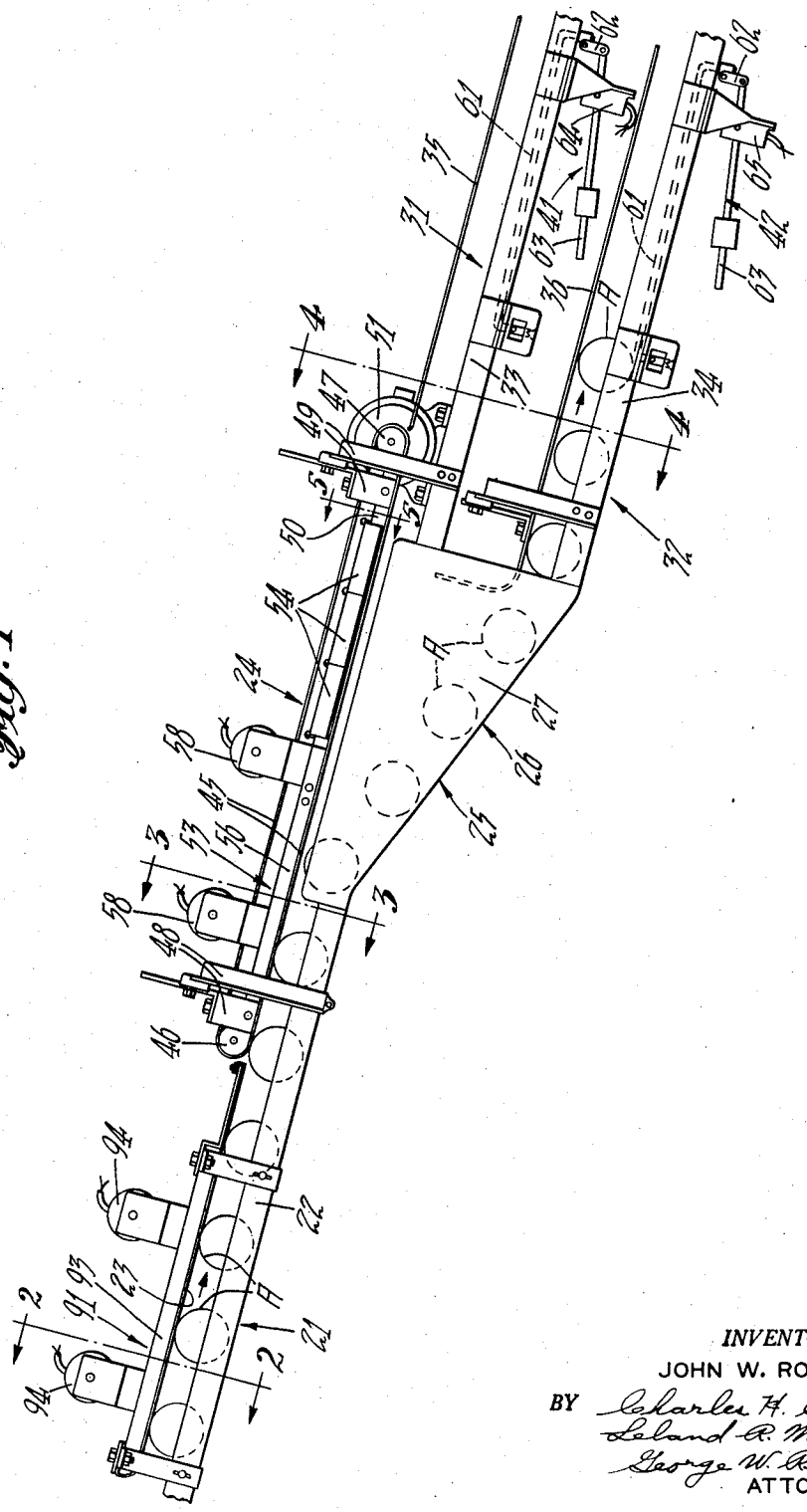
June 10, 1958 J. W. ROUSE 2,838,160

CONTAINER FEEDING DEVICES

Filed Jan. 24, 1956 3 Sheets-Sheet 1

Fig. 1



INVENTOR.
JOHN W. ROUSE
BY Charles H. Erne
Leland R. McCann
George W. Reiber
ATTORNEYS

