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Wittern et al.

[11] **3,929,255**

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[54] **VENDING MACHINE DIVIDED HELIX APPARATUS**

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[73] Assignee: **Fawn Engineering Corporation**, Des Moines, Iowa

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[52] **U.S. Cl.** **221/75**

[51] **Int. Cl.²** **G07F 11/36**

[58] **Field of Search** ..... 221/75, 112–115, 221/118, 130; 198/34 A, 213, 214

[56] **References Cited**

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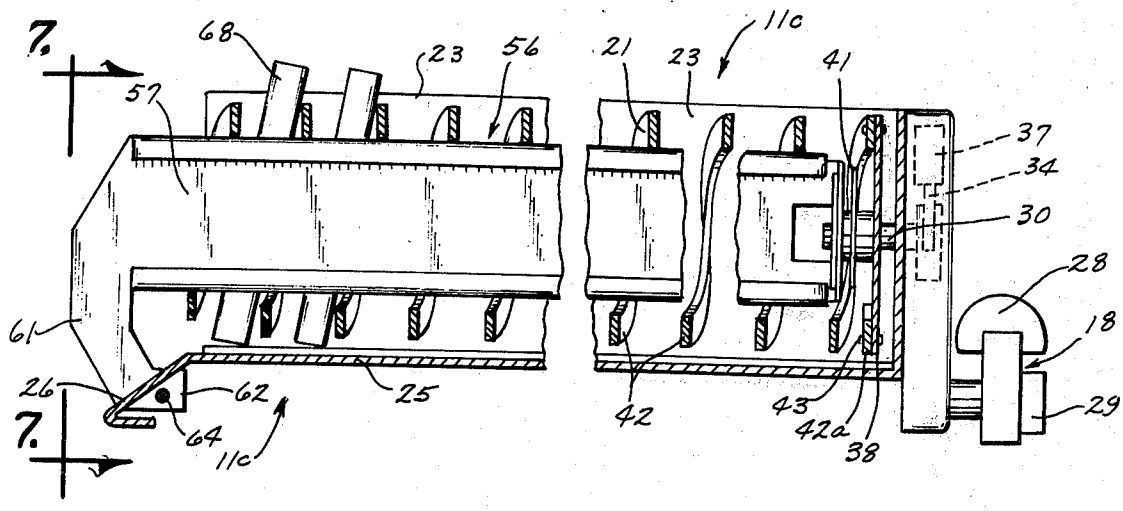
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Assistant Examiner—Charles A. Marmor
Attorney, Agent, or Firm—Henderson & Strom

[57] **ABSTRACT**

A vending machine having a plurality of discharge trays each including a helical element rotatably mounted at its rear to a drive mechanism for rotating within the tray a predetermined amount and having an open front, and a vertical divider extended longitudinally of each tray completely within the helical element and having a dual function of supporting the helical element off the tray floor and reducing the normal width of a tray such that items of widths less than cigarette packages can be vended from each tray by rotation of the helical element, and further wherein the divider can be removed, changed and re-installed without affecting the position of the helical element.

