

Jan. 23, 1962

A. N. MONTGOMERY
TIMED SPRAY DISPENSERS

3,018,056

Filed Sept. 29, 1960

3 Sheets-Sheet 1

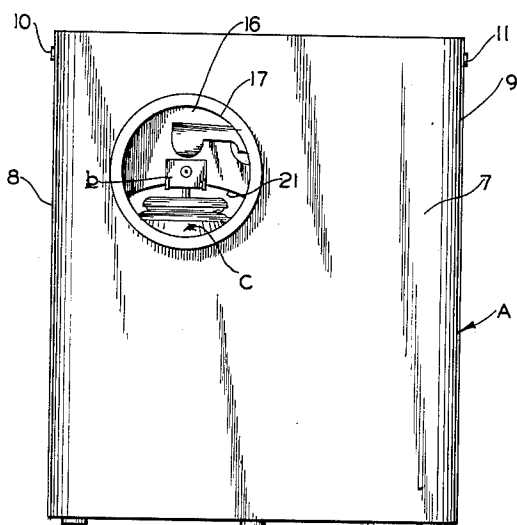


FIG. 1

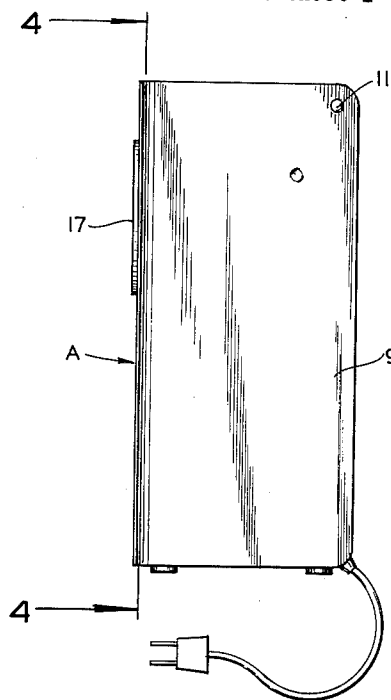


FIG. 2

