

July 11, 1961

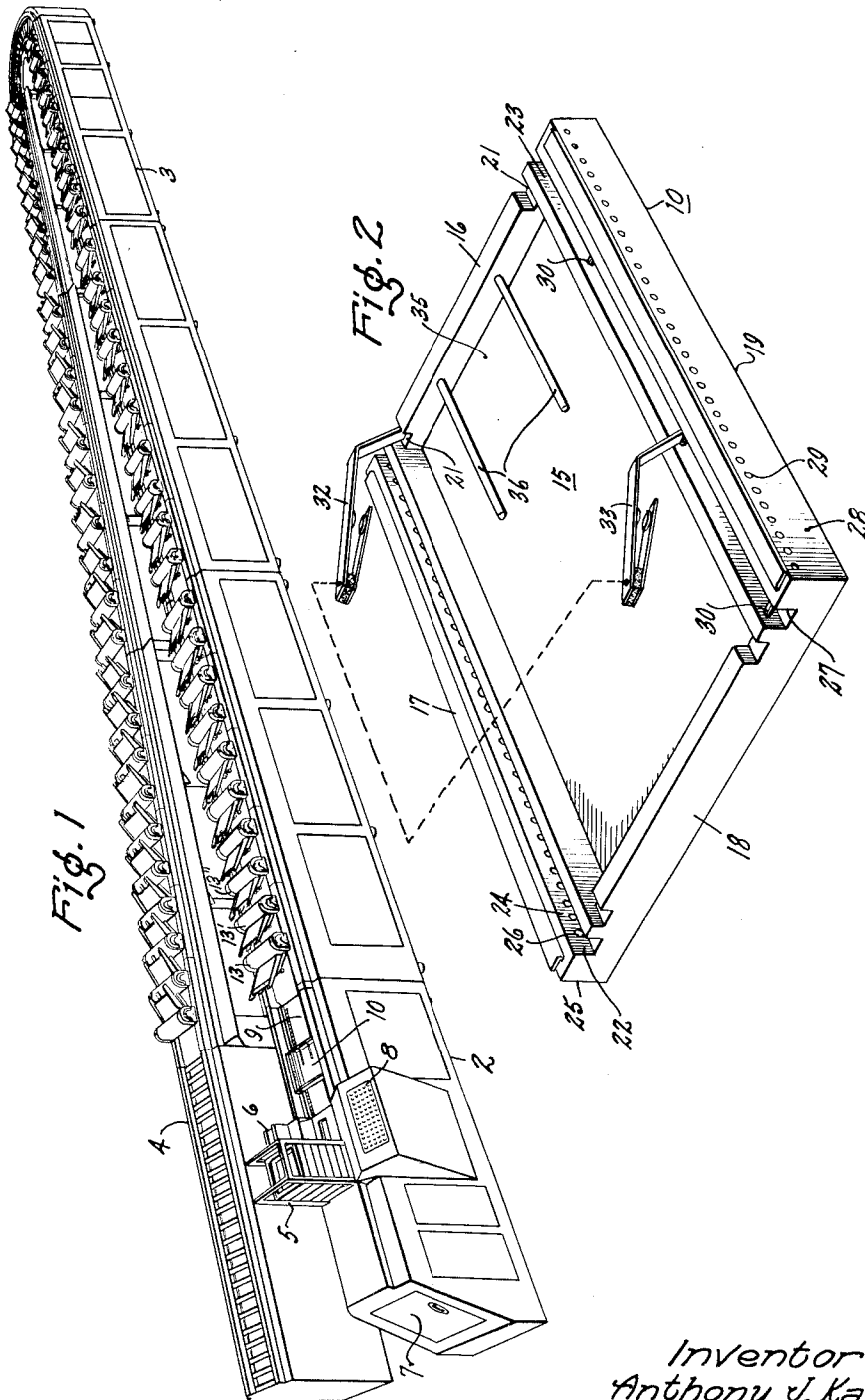
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2,991,996

ARTICLE DISPENSING APPARATUS

Filed June 15, 1959

5 Sheets-Sheet 1



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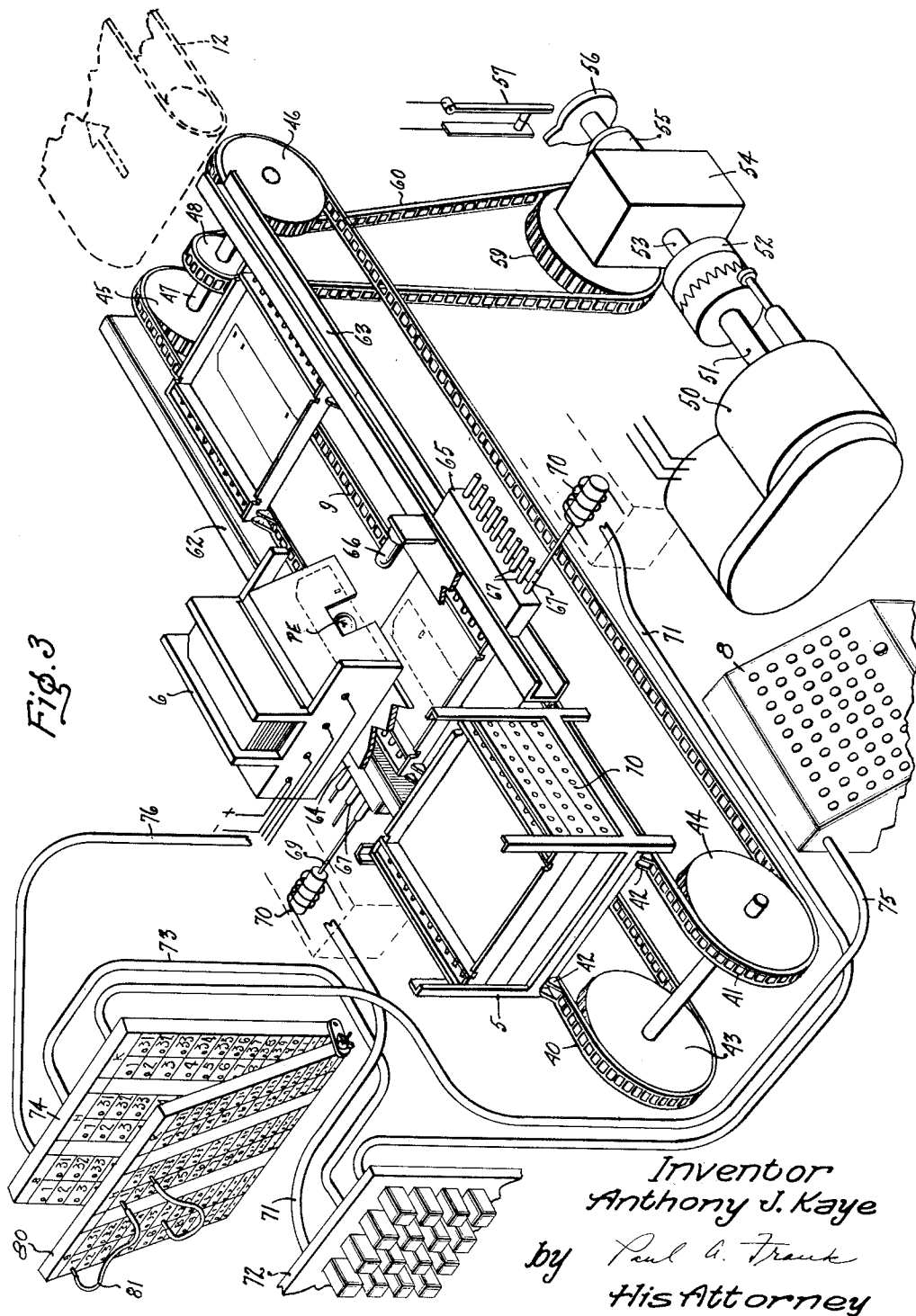
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ARTICLE DISPENSING APPARATUS

