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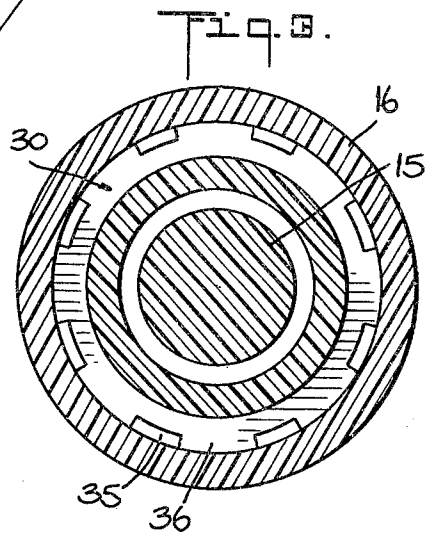
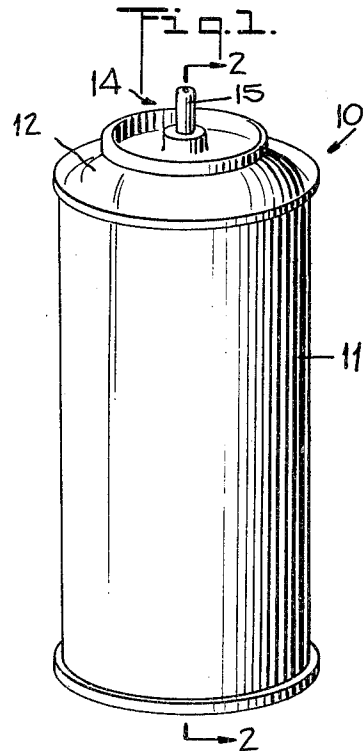
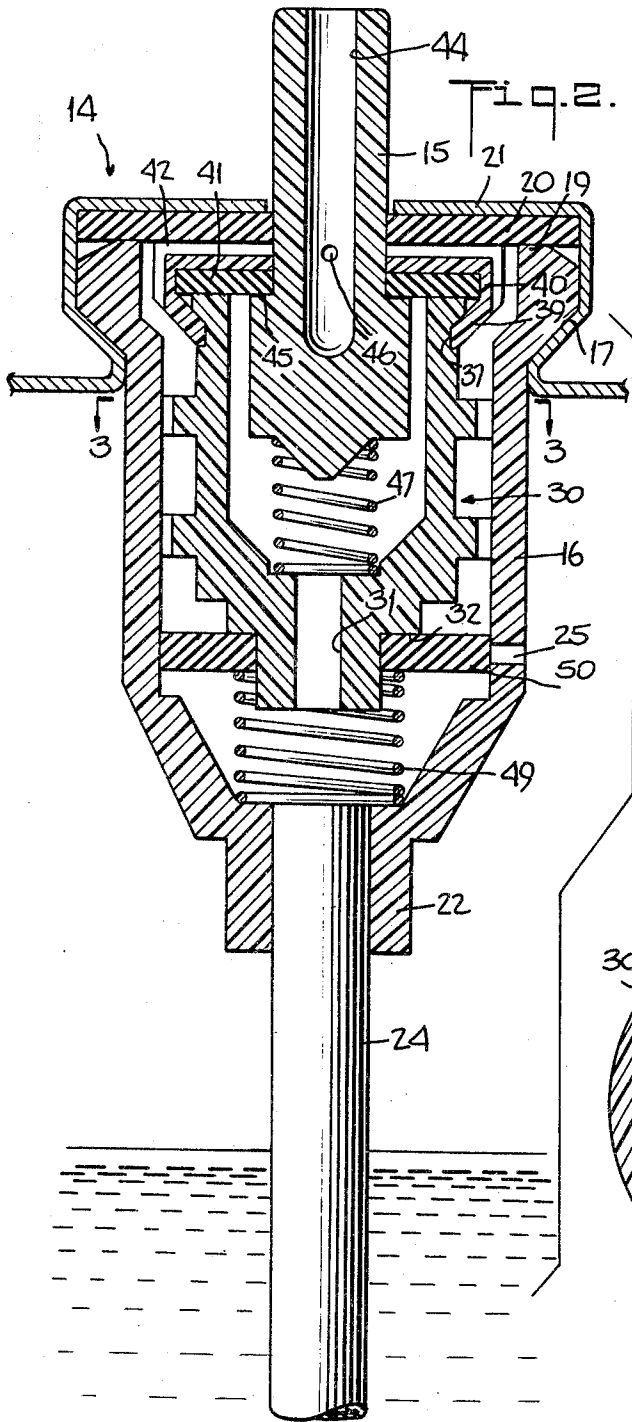
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PRESSURIZED CONTAINER AND COMBINED DISPENSING ASSEMBLY

