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(54) **TIME DELAY PRODUCT PUSHING SYSTEM**

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(57) **ABSTRACT**

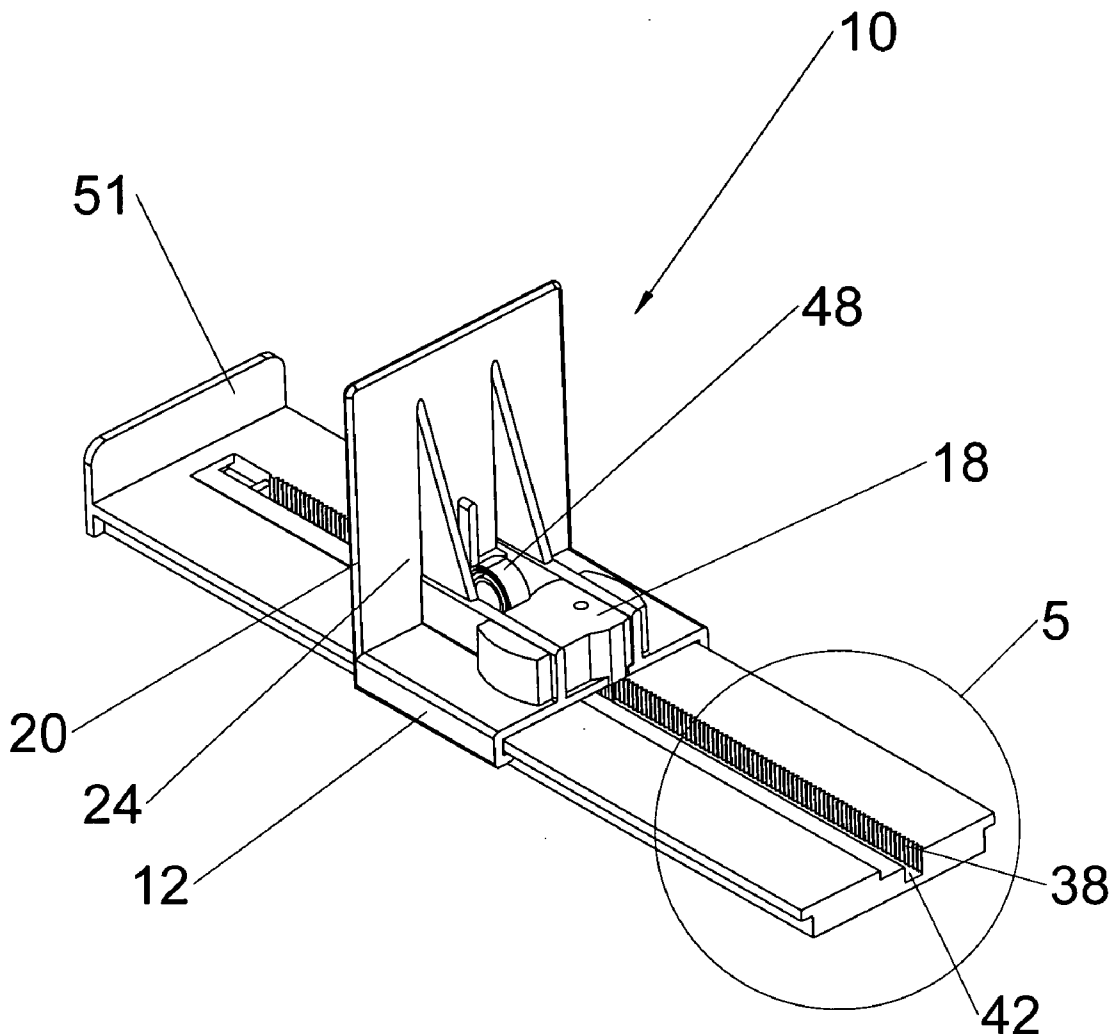
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**Related U.S. Application Data**

(60) Provisional application No. 60/674,880, filed on Apr. 25, 2005.

A system for controlled advancement of product. Systems of this invention includes a track and pusher system as well as a motor. The motor couples to the track and pusher system, controlling forward movement of the pusher along the track and thereby controlling the speed at which product is advanced for access by the consumer.



