March 15, 1949. C. L. GRAU 2,464,389

ACTUATING AND CONTROL UNIT

Original Filed May 7, 1946

Fig. 1

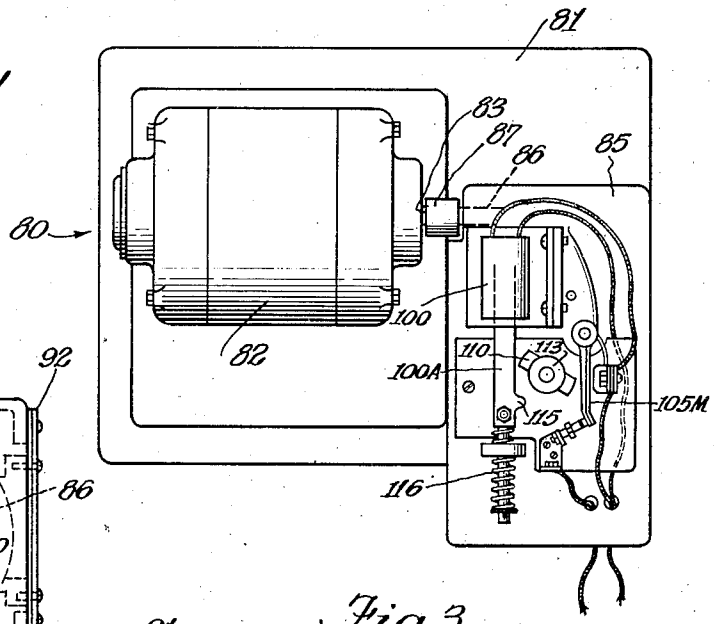


Fig. 2

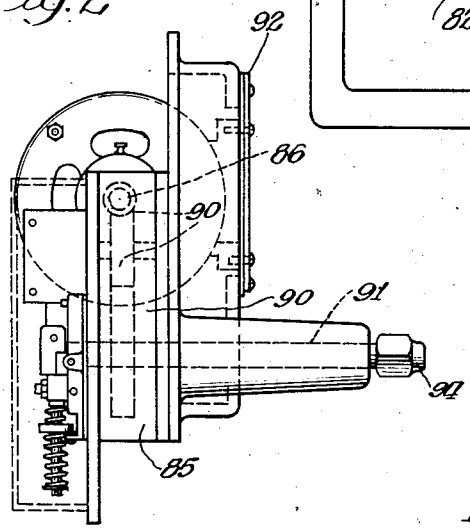
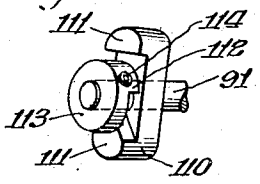


Fig. 3



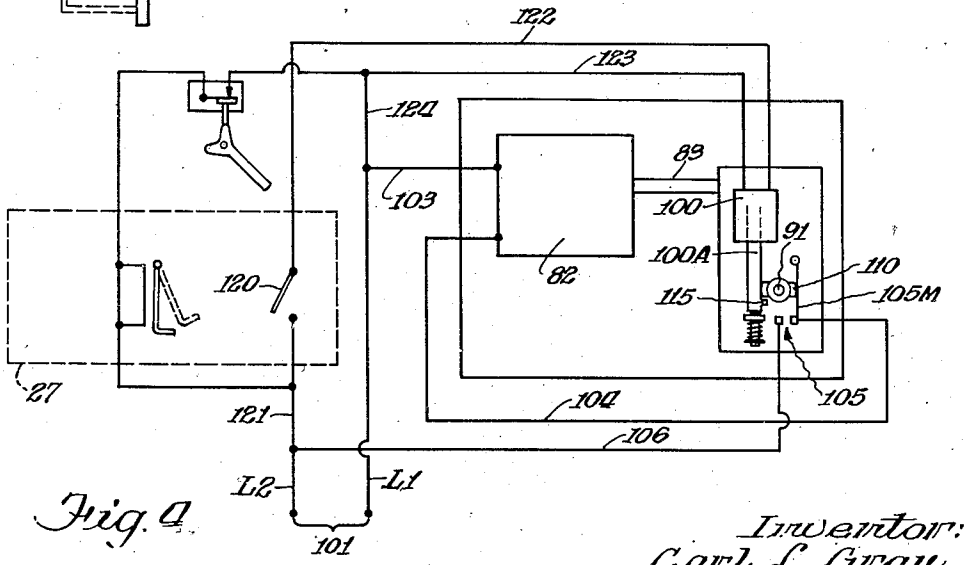


Fig. 4

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ACTUATING AND CONTROL UNIT

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Original application May 7, 1946, Serial No. 667,917. Divided and this application December 5, 1947, Serial No. 789,882

5 Claims. (Cl. 318—470)

1

This application is a division of my copending parent application Serial No. 667,917, May 7, 1946.

This invention relates to a driving and control unit adapted for use in vending apparatus of the coin-controlled type.