Filed July 16, 1968

2 Sheets-Sheet 1



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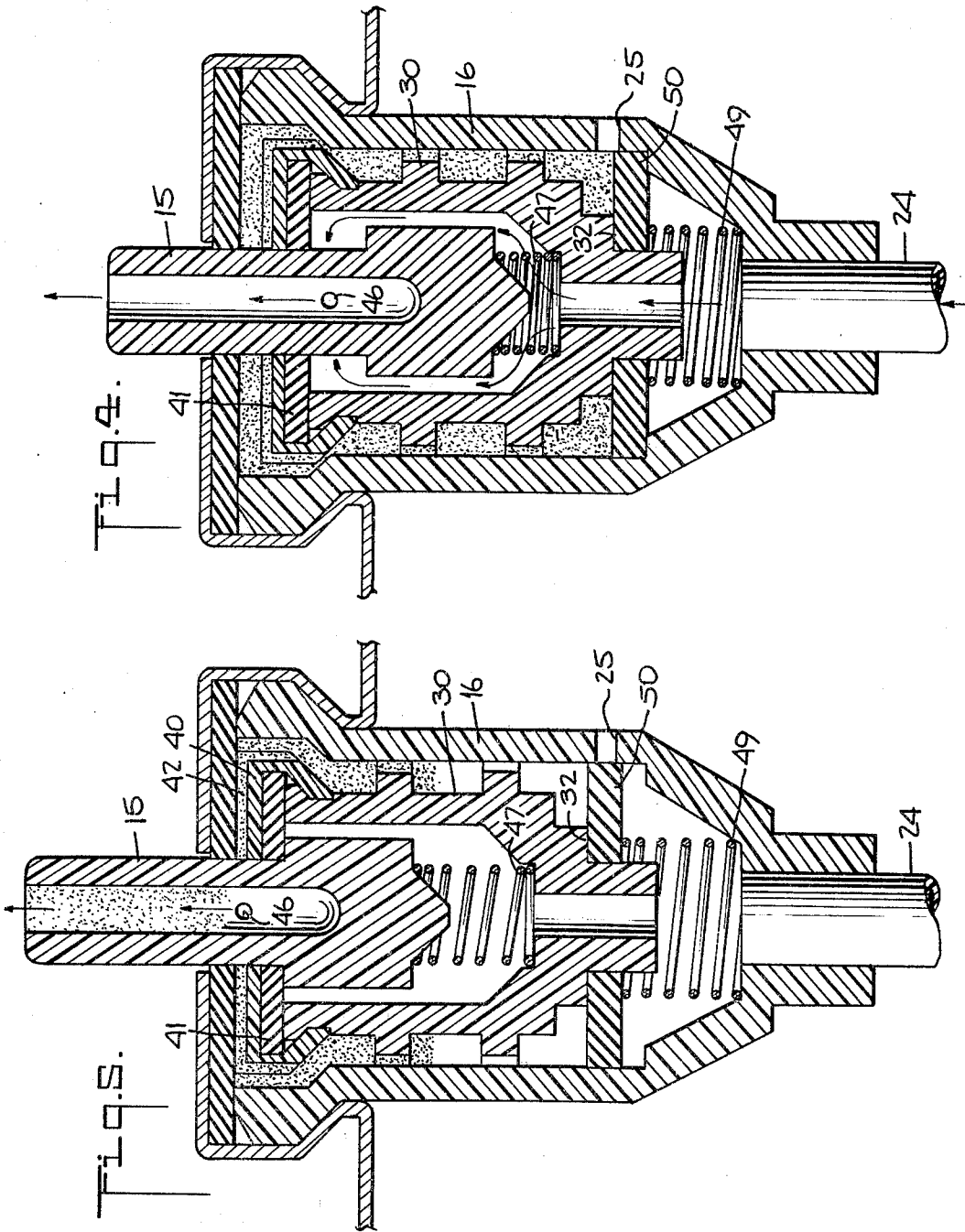
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PRESSURIZED CONTAINER AND COMBINED DISPENSING ASSEMBLY