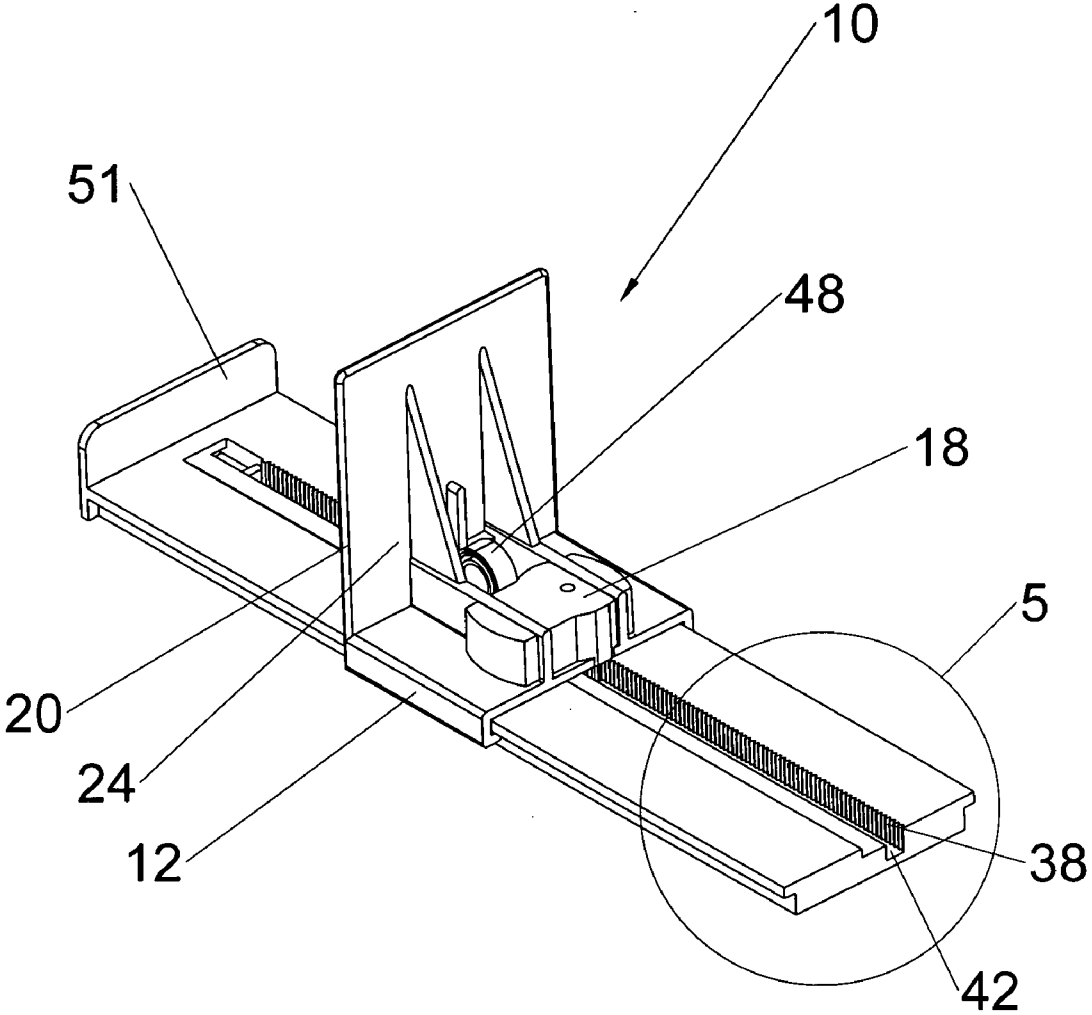


FIG. 1

