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S. I. TENNYSON
APPARATUS FOR UTILIZING AND SUPPLYING
CORROSION-INHIBITOR VAPORS

2,766,069

Filed April 16, 1953

2 Sheets-Sheet 1

FIG. 1.

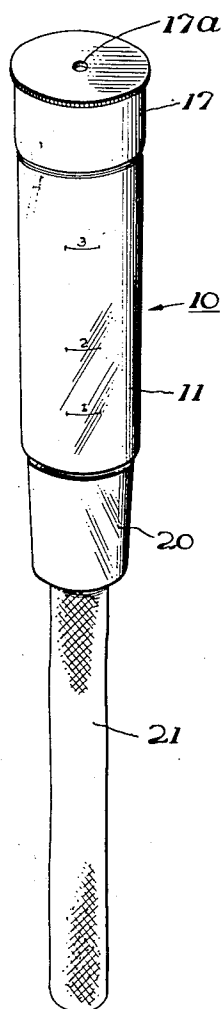


FIG. 2.

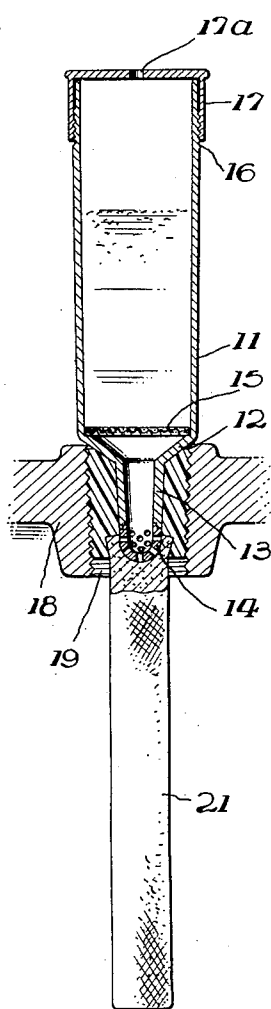


FIG. 3.

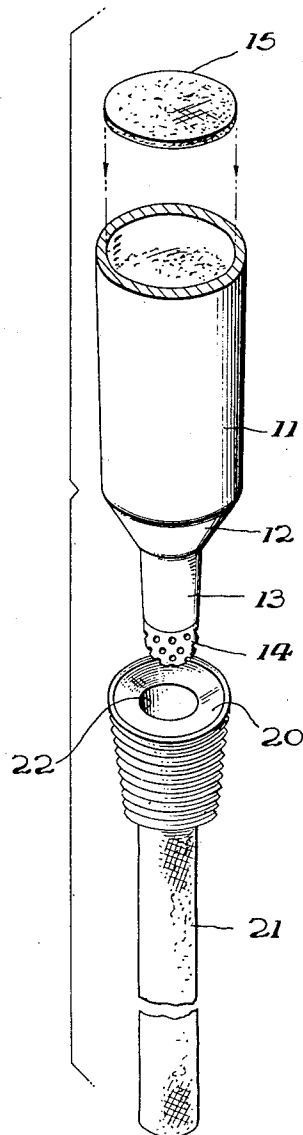
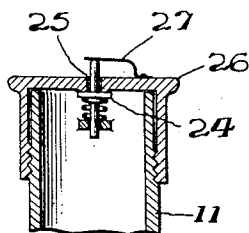


FIG. 4.



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FIG. 5.

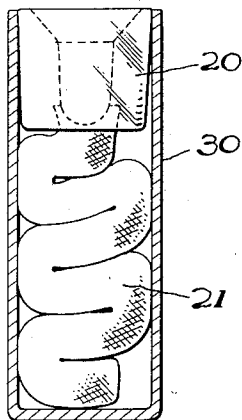


FIG. 7.

