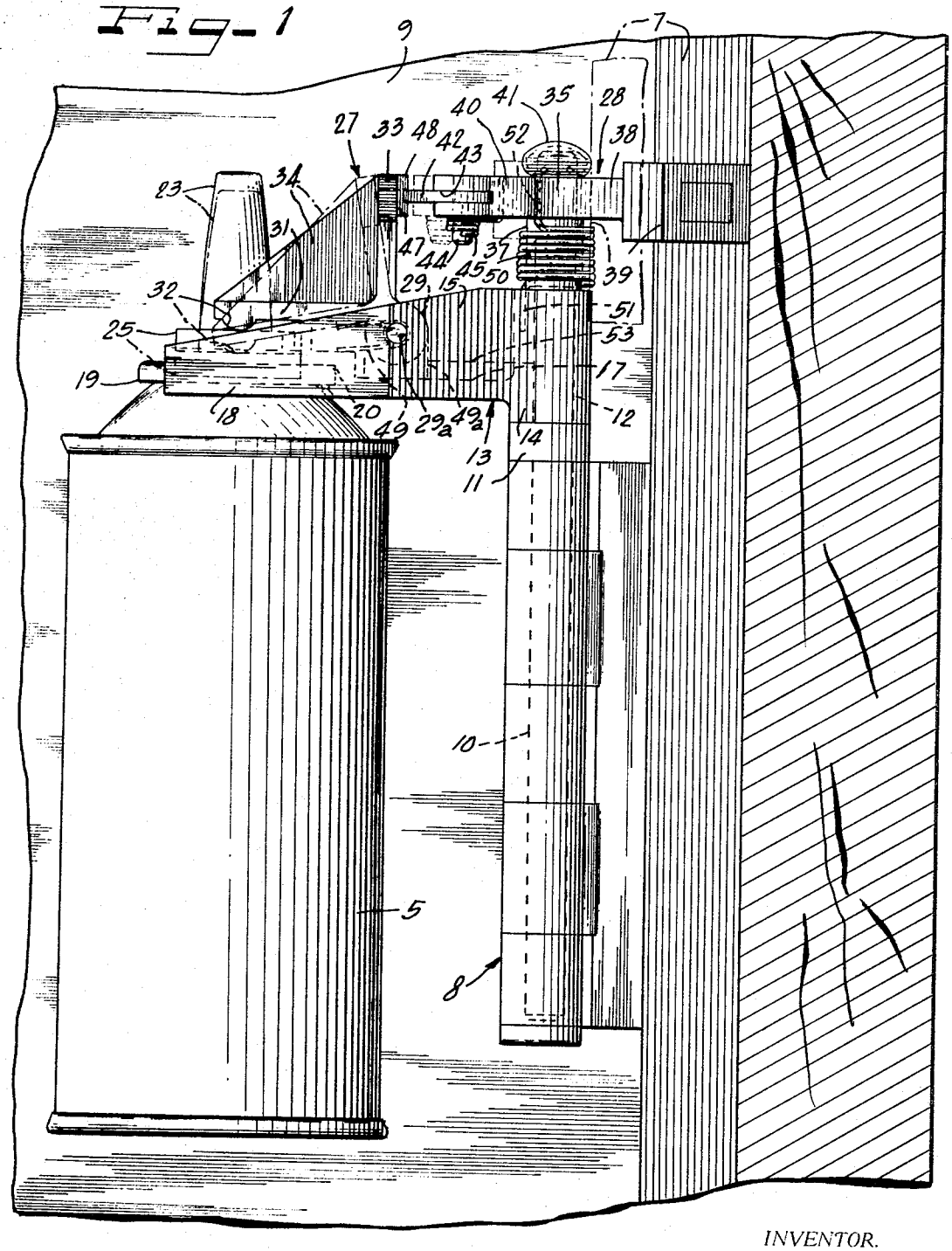
May 9, 1967 H. K. GRAVES 3,318,489

DOOR OPERATED SPACE CONDITIONING DISPENSER

Filed Dec. 6, 1965 2 Sheets-Sheet 1

Fig. 1



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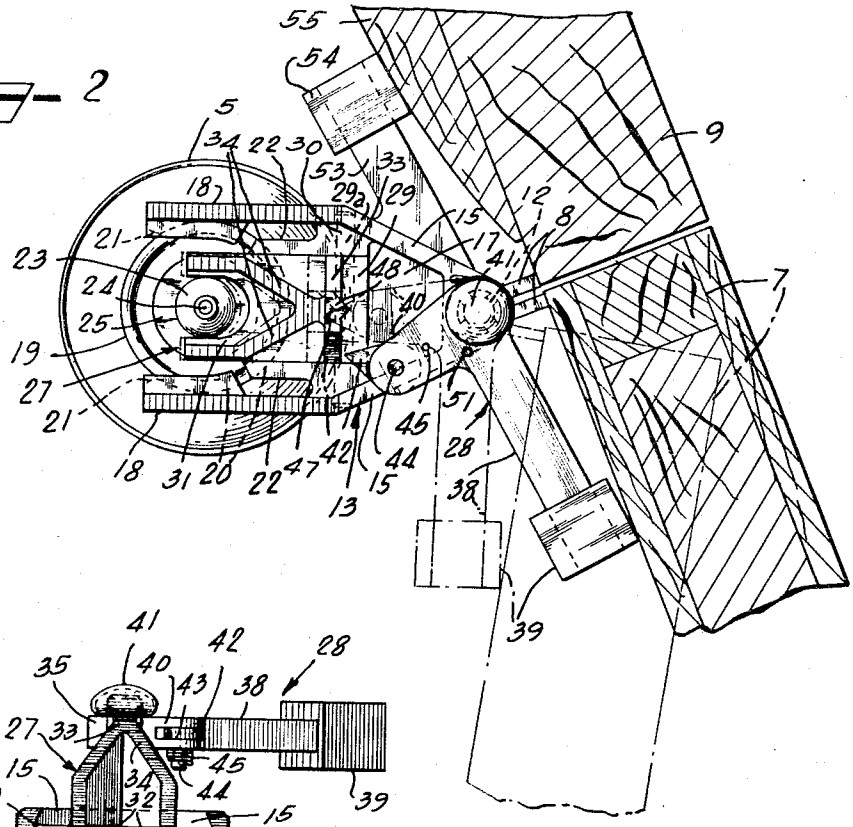
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May 9, 1967 H. K. GRAVES 3,318,489