June 10, 1958 J. W. ROUSE 2,838,160

CONTAINER FEEDING DEVICES

Filed Jan. 24, 1956 3 Sheets-Sheet 2

Fig. 2

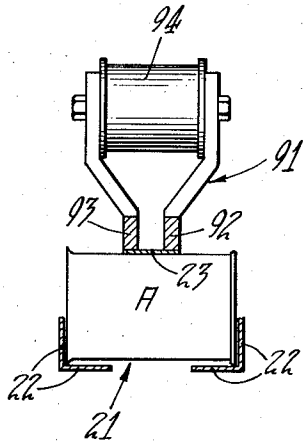


Fig. 3

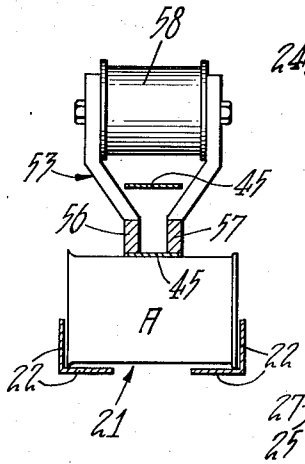


Fig. 4

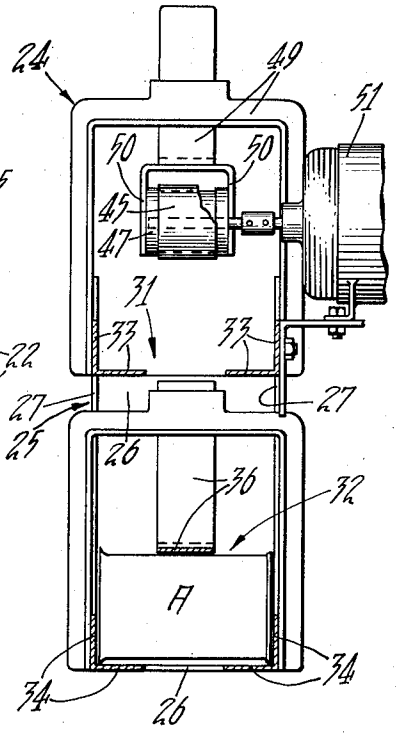


Fig. 5

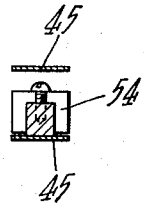
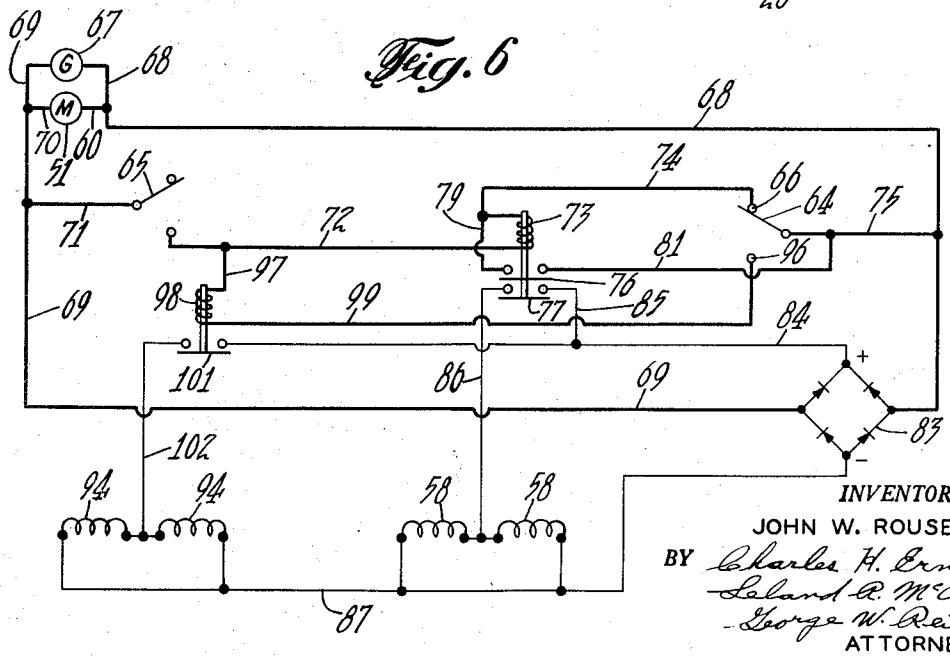