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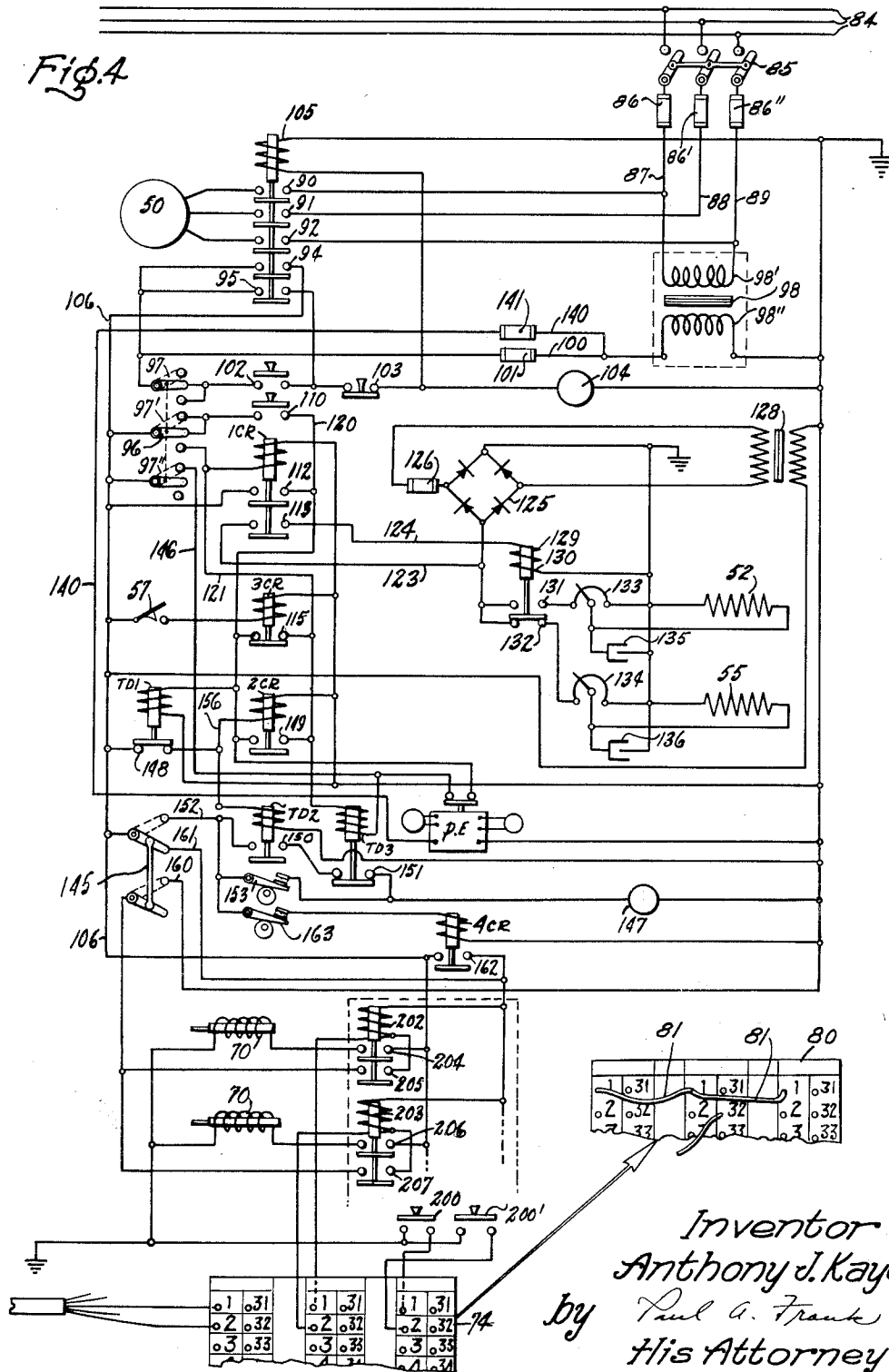


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5 Sheets-Sheet 3



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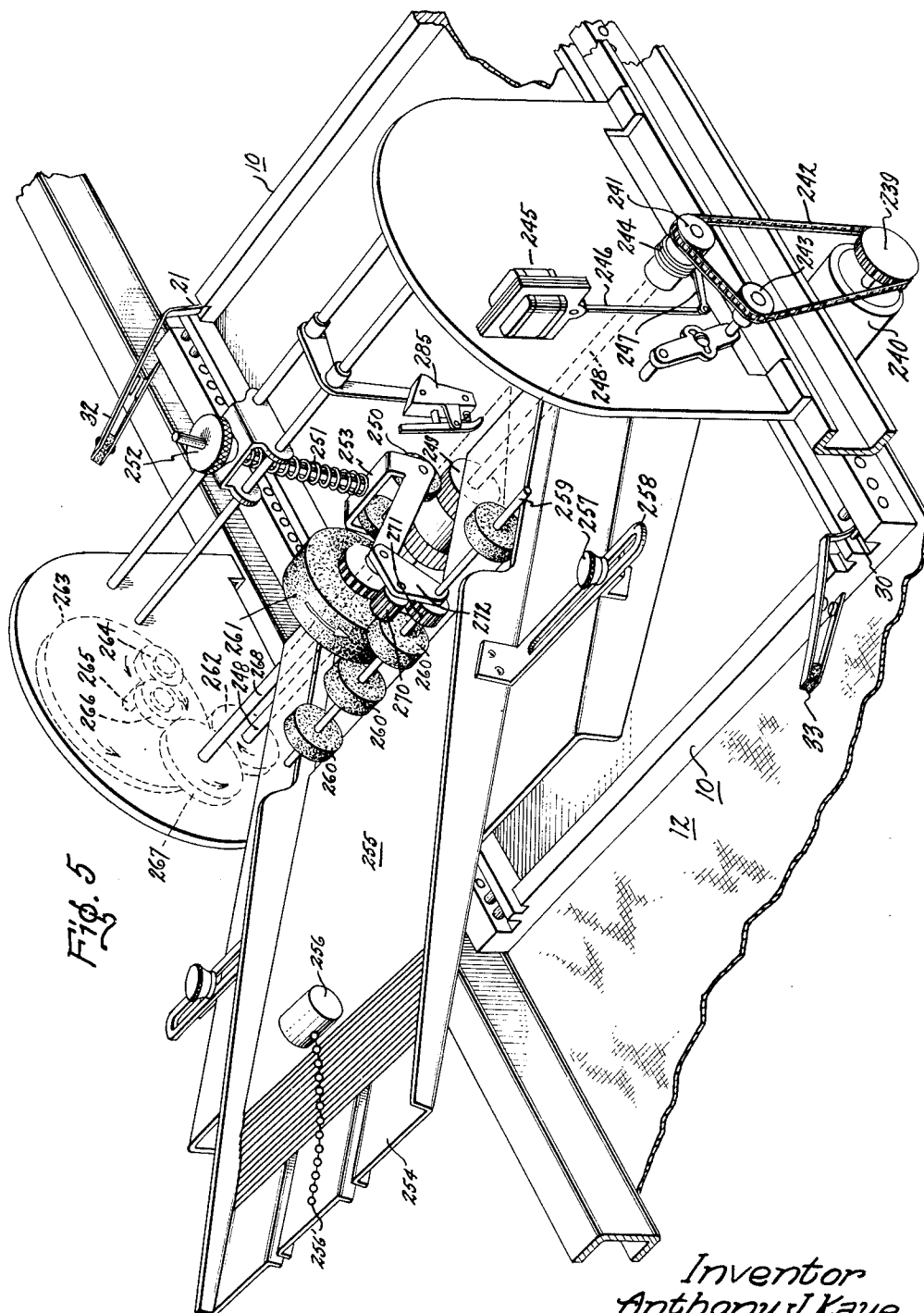
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ARTICLE DISPENSING APPARATUS