DOOR OPERATED SPACE CONDITIONING DISPENSER

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Fig. 2



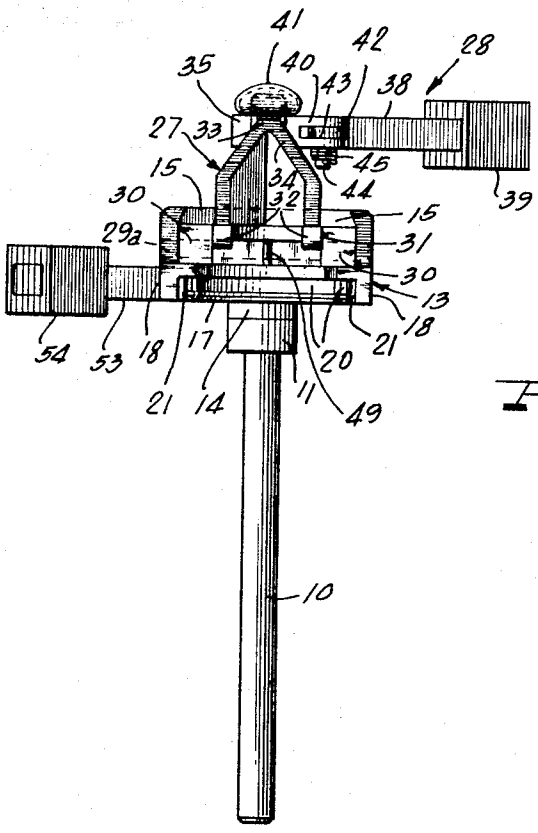


Fig. 3

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3,318,489
DOOR OPERATED SPACE CONDITIONING DISPENSER

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9 Claims. (Cl. 222—180)

