

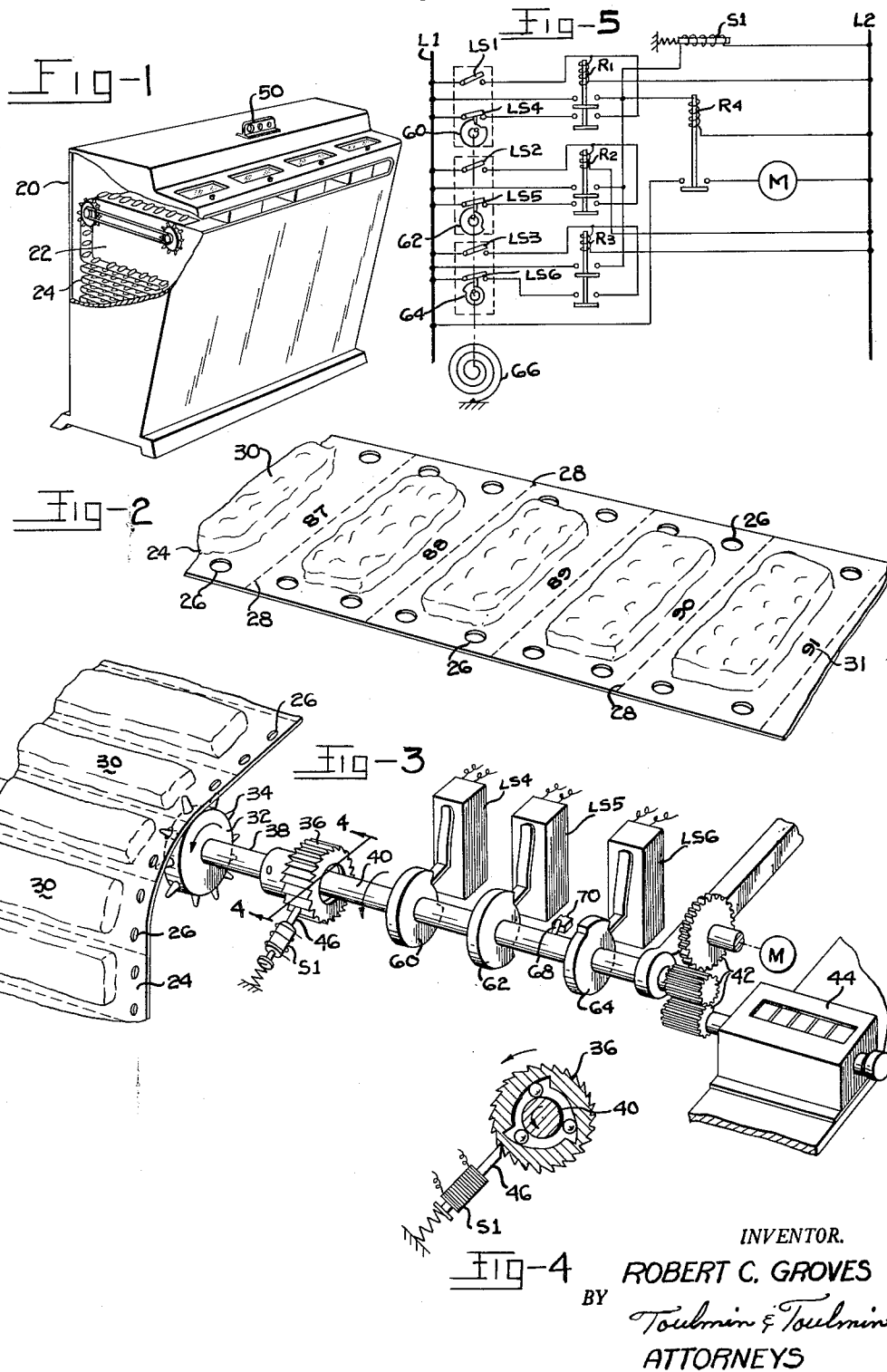
July 31, 1962

R. C. GROVES

3,047,347

CONTROLLING MOVEMENT OF ARTICLES

Filed April 25, 1955



INVENTOR.

