# United States Patent [19]

**Siegel**

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## [54] AEROSOL SPRAY DISPENSER


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[51] **Int. Cl.** ..... **B67d 5/08**

[58] **Field of Search** ..... 222/70, 76, 182, 222/503; 239/70



[56] **References Cited**

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[57] **ABSTRACT**

An automatic aerosol spray dispenser of a type adapted to contain a replaceable aerosol can and operate the valve mechanism thereof at predetermined intervals for adjustable shorter periods. Timing of the first mentioned intervals is by means of a solid state timing device having a discharging condensor. The discharge of the condensor is employed to commence operation of a motor driving a cam which drives a valve-operating mechanism, and opens a switch in series with the motor at the completion of a spray cycle, this switch being closed with initiation of motor operation. Since the motor operates only during the spray cycle, and continuous current consumption is limited to the charging of the condensor, the device is suitable for dry cell operation.


**2 Claims, 6 Drawing Figures**

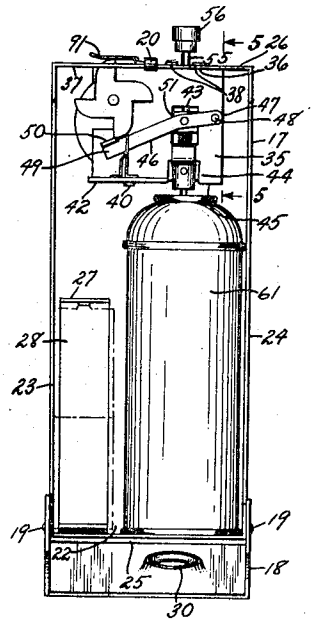


Fig.1

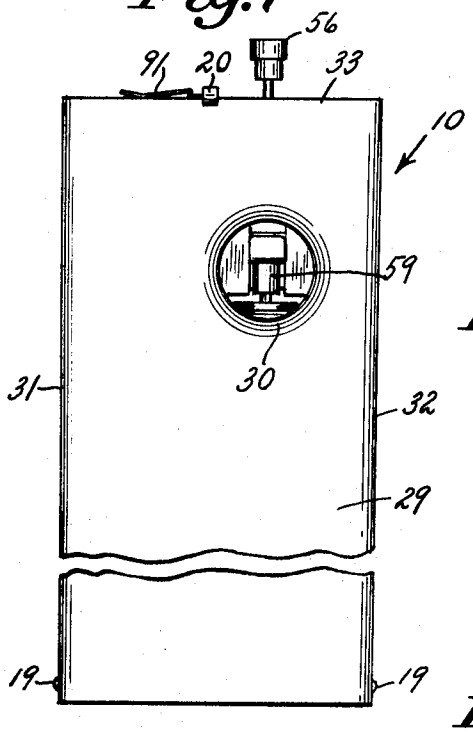



Fig.3

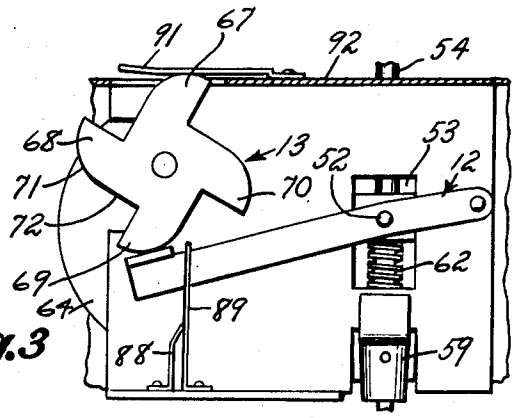



Fig.4

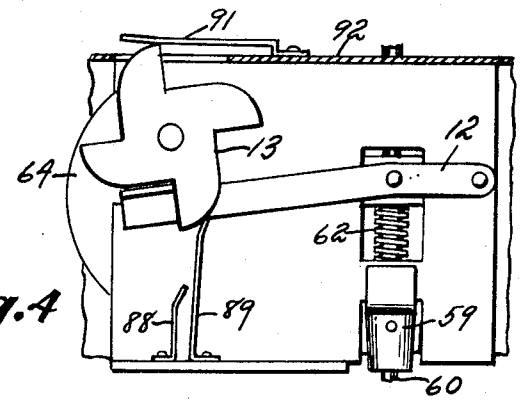



Fig.2

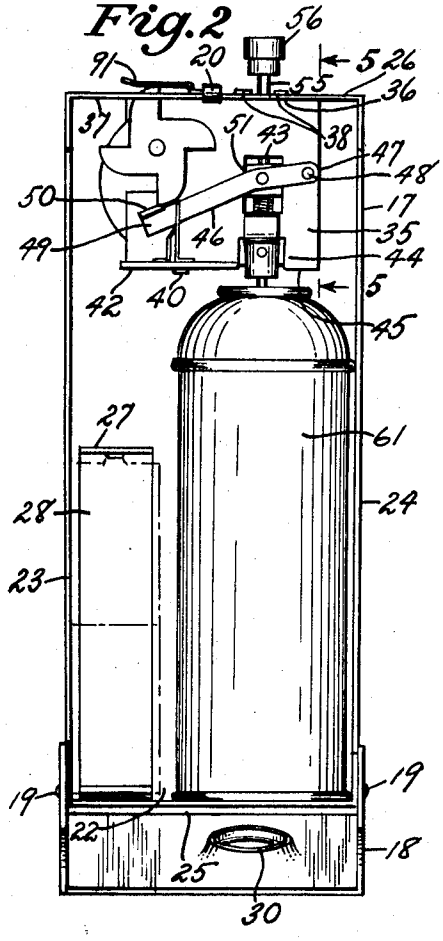



Fig.5

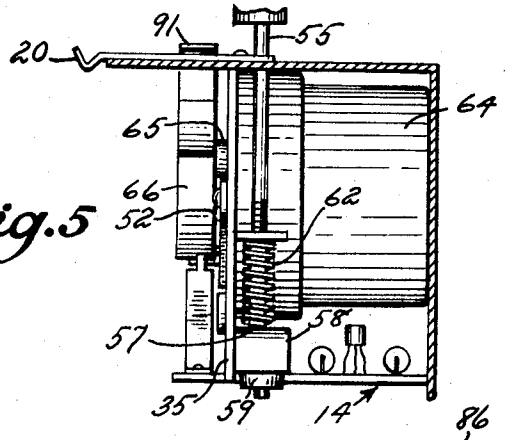
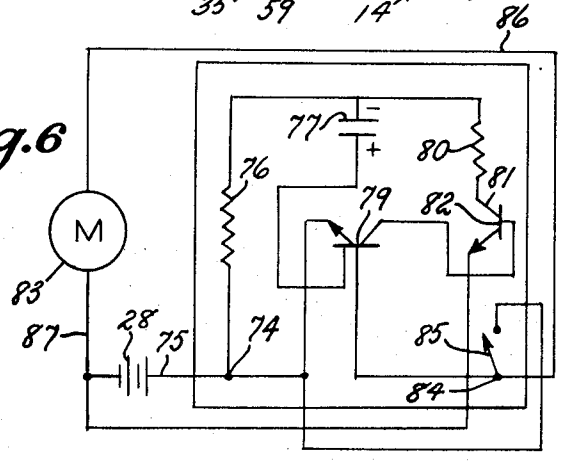



Fig.6



# AEROSOL SPRAY DISPENSER

This invention relates generally to the field of automatically operating aerosol spray dispensers, of a type adapted to contain a replaceable aerosol can, and operates the valve mechanism thereof at predetermined intervals for a spray cycle of a shorter interval. Devices of this general type are well known in the art, and the invention lies in specific constructional details, permitting the device to be manufactured at low cost, and to be powered by dry cells.

The advantages of automatic cyclic operation of aerosol spray dispensers are well understood by those skilled in the art, and need not be elaborated herein. Broadly speaking, such dispensers fall into two categories, one of which controls the amount of spray dispensed at each cycle by metering means, and the other of which obtains a metering action by control of the interval over which the valve on the aerosol can is depressed. Depending upon required design perameters, timing means have included synchronous clock motors, battery powered balance wheel clocks, mechanical clock work, and the like. Valve actuating means controlled by such clock work have included electrically operated solenoids, electric motors, springwork and the like, either directly operating the valve, or through levers, Geneva movements and the like. Each construction has offered various combinations of advantages and disadvantages, the more expensive mechanisms tending to be more reliable, at the expense of greater complexity, greater noise in operation, and greater overall bulk and weight.

