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Kuykendall

[11] **3,911,974**

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[54] **BALLOON DISPENSING AND FILLING MACHINE**

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[52] **U.S. Cl.** **141/94**; 46/90; 141/114; 221/14

[51] **Int. Cl.**[2] **B65B 3/04**

[58] **Field of Search** 46/90; 221/14; 141/114, 141/231, 313–317, 94, 95, 98

[56] **References Cited**

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Primary Examiner—Houston S. Bell, Jr.
Attorney, Agent, or Firm—Richards, Shefte & Pinckney

[57] **ABSTRACT**

A machine for dispensing individual balloons and inflating such balloons with a gas flowing through a selectively operated control valve. An electric circuit is provided for the machine which is powered solely by a battery, and this current operates the gas control valve as well as an indicator lamp which indicates to the user when the gas control valve should be activated. This circuit is designed to automatically open after a period of time under all operating conditions whereby neither the operator for the gas control valve nor the indicator lamp can inadvertently remain in circuit with the battery for any significant period of time, whereby the battery will not become drained of its power over a short period of time.

10 Claims, 4 Drawing Figures

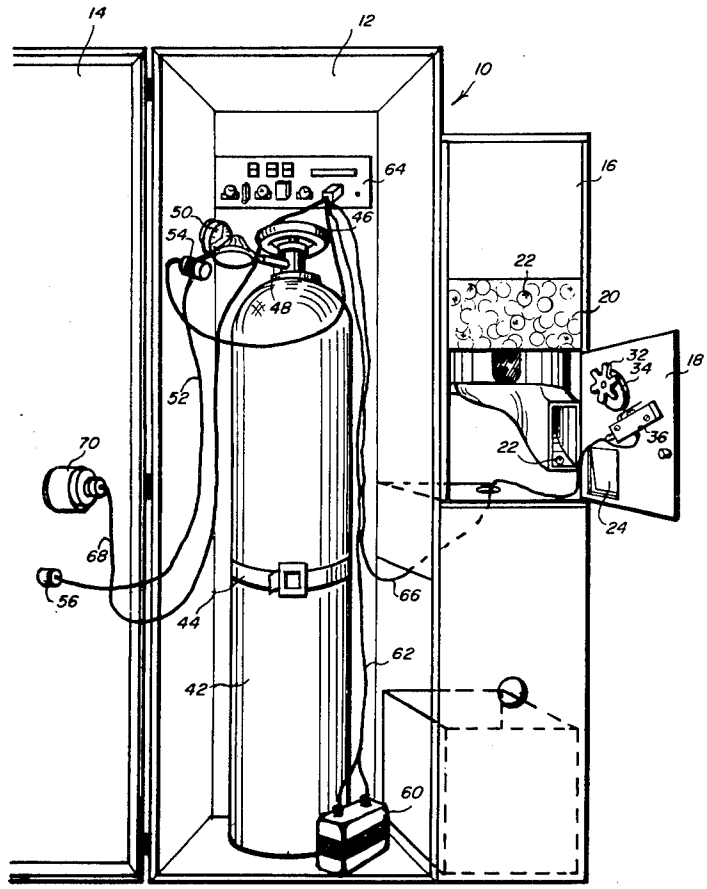
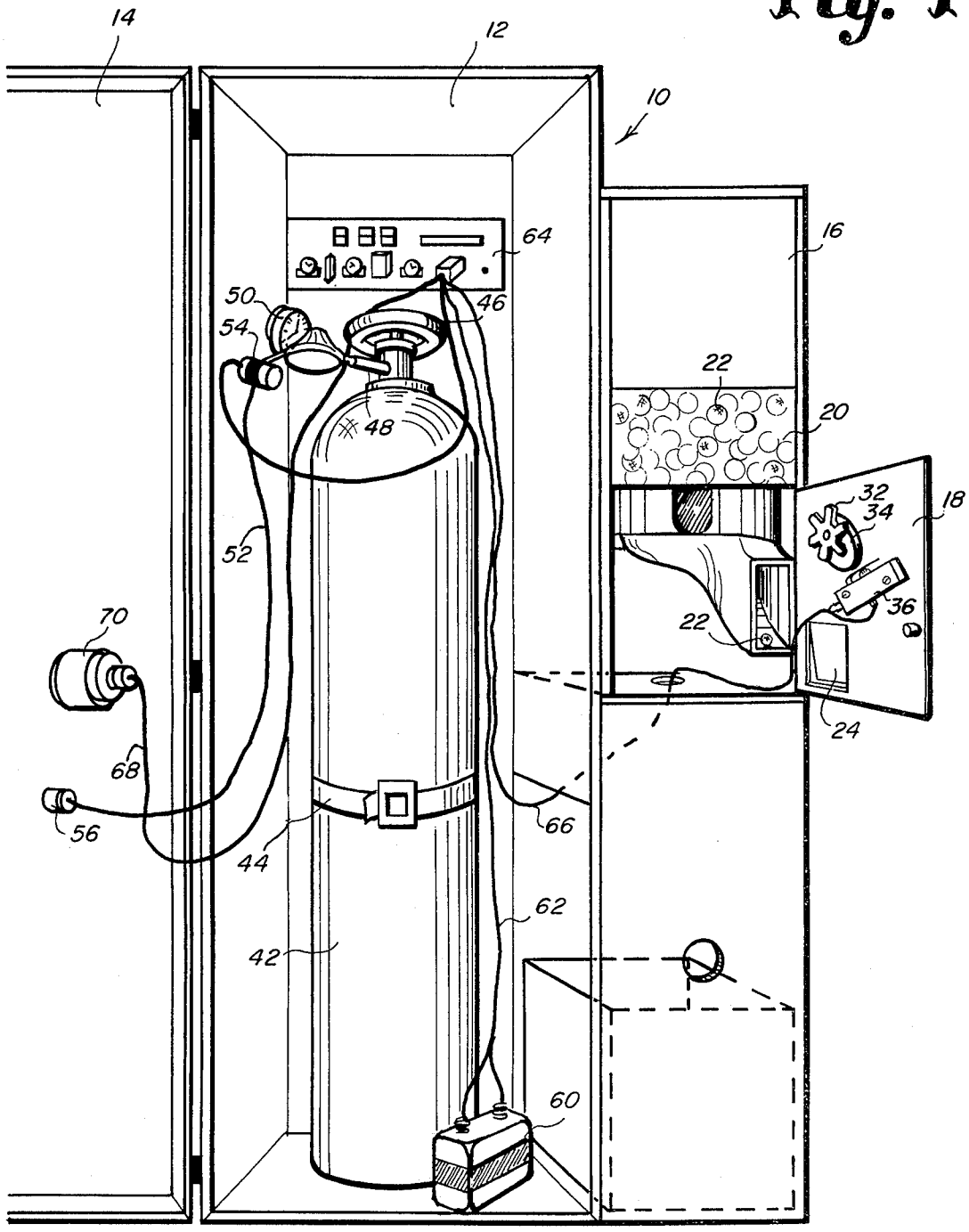