ROBERT C. GROVES

BY

Toulmin & Toulmin
ATTORNEYS

1

3,047,347

CONTROLLING MOVEMENT OF ARTICLES
Robert C. Groves, 335 Aberdeen Ave., Dayton, Ohio
Filed Apr. 25, 1955, Ser. No. 503,769
3 Claims. (Cl. 312-39)

This invention relates to the delivering of articles and the control thereof, and the automatic maintaining of records and accounting of the articles and material delivered.

In many dispensing, manufacturing, and packaging operations an important item of information which is desired to have available at any instant is the number of articles or amount of material that has been dispensed or handled up to a predetermined point, or the amount of material or number of articles remaining out of a given group yet to be dispensed or handled.

For example, in dispensing machines, which might dispense such articles as candy bars, or packages of cigarettes or the like, it would be convenient to inspect the machine and determine instantly the number of articles remaining to be dispensed.

In still other instances, as in the case of dispensing certain types of merchandise, nails for instance, it would be desirable, in order to eliminate expensive and time-consuming handling of such merchandise, to have a dispensing mechanism that could readily be adjusted to provide for the dispensing of a predetermined amount of the material being dispensed, with an accounting being kept of the amount dispensed and the amount yet remaining to be dispensed.

With the foregoing in mind, it is a primary object of the present invention to provide a method and apparatus for accomplishing the desirable results referred to above.

A particular object of this invention is the provision of a method and apparatus for maintaining a continuous inventory of material being dispensed from a dispensing device.

In general, the objectives of this invention are attained by utilizing a punched strip which is in positive engagement with a driving or driven member whereby the movement of the strip and movement of the member is positively correlated.

The punched strip is either in the form of a carrier of the articles or material being moved or dispensed, or may form a part of the said articles or material. The driving or driven member either drives the punched strip or is driven thereby, and in either case can be utilized for operating a counter or other quantity indicator, or for actuating a limit control which determines the amount of movement of the punched strip, or may be utilized for controlling the movement of another article or material which is to be combined with the articles or material associated with the punched strip.

The several objects and advantages of this invention will become more apparent upon reference to the following specification, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a more or less diagrammatic perspective view showing a coin-operated dispensing device embodying the principles of my invention;

FIGURE 2 is a perspective view showing a carrier strip adapted for being handled in the dispensing device of FIGURE 1;

FIGURE 3 is a perspective view showing the driving device which drives the punched carrier strip of FIGURE 2;

FIGURE 4 is a section on line 4-4 of FIGURE 3 showing a one-way drive clutch forming a part of the drive train leading to the member which engages the punched carrier strip in FIGURE 3; and

2

FIGURE 5 is a diagrammatic view of an electric control circuit adapted for being associated with the drive train of FIGURE 3.

Referring to the drawings somewhat in more detail, FIGURE 1 illustrates a dispensing device of the coin-operated type which is adapted for dispensing articles that are mounted on a punched carrier strip. Articles to be dispensed in this manner may comprise substantially anything of a size small enough to be packaged in continuous strips and of such a nature as to lend themselves to being dispensed in this manner.

In FIGURE 1 the device comprises a frame 20 having a compartment 22 therein, within which is disposed a plurality of strips 24 carrying the articles to be dispensed. Strips 24, as will be seen in FIGURE 2, are perforated along at least one side edge as at 26, and the carrier strip is also perforated by the perforations 28 at regular intervals between the articles 30 that are carried by the carrier strips. The carrier strip is preferably in the form of two webs or filaments, on which the articles are placed and with the webs or filaments being joined or sealed together between the articles and at their side edges, and with the perforations 28 extending across the sealed portions of the carrier strip.

According to this invention the carrier strip is provided with printed numbers or other indicia 31 thereon which indicate either the number of articles that have been dispensed from a strip or the number of articles yet remaining in a carrier strip to be dispensed. This enables the carrier strip to be made up in lengths of, say, 100 articles, and a cursory inspection of the dispensing device will, at any time, show whether or not it needs refilling.

According to this invention the perforations 26 along the side edges of the carrier strips 24, of which there may be several different types in the device of FIGURE 1, are utilized for driving the strips in the directions of their length to provide for the dispensing thereof from the device. An arrangement for controlling the movement of one of the strips is illustrated in FIGURE 3, with the electric control circuit therefor being illustrated in FIGURE 5.