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5 Sheets-Sheet 4



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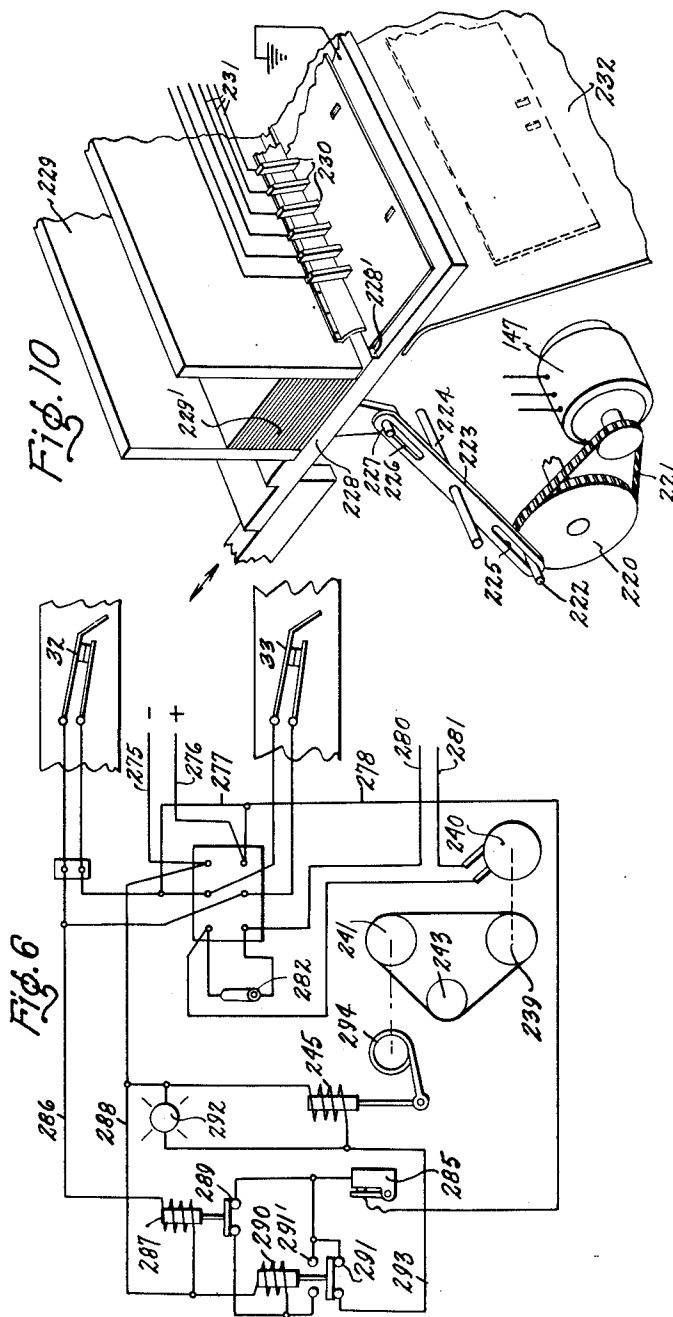
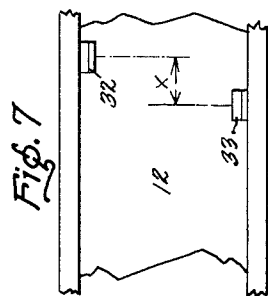
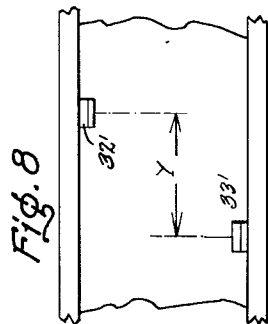
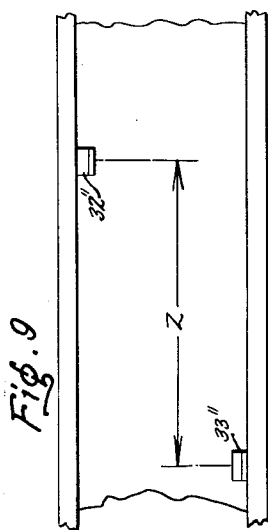
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ARTICLE DISPENSING APPARATUS

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5 Sheets-Sheet 5



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ARTICLE DISPENSING APPARATUS
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19 Claims. (Cl. 270—58)

This invention relates to article dispensing apparatus, and more particularly to article dispensing apparatus having a plurality of dispensing heads for selectively dispensing articles into a plurality of moving containers. This invention also relates to a method for selectively dispensing articles into moving containers.

In recent years there has been a tendency to fully mechanize assembly operations wherein a large quantity of uniform products are concerned. Normally under circumstances where the product is not uniform, the application of mechanization has not been readily possible. Such a situation exists in the assembly of unbound handbooks and the supplements therefor.

Many manufacturing companies distribute and maintain thousands of specialized handbooks and data books. Each of these books is tailored to the specific needs of the customer or holder of the book. These books may be supplemented with a large number of inserts, each holder of a book normally receiving a specific, select group of inserts. In some instances these inserts exceed one hundred pages. The inserts are distributed at frequent intervals, such as weekly. Under such circumstances the collation of groups of insert sheets is carried out the last few days of each week. The number of inserts also varies from week to week.

It is readily appreciated that the maintenance of such handbooks is a large and expensive task requiring a large number of people who manually collate the inserts a few days each week and because of the varying number of inserts each week are not assured of employment at regular intervals. Such employment prospects naturally are very unattractive and under the circumstances there is no assurance that sufficient personnel will be available each week to fulfill the work load for that particular week.

The chief object of the present invention is to provide an improved article dispensing apparatus wherein articles are selectively discharged into a moving container.

Another object is to provide an improved article dispensing apparatus to selectively collect articles in response to manual control means, or in response to information storing devices.

A further object is to provide an improved article dispensing apparatus to selectively collect articles in containers in response to indicia carried by the containers.

Another object is to provide an improved container having indicia thereon for use in article dispensing apparatus.

A still further object is to provide an improved method for selectively dispensing a plurality of articles into a plurality of moving containers.

These and other objects will be readily apparent from the following description.

The present invention relates to article dispensing apparatus including at least one container, indicia associated with said container, means for adjusting said indicia, at least one article dispensing means adapted to discharge an article into said container, means for conveying the container adjacent said article dispensing means, first means for sensing a predetermined position of the container relative to said dispensing means, second means responsive to said indicia, said first means being operatively associated with said second means to sense a predetermined relationship between said first

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means and second means to actuate said article dispensing means to discharge an article into said container.

This invention also relates to a method for selectively dispensing articles into a container, the steps of which consist in adjusting indicia in the container, continuously moving the container adjacent a plurality of article dispensing means, sensing the position of the container at a predetermined point adjacent each article dispensing means, sensing indicia on the container at a predetermined point adjacent each article dispensing means, discharging articles into the container in response to a predetermined sensing of the position and indicia of the container at each of said article dispensing means.

