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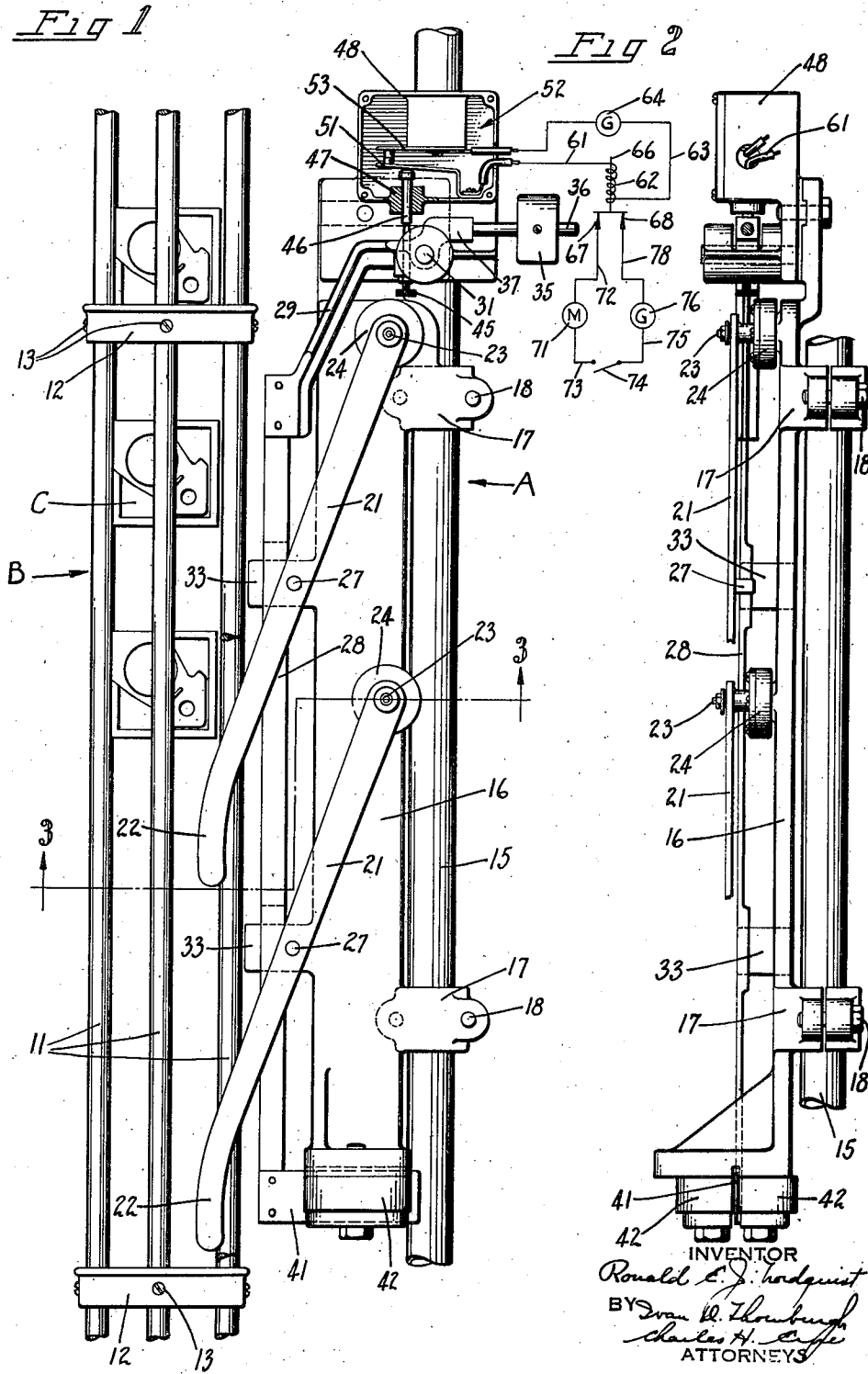
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CAN LINE CONTROL MECHANISM