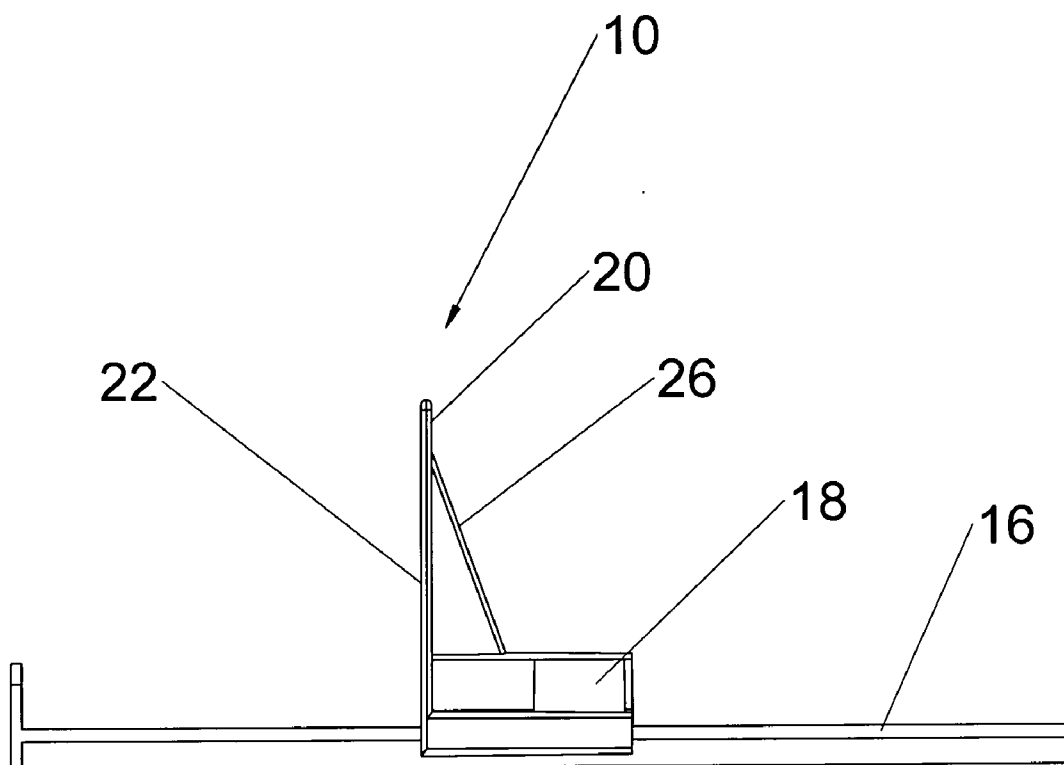
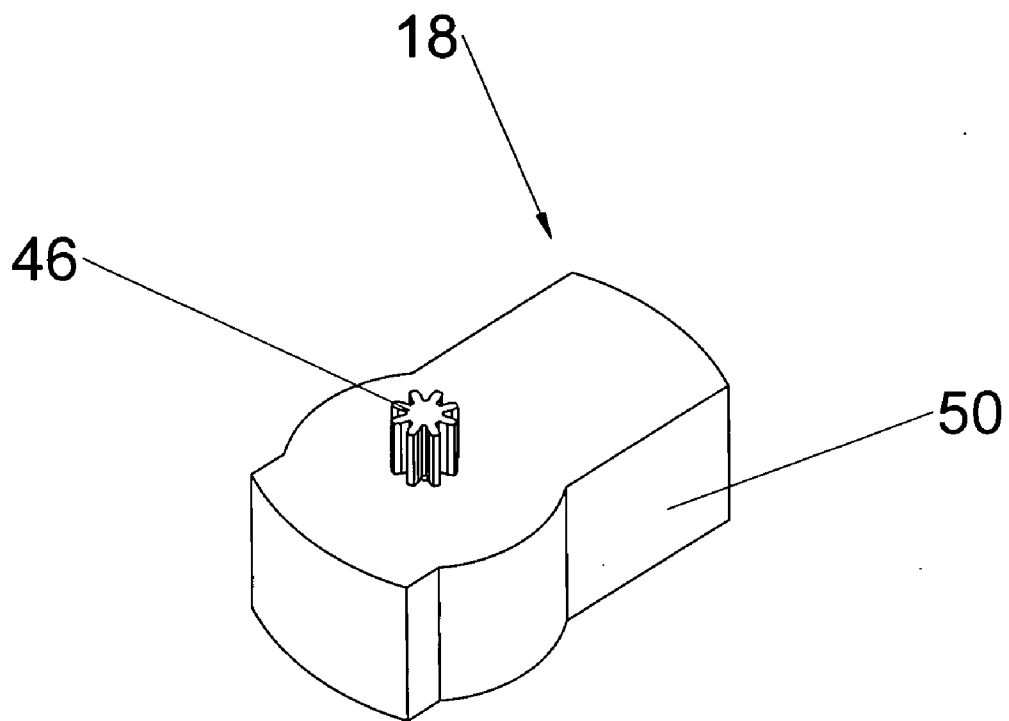