The invention will be more clearly understood by reference to the detailed description of the embodiment in the accompanying drawings, in which—

FIGURE 1 is a perspective view of an apparatus employing the present invention;

FIGURE 2 is a perspective view of a container utilized in the apparatus shown in FIGURE 1;

FIGURE 3 is a fragmentary perspective view of the indicia adjusting portion of the apparatus, and includes a schematic diagram of the control means employed with the indicia adjusting portion of the machine;

FIGURE 4 is a schematic diagram of the control system utilized in the apparatus disclosed in FIGURE 1;

FIGURE 5 is a perspective view of one of the article dispensing heads utilized in the apparatus shown in FIGURE 1;

FIGURE 6 is a schematic view of the control system utilized with each article dispensing head as shown in FIGURE 5;

FIGURES 7, 8, and 9 are fragmentary plan views of the conveyor utilized in the apparatus disclosed in FIGURE 1 showing the relative positions between the position sensing switch and the indicia sensing switch associated with each of the article dispensing heads, and

FIGURE 10 discloses a fragmentary perspective view of a card reading device utilized in the indicia sensing portion of the apparatus.

Referring to FIGURE 1, there is shown a perspective view of an apparatus embodying the present invention in which the indicia adjusting section 2 is connected to a dispensing section 3 and terminates in an unloading section 4. If desired, these particular sections may be connected in a straight-line arrangement or bent to any desired configuration, such as the single bend in the dispensing section as shown in FIGURE 1. Also, if it is desired, the unloading section may be directly connected to the indicia adjusting section to permit the immediate return of the container to the indicia adjusting section 2.

The indicia adjusting section 2 may include a container storing device 5 having located adjacent thereto a suitable card reader 6. Associated with the card reader 6 is a housing for terminal boxes for controlling solenoids which adjust the indicia on containers 10. These containers 10 are subject to intermittent motion on the conveyor 9. Under certain circumstances it is desirable that the indicia on the containers be manually adjusted by the keyboard 8.

The dispensing section comprises a conveyor 12 which moves the containers under a plurality of dispensing heads 13, 13', 13'', etc. After the containers 10 have passed beneath the dispensing heads 13, 13', 13'', etc. and have articles discharged therein in response to controls to be more fully described hereinafter, the containers are removed from the unloading section 4, the contents of the containers are taken therefrom, and the containers are returned to the container storing device 5.

FIGURE 2 discloses a perspective view of a container which may be used in the apparatus shown in FIGURE

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1. This container may comprise a bottom portion 15, a first wall 16, a second wall 17, a third wall 18, and a fourth wall 19. The first and third walls are parallel to one another, and the second and fourth walls are parallel to one another, thereby defining a receptacle portion 35 which is adapted to contain suitable sheets of paper dispensed by the dispensing heads 13, 13', 13'', etc. In order to maintain these sheets in an orderly fashion and to prevent their being dislodged from the receptacle portion 35 of the container 10, suitable rods 36 may be utilized. These rods 36 provide abutments over the bottom portion of the container and are adapted to retain the sheets dispensed into the receptacle portion between the bottom portion and the rods.

The first wall 16 acts as the front portion of the container as it moves through the apparatus disclosed in FIGURE 1. This wall 16 includes two position indicating portions 21 which coact with suitable switches 32, the function of which will be described more fully hereinafter.

The second and fourth walls of the container are provided with suitable means defining channels 22 and 23. The second wall 17 has an outer surface 25 and an inner surface 24, which latter surface forms a portion of the channel 22. A plurality of parallel holes 26 extend from the surface 24 to the surface 25. Similarly, the fourth wall 19 has an outer surface 28 and an inner surface 27. The surface 27 is also a portion of the means defining the channel 23. Parallel holes 29 extend from the surface 28 to the surface 27. Reciprocally mounted in these holes 26 and 29 are pins 30. These pins are adapted to be urged into the channels 22 and 23 in such a manner that the indicia sensing switch 33 engages these pins for a purpose to be more fully described hereinafter.

FIGURE 3 discloses a fragmentary perspective view and a schematic diagram of the indicia adjusting means and the controls associated therewith. The conveyor 9 comprises two endless belts 40 and 41 which have a plurality of cleats 42 associated therewith for the purpose of removing individual containers 10 from the container storage means 5. The endless belts 40 and 41 are mounted on sprockets 43, 44, 45, and 46. The conveyor 9 is intermittently advanced and halted at an indicia adjusting station beneath the card reader 6. At this point the various pins 30, described in FIGURE 2, are adjusted in such a manner that the dispensing heads 13, 13', 13'', etc. will selectively distribute sheets of paper or other articles into the container in response to the position indicating switch 32 and the simultaneous response of the indicia sensing switch 33.

In order to intermittently advance the containers 10, there is provided a suitable motor 50, whose output shaft 51 is connected to a suitable electric clutch 52. This clutch 52 is connected to the shaft 53 of the intermittent drive mechanism 54. This drive mechanism may comprise any suitable mechanism such as a lost motion drive or a Geneva movement wherein the output shaft is intermittently rotated. The shaft 53 extends through the drive mechanism 54 and has associated therewith a suitable electrically operated brake 55. The shaft 53 further has mounted thereon a suitable cam 56 which intermittently opens the switch 57 for a purpose to be more fully described hereinafter.

The intermittent drive mechanism 54 supplemented by the clutch 52 and the brake 55 intermittently rotates the output sprocket 59. The sprocket 59 is connected by means of the belt 60 to the sprocket 48 which is mounted on the shaft 47. This shaft also has mounted thereon the previously mentioned sprockets 45 and 46 upon which the endless belts 40 and 41 are mounted. By this means the conveyor 9 is intermittently driven.

Mounted adjacent the endless belts 40 and 41 are suitable channel members 62 and 63, provided to positively position the containers 10 as they are intermittently ad-

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vanced at points beneath the card reader 6. Block members 64 and 65 are mounted on opposite sides of the conveyor. These block members have located therein a plurality of reciprocal plungers 67. The plungers are adapted to engage the pins 30 in the containers 10. These pins 30, as previously mentioned, constitute the indicia on the containers, and they are selectively adjusted by these plungers 67. In order to actuate these plungers, each plunger may have attached thereto a suitable Bowden cable which is operatively associated with a suitable solenoid 70. The solenoid 70 are electrically connected by means of the cables 71 to the relay board 72. The relay board 72 contains a plurality of relays which are connected to the individual contacts on the H portion of the terminal board 74 by means of the cable 73. The terminal board also contains a B portion and a K portion. The B portion contacts are associated with the card reader 6, and the contacts in the K portion are associated with the keyboard 8. A suitable patch board 80 is provided which, when attached adjacent the terminal box 74, provides electrical connection between the contacts of the B, H, and K portions of the patch board 80 with the respective contacts of the B, H, and K portions of the terminal box.

In order to provide suitable connections between the contacts of B, H, and K portions of the patch board 80, suitable jumpers 81 are connected from the B to the H and from the K to the H portions of the patch board. By means of these jumpers, electrical impulses are passed from the card reader 6 and from the keyboard 8 in a desired manner to the individual solenoids 70, which are associated with the plungers which selectively adjust the indicia means on each container 10. As previously noted, this indicia comprises the pins 30.

Referring to FIGURE 4, there is shown a detailed control diagram of a preferred system for controlling the conveyor and the indicia adjusting means shown in FIGURES 1 and 3. The system permits a mode of operation hereinafter identified as "Manual" wherein a container is advanced to the indicia adjusting stage, and the indicia is adjusted in response to the keyboard. After the indicia is adjusted, the operation of the conveyor is continued until a second container is brought into indicia adjusting position. Another mode of operation hereinafter identified as "Automatic" is also possible in which the indicia is adjusted in response to information storing means such as perforated cards.