This invention relates to improvements in space or room air conditioners of the kind which dispense limited quantities of a conditioning substance such as deodorizer, perfume, and the like, in response to a predetermined stimulus, and more particularly concerns a dispensing device of this character responsive to movement of a door to dispense a predetermined, measured quantity of a conditioning substance into the air of the room.

While it has been proposed to mount a space conditioning dispenser on or in association with a door and comprising a squeeze-type container and means for squeezing the container to squirt a quantity of fluent material through a nozzle of the container, some difficulty in attaining uniformity of result has been experienced with the squeeze bottle arrangements. Where such squeeze bottles are manually operated several squirts may be introduced into a room space optionally by the user. With a door, however, a single squirt or discharge of conditioning material with each swinging movement of the door is ordinarily all that may be expected. Squeeze bottle nozzles are generally of limited, and even poor atomizing ability in order to avoid undue resistance to manual squeezing.

Accordingly, it is an important object of the present invention to provide a new and improved door operated space conditioning dispenser assembly which will generate sufficient thrust to actuate a pressurized container nozzle control valve responsive to ordinary and matter-of-course swinging movements of a door.

Another object of the invention is to provide a new and improved door operated space conditioning dispenser which will supply a single measured discharge of conditioning material in each door swinging cycle.

A further object of the invention is to provide a new and improved dispenser construction of the character described comprising a self-contained unit adapted to be mounted on a hinge pin of a door.

Still another object of the invention is to provide a new and improved door operated space conditioning dispenser which discharges upwardly.

Still another object of the invention is to provide a new and improved force-motion translating device especially suitable for door operated space conditioning dispensers.

Other objects, features and advantages of the present invention will be readily apparent from the following detailed description of a preferred embodiment thereof taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a side elevational view of a dispenser assembly embodying features of the invention and mounted in operative association with a door;

FIGURE 2 is a top plan view on a slightly reduced scale taken substantially on the line II—II of FIGURE 1; and

FIGURE 3 is a front elevational view of the device removed from the door and without the conditioning container.

According to the present invention there is provided an assembly for dispensing an atmosphere-conditioning material such as a deodorant from a container 5 into a room space responsive to swinging of a door 7 about a hinge 8 mounting it on a door frame 9. For this purpose, the hinge 8, which may be of the common butt hinge type, is provided with a replacement hinge pin 10 which has a collar 11 rigid therewith adjacent thereto but spaced from its upper end and serving as a stop against the top of the hinge joint.