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2 Sheets-Sheet 1



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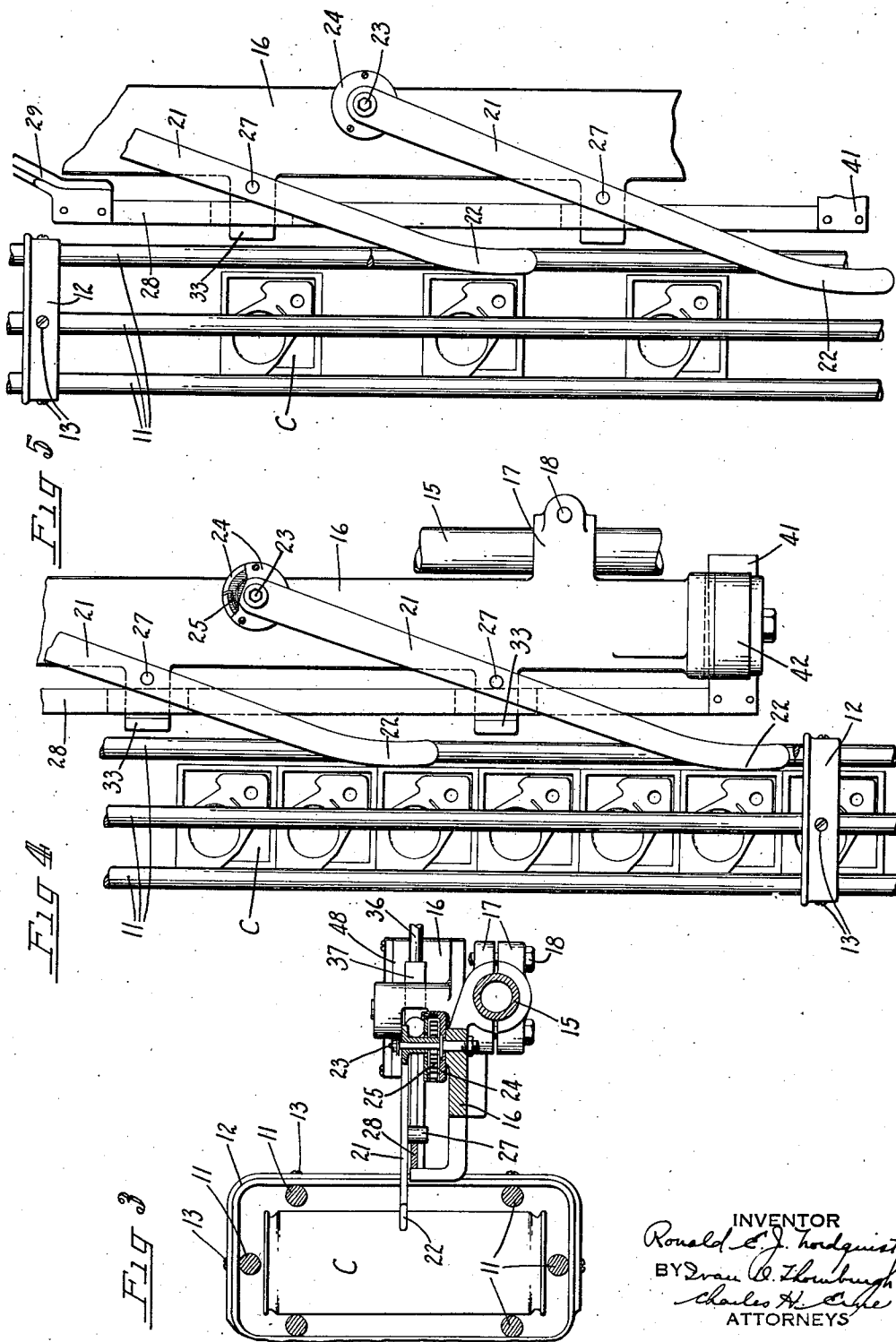
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INVENTOR
Ronald E. J. Hodgquist
 BY *Ernest C. Thornburgh*
Charles H. Cyke
 ATTORNEYS

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CAN LINE CONTROL MECHANISM

Ronald E. J. Nordquist, Maplewood, N. J., assign-
or to American Can Company, New York, N. Y.,
a corporation of New Jersey

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7 Claims. (Cl. 192—125)

The present invention relates to a can line control mechanism for light weight cans moving along a runway or the like and has particular reference to a double balance beam detector device which operates to control the feeding of incoming cans when cans already in the runway stop and thereby form a blockade.

An object of the invention is the provision of a double balance beam can line control device which is sensitive and simple in construction but which operates with a delayed action for preventing further feeding of cans into runway when the latter becomes blocked for any reason.

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 elevation of a can line control device embodying the instant invention, with parts broken away; the view also illustrating a wiring diagram of certain electric apparatus used with the device;

Fig. 2 is an end elevation of the device illustrated in Fig. 1, with parts broken away;

Fig. 3 is a transverse sectional view taken substantially along the broken line 3—3 in Fig. 1; and

Figs. 4 and 5 are fragmentary side elevations similar to Fig. 1 and showing the moving parts of the device in different positions.

As a preferred embodiment of the invention the drawings illustrate a can line control device A mounted adjacent a runway B through which light weight cans C, such as for example, empty square fibre milk cans or the like, pass on their way from a container feeding machine to another machine in the process of their manufacture. In the drawings, the runway is shown as being vertically disposed, the cans falling from a higher level to a lower level, although it should be understood that the control device will operate equally well when the runway is in an inclined or horizontal position and when can propelling means other than gravity is used.