A card reader which is incorporated in the control diagram shown in FIGURE 4 for use during "Automatic" operation is disclosed in FIGURE 10. The card reader comprises a movable table having means for taking information from a card moved thereon and a photoelectric lamp and cell which controls a relay actuated by the card falling from the table. A motor 147 drives sprocket 220 by means of the belt 221. The sprocket 220 has an eccentric pin 222 mounted thereon which engages the slot 225 in the lever 223. This lever 223 has a pin 224 adapted to be journaled for oscillating motion. The opposite end of the lever 223 is provided with a suitable slot 226 which engages the pin 227 in a manner so as to reciprocate the table 228. The table 228 moves relative to the card retaining means 229 which as shown contains a plurality of perforated cards 229'. The table 228 is provided with a suitable step 228' whereby, upon reciprocation of the table, the cards 229' which are retained by the means 229 are singly deposited on the step 228'. As the table 228 advances, the card so deposited passes underneath the brushes 230. Contact between the brushes 230 and the table 228 closes a circuit. The perforations located on the cards 229' selectively determine the circuits which are energized, causing selective energization of the solenoids 70. This action selectively adjusts the indicia on the various containers 10. At the end of the travel of the table 228, the table recedes, causing the card which has just passed under the brushes 230

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to slide down the plate 232 and fall into the container 10 which has just had its indicia adjusted. The falling card also momentarily shields the photoelectric cell PE (FIGURE 3) from the lamp 66 to open relay PE for a purpose to be described more fully hereinafter.

Considering the control diagram in FIGURE 4, three-phase power is supplied through the lines 84. This electrical energy passes through the switch 85 and through the fuses 86, 86', and 86". These fuses are connected to the lines 87, 88, and 89, respectively, which extend toward the motor 50. In these lines there are located three sets of contacts 90, 91, and 92 of the relay 105. Upon closing of these contacts, the motor 50 is energized. The lines 87 and 89 are also connected to the primary winding 98' of the transformer 98. The secondary winding 98" of the transformer 98 has one side connected to ground and the second side is connected to the lines 100 and 140. Line 100 has fuse 101 located therein, and line 140 has fuse 141 connected therein. Line 100 extends to contacts 94 and 95 of the relay 105. The contact 95 when closed comprises a portion of a holding circuit for the relay 105. During initial operation, current passes through the line 100 and through the switch arm 97 of switch 96. The switch 96 has three contact arms 97, 97', and 97". In the position as shown, the contact arms are in "Manual" operation position. In the upper dotted position the switch is in "Automatic" position, and when the contact arms are in a lower position, the switch 96 is in "Continuous" operation position.

Considering the switch in "Manual" operation, the current in the line 100 passes through contact arm 97 to the start switch 102 and then to the stop switch 103. Provision is made so that the contact 95 when closed causes current to bypass switches 96 and 102. Current then passes through the stop switch to the winding of relay 105 which is also connected to ground. This relay winding of relay 105 is connected in parallel with the light 104. Energization of the relay winding is therefore reflected by the light 104.

By pressing down the button 102, the relay 105 is energized, closing the contacts 90, 91, 92, 94 and 95. This energizes the motor 50, energizes the holding coil for the relay 105, and simultaneously by closing the contacts 94, passes current to the line 106.

Contact arm 97' of the switch 96 passes current to the manual switch 110 through the line 120 to the upper contacts 112 of the relay 1CR and to the contact 115 of the relay 3CR. The lower contact 113 of the relay 1CR is connected to a D.C. circuit.

This D.C. circuit is energized by the transformer 128, the secondary winding of which is connected to two terminals of the rectifier bridge 125. A fuse 126 may be provided in the circuit. One of the output terminals of the rectifier bridge 125 is connected to ground and the second terminal is connected to the contacts 113 of the relay 1CR through the line 123. A circuit is formed through line 124 with winding 129 of the relay 130. The relay 130 has upper contacts 131 and lower contacts 132. When the relay 130 is de-energized, the lower contacts 132 are closed. Direct current supplied by the rectifier bridge passes through the contacts 132 to rheostat 134. The circuit associated with rheostat 134 places a resistance in series with the brake winding 55 and a resistance in parallel with said brake winding. A suitable condenser 136 may be located in parallel with a portion of the rheostat 134 and the brake winding 55 for the purpose of bypassing A.C. current in the circuit to ground.

When the relay 130 is energized, the contacts 131 close a circuit, including a portion of the resistance in the rheostat 133 which is located in series with a circuit, including a resistance in the second portion of the rheostat 133 and the clutch winding 52 which is connected in parallel therewith. A by-pass condenser 135 is also located

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in parallel with the clutch winding 52 and the last mentioned resistance portion of the rheostat 133.

The winding of the relay 3CR is connected to the line 106 by means of the cam switch 57, previously mentioned and described in FIGURE 1. This switch is normally closed and breaks the circuit through the contacts 115 which de-energize the winding of the relay 1CR. When the cam switch 57 is open, a circuit is closed from the switch arm 97', through the manual switch 110, line 120, contacts 115 of relay 3CR, line 121, and through the winding of relay 1CR. This closes contacts 112 and 113 of relay 1CR. Contacts 112 maintain the flow of current from line 106 to line 120 to supply energy in line 120 and simultaneously close the D.C. circuit to energize the relay 130, resulting in the energization of the clutch winding 52 and de-energization of brake winding 55.

By this means the containers shown in FIGURE 3 are located under the card reader 6 in such a manner so that during "Manual" operation the keyboard 8 may be operated to selectively energize the solenoids 70 to selectively adjust the various pins 30 of the containers 10 to adjust the indicia thereof to discharge sheets of paper from the various dispensing means 13 of the apparatus shown in FIGURE 1.

By means of the operation of the cam switch 57 and the intermittent drive through the clutch 52 followed by the braking action of the brake 55, precise indexing is accomplished in such a manner as to insure that the containers are in proper position for adjustment of the indicia.

In this position, various key switches 200 and 200', shown in the lower portion of FIGURE 4 may be closed. These switches 200 and 200' coincide with the keys on the keyboard 8 in FIGURES 1 and 3. Referring to the patch board 80, jumper wires 81 are shown connecting the B and K portions of the board to the H portion. The connection of the patch board 80 to the terminal box 74 permits the keys 200 and 200' to actuate relays 202 and 203. Energization of these relays is possible because current passes through the line 106, through the switch 145, through the line 161 to the various relay windings. By closing the circuit by means of actuating the keyboard buttons 200 and 200', these relays are energized, closing the upper contacts 204 and 206 of the relays 202 and 203, respectively. This energizes the relays 70. A holding circuit may be closed by the closing of the contacts 205 and 207 of the relays 202 and 203, respectively. However, during "Manual" operation the position of the lower contact arm of switch 145 maintains an open circuit which prevents energization of the holding circuits.

In the apparatus disclosed in FIGURE 1, 60 dispensing heads are provided, each head having a corresponding key on the keyboard. Similarly, the B, K and H portions of the patch board 80 and the terminal box 74 each have 60 positions. Each H position has associated therewith a suitable relay and a suitable solenoid adapted to coast with a pin on each container 10. Naturally the containers 10 are also provided with 60 pins.

Considering automatic operation of the control system shown in FIGURE 4, the switch 96 has its switch arms 97, 97', and 97" in their uppermost (dotted) positions. Since the upper two arms 97 and 97' are connected to circuits having manual switches 102 and 110, these switch arms will not be in operation. Current, therefore, may flow through the line 106, through the contact arm 97", through the line 146, down to the photoelectric relay PE contacts which are closed. The contacts of this relay are connected to the contacts 149 of the relay 2CR and the winding of the time delay relay TD1. Current may also pass to the contacts 115 of the relay 3CR, which is normally closed. The contacts 149 of the relay 2CR and the contacts 112 of the relay 3CR are in parallel. These contacts are connected to the windings of the time delay relay TD3, the purpose of which will be more fully de-

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scribed hereinafter, and also to the winding of the relay 1CR.

The contacts 148 of the relay TD1 are connected to the relay winding of 2CR and TD2. These last mentioned windings are connected in parallel.