FIG. 2



**FIG. 3**

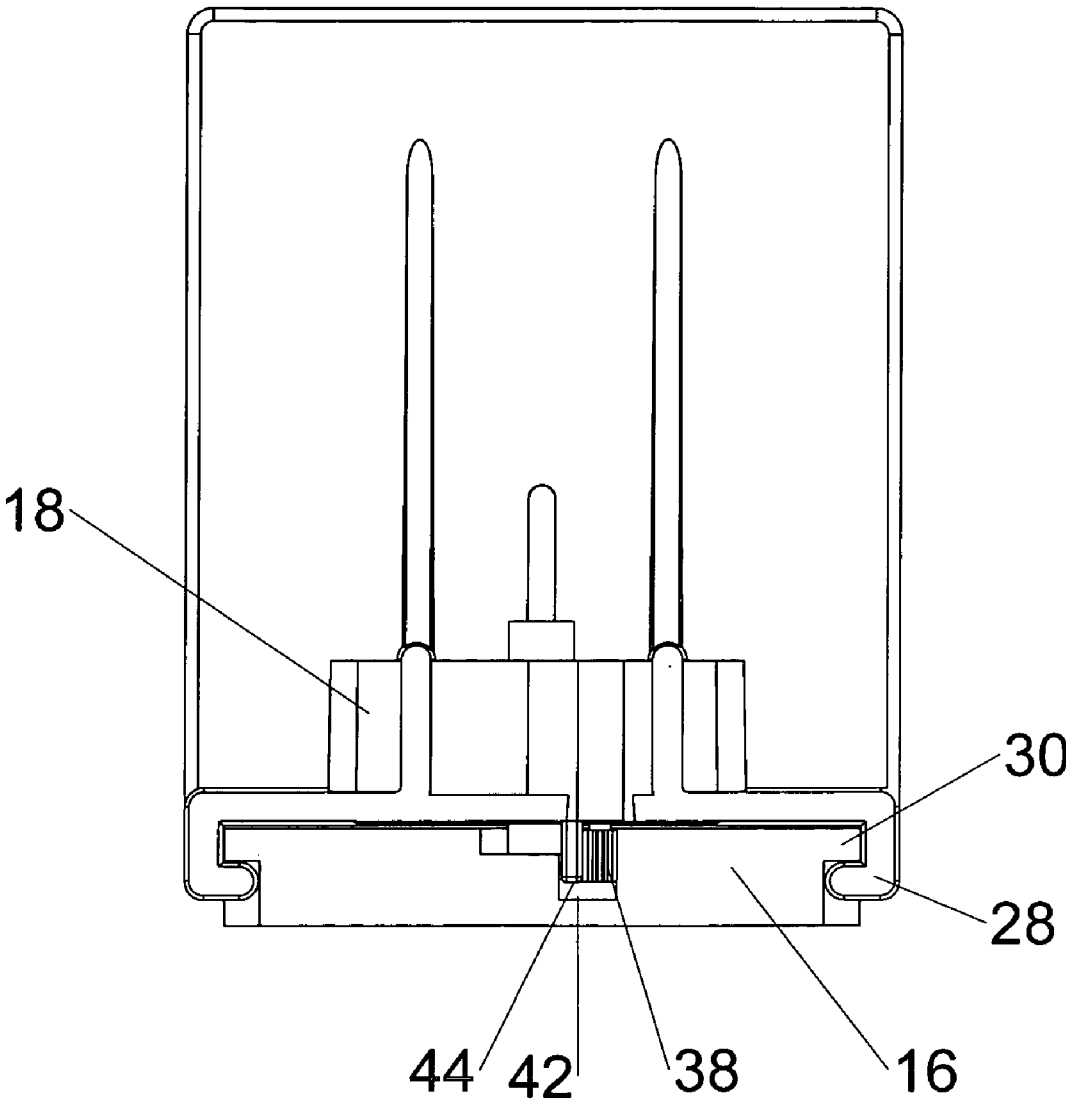
