A cartridge for a vaporizor includes a heating element and a tank for holding a vaporizable fluid. The heating element may be substantially composed electrically conductive wiring wrapped around wicking. The vaporizable fluid may be transferable to the heating element through a semi-permeable membrane. A heat shield may be placed between the heating element and an outer shell of the cartomizer in order to prevent the outer shell, or other components of the cartomizer, from experiencing undesired temperature raises potentially resulting in failure.
CARTRIDGE FOR A VAPORIZOR

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/916,650, filed Dec. 16, 2014, the content of which is hereby incorporated herein by reference in its entirety.

FIELD OF THE DISCLOSURE

[0002] This disclosure relates to the field of vaporizers, also referred to as electronic cigarettes, and more particularly a cartomizer for a vaporizer, also referred to as a cartridge.

BACKGROUND

[0003] Electronic cigarettes have recently emerged as a new product for providing nicotine through a smokeless inhalation process. In many embodiments of the electronic cigarette, most implementations consist of a power supply (typically a battery) and an atomizing device. In reusable electronic cigarettes, the two items are separated into a battery and a cartomizer, to allow the disposal and replacement of the nicotine containing fluid cartomizer while preserving the more costly battery and associated circuitry (microcontroller, switch, indicating LED, etc.). In disposable electronic cigarettes, the two items are combined to integrate the functions into one unit that is disposed of after either the battery energy or the nicotine containing liquid is exhausted.

[0004] The liquid that is produced vapor in electronic cigarettes is generally a solution of one or more of propylene glycol (PG) and/or vegetable glycerin (VG) and/or polyethylene glycol 400 (PEG400), mixed with concentrated flavors, and optionally, a variable percentage of a liquid nicotine concentrate. The solution is often sold in a bottle or in disposable cartridges or cartomizers. Many different flavors of such liquid are sold, including flavors that resemble the taste of regular tobacco, menthol, vanilla, coffee, cola and various fruits. Various nicotine concentrations are also available, and nicotine-free solutions are also common.

BRIEF SUMMARY OF THE DISCLOSURE

[0005] Embodiments of a cartomizer for use with an electronic cigarette may include an elongate outer shell having first and second ends; a first opening provided proximate to the first end of the outer shell, and a second opening provided proximate to the second end of the outer shell; and an airflow establishable between the first and second openings; a tank provided within the outer shell, the tank dimensioned to hold a vaporizable fluid; a heating element provided within the outer shell and adjacent to the tank, the heating element in the path of the airflow, the heating element operable to heat the vaporizable fluid to a vaporization temperature; and a heat shield provided proximate to the heating element. An electronic cigarette may include a battery portion which may include a battery housed within the battery, and embodiments of a cartomizer as described herein.

BRIEF DESCRIPTION OF THE FIGURES

[0006] FIG. 1 illustrates a side view of a battery portion for a vaporizer and a cartomizer in accordance with embodiments of the disclosure; longitudinal cross sectional view of an embodiment of a cartomizer for use with an electronic cigarette; and

[0007] FIG. 2 illustrates a side cross sectional view of an embodiment of a cartomizer for use with a vaporizer.

DETAILED DESCRIPTION

[0008] The following detailed description and the appended drawings describe and illustrate exemplary embodiments of the invention solely for the purpose of enabling one of ordinary skill in the relevant art to make and use the invention. As such, the detailed description and illustration of these embodiments are purely exemplary in nature and are in no way intended to limit the scope of the invention, or its protection, in any manner. It should be understood that the drawings are not to scale and in certain instances, details have been omitted, which are not necessary for an understanding of the present invention, such as conventional details of fabrication and assembly.

[0009] Embodiments of a cartomizer for use with an electronic cigarette may include an elongate outer shell having first and second ends; a first opening provided proximate to the first end of the outer shell, and a second opening provided proximate to the second end of the outer shell, and an airflow establishable between the first and second openings; a tank provided within the outer shell, the tank dimensioned to hold a vaporizable fluid; a heating element provided within the outer shell adjacent to the tank, the heating element in the path of the airflow, the heating element operable to heat the vaporizable fluid to a vaporization temperature; and a heat shield provided proximate to the heating element.

[0010] In further embodiments of a cartomizer, the heat shield is provided between the heating element and the outer shell. The heat shield may be formed as a ring. The heat shield may be substantially composed of a metal. The heating element may be composed of wicking and a conductive coil may be wrapped around the wicking. Embodiments of the cartomizer may further include a semi-permeable membrane provided between the tank and the heating element, and wherein the liquid is transferred from the tank to the heating element through the semi-permeable membrane.

[0011] An electronic cigarette may include a battery portion which may include a battery housed within the battery, and embodiments of a cartomizer as described herein.

[0012] With reference now to the Figures, an embodiment of a cartomizer 100 for use with a vaporizer or an electronic cigarette is provided in accordance with the disclosure. The electronic cigarette may consist of a battery portion 10, which may house circuitry and a battery, as well as embodiments of cartomizer 100 as provided within the disclosure. Cartomizer 100 may include an outer wall 110, the dimensions of which defining an outer diameter or an outer circumference of cartomizer 100. Outer wall 110 is illustrated as cylindrical, however the discloses further contemplates additional shapes or dimensions of outer wall 110. In some embodiments, outer wall 110 may be correspondingly dimensioned with the outer dimensions of the battery portion 10 to be joined or used with cartomizer 100. Outer wall 110 may be formed from plastic, glass or other any other suitable material known or to be discovered.