During automatic operation, the card reader switch 145 is in series with the contacts 150 of the time delay relay TD2, which in turn is in series with the contacts 151 of the time delay relay TD3. The contacts of the time delay relays TD3 and TD2 are in parallel with the table limit switch 153. Similarly, a pulsing switch 163 is associated with the card reader switch 145, and is connected in series with the winding of relay 4CR. It will be noted that the table limit switch 153, which is in parallel with the switches of relays TD3 and TD2, is also in circuit with the card reader motor 147.

Considering the operation during automatic operation as determined by the position of the switch arms of the switch 96, a card falling from the card reader shown in FIGURE 10 falls down the plate 232, past the photoelectric lamp associated with the card reader 6 (FIGURE 3). This breaks the circuit to the time delay relay TD1, which causes closing of the contacts 148. This momentarily causes energization of the winding of the relay 2CR and also energization of the time delay relay TD2. At this point, the contacts 115 of the relay 3CR are open. However, current passes through the contacts 149 of the relay 2CR and then through the winding of the time delay relay TD3 and also the winding of the relay 1CR. Energization of the winding of the relay 1CR closes the contacts 113, closing the D.C. circuit including the relay 130, thereby energizing the clutch 52 and de-energizing the brake 55. The rheostats 133 and 134 in the clutch and brake circuits, as previously mentioned are provided to control the strength of the fields of the windings 52 and 55.

After the relay 2CR has started a cycle, the circuit which was momentarily opened by the passage of a card past the light 66 of the photoelectric relay PE is closed and for a short period of time the time delay relay TD1 maintains its contacts 148 closed. However, after the predetermined period the relay opens the contacts 148, thereby breaking the circuit through the windings of the relays 2CR and TD2. At this point the cam switch 57 opens and current passes through the contacts 115 to continue the passage of current through the windings of the relays 1CR and TD3.

Considering the operation of the card reader at this point, current passes through the card reader switch 145, through the table limit switch 153 to the card reader motor 147. The card reader motor, as shown in FIGURE 10, urges a perforated card forward and causes the card to pass under the brushes 230. The card reader table 228 is mechanically connected to a pulsing switch 163. This pulsing switch 163 permits a circuit to close through the brushes 230 only at a precise time. By this means the perforations in the cards are sensed only at a predetermined portion of the card. This is implemented by means of the relay 4CR being energized, thereby closing the contacts 162. Electrical energy may then pass through the windings of the various relays 202 and 203. Simultaneously, the impulses from the card reader brushes are passed through the cable 76, shown in FIGURE 3, to the B section of the terminal box 74. As previously mentioned, the B section of the patch board is connected to the B section of the terminal box and because of the jumper wires, connection is made with the H section of the patch board to the H section of the terminal box, which energizes relays 202 and 203 in response to the perforations in the cards in the card reader. As previously noted, energization of the relays 202 and 203 causes energization of the solenoids 70. These solenoids are operatively associated with the plungers which urge the pins in the containers to selec-

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tively pass into the channel portion thereof. It will be noted that during "Automatic" operation the relays 202 and 203 are maintained in energized position by the holding circuits closed by contacts 205 and 207. The holding circuits are broken by opening of contacts 162 of relay 4CR.

The card reader motor causes the table 228 to advance and then recede to a predetermined point where the table limit switch de-energizes the motor and halts the operation of the card reader table 228. At this point the card whose perforations have been read has dropped past the photoelectric light previously mentioned, causing the photoelectric relay PE to start another cycle. However, it is noted that the time delay relay TD1 has located in circuit therewith the winding of the relay TD2. Further, the time delay relay TD3 is located in a circuit with the contacts 115 of the relay 2CR. As previously noted, the winding of relay 2CR is in a circuit with the time delay relay TD1. Therefore, the time delay relay TD1 determines the action ultimately of the windings of the time delay relays TD2 and TD3 so that at a precise point during the cycle current is passed to the card reader motor to start its operation although the table limit switch is open. This precise timing determines when the card reader motor should operate so as to urge forward a perforated card which will cause suitable operation of the solenoids 70 to cause the plungers to adjust the indicia on the containers.

As previously mentioned, the switch 96 has a lower position for continuous operation, and it will be readily seen that the switch arm 97 of the switch 96 at this point will continuously energize the winding of the relay 1CR causing continuous energization of the clutch 52. This causes uninterrupted indexing by the intermittent drive 54 shown in FIGURE 3.

Referring to FIGURE 5, there is shown a perspective view of a typical dispensing head mechanism. The head may comprise a plurality of wheels. A first group of wheels grasps the paper and urges it to the sheet splitting mechanism which comprises a second group of wheels which assures that only one sheet of paper is selected at a time and a third group of high speed wheels discharges the single sheet of paper into the container 10.

FIGURE 5 discloses a portion of the conveyor 12 and the container 10 located beneath the head mechanism. The two switches 32 and 33 are opened causing a solenoid 245 to be de-energized. This solenoid is associated with a clutch 244 through a lever 247 and the link 246.

The dispensing head mechanism is actuated by a motor 240 having an output sprocket 239 connected to the drive sprocket 241 by means of the belt 242. If desired a suitable tension adjusting sprocket 243 may be provided to maintain proper tension in the belt.

When the solenoid 245 is de-energized the clutch 244 operatively connects the motor 240 to the shaft 248. Located on this shaft 248 are suitable high speed wheels 249 which coast with the wheels 250. A sheet of paper 255 passes between the wheels 250 and 249 and is discharged into the container 10. It is noted that the wheels 250 are rotatably mounted on the lever member 253 which is journaled on the shaft 268. This lever member 253 is biased by the spring 251. The compression on the spring 251 may be adjusted by suitable manual manipulation of the knurled nut 252. By this means the amount of pressure asserted by the wheels 250 against the wheels 249 may be adjusted for optimum operation of these wheels to discharge sheets of paper into the container 10.

The wheel 261 coacts with an abrasive member (not shown) located beneath the plate 254 for the purpose of assuring that only a single sheet of paper is passed to the rolls 250 and 249. It is desirable that this wheel rotate at a lesser speed than the wheels 250 and 249. To accomplish this, rotary motion is imparted to the shaft 268 upon which the wheel 261 is mounted from the driven shaft 248. This rotary motion is transferred

from shaft 248 to shaft 268 through a reducing gear train comprising the coacting gears 262, 263, 264, 266 and 267. It is noted that the gear 263 is mounted on a common shaft with gear 264 and the gear 266 is an idler gear.

The wheels 260 are mounted on the shaft 259 and these wheels are intended to urge the paper into the feed mechanism to selectively discharge a single sheet of paper into the container 10. These wheels are driven by a gear train including gear 269 mounted on the shaft 268 which drives gear 270 which in turn meshes with gear 271. Gear 271 is mounted on the shaft 259 which is the driving shaft for the wheels 260. It is noted that the gears 270 and 271 are rotatably mounted on a plate 272, this plate being pivotally mounted about the axis of the shaft 268. By this means a driving connection is maintained with the shaft 259 while making it also possible to adjust the operating level of the shaft 259. This is necessary because of the varying height of the sheets of paper 255 located on the plate 254.

It is noted that the sheets of paper 255 are maintained on the plate 254 by means of the weight 256 having the chain 256' attached thereto. It is also possible to adjust the lateral position of the side members of the plate 254 by means of the adjustable tightening means 257 which engages the slotted flange members 258 extending from the plate 254.

In FIGURE 5 it is noted that when the position indicating means 21 on the container 10 are engaged the switch 32 is open. Also, when the indicia is simultaneously engaged, that is, when the switch 33 engages the pin 30 the switch is also open. As previously noted, under such circumstances the solenoid 245 is de-energized to engage the clutch 244 and inaugurate a full cycle.