4 Claims, 9 Drawing Figures



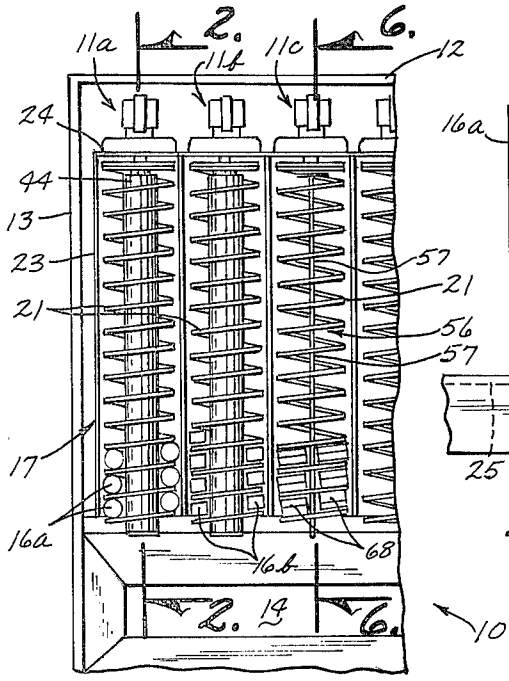


Fig. 1

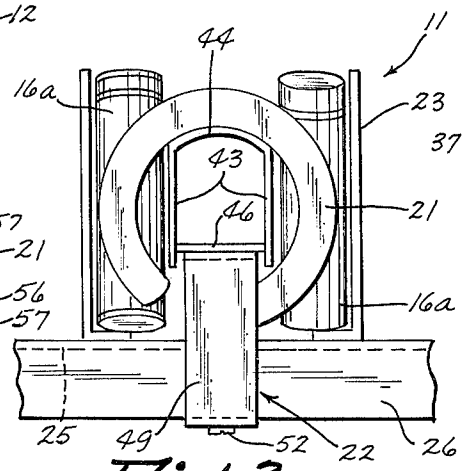


Fig. 3

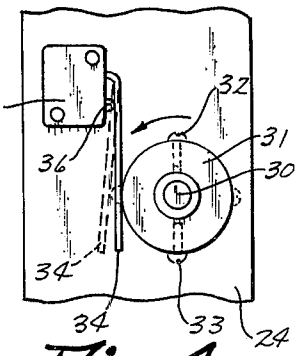


Fig. 4

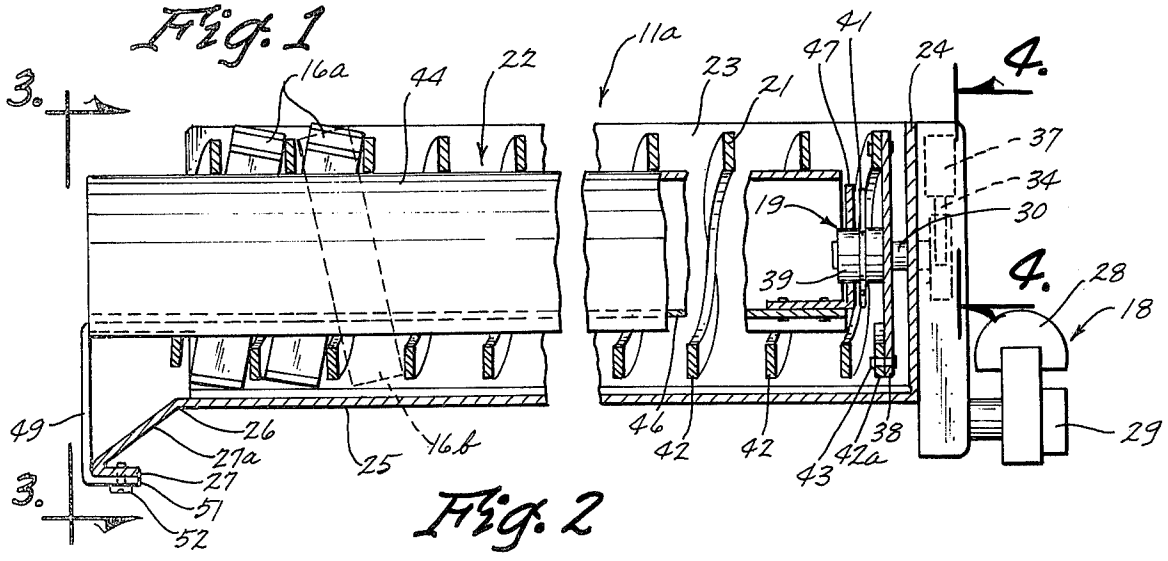


Fig. 2

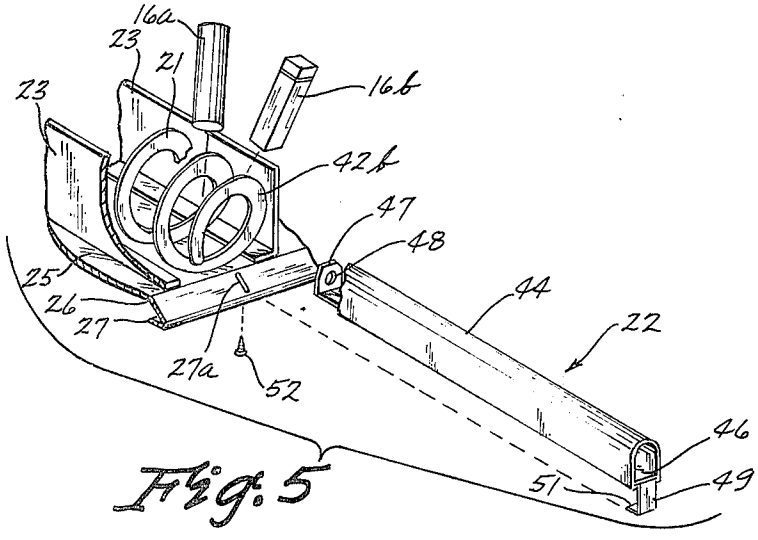


Fig. 5

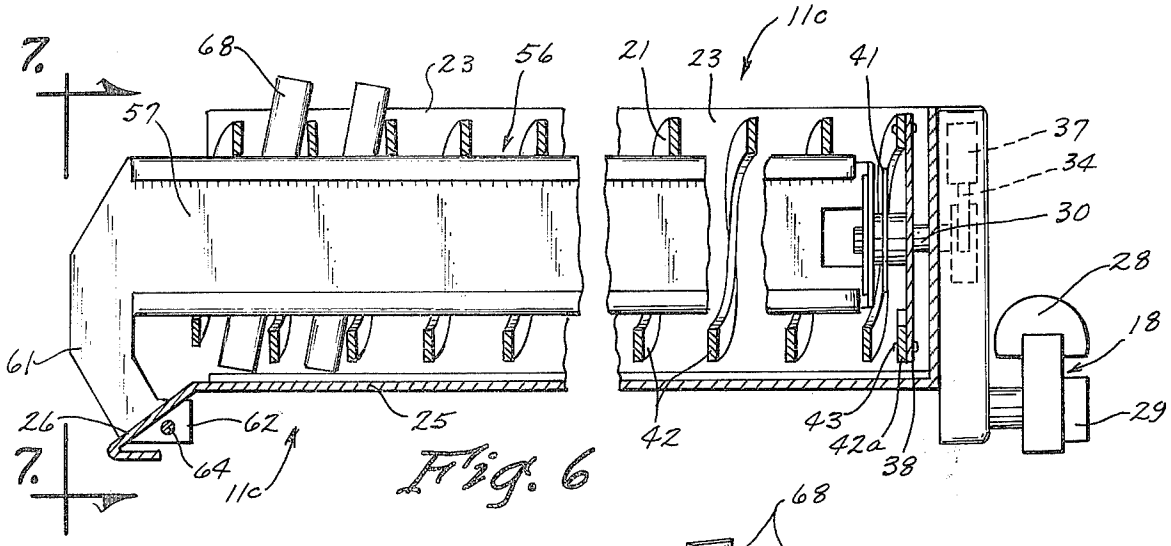


Fig. 6

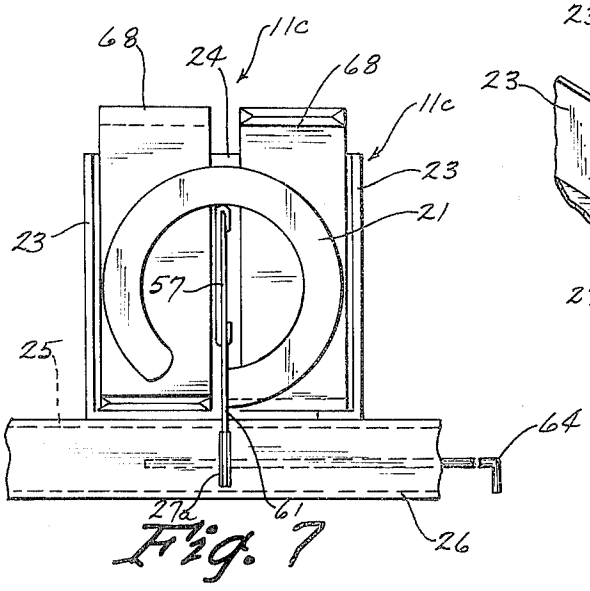


Fig. 7

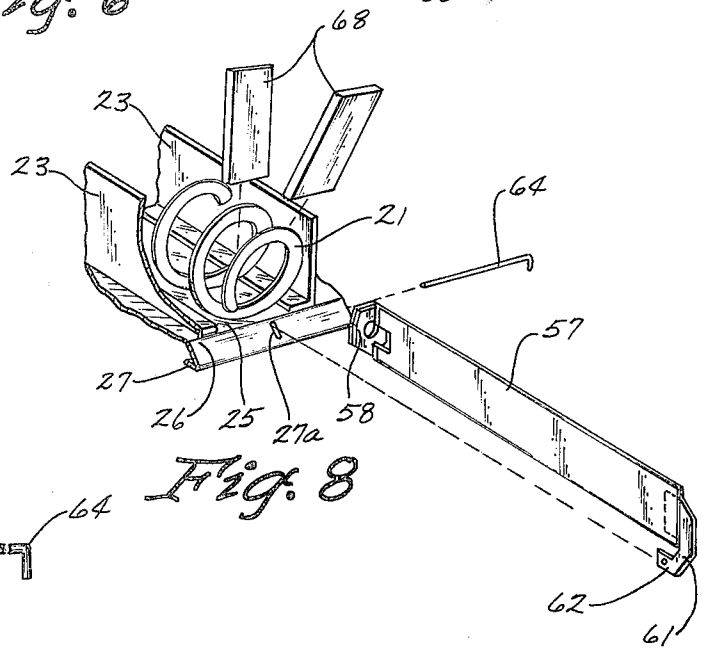


Fig. 8

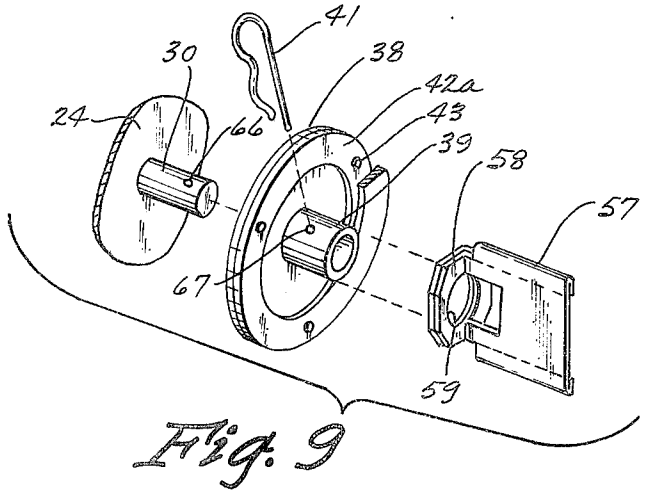


Fig. 9

VENDING MACHINE DIVIDED HELIX APPARATUS

BACKGROUND OF THE INVENTION

This invention relates generally to the type of vending machines shown and described in U.S. Pat. Nos. 3,178,055; 3,335,907; and 3,601,281 in that within a cabinet, an item discharge chute is provided at either the front or side for dispensing items to be withdrawn from the machine, and also provided are a plurality of item discharge tray units mounted usually in a side-by-side, horizontally disposed arrangement.

For purposes of economy and practicality, most tray units are of identical construction but yet the consumer demands that a large variety of products be made available to him. It is a great problem to the manufacturer, therefore, to provide a standard tray unit, based quite frequently on a size for vending cigarette packages, which can readily be converted to handling, for example, gum and candy mint packages.

SUMMARY OF THE INVENTION

The invention relates generally to vending machines and more particularly to vending machines having a plurality of item discharge trays mounted side-by-side in a horizontal manner and with their discharge ends adjacent the opening of an item discharge chute from whence the customer removes the item he has purchased.

The invention comprises a tray unit having spaced side walls, a rear wall, a bottom or floor and a front discharge end; a drive assembly mounted adjacent the rear of each tray unit and having a drive shaft extended through said rear wall; a driven unit within said tray unit rotatably connected to said drive shaft; a helical element having a plurality of convolutions secured at the rear to the driven unit for being rotated; and a divider device having both vertical height and transverse width for performing the dual function of serving as sole support for the helical element forward of its rear connection, and serving to divide the helical element into a pair of item discharging compartments of widths considerably less than one half the normal width of the tray unit.

