KEYED DISPENSING SYSTEMS AND RELATED METHODS

TECHNICAL FIELD

The present invention is generally directed to dispensing systems. In particular, the present invention is directed to keyed dispensers which allow only designated refill containers with dispensable material to be installed therein and, if desired, installed by selected distributors. More specifically, the present invention is directed to electronically keyed fluid dispensing systems.

BACKGROUND ART

It is well known to provide fluid dispensers for use in restaurants, factories, hospitals, bathrooms and the home. These dispensers may contain fluids such as soap, anti-bacterial cleansers, disinfectants, lotions and the like. It is also known to provide dispensers with some type of pump actuation mechanism wherein the user pushes or pulls a lever to dispense a quantity of fluid into the user's hands. "Hands-free" dispensers may also be utilized wherein the user simply places their hand underneath a sensor and a quantity of fluid is dispensed. Related types of dispensers may be used to dispense powder or aerosol materials.

Dispensers may directly hold a quantity of fluid, but these have been found to be messy and difficult to service. As such, it is known to use refill bags or containers that hold a quantity of fluid and provide a pump and nozzle mechanism. These refill bags are advantageous in that they are easily installed into a dispenser without a mess. And the dispenser can monitor usage to indicate when the refill bag is low and provide other dispenser status information.

Manufacturers of these fluid materials enlist distributors to install the dispensers at various locations and place the manufacturer's products in the dispensers. Further, the manufacturers rely on the distributors to put the correct refill container in the dispenser housing. For example, it would be very upsetting to hospital personnel to have hand moisturizing lotion dispensed when they instead desire anti-bacterial soap. Therefore, manufacturers provide keyed nozzle and pump mechanisms for each type of fluid refill bag so that only appropriate refill bags are installed in corresponding fluid dispensers.

Distributors prefer such a keying system so that their dispensers can only be refilled by them instead of their competitors. Replacement of refill containers by unauthorized distributors is sometimes referred to as "stuffing." In addition to providing keying between the dispenser and the fluid refill bag to ensure the compatibility of the product with the dispenser, keying is used to ensure that competitors of the distributor do not obtain the distributor's business. And it is also critical to the manufacturer that competitors do not stuff their product into the manufacturer's dispensers. Such activity prevents the manufacturer from obtaining an adequate financial return on the dispensers which are typically sold at cost or less.

Although mechanical keys are helpful in ensuring that the proper refill bag is installed into the proper dispenser and that the distributors maintain their business clientele, these keying systems have been found to be lacking. For example, if a distributor's competitor cannot install their refill packages into the distributor's dispenser device, the competitor may remove or alter the keying mechanism. As such, inferior fluid may be installed into a particular dispenser and the preferred distributor will lose sales. Mechanical keying also necessitates significant tooling costs underwritten by the manufacturer to design special nozzles and dispensers that are compatible with one another. In other words, each dispenser must be keyed for a particular product, a particular distributor and perhaps even a particular location. Accordingly, the inventory costs for maintaining refill bags with a particular key is significant. And the lead time for manufacturing such a refill bag may be quite lengthy. Moreover, the particular identification of a particular keying device may be lost or damaged so that it is difficult to determine which type of keying configuration is needed for the refill bags.

One attempt at controlling the type of product associated with a dispenser is disclosed in U.S. Pat. No. 6,431,400 B1. This patent discloses a refill bag that utilizes a wafer with an embedded magnet that must be properly oriented into a housing in order for the magnet to be detected and effectively close an on/off switch. If the magnet is not detected then the dispenser is disabled. Although effective in its' stated purpose, the device disclosed in the patent is lacking in that a specific orientation is required for installation of the refill container. The patent also discloses the use of a spiral coil on a printed circuit wafer on the bag which is inductively coupled to a similar spiral coil on the housing's base supporting surface. A capacitor connected to the spiral coil on the bag establishes a resonant frequency for a conventional frequency-measuring circuit to provide identification. It is believed that this scheme is lacking in that it provides no teaching for adaptability for use with multiple dispensers. It is also believed that the disclosed configuration is subject to a mis-alignment of the coils which may lead to mis-identification of the bag. And the use of a single coil as the emitting and receiving coils may lead to mis-identification of the bag.

Another approach to the "stuffing" problem is to provide a wire coil wrapped around a neck of a refill container, wherein a capacitor is attached to the coil to serve as an identifier key. The dispensing system that receives the refill container includes a pair of similar sized spaced apart wire coils connected to a controller which maintains a matching key. The controller energizes the first coil which in turn generates a signal detected by the refill container's coil. Together the connected coil and capacitor generate a signal detected by the other coil connected to the controller. The controller then compares the detected signal to the matching key. If there is a match, then the dispenser is enabled. If there is not a match, then the dispenser is disabled. Although this approach is effective, the wire coils must be specially manufactured and are costly. Another drawback is the added power requirements to energize the first coil and detect output of the container's coil with the other coil. Finally, this configuration is unable to provide information related to a position of the refill container's pumping mechanism during a dispensing event.

Therefore, there is a need in the art for a dispensing system that utilizes low cost components so as to provide electronic keying to prevent "stuffing." And there is a need to inexpensively provide a stroke position of the pumping mechanism as part of the electronic keying while utilizing minimal power.

SUMMARY OF THE INVENTION

In view of the foregoing it is a first aspect of the present invention to provide keyed dispensing systems and related methods.

Another aspect of the present invention is to provide a refill container for receipt in a dispensing system, the container comprising an enclosure for carrying dispensable material, a pump mechanism coupled to the enclosure and movable from a first position to a second position and back to the first