ABSTRACT: An apparatus for dispensing paint or the like and applying it to a surface to be coated. The apparatus comprises a frame having top and bottom cover plates receiving a paint can or like container therebetween and held together by locking screws, with a gasket interposed between a radially outer margin of the top cover plate and the cover-receiving ring of the recloseable can. A gas pressure supply assembly is fixedly disposed atop the cover plate, and includes a pressure regulator for controlling the pressure of a supply of propellant gas held within a miniature, throwaway cylinder or the like, such as a carbon dioxide cartridge. Gas pressure applied to the top surface of the paint in the container forces the paint up a dip tube, through a product supply passage in the pressure supply assembly, and through a flexible tube into a perforated sleeve forming the hub of an applicator roller, under the control of a valve in the applicator handle.
PRODUCT DISPENSER AND APPLICATOR

BACKGROUND OF THE INVENTION

The present invention is directed generally to dispensers and, more particularly to dispensers for facilitating repeated, economical dispensing of paint or like coating from the container in which the paint is purchased through a roller applicator to a surface to be coated. In one embodiment, for example, the invention is directed to a coating apparatus in which propellant gas is supplied from a compressed gas cartridge, such as a carbon dioxide (CO₂) cartridge, under the control of a simple and inexpensive regulator assembly, to the head space above the surface of paint or other coating fluid in an ordinary paint can or the like in order to force the liquid through a dip tube and conduit to an applicator roller assembly. The roller assembly includes a handle and an associated valve so that paint flow under the constant pressure provided by the regulator assembly may be controlled as desired.

Within recent years, great improvements have been made in several properties of many paints, particularly house paints for interior and exterior use. The most noticeable improvements have been concerned with ease of application, that is, improvements in the rheology or flow characteristics of these paints have made it possible to obtain excellent results in the finished job even where application is by means of rollers or applicators other than brushes. Modern emulsion paints are normally highly thixotropic, with the result that they will not drip from a roller on which they are held, and yet will flow easily with reduced apparent viscosity when rolling commences and continues, while dripping and running after application occur only in extreme circumstances. In addition, most modern paints have excellent leveling properties, that is, a short time after application, the thickness of the coating will tend to become uniform, even if it was applied in somewhat random thicknesses from place to place during work. One corollary of this property is that visible edges do not normally appear where newer paint is applied over older paint, with the result that painting may be interrupted and started again without causing lines or runs to appear at the interfaces of the new work with the old. Furthermore, the hiding power of most high quality modern paints is excellent with the result that single coat painting is now quite common. However, as will appear, further is still room for further improvement in methods and apparatus for applying these improved paints in certain situations and under certain conditions.

One drawback to roller-applied paints, for example, is that it is common for them to have extremely high initial viscosities, whereby their absorption by rollers is relatively slow or limited, and since thick films are applied, the roller must be dipped into a supply source, commonly a specially constructed pan, with great frequency, and, following each dipping into the pan, the distribution of the paint on the roller must be controlled by passing the roller back and forth over a textured surface portion of the pan to insure that the roller has an even coating of paint thereon. This is because a roller will transfer paint contained thereon to the coated surface in approximate proportion to the amount of paint absorbed on the portion of the roller in contact with the surface intended to be coated. Unless a certain amount of care is taken in this phase of painting, even the improved leveling characteristics of good quality paints will not overcome the problem entirely.

Thus, although the application of paint from a roller to a coated surface does not need to be further simplified, application of the paint to the roller might be improved, since it still requires consumption of significant time and effort, and this condition is somewhat aggravated by the fact that, particularly with the use of wide rollers, paint trays must correspondingly be large. There is, therefore, the possibility of significant product loss because of air exposure, and frequent and repeated pouring of a new supply of paint into the tray, which cannot be overfilled or underfilled for best results. One apparently inherent feature of this method of application is, therefore, that two containers must be present during any painting operation, and both must be kept together as the painter moves if undue effort is to be avoided. Where painting is undertaken from a ladder or the like, availability of space for receiving two large containers may also present a problem.