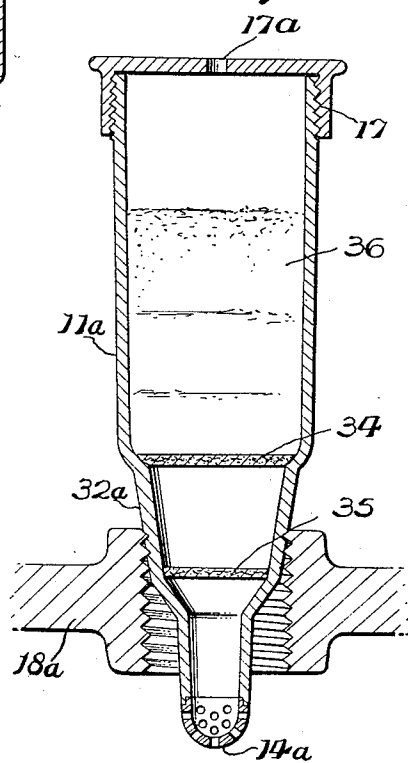
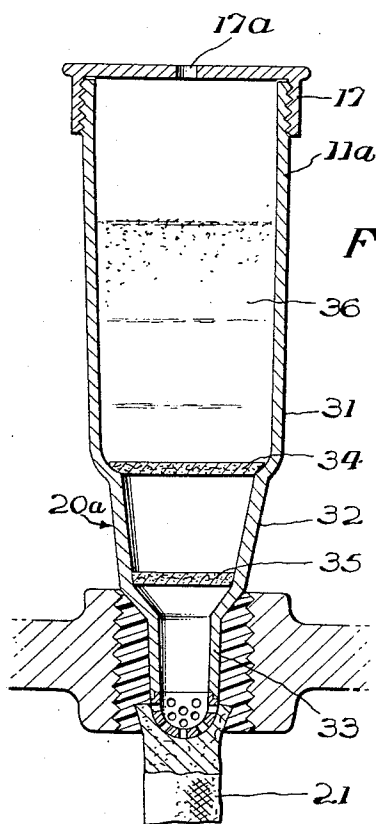


FIG. 6.



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APPARATUS FOR UTILIZING AND SUPPLYING CORROSION-INHIBITOR VAPORS

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4 Claims. (Cl. 299—24)

The present invention relates to apparatus and methods for utilizing and supplying corrosion-inhibitor vapors into contact with housed or enclosed metal surfaces and parts to protectively coat the same. Volatile corrosion-inhibitor compositions for this purpose are similar to those referred to in Patents Nos. 2,577,219, issued December 4, 1951, and 2,592,451, issued April 8, 1952.

Heretofore, various papers and wicks impregnated with vapor corrosion-inhibitor compositions have been used to introduce vapors migrating or diffusing therefrom into chambers for coating interior metal walls, parts and the like with some success, but these prior art arrangements lack the following important features and concepts:

1. There have been no vapor developing applicator apparatus for handling bulk material, such as crystals or powders of V. C. I. compositions and impregnated wick means in combination to provide for prolonged vapor diffusion for longer effective storing periods;

2. No adaptable form of apparatus for efficient use in any type or size of closure or housing opening have been developed;

3. Likewise, it is important to provide an applicator so that atmosphere or air to be breathed into a housing, enclosure or engine must pass through the volatile corrosion-inhibitor (V. C. I.) in the body of the applicator apparatus to thereby pick-up or entrain the corrosion-inhibitor crystals or the diffused vapors therefrom;

4. Still further no method heretofore practiced has provided for series or cascade feeding and renewing of wick impregnated applicators while in situ. That is, while the wick is installed and mounted in operating position in a housing, engine or the like.

Accordingly, the general object of the present invention is to provide an applicator and a method for providing the novel features set forth above.

A more specific object is to provide an applicator body formed with a nozzle of material, such as plastic adapted to conform itself to any form or shape of opening in a housing to thereby seal itself therein.

Another object is to provide in combination an impregnated wick and a bulk type crystal holder whereby the vapors from the bulk material replenish the wick, or reimpregnate, with corrosion-inhibitor vapors automatically upon proper installation of the wick in a housing.

Another object is to provide an improved wick installation arrangement, whereby the wick may be used efficiently and installed by itself in either a threaded or unthreaded housing opening.

Still another object is to provide an individual package for seal storing impregnated wicks prior to their use.

Yet another object is to form an ambient air breather opening in the top of a bulk crystal holder adapted to breathe such air and pass it through the bulk crystals therein.

A further object is to provide an ambient condition responsive intake check valve in the top of a bulk crystal holder.

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Still a further object is to provide interchangeable nozzles for bulk crystal holders.