In FIGURE 3 a pinwheel 32 having pins 34 engages the perforations 26 on one, or both, side edges of the particular carrier strip 24 so that rotation of pinwheel 32 will drive the carrier strip in the direction of its length.

It is preferred for the dispensing device of FIGURE 1 to be of the coin-operated type, and to this end automatic means are provided for rotating the pinwheel 32. This means takes the form of the one-way clutch 36 which connects shaft 38 of pinwheel 32 with shaft 40 which, in turn, is connected through gearing 42 with drive motor M and a counter 44.

The portion of clutch 36 that is connected with shaft 38 is provided with a notched periphery which is adapted for engagement by the latch member 46 which normally prevents rotation of the pinwheel in its dispensing direction, but which is adapted for being withdrawn by energization of solenoid S1 to permit rotation of the pinwheel. This prevents pulling of the carrier strip from the dispensing device manually.

The electric circuit for energizing motor M is illustrated in FIGURE 5. This circuit comprises means for selecting different amounts of rotation of motor M to provide for different lengths of dispensed carrier strips. This is a desirable feature in a coin-operated dispensing device, because a coin drop as at 50 may be provided thereon for receiving coins of different denominations, which will bring about the dispensing of corresponding lengths of the carrier strip. Such a coin-operated device might be adapted for receiving coins of 5 cents, 10 cents, or 25 cents denominations.

The coin drop is arranged, according to conventional

practices, for a 5 cent coin disposed therein to momentarily close a limit switch LS1; for a 10 cent coin disposed therein to momentarily close a limit switch LS2; and for a 25 cent coin disposed therein to momentarily close a limit switch LS3.

The limit switches have associated therewith the relays R1, R2, and R3, respectively, which close during the interval that the pertaining coin-operated limit switch is closed. Each of the said relays has a blade connected to energize a coil of the main relay R4 when closed and also energizes solenoid S1. Main relay R4 has a blade thereon for accomplishing the energization of motor M when the said relay is closed.

Each of relays R1, R2, and R3 has a holding circuit leading through a normally open blade of the retaining relay, and located in the circuits are the normally closed limit switches LS4, LS5, and LS6, respectively. These limit switches have associated therewith the cams 60, 62 and 64, respectively.

The cams are mounted on shaft 40 so that rotation of the shaft will rotate the cams. Each of the cams is provided with a raised portion and a valley, with the valleys differing in length so that each of the limit switches LS4, LS5 and LS6 will open in response to a different amount of angular movement of shaft 40; the smallest movement being required to open LS4; twice as much movement being required to open LS5; and five or six times as much movement being required to open LS6.

A preset torsion spring arrangement 66 is provided which, upon de-energization of motor M, will drive shaft 40 back to its starting position, at which time a stop pin 68 associated with the shaft strikes a stationary abutment 70. This will position the shaft so that each of the cams 60, 62 and 64 will have the actuating element of the pertaining limit switches LS4, LS5, or LS6 at the beginning of the valley portion thereof.

Operation of the Circuit of FIGURE 5

The operation of the circuit FIGURE 5 is as follows:

With the circuit at rest, solenoid S1 is deenergized and this permits latch member 46 to engage the ratchet wheel and to lock shaft 38 against forward rotation. The machine is placed in operation by inserting a coin in the coin receiver 50 and, depending upon the size of the coin, one of limit switches LS1, LS2 or LS3 will be closed. Depending on which one of the said limit switches are closed, one of relays R1, R2, or R3 will be closed. Whichever relay is closed, a holding circuit will be established therefor through one of its own blades while simultaneously, solenoid S1 will be energized to withdraw latch 46 and also relay R4 will be energized to close its blade which will cause energization of motor M. Energization of motor M will cause driving of shaft 40 and through the one way drive coupling, which includes the ratchet 36, will drive shaft 38. The amount of rotation imparted to the shafts will be determined by the actuation of the one of the limit switches LS4, LS5, and LS6 which pertains to the one of the limit switches LS1, LS2, or LS3 which was closed by the coin actuated device. When the pertaining limit switch is actuated, the holding circuit for the energized relay is opened and this will bring about de-energization of the relay while simultaneously the solenoid S1 will be deenergized and also the energizing coil of relay R4. The motor M is thus deenergized and the latch 46 is released to its latching position and the torsion spring 66 at that time will snap the shaft 40 back to its starting position, at which time finger 68 will engage stop 70. The counter 44 also embodies a one way drive so that it will register the amount of forward rotation of shaft 40 but will not be influenced by the reverse rotation thereof.