Fig. 6



INVENTOR.
JOHN W. ROUSE
BY Charles H. Erno
Leland R. McCann
George W. Reiber
ATTORNEYS

June 10, 1958 J. W. ROUSE 2,838,160

CONTAINER FEEDING DEVICES

Filed Jan. 24, 1956 3 Sheets-Sheet 3

Fig. 7

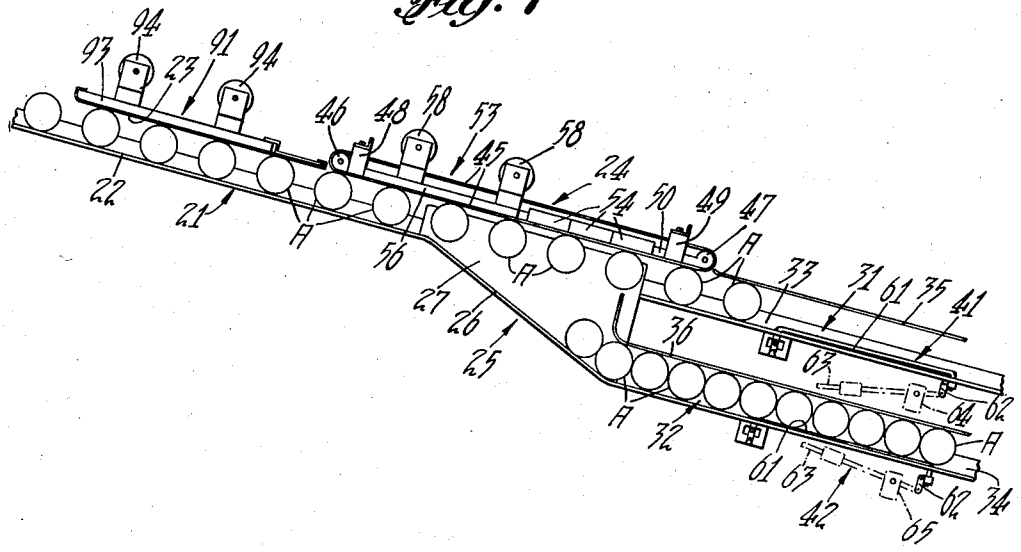
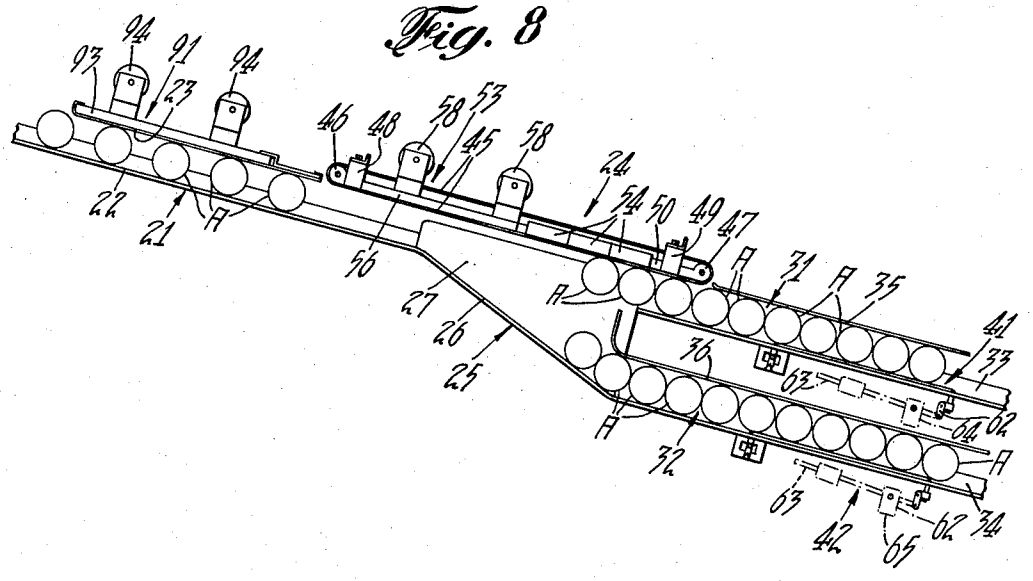