[0013] Cartomizer 100 may be used connected to a battery portion of an electronic cigarette. Embodiments of a battery portion are disclosed, for example, in U.S. Application Ser. No. 61/903,344, the entire contents of which are expressly
incorporated herein by reference. In some embodiments, car- 
tomizer 100 may be inserted into an end cavity or recess of the 
battery portion 10 of an electronic cigarette. Cartomizer 100 
may be substantially elongate and have a defined first end 
110A and a second end 110B. At least two holes or openings 
112A/112B may be provided so as to permit an air flow 114 
through cartomizer 100. One or more first openings 112A 
may be provided proximate to first end 110A, while one or 
more second openings 112B may be provided proximate to 
second end 110B. An airflow 114 may be thereby established 
through cartomizer 100 to permit a user of the electronic 
cigarette to inhale the produced vapor through one of the 
openings 112A/112B. In one embodiment, a battery portion 
10 of an electronic cigarette is connected at or proximate to 
first end 110A of cartomizer 100, while a mouthpiece may be 
provided at or proximate to second end 110B.

A vaporizable liquid 200 may be stored within a 
liquid tank 116 in at least a portion of cartomizer 100. Liquid 
200 may be any known or to be developed liquid which may 
be used in electronic cigarettes. In order to vaporize liquid 
200, a heating element 120 is provided for elevating the 
temperature of liquid 200 to its vaporization temperature. 
Heating element 120 may be an electrically conductive coil, 
such as a wire wrapped around a spool or other form of metal, 
through which electrical current is provided. This metal 
can be connected to a voltage source, and when current 
flows through it, it becomes heated to the point where 
the liquid vaporizes. The vapor then passes through the spool 
or coil and rises to the top of the tank, where it can be 
inhaled by the user.

Embodiments of the heat shield may be provided alternati-
vatively, or additionally, proximate to liquid tank 116, which 
in some embodiments is made of plastic and, regardless of 
the material tank 116 is made from, may benefit from insulation 
from high temperatures generated by heating element 120. 
For instance, when a plastic outer shell 110, or other plastic 
component, is heated to a glass transition temperature, the 
plastic changes from a substantially clear amorphous solid 
and begins to crystallize into an opaque solid.

The descriptions set forth above are meant to be 
illustrative and not limiting, and persons of skill in the art 
will recognize that various common and known deviations 
from the above described structures are considered to be 
within the scope of the disclosed concepts described herein.

What is claimed:

1. A cartomizer for use with an electronic cigarette, the 
cartomizer comprising:
an elongate outer shell having first and second ends; 
a first opening provided proximate to the first end of the 
outer shell, and a second opening provided proximate to 
the second end of the outer, and an airflow establishable 
between the first and second openings; 
a tank provided within the outer shell, the tank dimension-
ioned to hold a vaporizable fluid; 
a heating element provided within the outer shell and adja-
cent to the tank, the heating element in the path of the 
airflow, the heating element operable to heat the vapor-
izable fluid to a vaporization temperature; and 
a heat shield provided proximate to the heating element.

2. The cartomizer of claim 1, wherein the heat shield is 
provided between the heating element and the outer shell.

3. The cartomizer of claim 2, wherein the heat shield is 
formed as a ring.

4. The cartomizer of claim 2, wherein the heat shield is 
substantially composed of a metal.

5. The cartomizer of claim 2, wherein the heating element 
is composed of wicking and a conductive coil wrapped 
around the wicking.

6. The cartomizer of claim 5 further comprising a semi-
permeable membrane provided between the tank and the 
heating element, and wherein the liquid is transferred from 
the tank to the heating element through the semi-permeable 
membrane.

7. An electronic cigarette comprising:
a battery portion including a battery housed within the 
battery portion; and
a cartomizer including
an elongate outer shell having first and second ends,
a first opening provided proximate to the first end of the
outer shell, and a second opening provided proximate
to the second end of the outer, and an airflow estab-
lishable between the first and second openings,
a tank provided within the outer shell, the tank dimen-
sioned to hold a vaporizable fluid,
a heating element provided within the outer shell and
adjacent to the tank, the heating element in the path of
the airflow, the heating element operable to heat the
vaporizable fluid to a vaporization temperature, and
a heat shield provided proximate to the heating element.

8. The electronic cigarette of claim 7, wherein the heat
shield is provided between the heating element and the outer
shell.

9. The electronic cigarette of claim 8, wherein the heat
shield is formed as a ring.

10. The electronic cigarette of claim 7, wherein the heat
shield is substantially composed of a metal.

11. The electronic cigarette of claim 7, wherein the heating
element is composed of wicking and a conductive coil
wrapped around the wicking.

12. The electronic cigarette of claim 11 further comprising
a semi-permeable membrane provided between the tank and
the heating element, and wherein the liquid is transferred
from the tank to the heating element through the semi-per-
meable membrane.

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