With increasing use of devices of this type, there has been a persistent demand for construction which may be installed in areas where house current is not conveniently available, and which will nevertheless require servicing at relatively infrequent intervals. Such demands are not accommodated by clock work mechanisms which require winding, or a source of alternating current to provide synchronous motor operation. Battery powered balance wheel clocks do not offer sufficient power to open and close the dispensing valve of the can at the high speed required to prevent sputtering during the operating cycle. When such construction is coupled with a metering type dispenser, the total cost of the same tends to be quite high.

It is therefore among the principal objects of the present invention to provide an improved automatic aerosol dispenser of the above described class, in which the above mentioned disadvantages have been substantially eliminated.

Another object of the invention lies in the provision of any improved automatic aerosol dispenser capable of operation solely on small dry cells, with servicing intervals normally no greater than that required for the replacement of an exhausted aerosol can.

Another object of the invention lies in the provision of an improved battery powered automatic aerosol spray device in which the timing element is in the form of a transistorized solid state circuit employing a charging capacitor, the discharge of which is employed to initiate a spraying cycle, and in which the continuous current drain is of a very low order.

Another object of the invention lies in the provision of an improved automatic aerosol spray dispenser, in which without the need of metering structure, the timed cycle is accurately controlled by a battery powered motor.



A further object of the invention lies in the provision of an improved aerosol spray dispenser, in which both the timing mechanism and the valve operating mechanism may be operated from the same set of dry cells.

Yet another object of the invention lies in the provision of an improved aerosol spray dispenser possessed of the above advantages, in which the cost of fabrication may be of a reasonably low order, with consequent wide sale, distribution and use.

These objects, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawing, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIG. **1** is a front elevational view of an embodiment of the invention.

FIG. **2** is a front elevational view thereof, with the cover element removed for purposes of clarity, and illustrating the valve actuating mechanism at the completion of a spraying cycle.

FIG. **3** is a fragmentary front elevational view showing the commencement of a spraying cycle.

FIG. **4** is a similar fragmentary front elevational view showing the closing of the valve on an aerosol can, just prior to the completion of a spraying cycle.

FIG. **5** is a side elevational view.

FIG. **6** is a schematic wiring diagram of the timing element comprising a part of the embodiment.

In accordance with the invention, the device, generally indicated by reference character **10**, comprises broadly: a casing element **11**, container valve-actuating means **12**, motor driven camming means **13**, and solid state timing means **14**.

The casing element **11** is preferably formed from sheet metal, although, where desired, injection molded parts from synthetic resinous material are also suitable. The casing elements includes a main body member **17**, and a cover member **18**, pivotally associated therewith by pins **19**. A locking clip **20** maintains the cover member **18** in closed position.

The main body member **17** includes a planar base **22** suitable for mounting upon a vertically disposed wall (not shown), a pair of side walls **23**, **24**, a lower wall **25** and an upper wall **26**. The clip means **27** is mounted on the inner surface of the base **22** for supporting dry cells **28**.

The cover member **18** includes a forward wall **29** having a circular orifice **30** positioned to overlie the spray nozzle of an aerosol container. Side walls **31** and **32** overlie the side walls **23–24** of the main body member **17** when the upper edge **33** of the wall **29** engages the clip **20**.

The valve actuating means **12** includes a main plate or base **35**, the upper edge **36** of which abuts the inner surface **37** of the upper wall **26**. Locking tabs **38** extend through corresponding slots in the wall **26**, and a downwardly extending tab **40** penetrates a corresponding opening in an insulated plate **42** forming part of the timing means **14**. An upper slotted opening **43** extends through the plane of the plate **35**, and is axially aligned with a lower slotted opening **44** which extends to the lower edge **45** of the plate. A lever **46** is anchored for

pivotal movement at a first end **47** by a pintle **48**, and a second end **49** thereof is modified to form a cam follower means **50**. A medial point **51** is penetrated by a pintle **52** which engages a threaded nut member **53** engaged by a threaded shaft **54**. The upper end **55** of the shaft penetrates the upper wall **26** and supports a manually engagable member **56** threadedly engaged therewith. The lower end **57** engages a resilient clamp **58** which engages the vented nozzle **59** supported by the stem **60** of an aerosol container **61**. A spring **62** surrounds the shaft **54** between the nut member **53** and the clamp **58**, and serves to allow a limited degree of nutation of the clamp with respect to the shaft.