Another object is to provide a novel readily installed vapor corrosion-inhibitor device, wherein efficiency, simplicity and economy are combined.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

Figure 1 is a side view in elevation of one embodiment of the invention showing a wick attached to a bulk vapor corrosion-inhibitor crystal holder;

Figure 2 is a longitudinal cross-section view of the device shown in Figure 1;

Figure 3 is a pulled apart perspective view of the device illustrating its respective parts;

Figure 4 is another embodiment of the device, illustrating a condition responsive intake check valve for the applicator holder cap;

Figure 5 is a third embodiment illustrating a special storage container for individual wicks prior to their use;

Figure 6 is a fourth embodiment of a bulk type applicator adapted for use in any size housing opening with or without a wick member, but showing a wick attached; and

Figure 7 represents the embodiment illustrated in Figure 6 applied to a threaded housing opening without a wick member attached.

Referring to the drawings and first with reference to Figures 1 to 3, inclusive, the numeral 10 designates generally an applicator for holding predetermined amounts of bulk volatile corrosion-inhibitor crystals (V. C. I.). This applicator 10 comprises a body 11 having calibrated markings therein in grams and formed with a funnel-shaped nozzle having an inwardly tapered section 12 leading into the tubular shank or nozzle nipple 13, which is counterbored to interfit with interchangeable perforated tips 14. (See Figure 3.)

The intersection of the main body 11 with the interior tapered wall of section 12 forms a support for a filter disc 15 formed of suitable material preferably a fibre glass disc. The top of the body 11 may be exteriorly threaded at 16 to accommodate an interiorly threaded cap 17 formed with an air breather opening 17a therein to provide for passage of air downward through the vapor crystals in the body 11 and out through the filter disc 15 and perforated tip 14 into the interior of a chamber or housing. The housing wall 18 is shown in Figure 2 with a threaded opening 19 adapted to cooperate with the cork-like or plastic tip 20 connected to wick 21 impregnated with a V. C. I. composition. This wick tip or stopper member 20 is formed with a tapered duct to provide a socket 22 to frictionally fit over the tapered shank 13 of the nozzle, so that the perforated vapor emitting nozzle tip 14 is embraced by the wick fabric 21 or is in contact therewith. (See Figures 2 and 3.)

As shown in Figure 3 the various parts of the device are individually replaceable and interchangeable and the wick stopper 20 is of a material deformable to make its own threads or the conforming convolutions of any shape of opening to which it may be mounted.

Another embodiment of the invention is shown in Figure 4 and illustrates a condition responsive air breather check valve 24 adapted to open and close the opening 25 in the cap 26. Any suitable condition responsive means, such as a bi-metallic strip 27 or barometrically responsive device may be used to control the valve 24.

A third embodiment of this invention is illustrated in Figure 5 and shows a box 30 of impervious plastic material formed in one piece. The walls of the box 30 at the open end thereof taper inwardly and thereby fric-

tionally bind against the sides of the wick plug or stopper 20. Thus, when the wick is rolled up inside the box 30 and the plug or stoppers pushed into the opening at the top, the wick 21 is sealed tightly therein by frictional engagement. This arrangement permits safe storage and shipment of the wicks prior to use. Also, the box 30 with its wick may be shipped within the applicant's body as a kit arrangement and be set up for use at any desired location to which it may be shipped.

A fourth embodiment of the invention is illustrated in Figures 6 and 7, wherein the nozzle of the V. C. I. crystal holder 11^a is formed with three tapered thread tapping or plug surfaces 31, 32 and 33. For example, the exterior annular surface of the body 11^a of the holder is tapered and may be plugged into a large opening, the annular tapered surface 32 in a medium opening and the exterior of the tapered tubular shank 33 may fit or plug in a relatively smaller opening. Figure 7 shows the annular surface 32 mounted in a thread opening with the wick member removed and the perforated tip 14^a projecting downwardly into the confines of a housing below the thickness of a wall 18^a. The wick stopper 20^a in Figure 6 operates substantially in the same manner as in Figures 1, 2 and 3, except that if the medium annular surface 32 or larger surface 31 are used this will cause the wick stopper to project below the interior wall of the housing and make no contact with the walls of the housing opening. Thus, when surfaces 31 or 32 are used for larger openings, the wick may be left off or on as the occasion requires.