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2 Sheets-Sheet 2



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**PRESSURIZED CONTAINER AND COMBINED
DISPENSING ASSEMBLY**

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10 Claims

ABSTRACT OF THE DISCLOSURE

Pressurized container and combined dispensing assembly wherein gaseous propellant is admitted to the outlet means after discharge of product to clear same of residue.

This invention relates to a dispenser assembly and a combination therewith of a pressurized package, and more particularly, to such packages and assemblies useful for effecting discharge of a fluid composition by the action of a pressurizing propellant.

In packages of the class described, it is known to employ single or multi-phase compositions wherein the product or composition to be discharged occurs in a liquid phase beneath a propellant occurring in a gaseous phase.

A variety of dispenser assemblies or valves are available for use in such packages to permit the propellant to drive the liquid composition to atmosphere usually through a dip tube extending from the valve down towards the bottom of the package.

While some of these valves are arranged simply for direct discharge of product to atmosphere, others employ a vapor tap principle according to which some gaseous propellant is admixed with the product as it passes through the valve so that, upon reaching atmospheric pressure, the propellant expands rapidly and assists in breaking down the particles of product into exceedingly fine form. Nevertheless, it has been observed that due to the pressure drop through many types of valves, products having certain characteristics tend to drool and leave a residue in the discharge package after the valve is shut, and this may lead to clogging of the discharge passages. Accordingly, there has long been a need for a package of the class described in which such drool or after-drip is avoided.

Thus, I have conceived by my invention a novel package and dispensing assembly which effectively eliminates after-dip and prevents clogging of the discharge passages.

In essence, my contribution is based upon the utilization of a small quantity of gaseous propellant which is permitted to pass through the discharge passages to atmosphere immediately after termination of discharge of the product thus to blow out any residue remaining in those passages.

As a feature of my invention, I provide a pressurized package of the class described including a container, a fluid composition in the container, propellant means also in the container, and a dispensing assembly mounted in the container and comprising a body having an inlet and outlet means, means effecting communication between the body inlet and the interior of the container, a housing within the body formed with an internal chamber in communication with the inlet, the housing cooperating with the body to define a second chamber therebetween, an orifice in the body effecting communication between the second chamber and the interior of the container, first sealing means normally closing the orifice, and second sealing means normally sealing the outlet means from communication with the internal chamber and permitting communication between the outlet means and the sec-

ond chamber. In this arrangement, the first sealing means is shiftable to uncover the orifice and the outlet means is shiftable to a position relatively to the second sealing means to seal same from communication with the second chamber and to place same in communication with the internal chamber whereby fluid composition is propelled through the body inlet, the housing and the outlet means and propellant is admitted into the second chamber. Spring means are provided urging the first sealing means and the outlet means to normal position whereby the outlet means is sealed from the interior of the container and is placed in communication with the second chamber so that propellant expands through the outlet means flushing same, and the first sealing means seals the orifice.