Where a bottled merchandise such as soft drinks is being vended, as for example in a manufacturing plant, or in offices, it is essential that this bottled merchandise be properly refrigerated, and because of such refrigeration, many problems are introduced with respect to dampness and corrosion of the operating parts of the driving and control mechanism. It is therefore an important object of the present invention to enable the control mechanism of such a vending mechanism to be so constructed and arranged that the control mechanism that may be located outside of the refrigerated portion of the apparatus, and a related object is to enable the motor that drives the vending mechanism to be located in a protected relation where it will not be subjected to dampness and corrosion that normally result from the presence of the refrigerated air within the cabinet.

A further object of the present invention is to afford a simple operating and control unit for such vending machines and to so construct such a unit that it may be economically produced and maintained.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principle thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

Fig. 1 is a front elevational view of the driving and control unit of the present invention;

Fig. 2 is an end elevational view of the driving and control unit as viewed from the right in Fig. 1;

Fig. 3 is a perspective view of a control cam that is included in the driving and control unit; and

Fig. 4 is a schematic wiring diagram illustrating an exemplary control circuit in which the driving and control unit of the present invention may be employed.

2

For purposes of disclosure, the invention has been illustrated herein as embodied in a drive and control unit 80 that is shown in detail in Figs. 1 to 3, and which may be related to a delivery or other driven mechanism in the manner illustrated in my aforesaid parent application. Thus as shown in Figs. 1 and 2, the delivery and control unit embodies a mounting base 81 on the forward face of which a driving motor 82 is mounted with its drive shaft 83 disposed in a horizontal position. A reduction gear box 85 is also secured on the forward face of the mounting plate 81, as will be evident in Figs. 1 and 2, and the power input shaft 86 of the reduction gearing is aligned with the motor shaft 83 and is coupled thereto by a coupling 87. Within the reduction gear box 85, any suitable gearing arrangement may be employed and in the present instance, this gearing includes a plurality of gears 90, the final one of which is fixed within the gear box upon a horizontal and rearwardly projecting output shaft 91. When the mounting and control unit 80 is to be put in place in a vending or like apparatus, it is disposed in a protected position as for example on the outside of the insulated wall of the refrigerated vending apparatus, and such mounting may be accomplished through the use of a vibration absorbing means 92 that is illustrated generally in Fig. 2 of the drawings. As the unit 80 is put in place, the rearwardly projecting end of the shaft 91 is moved endwise toward the adjacent and aligned end of the shaft that is to be driven thereby, and a driving coupling 94 on the rear end of the shaft 91 is moved into driving engagement with a complemental element on the adjacent end of the driven shaft.

Thus, when the motor 82 is energized, the shaft that is coupled to the shaft 91 will be operated.

The desired control for the operation of the motor 82 and the mechanism that is driven thereby is under the present invention accomplished in a simple and expeditious manner that avoids the use of relays and other mechanism that may tend to get out of order in the use of the machine. Thus, under the present invention, the energizing circuit for the motor 82 is closed through the operation of the solenoid 100, and is opened under control of the rotative movement of the final drive shaft 91 of the unit. Thus, as will be evident in Figs. 1 and 4, the motor circuit is afforded from a conventional power source 101 that includes line wires L1 and L2. A wire 103 as extended from the line wire 101, to one terminal of the motor 82 while a wire 104 is extended from the other terminal of the motor 82 to the

movable contact 105M of a normally closed switch 105. The stationary contact 105S of this switch is connected by a wire 106 to the other line wire L2 so that upon closure of the switch 105, the motor M is energized. The switch 105 is arranged to be opened and closed under control of a cam 110 that is mounted on the forwardly projected end of the final drive shaft 91 and to enable this to be accomplished the cam 110 has a limited lost-motion connection with the shaft 91 so as to enable limited rocking movement of the cam 110 with respect to the shaft 91. Thus the cam 110 is in the form of a lever that is loosely mounted on the shaft 91 so that the ends thereof project radially in opposite direction from the shaft 91, and teeth 111 are extended forwardly from the opposite ends of the cam 110 so that these teeth may be engaged by driving teeth 112 formed on a collar 113 that is fixed by a pin or set screw 114 on the forward end of the shaft 91. The relation of the teeth 111 and 112 is such that the cam 110 may rock a limited angular stroke with respect to the shaft 91. The switch 105 is so mounted and disposed with relation to the forward end of the shaft 91 that when the cam 110 is rotated by the shaft 91, one of the ends of the cam 110 will eventually engage and move the switch element 105M to its open position of Fig. 4. Such rotative movement of the cam 110 is of course imparted thereto in the course of movement of the shaft 91 because the tooth 112 will engage with the tooth 111 of the cam to effect such drive. Thus, the switch 105 will be opened when the cam reaches a position such as that shown in Fig. 4, and the operation of the mechanism will be stopped. When the mechanism is to be operated through another cycle, it is only necessary to rock the cam 110 in an advancing direction with respect to the shaft 91, and this may be of course accomplished because of the aforesaid lost-motion connection. In the course of such rocking movement of the cam 110, the switch 105 is allowed to close and the cycle of operation will therefore be properly initiated. As such cycle progresses, the lost-motion between the cam and the shaft 91 will of course be taken up, and the cam 110 will again be driven by the shaft 91 so as to properly engage and move the switch element 105M to its open position when the cam shaft 70L and 70R have been moved through 180 degrees.

