CONTAINER LID HAVING MULTIPLE UTILITIES

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ABSTRACT
The prevention from hardening upon storage of paste-like material by use of a lid having an inlet port, an outlet port, and a plastic bag attached to the inlet port. By expelling the air in contact with the paste-like material, the material can be prevented from hardening during storage. A similar lid is used in a pre-cleaning device situated between a dust-producing tool and a wet/dry vacuum. Dust-laden air enters the device through an inlet port and is discharged over a water filter. The pre-cleaned air is vacuumed to a wet/dry vacuum. The pre-cleaning process lengthens the useful life of the wet/dry vacuum. A hand-held sander is disclosed which provides for rapid change of sandpaper. The sander has a hollow upper handle component and a lower surface component which are held together with a latch. Depressing of a quick-release button allows separation of the two parts.
Fig. 5
CONTAINER LID HAVING MULTIPLE UTILITIES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the filing date of applicant’s provisional application, Ser. No. 60/999,779, having an effective filing date of Jul. 1, 2008, which is incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] (Not applicable)

REFERENCE TO SEQUENTIAL LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING APPENDIX SUBMITTED ON A COMPACT DISC

[0003] (Not applicable)

BACKGROUND OF THE INVENTION

[0004] 1) Field of the Invention

[0005] This invention is directed to container lids which have multiple utilities and to processes for using these lids. One disclosed utility is keeping paste-like and liquid compositions from becoming hard during storage. Another disclosed utility is pre-cleaning air from an industrial tool prior to entrance into a wet/dry vacuum cleaner. This invention is also directed to a hand-held sander which has a fast and simple release of the sandpaper which may be used in combination with the lid.

[0006] 2) Description of the Related Art

[0007] In the prior art, a user obtained a can of paste-like or liquid material such as joint compound, glazer’s putty, or paint, removed the lid, used a portion of the material, reapplied the lid, and stored the can until the next use. Over a period of time the material reacted with air in the can and the reaction caused the material to harden. One partial solution was to place a wet cloth into the can of paste-like material to slow down the hardening process. With or without the use of this partial solution, the material at least partially dried out. The user had to discard the partially used can or remove as much of the dried material as possible and attempt to mix the material to get a smooth consistency. Any remaining dry lumps mixed into the material creating an inconsistent texture which created an annoyance to the user when the material was applied to a surface. Dried material created gouges or streaks in the applied material and the dried lumps had to be removed by hand. It is easy to see that the prior art containers and methods used to store paste-like materials and liquids caused a waste of material and time.

[0008] A more recent solution to this problem is disclosed in Published Application US 2003/0019539. In this document, a paint can contains a lid having an opening. An inflatable bladder can be inserted between the surface of the paint and the lid, the bladder may be pressurized so as to substantially fill the space between the paint and the lid, a tube connecting the bladder with the exterior of the can may be closed with a valve, and air trapped between the can and the expanded bladder may be released by means of a pressure valve. This innovation substantially decreases the amount of air coming in contact with the paint and decreases the formation of a crust due to contact of paint with air. However, the air remaining within the can between the paint and the lid is under a pressure at least as high as ambient pressure and the “amount” of air (\(P \times V\)) may be appreciable and may not entirely prevent the formation of the crust and its associated problems.

[0009] U.S. Pat. No. 7,246,406 issued Jul. 24, 2007 to Yarbrough et al. discloses a device for cleaning dust from air which comes from an industrial operation, such as cutting concrete with a saw. Over time, the filter media of this device and conventional wet/dry vacuum cleaners becomes clogged, the airflow slows, and the dust collection becomes less efficient.

[0010] Hand-held Sanders are known in the art. Changing the sandpaper on conventional Sanders can be cumbersome and time consuming. The user must use a screwdriver or clip down a fastener that attaches from the top side of either end of the sanding device.

BRIEF SUMMARY OF THE INVENTION

[0011] One embodiment of this invention is directed to lids for cans of paste-like and liquid compositions wherein the lids contain air inlet and outlet ports. An airtight flexible bag is attached to an inlet port. In one alternative, with the lid in place vacuum is applied to the outlet port, resulting in air passing out of the space between the bag and the material in the container. As a result, ambient air passes into the bag and the bag assumes the contour of the paste-like material and presses against the material. Since the pressure of the air between the lid and the material is below ambient pressure, only a very limited “amount” (\(P \times V\)) of air is in contact with the paste-like or liquid material and the material retains its desired consistency. The present invention uses a can lid of predetermined size to fit over containers of paste-like or liquid material. Conventional examples are one-gallon and five-gallon containers.