Fig. 1


14
12
10
64
16
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46
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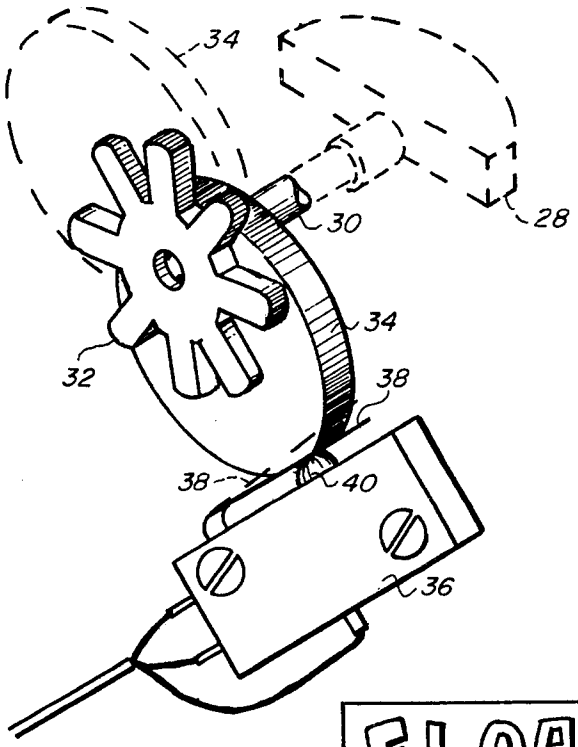