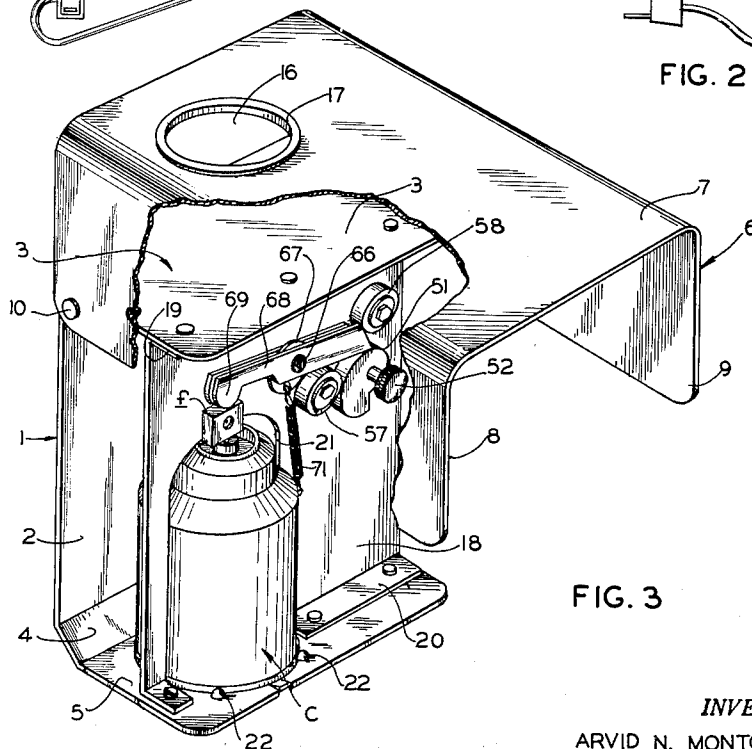


FIG. 3

INVENTOR.
ARVID N. MONTGOMERY
BY *Alfred W. Perchett*
ATTORNEY

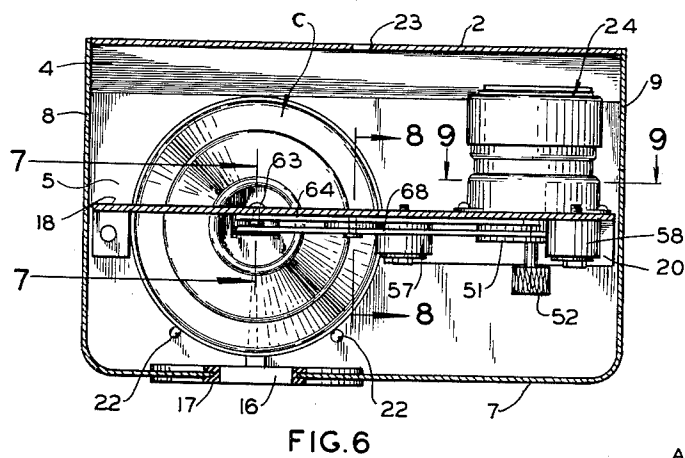
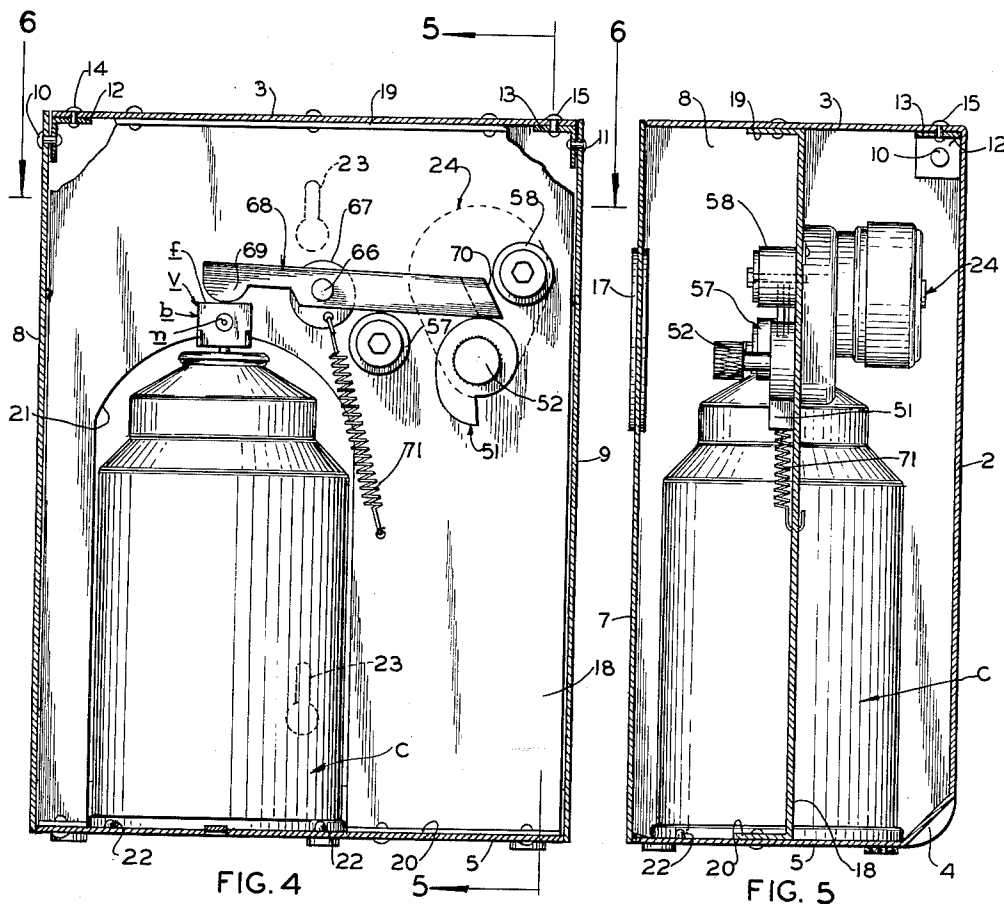
Jan. 23, 1962