It is also well known in the painting industry to apply paint by spray coating or similar pressure feeding methods; however, painting carried out in this manner is normally done only on a commercial scale where the work or object to be painted may be moved into and subsequently out of the painting location, such as a spray booth or the like. Likewise, in relatively large painting jobs, ordinary paint sprayers may be used only if contamination of adjacent buildings or articles is not a problem. Most known sprayable paint is also of the solvent type, since it must be applied at low viscosities and high stability of solution or dispersion not consistent with emulsion systems; solvent painting is inconvenient and even dangerous when used in confined quarters, for example. In addition, because cleaning up is difficult and expensive where spray painting is carried on in confined quarters, and because spray painting or other force fed painting equipment is relatively expensive, heretofore known apparatus and methods of mechanically applying paint have left significant room for improvement.

Accordingly, it is an object of the invention to provide a dispenser assembly for use with a container of paint or like coating liquid to be dispensed which may be readily secured in place over an open paint container without the use of special adapters or the like.

It is a further object to provide a dispenser for feeding paint to a roller or like applicator in which the dispenser includes a self-contained, disposable gas source for use with an economical gas pressure regulator assembly.

Another object is to provide a dispenser which includes means for receiving a container and in which said receiving means serves to support the container against buckling or buckling occasioned by application of head space pressure to the contents of the container.

A further object is to provide a dispenser unit which includes parts that may be assembled and manufactured at minimum costs.

Another object is to provide a dispenser which utilizes inexpensive, disposable gas cylinders as a propellant.

A still further object is to provide a dispenser unit which includes a regulator assembly adapted to be readily locked in place within a cover plate adapted to form a pressure seal with the open top of a container.

A further object is to provide a dispenser unit in which the dispensing arrangement includes means for minimizing paint clogging or emulsion breakdown during dispensing.

Still another object is to provide a dispenser which includes means for facilitating cleaning thereof after a painting operation, in a simple manner without the use of special adapters or the like.

A further object of the invention is to provide a dispenser and applicator which includes an applicator having a perforated hub and paint flow control means associated therewith.

Another object is to provide a dispenser and applicator which is useful with different styles of paint containers, and, within limits, with different sizes of containers.

These and other objects of the invention are achieved by providing an apparatus for dispensing and applying a coating, which apparatus includes a top cover plate adapted to be locked in gastight relation over the top of an open container, means for forcing a coating material from the container through the passage under a regulated pressure applied to the top surface of the liquid within the container, and means for supplying the liquid to the perforated hub of a roller applicator under the control of a valve associated with the applicator handle.
The exact manner in which this invention achieves these objects, and others which are inherent therein, will become more apparent when reference is made to the following description, to the appended claims, and to the accompanying drawings, in which like reference numerals indicate corresponding parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the dispenser assembly of the invention including the coating applicator, and showing a paint container disposed in place in the dispenser;
FIG. 2 is an enlarged vertical sectional view, with portions broken away, of the dispenser unit of the invention;
FIG. 3 is an enlarged vertical sectional view of the dispenser of the invention, taken at right angles to the sectional view of FIG. 2;
FIG. 4 is an enlarged vertical sectional view of the product flow control valve of the applicator assembly;
FIG. 5 is a view similar to FIG. 4, showing portions of the valve in a different position of use; and
FIG. 6 is a vertical sectional view of the control valve of FIG. 5 taken along line 6—6 thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

Although the dispenser and applicator assembly of the present invention has various uses, as set forth above, and as will appear more fully herein, an embodiment thereof will be described in detail which is adapted to be used with an ordinary container of a coating liquid, such as a 1 gallon can of paint for applying the paint to a surface to be coated by means of a specially constructed applicator assembly.

Referring now particularly to FIG. 1, one form of the combined dispenser and applicator unit 8 is shown to comprise several principal elements, namely, the product applicator assembly 10, a conduit unit 12, a paint container 14, including a base member 16, and a combination pressure source and regulator assembly 18 held in place within a top cover unit 20.