It is an object of this invention to provide an improved vending machine.

It is another object of this invention to provide a vending machine having a tray unit from which cigarette packages are normally vended, and within which a helical discharge element is supported above the floor of the tray unit, and by a vertical divider capable of having sufficient width to vend gum and/or candy mint packages from the tray unit in double rows.

It is yet another object of this invention to provide a vending machine having a helical element and a vertical divider for supporting the element up off the tray floor, and for also dividing the tray into a double row for items, which divider can be moved back and forth, and changed within the element without affecting the said element.

Another object of this invention is the provision of a vending machine capable of attaining these objectives which is economical and effective.

These objects and other features and advantages of this invention will be readily apparent upon reference to the following description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary plan view of the interior of a vending machine embodying the present invention;

FIG. **2** is an enlarged, foreshortened vertical sectional view taken along the line **2—2** in FIG. **1**;

FIG. **3** is a front elevational view taken along the line **3—3** in FIG. **2**;

FIG. **4** is an elevational view taken along the line **4—4** in FIG. **2**;

FIG. **5** is a fragmentary, exploded perspective view of certain parts of the invention;

FIG. **6** is a foreshortened vertical sectional view taken along the line **6—6** in FIG. **1** and showing a modification of the invention;

FIG. **7** is a front elevational view taken along the line **7—7** in FIg. **6**;

FIG. **8** is a view of parts of the modified embodiment at the front end thereof comparable to the FIG. **5** view; and

FIG. **9** is an exploded view of parts at the rear end of the FIG. **6** embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings and particularly to FIG. **1**, a portion of a cabinet **10** for a conventional vending machine is illustrated, showing a preferred embodiment of the present invention in the form of a plurality of helix discharge units indicated generally at **11** in FIG. **3**, and shown in a side-by-side, horizontal relationship in plan view in FIG. **1** by the reference numerals **11***a*, **11***b* and **11***c*. The cabinet includes a rear panel **12** and a side panel **13**, and the front open ends of the helix discharge units **11***a* – **11***c* are disposed above an item discharge chute **14**.

It will be noted in FIG. **1** that a plurality of items, such as rolls **16***a* of mints or the like and packages **16***b* of gum or the like are disposed in pairs within each helix discharge unit **11**, the number of course depending how many of the items **16** have been loaded into and then dispensed in a first in - first out manner from the vending machine by operation of a conventional coin mechanism (not shown). As is shown in FIG. **5**, it may be that a plurality of rolls **16***a* are loaded on one side and a plurality of packages **16***b* are loaded on the other side of the same discharge unit. As is well known in the trade, energization by the coin mechanism of one or other of the helix discharge units **11***a*, **11***b* or **11***c* results in dispensing whatever particular item or product is loaded in that unit into the discharge chute **14** for subsequent withdrawal by the customer.

As each helix discharge unit **11** is identical, only one will be described. It comprises generally a tray assembly **17**, a drive unit **18** (FIG. **2**), a driven unit **19**, a helix **21**, and a divider unit **22** (FIGS. **2** and **3**).

More specifically, the tray assembly **17** includes a pair of horizontally spaced, upright side walls **23** (FIG. **3**) of a height greater than the diameter of the helix **21**, a rear wall **24** connecting the rear ends of the side walls **23**, and a bottom or floor **25** (FIG. **2**) which includes a downwardly inclined front ledge **26** with a return portion **27**. A slot **27***a* (FIG. **5**) is formed in the front ledge **26** directly in front of and intermediate the side walls of each helix discharge unit **11**.

Each drive unit **18** (FIG. **2**) includes an electric motor **28** for operating a gear reduction unit **29** which in turn rotates a drive shaft **30** (FIG. **2**). A collar **31**

(FIG. 4) is mounted on the drive shaft 30 and has secured thereto in diametrically opposed positions a pair of switch actuators 32 and 33. In this relationship, each switch actuator is 180° from the other.

A leaf contact 34 (FIG. 4) is normally out of contact of a plunger 36, which plunger is operably connected to a switch 37 interposed in the electric circuit for the motor 28. The arrangment of these elements is such that operation of the coin mechanism (not shown) by the customer results in controlled rotation by interaction of the switch 37 and motor 28, of the drive shaft 30 180° per coin deposit for a purpose seen herinafter.