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Fig. 2

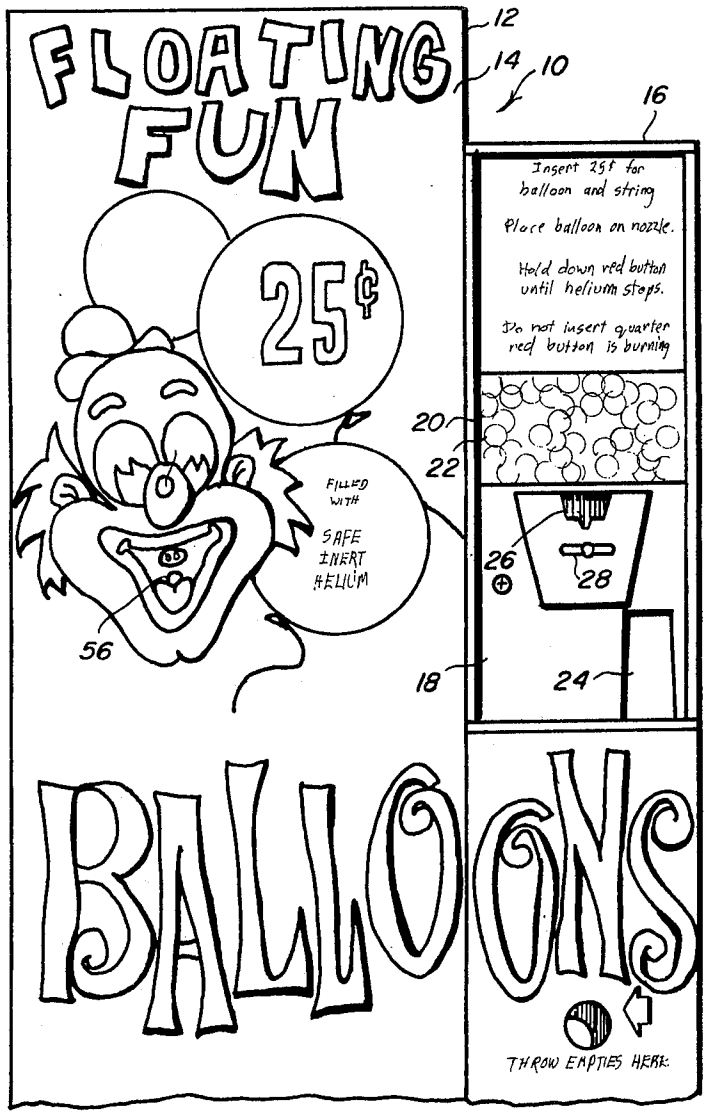
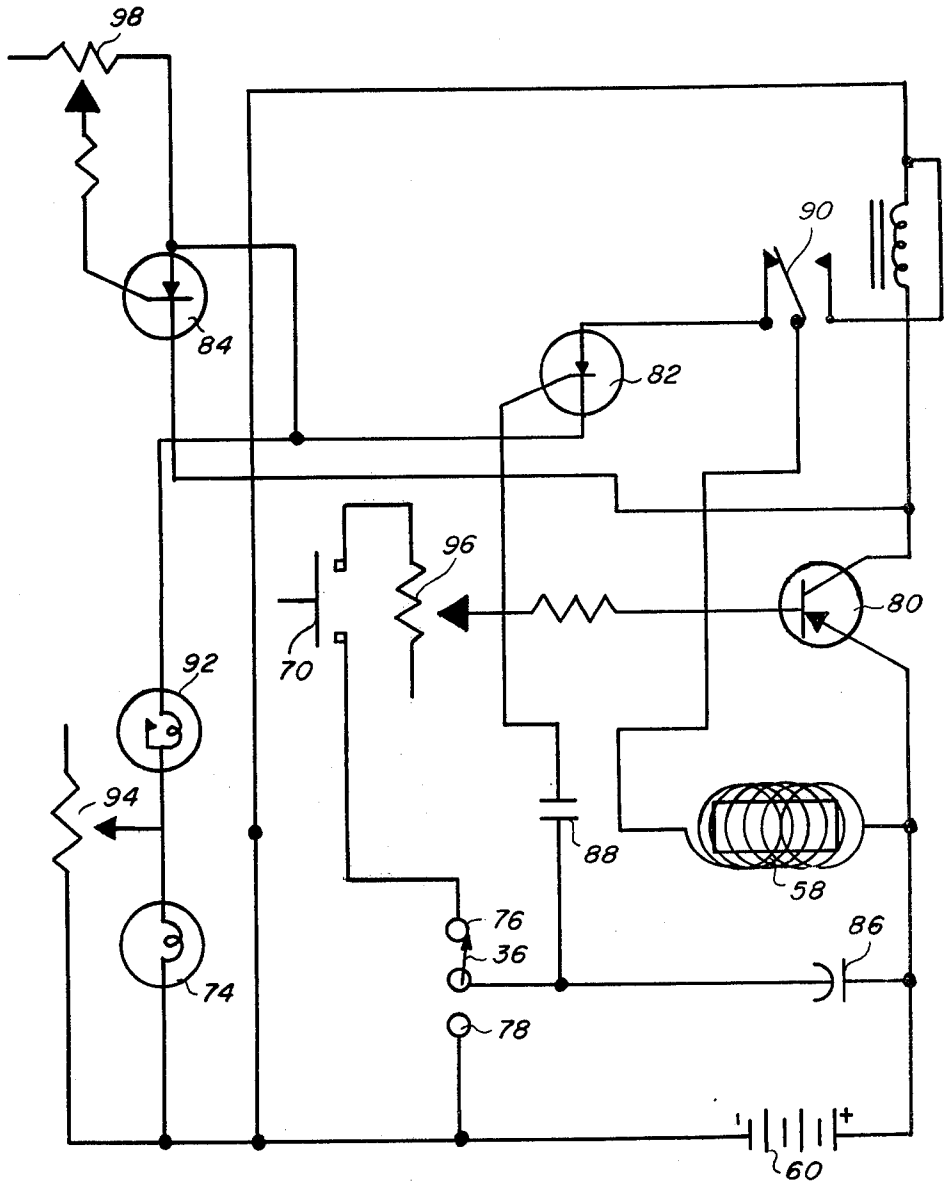