[0012] In another alternative, a flexible air-tight bag is fitted into an inlet port and secured in place. With the use of a built-in, hand-operated air pump, air in container is forced out and ambient air is drawn into the bag. The air expands the bag, forcing the bag to assume the contour of the paste-like material, thus keeping air from contacting the paste-like material and original consistency of the material is maintained. With repeated pumping, the pressure of the air within the container may be made to be lower than ambient pressure so that the “amount” (\(P \times V\)) of air available to react with the material is less than that which would be available had the bladder been filled using high pressure.

[0013] The second embodiment of the present invention discloses a device for pre-cleaning air to be filtered by any conventional wet/dry vacuum. The multipurpose lid of the present invention contains an inlet port and an outlet port. The inlet port is connected to a source of dirty air via an intake tube. The outlet port is attached to a device for cleaning dirty air, such as a conventional wet/dry vacuum cleaner. The lid is attached to a conventional pail or other container which is partially filled with water. Dirty air is discharged from an inlet tube above the level of the water, proceeds into the water where most of the dust is captured, and is pulled out of the container by a vacuum unit which is part of the final cleaning system. By use of the above device, the air coming from the source of dirty air is substantially cleaned, thus prolonging the life of the final cleaning apparatus.

[0014] The sanders of the present invention may be used as the source of dirty air in the above embodiment. The sander contains a button on the top of the handle. When the button is
depressed, the bottom surface component of the sander is disengaged and swings open. Used sandpaper is removed from the sander. Ends of sandpaper strips are fitted into front and rear slots and the bottom surface component is fitted back into place.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIGS. 1 and 2 are cut-away side elevational views of one device used in the first embodiment of the present invention. FIG. 3 is a cut-away side elevational view of another device used in the second embodiment of the present invention. FIG. 4 is an elevational perspective view of a sander of this invention suitable for use with the pre-cleaning device of the second embodiment of this invention. The sander is in the closed condition.

FIG. 5 is an elevational perspective view of the sander of FIG. 4 in the open condition.

DETAILED DESCRIPTION OF THE INVENTION

The first embodiment of this invention is directed to keeping paste-like materials or liquids in containers 4 such as pastes or cans in a fresh condition during storage. Such material 2 is basically any material that is stored in the container 4 and has a tendency to dry out due to contact with air during storage. The container 4 is made of metal or plastic and is of conventional size of containers used in the art, such as one gallon or five gallon cans or pastes. To accomplish this goal the invention uses a pre-sized lid 6, usually of plastic, which snaps onto the top edge 8 of the container 4.

In a first alternative of the first embodiment, shown in FIG. 1, the lid 6 for a container 4 has an inlet port 10 and an outlet port 12. A strong, flexible bag 14, conveniently a plastic bag, is fit through a first, inlet, port 10 so that the mouth 16 of the bag 14 will be toward the outside 18 of the container 4 when the lid 6 and the container 4 are joined. The bag 14 and the port 10 may be securely fastened by simple friction fit using an internal ring 20 to hold the bag 14 in place. A first closure component 22 may be used. This component 22 fits into the ring 20 to provide an air-tight seal for use during storage. This component 22 preferably has a one-way valve (not shown) to allow air into the bag 14 but will prevent air from exiting the bag 14. The outlet port 12 contains an inwardly extending tube 24 having a plurality of openings 26. The second, outlet, port 12 fits snugly by friction fit onto a hose 28 connected to a vacuum device (not shown). A second closure component (not shown) may be used. This component fits into the outlet port 12 to provide an air-tight seal during storage.

In a second alternative of the first embodiment, shown in FIG. 2, the lid 6 contains an inlet port 10 connected to a bag 14 by means of an internal ring 20 as in the first alternative. The inlet port 10 contains a one-way inlet valve (not shown) as in the first alternative for allowing ambient air to pass from outside the container 4 into the bag 14 but preventing escape of air from the bag 14. The lid 6 is equipped with an outlet port 30 having a one-way valve (not shown) such that air may leave the container 4 but may not enter the container 4. In this alternative, the lid 6 is designed in such a way that it will operate as a diaphragm pump 32 which allows air to leave the container 4 when the pump 32 is depressed and prohibits air from reentering the container 4 when the pump 32 is released. In this alternative the lid 6 has a domical configuration within its structure that will allow the user to compress and decompress the structure multiple times to remove air from the container 4. The inlet and outlet diaphragm valves operate in an opposing method. When the lid 6 is compressed the outlet valve allows air to freely pass out of the container 4 while the inlet valve does not. When the lid 6 moves into a decompression mode the inlet valve opens and the outlet valve closes. With the inlet valve open, ambient air passes into the flexible bag 14. With enough compressions substantially all of the air between the flexible bag 14 and the container 4 is forced out through the outlet valve and flexible bag 14 is inflated with drawn-in ambient air. This air pump serves to evacuate air from the container 4 and, unlike the first alternative, does not require a separate vacuum source. The lower resulting pressure in the space between the material 2 and the lid 6 means that a lower amount of air is available to react with the material 2 than if the bag 14 has been inflated using positive pressure.