Above the collar 11, the hinge pin 10 has an upwardly projecting head extension 12 of suitable length to support the remainder of the dispensing assembly thereon in association with the collar 11. Accordingly, a bracket 13 is mounted on the hinge pin through a sleeve 14 engaged on the pin extension 12 and resting at its lower end on the collar 11. Extending integrally laterally from the mounting sleeve 14 is a pair of coextensive splayed side flanges 15 joined by a base web 17 and terminating in a spaced parallel pair of coextensive, complementary container-supporting arms 18 which project a suitable distance outwardly beyond the outer end of the base web 17 to receive an annular mounting flange collar 19 on the head end of the container 5. To receive and retain the collar 19, a segmental annular groove 20 is provided within the forward edge of the web 17 and the inside faces of the arms 18 aligned therewith. An entrance into the groove is provided between the inner ends of the arms 18 and with the adjacent ends of the groove provided with respective retainer detent lugs 21 having their outer sides contoured to afford leadin cam surfaces. By having the supporting arms 18 relatively resiliently flexible, mounting of the container 5 is adapted to be effected by moving the mounting collar 19 into the outer end of the groove 20 and by inward pressure against the detents 21 causing the arms 18 to spread apart until the diameter of the collar has passed the peaks of the detents whereupon the collar under continuing inward thrusting pressure will snap past the detents and fully into the groove into retained engagement therein and with the mounting collar being embraced over more than 180° of its perimeter. Suitable resilient flexibility of the arms 18 is assured by constructing the bracket 13 of an inherently self sustaining, but resiliently flexible material in small cross section, such as a moldable plastic, of which the material commercially available as Delrin is a commercial example. Assured resilient flexibility of the arms 18 is attained by suitably separating them from the web 17 as by means of respective slots 22 extending inwardly to a point short of the juncture of the arms 18 with the splayed side flanges 15, affording an adequately thin flexure section transversely in the arms 18 but a vertical width which is great enough to avoid any substantial flexure of the arms in a vertical direction. Through this arrangement moderate inward pressure applied to the container 5 effects snapping mounted engagement thereof in the groove 20 and for removing the container a reverse, outward pull thereon with substantially the same effort will snap the mounting collar 19 free from the groove. As mounted, the container presents an upwardly extending atomizing nozzle 23 having an upwardly opening atomizing orifice 24. Within the top of the container and operatively associated with the nozzle 23 is suitable metering valve mechanism of a known type operative upon depressing the nozzle by downward pressure against an annular triggering flange 25 about its lower end, to release through the atomizing orifice 24 a predetermined quantity of an atmosphere conditioning material impelled by a pressurizing dispersal fluid such as Freon. Means are therefore provided for operating the nozzle 23 in response to swinging movements of the door 7, herein comprising a depressor 27 mounted on the bracket 13 constructed and arranged to be actuated by an actuator 28 mounted in association with the bracket 15 on the mounting hinge pin extension 12.

In a convenient, practical arrangement, the depressor **27** comprises a rockably mounted lever of generally bell crank form having a fulcrum hub **29** pivotally connected as by means of a pin **29***a* between opposed centering bosses **30** provided for this purpose integral with the juncture portions of the side flanges **15** and the arms **18** and the web **17**. This places the hub **28** inwardly adjacent to the retaining groove **20** so that an outwardly extending bifurcated presser arm **31** integral with the hub extends into straddling relation to the nozzle **23** and overlying relation to the trigger flange **25**, with respective downwardly projecting thrust nibs or pads **32** engaging the upper face of the flange. Extending upwardly integrally from the hub **28** is an actuating arm **33** which is desirably rigidly connected with the presser arm **31** by integral brace flange structure **34**. Rocking of the depressor **27** toward the nozzle **23** as indicated in dash outline in FIG. 1 causes the pressure arm **31** to depress the nozzle **23** and thus release a charge of conditioning material from the container.

For translating swinging movement of the door **7** into rocking movement of the depressor **27** for operating the atomizing nozzle **23**, the actuator **28** desirably comprises a generally bell crank lever including a fulcrum hub **35** pivotally mounted on the pin extension **12**, with a spacer sleeve **37** separately formed or integral with the hub spacing the hub above the hub sleeve **14** of the bracket. Extending horizontally from the hub **35** is an elongated follower arm **38** desirably provided on its distal end portion with a cushioning knob or sleeve **39** engageable with either the door **7**, or the jamb **9**, depending on whether the device is mounted on a lefthand mounted or righthand mounted door. In the illustrated instance a lefthand mounted door arrangement is depicted. Integral with the proximal end of the arm **38** and with the hub **35** is a shorter preferably right angularly outwardly extending actuator arm **40** which is adapted to swing into depressor rocking relation to the depressor arm **33** when the actuator **28** is pivotally swung about the pin extension **12**. Retention of the actuator **28** against upward displacement from the pin extension **12** is suitably effected by a keeper such as a press-on nut or cap **41** of the self-retained gripper teeth type engaged upon an upwardly projecting terminal portion of the shaft extension.