A. N. MONTGOMERY
TIMED SPRAY DISPENSERS

3,018,056

Filed Sept. 29, 1960

3 Sheets-Sheet 2



INVENTOR.
ARVID N. MONTGOMERY
BY *Alfred W. Hetcher*
ATTORNEY

Jan. 23, 1962

A. N. MONTGOMERY
TIMED SPRAY DISPENSERS

3,018,056

Filed Sept. 29, 1960

3 Sheets-Sheet 3

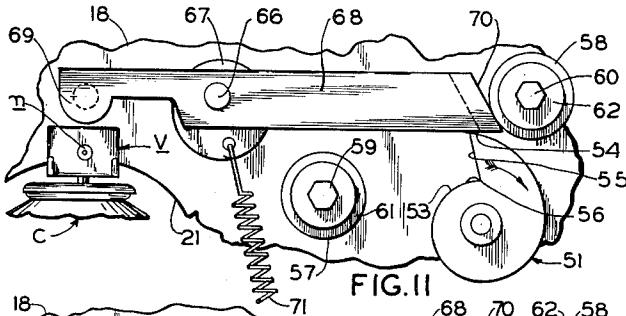


FIG. 11

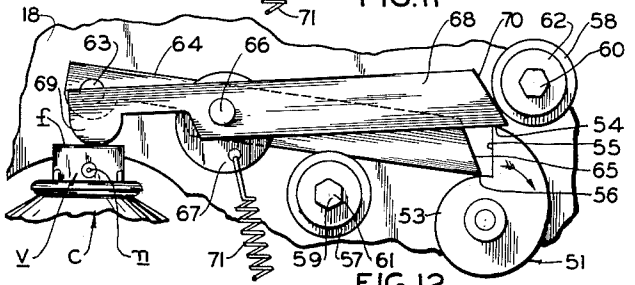


FIG. 12

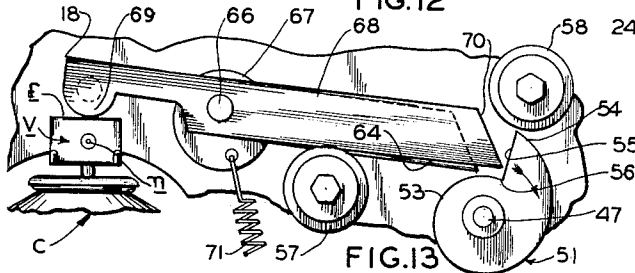


FIG. 13

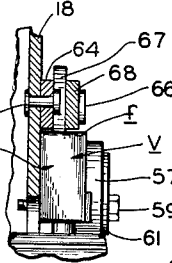


FIG. 7

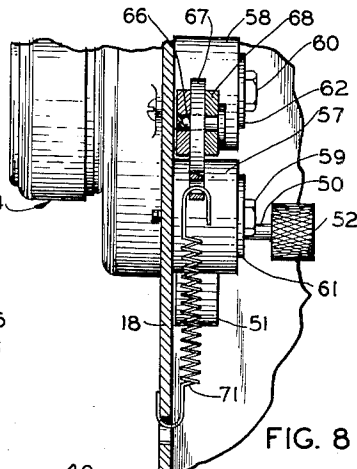


FIG. 8

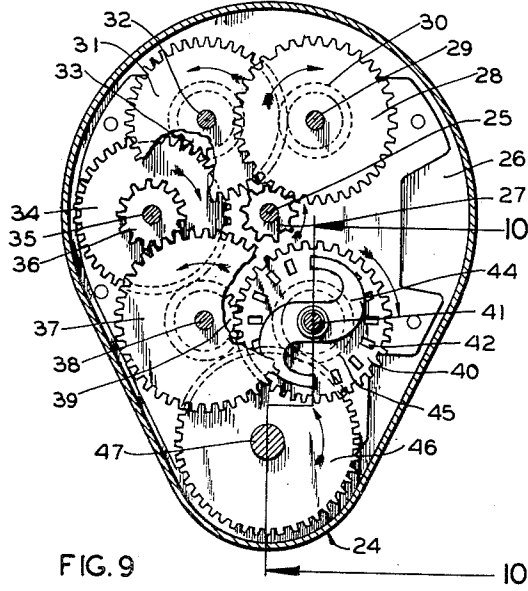


FIG. 9

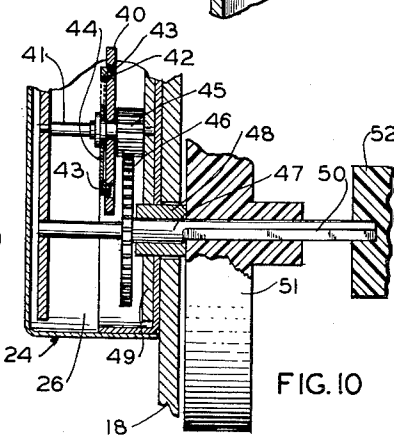


FIG. 10

INVENTOR.
ARVID N. MONTGOMERY
BY
Alfred W. Petchaft
ATTORNEY

1

3,018,056

TIMED SPRAY DISPENSERS

Arvid N. Montgomery, Owensville, Ind., assignor to Montgomery Manufacturing Company, Inc., Owensville, Ind., a corporation of Indiana

Filed Sept. 29, 1960, Ser. No. 59,293

10 Claims. (Cl. 239-70)

This invention relates in general to certain new and useful improvements in timed spray dispensers and, more particularly, to a device for automatically injecting a deodorizing or germicidal spray into the atmosphere of a room or similar enclosure at timed intervals.