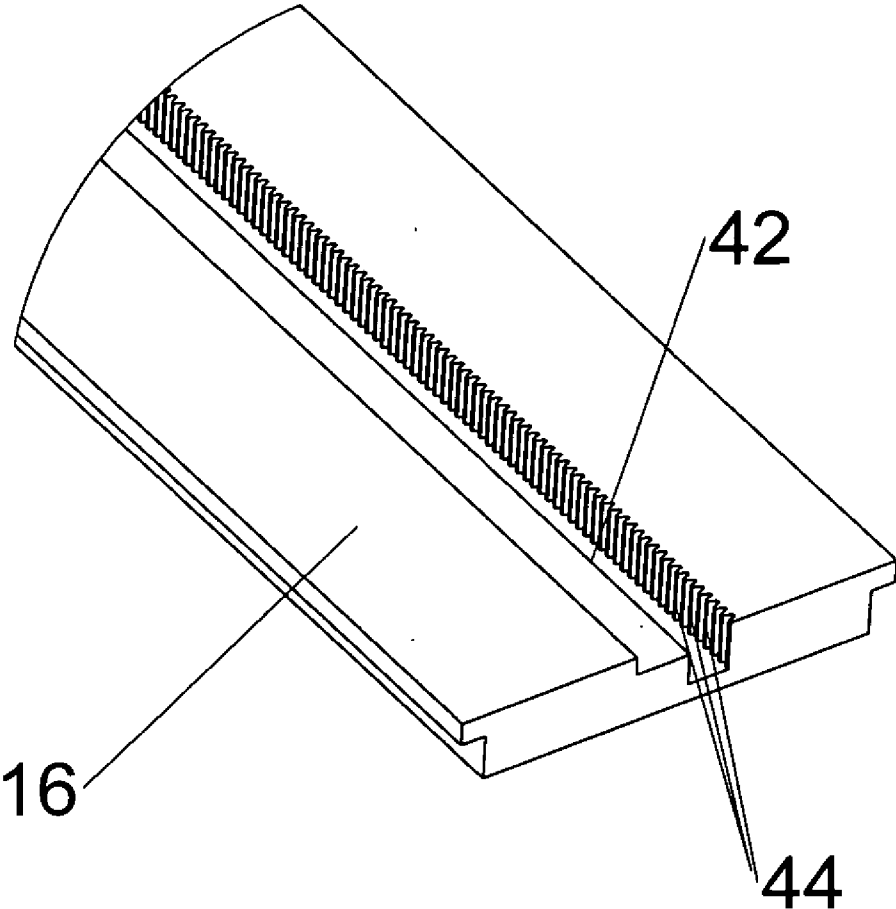


