A gas adaptor installed to an opening of a fuel tank comprises an inner cylinder; a top of the inner cylinder being extended with a flange; an center of the inner cylinder having a fuel receiving hole; an outer cylinder extending from an outer edge of the flange of the inner cylinder; an inner wall of the outer cylinder being assemble to an opening of a fuel tank; a tube extending from one end of the flange; the tube being communicable to an EEC; a guide hole extending from one end of the flange and communicable to the tube; a sub-gas chamber being formed between the inner cylinder and the outer cylinder; the sub-gas chamber being communicable to the guide hole. The sub-gas chamber is communicable to an evaporative emission control system (EEC) through the guide hole and the tube.
GAS ADAPTOR INSTALLED TO AN OPENING OF A FUEL TANK OF SMALL ENGINES EQUIPMENTS

FIELD OF THE INVENTION

[0001] The present invention relates to fuel tanks, and particular to a gas adaptor installed to an opening of a fuel tank of small engine equipment, wherein the evaporated gas in the fuel tank can be guided to an evaporative emission control system (EEC) directly. The gas adaptor is directly installed upon an opening of a fuel tank of small engine equipment. The adaptor is suitable for fuel tank openings of different sizes and specifications.

BACKGROUND OF THE INVENTION

[0002] Conventionally, traditional small engines refer to outputting horsepower below in 25 HP (19 Kw), and its equipments has a fuel tank cover installed to an opening of a fuel tank but only the functions of opening or closing the fuel tank. A vent is formed on a surface of the cover for avoiding the deformation or explosion of the fuel tank due to the evaporative exhaust gas within the fuel tank. However, the vent is helpful to the continuous evaporation of the fuel within the fuel tank so as to pollute the environment and consume a large amount of fuel. Furthermore, when the small engine equipment falls to the ground, the drained fuel will induce the fire accident. Thereby, the prior art has some defects necessary to be resolved.

[0003] To overcome above mentioned problem in the prior art fuel tank cap, an improved cap for the opening of the fuel tank is developed by adjusting the opening timing of the opening of the fuel tank according to the pressure inside the fuel tank so as to retain the pressure within the fuel tank. However, although this kind of cover has the advantage of reducing the evaporation of gas, while the evaporated gas will disperse into atmosphere so as to pollute environment. Moreover, in this prior art, the opening of the fuel channel of the cover is controlled by a pressure difference valve has a complicated structure with too many components so that the cost is high and fault rate increases.

[0004] Besides, to match the environmental rules, the evaporated gas from cars or motorcycles cannot be drained to atmosphere. As a result evaporative emission control system (EEC) is commonly used in the motorcycles and thus the fuel tank must be a sealing structure. The gas from the fuel tank is reused by the evaporative emission control system (EEC) to the oil supply system of an engine. Therefore, in some new fuel tank, gas reuse channel is designed so as to guide gas into the evaporative emission control system (EEC). Thereby, the opening of the fuel tank is locked with sealing cap so as to avoid gas to drain out. However, this way must be formed a new mold or modified the original mold and is used to the new small engine equipments, but the current used small engine equipments has no this effect. Otherwise, the current used small engine equipments must be replaced with a new fuel tank. Therefore, the cost is increased.

SUMMARY OF THE INVENTION

[0005] Accordingly, the primary object of the present invention is to provide a gas adaptor installed to an opening of a fuel tank of a small engine equipment, wherein the gas adaptor is directly installed upon an opening of a fuel tank of a small engine equipment. The adaptor is suitable for fuel tank openings of different sizes and specifications. Thereby, the fuel tank mold need not being modified and no new mold is necessary. The current used fuel tanks can be assembled with the gas adaptor of the present invention.

[0006] To achieve object, the present invention provides a gas adaptor installed to an opening of a fuel tank, wherein the gas adaptor is installed with a fuel receiving hole which can be screwed into or plugged into the fuel tank cap. The gas adaptor has a tube for guiding gas in the fuel tank into an expansion chamber so that the gas can be reused.

[0007] The gas adaptor is formed with a sub-gas chamber which is communicated to an expansion chamber upon a surface of the fuel in the fuel tank. The sub-gas chamber is communicated to the evaporative emission control system (EEC) through the tube.

[0008] Besides, a bottom of the inner cylinder 24 is extended with a tube portion; an opening of the tube portion has a specific height h to a top wall of the fuel tank. The tube portion is communicated to the fuel receiving hole. An expansion chamber is formed between an outer wall of the tube portion and an inner wall of the fuel tank for receiving evaporated gas. When fuel is filled fully in the fuel tank, the tube portion causes an inner pressure in formed in the expansion chamber so that no vacuum is formed in the fuel tank.

[0009] Moreover, other than the fuel tank, fuel tank cover, evaporative emission control system (EEC), other portions of the present invention are formed integrally. Thus the cost can be downed. Thereby, the present invention can be used to old or new fuel tanks.

[0010] The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is an exploded perspective view showing that the gas adaptor is installed to an opening of a fuel tank and a cover of the fuel tank is installed to a fuel receiving hole of the fuel adaptor.

[0012] FIG. 2 is a structural schematic view of the present invention, where the fuel adaptor is assembled to an opening of a fuel tank and a cover is coupled thereto.

[0013] FIG. 3 is a schematic view of the present invention, where it is illustrated that an expansion chamber is formed at an upper side of the oil surface; the expansion chamber is communicable to a sub-gas chamber so as to be communicated to an evaporative emission control system (EEC) through a guide hole and a tube.