At the present time, there are a number of germicidal and deodorizing preparations which can be suitably pressure contained in combination with an aerosol propellant. Such containers are commonly provided with a manually operable push-type valve which is normally closed and will, upon being pushed inwardly toward the container, dispense a spray laden with a suitable concentration of the deodorizing or germicidal material. Such devices are reasonably satisfactory for domestic use inasmuch as the housewife ordinarily wishes merely to deodorize the kitchen and dining room of her home after cooking particles of food which may have a characteristic or pungent odor or for other similar reasons. Under such circumstances, she will spray the room rather liberally once or twice during the course of the cooking procedure with an aerosolized deodorant and the results will be fairly effective. Similarly, in the use of germicidal materials for spraying the atmosphere of a bedroom where a child may have a cold or some other respiratory infection or for use in rooms where persons are susceptible to such infections and an effort is being made to lower the incidence of infection by reason of the use of airborne germicides, the housewife may again manually manipulate the valve of an aerosolized container and inject into the atmosphere a rather copious quantity of the germicidal spray. Ordinarily this may be done once or twice during the course of a day.

Obviously, such forms of usage are extremely wasteful of material, since it is virtually impossible for a user to estimate the amount of material which is being consumed in a single manual application of the type above described. Moreover, it has been shown that aerosolized deodorants and germicidal preparations are highly effective in relatively low concentrations provided that the concentration is maintained more or less continuously at or slightly above the effective level.

It should also be apparent that the manual dispensing of aerosolized sprays is relatively wasteful since it is virtually impossible for an individual to estimate accurately the amount of spray which may be diffused into the atmosphere merely by holding down the valve for some arbitrarily selected interval. Even though an individual makes every effort to hold the valve open for a precise interval, the length of such intervals and the intermittency thereof cannot be accurately maintained. However, even if it could be assumed that some individuals might become very adept and achieve reasonably high accuracy in the manual use of aerosolized materials, it still would be impossible to achieve great accuracy and avoid waste, because the amount of material which may be dispensed as a result of any particular manipulation of the valve is a function of temperature. If the container happens to have been stored in a relatively cool place prior to use, the amount of spray dispensed during a given interval will be below normal. On the other hand, if the container has been stored in a relatively warm place prior to use, the opposite result will be achieved. Even the temperature factor resulting from the hand in which the container is held may have some bearing on the accuracy

2

with which the spray is dispensed. While this may be of no great importance to the housewife who uses a so-called "deodorant bomb" infrequently, it becomes a matter of substantial economic importance in commercial uses, such as restaurants, offices, hotel lobbies, public washrooms, and the like.

It is, therefore, the primary object of the present invention to provide for the automatic intermittent dispensing of pressurized deodorant, air purifying, germicidal, antiseptic, and insecticidal sprays.

It is another object of the present invention to provide a device of the type stated which is capable of dispensing pressurized deodorant, air purifying, germicidal, antiseptic, and insecticidal sprays in controlled or measured quantities.

It is a further object of the present invention to provide a device of the type stated which is capable of accurate and highly reliable time-controlled operation.

It is also an object of the present invention to provide a device of the type stated which is not only rugged in construction, but can be manufactured with a minimum of moving parts and is, therefore, extremely economical both as to original cost and subsequent maintenance.

It is an additional object of the present invention to provide an aerosol spray dispenser of the type stated in which the aerosolized container can be inserted, removed, and replaced conveniently and, when in place, will be firmly held in operative position.