FIG. 4



**FIG. 5**

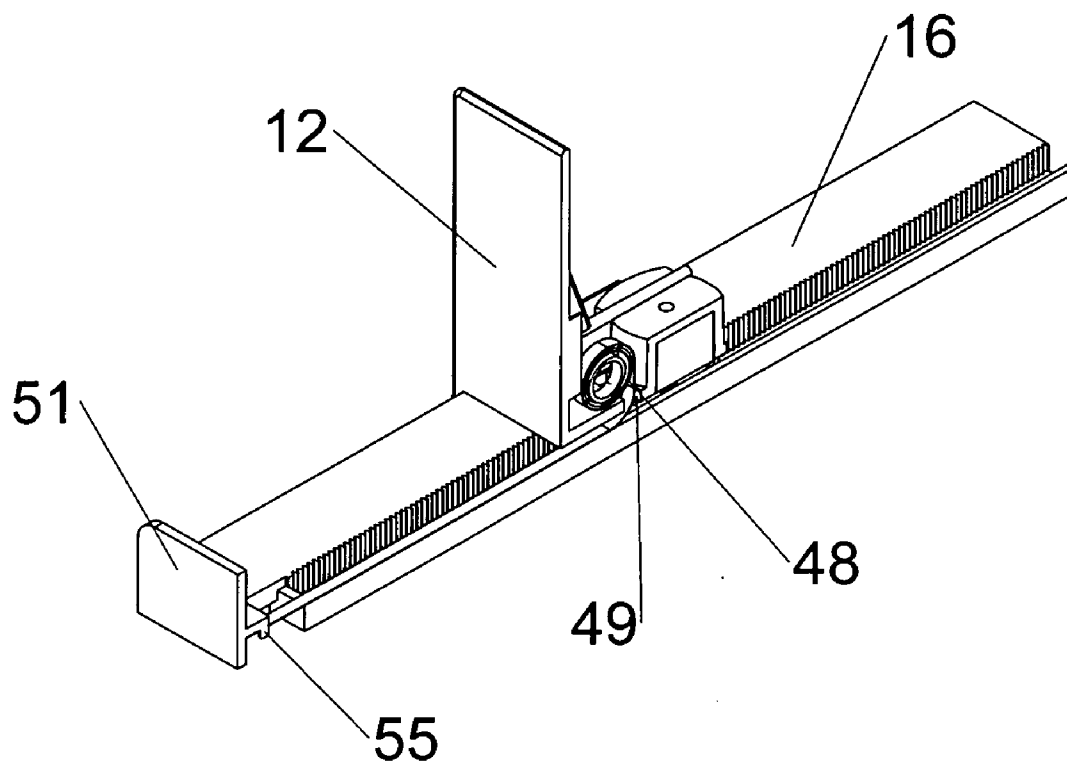


FIG. 6

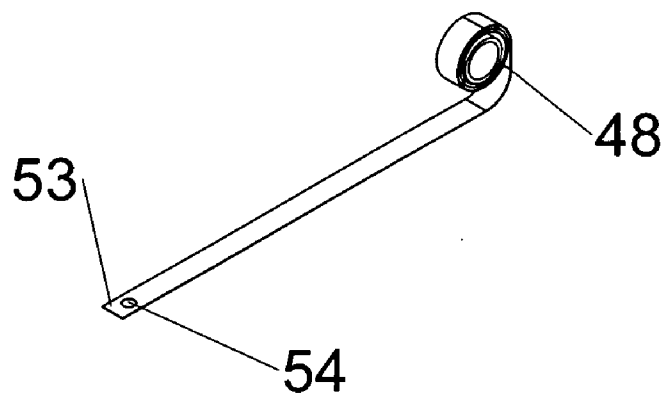


FIG. 7

## TIME DELAY PRODUCT PUSHING SYSTEM

### RELATED APPLICATION DATA

[0001] This application claims priority to U.S. Provisional Application No. 60/674,880, filed Apr. 25, 2005, incorporated herein by this reference.

### FIELD OF THE INVENTION

[0002] This invention relates generally to a system for advancing product on a shelf and, in particular, to a device allowing controlled forward movement of product.

### BACKGROUND

[0003] Theft of small items in retail stores is an all too common problem. Items that are in high demand by thieves include over-the-counter (OTC) products such as analgesics and cough and cold medications, razor blades, camera film, batteries, videos, DVDs, smoking cessation products and infant formula. Shelf sweeping is a particular problem for small items. Shelf sweeping occurs when individuals or groups remove all the shelf stock and exit the store, similar to a "smash and grab" shoplifting technique. Shelf sweeping relies on excessive quantities of product being available on the shelf. Retailers must keep substantial inventory on shelf or incur the cost, including labor costs, of constantly restocking.

[0004] In addition to preventing theft, retail stores may want to limit the purchase of certain items. For example, to make methamphetamine, large quantities of cold medication are needed. Pseudoephedrine, the sole active ingredient in many cold medicines and decongestants, is also a key ingredient in methamphetamine, a powerful and highly addictive stimulant.

[0005] Retailers are constantly challenged to balance the needs of legitimate consumers' access to high theft items with measures to minimize the incidence of theft. Because theft has become so rampant in certain product categories, such as razors and infant formula, many retail stores are taking the products off the shelves and placing them behind the counter or under lock and key. Customers must request the products in order to make a purchase. This requires additional labor costs to provide individual service to customers who would normally not require it. It also makes it difficult for customers to compare products. Furthermore, it may be impossible where the space behind the counter is limited and is needed for prescription medications. In some cases, products are simply unavailable due to high pilferage rates. Therefore, a device or dispensing apparatus that minimizes the incidence of product theft is needed.

[0006] A common problem at pharmacies and grocery stores is ensuring that consumers have access to cold medication, but at the same time deterring theft or multiple purchases for the production of drugs. A solution to the problem of sweeping is to limit the amount of cold medicine each customer is allowed to purchase. However, this requires additional labor and is not feasible where many stores now allow customers the option to check themselves out without the help of a cashier. Furthermore, this solution also keeps lawful products out of the hands of lawful consumers. Finally, legislation may be required to in order to limit such purchases.