Referring now particularly to FIGS. 2 and 3, it will be seen that the pressure source and regulator assembly 18 includes, in addition to the cover unit 20, a regulator body 22, a regulator cover 24, a gas pressure conduit 26, and a product dispensing body 28.

A compressed gas cartridge, such as a conventional eight gram CO₂ cylinder (not shown), is received within a chamber 30 defined by the interior surfaces 32, 34 of the regulator cover and body 34, 22 respectively. A piercing tip 36 is adapted to pierce the flangeable end of a gas cylinder when the interior and exterior threads 38, 40 of the body 22 and cover 24 are substantially fully taken up and a seal has been established between the cover 24 and the body 22 by means of the sealing “O” ring 42 disposed therebetween. Also disposed within the regulator body 22 is a plug assembly 44 which includes a filter screen 46, preferably of a sintered metal material, a valve seat 48, preferably of a lubricous, nonsticking material, such as “Teflon” fluorocarbon polymer, and a gas passageway 50, a second “O” ring 52 being provided to seal any leakage between the plug 44 and the body 22. A cylindrical sidewall portion 54 defines a low pressure chamber 56, the bottom portion of which is defined by the top surface 58 of a regulator piston 60, having sidewalls 62. The piston 60 moves freely within a lower cylindrical bore 64 against the force of a regulator spring 66 which tends to urge the piston 60 upwardly in the orientation of FIG. 2.

A bottle 68, extending upwardly from the top surface 58 of the piston 60 supports a valve stem 70 having a valve head 72 atop thereof, the head 72 being received in the seat 68 when the piston 60 is in its extreme lowermost position. An “O” ring 74 provides a gastight seal between the piston 60 and the sidewall 64.

A nozzle 76 is provided for receiving one end of the gas pressure conduit 26, the other end of which is received by a nozzle unit 78 disposed atop a one-way check valve 80 which is normally spring biased to a closed position and adapted to prevent undesired flow of gas from the head space area 82 of the container 14 upwardly through the conduit 26. The operation of the regulator assembly 18 of the invention is conventional for a piston regulator and is similar to the operation of a counterpart regulator described in the U.S. Pat. No. 3,352,457 to Tracy et al., for example.

Referring now in particular to FIG. 3, the product dispensing body 28 includes an integrally formed, lowermost extension 84 having threads 86 on the exterior thereof for receiving a locking collar 88 which includes cooperating, inwardly facing threads 90 thereof. Disposing radially outwardly from the lower extension 84 is a sealing flange 92 having a groove 94 therein for reception of an “O” ring 96 which is held in compression against the upper surface 98 of the cover 20 by cooperation between the extension 84 and the locking collar 88.

The cover 20 is generally flat plate, having a slightly countersunk radially inner section 100 and including slots 102 adjacent the outer margin thereof for receiving the upper shank portions 104 respectively of the plurality of threaded fasteners 106, each of which has a locking nut 108 associated therewith. The container 14 is a conventional, so-called “double tite” or “triple tite” paint can having the characteristic, well-known cover-receiving ring assembly 110 locked by a double seam 112 to the upper portion 114 of the container body. An annular, somewhat wide, flat sealing washer or gasket 116 is disposed between the inner surface 118 of the cover 20 and the upper portions of the ring 110 and double seam 112. A dip tube 120 is press fit into and extends downwardly from the lower body extension 84, and terminates in a bottom surface 122 lying closely adjacent the bottom panel 124 of the can body 14. Covering the lower surface of the bottom panel 124 to support the same against bulging under pressure and forming locating means for the fasteners 106 is a bottom cover plate 126 having openings 128 therein for receiving the lower shanks 130 of the fasteners 106. Fastener heads 132 locate the bottom plate in relation to the cover unit 20 and permit any desired degree of compression to be obtained between covers 20, 126 for obtaining a gastight seal between the top cover 20 and the interior 82 of the paint container 14.