Referring to FIG. 2, the driven unit 19 is best seen, and includes a flat disc 38 mounted on the drive shaft 30 and integral with a sleeve 39 which embraces the drive shaft 30 and which is driveably connected thereto by means of a pin 41 passing through both the sleeve 39 and the drive shaft 30. By this arrangement, rotation of the drive shaft 30 results in identical rotation of the disc 38.

The helix 21 comprises a plurality of convolutions 42 of a flat nature as is illustrated in FIG. 2. The rear end 42a (FIG. 2) of the helix 21 is secured by fasteners 43 to the disc 38 such that rotation of the disc results in like rotation of the helix 21. It thus may be appreciated that rotation of the drive shaft 30 for 180° results in rotation of the helix 21 180°.

For the purpose of dividing each tray assembly 17 into two compartments for the items 16a and 16b, the divider unit 22 is provided, which unit includes an elongated, inverted U-shaped member 44 (FIGS. 3 and 5). The unit 22 includes further a base portion 46 for the member 44 having at rear thereof an upturned flange 47 (FIG. 5) with an opening 48 formed therein of a diameter larger than the sleeve 49 (FIG. 2) such that the flange 47 is loosely fitted over the sleeve 39 as best illustrated in FIG. 2. The front end of the divider unit 22 includes a tongue 49 depending from the base portion 46 and having an inturned portion 51 (FIG. 2) which mates with the return portion 27 of the tray unit floor 25, and is connected thereto by a fastener 52.

Referring to FIG. 3, it can be seen that the top of the member 44 has an arcuate formation complimentary with the arcuate inner surface of the helix 21 such that the helix rides thereon, the divider unit 22 supporting the helix 21 above the floor 25 of the tray assembly 17 as best illustrated in FIG. 2. Furthermore, the width of the divider unit member 44 by virtue of the spacing of the sides 43 thereof is approximately one-third of the width of the space between the tray side walls 23 and wherein the items 16a, or 16b as the case may be, are placeable on either side of the member 44 between adjacent convolutions 42 of the helix 21 and held in an approximate upright position as best shown in FIg. 2.

Referring to FIG. 5, the arrangement is such that upon 180° rotation of the helix 21 an item, 16b, on one side of the divider member 44 is discharged from the tray assembly 17, and then upon another 180° rotation of the helix 21, the item, 16a for example, on the other side of the divider member 44 is discharged from the tray assembly 17, both discharged items falling into the item discharge chute 14 for withdrawal by the purchaser.

It may also be noted that as the divider unit member 44 is contained completely within the helix 21 (FIGS. 2 and 3), upon withdrawal of the fastener 52 (FIG. 2), the entire divider unit 22 can be readily and easily pulled from its freely mounted position on the sleeve 39, the removal for whatever purpose; and in this regard a divider unit of a different width as to the member 44 can be reinserted in the same manner and connected to the floor 25 and mounted on the sleeve 39. By the loose mounting on the sleeve 39, it will be seen that rotation of the sleeve 39 does not affect the upright stationary position of the divider member 44. Furthermore, each end of the divider member 44 is supported thereby ensuring complete horizontal support of the convolutions 42 of the helix 21 for ensuring efficient rotation of the helix 21.

Referring to FIGS. 6 – 9, a modification of the divider unit 22 of FIGS. 1 – 5 is illustrated, with all other parts of the FIG. 6 – FIG. 9 embodiment being identical to the FIG. 1 – FIG. 5 embodiment and being shown by like reference numerals. The modified divider unit is indicated generally at 56 in FIGS. 1 and 6 and is shown mounted in the helix discharge unit 11c.

