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(54) **COMBUSTION SYSTEM AND METHOD OF OPERATION THEREOF**

VERBRENNUNGSSYSTEM UND VERFAHREN ZUM BETRIEB DAVON

SYSTÈME DE COMBUSTION ET PROCÉDÉ DE FONCTIONNEMENT CORRESPONDANT

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Description

Background of the Invention

[0001] The present invention relates to a combustion system and method of operation thereof.

[0002] Current combustion systems, such as fireplaces, which can create warm and cozy atmosphere, mostly use an ethanol-based fuel, which is a highly flammable liquid, which may lead to an explosion risk or burn injuries during the procedure of filling fuel. The risk is especially high especially after the fireplace is completely extinguished or cooled sufficiently. Further, when a fireplace accidentally falls, ethanol-based fuels can cause the fire to spread rapidly. Likewise, isopropanol, which is also frequently used as a fuel, suffers similar disadvantages as ethanol-based fuels.

[0003] It has now been found that the above problems can be overcome by using propylene glycol based fuels. Propylene glycol based fuels contain at least 60 wt% propylene glycol and have a flash point of at least higher than 50°C, which can even be as high as 104°C depending on the compounding ratio. So propylene glycol based fuels are actually a non-inflammable flammable liquid fuel. "Non-inflammable" means that it won't catch fire when in contact with a flame (such as a match) at room temperature, and "flammable" means that it can burn under the right conditions. Further, burning propylene glycol based fuels will extinguish if poured onto a surface which is at a temperature the same as the ambient temperature, thereby preventing the fire from spreading.

[0004] Additionally, a wick is essential for supplying fuel to a flame and draws up the fuel by the capillary attraction. The wick may be made of, for example, glass fibers, ceramic fiber materials, silicate fiber materials or rock wool, or polymeric materials such as aramid fibers, cotton or porous materials such as pumice, or other wick materials known in the art. In contrast to wicks made of other materials, the metal wick does not produce carbonization and wear during combustion and so more suitable for burning propylene glycol based liquid fuels completely. However, metal wicks has a problem of getting overheated due to a good thermal conductivity of the metal, thereby affecting the flame size and transferring heat from the flame tip to the fuel.

[0005] US 10 842 146 B1 describes a system for repelling insects from an outdoor area which includes at least one torch configured to disburse an insect repellent by burning a fuel, and a central fuel reservoir interconnected with the torches by a fuel plumbing system and configured to automatically replenish the fuel in a local reservoir of the torch.

[0006] EP 0 540 133 A2 describes a cooking fuel device which includes a fuel container and a wick supporting member positioned at the top of the container.

[0007] US 2018/266677 A1 describes a wick configured from a single metallic meshed wick material which continuously includes a spiral section with a shape in-

cluding at least one loop, a folded section with a shape including a fold, a first length extending away from the spiral section to the fold and along a first imaginary plane and a second length extending from the fold to the spiral section and along a second imaginary plane, and a wrapped section with a shape including at least one contour conforming shapes of the spiral and folded sections.

[0008] US 2008/014539 A1 describes low vapor pressure compound-based fuels, which are useful in catalytic burner systems that can be used to disperse fragrances, insecticides, insect repellants (e.g., citronella), aromatherapy compounds, medicinal compounds, deodorizing compounds, disinfectant compositions, fungicides and herbicides.

[0009] Generally, when the flame is extinguished, the wick and the fuel are still hot, indicating that the fuel is evaporating to produce exhaust gas with toxic chemicals. While propylene glycol based fuel is a low smoke toxicity fuel, even the smallest amount of toxic chemicals can raise concerns regarding human health. Therefore, providing a combustion system that people can use without risk to their health and can be used in an environment with children and pregnant women is desirable.

[0010] The present invention is, therefore, intended to obviate or at least alleviate the problems encountered in the prior art.

Summary of the Invention

[0011] The invention is defined by the features of the independent claims.

[0012] According to the present invention, a combustion system using at least 90 wt% propylene glycol based liquid fuel according to claim 1 includes a first fuel tank for containing the propylene glycol based liquid fuel, a wick for transmitting the propylene glycol based liquid fuel in the first tank, a sensing unit configured to receive an activating signal and sense the liquid level of the propylene glycol based liquid fuel in the first fuel tank and send a fuel replenishment signal accordingly, a second fuel tank for containing the propylene glycol based liquid fuel, a conduit system connecting the first fuel tank to the second fuel tank, and a drive unit connected with the conduit system and configured to receive the fuel replenishment signal so as to cause the propylene glycol based liquid fuel in the second fuel tank to replenish the first fuel tank through the conduit system as well as to cool the wick.

[0013] Further, a method of operating the combustion system according to claim 10 includes preparing the combustion system; using the sensing unit to receive an activating signal and sense the liquid level of the propylene glycol based liquid fuel in the first fuel tank and send a fuel replenishment signal accordingly; and using the drive unit to receive the fuel replenishment signal so as to cause the propylene glycol based liquid fuel in the second fuel tank to replenish the first fuel tank through the conduit system, and to cause the propylene glycol based liquid

fuel from the second fuel tank to cool the wick.