A further feature of the present invention resides in provision of an outlet passage in the outlet means open to atmosphere and formed in a stem that passes through the valve body and is arranged to be depressed by the application of an external force against the action of the spring means.

Additionally, I prefer that the spring means comprise two springs, the first of which urges the stem toward normal position; and the second of which urges the first sealing means towards normal position, the spring force of the first spring being greater than that of the second spring.

There has thus been outlined rather broadly the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent construction as do not depart from the spirit and scope of the invention.

A specific embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a profile view of a package in combination with dispensing means according to the present invention; FIG. 2 is a cross-sectional view taken along the lines 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken along the lines 3—3 of FIG. 2;

FIG. 4 is a vertical section of the dispensing assembly illustrating same in its product discharge position; and

FIG. 5 is a view similar to FIG. 4 but illustrating same in normal position after discharge and with flushing taking place.

Turning now to the drawings, and more particularly to FIGS. 1 and 2, there is shown a pressurized package 10 including a conventional aerosol can 11 having a domed top 12 and a dispensing assembly 14 mounted centrally of the top with a depressible stem 15 protruding therefrom. A conventional head may be formed or fitted to the upper end of the stem to direct the discharge and control its emission as desired, but such as not part of this invention and so is not shown. As best shown in FIG. 2, the valve body 16 is formed with a downwardly inclined shoulder 17 and an upper rim 19 against the latter of which rests a gasket 20 having a central opening through which the stem 15 passes. The entire assembly is supported by means of a thin metal member 21 crimped against the shoulder 17 and around and over the gasket 20.

The body 16 is generally cup-shaped and has a depending cylindrical configuration 22 at its lower central region into which is press fit a dip tube 24 which extends down to the bottom of the can. An orifice 25 is shown formed at the side of the body 16 although it will be appreciated that several such orifices may be used.

A cup-shaped housing 30 is positioned within the body 16 and is formed with a downwardly depending central cylindrical passageway 31, an external downwardly facing shoulder 32 and a pair of spaced outwardly extending guide rings 34 having vertical grooves 35 therein for the passage of fluid. As shown in FIG. 3, the lands 36 formed by the grooves 35 bear against the inner wall of the body 16 to guide the housing 30 for vertical movement therein.

Just below the upper rim of the housing 30 there is formed an annular groove 37 into which is crimped a flange 39 formed on a metal disc 40 which is positioned horizontally across a gasket 41 that is thereby pressed against the upper rim of the housing 30. The disc 40 and gasket 41 have central openings through which the stem 15 extends, the gasket providing a seal at the housing rim and at the stem.

The disc 40 is relatively thick and is formed with a plurality of radial grooves 42 cut into its top surface and extending downwardly at the sides thereof for a purpose later to be described.

The stem 15 is formed with a central, vertical bore 44 and with an enlarged base which provides an upwardly facing shoulder 45 that normally engages the underside of the gasket 41, as shown in FIGS. 2 and 5. One or more openings 46 are formed in the stem 15 at a position to place the bore 44 in communication with the grooves 42 when same is in its normal position (FIGS. 2 and 5), although only one such opening is shown.

The stem 15 is maintained in its normal position, that is with the shoulder 45 against the gasket 41 by a spring 47 which bears between the base of the stem and the bottom of the housing 30; and a second spring 49, bearing between the bottom of the body 16 and the bottom of a gasket 50 normally maintains the gasket 50 against the shoulder 32 and in sealing relation to the orifice or orifices 25, as the case may be, and thus urges the housing 30 towards its upper limit of movement. The housing 30 could, of course, be formed with a larger diameter at its base and be provided with an O-ring in lieu of the gasket 50 to seal off the orifice 25. The spring 47 is preferably stronger, i.e. of greater spring force than the spring 49.