[0007] Studies have shown that a desirable form of theft deterrence is to cause time delay between the dispensing of multiple products. Would be thieves are less likely to steal products if there is a substantial delay between the dispensing of individual products. It is also desirable to achieve time delayed dispensing of products in cost effective manner.

### SUMMARY

[0008] Systems of this invention provide controlled advancement of product on a shelf unit. As a first product is removed from the shelf unit, the products located behind the one that was removed must move forward. A pushing device of one embodiment of this invention includes a pusher, a track and a motor. The motor couples to the track and pusher system, controlling forward movement of the pusher along the track and thereby controlling the speed at which product is advanced for access by the consumer.

[0009] Forward movement may be controlled using a resistance motor. External gear components on the motor engage gear components on the pushing device track, so that limitation of rotation of the external gear components controls movement of the pusher of the pushing device.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] **FIG. 1** is a perspective view of a pushing device according to embodiments of the invention.

[0011] **FIG. 2** is a side view of the pushing device of **FIG. 1**.

[0012] **FIG. 3** is a perspective view of the motor of the pushing device of **FIG. 1**.

[0013] **FIG. 4** is a rear view of the pushing device of **FIG. 1**.

[0014] **FIG. 5** is an enlarged perspective view of the track of **FIG. 1**.

[0015] **FIG. 6** is a perspective view in partial cross-section of the pushing device of **FIG. 1**.

[0016] **FIG. 7** is a perspective view of the spring of **FIG. 1**.

### DETAILED DESCRIPTION

[0017] Certain embodiments of the invention comprise a pushing device **10**, such as a product pushing device, for advancing product. For example, it may be desirable to position product close to the edge of a shelf unit. As a first product is removed from the shelf unit, the products located behind the one that was removed must move forward. A pushing device may be used to accomplish the forward movement of product.

[0018] According to certain embodiments, pushing device **10**, shown in **FIGS. 1-2** and **4-5**, comprises a pusher **12**, a track **16**, and a motor **18**. Pusher **12** includes a pushing ram **20** that engages product (not shown) and pushes product forward. As shown in **FIG. 1**, pushing ram **20** includes a front surface **22** for engaging product and a rear surface **24**. In one embodiment, shown in the figures, the pushing ram **20** is rectangular plate, although other suitable shapes and geometries may also be used. Pusher **12** includes gusset **26** (shown in **FIG. 2**), reinforcing pusher **12** and providing a housing for spring **48** (further described below).



[0019] As shown in FIG. 4, extension 28 of pusher 12 extends beyond the bottom portion 26 of pushing ram 20. In this manner, extension 28 engages lip 30 of track 16, so that pusher 12 is in sliding engagement with track 16.

[0020] As shown in FIGS. 1, 4 and 5, track 16 includes a central channel 42 having side walls 38. Exposed gear teeth 44 on side walls 38 of central channel 42 project into channel 42 and engage external gear of the motor 18, as further described below. It should be understood that the gear teeth may be positioned in various other manners along the track and maintain the functionality of the pushing device.

[0021] As shown in FIG. 6, spring 48 extends through a small slot 49 in the pusher 12 and attaches to the lip 51 of the track 16. In the embodiment shown in FIGS. 6 and 7, end 53 of spring 48 includes aperture 54 that engages post 55 of track 16. Spring 48 may also be attached to pushing device 10 in any other suitable manner. Movement of pusher 12 toward the back end of the track 16 unwinds spring 48 so that spring 48 urges pusher 12 in the forward direction. The spring may preferably be a constant force spring, such as those sold under the trademark Conforce®g, but many other types of springs, such as a variable force spring, may also be used.

[0022] Motor 18 is attached to pusher 12. As shown in FIG. 3, motor 18 includes a housing 50 and an external gear 46. Motor 18 is positioned on pusher 12 so that external gear 46 extend into channel 42 of track 16 and engage gear teeth 44. According to certain embodiments, one such motor is a resistance motor, such as the resistance motor Model #w217 sold by Vigor, although other types of motors may also be used.