Brief Description of the Drawings

[0014]

Fig. 1 is a perspective view of a combustion system in accordance with the present invention.

Fig. 2 is a partial, cross-sectional view of the combustion system of Fig. 1.

Fig. 3 is a flow chart illustrating the method of using the combustion system of the present invention.

Detailed Description of the Invention

[0015] FIG. 1 and FIG. 2 are perspective and partial, cross-sectional views of a combustion system in accordance with the present invention respectively. The combustion system of the present invention uses at least 90 wt% propylene glycol based liquid fuel. The combustion system includes a first fuel tank 10, a second fuel tank 20, and a drive unit 40.

[0016] The first fuel tank 10 is for containing the propylene glycol based liquid fuel and includes a wick 11 inserted therein for transmitting the propylene glycol based liquid fuel in the first tank 10. Preferably, the wick 11 is made of non wool material. Preferably, the wick 11 is made of metal. Preferably, the wick 11 is made of carbon fiber. The first fuel tank 10 also includes a sensing unit 12 configured to receive an activating signal and sense the liquid level of the propylene glycol based liquid fuel in the first fuel tank 10 and send a fuel replenishment signal accordingly, i.e. when the liquid level is at a low predetermined level

[0017] The second fuel tank 20 is for containing the propylene glycol based liquid fuel. The second fuel tank 20 is connected to the first fuel tank 10 by a conduit system 30.

[0018] The drive unit 40 is connected with the conduit system 30 and configured to receive the fuel replenishment signal so as to cause the propylene glycol based liquid fuel in the second fuel tank 20 to replenish the first fuel tank 10 through the conduit system 30 as well as to cool the wick 11.

[0019] Before the wick 11 is lit, the sensing unit 12 can sense the liquid level of the propylene glycol based liquid fuel in the first fuel tank 10 in advance, and if the liquid level is low, it will send the fuel replenishment signal the driving unit 40. The signal causes the drive unit 40 to replenish the propylene glycol based liquid fuel in the second fuel tank 20 to flow into the first fuel tank 10 through the conduit system 30 until a high liquid level is achieved; on the contrary, a user can ignite the wick 11 if the liquid level is high. When the wick 11 is lit and starts to transmit the propylene glycol based liquid fuel in the first fuel tank 10 to a flame, once the sensing unit 12 senses that the propylene glycol based liquid fuel in the first fuel tank 10 is consumed to a low level, the fuel re-

plenishing signal is sent to the drive unit 40, so that the drive unit 40 causes the propylene glycol based liquid fuel in the second fuel tank 20 to replenish the first fuel tank 10 through the conduit system 30, and the propylene glycol based liquid fuel from the second fuel tank 20 can not only supply fuel to and maintain the flame, but also cool the wick 11 heated by the flame so as to prevent the wick 11 from being overheated to affect the size and shape of the flame.

[0020] The above efficacy is based in particular on the high flash point characteristics of propylene glycol based fuels, utilizing the propylene glycol based liquid fuel from the second fuel tank 20 to cool the wick 11 that has been heated by the flame and stabilize the flame size and shape, generally Ethanol or isopropanol based fuels cannot be used in this way, because their flash point is extremely low, and they are ignited upon contact with the wick 11 heated by the flame, and cannot be used to cool the wick 11 at all.

[0021] In addition, the driving unit 40 is configured to receive a shutdown signal so as to pump the propylene glycol based liquid fuel in the first fuel tank 10 to the second fuel tank 20 by the conduit system 30. When the wick 11 is in the ignited state, once the driving unit 40 receives the shutdown signal, it starts to pump the propylene glycol based liquid fuel in the first fuel tank 10 to the second fuel tank 20 until the propylene glycol based liquid fuel is at a low level such that the wick 11 cannot generate a flame, or the propylene glycol based liquid fuel in the first fuel tank 10 is completely pumped to the second fuel tank 20 to extinguish the flame of the wick 11. Further, when the wick 11 is in the ignited state, it will conduct the heat of the flame to the propylene glycol based liquid fuel in the first fuel tank 10. Thus, when the propylene glycol based liquid fuel is pumped to the second fuel tank 20 the wick 11 is also cooled, thereby better cooling the environment temperature. This is the characteristic of the high flash point of propylene glycol based fuel, and the propylene glycol based liquid fuel in the first fuel tank 10 is cooled by the propylene glycol based liquid fuel from the second fuel tank 20.

[0022] Further, when the driving unit 40 receives the shutdown signal and pumps the level of the propylene glycol based liquid fuel in the first fuel tank 10 to a height that cannot be transmitted by the wick 11 to generate a flame, or after the propylene glycol based liquid fuel in the first fuel tank 10 is completely pumped to the second fuel tank 20 (sensed by the sensing unit 12), it continues operating for a predetermined period of time so as to extract exhaust gas produced after the flame goes out through the conduit system 30.