Fig. 8



INVENTOR.
JOHN W. ROUSE
BY Charles H. Erne
Leland R. McCann
George W. Reiber
ATTORNEYS

United States Patent Office 2,838,160 Patented June 10, 1958

2,838,160

CONTAINER FEEDING DEVICES

John W. Rouse, Kansas City, Mo., assignor to American Can Company, New York, N. Y., a corporation of New Jersey

Application January 24, 1956, Serial No. 561,002

9 Claims. (Cl. 198—31)

The present invention relates to can runways having divider units for dividing a single line of cans into a plurality of lines and has particular reference to magnetic devices for controlling the flow of the cans through the divider units.

An object of the instant invention is the provision in a can runway having a divider unit, of magnetic control devices which operate quickly and smoothly so as to properly divide cans traveling at high speeds, without interruption in the flow of the cans.

Another object is the provision of such devices which are simple in construction and less expensive to build and maintain than dividers now in use.

Another object is the provision of such devices in which jams of cans have been entirely eliminated with a resultant saving in production time.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a side view of a can runway and divider unit embodying the instant invention, with parts broken away;

Figs. 2, 3, 4, 5 are enlarged sectional views taken substantially along the respective lines 2—2, 3—3, 4—4, 5—5 in Fig. 1;

Fig. 6 is a wiring diagram of the electric apparatus used in the devices; and

Figs. 7 and 8 are schematic side views of the devices illustrating different can flow conditions.

As a preferred or exemplary embodiment of the instant invention the drawings illustrate a portion of a runway system along which sheet metal cylindrical cans or containers A roll on their sides at high speed in a single line procession from a previous operation can making machine, and are divided into two separate single line processions for continued travel into two subsequent operation can making machines. This is a usual can making procedure. The runway system preferably is disposed in a declining position so as to facilitate rolling of the cans therethrough by gravitational forces.

In the single line procession the cans A roll along an inlet runway 21 (Figs. 1 and 2) preferably comprising a pair of spaced and parallel angle irons 22 which constitute tracks which lead from a previous operation can making machine and which support and guide the cans along a predetermined path of travel to a divider unit 24 connected to the terminal end of the runway 21. A top guide rail 23 retains the cans in the runway 21.

The divider unit 24 includes a triangular shaped booth or housing 25 having a steeply sloping bottom wall 26 (Figs. 1 and 4) and spaced and parallel upright side walls 27. At the entrance or inlet end of the housing 25 (the left as viewed in Fig. 1) the side walls 27 are of a height slightly greater than the angle irons 22 of the runway 21 and are connected to the ends of the angle

irons so that the side walls 27 and the bottom wall 26 form a smooth but steeply sloping continuation of the runway 21. At the exit end of the housing 25 (at the right as viewed in Fig. 1), the side walls 27 are considerably higher than the entrance end and are connected to two vertically spaced or upper and lower continuing parallel outlet runways 31, 32.

The upper and lower outlet runways 31, 32, are similar to the inlet runway 21 and preferably comprise pairs of spaced and parallel angle irons 33, 34 respectively (see also Fig. 4) to receive, support and guide the divided cans A along two separate single line processions to the subsequent operation can making machines. Top guide rails 35, 36 retain the cans in the runways.

The upper outlet runway 31 preferably is located in endwise, spaced alignment with the inlet runway 21 and constitutes a spaced continuation of the inlet runway 21, the ends of the angle irons 33 of the upper outlet runway 31 being connected to the upright side walls 27 of the divider housing 25. The lower outlet runway 32 is located adjacent the bottom of the divider housing 25 and has the ends of its angle irons 34 connected to the housing bottom wall 26 and its side walls 27 so that cans rolling down the sloping bottom wall 26 can roll directly into the lower outlet runway 32.