With the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (three sheets)—

FIG. 1 is a front elevational view of a time-controlled aerosol spray dispenser constructed in accordance with and embodying the present invention;

FIG. 2 is a side elevational view of the aerosol spray dispenser;

FIG. 3 is a perspective view, partly broken away and in section, of the aerosol spray dispenser of the present invention;

FIG. 4 is a vertical sectional view taken along line 4-4 of FIG. 2;

FIG. 5 is a transverse sectional view taken along line 5-5 of FIG. 4;

FIG. 6 is a horizontal sectional view taken along line 6-6 of FIG. 4;

FIGS. 7, 8, and 9 are fragmentary sectional views taken along lines 7-7, 8-8, and 9-9, respectively, of FIG. 6;

FIG. 10 is a fragmentary sectional view taken along line 10-10 of FIG. 9; and

FIGS. 11, 12, and 13 are fragmentary elevational views of the cam actuated mechanism forming a part of the present invention showing said mechanism in its several positions.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of the present invention, A designates an aerosol spray dispenser comprising a framework 1 formed preferably of sheet metal and including a vertical back wall 2 integrally connected across its top margin to a horizontal top wall 3 and across its bottom wall by means of an angularly bent, relatively narrow, flange 4 to a horizontal bottom wall 5. The forward corners of the top wall 3 and the bottom wall 5 are suitably rounded off and the marginal edges thereof are arranged in vertically aligned registration so as to fit snugly and conformably within the confines of a U-shaped cover member 6 integrally including a flat front wall 7 and parallel side walls 8, 9. The cover member 6, at the upper rear corners of its side walls 8, 9, is pivotally mounted, by

3

means of headed pivot pins 10, 11, upon small L-shaped brackets 12, 13, which are, in turn, secured by means of rivets 14, 15, to the top wall 3. The cover member 6 is shaped to fit down in closure-forming position around the framework 1, as shown in FIGS. 1 and 2, and can optionally be swung upwardly into open position, as shown in FIG. 3, so as to afford convenient access to the interior of the framework 1, for purposes presently more fully appearing.

Finally, the front wall 7 of the cover member 6 is provided with a relatively large circular aperture 16, the margin of which is preferably bounded by a press-fitted plastic trim-ring 17.

Disposed in outwardly spaced relation to the rear wall 2 and extending vertically between the top and bottom walls 3, 5, is an intermediate wall or partition 18 integrally provided across its top and bottom margins with horizontal flanges 19, 20, which rest snugly against, and are riveted to, the top and bottom walls 3, 5, respectively. Moreover, the intermediate wall or partition 18 is provided with a relatively large opening 21 having the shape of an inverted U, which opens at its lower end upon the bottom wall 5 and is of such size and shape as to accommodate, and loosely embrace, a pressurized aerosol container C.

The aerosol container C may be of any conventional design or construction and, therefore, is not specifically illustrated or described herein, it being sufficient for present purposes merely to note that the container C is provided at its upper end with a conventional type of vertically reciprocating or so-called "push-type" spray valve *v* including a relatively large plastic push-button *b* having a flat horizontal top face *f* and a forwardly presented horizontal spray opening or so-called "nozzle" *n*. Preferably the bottom wall 5 is provided with a plurality of upstruck semicircular bosses or protuberances 22 which are located so as to engage the forward portion of the bottom rim of the container C and hold it in centralized position within the opening 21. It should be noted in this connection that the forward bottom margin of the angular flange 4 is so located as to serve as a rear stop for the bottom rim of the container C and that, when so positioned, the container C is located so that the flat top surface *f* of the valve *v* is positioned a short distance forwardly of the partition or intermediate wall 18, all as best seen in FIGS. 3 and 6.

Preferably, though not necessarily, the back wall 2 of the framework 1 is centrally provided with two vertically spaced bayonet slots 23 by which the dispenser A may be conventionally hung from suitably headed fasteners which can be driven into a wall or other similar supporting structure. Since this method of attachment to a wall and the headed fasteners used for such positioning are entirely conventional, such fasteners are not described or shown herein.

Riveted or otherwise suitably fastened upon the rear face of the intermediate wall or partition 18 is a synchronous electric motor 24 of the type commonly used in clocks, washing machine timers, and similar devices. The motor 24 includes a suitably journaled drive shaft 25 which projects forwardly into a gear compartment 26 and is provided with a drive pinion 27 which meshes with a spur gear 28, the latter being, in turn, rigidly mounted upon an idler shaft 29 which is journaled within the gear compartment 26. Also rigidly mounted upon the shaft 29 for rotation with the spur gear 28 is a pinion 30 which is in meshing engagement with a spur gear 31 rigidly mounted upon an idler shaft 32 also suitably journaled within the gear compartment 26. Rigidly mounted on the idler shaft 32 for rotation with the spur gear 31 is a pinion 33 which is in meshing engagement with a spur gear 34 rigidly mounted on an idler shaft 35 which is also suitably journaled within the gear compartment 26. Rigidly mounted on the idler shaft 35 for rotation with the spur gear 34 is a pinion 36 which meshes with a

4

spur gear 37 rigidly mounted on an idler shaft 38 also suitably journaled in the gear compartment 26. Rigidly mounted on the idler shaft 38 for rotation with the spur gear 37 is a pinion 39 which meshes with a clutch gear 40 rotatably mounted on a shaft 41 which is suitably journaled in the gear compartment 26.