Referring now to FIG. 3, the product dispensing body 28 and its relation to other elements of the unit 8 are shown. This figure shows a bore 134 in the lower extension 84 of the body 28, the bore 134 being in communication with a reduced diameter countersbore 136 in which is received the outer surface 138 of the upper portion of the dip tube 120 in an removable fit. Sidewalls 140 within the body 28 define a product passage 142 through which the paint may flow to the applicator 10 (FIG. 1) by way of the conduit 12. A nose portion 144 of the body 28 includes threads 146 on the exterior thereof for engagement with threads 148 on the interior of a collar 150 which is mounted for free rotation but locked against axial movement by an annular rib 152 on the proximate end portion 154 of the conduit 12. A locking ring 156 is press fit over the outer surface 158 of the conduit 12 to insure a liquidtight seal between the interior surface 160 of the conduit and the undulations 162 formed on the conduit end portion 154. Likewise, a corresponding ring 164 locks the remote end 166 of the conduit 12 in position surrounding a part of the fitting 168, on which threads 170 are provided. A product passage 172 is disposed centrally within the fitting 168 which may be received in a handle bore 174 with threads 176 on the inner surface thereof (FIG. 4). Preferably, the interior diameter of the passage 140 is the same as the diameter of the inner portion 172 of the fitting 168, which is in turn the same size as the interior 160 of the tube 180.

Referring now in particular to FIGS. 1 and 4, it is shown that the applicator 10 includes a handle 178 to which is attached a rigid product tube 180 serving to support an absorbent cylindrical sleeve 182 for rotation with a hub 184 about an axis.
concentric with the cylindrical end portion 186 of the tube 180. The hub 184 has a foraminous or perforated outer surface 188 to allow communication between the interior thereof and the absorbent roller sleeve 182 which is adapted to receive paint and transfer it to a surface to be coated.

Referring now in greater detail to the applicator 10, FIGS. 4–6 show that means for controlling the flow of paint to the roller 182 are provided in the form of a product control valve 190. The valve 190 includes a flanged head portion 192, and a stem 194 having a cylindrical product opening 196 extending therethrough. A compression spring 199 urges the valve 190 to the left-hand or closed position in the orientation of FIG. 4, so as to close off communication between the bore 200 in the handle 178 and the interior 202 of the tube 180. A fastener 204 receives a slidable locking flange 206, which, when moved to the position shown in FIG. 4, engages the base 208 of the stem 194 to hold the valve 190 in the closed position. When the valve 190 is open, the flange 206 may be engaged with retainer means such as an inside surface 210 of the base 208 to hold the valve stem 194 open (FIG. 5).

In addition to the axial movement just illustrated, the stem 194 may be rotated about its axis through a plurality of positions for regulating the flow of product through the opening 196. This manipulation of the valve 190 serves to move it from a fully closed or blocking-to-the-position to a new position such as that shown in FIGS. 4 and 5, from which it may be closed or opened to any desired extent by rotation of the head portion 192 thereof. The flange 206 and its associated parts allow the valve body 194 to be locked in this position for convenience, while the spring 199 insures that the valve will remain closed unless it is intended to be held open. Thus, by simple manipulation of the valve 190, the operator may refill the roller intermittently or continuously, as desired, depending on working conditions.

Referring now to FIG. 3, another desirable feature of the invention is shown which resides in the provision of standard coupling such as the collar 150 on one end of the tube 12 and the fitting 168 on the opposite end portion 166 thereof. In the preferred form of the invention, these units are sized and threaded so as to be received by a standard garden hose, water faucet, or the like.

In this way, when painting is completed, the roller may be immersed in water and clear water forced through the product tube from the opposite end thereof. In the alternative, or subsequently, the fitting 168 may be attached to a water source to force water in the opposite direction for the cleaning of the unit. Because of the presence of the valve 80, however, the pressure regulator assembly 18 requires no maintenance other than replacement of the cartridge when the gas supply held therein is exhausted.