FIGURE 6 discloses a schematic drawing of a circuit which may be utilized with the feed mechanism shown in FIGURE 5. Current for the motor 240 is introduced through the lines 280 and 281. This motor circuit includes a manual switch 282. Under normal operation the motor 240 is in continuous operation. FIGURE 6 schematically shows the sprockets 239, 241 and 243 with a connection of the sprocket 241 to the clutch 244. The clutch solenoid 245 has located in parallel therewith a light 292, which light is on when the solenoid 245 is energized and the clutch 244 is disengaged.

In order to de-energize the solenoid 245 when the switches 32 and 33 are open, a circuit is provided wherein these switches are located in parallel. Energy for the circuit is supplied through the lines 275 and 276. These switches are connected to a source of direct current through the line 276 and 277 and when at least one of these switches is closed current is passed through the line 286 to the winding of the solenoid 287 and completes a circuit through the line 288 which is connected to the negative terminal of the source of direct current through line 275. When the solenoid 287 is so energized, the contacts 289 are open.

Current also may flow from the line 276 to the line 279 through the switch 285. This switch is normally closed and is shown in FIGURE 5 as sensing the passage of paper into the container 10 from the dispensing head. When paper passes by this switch in the manner shown the switch is open. The purpose of this switch is to continue the operation of the dispensing head to complete the cycle, the end of the cycle being sensed when the paper no longer engages the switch 285 causing the switch to close.

When switch 285 is closed current may pass through contacts 291 of the relay 290 through line 293 and through the winding of the solenoid 245 and also through the lamp 292. The circuit is completed through line 288 to the negative lead 275. Under such circumstances the solenoid is energized and the clutch 244 is de-energized.

When the container shown in FIGURE 5 simultaneously opens both switches 32 and 33 the solenoid 287

is de-energized causing the contacts 289 to close forming a circuit through the winding of the solenoid 290. This causes the contacts 291 to open and the contacts 291' to close. This maintains energization of the relay 290 and breaks the circuit through the solenoid 245 causing the clutch 244 to inaugurate a cycle wherein the single sheet of paper is discharged into the container 10. In order to assure that the cycle will continue to its desired completion, as the sheet of paper from the plate 254 in FIGURE 5 passes the switch 285 this switch is opened assuring that no current will pass to the solenoid 245 which would result in disengagement of the clutch 244. After the sheet of paper is discharged in the container the switch 285 will return to its closed condition and the solenoid 245 may be again energized and the clutch 244 disengaged.

Referring to FIGURES 7, 8 and 9 there is disclosed various positions of the position sensing switch associated with each head and a relative position for the indicia sensing switch at each dispensing head. FIGURE 7 shows the switch 32 which senses the position of the container located a distance X from the indicia sensing switch 33. In the event that the position sensing portion 21 of the container is engaged, opening the switch 32 while the indicia sensing switch 33 simultaneously engages a pin located on the container 10, the simultaneous opening of these switches will cause the dispensing head to discharge a single sheet of paper into the container. In the event that the switch 32 is not opened at a particular point simultaneously with the opening of a switch 33 the container will pass by a particular dispensing head without actuation of the dispensing head to discharge a sheet of paper into the container. FIGURE 8 shows the position sensing switch 32' a distance Y from the indicia sensing switch 33'. Similarly FIGURE 9 discloses the position sensing switch 32' a distance Z from the indicia sensing switch 33'.

Considering the operation of the invention, referring to FIGURES 1, 3, 5 and 6 the motor 50 continuously drives the shaft 51. This shaft 51 is intermittently connected to the indexing means 54 by the clutch 52. When the clutch 52 is disengaged a brake 55 is associated with the indexing means 54 to assure a positive halt of the drive. This is achieved by means of the cam switch 57 which is electrically associated with the clutch 52 and the brake 55.

By this drive means the conveyor 9 intermittently advances the containers 10 which are stored in the storage means 5. These containers are advanced to a position under the card reader 6. In this position the plungers 67 are in alignment with the pins on the container 10 and in response to the keyboard 8 or to the card reader 6 electrical energy is passed through the terminal board 74, through the patchboard 80 through the various solenoids 70 which are associated with the plungers 67. By the action of the keys of the keyboard 8, or the perforations of the cards 229' which are read by the card reader 6, a select group of solenoids are energized causing a select group of pins to be urged into the channels 22 and 23 of the container 10. Each pin determines that a predetermined head will be actuated when the container passes under the head causing a sheet of paper from the dispensing head to be discharged into the container. After the pins on the container are adjusted, the container 10 is intermittently advanced on the conveyor 9 and a similar operation occurs on the containers that follow. After a predetermined number of cycles the container 10 reaches the dispensing section of the apparatus which includes a continuously moving conveyor 12. As the container advances each dispensing head senses the position of the container at a predetermined point by opening the switch 32 and in the event that a sheet of paper is desired from the dispensing head a suitable pin in the channel 22 or channel 23 will open the switch 33 causing the circuit in FIGURE 6 to be actuated so that the solenoid 245

shown in FIGURE 5 will be de-energized. This causes a drive connection to be made between the motor 240 and the shaft 248.

As a result of the driving connection between the various gears and wheels previously described the first group of wheels 260 will grasp a sheet of paper 255 from the plate 254 and urge it into contact with the wheel 261. This wheel 261 cooperates with an abrasive member in such a manner as to assure that only a single sheet of paper passes therebetween. The sheet of paper then is advanced to the high speed wheels 249 and 250 which discharge the paper into the container 10 on the fly, that is the motion of the container past the dispensing head is continuous. The switch 285 senses the passage of paper into the container and will maintain the solenoid 245 de-energized until the paper has left the dispensing head at which point the switch 285 will permit the solenoid to be re-energized, disengaging clutch 244.

The container passes beneath each dispensing head and in the event that there is a simultaneous opening of the position indicating switch 32 and the indicia indication switch 33 a sheet of paper will be discharged in the container from the head. In the present embodiment, sixty such dispensing heads are disclosed. This number of dispensing heads may be varied to determine the needs of the particular article or type of book being assembled. The containers are advanced to the unloading section 4 where the sheets are removed from the container and suitably disposed of. The containers are then placed in the racks for reuse. It will be noted that prior to reuse the pins in each container must be restored to their initial position so as not to protrude into the channels of the container. It will be appreciated that two channels are provided in each container and two position indicating points are located on each container. This is done to add to the versatility of the container and permit a single container to have a large number of indicia sensing means.

There has been shown an apparatus and method for dispensing sheets of paper into a moving container for use in the assembling of books and the supplements therefor. It will be appreciated that other types of dispensing means may be utilized for dispensing other types of articles into containers.

While a particular embodiment of this invention has been shown it will, of course, be understood that it is not limited thereto since many modifications both in the circuit arrangement and in the instrumentalities employed may be made. It is contemplated by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an article dispensing apparatus, the combination of at least one container, movable indicia associated with said container, means for adjusting the position of said indicia, at least one article dispensing means adapted to discharge an article into said container, means for conveying the container adjacent said article dispensing means, first means for sensing a predetermined position of the container relative to said dispensing means, second means responsive to said indicia, said first means being operatively associated with said second means to sense a predetermined relationship between said first means and second means to actuate said article dispensing means to discharge an article into said container.

2. In an article dispensing apparatus, the combination of a plurality of containers, movable indicia associated with each of said containers, means for adjusting the position of the indicia on each of said containers, a plurality of article dispensing means, a conveyor for continuously moving the containers adjacent the article dispensing means, means associated with each of said article dispensing means for sensing the presence of indicia at

a predetermined position of the container to discharge an article into the continuously moving container.