The clutch gear 40 is provided intermediate its center and its outer periphery with a uniformly spaced series of annularly arranged rectangular apertures 42 for engagement with laterally projecting ears 43 formed integrally on the diametrically opposed ends of an S-shaped spring-plate 44, the latter being rigidly mounted upon the shaft 41 so as to establish clutch-like connection between the spur gear 40 and the shaft 41. Also rigidly mounted on the shaft 41 is a pinion 45 which meshes with a spur gear 46 rigidly mounted on a main shaft 47 which is suitably journaled in, and extends across, the gear compartment 26 and projects through a sleeve bearing 48 which is mounted in the forward wall 49 of the gear compartment 26 and also through the partition or intermediate wall 18. At its forwardly projecting end, the main shaft 47 is integrally provided with a splined section 50 for fixed engagement with a high-rise timing cam 51 which is positioned slightly forward of the forwardly presented face of the partition or intermediate wall 18. The splined section 50 projects forwardly beyond the timing cam 51 and is provided with a setting knob 52 having a knurled surface so that the knob can be easily grasped between the fingers and turned.

The spring tension within the S-shaped spring-plate 44 is such that the ears 43 will normally be engaged in a diametrically opposed pair of apertures 42 of the clutch gear 40. Thus, under normal conditions, the constant speed rotation of the motor shaft 25 will be transmitted through the pinion 27 and the above-described clockwork train to the shaft 41, pinion 45, and, thence, to the spur gear 46, which, in turn, will rotate the timing cam 51. If, however, it is necessary or desirable to change the setting of the timing cam 51, this may be readily accomplished by manual rotation of the main shaft 47 through the application thereto of sufficient manual force to override the resilient connection between the S-shaped spring-plate 44 and clutch gear 40.

The timing cam 51 is formed with a convolute peripheral surface 53 which increases in radial distance from the center of the main shaft 47 to a high point 54 and then drops sharply back across a radial shoulder 55 to an initial low point 56. Rigidly mounted on, and projecting forwardly from, the partition or intermediate wall 18 in proximate relation to the timing cam 51 are cylindrical rubber bumpers 57, 58, which are respectively held in place by means of bolts 59, 60, and washers 61, 62, all as best seen in FIGS. 11, 12, and 13, and for purposes presently more fully appearing.

Mounted in, and projecting forwardly from, the partition or intermediate wall 18 is a pivot pin 63 which is located in upwardly spaced relation to the center-point of the arcuate top margin of the container-receiving opening 21. Furthermore, the pivot pin 63 is spaced upwardly from the uppermost position of the top surface *f* of the push-button *b*. Rockably mounted upon the pivot pin 63 and extending laterally therefrom across the front face of the partition or intermediate wall 18 is a primary link 64 which is provided at its opposite end with a beveled face 65 and at such end rides upon the surface 53 of the timing cam 51. Intermediate its ends, the primary link 64 is provided with a floating pivot pin 66 which supports a relatively large spacer disk 67. Rockably mounted on the floating pivot pin 66 is a secondary link 68 which is somewhat similar in shape to the primary link 64 and is provided at one end with a downwardly extending arcuate contact-ear 69 located directly above the push-button *b* of the container valve *v*. At its other end, the secondary link 68 is somewhat longer than the primary link 64 and is provided with a beveled face 70. At this end, the

5

secondary link 68 also rides upon the surface 53 of the timing cam 51. Hooked at its upper end to the spacer disk 67 and at its lower end to the partition or intermediate wall 18 is a tension spring 71 which biases both the primary and secondary links downwardly into engagement with the timing cam 51.