Although a simple camming actuation contact between the actuator arm **40** and the depressor arm **33** may be provided, a desirable arrangement comprises an escapement mechanism effective to rock the depressor momentarily and then release the same as the arm **40** swings past the arm **33** in one direction and passing freely in the opposite swinging direction. To this end, an escapement pawl **42** is mounted within a horizontal inwardly opening slot **43** in the distal end portion of the arm **40** and is pivotal on an axle pin **44** to which it is fixed. Normally the pawl **42** is biased as by means of a torsion spring **45** acting on a downwardly projecting portion of the axle pin **44** to orient the tip of the pawl toward the arm **33** in the ready, closed door position of the actuator **28**. Upon opposite relative swinging movements of the bracket **13** and the actuator **38**, the tip of the pawl **42** engages thrustingly in a notch **47** defined by one side of a vertically extending escapement tooth projection **48** integrally on the inner side of the upper end portion of the arm **33** and offset from the side of the arm toward which the pawl approaches. The pawl **42** projects from the end of the actuator arm **40** in a predetermined greater distance than the clearance between the end of the actuator arm and the inner face of the depressor arm **33**. Therefore, translation of relative swinging movement of the bracket **13** and the actuator **28** toward one another is translated into rocking movement of the depressor **27** by engagement of the tip of the pawl **42** in the notch 47 whereby the escapement tooth **48** blocks passage of the pawl which is thus caused to straighten out in the continuing relative pivotal movement of the bracket and

actuator until the pawl is in substantially straight alignment with the arm **40**, as visualized in dot-dash outline in FIG. 2. As a result, the depressor **27** is rockingly thrust by the straightening pawl **42** toward the dispenser nozzle **23**, depressing the same, as best seen in FIG. 1, and thereby triggering a discharge of atomized atmosphere-conditioning material from the container **5**.

As the pawl **42** pivots over-center in the continuing relative pivotal movements of the bracket **13** and the actuator **28**, the tip of the pawl released from the notch **47** and the pawl slides past the tooth **48** being then snapped by the spring **45** into its normal angled axis relation to the longitudinal axis of the arm **40**. During return relative swinging movements of the bracket **13** and the actuator **28** to starting position, the pawl **42** rides freely past the tooth **48** as permitted by the opposing cam surfaces of the pawl and tooth and the resilient yielding pivoting enabled by the pivotal mounting and spring biased relation of the pawl.

Return biasing means are desirably provided for the depressor **27**, conveniently comprising a hairpin torsion spring **49** engaged about the pivot pin **29***a* and having opposite arms thrusting under spring load against respectively the underside of the depressor arm **31** and the underlying surface provided by the bracket **13**. Depending stops **49***a* on the hub **29** engage the web **17** in the upwardly biased position of the depressor whereby to maintain the arm **31** clear of the arms **18** to facilitate assembly of the mounting collar **19** and the triggering flange **25** of the container without interference from the arm **31**.

Means are provided to maintain operative connection of the bracket **13** and the actuator **28** with the door **7** and the frame **9** to follow opening and closing of the door. Although if desired such connection may comprise direct mechanical linkage, or the like, a more convenient arrangement requiring no direct attachment of mechanism to the door or frame and thus avoiding mutilation thereof, as well as greatly simplifying installation of the dispensing assembly, comprises resiliently biasing the bracket and actuator into following relation with either the door or the door frame selectively and alternatively, depending on whether a lefthand or righthand door is involved. Conveniently, the biasing means comprise a coiled torsion spring **50** mounted about the spacer sleeve **37** and having respective opposite terminals **51** and **52** anchored in the bracket **13** and the actuator **28** under torsional bias of the spring normally urging the bracket and actuator to spread apart into positive following connection with the door and frame, as the case may be. As a result, the terminal cushion **39** on the actuator arm **38** is maintained in spring-biased thrusting engagement with the door **7** in the illustrated mounting of the assembly, or alternatively with the door frame structure if mounted on an opposite hand door. Similarly, the bracket **13** is biased toward operative connection with the jamb structure **9** in the illustrated mounting, or toward the door in an opposite hand mounting. To maintain an adequately spaced relation of the container gripping arm portion of the bracket on the engaged room surface to accommodate the container **5** freely, a lateral spacer thrust arm **53** desirably extends integrally rigidly from the side of the bracket opposite to that from which the actuator arm **38** extends and carries a terminal cushion **54** which thrusts in following relation against the opposing room surface, in this instance the frame **9**, and more particularly trim **55** thereon, where the frame is equipped with such trim.