[0023] In order to improve the cooling efficiency of the fuel, the volume of the first fuel tank 10 in this embodiment is smaller than the volume of the second fuel tank 20, and more preferably, the volume of the second fuel tank 20 is at least ten times larger than a volume of the first fuel tank 10.

[0024] Further, at least 90 wt% propylene glycol based

liquid fuel used by the combustion system of the present invention can preferably contain 95 wt% propylene glycol.

[0025] Further, the conduit system 30 of the present invention can include a first conduit connecting the first fuel tank 10 to the drive unit 40 and a second conduit 32 connecting the second fuel tank 20 to the drive unit 40.

[0026] Further, the drive unit 40 includes a motor 41 which is adapted to transmit the propylene glycol based liquid fuel in the second fuel tank 20 to the first fuel tank 10 through the conduit system 30, or to transmit the propylene glycol based liquid fuel in the first fuel tank 10 to the second fuel tank 20 through the conduit system 30.

[0027] Fig. 3 shows a method flowchart of operating the combustion system using at least 90wt% propylene glycol based liquid fuel. The method includes preparing the combustion system, which has been described in detail above, and will not be repeated here for brevity; using the sensing unit 12 to receive an activating signal and sense the liquid level of the propylene glycol based liquid fuel in the first fuel tank 10 and send a fuel replenishment signal accordingly i.e. if the liquid level is not high enough for igniting wick 11; using the drive unit 40 to receive the fuel replenishment signal so as to cause the propylene glycol based liquid fuel in the second fuel tank 20 to replenish the first fuel tank 10 through the conduit system 30, and to cause the propylene glycol based liquid fuel from the second fuel tank 20 to cool the wick 11, i.e. the propylene glycol based liquid fuel in the first fuel tank 10 reaches a height for igniting the wick 11 or maintaining the flame generated by the wick 11 in the ignited state, and it is worth noting that the wick 11 will heat up due to heat conduction in the ignited state, and the wick 11 can be cooled by supplementing the normal temperature propylene glycol-based liquid fuel from the second fuel tank 20 to achieve the cooling effect; and using the drive unit 40 to receive a shutdown signal and pump the propylene glycol based liquid fuel in the first fuel tank 10 to the second fuel tank 20 through the conduit system 30, and wherein the drive unit 40 continues operating for a predetermined period of time after receiving the shutdown signal and pumping the propylene glycol based liquid fuel in the first fuel tank 10 to the second fuel tank 20 so as to extract exhaust gas produced after the flame goes out.

[0028] The operating method of the combustion system further includes the steps that the driving unit 40 receives the shutdown signal, and accordingly, the propylene glycol based liquid fuel in the first fuel tank 10 is pumped to the second fuel tank 20 through the conduit system 30 until the propylene glycol based liquid fuel in the first fuel tank 10 is low and the wick 11 cannot generate a flame, or the propylene glycol based liquid fuel in the first fuel tank 10 is completely pumped to the second fuel tank 20, so that the flame of the wick 11 goes out.

[0029] After the driving unit 40 receives the shutdown signal and pumps the liquid level of the propylene glycol based liquid fuel in the first fuel tank 10 to a low level, or completely pumps the propylene glycol based liquid fuel

in the first fuel tank 10 to the second fuel tank 20 (sensed by the sensing unit 12), it continues operating for a predetermined period of time to extract the exhaust gas generated by the extinguishment of the flame of the wick 11 through the conduit system 30.

Claims

1. A combustion system using at least 90 wt% propylene glycol based liquid fuel, the combustion system comprising:

a first fuel tank (10) for containing the propylene glycol based liquid fuel, a wick (11) for transmitting the propylene glycol based liquid fuel in the first fuel tank (10), a sensing unit (12) configured to receive an activating signal and sense the liquid level of the propylene glycol based liquid fuel in the first fuel tank (10) and send a fuel replenishment signal accordingly, a second fuel tank (20) for containing the propylene glycol based liquid fuel, a conduit system (30) connecting the first fuel tank (10) to the second fuel tank (20), and a drive unit (40) connected with the conduit system (30) and configured to receive the fuel replenishment signal so as to cause the propylene glycol based liquid fuel in the second fuel tank (20) to replenish the first fuel tank (10) through the conduit system (30) as well as to cool the wick (11), wherein the drive unit (40) is also configured to receive a shutdown signal so as to pump the propylene glycol based liquid fuel in the first fuel tank (10) into the second fuel tank (20).

2. The combustion system as claimed in the previous claim 1, wherein the drive unit (40) is configured to continue pumping the propylene glycol based liquid fuel in the first fuel tank (10) into the second fuel tank (20) for a predetermined time after receiving the shutdown signal.

3. The combustion system of claim 1, wherein the volume of the first fuel tank (10) is smaller than the volume of the second fuel tank (20).

4. The combustion system as claimed in the previous claim 3, wherein the volume of the second fuel tank (20) is at least ten times larger than a volume of the first fuel tank (10).

5. The combustion system as claimed in claim 1, wherein the conduit system (30) includes a first conduit (31) connecting the first fuel tank (10) to the drive unit (40) and a second conduit (32) connecting the second fuel tank (20) to the drive unit (40).