As the timing cam 51 rotates in a clockwise direction, as shown in FIG. 11, the high point 54 will approach an upper position and will simultaneously lift the primary and secondary links to the horizontal position shown in FIG. 11. In this position, the beveled face 70 of the secondary link will come into abutment against the rubber bumper 58 and, thus, the secondary link 68 will be held in this upper or approximately horizontal position for several instants as the timing cam 51 rotates to the position shown in FIG. 12. In this latter position, the high point 54 of the timing cam 51 will pass beyond the end of the primary link 64 and the latter will drop down quickly to its lowermost position in which its downwardly presented longitudinal edge will abut against the bumper 57 and the cam engaging end of the primary link 64 will be held slightly up away from contact with the surface 53 of the timing cam 51.

As the primary link drops down to the position shown in FIG. 12, the floating pivot pin 66 will swing downwardly in an arc, centering upon the center of the pivot pin 63 and the arcuate contact-ear 69 of the secondary link 68 will move downwardly against the surface *f* of the push-button *b*, thereby depressing the push-button *b* and opening the valve *v* of the container to allow a burst of spray to issue from the nozzle *n*. The secondary link 68 will remain in the position shown in FIG. 12 and the push-button *b* will be held down for a predetermined increment of time during which the timing cam 51 will rotate from the position shown in FIG. 12 to the position shown in FIG. 13. When the timing cam 51 reaches the position shown in FIG. 13, the high point 54 thereof will pass beyond the end of the secondary link 68 and the latter will drop down into substantial coincidence with the primary link 64. During this increment of time, the floating pivot pin 66 remains stationary and acts as a fixed fulcrum for the secondary link 68 so that the secondary link 68 is free to be shifted upwardly by the force of the spring which is built into the valve *v* of the container *C* and the valve *v* will, thus, return to closed position.

It will be evident, therefore, that, by reason of the successive rocking action of the primary link 64 and the secondary link 68, the valve *v* will remain open for a timed increment and will, therefore, emit a precisely timed burst of spray. Inasmuch as the aerosol fluid has the characteristics of a refrigerant liquid, the pressure within the container *C* will always remain at a substantially constant pressure for the particular ambient temperature to which the container *C* is subjected as long as any appreciable quantity of the propellant within the container *C* is in the liquid phase. Since room temperature in offices, dwellings, and the like, will ordinarily fall somewhere within the range of 60° F. to 90° F., the effect of such variations in ambient temperature will not, for practical purposes, result in any substantial changes in the pressure-equilibrium within the container. Therefore, by precisely controlling the timed interval of the spray burst, it is possible to obtain a reasonably accurate quantitative metering of the spray burst.

When it is necessary to replace a container *C* after its contents have been exhausted, the cover 6 is swung up to the position shown in FIG. 3 and the container *C* slipped out of position and replaced with a fully charged container *C*. Thereupon, the cover 6 is swung down to the positions shown in FIGS. 1 and 2. It will be noted that, in the closed position, the aperture 16 will be approximately concentric with the nozzle *n* of the container valve *v* so that the spray burst intermittently issuing from the nozzle *n* will pass freely through the aperture 16 and

6

enter the atmosphere of the room in which the spray dispenser is located.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the timed spray dispensers may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A spray dispenser comprising a frame having means for holding an aerosol container which is provided with a push-type valve, clock means operatively carried by the frame, a cam operatively driven by the clock means, said cam having a relatively quick drop-off shoulder defining a high point, first lever means actuated by the cam for actuating the valve to open position, and second lever means also actuated by the cam, said second lever means being substantially longer than the first lever means and having an extended end, said second lever being positioned to have its extended end ride on the cam so as to drop from the high point of the cam at a predetermined successive time increment following opening of the valve, whereby to close the valve.

2. A spray dispenser comprising a frame having means for holding an aerosol container which is provided with a push-type valve, clock means operatively carried by the frame, a clutch having a driven member and a driving member, said driven member being connected to the clock means, a cam operatively connected to the driving member of the clutch, said cam having a relatively quick drop-off shoulder defining a high point, a lever actuated by the cam for actuating the valve to open position, said lever being positioned to ride on said cam, whereby said lever will actuate the valve when the lever and high point are in contact, and means also actuated by the cam at a predetermined successive time increment following opening of the valve, whereby to close the valve.

3. A spray dispenser comprising a frame having means for holding an aerosol container which is provided with a push-type valve, clock means operatively carried by the frame, a cam operatively driven by the clock means, a first lever pivotally mounted at one end on the frame and riding at its other end on the cam, a second lever pivoted intermediate its ends upon the first lever, said second lever being provided at one end with an element adapted to actuate the valve, said second lever also riding at its other end on the cam and being somewhat longer at such end than the first lever, whereby to drop off of the cam later than the first lever so that the first lever as it drops off the cam will cause the second lever to open the valve and the second lever as it subsequently drops off the cam will cause said valve to close, thereby establishing a recurrent timed interval during which the valve is open.