Another feature of the particular advantage is that the product dispensing body 28 may be formed separately from the regulator body 22 and both of these units may be formed separately from the top cover 20. Accordingly, extremely economical use of materials may be accomplished without sacrificing precision or dependability. In particular, since the plate 20 is normally made of a mild steel plate formed by a stamping and punching process, which provides rugged but inexpensive construction, gastight mounting of the product body 28 and the associated regulator assembly 18 thereto can be accomplished with complete reliability because of the provision of the flange 92, the "O" ring 96, and the collar 80 which locks the extension 84 and the associated body 28 in place. In keeping with this concept, the central opening in the plate 20 need not be precisely sized or located; nevertheless, the body is rigidly located and a tight seal is maintained at minimum cost.

Referring now to the operation of the device, once the dip tube 128 is inserted in the extension 184, a container 140 opened and placed in a position beneath the top cover 20. Thereafter, the cover is fastened in place by manipulating the nuts 108, a cartridge is inserted and the cover 20 is locked in place. Under the preset, fixed pressure provided by the opening and closing of the valve 72 in response to head space pressure within the container 14, product is forced into the roller portion 182 of the applicator 10 under control of the valve 190. Paint or other coating may thus be applied until the contents of the container are exhausted. Somewhat unexpectedly, tests have shown that roller-applied paints, such as emulsion paints, do not undergo undesirable concept, of carbon dioxide under conditions normally encountered in painting. This is advantageous in that standard CO₂ cylinders, which are readily available for other purposes at economical prices, may be used without the need for special propellants or the like.

A roller unit has been illustrated as the preferred form of applicator, but, as is well known, other applicators, such as relatively flat plates or the like, suitably constructed may be used where it is desired to paint corners or other margin portions of building interiors or the like. Smaller capacity cans may be accommodated merely by the provision of sealing gaskets of different diameters, and shortened or lengthened dip tubes, where indicated. In other words, the beam strength of the top and bottom covers is such that any smaller size container may be accommodated by providing a suitable size gasket.

We claim:

1. A dispenser and applicator assembly for ready association with a standard container of a coating fluid, said assembly including an applicator for said coating fluid, a handle unit for manipulating said applicator, a dispenser unit and said container, said dispenser unit comprising, in combination, cylinder, lower container support means, said container cover unit and fasteners extending between said support means and said cover unit for permitting removal and replacement of said container, means associated with a lower surface of said cover unit for forming a gasket seal between said cover and a radially outer margin of the upper portion of said container, said seal means being adapted to tolerate substantial variations of shape and dimension in said container, a regulator-receiving opening formed in said cover unit and defined by an inner margin thereof, a self-contained gas pressure regulator unit adapted to removably receive a compressed gas cartridge therein and further including a gas conduit extending from said regulator unit and through said cover unit, means for controlling gas flow through said gas conduit from said regulating unit to the head space above the product level in said container, means normally urged said gas flow control means to an open position for permitting gas flow, and means for moving said gas flow control means to a closed position in response to a predetermined level of head space pressure in said associated container, whereby said head space pressure is self-regulating so as to permit effective dispensing and to prevent frothing of said coating fluid, said pressure regulator including an associated sealing flange for resilient seal means associated with one surface thereof, and means bearing against one surface of said cover unit for urging said flange and said associated regulating unit into a position closely overlying said cover unit with said resilient seal disposed in said inner margin and being held in compression between said flange and said cover unit.

2. A dispenser and applicator assembly as defined in claim 1 wherein means are provided in said opening for engaging a portion of said regulator unit to prevent rotation thereof.

3. A dispenser and applicator assembly as defined in claim 1 wherein said cover comprises a unitary, substantially flat, generally circular metal element.

4. A dispenser and applicator assembly as defined in claim 1 wherein said regulator unit is removably received within said opening.

5. A dispenser and applicator assembly as defined in claim 1 wherein positionally adjustable single means are provided for permitting flow of coating fluid into said applicator in one position thereof and for preventing fluid flow thereto in another position thereof, said single means also being adapted to be adjusted to control the flow rate when open said means is in said one position, wherein means are provided for holding said maintaining said single means in both said one position and said other position without affecting the flow rate setting thereof.