The flow of cans through the inlet runway 21 is maintained at a rate substantially equal to the rate at which the two subsequent operation machines can receive them. Accordingly the two outlet runways 31, 32 are maintained substantially filled with cans so as to provide a constant supply of cans to the subsequent operation machines.

Under normal operating conditions, cans A rolling along the inlet runway 21, enter the divider unit housing 25 and roll down the sloping bottom wall 26 into the lower outlet runway 32 as shown in Fig. 1, which directs them to one of the subsequent operation machines hereinbefore mentioned. When this lower outlet runway 32 becomes filled with cans, the divider unit 24 operates to cut off the flow of cans to the lower outlet runway 32 and to feed them into the upper outlet runway 31 as shown in Fig. 7. This transfer of the feeding of the cans from one outlet runway to the other is effected by runway control devices 41, 42 (Fig. 1) which are located in the respective runways 31, 32 for controlling the divider unit 24.

The divider unit 24 includes an endless, preferably nonmetallic transfer belt 45 (Figs. 1, 4, 7 and 8) which extends across the upper portion of the housing 25, from the discharge end of the inlet runway 21 to the entrance end of the upper outlet runway 31 and slightly overlapping these runways. The lower run of the belt 45 preferably is flush with the under faces of the inlet and outlet runway top rails 23, 35. The transfer belt operates over a pair of spaced pulleys 46, 47 disposed adjacent the ends of the inlet and upper outlet runways 21, 31, respectively, and are mounted in brackets 48, 49 which extend up from the respective runways. Pulley 47 preferably is a driving pulley and is rotated by an electric motor 51 which is connected to the pulley. The motor 51 preferably is maintained in continuous operation so as to keep the belt 45 operating continuously.

Between the lower and upper runs of the transfer belt 45, the brackets 48, 49 by way of connecting rails 50, carry magnetic sections comprising an elongated electromagnet 53 (Figs. 1 and 3) and a plurality of adjacent permanent magnets 54 (Figs. 1 and 5) disposed in end-to-end relation. These magnets 53, 54 collectively extend substantially the full length of the lower run of the transfer belt 45 and are closely adjacent this run of the the belt. The permanent magnets 54 are located adjacent the upper outlet runway 31. The electromagnets

53 are located adjacent the inlet runway 21. These electromagnets 53 preferably comprise a pair of longitudinally extending pole pieces 56, 57 (Fig. 3) disposed on opposite sides of a pair of coils 58 spaced along the pole pieces (see Fig. 1). The electromagnets 53 are normally deenergized and are controlled by the outlet runway control devices 41, 42 as will be hereinafter explained.

The control devices 41, 42 preferably are of the character of those disclosed in United States Patent 1,806,879 issued May 26, 1931 to H. W. Lindgren on Runway Switch and Control Therefor, and briefly comprise actuating rods 61 which extend longitudinally in the outlet runways 31, 32 between their respective angle irons 33, 34. One end of each rod 61 is anchored and disposed below the path of travel of the cans A through the runways. The opposite end of each rod 61 extends up into the path of travel of the cans and is connected by a link 62 to one end of a pivotally mounted and weighted balance beam 63. One of the balance beams 61 is connected to and actuates an electric switch 64 while the other is connected to and actuates a switch 65. The switch 65 in the lower outlet runway is electrically connected to the coils 58 of the electromagnets 53 and is normally open. The switch 64 in the upper outlet runway 31 is a double pole switch and is normally closed against a pole 66 (see Fig. 6).

In operation, cans A entering either of the outlet runways 31, 32 roll over the actuating rods 61 without affecting them. However when the runway becomes filled and the cans back up over the actuating rods 61, and remain stationary on them, the weight of the cans is sufficient to depress the unanchored ends of the rods and this causes their balance beams 63 to rock on their pivots and hence close their control switches.