By the described arrangement there is provided a novel dispensing device for articles packaged according to my invention on continuous carrier strip means having one or more rows of perforations thereon, and with selective

control being provided to determine the amount of movement of each carrier strip handled by the dispensing device. Each actuating mechanism for each carrier strip also includes a counter so that a continuous over-all indication of the number of each article dispensed is available.

The arrangement just described has the perforations along the strip varying in simple numerical ratio to the articles carried by the strip. In the strip illustrated in FIGURES 2 and 3 this numerical ratio is two perforations for each article. It will be apparent, however, that, in the interest of economy or to provide a compact strip which will require the minimum of storage space, the articles might be located on the strip in as close association as possible without regard to the maintaining of a simple numerical ratio between the number of articles and the number of perforations. In dispensing articles carried on strips of this nature it is necessary to provide for a length of feed of the carrier strip.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

I claim:

1. In a dispensing device; a frame, a discharge opening therein, said device being adapted for feeding a tubular carrier strip within said frame through said discharge opening, said carrier strip having punched holes distributed uniformly along the length thereof, a driving pinwheel having pins adapted for engaging said series of punched holes, a motor for driving said pinwheel, a one-way drive between the motor and pinwheel, means for controlling the energization of said motor to control the feeding of said strip from said device, said last-mentioned means comprising a plurality of cam means connected with said motor to move in unison with the motor, a limit switch under the control of each said cam means, each switch being actuated by its respective cam means in a different rotated position of said motor, a relay pertaining to each switch, each switch being operable to deenergize its pertaining relay when actuated, each relay being connected with the motor so energization of any of the relays will energize the motor, coin-operated means for selectively energizing said relays thereby selectively making said limit switches effective for de-energizing said motor in response to a predetermined rotation, resilient means operable to return the motor to its starting position upon de-energization thereof, a latch normally effective to lock the pinwheel against rotation, and means connected to said relays operable automatically for making the latch ineffective when the motor is energized and effective when the motor is de-energized.

2. A dispensing device for dispensing tubular strips having uniformly spaced perforations along the side edges, a pinwheel drive member in the device engaging the said perforations, a motor for rotating the drive member, a plurality of cams driven by the motor so as to rotate in unison with the drive member, a one-way drive connecting the motor with drive member, a switch under the control of each said cam, each switch being actuated by its respective cam in a different rotated position of said motor, a relay in circuit with each switch adapted for being deenergized when the pertaining switch is actuated, means for selectively energizing said relays, each said relay being connected in circuit with said motor and being adapted when energized to cause energization of said motor, a latch normally engaged with said drive member operable for preventing forward rotation of said drive member, and means connected to said relays operable for withdrawing said latch from engagement with said drive member simultaneously with the energization of any of said relays.

3. A dispensing device according to claim 2 in which

there is a counter connected with the cams to rotate there-with.

References Cited in the file of this patent

UNITED STATES PATENTS

661,130	Pape	Nov. 6, 1900	5
683,660	Price	Oct. 1, 1901	
1,304,974	Helsel	May 27, 1919	
1,895,899	Schaub	Jan. 31, 1933	10
1,946,371	Walker	Feb. 6, 1934	

2,037,825
2,186,302
2,258,912
2,323,255
2,368,001
2,599,173
2,758,710
2,767,981
2,801,848

Salfisberg	Apr. 21, 1936
Martin	Jan. 9, 1940
Steen	Oct. 14, 1941
Sutherland	June 29, 1943
Cooper	Jan. 23, 1945
Hamilton	June 3, 1952
Arens	Aug. 14, 1956
Hempel	Oct. 23, 1956
Taylor	Aug. 6, 1957