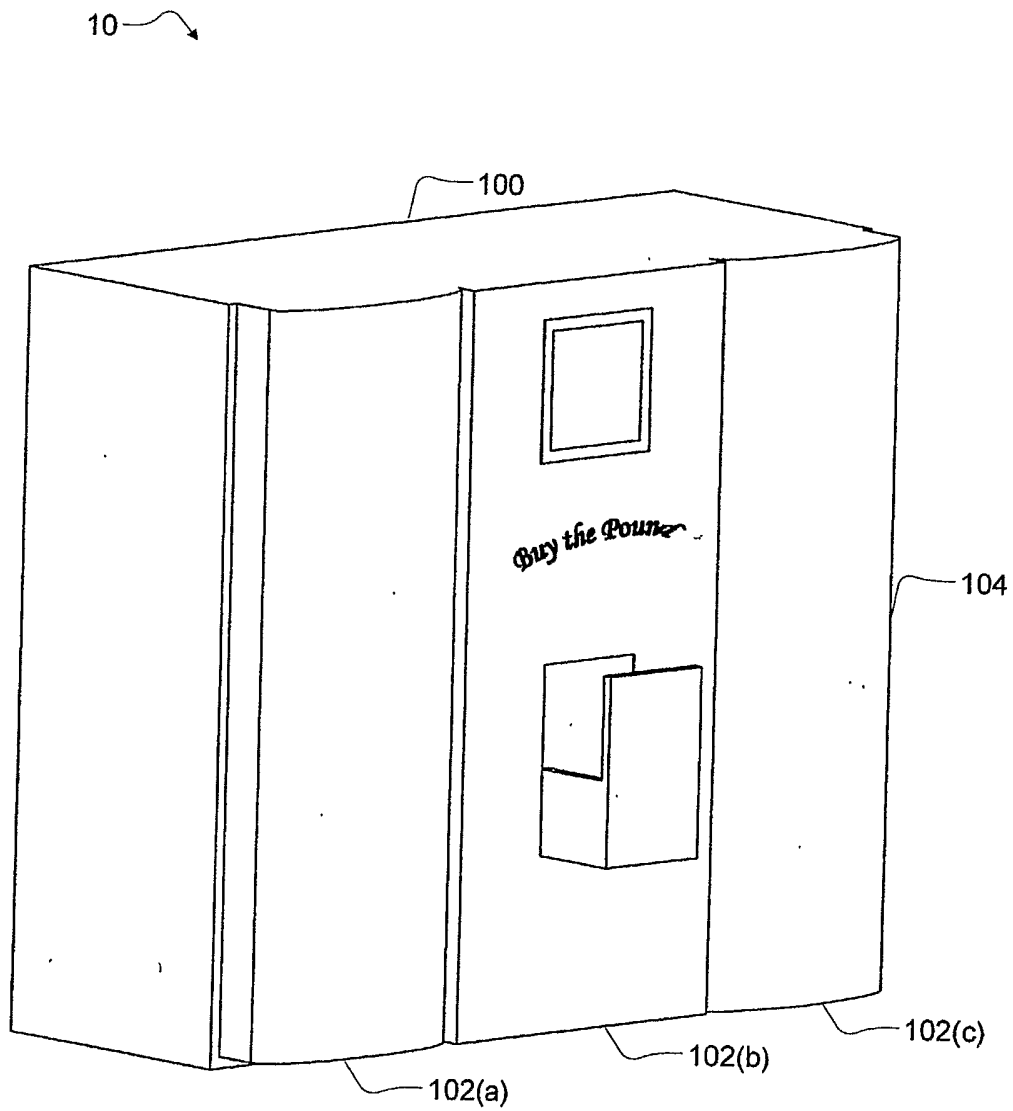


FIG. 6

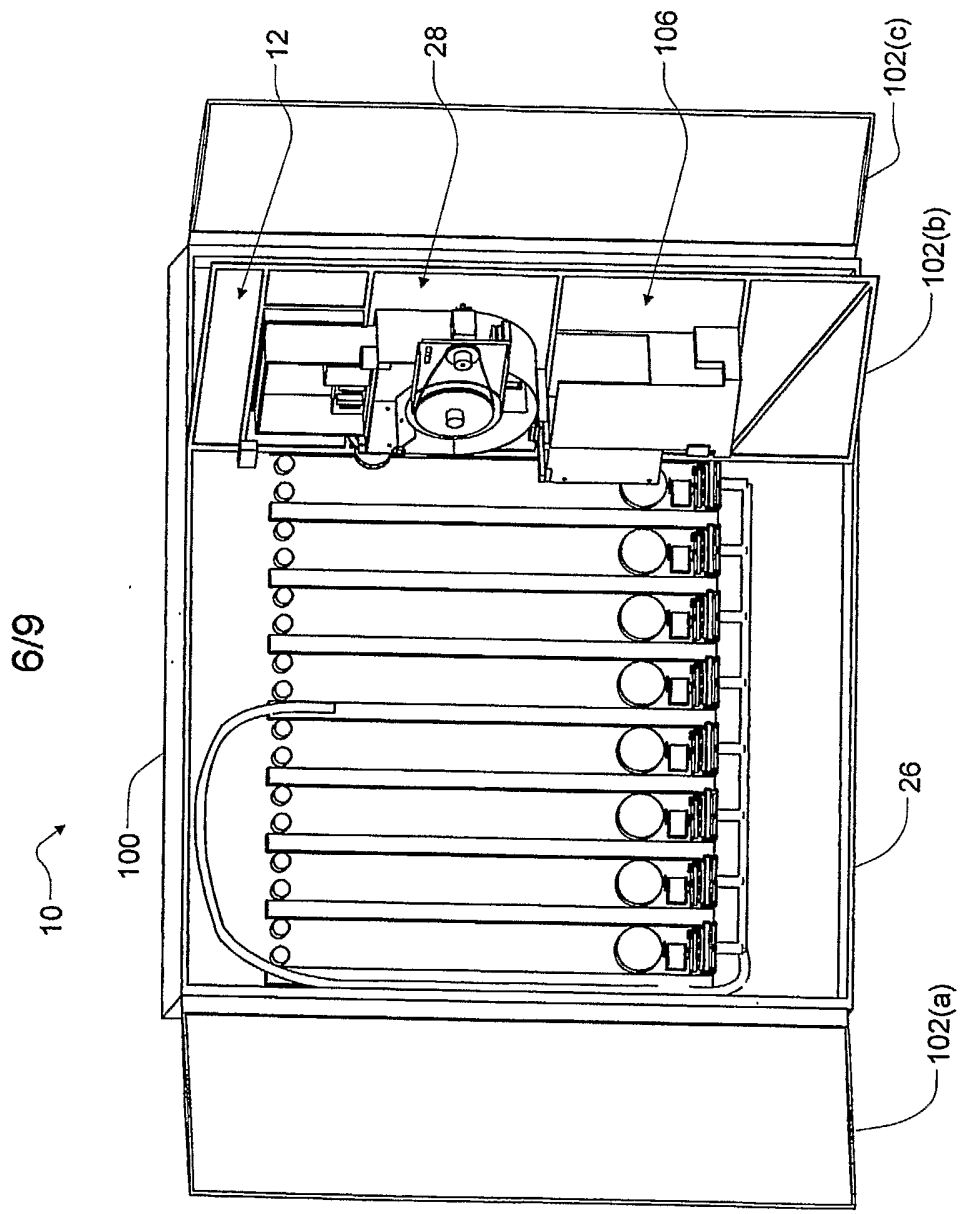


FIG. 7