The runway B may be of any suitable construction, that illustrated in the drawings being given as one example. Such a runway includes a plurality of spaced rods 11 arranged to engage and guide the moving cans on two sides and two ends. These rods are supported within collars 12 which surround the rods in spaced relation and which hold them in place. The rods are preferably secured by screws 13 to the collars,

The control device A is preferably mounted adjacent the runway B on a vertical supporting column 15 which is held stationary in any suitable manner. The device includes a frame 16 having spaced clamping members 17 which surround the supporting column and which are secured in clamping position by bolts 18 so that the frame will be held rigid.

Frame 16 carries two spaced can detector arms 21 having curved outer ends 22 which normally extend into the path of travel of the cans passing through the runway. The inner ends of the arms are mounted on rotatable pins 23 carried in housings 24 which are also secured to the frame 16. Inside each housing there is a helical spring 25 (Fig. 4) one end of which is secured to the housing and the other end fastened to the pin. In such a construction the springs exert a pressure on the detector arms and hence maintain the curved ends of the arms in the path of travel of the cans in the runway.

The detector arms 21 carry projecting studs 27 which engage against a movable operating bar 28 disposed in the frame 16 substantially parallel with but adjacent the runway B. At its upper end the operating bar is secured to an angular bracket 29 which is mounted on a pivot pin 31 secured in the frame 16. The operating bar is thus free to swing on the pivot pin 31.

The operating bar 28 is held by the angular bracket in an off center position and thus has a tendency to swing inwardly away from the runway under its own weight. This swinging action is normally prevented by the pressure of the detector arm studs 27 acting under the resistance of the helical springs 25. The operating bar is thus normally held against stops 33 which are formed on the frame 16. To effect a more delicate balance of the operating bar and thus make its action more sensitive, a portion of its weight is counterbalanced by a weight 35 which is mounted on a rod 36 threadedly secured in a boss 37 formed on the angular bracket 29.

As cans C pass through the runway B, each can strikes and pushes to one side the curved end 22 of first one of the detector arms 21 and then the other. The distance between the curved ends of the detector arms is greater than the width of a single can so that as long as normally properly spaced individual cans pass through the runway only one of the arms will be rocked at a time. In this case there will be at least one arm still extending in the runway and holding the operating bar 28 against its stops thus preventing

it from swinging. Under such normal passage of the cans no work is done by the control device.

However, when cans become blocked in the runway for any reason causing them to stack up one on top of the other, both detector arms 21 will be rocked or pushed outwardly and held in the position shown in Fig. 4. The detector arms studs 27 have now been moved away from the operating bar thereby releasing it so that it is free to swing away from its stops.

A brake is applied to the operating bar 28 to prevent too quick and too free a swinging action thereof. Such an action may occur if two passing cans are so spaced as to rock both detecting arms at once even though the cans are normally moving through the runway. For the purpose of preventing this rapid action the lower end of the operating bar is provided with an aluminum shoe 41 which extends between two oppositely disposed permanent magnets 42 secured to the frame 16. These magnets react on the shoe and hence retard the swinging action of the operating bar away from its stops 33. The brake thus insures that the control operates only if the blockade of cans is permanent and not just a momentary condition.

The swinging action of the operating bar 28 actuates electric switch elements for controlling the machine which feeds the containers C into the runway B. This control is effected by an adjustable screw 45 (Fig. 1) which is threaded into the angular bracket 29. The screw is vertically disposed in the bracket and its upper end engages against a switch pin 46 which slides vertically in a bearing 47 formed in a switch box 48 mounted on the frame 16. The upper end of the switch pin engages against a movable switch contact member 51 of a normally closed switch 52 disposed inside the switch box.

When the switch 52 is closed the movable contact 51 engages with a stationary contact 53. When the operating bar is released and swings away from the runway as just described the screw 45 moves away from the pin 46 and thereby permits the latter to slide down in its bearing. This allows the movable switch member 51 to spring away from the stationary member 53 and thereby open the switch.

Referring now to the wiring diagram illustrated in connection with Fig. 1 it will be seen that the switch contact 51 of switch 52 is connected by a wire 61 to a solenoid relay 62. The solenoid is also connected by a wire 63 to a source of electric energy such as a generator 64. This generator is also connected to the stationary contact 53 of switch 52.

As long as the switch 52 is closed, as when cans C are normally passing through the runway, electric energy from the generator 64 flows through the circuit including the solenoid and thereby energizes the solenoid. The solenoid is provided with a movable core 66 which constitutes a part of a switch having contacts 67, 68 which are included in an electric motor circuit associated with the machine which feeds the cans C into the runway and which is preferably operated by an electric motor 71. This motor is connected by a wire 72 to the relay contact 67. It is also connected by a wire 73 to a service switch 74. The switch is connected by a wire 75 to a motor generator 76 which in turn is connected by a wire 78 to the other relay contact 68.