In this form two superimposed filter discs 34 and 35 may be mounted in the nozzle section if desired instead of one disc.

The cap 17 and breather opening 17^a are identical to the arrangement of Figures 1 to 3 and the V. C. I. crystals 36 may be regulated for quantity by a gram measuring scale as shown in Figure 1 in comparison with a known time chart to indicate how long the crystal operation will continue to be effective.

The use of each device is believed to be clear from the foregoing description. For example, if the wick is to be used alone without the bulk applicator 10, then it is removed from its box 30 and plugged directly into an opening. Then, as the wick vapors are gradually exhausted, the applicator 10 may be subsequently mounted in the wick stopper socket 22 and the bulk type V. C. I. vapors used to re-impregnate the wick while it remains installed.

Conversely the applicator may be used alone and mounted or plugged directly in the opening in wall 18^a as shown in the embodiment of Figure 7. If the opening is real small then the relatively small tubular shank 13 may be used to plug the opening without the wick cork or stopper. Also, if more suitable the wick stopper may be inserted within the applicator nozzle and the wick strung through the open end of the nozzle tip.

Various predetermined lengths of wick and measurements of bulk crystals or powder may be used with the accelerating opening 17^a or the special barometric control valve 27. This novel method of V. C. I. applicator accelerates the sublimating or diffusing action of the crystals or powder in bulk, and results in a uniformly deposited crystalline film, coating the entire area of the metal surfaces to be protected. Also, pellets, cakes or liquid forms of V. C. I. impositions may be used if desired.

The perforated tip 14 may be completely removed and a wick strung through the tubular shank 13 from the hollow body 11 for insertion into the void or chamber to be protected. In this case no stopper 20 is necessary as the shank 13, section 12 or the tapered annular exterior of 11 will function as the stopper.

Thus, there is provided a novel method of progressively feeding corrosion-inhibitor vapors into a chamber and of serially recharging or re-impregnating the vapor diffuser wick by the use of an additional supply reservoir of V. C. I. crystals, powder or the like. Such V. C. I. compounds are generally referred to in Patents Nos. 2,577,219, issued December 4, 1951, and 2,592,451, issued April 8, 1952, and assigned to Shell Development Company, of San Francisco.

Also there is thus provided a novel apparatus for applying V. C. I. vapors by wick and by bulk means.

While only four embodiments of this invention have been illustrated and described in detail, it is to be expressly understood other changes and modifications, which will now appear to those skilled in the art, may be made and yet be dominated by the appended claims. Reference is therefore to be had to the appended claims for a determination of the limits of the present invention.

What is claimed is:

1. Means for supplying corrosion-inhibitor vapors into a chamber enclosing metal surfaces and parts to be coated thereby, said chamber having a breather opening, comprising a hollow reservoir for bulk corrosion-inhibitor crystals with a tapered nozzle fitting in said opening, a vapor discharging perforated tip on said nozzle projecting into said chamber, a hollow plug formed with a tapered bore frictionally mounted on the said nozzle, and a wick impregnated with a suitable corrosion-inhibitor vapor diffusing composition embracing the said perforated tip.
2. An applicator for supplying metal coating vapor into a housing, comprising a main hollow reservoir body, a tapered nozzle on one end of the body, a closure cap on the other end of the body, a vapor discharge tip carried by said nozzle adapted to project into the interior of the housing, at least one breather opening in the closure cap, and an air intake check-valve mounted to seat over said opening for barometrically regulating the supply of air into said reservoir body.
3. An applicator for supplying metal coating vapor into a housing, comprising a main hollow reservoir body, a tapered nozzle on one end of the body, a closure cap on the other end of the body, a vapor discharge tip carried by said nozzle adapted to project into the interior of the housing, a breather opening in the closure cap, an air intake check-valve mounted to seat over said opening for barometrically regulating the supply of air into said reservoir body, and a condition responsive element connected to said valve.
4. An applicator system for supplying corrosion-inhibitor vapors in series into a chamber, comprising a reservoir for holding bulk type corrosion-inhibitor material, said reservoir having a tapered nozzle with a diffusing tip, a plug with a tapered bore fitting over said nozzle, and a wick impregnated with corrosion-inhibitor composition adapted to constantly be reimpregnated during use by the vapors diffusing from the discharge tip of the said reservoir.

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