FLOATING FUN
25¢
FILLED WITH SAFE INERT HELIUM
56
12
14
10
16
Insert 25¢ for balloon and string
Place balloon on nozzle.
Hold down red button until helium stops.
Do not insert quarter red button is burning
20
22
26
28
18
24
BALLOONS
THROW EMPTIES HERE

Fig. 3

Fig. 4



BALLOON DISPENSING AND FILLING MACHINE

BACKGROUND OF THE INVENTION

Presently, coin-operated machines are available which dispense and then inflate toy balloons, and these machines are often located in a large variety of stores and similar commercial establishments where they are exposed to children who can operate the machine with little or no assistance. A typical example of such coin-operated, balloon vending machines is disclosed in U.S. Pat. No. 3,191,801, issued Jun. 29, 1965, to Standish.

These machines are electrically operated, and they are designed to be plugged into a convenient source of a-c power at the store or establishment where the machine is placed. The machine generally includes a coin-operated mechanism for dispensing individual balloons from a supply of balloons, and operation of the dispensing mechanism activates a control circuit which is used to control a supply of helium, air, or other gas, which can be admitted into the dispensed balloon through a nozzle. Usually, the control circuit, after being energized by the coin-operated dispensing mechanism, remains activated until the machine user or operator presses a switch to cause release of the filling gas, whereby such user can place the dispensed balloon over the nozzle and then cause release of the filling gas by pressing the switch provided for this purpose. Thus, the control circuit can, under some circumstances, remain closed for a substantial period of time, as, for example, when a child neglects to fill the dispensed balloon or when the balloon dispensing mechanism malfunctions and fails to deliver a balloon for filling. During the time the control circuit is closed, it is generally consuming power from the a-c source to which it is connected, but this power consumption is relatively small and presents no particular problem where the machine is plugged into a convenient source of a-c power.

It is apparent, however, that machines of the aforementioned type have a somewhat restricted area of use because they must be located at or near an outlet for a-c power. Thus, these machines cannot be located in outside or remote areas where an a-c source is not available, and even within commercial establishments it may be difficult or undesirable to place a machine at a point where it can be plugged into available a-c sockets.

However, the present invention overcomes the drawbacks of presently available balloon vending machines by providing a battery-operated control circuit for the machines, and this battery-operated control circuit is particularly designed to insure that the battery cannot be inadvertently drained of power by the control circuit remaining closed for an inordinate amount of time; yet this control circuit can still be used to fill a balloon with gas long after the dispensing mechanism has been operated.

SUMMARY OF THE INVENTION

In accordance with the present invention, a balloon vending and inflating machine is provided with an electrical operating circuit that is powered solely by a direct current battery. The machine includes a mechanical dispensing arrangement which may be coin-operated to dispense balloons individually from a supply, and an inflating arrangement including a filling nozzle and a source of gas controlled by a solenoid operated valve to cause a measured quantity of gas to be released through the nozzle when a manual switch is closed by the user of the machine after a balloon has been mechanically dispensed.

The circuit for the valve solenoid is normally open so as not to drain the battery, and this circuit is initially activated by the operation of the dispensing mechanism so that when the manual switch is closed, the solenoid will be energized by the battery. However, the circuit is designed so that after initial activation thereof by the dispensing mechanism, the battery circuit is immediately opened and remains open until the manual switch is closed whereby there is no drain on the battery in the interim. This circuit is also designed so that when the manual switch is closed to cause the battery to energize the solenoid, the circuit will automatically become open again as soon as the solenoid has been energized for a sufficient period of time to cause release of a properly measured quantity of gas.