Under normal operation as when the solenoid 62 is energized the relay having the contacts 67, 68 is held closed and when the service switch 74

is closed electric energy from the motor generator 76 excites the motor and thereby actuates the can feeding machine. However, when the cans in the runway stack up and operate the detector device to open switch 52, the solenoid circuit is broken and the solenoid is thus deenergized. This permits the core 66 of the solenoid relay to move up under spring action embodied in the solenoid in the usual manner, and hence open the relay. The motor circuit is thereby broken and the motor stops. This stops the can feeding machine from feeding any more cans into the runway until the congestion is cleared away.

When the runway is again free of cans the operating bar 28 of the detector device will be pushed back by the detector arms 21 into its normal position. This will again close the switch 52 and energize the solenoid and the motor circuit will be again established. The can feeding machine will thus begin feeding more cans into the runway.

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 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 machine control mechanism for cans, the combination of a runway along which cans pass from a can feeding machine, a plurality of movable disconnected spaced detector arms projecting into the path of travel of the cans passing through said runway, and means cooperating with said detector arms and responsive to movement thereof for controlling the operation of said feeding machine to prevent further feeding of cans into said runway when a blockade of the cans in the runway shifts and simultaneously holds said detector arms out of the path of travel of the cans.

2. In a line control mechanism for cans, the combination of a runway along which cans pass from a can feeding machine, a plurality of movable disconnected spaced detector arms projecting into the path of travel of the cans passing through said runway, means cooperating with and connected to said detector arms and responsive to movement thereof for controlling the operation of said feeding machine to prevent further feeding of cans into said runway when a blockade of the cans in the runway shifts and holds said detector arms out of the path of travel of the cans, and instrumentalities for delaying the operation of said actuated means.

3. In a line control mechanism for cans, the combination of a runway along which cans pass from a can feeding machine, a detector operating bar, a pair of pivoted detector arms extending into the path of travel of the cans passing through said runway, said arms normally exerting a pressure on said operating bar to retain the latter in a normal operating position, and means actuated by said operating bar for controlling the operation of said feeding machine to prevent further feeding of cans into said runway when a blockade of the cans in the runway shifts and holds both of said detector arms out of the path of travel of the cans to release the pressure on said operating bar and to permit it to move into operated position.

4. In a line control mechanism for cans, the combination of a runway along which cans pass from a can feeding machine, a detector operating bar pivoted at one end and free at its opposite end and movable under its own weight, a pair of pivoted detector arms extending into the path of travel of the cans passing through said runway, said arms exerting a pressure on said operating bar to retain the latter in a normal operating position, means actuated by said operating bar for controlling the operation of said feeding machine to prevent further feeding of cans into said runway when a blockade of the cans in the runway shifts and holds said detector arms to release the pressure on said operating bar so that it may move under its own weight, and magnetic brake elements disposed adjacent the free end of said operating bar for delaying the movement of said bar when it is released.

5. In a line control mechanism for cans, the combination of a runway along which cans pass from a can feeding machine, a detector operating bar movable under its own weight, a pair of pivoted detector arms extending into the path of travel of the cans passing through said runway, said arms exerting a pressure on said operating bar to retain the latter in a normal operating position, and electric switch means actuated by said operating bar for controlling the operation of said feeding machine to prevent further feeding of cans into said runway when a blockade of the cans in the runway moves and holds said detector arms out of the path of travel of the cans and thereby releases the pressure on said operating bar so that it may move under its own weight.

6. In a line control mechanism for cans, the

combination of a runway along which cans pass from a can feeding machine, an electric motor for actuating said can feeding machine, a detector operating bar movable under its own weight, a pair of pivoted detector arms extending into the path of travel of the cans passing through said runway, said arms exerting a pressure on said operating bar to retain the latter in a normal operating position, and electric switch means and electric circuits connected with said electric motor and actuated by said operating bar for controlling the operation of said feeding machine to prevent further feeding of cans into said runway when a blockade of the cans in the runway moves and holds said detector arms to release the pressure on said operating bar so that it may move under its own weight.

7. In a line control mechanism for cans, the combination of a runway along which cans pass from a can feeding machine, a detector operating bar movable under its own weight, weight means for partially counter-balancing the weight of said operating bar so that it will be sensitive in operation, a pair of pivoted detector arms extending into the path of travel of the cans passing through said runway, said arms exerting a pressure on said operating bar to retain the latter in a normal operating position, and means actuated by said operating bar for controlling the operation of said feeding machine to prevent further feeding of cans into said runway when a blockade of the cans in the runway moves and holds said detector arms out of the path of travel of the cans and thereby releases the pressure on said operating bar so that it may move under its own weight.

RONALD E. J. NORDQUIST.