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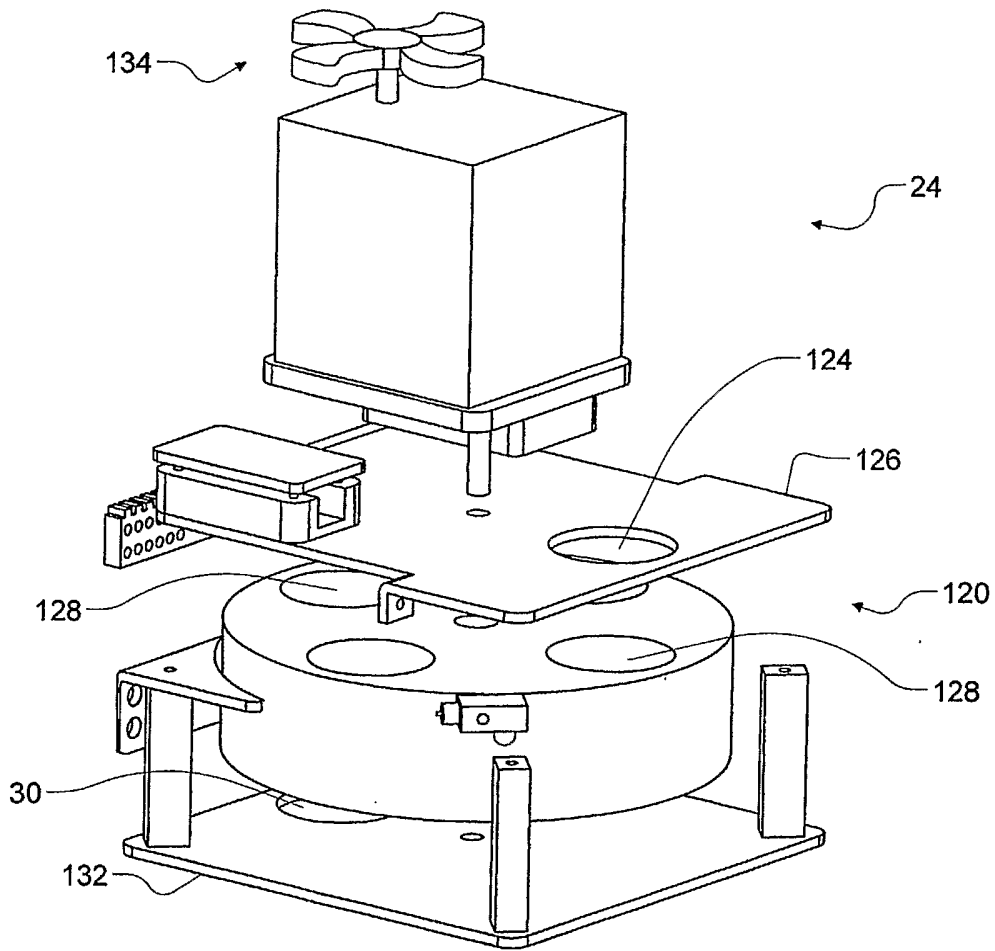