The motor driven camming means **13** includes a small electric motor and reduction gears (not shown) disposed within a housing **64** secured to the plate **35**. The output shaft **65** thereof penetrates the plate **35** and mounts a cam member **66** having four radially extending portions **67**, **68**, **69** and **70**. Each of the portions **67–70** includes a curved cam face **71** separated from the other faces by recesses **72**.

The solid state timing means **14** may be of a well known transistorized type, and as best understood from a consideration of FIG. **6** in the drawing, includes a terminal **74** interconnected by a conductor **75** to replaceable dry cells **28**. A resistor **76** of approximately 18 meg ohm value is connected to the terminal **74**, and slowly charges a condensor **77** in turn connected to the cathode **78** of a first transistor **79**. A second resistor **80** of approximately 180 ohms resistence connects to the cathode **81** of a second transistor **82** to provide bias voltage for the transistor **79**. When the transistor **79** becomes conductive, the condensor **77** is discharged to a terminal **84** of a cam operated switch **85** and to a conductor **86** to the motor **83**. A return conductor **87** connects the motor to the battery. This discharge will provide a sufficient electrical impulse to commence operation of the motor, whereby the cam member **66** is driven a short distance.

## OPERATION

Operation of a timing cycle will be best understood from a consideration of FIGS. **2**, **3** and **4** in the drawing. Normally, during the interval in which the condensor **77** is slowly charging, the device will be in the position shown in FIG. **2**, in which the blades **88** and **89** of the switch **85** are maintained in open condition by contact with one of the radially extending portions **67–70** of the cam member **66**. With the discharge of the condensor, the motor commences operation, and a slight movement of the engaged portion **67–70** disengages the blade **89**, so that the switch closes under resilient action. Current then flows directly from the battery to the motor, which rotates the cam member **66** resulting in depression of the lever **46** until the cam face **71** has parted contact with the cam follower member **50**. Once the lever **46** is released, the valve in the aerosol can closes, thus ending spraying of the contents of the can. Immediately thereafter, the cam face again opens the switch **85**, thus terminating the flow of current to the motor, and the motor is quickly braked to a stop by the contact of an oppositely disposed portion **67–70** with a resilient brake **91** on an upper surface **92** of the upper wall **26**.

The condensor **77** again recharges over the predetermined interval, until it again reaches the predetermined degree of charge, at which time the cycle is repeated. Should non-automatic operation be desired, for any reason, this can be obtained by pressing downwardly on the manually engageable member **56**, wherein the motion is transmitted directly through the engagable **54** to the valve of the aerosol can. Rotation of the manually engagable member **56** will also result in transmission of motion through the nut member **53** to the lever **46**, to a point where the valve is also open, and the contents of the can may then be continuously discharged.

I wish it to be understood that I do not consider the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

I claim:

**1**. In an automatic aerosol spray dispenser for use with a replaceable aerosol can, the improvement comprising: a casing element having means for retaining said can in relatively fixed position, valve actuating means including a lever mounted for pivotal movement at one end thereof with respect to said casing, and having means thereon engaging said can, and cam following means on an oppositely disposed end thereof; motor means disposed within said casing element having an output shaft, and camming means on said shaft in the area of said cam follower means to periodically directly contact the same; solid state timing means including a chargeable condensor, battery means powering said timing means and said motor means, and switch means in series with said motor means and operated by said camming means, whereby: upon the charging of said condensor of said timing means to a predetermined level, and the discharge thereof to said motor means, said motor means will commence operation sufficient to move said camming means to a position wherein said switch closes to cause said motor means to be powered directly from said battery means for the remainder of a spraying cycle terminated by said camming means again contacting and opening said switch; said camming means including a four-lobed cam directly contacting said cam follower means and said switch means, whereby said cam rotates 90° for each cycle of operation; said valve actuating means including a nut on said lever, a threaded shaft engaging said nut and extending toward said can, and clamping means on an end of said shaft engaging a moveable valve-associated member on said container, whereby rotation of said shaft in said nut member may adjust the relation between said clamping means and said cam follower means on said lever.

**2**. Structure in accordance with claim **1**, in which said threaded shaft projects outwardly of said casing element at an opposite end thereof to permit manually imparted axial motion to be transmitted directly to said clamp.

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