4. A spray dispenser comprising a frame, a housing mounted on said frame, means for holding an aerosol container enclosingly disposed within said housing, said aerosol container being provided with a push-type valve, means for expelling a spray from the container outwardly of the housing, positioning means within said housing for aligning said nozzle with said last-named means, clock means operatively carried by the frame, a cam operatively driven by the clock means, said cam having a relatively quick drop-off shoulder defining a high point, first lever means actuated by the cam for actuating the valve to open position, and second lever means also actuated by the cam, said second lever means being substantially longer than the first lever means and having an extended end, said second lever being positioned to have its extended end ride on the cam so as to drop from the high point of the cam at a predetermined successive time increment following opening of the valve, whereby to close the valve.

5. A spray dispenser comprising a frame, a housing

7

mounted on said frame, means for holding an aerosol container enclosingly disposed within said housing, said aerosol container being provided with a push-type valve, means for expelling a spray from the container outwardly of the housing, positioning means within said housing for aligning said nozzle with said last-named means, clock means operatively carried by the frame, a cam operatively driven by the clock means, a first lever pivotally mounted at one end on the frame and riding at its other end on the cam, a second lever pivoted intermediate its ends upon the first lever, said second lever being provided at one end with an element adapted to actuate the valve, said second lever also riding at its other end on the cam and being somewhat longer at such end than the first lever, whereby to drop off of the cam later than the first lever so that the first lever as it drops off the cam will cause the second lever to open the valve and the second lever as it subsequently drops off the cam will cause said valve to close, thereby establishing a recurrent timed interval during which the valve is open.

6. A spray dispenser comprising a frame having means for holding an aerosol container which is provided with a push-type valve, clock means operatively carried by the frame, a cam rigidly mounted on a shaft that is operatively driven by the clock means, said cam having a convolute peripheral surface which increases in a radial distance from the center of the shaft to a high point and drops back across a radial shoulder to an initial low point, a first lever pivotally mounted at one end on the frame and riding at its other end on the cam, a second lever pivoted intermediate its ends upon the first lever, said second lever being provided at one end with an element adapted to actuate the valve, said second lever also riding at its other end on the cam and being somewhat longer at such end than the first lever; as such cam turns the first lever will drop off of the high point to the low point thereon and cause the second lever to open the valve and the second lever as it subsequently drops off the cam will cause said valve to close, thereby establishing a recurrent timed interval during which the valve is open.

7. A spray dispenser comprising a frame having means for holding an aerosol container which is provided with

8

a push-type valve, clock means operatively carried by the frame, a cam operatively driven by the clock means, a first lever pivotally mounted at one end on the frame and spaced upwardly from the uppermost position of said push-type valve, said first lever riding at its other end on the cam, a second lever pivoted intermediate its ends upon the first lever, said second lever being provided at one end with an element adapted to actuate the valve, said second lever also riding at its other end on the cam and being somewhat longer at such end than the first lever, whereby to drop off of the cam later than the first lever so that the first lever as it drops off the cam will cause the second lever to open the valve and the second lever as it subsequently drops off the cam will cause said valve to close, thereby establishing a recurrent timed interval during which the valve is open.

8. The spray dispenser of claim 3 wherein the first and second levers lie in substantially marginally superimposed relationship when the valve is in the closed position.

9. The spray dispenser of claim 3 wherein the pivotal connection of the first lever and frame and the pivotal connection of the second lever and first lever are spaced upwardly from the uppermost position of the push-type valve.

10. The spray dispenser of claim 6 wherein the first and second levers are in substantially horizontal marginally superimposed relationship when they are raised by the high point of said cam; as said cam rotates said first lever will fall from the high point to the low point and the pivotal connection of said first and second levers will swing arcuately downward, causing said second lever to open said valve.

References Cited in the file of this patent

UNITED STATES PATENTS

624,733	Barnikel	May 9, 1899
2,554,260	Mueller	May 22, 1951
2,592,024	Goodroad et al.	Apr. 8, 1952
2,613,108	Kraus	Oct. 7, 1952
2,830,528	Arnett	Apr. 15, 1958
2,967,643	Edelstein et al.	Jan. 10, 1961