After the circuit is initially activated by operating the dispensing mechanism, an indicator, such as a lamp, is energized by the battery to indicate to the user that the balloon inflating apparatus is ready for operation when the manual switch is closed. Obviously, this indicator light will come on upon operation of the dispensing mechanism, and, in accordance with a feature of the present invention, the circuit between the battery and the indicator light will be automatically opened if the manual switch is not closed by the user within a predetermined time after operation of the balloon dispensing mechanism, whereby the battery will not be drained if for some reason the user operates the dispensing mechanism and does not press the manual switch within a predetermined interval. However, even after the indicator lamp circuit is opened the machine user may still obtain filling gas by pressing the manual switch even after a considerable amount of time has passed since the balloon was first dispensed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front view of a balloon dispensing and inflating machine embodying the present invention, with doors of the machine open to show the interior components thereof;

FIG. **2** is a detail view of a portion of the balloon dispensing mechanism and switch associated therewith;

FIG. **3** is a front view of the machine illustrated in FIG. **1** with the doors of the machine closed; and

FIG. **4** is a wiring diagram of the operating circuit for the machine.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Looking now in greater detail at the accompanying drawings, FIGS. **1** and **3** illustrate a balloon vending and inflating machine **10** including a large cabinet portion **12** provided with a closure door **14**, and a smaller cabinet **16** having a hinged door **18**. The smaller cabinet **16** contains a supply **20** of balloons **22** which may be individually packaged in spherical plastic containers or the like, and a conventional coin-operated dispensing mechanism is provided for mechanically dispensing the balloons individually from the supply **20** to an opening **24** when a coin is inserted in a coin slot **26** (FIG. **3**) and a handle **28** is turned. As best seen in FIGS. **1** and **2**, the handle **28** is connected to a shaft **30** on which a gear **32** is mounted for operating the dis-

pensing mechanism (not shown) when the handle **28** is turned a complete revolution. A cam **34** is also mounted on the shaft **30**, and a switch **36** is mounted on the inside of the door **18**, the switch **36** including a flexible contact **38** normally biased away from a fixed contact **40** whereby the switch **34** is normally open. However, when the handle **28** and shaft **30** are rotated to dispense a balloon, the cam **34** will come into abutment with the flexible contact **38** to press it against the fixed contact **40** to temporarily close the switch **36** until the cam **34** moves out of abutment with flexible contact **38** which then returns to its open position shown in dotted lines in FIG. **2.** It is to be noted that the shape of the cam **34** determines how long the flexible contact **38** is held against the fixed contact **40** during a revolution of the shaft **30.**

Within the large cabinet **12** there is housed a tank **42** filled with a gas such as helium, the tank **42** being held in place by a strap **44.** The tank **42** has a conventional manually controlled valve **46** at the top thereof, and an outlet pipe **48** having a pressure gauge **50** mounted thereon for indicating the pressure of the helium in the tank **42.** A flexible tube **52** extends from the gauge **50** to a regulating valve **54,** and from the valve **54** to a nozzle **56** which extends through the door **14** of the large cabinet **12,** the valve **54** being operated by a solenoid **58** (see FIG. **4**) to selectively permit helium to flow from the tank **42** to the nozzle **54** when the solenoid **56** is energized as will be explained in greater detail presently.

Also located within the large cabinet **12** is a 6-volt direct-current battery **60** having electrical lines **62** leading therefrom to a circuit board **64** mounted on the back wall of the cabinet **12.** The circuit board **64** contains a number of electrical components which will be explained in greater detail in connection with the wiring diagram illustrated in FIG. **4,** and the circuit board **64** is connected to the switch **36** by an electrical line **66** and is connected by another electrical line **68** to a manual switch **70** which is mounted in the door **14** to present a push-buttom **72** (see FIG. **3**) at the front side thereof. Additionally, the push-button **72** includes an indicator lamp **74** (see FIG. **4**) therein which becomes lighted during operation of the machine as explained below.