FIG. 8

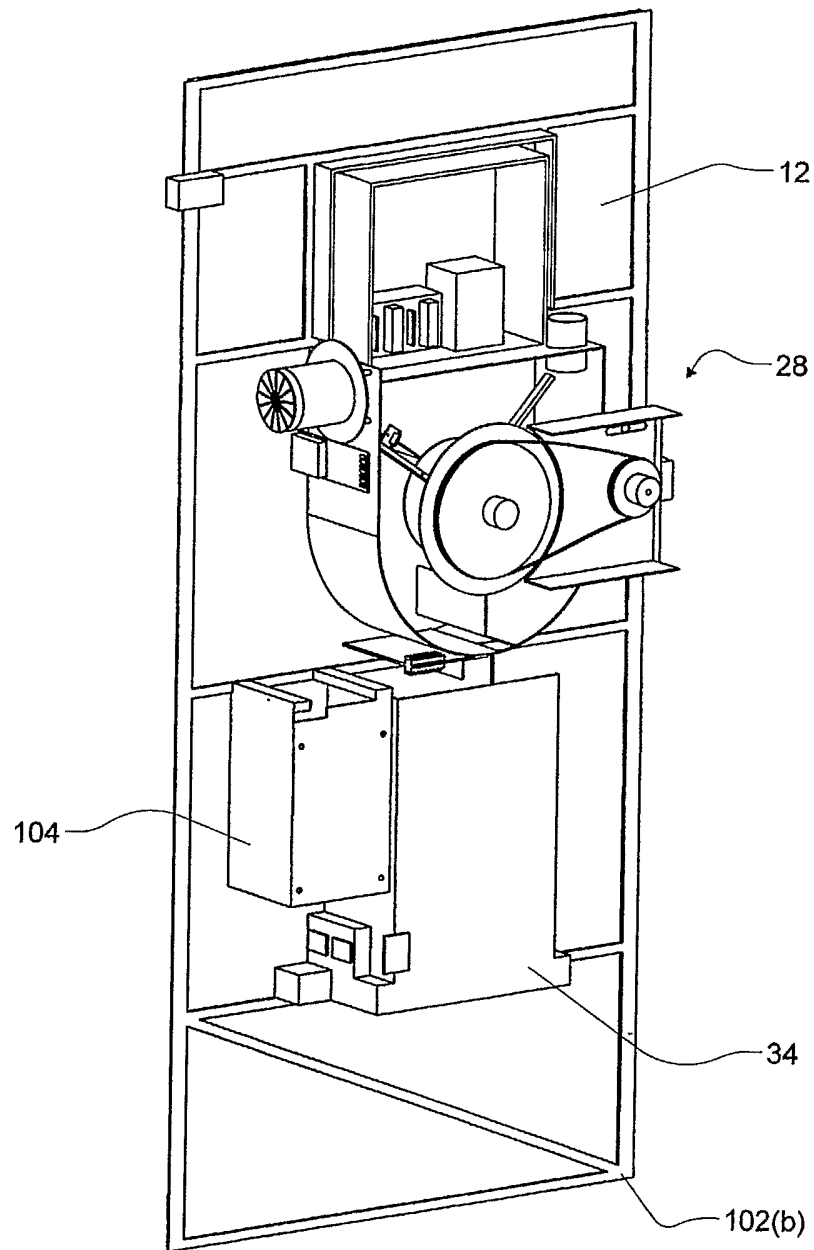