[0023] The pushing device may preferably be associated with a display device (not shown) for housing displayed product. It may be preferable that the display device be made of a translucent material such that the products stored within the display case are visible. Product can be loaded in pushing device 10 by forcing pushing ram 20 backwards along track 16 and placing multiple units of the product against the pushing ram 20. A lip or wall may be located at the front of the display device so that the multiple units of product are located between pushing ram 20 of product pusher 10 and the lip. As described above, spring 48 causes the pushing ram 20 to exert force on the products towards the front of the track 16. Resistance motor 18 preferably allows pushing ram 20 to be forced backwards freely for loading of the product.

[0024] As one product is selected from the front of pushing device 10, the compression of the spring 48 causes pushing ram 20 to move forward and the external gear 46 to rotate along gear teeth 36 of track 16. This in turn causes the remaining product to move forward along track 16 until the remaining products engage the front lip 51. Resistance motor 18, however, substantially reduces the speed of this forward progression. The internal gears of the resistance motor are preferably configured to provide resistance to the forward movement by limiting the rotation of the external gear 46. Because the external gear 46 engages gear teeth 44 of track 16 and the external gear rotation is limited, the movement of pushing ram 20 and therefore the remaining product to the front of track 16 is substantially slowed.

[0025] The display device is preferably configured so that only one product may be removed at a time. The display

device is also preferably configured so that product may only be removed when it is at the front of the display device. This requires someone who wants to remove more than one product from the device to wait for several seconds between removal of each product, which has been found to be a substantial deterrence to product theft.

[0026] According to certain embodiments, the pusher and track may all be made from molded plastic, although numerous other materials may be used if desired. The gear teeth may preferably be molded into the track in the desired orientation.

[0027] According to certain embodiments, the pushing device may be used with product hanging hooks (not shown). Product hanging hooks may be configured to slide along the track. As a first product is selected, a spring may cause the subsequent product to move forward along the track. Resistance motors may preferably be used with each hook to slow the progression of the subsequent product by limiting the rotation of the external gear along the gear teeth of the rack gear.

[0028] While the invention has been described in detail with particular reference to the disclosed embodiments, it will be understood that variations and modifications can be affected within the spirit and scope of the invention as described herein.

1. A device for controlled advancement of a product comprising:

- (a) a track,
  - (b) a pusher slidable along the track, and
  - (c) a motor attached to the pusher and coupled to the track, wherein the motor controls forward movement of the pusher along the track.
2. The device of claim 1, wherein the track further comprises a channel.
3. The device of claim 2, wherein the channel further comprises gear teeth that project into the channel.
4. The device of claim 1, wherein the motor further comprises an external gear component.
5. The device of claim 1, wherein the pusher further comprises a pushing ram.
6. The device of claim 1, wherein the pusher further comprises an extension for coupling the pusher to the track, so that the pusher slides along the track.
7. The device of claim 1, further comprising a spring that urges the pusher in a forward direction.
8. The device of claim 7, wherein the spring is a constant force spring.
9. A product pushing device comprising:

- (a) a track comprising a central channel and having a motor engagement surface,
- (b) a pusher slidable along the track, and
- (c) a motor attached to the pusher and comprising an external engagement component,

wherein the external engagement component of the motor engages the motor engagement surface, allowing the motor to control movement of the pusher along the track.

10. The product pushing device of claim 9, wherein the motor engagement surface comprises gear teeth.

**11.** The product pushing device of claim 9, wherein the external engagement component is an external gear component.

**12.** The product pushing device of claim 9, further comprising a pushing ram.

**13.** The product pushing device of claim 9, wherein the pusher further comprises an extension for coupling the pusher to the track and allowing the pusher to slide along the track.

**14.** The product pushing device of claim 9, further comprising a spring that urges the pusher in a forward direction.

**15.** The product pushing device of claim 14, wherein the spring is a constant force spring.

**16.** The product pushing device of claim 14, wherein an end of the spring passes through a slot in the pusher and is attached to an end of the track.

**17.** A system for controlled advancement of product comprising:

(a) a track comprising a central channel having side walls, at least one of the side walls including gear teeth;

(b) a pusher slidable along the track and comprising a pushing ram and a bracket;

(c) a motor attached to the pusher and comprising an external gear component that extends into the channel of the track and engages the gear teeth; and

(d) a spring attached to the track for urging the pusher in a forward direction.

**18.** The system of claim 17, wherein the spring is a constant force spring.

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