6. The combustion system of claim 1, wherein the drive unit (40) includes a motor (41).
7. The combustion system as claimed in claim 1, wherein the wick (11) is made of non wool material.
8. The combustion system as claimed in claim 1, wherein the wick (11) is made of metal.
9. The combustion system as claimed in claim 1, wherein the wick (11) is made of carbon fiber.
10. A method of operating a combustion system using at least 90wt% propylene glycol based liquid fuel, comprising:

preparing a combustion system which includes:

a first fuel tank (10) for containing the propylene glycol based liquid fuel with a wick (11) inserted therein for transmitting the propylene glycol based liquid fuel in the first fuel tank (10), and a sensing unit (12) disposed therein;

a second fuel tank (20) for containing the propylene glycol based liquid fuel;

a conduit system (30) connecting the first fuel tank (10) to the second fuel tank (20); and

a drive unit (40) connected with the conduit system (30)

using the sensing unit (12) to receive an activating signal and sense the liquid level of the propylene glycol based liquid fuel in the first fuel tank (10) and send a fuel replenishment signal accordingly;

using the drive unit (40) to receive the fuel replenishment signal so as to cause the propylene glycol based liquid fuel in the second fuel tank (20) to replenish the first fuel tank (10) through the conduit system (30), and to cause the propylene glycol based liquid fuel from the second fuel tank (20) to cool the wick (11); and

using the drive unit (40) to receive a shutdown signal and pump the propylene glycol based liquid fuel in the first fuel tank (10) to the second fuel tank (20) through the conduit system (30), and wherein the drive unit (40) continues operating for a predetermined period of time after receiving the shutdown signal and pumping the propylene glycol based liquid fuel in the first fuel tank (10) to the second fuel tank (20) so as to extract exhaust gas produced after the flame goes out.

11. The combustion system as claimed in claim 7, wherein the wick (11) is made of metal.

12. The combustion system as claimed in claim 7, wherein the wick (11) is made of carbon fiber.

5 Patentansprüche

1. Verbrennungssystem, das mindestens 90 Gew.-% Flüssigbrennstoff auf Propylenglykollbasis verwendet, wobei das Verbrennungssystem aufweist:

einen ersten Brennstoffbehälter (10) zum Aufnehmen des Flüssigbrennstoffs auf Propylenglykollbasis, einen Docht (11) zum Transportieren des Flüssigbrennstoffs auf Propylenglykollbasis in den ersten Brennstoffbehälter (10), eine Erfassungseinheit (12), die dafür konfiguriert ist, ein Aktivierungssignal zu empfangen und den Flüssigkeitsstand des Flüssigbrennstoffs auf Propylenglykollbasis im ersten Brennstoffbehälter (10) zu erfassen und entsprechend ein Brennstoffnachfüllsignal zu übertragen, einen zweiten Brennstoffbehälter (20) zum Aufnehmen des Flüssigbrennstoffs auf Propylenglykollbasis, ein Leitungssystem (30), das den ersten Brennstoffbehälter (10) mit dem zweiten Brennstoffbehälter (20) verbindet, und eine Antriebseinheit (40), die mit dem Leitungssystem (30) verbunden und dafür konfiguriert ist, das Brennstoffnachfüllsignal zu empfangen, um zu veranlassen, dass der Flüssigbrennstoff auf Propylenglykollbasis im zweiten Brennstoffbehälter (20) den ersten Brennstoffbehälter (10) über das Leitungssystem (30) auffüllt sowie den Docht (11) kühlt, wobei die Antriebseinheit (40) auch dafür konfiguriert ist, ein Abschaltsignal zu empfangen, um den Flüssigbrennstoff auf Propylenglykollbasis im ersten Brennstoffbehälter (10) in den zweiten Brennstoffbehälter (20) zu pumpen.

2. Verbrennungssystem nach dem vorhergehenden Anspruch 1, wobei die Antriebseinheit (40) dafür konfiguriert ist, den Flüssigbrennstoff auf Propylenglykollbasis im ersten Brennstoffbehälter (10) für eine vorgegebene Zeit nach dem Empfang des Abschaltsignals weiterhin in den zweiten Brennstoffbehälter (20) zu pumpen.
3. Verbrennungssystem nach Anspruch 1, wobei das Volumen des ersten Brennstoffbehälters (10) kleiner ist als das Volumen des zweiten Brennstoffbehälters (20).
4. Verbrennungssystem nach dem vorhergehenden Anspruch 3, wobei das Volumen des zweiten Brennstoffbehälters (20) mindestens zehnmal größer ist als das Volumen des ersten Brennstoffbehälters (10).