Thus when cans A back up in the lower outlet runway 32 they depress its rod 61 and close its control switch 65 and this, through suitable electric circuits shown in Fig. 6 energizes the electromagnets 53. This energization of the electromagnets 53 causes the cans A from the inlet runway 21 to be attracted to the magnets and thereby are withheld from entering the lower outlet runway 32. This cuts off cans from the lower outlet runway. The cans clinging to the electromagnets 53 are propelled by the transfer belt 45 along a suspended path of travel through the divider housing 25, onto and along the permanent magnets 54 and are delivered into the upper outlet runway 31 as shown in Fig. 7.

The electric circuits involved in energizing the coils 58 of the electromagnets 53 are shown in Fig. 6 and are supplied with electric current from any suitable source of such current such as a generator 67 having direct lead wires 68, 69. The motor 51 is directly connected by wires 69, 70 to the lead wires 68, 69 to insure continuous operation of the motor. When the runway control switch 65 is closed as mentioned above, electric current from the generator 67 (see Fig. 6) flows along wire 69, a connecting wire 71, closed switch 65, a connecting wire 72, a relay solenoid 73, a wire 74, contact 66, switch 64, a connecting wire 75, and wire 68, back to the generator. The current flowing through this circuit energizes the relay solenoid 73 and this in turn closes two normally open relay switches, called a holding switch 76 and a coil switch 77.

Closing of the holding switch 76 establishes a new circuit from wire 72, through the solenoid 73, a connecting wire 79, closed holding switch 76, a wire 81, to wire 75, thus by-passing the switch 64 in the upper outlet runway 31. Closing of the coil switch 77 establishes a direct current circuit between the coils 58 and a rectifier 83 connected to the lead wires 68, 69 of the generator 67. With the coil switch 77 closed, current from the rectifier flows along a wire 84, a connecting wire 85, closed switch 77, a wire 86, coils 58 and a wire 87 returning to the rectifier 83. This current energizes the coils 58 and causes the transfer of the cans A from the

inlet runway 21 to the upper outlet runway 31 as hereinbefore explained.

Under certain conditions, as when for any reason, the cans A back up into both of the outlet runways 31, 32 as shown in Fig. 8, the control switch 64 in the upper outlet runway 31 is actuated through depression of its actuating rod 61 by the cans backed up in this runway and this effects a stoppage of the flow of cans from the inlet runway 21 (see Fig. 8). For this purpose the inlet runway 21, above and adjacent its stop rail 23, is provided with an elongated electromagnet 91 (Figs. 1 and 2) having a pair of spaced and parallel pole pieces 92, 93 connecting to opposite ends of a pair of coils 94 which are normally deenergized.

The coils 94 are connected into the rectifier circuit in Fig. 6 and are controlled by the upper outlet runway switch 64. When this switch 64 closes against a contact 96 (Fig. 6) as when both outlet runways 31, 32 are filled with cans, a circuit from wire 72 is established which causes electric current to flow along a connecting wire 97, through a relay solenoid 98, a connecting wire 99, to the contact 96, switch 64, wires 75 and 68 returning to the generator. This flow of current energizes the relay solenoid 98 and this closes a normally open relay switch 101 in the rectifier circuit. Current then flows from the rectifier 83, along wire 84, closed switch 101, a connecting wire 102, coils 94 and the wire 87 returning to the rectifier. This current energizes the coils 94, and through the pole pieces 92, 93 energizes the electromagnet 91 and thereby attracts the cans A in the inlet runway 21, to them. The coils 94 are of such magnetic strength as to stop the cans A in the inlet runway 21 near its discharge end, from further rolling and thereby acts as a brake on the cans, holding them at a standstill and thereby preventing their discharge into the divider unit 24 as shown in Fig. 8. The electromagnet 91 is thus a brake magnet.

When the cans in either of the outlet runways 31, 32 start rolling after such a stoppage and move beyond the control actuating rods 61, the brake magnet 91 is deenergized and the cans from the inlet runway 21 are permitted to roll into one or the other of the outlet runways. If the upper outlet runway 31 empties first, its control switch 64 moves away from contact 96 (Fig. 6) and closes against its contact 66. This deenergizes the brake relay solenoid 98 and opens the relay switch 101 with the result that the brake coils 94 are deenergized. Cans will then roll from the inlet runway 21 into the upper outlet runway 31 as explained above.