Referring now to the wiring diagram illustrated in FIG. **4,** it will be noted that the only source of power for the circuit is the aforementioned direct current battery **60.** The aforementioned switch **36** is a single pole, double throw switch which is normally positioned at contact **76** as shown in FIG. **4** and which is temporarily located at contact **78** when the cam **34** (FIG. **2**) presses flexible contact **38** against fixed contact **40** during operation of the dispensing mechanism handle **28** as described above. The circuit shown in FIG. **4** also includes a PNP transistor **80** and two silicone controlled rectifiers **82** and **84** which, as is known, act as open switches until the gates thereof are biased to cause them to become conductive whereupon they act as closed switches. The circuit in FIG. **4** is shown at its inoperative condition, with the switch **36** at its upper contact **76,** the transistor **80** and the rectifiers **82, 84** in a quiescent condition, and the manual push-bottom switch **70** biased toward an open position as shown. This is the condition of the circuit when the machine **10** is not being operated, and it will be noted that there is no drain whatever on the battery **60** because it is not connected in any closed circuit.

When the machine is operated, the user places a coin in coin slot **26** and turns handle **28** to obtain a balloon, the turning of handle **28** acting to cause switch **36** to move temporarily to contact **78** for a time corresponding to the time flexible switch contact **38** is held against fixed contact **40** by the cam **34.** When the switch **36** is moved to contact **78,** battery **60** is connected in circuit with a capacitor **86** whereby the capacitor **86** is charged by the battery **60,** and the battery **60** also acts through a second capacitor **88** to provide a biasing pulse on the gate of the rectifier **82** whereby rectifier **82** becomes conductive. When rectifier **82** becomes conductive, it completes a circuit from the positive terminal of the battery **60,** through the solenoid **58,** a relay **90,** the rectifier **82,** a thermal relay or lamp **92,** the indicator lamp **74** and back to the negative terminal of the battery **60.** The thermal relay **92** may be any of a number of conventional thermal relays (i.e., a "blinking" lamp used on Christmas trees) which are initially conductive at a relatively high resistance and which are responsive to the heat generated by the current flow therethrough to change to a condition of low resistance after a predetermined amount of heat is generated by the current flow therethrough. Thus, the thermal relay **92** is conductive and imposes a relatively high resistance on the circuit when rectifier **82** becomes conductive, and current also flows through the indicator lamp **74** to illuminate the same. For reasons to be discussed in greater detail presently, the thermal relay **92** will, after a predetermined period of time, change to its low resistance condition, and since this predetermined period of time is directly related to the amount of current flowing through the thermal relay **92,** a variable resistor **94** around the indicator lamp **74** may be adjusted to increase or decrease the voltage drop thereacross so as to regulate the current flow through the thermal relay **92** and thereby regulate the time during which it remains in its high resistance condition. Preferably, the variable resistance **94** is adjusted so that the thermal relay **92** will remain in its high resistance state for about four minutes.

Thus, it will be noted that when switch **36** is temporarily closed, the capacitor **86** becomes charged and the indicator lamp **74** becomes illuminated. However, even though the solenoid **58** has some current flowing therethrough, the load on the direct current circuit offered by rectifier **82,** the thermal relay **92,** variable resistance **94** and indicator lamp **74** is sufficient to lower the current flow through the solenoid **58** to a level which is insufficient to activate the solenoid **58** whereby the regulator valve **54** for the helium supply remains closed. Similarly, there is insufficient current flow or current pulsing at the gate of the rectifier **84** to cause it to become conductive.

Normally, the machine user will then remove the dispensed balloon and place the lip thereof over the nozzle **56,** and then press the push-button **72** which is now illuminated by indicator lamp **74** to indicate that the push-button **72** is ready to be pressed for releasing helium through the nozzle **56.** When the user presses push-button **72,** the manual switch **70** is closed thereby completing a circuit between the charged capacitor **86** and the base of the transistor **80** whereupon such base has a bias imposed thereupon by the discharge from the capacitor **86,** and the transistor **80** becomes conductive

for a period of time determined by the time current flows to the base from the capacitor **86.** It is to be noted that the capacitor **86** has a relatively large capacity (e.g. 250 MFD), and a variable resistance **96** is placed between capacitor **86** and the base of transistor **80** for regulating the current flow to such base and thereby regulating the time transistor **80** remains in a conductive state.