5. Verbrennungssystem nach Anspruch 1, wobei das Leitungssystem (30) eine erste Leitung (31), die den ersten Brennstoffbehälter (10) mit der Antriebseinheit (40) verbindet, und eine zweite Leitung (32) aufweist, die den zweiten Brennstoffbehälter (20) mit der Antriebseinheit (40) verbindet. 5
6. Verbrennungssystem nach Anspruch 1, wobei die Antriebseinheit (40) einen Motor (41) aufweist. 10
7. Verbrennungssystem nach Anspruch 1, wobei der Docht (11) aus Nicht-Wollmaterial hergestellt ist.
8. Verbrennungssystem nach Anspruch 1, wobei der Docht (11) aus Metall hergestellt ist. 15
9. Verbrennungssystem nach Anspruch 1, wobei der Docht (11) aus Kohlenstofffaser hergestellt ist.
10. Verfahren zum Betreiben eines Verbrennungssystems unter Verwendung von Flüssigbrennstoff auf der Basis von mindestens 90 Gew.-% Propylenglykol, mit den Schritten:
Vorbereiten eines Verbrennungssystems, das aufweist: 20
 - einen ersten Brennstoffbehälter (10) zum Aufnehmen des Flüssigbrennstoffs auf Propylenglykolbasis mit einem darin eingefügten Docht (11) zum Transportieren des Flüssigbrennstoffs auf Propylenglykolbasis in den ersten Brennstoffbehälter (10) und einer darin angeordneten Erfassungseinheit (12); 30
 - einen zweiten Brennstoffbehälter (20) zum Aufnehmen des Flüssigbrennstoffs auf Propylenglykolbasis; 35
 - ein Leitungssystem (30), das den ersten Brennstoffbehälter (10) mit dem zweiten Brennstoffbehälter (20) verbindet; und
 - eine mit dem Leitungssystem (30) verbundene Antriebseinheit (40); 40
 - Verwenden der Erfassungseinheit (12) zum Empfangen eines Aktivierungssignals und Erfassen des Flüssigkeitsstands des Flüssigbrennstoffs auf Propylenglykolbasis im ersten Brennstoffbehälter (10) und entsprechenden Übertragen eines Brennstoffnachfüllsignals; 45
 - Verwenden der Antriebseinheit (40) zum Empfangen des Brennstoffnachfüllsignal, um zu veranlassen, dass der Flüssigbrennstoff auf Propylenglykolbasis im zweiten Brennstoffbehälter (20) den ersten Brennstoffbehälter (10) über das Leitungssystem (30) auffüllt, und um zu veranlassen, dass der Flüssigbrennstoff auf Propylenglykolbasis vom zweiten Brennstoffbehälter (20) den Docht (11) kühlt; und 50
 - Verwenden der Antriebseinheit (40) zum Empfangen eines Abschaltsignals und Pumpen des

Flüssigbrennstoffs auf Propylenglykolbasis im ersten Brennstoffbehälter (10) über das Leitungssystem (30) zum zweiten Brennstoffbehälter (20), wobei die Antriebseinheit (40) nach dem Empfang des Abschaltsignals und dem Pumpen des Flüssigbrennstoffs auf Propylenglykolbasis im ersten Brennstoffbehälter (10) zum zweiten Brennstoffbehälter (20) für eine vorgegebene Zeitdauer weiter in Betrieb bleibt, um nach dem Erlöschen der Flamme erzeugtes Abgas abzusaugen.

11. Verbrennungssystem nach Anspruch 7, wobei der Docht (11) aus Metall hergestellt ist.

12. Verbrennungssystem nach Anspruch 7, wobei der Docht (11) aus Kohlenstofffaser hergestellt ist.

Revendications

1. Système de combustion utilisant un carburant liquide à base d'au moins 90 % en masse de propylène glycol, le système de combustion comprenant :

un premier réservoir de carburant (10) pour contenir le carburant liquide à base de propylène glycol, une mèche (11) pour transmettre le carburant liquide à base de propylène glycol dans le premier réservoir de carburant (10),
une unité de détection (12) conçue pour recevoir un signal d'activation et détecter le niveau de liquide du carburant liquide à base de propylène glycol dans le premier réservoir de carburant (10) et envoyer un signal de ravitaillement en carburant le cas échéant, un second réservoir de carburant (20) pour contenir le carburant liquide à base de propylène glycol, un système de conduite (30) reliant le premier réservoir de carburant (10) au second réservoir de carburant (20), et une unité d'entraînement (40) reliée au système de conduite (30) et conçue pour recevoir le signal de ravitaillement en carburant de manière à amener le carburant liquide à base de propylène glycol dans le second réservoir de carburant (20) pour ravitailler le premier réservoir de carburant (10) à travers le système de conduite (30) ainsi que pour refroidir la mèche (11), dans lequel
l'unité d'entraînement (40) est également conçue pour recevoir un signal d'arrêt de sorte à pomper le carburant liquide à base de propylène glycol du premier réservoir de carburant (10) dans le second réservoir de carburant (20).