Referring now to FIG. 4, it will be seen that to effect discharge of the product composition from the can, the stem is depressed until the openings 46 are positioned below the gasket 41 at which point fluid flow communication is established between the dip tube 24 through which product is driven by the propellant in the can, the body 16 below the gasket 50, the cylindrical passageway 31 at the bottom of the housing 30, up through the interior of the housing around the base of the stem 15, through the openings 46, up the vertical bore 44 and to atmosphere. However, since the spring 47 is stronger than spring 49 and since spring 47 bears at its lower end on the housing 30, it will be appreciated that before the stem 15 descends relatively to the housing 30 and gasket 41, the spring 49 collapses so that the housing, stem and gasket 50 move downwardly together, the latter uncovering the orifices 25 and allowing propellant from the top of the can to enter the space or chamber between the body 16 and housing 30. Further depression of the stem 15 collapses the spring 47 allowing the openings 46 in the stem to move below the gasket 41 to discharge position, the gasket 41 sealing the openings 46 from communication with the propellant in the chamber between the housing and body and trapping the propellant there.

Upon release of the force depressing the stem 15, the springs 47 and 49 act to return the parts to normal

position. Thus, the openings 46 in stem 15 move upwardly through gasket 41 which acts to seal those openings from the interior of the housing 30 and terminating discharge of product composition. Meanwhile, the gasket 50 is moved upwardly by the spring 49 to seal the orifices 25, thus breaking fluid flow communication between the upper region of the can and the chamber between the housing and body; and as the openings 46 in the stem 15 reach normal position in communication with the grooves 42 in the disc 40, the pressurized propellant in the chamber between the housing and body expands through those grooves and openings and up the bore 44 to atmosphere clearing the latter and any head which may be used of residual drool or after-drip which might otherwise have remained there. It will be appreciated that by proper sizing of parts the quantity of propellant employed to clear the discharge bore may be carefully controlled.

From the foregoing description, it will be seen that I contribute by my invention a novel pressurized container and dispensing assembly combination which is highly effective in eliminating the problem of after-drip or drool.

I believe that the construction and operation of my novel package and dispensing assembly will now be understood and that the advantages of my invention will be fully appreciated by those persons skilled in the art.

I claim:

1. In a valve of the class described, a valve body having an inlet and outlet means, a housing within said body formed with an internal chamber in communication with said inlet, said housing cooperating with said body to define a second chamber therebetween, an orifice in said body communication with said second chamber, first sealing means normally closing said orifice, second sealing means normally sealing said outlet means from communication with said internal chamber and permitting communication between said outlet means and said second chamber, said first sealing means being shiftable to uncover said orifice and said outlet means being shiftable to a position relatively to said second sealing means to seal same from communication with said second chamber and to place same in communication with said internal chamber, and spring means urging said first sealing means and outlet means to normal position.

2. A valve according to claim 1, wherein said outlet means comprises an outlet passage formed in a valve stem that passes through said valve body and is arranged to be depressed by application of an external force against the action of the spring means.

3. A valve according to claim 2, wherein said spring means comprise a first spring urging said stem towards normal position and a second spring urging said first sealing means towards normal position, the spring force of said first spring being greater than that of said second spring.

4. In a valve of the class described, a valve body formed with an inlet, a valve stem formed with an outlet passage and arranged for reciprocating movement in an opening in said body, a housing in said valve body cooperating with same to define an outer chamber therebetween and itself having an internal chamber communicating with said body inlet, means normally sealing said outlet passage from communication with said internal chamber but effecting communication between said outlet passage and said outer chamber, first spring means between said housing and said stem urging said stem in a direction relatively to said housing normally to maintain said outlet passage as aforementioned relatively to said chambers, an orifice in said body communicating with said outer chamber, sealing means in said body moveable to seal and unseal said orifice, second spring means cooperating with said housing normally to maintain said sealing means in sealing position relatively to said orifice,

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said stem and housing being moveable upon the application of an external force against the action of said second spring means to shift said sealing means from sealing engagement relatively to said orifice to establish communication between same and said outer chamber, further external force shifting said stem relatively to said housing against the action of said first spring means to seal said outlet passage from said outer chamber and to establish communication between said outlet passage and said inlet through said internal chamber, said spring means acting upon release of said external force to effect sealing of said outlet passage from communication with said internal chamber and to effect communication between said outlet passage and said outer chamber and to effect sealing of said orifice.