When the transistor **80** becomes conductive, it completes a circuit from the positive terminal of the battery **60,** through the coil of the relay **90,** and back to the negative terminal of the battery **60,** whereupon the relay **90** will be moved from its left-hand contact as shown in FIG. **4** to its right-hand contact. When the relay **90** moves to its right-hand contact, the circuit through rectifier **82,** thermal relay **92** and indicator lamp **74** is immediately opened and remains open. Also, a new circuit is completed from the positive terminal of the battery **60,** through the solenoid **58,** through the relay **90** and back to the negative terminal of the battery **60.** Since the solenoid **58** will be directly in circuit with the battery **60** with substantially no other load on the circuit, there is sufficient current flow through the solenoid **58** to energize it and cause it to open helium control valve **54.** The solenoid **58** will remain energized and helium will therefore flow through the nozzle **56** for as long as the base of the transistor **80** is biased by the capacitor **86,** which may be regulated as described above. When the bias imposed on the base of transistor **80** is removed by the completed discharge of the capacitor **86,** the transistor **80** becomes non-conductive so as to open the circuit to the coil of the relay **90** whereby it returns to its left-hand contact and opens the circuit between the battery **60** and the solenoid **58** to stop further flow of helium through the regulating valve **54.** Moreover, since the circuit through rectifier **82** has previously been opened by the relay **90** as described above, it is now non-conductive and all circuits from the battery **60** are open and there is no drain thereon until the coin-operated dispensing mechanism is again operated.

There are times, however, when a user will operate the dispensing mechanism so as to cause activation of the circuit through the indicator lamp **74,** and will fail to ever press the push buttom **72** of the manual switch, as, for example, when a child obtains a dispensed balloon without realizing that the balloon can also be filled with helium or when the balloon dispensing mechanism malfunctions so that no balloon is dispensed for filling. Under these circumstances, the circuit including the battery **60** and the indicator lamp **74** would remain closed so as to cause a continuous drain on the battery **60** whereby it would soon be drained of all power and the machine **10** would be inoperative. However, in accordance with a feature of the present invention, the rectifier **84** is provided to open the circuit between the battery **60** and the indicator lamp **74** if the manual switch **70** is not pressed within a predetermined time after the dispensing mechanism has been operated. As explained above, the thermal relay **92** will be conductive at high resistance when the rectifier **82** first becomes conductive upon operation of the dispensing mechanism, and will remain in this state for a predetermined time (i.e., 4 minutes) depending upon the setting of the variable resistance **94.** After the predetermined period of time has elapsed without the manual switch **70** having been closed, the thermal relay **90** will be heated sufficiently to cause it to change to its low resistance state, and this decrease in resistance in the circuit causes a current surge which is transmitted to the gate of the rectifier **84** through a variable resistance **98** whereby the rectifier **84** becomes conductive. When the rectifier **84** becomes conductive, it establishes a circuit from the positive terminal of the battery **60,** through the solenoid **58,** relay **90,** rectifier **82,** rectifier **84,** the coil of relay **90,** and back to the negative terminal of the battery **60.** This circuit energizes the coil of relay **90** to pull it away from the left-hand contact toward the right-hand contact, and before the relay reaches the right-hand contact all circuits are opened from the battery **60,** and the rectifiers **82** and **84** become non-conductive thereby maintaining the circuits in an open condition even when the relay returns to the left-hand contact. Thus, the circuit from the battery **60** to the indicator lamp **74** will only remain closed for a predetermined time established by the thermal relay **92,** after which the circuit will automatically open and stop further drain on the battery **60.** However, it is important to recognize that even though all circuits from the battery **60** are open as described above it is still possible, at least for a period of time, for the user of the machine **10** to fill a dispensed balloon with helium by pressing the manual switch **70** because the capacitor **86** has been previously charged by the operation of the dispensing mechanism and the charge on the capacitor **86** will, when manual switch **70** is pressed, impose a bias on the base of the transistor **80** whereby it will become temporarily conductive to cause the solenoid **58** to become energized for a predetermined time as previously described. Accordingly, if the machine user fails to press the manual switch **70** within a predetermined time, the circuits from the battery **60** will be automatically opened to prevent unnecessary drain thereon, yet the machine user may thereafter satisfactorily inflate a balloon by pressing the manual switch **70** since the capacitor **86** will hold its charge for a relatively long time (i.e., several hours).

Summarizing, in the ordinary operation of the machine **10,** the user will turn the coin-operated dispensing mechanism to obtain a ballon, and this operation will activate a circuit from the battery **60** to energize the solenoid **58** when the manual switch **70** is pressed whereby the dispensed ballon can be filled with a predetermined quantity of helium, after which the entire circuit from battery **60** is opened to prevent drain thereon. This operation of the coin-operated dispensing mechanism also closes a circuit between the battery **60** and the indicator lamp **74** to cause the manual switch **70** to become lighted for indicating to the user that the manual switch **70** is ready for pressing, but this circuit for the indicator lamp **74** will automatically be opened when the manual switch **70** is pressed or, if the user fails to press the manual switch **70,** the circuit will automatically open after a predetermined period because of the action of thermal relay **92.** Thereafter, for a period of at least several hours, the user may still obtain helium by pressing the manual switch **70.**

Accordingly, the balloon dispensing machine **10** of the present invention is powered solely by a battery, whereby it can be located for use almost anywhere, including outdoor locations where electrical power is not available or indoor locations where electrical outlets are not readily accessible. Despite the fact that the machine **10** is battery powered, its electrical operating cir-

cuit insures that the battery **60** will not be drained under ordinary or even abnormal operating conditions, but the user of the machine **10** will nevertheless be able to obtain the necessary helium for inflating the dispensed balloon for a period of time after all of the battery circuits have been opened.