2. Système de combustion selon la revendication 1 précédente, dans lequel l'unité d'entraînement (40) est conçue pour poursuivre le pompage du carburant

- liquide à base de propylène glycol du premier réservoir de carburant (10) dans le second réservoir de carburant (20) pour une durée prédéterminée après avoir reçu le signal d'arrêt.
3. Système de combustion selon la revendication 1, dans lequel le volume du premier réservoir de carburant (10) est inférieur au volume du second réservoir de carburant (20). 5
4. Système de combustion selon la revendication 3 précédente, dans lequel le volume du second réservoir de carburant (20) est au moins dix fois supérieur à un volume du premier réservoir de carburant (10). 10
5. Système de combustion selon la revendication 1, dans lequel le système de conduite (30) inclut une première conduite (31) reliant le premier réservoir de carburant (10) à l'unité d'entraînement (40) et une seconde conduite (32) reliant le second réservoir de carburant (20) à l'unité d'entraînement (40). 15 20
6. Système de combustion selon la revendication 1, dans lequel l'unité d'entraînement (40) inclut un moteur (41). 25
7. Système de combustion selon la revendication 1, dans lequel la mèche (11) est fabriquée en un matériau non laineux. 30
8. Système de combustion selon la revendication 1, dans lequel la mèche (11) est fabriquée en métal.
9. Système de combustion selon la revendication 1, dans lequel la mèche (11) est fabriquée en fibre de carbone. 35
10. Procédé de fonctionnement d'un système de combustion utilisant un carburant liquide à base d'au moins 90 % en masse de propylène glycol, comprenant : 40
la préparation d'un système de combustion qui inclut :
- un premier réservoir de carburant (10) pour contenir le carburant liquide à base de propylène glycol avec une mèche (11) insérée dedans pour transmettre le carburant liquide à base de propylène glycol dans le premier réservoir de carburant (10), et une unité de détection (12) disposée dessus ; 45 50
un second réservoir de carburant (20) pour contenir le carburant liquide à base de propylène glycol ;
un système de conduite (30) reliant le premier réservoir de carburant (10) au second réservoir de carburant (20) ; et 55
une unité d'entraînement (40) reliée au système de conduite (30)
- l'utilisation de l'unité de détection (12) pour recevoir un signal d'activation et détecter le niveau de liquide du carburant liquide à base de propylène glycol dans le premier réservoir de carburant (10) et envoyer un signal de ravitaillement en carburant le échéant ;
l'utilisation de l'unité d'entraînement (40) pour recevoir le signal de ravitaillement en carburant de sorte à amener le carburant liquide à base de propylène glycol dans le second réservoir de carburant (20) pour ravitailler le premier réservoir de carburant (10) à travers le système de conduite (30), et pour amener le carburant liquide à base de propylène glycol du second réservoir de carburant (20) à refroidir la mèche (11) ; et
l'utilisation de l'unité d'entraînement (40) pour recevoir un signal d'arrêt et pomper le carburant liquide à base de propylène glycol du premier réservoir de carburant (10) au second réservoir de carburant (20) à travers le système de conduite (30), et dans lequel l'unité d'entraînement (40) continue à fonctionner pendant une période prédéterminée après la réception du signal d'arrêt et le pompage du carburant liquide à base de propylène glycol du premier réservoir de carburant (10) au second réservoir de carburant (20) de sorte à extraire le gaz d'échappement produit après que la flamme s'éteint.
11. Système de combustion selon la revendication 7, dans lequel la mèche (11) est fabriquée en métal.
12. Système de combustion selon la revendication 7, dans lequel la mèche (11) est fabriquée en fibre de carbone.