If the lower outlet runway 32 empties first or even simultaneously with the upper outlet runway 31, the control actuating rod 61 in the lower runway opens its switch 65 and all the circuits are broken, thus permitting cans to roll from the inlet runway 21 into the lower outlet runway 32.

Thus the divider unit 24, through its continuously operating transfer belt 45, and its energizable electromagnet 53 divides or switches the flow of the cans from the inlet runway 21 into one or the other of the outlet runways 31, 32 as they are needed, in accordance with the operation of the outlet runway control devices 41, 42 and when both outlet runways are filled, applies a braking action on the cans in the inlet runway 21 to prevent flow of cans into the divider unit until needed. The permanent magnets 54 serve to guide the cans into the upper outlet runway 31 as they enter this runway and to support excess cans which are disposed outside of the runway but at the entrance to the runway at the time a change of delivery of cans from the upper to the lower runway takes place.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the the parts without departing from the spirit and

scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a can runway system, the combination of an inlet runway, a pair of outlet runways disposed in vertically spaced relation to each other adjacent said inlet runway, a divider housing connecting said inlet runway with the lowermost of said outlet runways for the passage of cans from said inlet runway into said lowermost outlet runway, magnetic means disposed between said inlet runway and the uppermost of said outlet runways for directing cans along a path from said inlet runway into said uppermost outlet runway, said magnetic means comprising an electromagnetic section having pole pieces extending from said inlet runway longitudinally along a portion of the upper side of said path of the cans leading toward the uppermost of said outlet runways and a permanent magnetic section extending longitudinally from said electromagnetic section and along the remainder of said upper side of said path of the cans to said uppermost outlet runway, and means partially located within said lowermost outlet runway and connected with said magnetic means and operable by an accumulation of cans in said lowermost outlet runway to energize and thus render said electromagnetic section effective on cans entering said divider housing from said inlet runway to divert such cans away from said lowermost outlet runway and onto said permanent magnetic section which serves to guide said cans to said uppermost outlet runway and to support excess cans disposed between said electromagnetic section and the entrance to said uppermost outlet runway when the latter is filled and said electromagnetic section is deenergized.

2. The combination defined in claim 1 in which said runways are disposed in a declining position to effect rolling of said cans through said runways.

3. The combination defined in claim 1 in which said magnetic means is an electromagnet.

4. The combination defined in claim 1 in which there is provided conveyor means disposed adjacent said magnetic means for propelling the cans into said uppermost outlet runway.

5. The combination defined in claim 4 in which said conveyor means is an endless belt and in which there is provided means for actuating said belt.

6. The combination defined in claim 4 in which said conveyor means is actuated continuously.

7. In a can runway system, the combination of an inlet runway, magnetic brake means in said inlet runway for holding said cans against discharge therefrom, a pair of outlet runways disposed in vertically spaced relation to each other adjacent said inlet runway, a divider housing connecting said inlet runway with the lowermost of said outlet runways for the passage of cans from said inlet runway into said lowermost outlet runway, magnetic means disposed between said inlet runway and the uppermost of said outlet runways for directing cans from said inlet runway into said uppermost outlet runway, means partially located within said lowermost outlet runway and connected with said magnetic means and operable by an accumulation of cans in said lowermost outlet runway to render said magnetic means effective on cans entering said divider housing from said inlet runway to divert such cans away from said lowermost outlet runway and into said uppermost outlet runway, and means partially located within said uppermost outlet runway and connected with said brake means and operable by an accumulation of cans in said uppermost outlet runway to render said brake means effective to hold said cans in said inlet runway when said uppermost outlet runway is filled.

8. The combination defined in claim 7 wherein said magnetic brake means is an electromagnet disposed adjacent the path of travel of said cans through said inlet runway.

9. The combination defined in claim 7 wherein there is provided means partially located within each of said outlet runways and connected with said brake means and operable by an accumulation of cans in both of said outlet runways to render said brake means effective to hold said cans in said inlet runway when said outlet runways are filled.

References Cited in the file of this patent

UNITED STATES PATENTS

2,303,526	Cummings et al.	Dec. 1, 1942
2,743,001	Nordquist	Apr. 24, 1956