Also, it will be noted that while the total amount of helium dispensed during one operation of the machine **10** depends upon the complete discharge of the capacitor **86,** the total time helium is being dispensed through the nozzle **56** may be broken down into increments by selectively opening and closing the manual switch **70** whereby, for one coin-operated operation of the machine, more than one balloon can be serially attached to the nozzle **56** and filled if desired.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise to exclude any variation or equivalent arrangement that would be apparent from, or reasonably suggested by, the foregoing disclosure to the skill of the art.

I claim:

1. Apparatus for dispensing and filling balloons with gas including:

a. a supply of balloons

b. selectively operable means for serially dispensing individual balloons from said balloon supply;

c. balloon filling means including a supply of gas, nozzle means connected to said gas supply and adapted to have a balloon fitted thereon for filling with said gas, and selectively operable valve means for controlling the flow of gas from said gas supply to said nozzle means; and

d. control circuit means powered solely by a battery, and including electrical means for operating said valve means, a normally open manual switch, and circuit activating means operable in response to the operation of said dispensing means to automatically connect said battery in circuit with said valve operating means to cause energization thereof for a predetermined period of time when said manual switch is closed and to then automatically open the circuit containing said battery.

2. Apparatus for dispensing and filling balloons with gas as defined in claim **1** and further characterized in that said circuit activating means includes regulating means for selectively determining the length of said predetermined period said battery is connected in circuit with said valve operating means to energize the same.

3. Apparatus for dispensing and filling balloons with gas as defined in claim **1** and further characterized in that said circuit activating means includes a two-position switch operated between first and second positions by said dispensing means, and a capacitor connected in circuit with said battery to be charged thereby in said first position of said two-position switch and connected in circuit with said manual switch when said two-position switch is at said second position thereof, said capacitor discharging through said manual switch when the latter is closed to thereby cause said battery to be connected in circuit with said valve operating means to energize the same.

4. Apparatus for dispensing and filling balloons with gas as defined in claim **3** and further characterized in that said circuit activating means includes a relay controlled by a transistor to cause said battery to be connected in circuit with said valve operating means to energize the same when said transistor is conducting, and in that the base of said transistor is electrically biased by said capacitor during the discharge thereof through said manual switch when it is closed to cause said transistor to conduct during said discharge.

5. Apparatus for dispensing and filling balloons with gas as defined in claim **4** and further characterized in that a variable resistance is disposed between said capacitor and said transistor base to selectively regulate the bias imposed on said transistor base by said capacitor and thereby regulate the time during which said battery is connected in circuit with said valve operating means to energize the same.

6. Apparatus for dispensing and filling balloons with gas as defined in claim **1** and further characterized in that said apparatus further includes:

e. indicating circuit means connected to said battery and being closed by operation of said circuit activating means, said indicating circuit means including an indicator and means for automatically opening said indicating circuit means after it has been closed for a predetermined period of time.

7. Apparatus for dispensing and filling balloons with gas as defined in claim **6** and further characterized in that said indicator is a lamp, and in that said circuit opening means includes a thermal relay which is initially in a conductive state at a high resistance and which becomes conductive at a low resistance after the current flow therethrough generates a predetermined amount of heat.

8. Apparatus for dispensing and filling balloons with gas as defined in claim **7** and further characterized in that said indicator circuit includes a rectifier located in series with said battery, and indicator lamp and said thermal relay, and in that the gate of said rectifier is selectively connected to said battery by the operation of said circuit activating means to cause said battery to impose a bias on said rectifier gate whereby said rectifier will conduct.

9. Apparatus for dispensing and filling balloons with gas as defined in claim **8,** and further characterized in that said circuit opening means includes a relay operated in response to said thermal relay changing to said low resistance state thereof to open said indicating circuit whereby said rectifier becomes non-conductive.

10. Apparatus for dispensing and filling balloons with gas as defined in claim **2** and further characterized in that said manual switch may be selectively opened and closed to break up said predetermined period of time into increments whereby one or more balloons may be filled with gas following one operation of said circuit activating means.

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