5. A valve according to claim 4, wherein said housing is cup-shaped and formed with an external shoulder, said first spring means bears between the base of the cup and said stem, said sealing means bears against said shoulder, said second spring means bears against said sealing means and said valve body, and said means normally sealing said outlet passage comprises a gasket seated on the rim of said cup-shaped housing.

6. A pressurized package of the class described, including a container, a fluid composition in the container, propellant means also in the container for discharging the composition from the container, and a dispensing assembly mounted in the container and comprising; a body having an inlet and outlet means, means effecting communication between said body inlet and the interior of the container, a housing within said body formed with an internal chamber in communication with said inlet, said housing cooperating with said body to define a second chamber therebetween, an orifice in said body effecting communication between said chamber and the interior of the container, first sealing means normally closing said orifice, second sealing means normally sealing said outlet means from communication with said internal chamber and permitting communication between said outlet means and said second chamber, said first sealing means being shiftable to uncover said orifice and said outlet means being shiftable to a position relatively to said second sealing means to seal same from communication with said second chamber and to place same in communication with said internal chamber whereby fluid composition is propelled through said body inlet, said housing and said outlet means and propellant is admitted into said second chamber, and spring means urging said first sealing means and outlet means to normal position whereby said outlet means is sealed from the interior of the container and is placed in communication with said second chamber so that propellant expands through said outlet means flushing same, and said first sealing means seals said orifice.

7. A package according to claim 6, wherein said outlet means comprises; an outlet passage to open to atmosphere and formed in a valve stem that passes through said valve body and is arranged to be depressed by application of an external force against the action of the spring means.

8. A package according to claim 7, wherein said spring means comprise a first spring urging said stem towards normal position and a second spring urging said first seal-

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ing means to normal sealing position, said first spring having a stronger spring force than said second spring.

9. A pressurized package of the class described including a container, a fluid composition in the container, propellant means also in the container for discharging the composition from the container, and a dispensing assembly mounted in the container and comprising; a body formed with an inlet, a valve stem formed with an outlet passage and arranged for reciprocating movement in an opening in said body, a housing in said valve body cooperating with same to define an outer chamber therebetween and itself having an internal chamber communicating with said body inlet, means normally sealing said outlet passage from communication with said internal chamber but effecting communication between said outlet passage and said outer chamber, first spring means between said housing and said stem urging said stem in a direction relatively to aid housing normally to maintain outlet passage as aforementioned relatively to said chambers, an orifice in said body communicating with said outer chamber, sealing means in said body moveable to seal and unseal said orifice, second spring means cooperating with said housing normally to maintain said sealing means in sealing position relatively to said orifice, said stem and housing being moveable upon the application of an external force against the action of said second spring means to shift said sealing means from sealing engagement relatively to said orifice to establish communication between the container and said outer chamber, further external force shifting said stem relatively to said housing against the action of said first spring means to seal said outlet passage from said outer chamber to establish communication between said outlet passage and said inlet through said internal chamber whereby the fluid composition is discharged to atmosphere, said springs acting upon release of said external force to effect sealing of said outlet passage from communication with said internal chamber to terminate discharge of fluid composition and to effect communication between said outlet passage and said outer chamber whereby propellant in said outer chamber expands through said outlet passage to flush same, and to effect sealing of said orifice.

10. A package according to claim 9, wherein said housing is cup-shaped and formed with an external shoulder, said first spring means bears between the base of the cup and said stem, said sealing means bears against said shoulder, said second spring means bears against said sealing means and said valve body, and said means normally sealing said outlet passage comprises a gasket seated on the rim of said cup-shaped housing.

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