Referring specifically to FIGS. 6 – 9 inclusive, the modified divider unit 56 comprises an elongated upright member 57 which has a rear flange 58 extended normal to the drive shaft 30 (FIG. 9) and with an opening 59 formed therein whereby the flange 58 is loosely mounted over the sleeve 39. The pin 41 connecting the drive shaft 30 and the sleeve 39 by passing through the holes 66 and 67 formed therein, respectively, results in rotation of the helix 21 during rotation of the drive shaft 30, but with the loose mounting of the flange 58 of the divider member 57, the latter is supported in the upright position as best illustrated in FIG. 7, due to the provision at the front end thereof of a tongue 61 having a return or tab 62 which is inserted through the opening 27a (FIG. 8) formed in the ledge 26, which return 62 is secured in the position best illustrated in FIG. 6 by the insertion of an elongated rod 64 through a hole or passage 63 formed in the return 62 for that purpose. The return or tab 62 rests upon the bottom of the slot 27a to thereby support the front of the divider member 57. It may be appreciated that the rod 64 would pass through other holes (not shown) in other returns comparable to the return 62 and holes 63 of the illustrated helix discharge unit 11c.The rod or elongated pin 64 extends parallel to and under the front ledge 26 and transversely of the tray means, which tray means is formed in part by the side walls 23 and the bottom or floor 25.

Items 68 such as packages of thin cigars may be mounted within the tray assembly 17 of the discharge unit 11c as illustrated in FIG. 7, with the rotation of the helix 21 effecting 180° incremental movements of the helix 21 such that an item 68 is discharged from alternate sides of the divider member 57 as a result of each 180° incremental rotation of the helix 21.

Again, comparable to the function of the divider unit 22 for the FIG. 1 – 5 embodiment, the divider unit 56 of the FIG. 6 – FIG. 9 embodiment is operable to support the helix 21 up off the tray floor 25, divides the tray assembly 17 into a double row of items 68, can be removed from the discharge unit 11c without changing the position of the helix 21 and can of course be reinserted therein again without affecting the remainder of the discharge unit 11c, and lastly and as importantly by virtue of being supported at its front end rear, the divider member 57 provides full horizontal support for the helix 21 to ensure efficient and effective rotational movement thereof. The objects of the invention are thereby fully attained.

We claim:

1. In a vending machine having a cabinet and within one portion of which is an item discharge chute for dispensing items to be withdrawn from the machine, a plurality of item discharge units mounted in a side-by-side, horizontally disposed arrangement, each item discharge unit comprising:

tray means having side walls, a rear wall, a bottom and a front end open to the discharge chute, said tray means including a front ledge portion extended forwardly and downwardly toward the chute and beyond the front end of said helical means;

drive means mounted in said machine and having a drive shaft inserted through said rear wall and toward said front end, said drive means customer controlled for predetermined incremental operation;

driven means connected to said drive means and rotatable therewith, said driven means including a disc and sleeve integral therewith, with said sleeve secured to said drive shaft;

divider means mounted within said tray means intermediate said side walls and extended longitudinally of said tray means, one end thereof mounted on said driven means in a non-rotatable manner, and the other end of said divider means secured to said bottom at the front end thereof, said divider means including a rear end extending normal to the axis of said drive shaft, said rear end also having an opening formed therein which is larger than said sleeve, whereby said rear end is fitted over and rests upon said sleeve and said sleeve is inserted through said opening;

helical means having a plurality of convolutions disposed within and extended the length of said tray means, said helical means secured at the rear end thereof to said driven means so as to be rotatable thereby and supported on said divider means, the arrangement such that articles to be dispensed are placeable completely to each side of said divider means between adjacent convolutions and are discharged alternately from said front end in response to operation of said drive means; and

wherein said front ledge portion of the tray means has a slot formed therein, and said divider means includes an element, the front end of which has a tab inserted through said slot, the bottom of said tab resting upon the bottom of said slot, said tab having a passage formed therein, and an elongated pin extended parallel to and under the said front ledge portion of the tray portion transversely of said tray means and inserted through said passage for locking said element to the front of said tray means.

2. In a vending machine as described in claim 1, and wherein said divider means includes an element extended the length of said tray means and having a front portion secured to the bottom thereof, said helical means resting upon said element.

3. In a vending machine as described in claim 1, and wherein said divider element has a width approximately one-third the width of said tray means and with a top portion thereof curves so as to receive in a complimentary manner the inner arcuate surface of the said convolutions.

4. In a vending machine as described in claim 1, and wherein the front end of said helical means is open whereby said vertical divider means is longitudinally movable therethrough.

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