FIG. 9

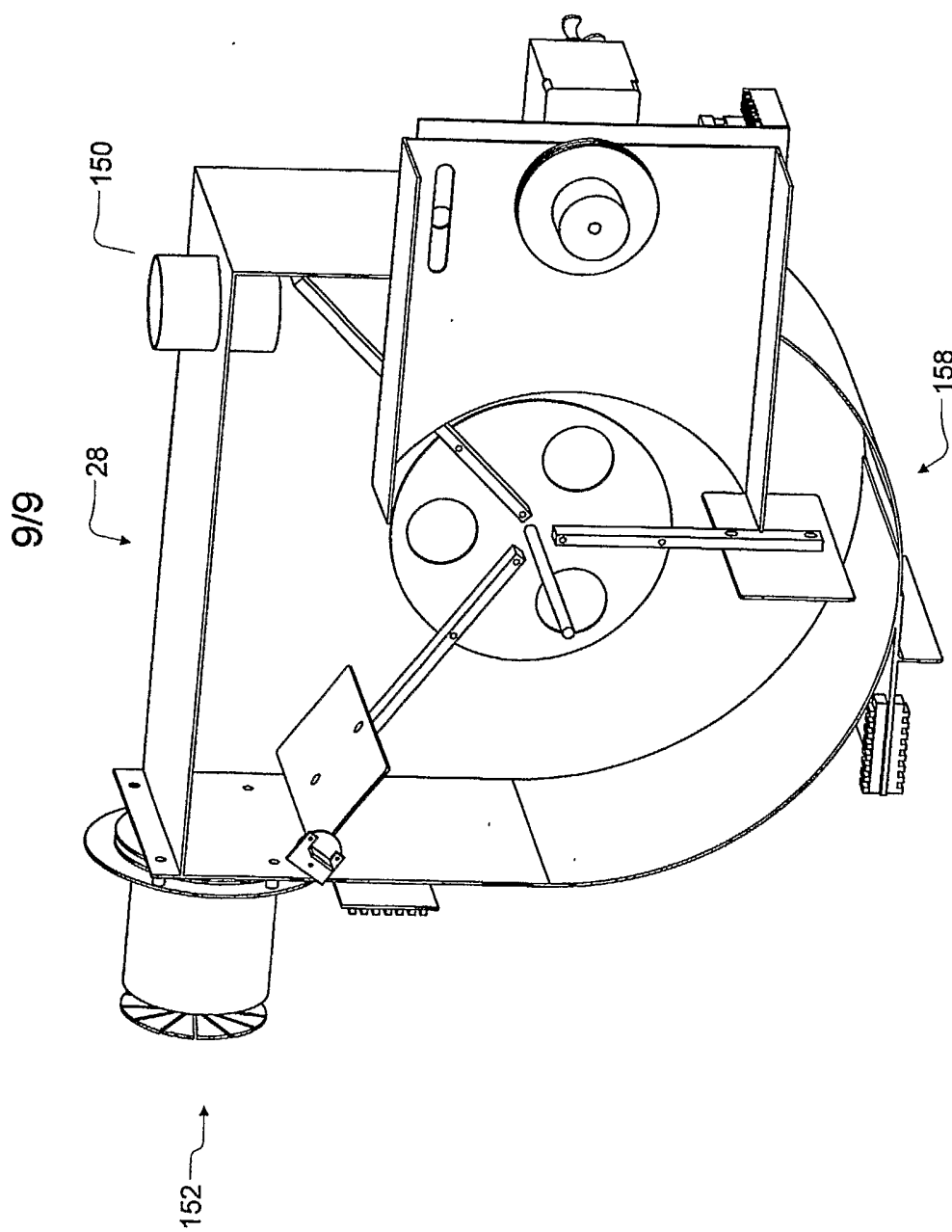


FIG. 10