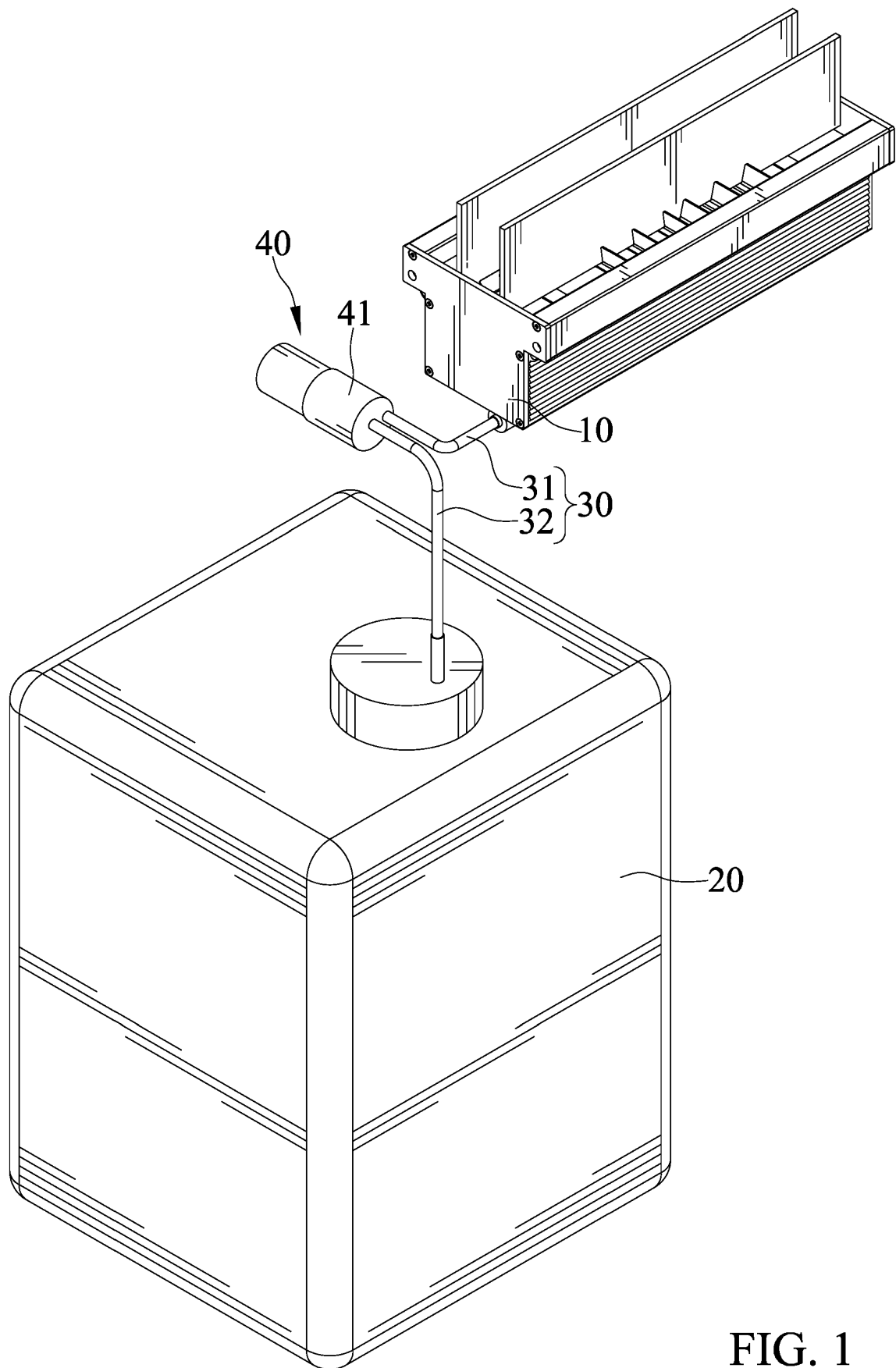


FIG. 1

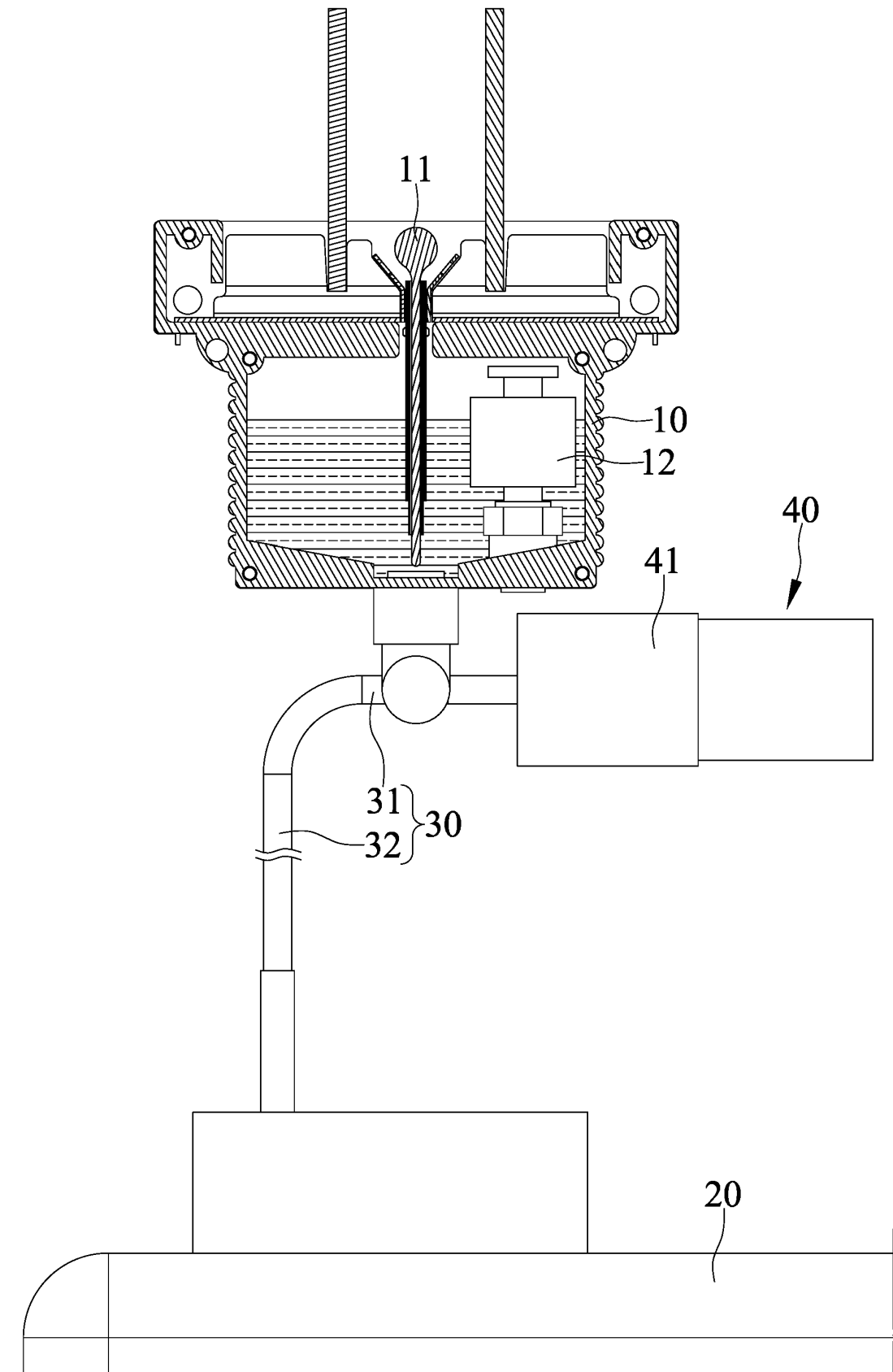


FIG. 2

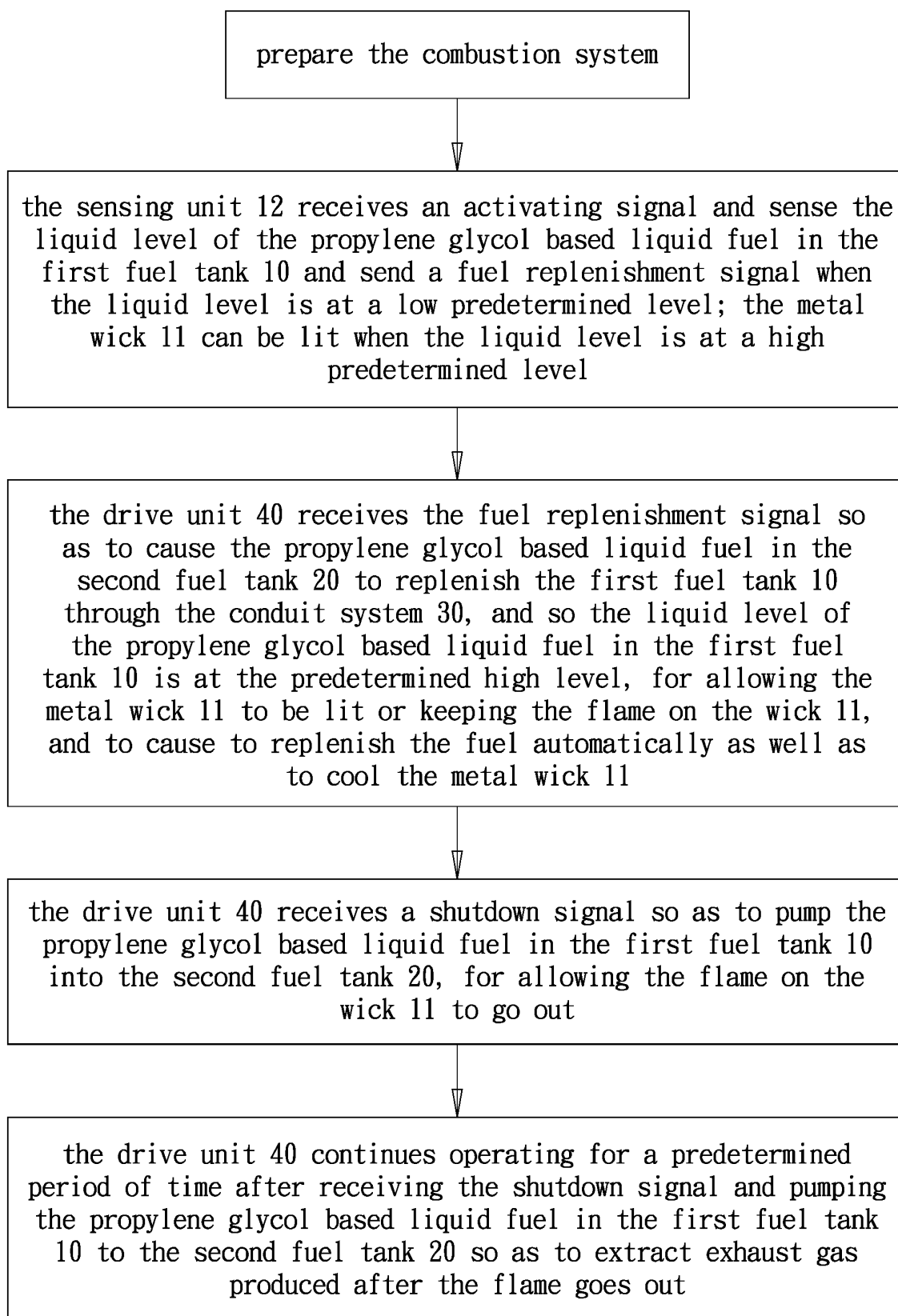


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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