In carrying out the process of the first embodiment, the user obtains a container 4 of material 2 which is subject to hardening when exposed to air during storage. Such material 2 may be joint compound, glazier's putty, paint, and the like. The container 4 may have an original, conventional lid or it may have the lid 6 of the present invention. The original lid, if present, is removed, the material 2 in the container 4 is partially used, the lid 6 of the present invention is applied, air is evacuated from the space between the bag 14 and the material 2, and the container 4 is stored. By using this process the material 2 is not subject to reaction with air and is maintained in a paste-like or liquid condition.

The second embodiment of this invention is described with reference to FIG. 3. This embodiment provides a device 34 for pre-filtering dirty air before it comes into contact with the conventional filter within a wet/dry vacuum device (not shown). The device 34 of this invention provides longer useful operation time of the wet/dry vacuum device without clogging the filter medium. This device 34 has a container 36 such as a pail and a lid 38. The device 34 is based on the function of forcing dirty air into water 40 that is placed in the bottom 42 of the device 34. A conventional wet/dry vacuum attached to the device 34 by an outlet tube 44 is used to create a vacuum which is used to bring the dirty air into the container 36 by way of an intake tube 46. The origin of the dirty air may be an industrial tool 48 such as a sander or circular saw. The tool 48 is connected by means of an intake tube 46 having an appropriate inlet fitting 50 to the inlet port 52 of the pre-cleaning device 34. An inlet tube 54 is connected to the inlet fitting 50 and ends slightly above the surface of the water 40 with a water level indicator 56 on the surface of the filtration water 40. The outlet port 58 contains an outlet fitting 60 having vertical openings 62 around it. These openings 62 help prevent the transfer of water 40 into the outlet fitting 60 by causing the air to flow over a greater surface and by pulling air in from only a horizontally diffused direction. The outlet port 58 is attached by the outlet fitting 60 to an outlet tube 44, which carries the pre-cleaned air to a wet/dry vacuum for further cleaning.

In operation, the inlet tube 54 having the water level indicator 56 is attached to the inlet fitting 50 on the inlet port 52 of the lid 38. The lid 38 is placed on the container 36 and water 40 is introduced into the container 36 until the user can
28. Although the invention has been described and illustrated in detail, it is to be clearly understood that the same is by way of illustration and example, and is not to be taken by way of limitation. The spirit and scope of the present invention are to be limited only by the terms of the appended claims.

1. A lid for a container for material which hardens upon exposure to air during storage, which container has an inside and an outside, which lid has an inlet port and an outlet port, a strong, flexible bag having a mouth fit through the inlet port so that the mouth of the bag is toward the outside of the container when the lid and the container are joined, and the outlet port contains an inwardly extending tube having a plurality of openings such that when air is expelled from the container a partial vacuum is created, which partial vacuum causes air to enter the bag and causes the bag to abut the material.

2. The combination of a container having material which has a tendency to harden upon storage in the presence of air and the lid of claim 1.

3. A lid for a container having an inside and an outside, which lid has an inlet port connected to a bag having a mouth fit through the inlet port so that the mouth of the bag is toward the outside of the container when the lid and the container are joined, the inlet port containing a one-way inlet valve allowing ambient air to pass from outside the container into the bag, an outlet port having a one-way valve such that air may leave the container but may not enter the container, the lid being designed in such a way that it will operate as a diaphragm pump which allows air to leave the container when the pump is depressed and prohibits air from reentering the container when the pump is released.

4. The combination of a container having material which has a tendency to harden upon storage in the presence of air and the lid of claim 3.

5. A combination for pre-cleaning dirty air comprising: a container containing water, a lid on the container, an inlet port in the lid, an intake tube attached to the inlet port for bringing dirty air to the container, an inlet tube having a lower end, which inlet tube is connected to the inlet port and ends slightly above the surface of the water, said inlet tube having a water level indicator at the lower end thereof, an outlet port containing an outlet fitting having vertical openings around it, which outlet port is attached to an outlet tube for carrying pre-cleaned air from the container.

6. The combination of claim 5, wherein the intake tube is connected to a tool and wherein the outlet tube is connected to a wet/dry vacuum device.