DETAILED DESCRIPTION OF THE INVENTION

[0014] In order that those skilled in the art can further understand the present invention, a description will be described in the following in details. However, these descriptions and the appended drawings are only used to cause those skilled in the art to understand the objects, features, and characteristics of the present invention, but not
to be used to confine the scope and spirit of the present invention defined in the appended claims.

[0015] With reference to FIG. 1, it is illustrated that the present invention is installed to an adaptor 2 on an opening 31 of a fuel tank 3.

[0016] The specification of the fuel tank 3 is not confined, but it is necessary that the fuel tank 3 has an opening 31. Conventionally, the opening 31 serves for receiving fuel. The opening 31 is screwed with conventional fuel tank cover. An outer wall (or inner wall) of the opening 31 is extended with an outer thread 36 for screwing the fuel tank cover having inner thread (referring to FIG. 1). The outer thread 36 upon the opening 31 is replaced by an inner thread within the opening. The threads may be replaced by ribs, buckling recesses, etc. for locking the fuel tank to the cover. In the present invention, the outer thread 36 serves to be assembled to the adaptor 2.

[0017] The adaptor 2 is an integral body. The adaptor 2 has an inner cylinder 24. A center of the inner cylinder 24 is used as a fuel receiving hole 29 for receiving a fuel driver for injecting fuel into the fuel tank 3. A top periphery of the fuel receiving hole 29 is formed with an inner thread 28 for locking with the outer thread 10 of the fuel tank 3. In the present invention, the threads may be replaced by ribs, buckling recesses, rings, etc. so that the cover 1 can tightly seal the fuel receiving hole 29.

[0018] A top of the inner cylinder 24 is extended with a flange 23. A tube 22 is extended from one end of the flange 23. A guide hole 21 is also extended from the flange 23. An outer edge of the flange 23 is downwards and axially extended with an outer cylinder 25. Thereby, a sub-gas chamber 20 is formed between the inner cylinder 24 and the outer cylinder 25.

[0019] An inner wall of the outer cylinder 25 is formed with inner thread 26 for firmly securing with the outer thread 36 of the opening 31, see FIG. 2. Besides, when the outer thread 36 of the opening 31 is replaced by ribs, buckling recesses, or rings, the inner thread 26 can be changed correspondingly for coupling to the opening 31. Furthermore, in the present invention, the Ultrasonic welding, spin welding, vibration welding, high frequency welding or such ways as hot plate welding is suitable to fix the inner wall of the outer cylinder 25 to the opening 31. All these are within the scope of the present invention.

[0020] Above mentioned sub-gas chamber 20 serves to communicate the guide hole 21 with the tube 22. The tube 22 can be connected to an evaporative emission control system (EEC) so that gas in the fuel tank 3 is communicated to the evaporative emission control system (EEC) through the guide hole 21 and the tube 22.

[0021] A bottom of the inner cylinder 24 is extended with a tube portion 27. An opening of the tube portion 27 has a specific height h to a top wall 33 of the fuel tank 3, see FIG. 2. The tube portion 27 is communicated to the fuel receiving hole 29. An outer wall of the tube portion 27 and an inner wall of the fuel tank 3 are formed with an expansion chamber 30 for receiving evaporated gas. When the fuel tank 3 is filled with fuel, the expansion chamber 30 is formed by the outer wall of the tube portion 27, the inner wall of the fuel tank 3 and the surface of the fuel so as to avoid the deformation of the fuel tank 3 with the use of fuel. Thereby, the specific height h serves to decide the volume of the expansion chamber 30, the full filling height of the fuel in the fuel tank 3, and the fuel volume in the fuel tank 3.

[0022] Thereby, the gas evaporated into the expansion chamber 30 and sub-gas chamber 20 of the fuel tank 3 can be guided to the evaporative exhaust control system (EESC) of the engine so as to retain the stability of the inner pressure of the fuel tank 3. Thereby, the problem of environmental pollution due to the draining of gas is resolved by the design of the present invention.

[0023] The present invention is thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the present invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is:

1. A gas adaptor installed to an opening of a fuel tank comprising:

an inner cylinder; a top of the inner cylinder being extended with a flange; an center of the inner cylinder having a fuel receiving hole; the fuel receiving hole being capable of being coupled with a cover of the fuel tank;

an outer cylinder extending from an outer edge of the flange of the inner cylinder; an inner wall of the outer cylinder being assembled to an opening of a fuel tank;

tube extending from one end of the flange; the tube being communicable to an evaporative emission control system (EEC);

guide hole extending from one end of the flange and communicable to the tube;

sub-gas chamber being formed between the inner cylinder and the outer cylinder; the sub-gas chamber being communicable to the guide hole;

wherein the sub-gas chamber is communicable to an evaporative emission control system (EEC) through the guide hole and the tube.

2. The gas adaptor installed to an opening of a fuel tank as claimed in claim 1, wherein a bottom of the inner cylinder is extended with a tube portion which is extended into the fuel tank for controlling a height of the fuel surface in the fuel tank.

3. The gas adaptor installed to an opening of a fuel tank as claimed in claim 2, wherein an opening of the tube portion has a specific height to a top wall of the fuel tank; an outer wall of the tube portion and an inner wall of the fuel tank is formed with an expansion chamber; the expansion chamber is communicable to the sub-gas chamber.