From the foregoing it will be apparent that the present invention provides a new self-contained atmosphere-conditioning dispensing assembly which is exceedingly simple to mount in association with a door by which it is automatically operated. Mounting of the assembly is effected easily without any defacement of the door or the adjacent jamb, simply by withdrawing the conventional hinge pin of one of the door hinges and inserting in its place the replacement pin of the dispenser assembly upon which the bracket is mounted and entirely sup-

ported. Thus, the assembly is installed in place for operation simply by dropping it into place after removing the conventional hinge pin.

Although minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon, all such modifications as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. In combination in an assembly for dispensing an atmosphere-conditioning material such as deodorant into a room space responsive to swinging of a door about a hinge mounting it on a door frame;

a door hinge replacement pin;

a bracket mounted on and entirely supported by said replacement pin so that the assembly can be dropped into place by removing the conventional hinge pin from the hinge of the door and replacing it with said replacement pin;

means carried by said bracket and said replacement pin for operating an atomizing-nozzle-equipped dispensing container responsive to swinging movement of the door about said replacement pin; and

means on said bracket for supporting the dispensing container in position to be operated on by said operating means.

2. An assembly as defined in claim **1**, in which said operating means include a depressor rockably mounted on the bracket for actuating a depressible dispensing nozzle structure on the container and an actuator pivotally mounted on said replacement pin and active to rock said depressor during swinging movement of the door.

3. An assembly as defined in claim **2**, in which said depressor and said actuator have a one-way escapement mechanism operative to effect rocking of the depressor during swinging of the door in one direction and remaining inoperative in the swinging movement of the door in the opposite direction.

4. An assembly as defined in claim **1**, in which said operating means comprise a nozzle-depressing rock lever pivotally mounted for up and down movement on the bracket and an actuating lever coactive therewith and pivotally mounted for side-to-side movement on said replacement pin.

5. An assembly as defined in claim **1**, in which said bracket and that portion of the operating means carried by said replacement pin have respective followers for engaging respectively the door and the door frame, and

biasing means acting on and between said bracket and said pin-carried portion maintaining said followers in operating connection with the door and frame.

6. An assembly as defined in claim **1**, in which the bracket and the pin carried portion of the operating means have respectively oppositely extending arms operatively engageable with the door and door frame.

7. An assembly as defined in claim **1**, in which said bracket has resiliently flexible gripper arms for snappingly releasably engaging a collar on the container and thereby retaining the container in operative association with the bracket.

8. In combination in a motion and thrust translating assembly:

a supporting structure;

a rocking member pivotally mounted on said supporting structure and having a thrust portion extending substantially beyond its pivot for engagement with a member to be motivated thereby and a force-receiving portion extending from said pivot angularly relative to said thrust portion; and

an actuating lever intermediately pivotally mounted on an axis transverse to and spaced from said pivot of said rocking member, said lever having an arm operatively opposing said force-receiving portion and including means to thrust thereagainst and effect rocking of said rocking member upon relative swinging movement of the lever about its pivot, and another arm on said lever for operative connection with a movable object for driving the lever pivotally relative to said rocking member.

9. An assembly as defined in claim **8**, in which said force-receiving portion and said thrust arm have one-way escapement mechanism effecting rocking of the rocking member in one swinging direction of movement of said lever and being inoperative in the opposite direction of swinging movement of the lever.

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