The desired shifting the cam 110 so as to effect the closing of the switch 105 is caused by operation of the solenoid 100, the armature 110A of which is urged downwardly by its spring 116, and at the end of a vending cycle, the tooth 115 is disposed beneath the left hand end of the cam 110 in the relationship shown in Fig. 4 of the drawings. When the solenoid 100 is energized, the armature 110A thereof is moved upwardly so as to shift or rock the cam 110 through its lost-motion movement to the position shown in Fig. 1, and this allows the switch 105 to close. The solenoid 100 may then be deenergized so as to allow the same to return to the relationship shown in Fig. 1, and the cycle of operation of the mechanism will progress and will be terminated by the switch opening action of the cam 110 with the parts in the position as shown in Fig. 4.

The solenoid 100 may be operated under control of a coin slot mechanism 27, Fig. 4, and this coin slot mechanism includes a normally open switch 120 that is momentarily closed each time a coin passes through the normal or proper coin receiving channel of the coin slot mechanism. The switch 120 has one contact thereof connected by a wire 121 to the line wire L2, while a wire 122 extends from the other contact of the switch 120 to one terminal of the solenoid 100. The other terminal of the solenoid 100 is connected by wires 123 and 124 to the line wire L1 so that when the switch 120 is closed, by passage of a coin, the solenoid 100 will be momentarily energized in the manner hereinbefore described.

From the foregoing description it will be evident that the present invention enables the driving and control mechanism of a refrigerated vending machine to be located outside of the refrigerated portion of the cabinet, and this is accomplished in a simple manner that enables the mechanism to be easily inspected or removed. This mechanism is simple in character since it avoids the use of relays and accomplishes the control function through the use of a simple and inexpensive solenoid. It will be evident that the present invention enables vending machines to be made more reliable in operation and this may be done in a simple and economical manner.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A driving and control unit for coin controlled vending machines and the like comprising a base having forward and rear faces, a driving motor mounted on said forward face of said base, a gear reduction unit mounted on said forward face of said base and having an input shaft driven by said motor and an output shaft extended rearwardly through said base beyond the rear face thereof and extended forwardly from said gear box to afford an extended forward end, a normally open switch mounted on said gear box adjacent said forward end of said output shaft, a cam mounted on said forward end of said output shaft for limited angular lost motion with respect thereto and including at least one cam lobe operable at a predetermined angular position of said output shaft to open said switch, and a solenoid mounted on said gear box adjacent to said cam and operable when energized to advance said cam angularly with respect to said output shaft to thereby release said switch for closing movement.

2. A driving and control unit for coin controlled vending machines and the like comprising a base having forward and rear faces, a driving motor mounted on said forward face of said base, a gear reduction unit mounted on said base and having an input shaft driven by said motor and an output shaft extended rearwardly through said base beyond the rear face thereof, a normally open switch mounted in a fixed relation at one side of said output shaft, a cam mounted on said output shaft for limited angular lost motion with respect thereto and including at least one cam lobe operable at a predetermined angular position of said output shaft to open said switch, and a solenoid mounted in fixed relation with respect to said base and operable when energized to advance said cam angularly with respect to said output shaft to thereby release said switch for closing movement.

3. A driving and control unit of the character described, comprising a base, a driving motor

mounted on said base, an output shaft rotatably mounted on said base and operatively connected to said motor so as to be driven thereby, a normally open switch mounted in a fixed relation at one side of said output shaft and adapted to control said motor, a cam mounted on said output shaft for limited angular lost motion with respect thereto and including at least one cam lobe operable at a predetermined angular position of said output shaft to open said switch, and a solenoid mounted in fixed relation with respect to said base and operable when energized to advance said cam angularly with respect to said output shaft to thereby release said switch for closing movement.

4. In a driving and control unit of the character described, a base, a driving means mounted on said base, an output shaft mounted on said base and driven by said driving means, means for controlling said driving, means including a normally open switch mounted in a fixed relation at one side of said output shaft, a cam mounted on said output shaft for limited angular lost motion with respect thereto and including at least one cam lobe operable at a predetermined

angular position of said output shaft to open said switch, and a solenoid mounted in fixed relation with respect to said base and operable when energized to advance said cam angularly with respect to said output shaft to thereby release said switch for closing movement.

5. In a driving and control means of the character described, a driving means, a shaft driven by said driving means, means for controlling the driving action of said driving means on said shaft and including a normally open switch mounted in a fixed relation at one side of said shaft, a cam mounted on said shaft for limited angular lost motion with respect thereto and including at least one cam lobe operable at a predetermined angular position of said shaft to open said switch, and a stationarily mounted solenoid having cam actuating means associated therewith and operable when said solenoid is energized to advance said cam angularly with respect to said shaft to thereby release said switch for closing movement.

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No references cited.