3. In an article dispensing apparatus, the combination of a plurality of containers, indicia associated with each of said containers, means for intermittently advancing said containers, means for adjusting the indicia associated with each of said containers during the interval between intermittent advances of the containers, a plurality of article dispensing means adapted to discharge articles into said containers, conveyor means for continuously moving the containers adjacent the article dispensing means after the indicia has been adjusted on the containers, first means for sensing a predetermined position of a container relative to one of said article dispensing means, and second means responsive to indicia associated with the container, said first means being operatively associated with said second means to sense a predetermined relationship between said first and second means to actuate said dispensing means to discharge an article into said container.

4. An article dispensing apparatus according to claim 3 in which the container comprises a bottom member, a first wall member, a second wall member, a third wall member, a fourth wall member, said first and second wall members being parallel, said second and fourth wall members being parallel, said wall members being connected to said bottom member to form a receptacle, means defining a longitudinal channel in said fourth member, a plurality of pins reciprocally mounted in said fourth member, said pins being parallel to said first and third wall members and being adapted to extend into said channel.

5. An article dispensing apparatus according to claim 3 in which the container includes a receptacle portion and an indicia portion, the indicia portion comprising means defining at least one longitudinal channel and a plurality of parallel reciprocally mounted pins adapted to extend into said channel.

6. An article dispensing apparatus according to claim 5 in which the means for adjusting the indicia associated with each of said containers comprises a plurality of servo motors adapted to be operatively connected to individual pins mounted in said containers to selectively urge said pins into the channel in the indicia portion of the container.

7. An article dispensing apparatus according to claim 6 in which the means for adjusting the indicia further comprises an information storing device adapted to selectively actuate said servo motors, manual means adapted to energize said servo motors, and means for selectively connecting the information storing device and manual means to said servo motors.

8. An article dispensing apparatus according to claim 5 in which the article dispensing means includes a feed mechanism and means for actuating said feed mechanism; said first means including a first electrical switch adapted to engage the container, said second means including a second electrical switch, a portion of said second switch being adapted to extend into the means defining a channel in the container, said means for actuating the feed mechanism being connected in an electrical circuit with the first and second switches, said feed mechanism being actuated by engagement of the container with the first switch simultaneously with the engagement of the second switch with a pin extending into the means defining a channel in the indicia portion of the container to discharge an article into the receptacle portion of the container.

9. A container for use in an article dispensing apparatus comprising a bottom member, a first wall member, a second wall member, a third wall member, a fourth wall member, said first and second wall members being parallel, said second and fourth wall members being parallel, said wall members being connected with said bottom member to form a receptacle, means defining a longitu-

dinal channel in said fourth member, a plurality of pins reciprocally mounted in said fourth member, said pins being parallel to said first and third wall members and being adapted to extend into said channel.

10. A container for use in an article dispensing apparatus comprising a receptacle portion and an indicia portion, said indicia portion including means defining at least one longitudinal channel and a plurality of parallel reciprocally mounted pins adapted to extend into said channel.

11. In a method for selectively dispensing articles into a container, the steps which consist of selectively positioning the indicia on the container, continuously moving the container adjacent a plurality of article dispensing means, sensing the position of the container at a predetermined point adjacent each article dispensing means, sensing indicia on the container at a predetermined point adjacent each article dispensing means, discharging articles into the container in response to a predetermined sensing of the position and indicia of the container at each of said article dispensing means.

12. In a method for selectively dispensing articles into containers, the steps which consist of intermittently advancing containers, adjusting indicia on each container during an interval between advances of the containers, continuously moving the containers adjacent a plurality of article dispensing means after the indicia has been adjusted, sensing the position of the containers at a predetermined point adjacent each article dispensing means, sensing the indicia on the containers at a predetermined point adjacent each article dispensing means, discharging articles into the containers in response to a predetermined sensing indicia on the container at a predetermined point each of said article dispensing means.

13. In a method for selectively dispensing articles into containers, the steps which consist of intermittently advancing containers, adjusting indicia on each container during an interval between advances of the containers, continuously moving the containers adjacent a plurality of article dispensing means after the indicia has been adjusted, sensing the position of the containers at a predetermined point adjacent each article dispensing means, sensing the indicia on the containers at a predetermined point adjacent each article dispensing means, discharging articles into the containers in response to a simultaneous sensing of the position and indicia of the containers at each of said article dispensing means.

14. In a method for selectively dispensing articles into containers, the steps which consist of intermittently advancing the containers, causing a plurality of pins to protrude from a surface of the container during the interval between advances, continuously moving the containers adjacent a plurality of article dispensing means after the pins have been moved, sensing the position of the containers at a predetermined point adjacent each article dispensing means, sensing the pins on the containers at a predetermined point adjacent each article dispensing means, and discharging articles into the containers in response to the simultaneous sensing of the position of the containers and the pins protruding from a surface of the containers.

15. In an article dispensing apparatus, the combination of at least one container, indicia associated with said container comprising a plurality of parallel movable pins mounted in said container and adapted to selectively protrude from a surface of the container, means for adjusting said indicia, at least one article dispensing means adapted to discharge an article into said container, means for conveying the container adjacent said article dispensing means, first means for sensing a predetermined position of the container relative to said dispensing means, second means responsive to said indicia, said first means being operatively associated with said second means to sense a predetermined relationship between said first means and

second means to actuate said article dispensing means to discharge an article into said container.

16. In an article dispensing apparatus, the combination of at least one container, indicia associated with said container comprising a plurality of parallel movable pins mounted in said container and adapted to selectively protrude from a surface of the container, means for adjusting said indicia including a plurality of reciprocal members adapted to engage and urge said pins to protrude from the surface of said container, at least one article dispensing means adapted to discharge an article into said container, means for conveying the container adjacent said article dispensing means, first means for sensing a predetermined position of the container relative to said dispensing means, second means responsive to said indicia, said first means being operatively associated with said second means to sense a predetermined relationship between said first means and second means to actuate said article dispensing means to discharge an article into said container.

17. In an article dispensing apparatus, the combination of at least one container, indicia associated with said container, means for adjusting said indicia, at least one article dispensing means adapted to discharge an article into said container, means for conveying the container adjacent said article dispensing means, first means for sensing a predetermined position of the container relative to said dispensing means, second means responsive to said indicia, said first means being operatively associated with said second means to sense a predetermined relationship between said first means and second means to actuate said article dispensing means to discharge an article into said container, said article dispensing means including a feed mechanism, motor means, a clutch adapted to connect said motor means to said feed mechanism, a servo motor being connected in a circuit with said first means and said second means so that sensing of the position of the container by the first means with a simultaneous response to indicia by the second means causes engagement of said clutch actuating the feed mechanism to discharge an article into the container.

18. In an article dispensing apparatus, the combination of a plurality of containers, indicia associated with each of said containers comprising a plurality of parallel movable pins mounted in said containers and adapted to selectively protrude from a surface of the containers, means for adjusting the indicia on each of said containers, a plurality of article dispensing means, a conveyor for continuously moving the containers adjacent the article dispensing means, means associated with each of said article dispensing means for sensing the presence of indicia at a predetermined position of the container to discharge an article into the continuously moving container.

19. In an article dispensing apparatus, the combination of a plurality of containers, indicia associated with each of said containers comprising a plurality of parallel movable pins mounted in said container and adapted to selectively protrude from a surface of the container, means for adjusting the indicia on each of said containers including a plurality of reciprocating members adapted to engage and urge said pins to protrude from the surface of the container, a plurality of article dispensing means, a conveyor for continuously moving the containers adjacent the article dispensing means, means associated with each of said article dispensing means for sensing the presence of indicia at a predetermined position of the container to discharge an article into the continuously moving container.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,991,996

July 11, 1961

Anthony J. Kaye

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 13, line 33, for "indicia on the container at a predetermined point" read -- of the position and indicia of the containers at --.

Signed and sealed this 6th day of February 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents