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(73) Patenthaver: **L'Air Liquide, Société Anonyme pour l'Etude et l'Exploitation des Procédés Georges Claude, 75 Quai d'Orsay, 75007 Paris, Frankrig**

(72) Opfinder: **Brouns, Marcel, , 40235 Düsseldorf, Tyskland**
Jagemann, Johannes, , 40235 Düsseldorf, Tyskland

(74) Fuldmægtig i Danmark: **RWS Group, Europa House, Chiltern Park, Chiltern Hill, Chalfont St Peter, Bucks SL9 9FG, Storbritannien**

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DESCRIPTION

Description

[0001] The invention is directed to supplying a gas stored in its liquified state to a consumer process that requires the gas in its gaseous state. The invention is directed to a corresponding method, device and arrangement.

[0002] Gases such as nitrogen are often stored in a liquified state. However, most consumer processes require the gases to be provided in the gaseous state. Hence, it is known to evaporate a liquified gas before it is supplied to a consumer process. Known processes in this respect are energetically inefficient.

[0003] Processes in literature that evaporate liquified gases, in particular liquified natural gases, can be found in WO 2021/118470 A1, US 2008/0202161 A1 and in US 4 995 234

[0004] The object of the invention is to improve the prior art so that a gas that is stored in a liquified state can be supplied to a consumer process in a more energetically efficient manner.

[0005] The object is solved with the method, device and arrangement according to the independent claims. Advantageous refinements are presented in the dependent claims. The features described in the claims and in the description can be combined with each other in any technologically reasonable manner.

[0006] According to the invention a method is presented that comprises:

1. a) providing a gas in a liquified state,
2. b) guiding the gas provided in step a) through a first vaporizing means such that the gas is partly evaporated,
3. c) guiding a first fraction of the gas from the first vaporizing means via a turbine to a consumer process, and guiding a second fraction of the gas from the first vaporizing means via a second vaporizing means and the turbine to the consumer process, wherein upon leaving the first vaporizing means the second fraction comprises a greater percentage of the gas in the liquified state than the first fraction, and wherein the turbine drives a generator so as to generate electric energy.

[0007] With the described method a gas can be supplied to a consumer process. The gas is stored in a liquified state and evaporated before being supplied to the consumer process. Upon evaporation the liquified gas expands. The expansion work generated due to the corresponding pressure reduction is used to drive the turbine so as to generate electric energy as a byproduct. The evaporation is basically performed using the first vaporizing means. However, the first vaporizing means might not be sufficient to evaporate the liquified gas to a desired extent. Thus, the second fraction which comprises a greater percentage of the gas in the liquified state is further treated in a second vaporizing means.

[0008] A gas within the meaning used herein is any substance that is gaseous under normal conditions as commonly defined in chemistry, that is at a temperature of 0 °C and at a pressure of 1013 hPa. That is, the term gas does not necessarily indicate the actual state of the substance. In particular, the gas can be in a liquified state. The expression "liquified state" refers to the liquid state of the gas and indicates that the liquid state is not the normal state but rather has been reached by liquification. In an alternative wording instead of the term "gas" the term "substance that is in a gaseous state under normal conditions" could be used.

[0009] The described method can be used with any gas. However, in a preferred embodiment of the method the gas is nitrogen. Applying the described method to nitrogen was found to be particularly advantageous. In particular, many consumer processes require nitrogen in a gaseous state, whereas storing nitrogen in its liquified state is particularly simple. As a conceivable alternative, the gas could be air. However, it would be energetically inefficient to liquify air, store the air in its liquified state and evaporate the air before supplying it to a consumer process. It would be more reasonable to use atmospheric air, which is already in its gaseous state.

[0010] In step a) the gas is provided in its liquified state. The gas is preferably stored within a storage tank. In general, a liquified gas within a storage tank will have a gaseous phase and a liquid phase. For the method, preferably only the gas in the liquefied state is used. This can be achieved in that the gas is extracted at the bottom of the storage tank, which is where commonly the liquid phase is located.

[0011] In step b) the gas is guided through the first vaporizing means. Preferably, in step b) the gas is heated with the first vaporizing means. The gas is preferably extracted from the storage tank and guided to and through the first vaporizing means. The first vaporizing means preferably comprises a heat exchanger. The heat exchanger preferably has two branches that are arranged such that heat can be exchanged between substances flowing through the two branches. The liquified gas is preferably guided through a first of the branches. A heat exchange medium such as water can be guided through a second of the branches. The gas is heated within the heat exchanger. This is possible by providing the heat exchange medium to the heat exchanger at a temperature higher than the temperature of the gas when entering the heat exchanger. Alternatively or additionally, the first vaporizing means can comprise a vaporizer such as an ambient air vaporizer.

[0012] In step b) a part of the gas evaporates within the first vaporizing means. That is, immediately before leaving the first vaporizing means, the gas has a liquid phase and a gaseous phase.

[0013] In step c) the gas is guided from the first vaporizing means to the consumer process. The consumer process is a process that consumes the gas. The described method can be used with a variety of consumer processes. Examples include processes that use an inert gas as a protective atmosphere, processes that use the gas as a cryogenic substance and processes that use the gas in chemical reactions. The consumer process is preferably performed in a consumer process installation.

[0014] The gas is guided from the first vaporizing means to the consumer process via two different flow paths. A first fraction of the gas is guided from the first vaporizing means to the consumer process via a turbine. A second fraction of the gas is guided from the first vaporizing means to the consumer process via a second vaporizing means and the turbine. Preferably, the entire gas that leaves the first vaporizing means is guided to the consumer process. Preferably, the first fraction and the second fraction together constitute the entire gas that leaves the first vaporizing means. While the first fraction is immediately used to drive the turbine, the second fraction is further subjected to evaporation in the second vaporizing means before it contributes to driving the turbine. This is reasonable since upon leaving the first vaporizing means the second fraction comprises a greater percentage of the gas in the liquified state than the first fraction. In other words the second fraction comprises relatively more of the gas in the liquified state than the first fraction. The ratio between the gas in the liquified state and the gas in the gaseous state is larger for the second fraction than for the first fraction.

[0015] In a preferred embodiment the first fraction is the gaseous phase of the gas that leaves the first vaporizing means and the second fraction is the liquid phase. That is, the gas is guided directly from the first vaporizing means to the turbine to the extent that the gas is already evaporated, whereas the fraction of the gas that is still in the liquified state is evaporated in the second vaporizing means before it is guided to the turbine. Ideally, the entire gas that reaches the turbine is in the gaseous state.

[0016] However, in reality it can be challenging to achieve an ideal separation of the gaseous and liquid phases of the gas that leaves the first vaporizing means. It was found that the described advantages can already be achieved once, upon leaving the first vaporizing means, the second fraction comprises a greater percentage of the gas in the liquified state than the first fraction. Also, it is possible for a part of the gas to evaporate in the piping between the first vaporizing means, the second vaporizing means and the turbine. In particular, it is also possible that a part of the gas evaporates within the turbine. This is particularly due to the pressure drop caused by the turbine.

[0017] The turbine drives a generator so as to generate electric energy. The electric energy thereby generated is a byproduct that is obtained from evaporating the gas. To this end, the described method is particularly energy efficient. Owing to the additional evaporation in the second vaporizing means it is more likely that the entire gas is evaporated before leaving the turbine. Hence, the entire expansion energy can be exploited. Without the second vaporizing means it would be more likely for a part of the gas to remain in the liquified state until after having passed the turbine. Regarding the consumer process this might even be acceptable since, depending on the details of the consumer process, it is likely that the gas will eventually evaporate before it is used in the consumer process. However, in view of energy efficiency it is advantageous to have as much of the gas as possible evaporated before it leaves the turbine.

[0018] The first fraction and the second fraction can be extracted from the first vaporizing means at respective outlets. Therein, gravity can be used to separate the liquid and gaseous phases of the gas. However, it is also possible to extract the entire gas from the first vaporizing means and separate the first fraction and the second fraction between the first vaporizing means and the second vaporizing means and the turbine, respectively.

[0019] The first fraction preferably constitutes 20 to 80 %, in particular 40 to 60 %, of the gas that leaves the first vaporizing means and the second fraction preferably constitutes the remainder of the gas that leaves the first vaporizing means. That is, the first fraction and the second fraction each constitute a significant amount of the gas. That way the described advantage of having two different flow paths from the first vaporizing means to the consumer process can be achieved to a significant extent.

[0020] Preferably, the gas is stored at a pressure within the range from 5 to 30 bar, in particular in the range from 10 to 20 bar. The consumer process is preferably configured for using the gas at a pressure that is lower than the pressure at which the gas is stored. Consequently, it is preferred that in step c) the gas is supplied to the consumer process at a pressure lower than the pressure at which the gas is provided in step a). It is particularly preferred that the gas is supplied to the consumer process at a pressure that is 5 to 15 bar lower than the pressure at which the gas is provided in step a). For example, the gas can be stored at 16 bar and used at 6 bar. A flow rate of 300 Nm^3/h of the gas will thereby yield an electric power of 8 kW.

[0021] In a further preferred embodiment of the method upon leaving the first vaporizing means at least 80 % of the first fraction of the gas is in a gaseous state and/or at least 80 % of the second fraction of the gas is in the liquified state.

[0022] Ideally, the gas of the first fraction is entirely in the gaseous state and the gas of the second fraction is entirely in the liquified state when the gas leaves the first vaporizing means. However, for the described advantages to be achieved such an ideal separation is not required. Hence, according to the preferred embodiment it is sufficient if at least 80 % of the gas of the first fraction is in the gaseous state and at least 80 % of the gas of the second fraction is in the liquified state when the gas leaves the first vaporizing means. It is even more preferred that upon leaving the when the gas leaves the first vaporizing means at least 95 % of the first fraction of the gas is in a gaseous state and/or at least 95 % of the second fraction of the gas is in the liquified state.

[0023] In a further preferred embodiment of the method in step c) the second vaporizing means is used as a backup for the first vaporizing means.

[0024] The second vaporizing means can be used to the extent that the first vaporizing means is not capable of evaporating the entire gas. That is, the second vaporizing means is used to the extent the gas is not already evaporated by the first vaporizing means.

[0025] In a further preferred embodiment of the method the electric energy generated with the generator in step c) is used at least partly for powering a control unit configured for controlling the method.

[0026] The electric energy generated in step c) can be sufficient for powering the control unit. To this end, a device for supplying the gas involving the described method can be self-sufficient.

[0027] In a further preferred embodiment of the method the electric energy generated with the generator in step c) is supplied at least partly to a public power grid. In this embodiment the generated energy can be sold.

[0028] In a further preferred embodiment the method further comprises:
d) performing the consumer process using the gas supplied according to step c).

[0029] In the present embodiment the method is not only a method for supplying a gas, but rather a method for supplying a gas to a consumer process and performing the consumer process.

[0030] In a further preferred embodiment of the method the electric energy generated with the generator in step c) is used at least partly in the consumer process according to step d).

[0031] In this embodiment the synergetic effect can be achieved that not only the gas is supplied to the consumer process according to steps a) to c), but that also the electric energy generated thereby can be used in the consumer process according to step d).

[0032] In a further preferred embodiment of the method the first vaporizing means used in step c) is at least temporarily operated with a heat exchange medium used for a cooling in the consumer process.

[0033] In this embodiment the synergetic effect can be achieved that not only the gas is supplied to the consumer process according to steps a) to c), but that also the heat exchange involved therein is used for cooling in the consumer process according to step d).

[0034] In particular in this embodiment the first vaporizing means preferably comprises a heat exchanger. The heat exchanger preferably comprises two branches that are arranged such that heat can be exchanged between substances flowing through the two branches. The liquified gas is preferably guided through a first of the branches. The heat exchange medium is preferably guided through a second of the branches. That is, the consumer process is connected to the first vaporizing means in two different ways. On the one hand, the gas can be guided from the first branch of the heat exchanger of the first vaporizing means to the consumer process. On the other hand, the heat exchange medium can be circulated between the consumer process and the second branch of the heat exchanger of the first vaporizing means. In the heat exchanger of the first vaporizing means the gas preferably does not come into direct contact with the heat exchange medium. That is, the gas and the heat exchange medium do not mix within the heat exchanger. However, within the heat exchanger the gas and the heat exchange medium come into thermal contact with each other so as to exchange heat. The heat exchange medium is preferably water.

[0035] As a further aspect of the invention a device for supplying a gas is presented. The device comprises:

- a storage tank for storing the gas in a liquified state,
- a first vaporizing means,
- a second vaporizing means,
- a turbine and a generator coupled thereto,
- an outlet for the gas,
  wherein the storage tank is fluidly connected via the first vaporizing means, the second vaporizing means and the turbine to the outlet, such that a second fraction of the gas can be guided from the first vaporizing means via the second vaporizing means and the turbine to the outlet, and wherein the first vaporizing means is further fluidly connected to the turbine so as to bypass the second vaporizing means, such that a first fraction of the gas can be guided from the first vaporizing means via the turbine to the outlet, and wherein the device is configured such that upon leaving the first vaporizing means the second fraction comprises a greater percentage of the gas in the liquified state than the first fraction.

[0036] The advantages and features of the method are transferrable to the device, and vice versa. The device is preferably configured to be used according to the method. The method is preferably performed using the device. In a preferred embodiment the device further comprises a control unit configured for controlling the device using the described method.

[0037] Since the storage tank is fluidly connected via the first vaporizing means, the second vaporizing means and the turbine to the outlet, the second fraction of the gas can be guided from the first vaporizing means via the second vaporizing means and the turbine to the outlet. Since the first vaporizing means is further fluidly connected to the turbine so as to bypass the second vaporizing means, the first fraction of the gas can be guided from the first vaporizing means via the turbine to the outlet. At the outlet the gas can be handed over to the consumer process.

[0038] In a further preferred embodiment of the device the first vaporizing means comprises a heat exchanger and/or a vaporizer. The "and" case is preferred.

[0039] The first vaporizing means is preferably configured as a unit comprising the heat exchanger and the vaporizer. The first vaporizing means preferably comprises a housing, in which both the heat exchanger and the vaporizer are located. The first vaporizing means is preferably configured such that the heat exchanger is used for evaporating the gas in case a heat exchange medium is available and that otherwise the vaporizer is used. This way the gas can be evaporated with the first vaporizing means at any time, wherein the further advantage of cooling a heat exchange medium for further use can be achieved whenever a heat exchange medium is supplied to the first vaporizing means. Preferably, the first vaporizing means is configured such that it switches automatically between the heat exchanger and the vaporizer depending on whether or not a heat exchange medium is supplied to the first vaporizing means. In the described embodiment the first vaporizing means can also be referred to as an eco-chiller. This is due to the fact that with the first vaporizing means a particularly eco-friendly evaporation of liquified gas can be achieved. In particular, the heat exchange medium cooled by the gas can be used in the consumer process.

[0040] Alternatively, it is sufficient for the first vaporizing means to comprise only one of a heat exchanger or a vaporizer. The general concept of having two flow paths from the storage tank to the consumer process can still be realized even if the first vaporizing means does not have both the heat exchanger and the vaporizer.

[0041] In any case in which the first vaporizing means comprises a vaporizer it is preferred that the vaporizer is an ambient air vaporizer. In a further preferred embodiment of the device the turbine is a micro-turbine. In a further preferred embodiment of the device the second vaporizing means is an ambient air vaporizer. It was found that these two embodiments are particularly energy efficient.

[0042] As a further aspect of the invention an arrangement is presented that comprises:

- a device for supplying a gas configured as described,
- a consumer process installation,

wherein the consumer process installation is fluidly connected to the outlet of the device.

[0043] The advantages and features of the method and device are transferrable to the arrangement, and vice versa. The arrangement is preferably configured to be used according to the method. The method is preferably performed using the arrangement.

[0044] The consumer process installation is preferably configured for the consumer process. The device for supplying the gas can be provided by a gas manufacturer, whereas the consumer process installation can be provided by a customer. Hence, it is advantageous that the device for supplying the gas and the consumer process installation only have well-defined interfaces. In particular, the device comprises the outlet, via which the gas can be supplied to the consumer process installation, which preferably has a respective inlet. Further, the device and the consumer process installation can have respective electric terminals, via which the electric energy generated with the generator can be supplied to the consumer process installation. Further, the consumer process installation and the device for supplying the gas preferably have respective heat exchange medium terminals for circulating the heat exchange medium.

[0045] In a preferred embodiment of the arrangement the generator of the device is connected electrically to a control unit of the device and/or to the consumer process installation.

[0046] In a further preferred embodiment the arrangement further comprises a cooling installation thermally coupled to the first vaporizing means of the device and to the consumer process installation.

[0047] The cooling installation can be used to provide a cooled heat exchange medium to the consumer process installation, where the heat exchange medium can be heated up. The heated heat exchange medium can be guided back to the cooling installation, where it can be cooled again. Also, part of the heated heat exchange medium flowing from the consumer process installation back to the cooling installation can be branched off so as to pass the heat exchanger of the first vaporizing means of the device for supplying gas, in particular through the second branch of the heat exchanger. Thereby, the heat exchanger supports the cooling installation such that the cooling installation consumes less energy. It is even possible to use a cooling installation that has a lower maximum cooling power.

[0048] In the following the invention will be described with respect to the figure. The figure shows a preferred embodiment, to which the invention is not limited. The figure and the dimensions shown therein are only schematic. The figure shows:

Fig. 1:
: an arrangement according to the invention.

[0049] Fig. 1 shows arrangement 1 that comprises a device 2 for supplying a gas such as nitrogen as well as a consumer process installation 9, to which the gas is supplied. The device 2 comprises a storage tank 3 for storing the gas in a liquified state, a first vaporizing means 4, an ambient air vaporizer as a second vaporizing means 5, a turbine 6 and a generator 12 coupled thereto as well as an outlet 7 for the gas. The first vaporizing means 4 comprises a heat exchanger 16 with a first branch, via which the gas can be guided and a second branch 15 for a heat exchange medium.. The first vaporizing means 4 further comprises a vaporizer 17. In the exemplarily shown embodiment the heat exchanger 16 and the vaporizer 17 are provided in series. However, it is also possible that the vaporizer 17 is arranged parallel to the heat exchanger 16 such that the gas can be guided through the heat exchanger 16 only, through the vaporizer 17 only or partly through the heat exchanger 16 and partly through the vaporizer 17. The turbine 6 can be a micro-turbine. Via the outlet 7 the device 2 is fluidly connected to the consumer process installation 9.

[0050] The storage tank 3 is fluidly connected via the first vaporizing means 4, the second vaporizing means 5 and the turbine 6 to the outlet 7. The first vaporizing means 4 is further fluidly connected to the turbine 6 so as to bypass the second vaporizing means 5. The device 2 further comprises a control unit 8 configured for controlling the device 2 using a method that comprises:

1. a) providing the gas in a liquified state in the storage tank 3,
2. b) guiding the gas provided in step a) through the first vaporizing means 4 such that the gas is partly evaporated,
3. c) guiding a first fraction of the gas from the first vaporizing means 4 via the turbine 6 to the consumer process installation 9, and guiding a second fraction of the gas from the first vaporizing means 4 via the second vaporizing means 5 and the turbine 6 to the consumer process installation 9, wherein upon leaving the first vaporizing means 4 the second fraction comprises a greater percentage of the gas in the liquified state than the first fraction, and wherein the turbine 6 drives the generator 12 so as to generate electric energy,
4. d) performing a consumer process with the consumer process installation 9 using the gas supplied according to step c).

[0051] Upon leaving the first vaporizing means 4 preferably at least 80 % of the first fraction of the gas is in a gaseous state and/or at least 80 % of the second fraction of the gas is in the liquified state. With the device 2 liquified gas stored in the storage tank 3 can be evaporated, wherein the corresponding volume expansion is used to generate electric energy as a byproduct. For the evaporation the first vaporizing means 4 is provided. To the end the gas is not fully evaporated in the first vaporizing means 4, the second vaporizing means 5 is provided as a backup.

[0052] The electric energy generated with the generator 12 can be used for powering the control unit 8 of the device 2 and/or in the consumer process installation 9. Therefore, the generator 12 is connected electrically to the control unit 8 of the device 2 and/or to the consumer process installation 9. Also, the electrical energy can be supplied to a public power grid. Therefore, the device 2 comprises an electrical terminal 11.

[0053] The arrangement 1 further comprises a cooling installation 10 thermally coupled to the first vaporizing means 4 of the device 2 and to the consumer process installation 9. The thermal coupling is achieved in that the cooling installation 10, the heat exchanger 16 of the first vaporizing means 4 and the consumer process installation 9 are included in a heat exchange circuit 13. With this configuration the heat exchanger 16 can be operated with a heat exchange medium used for a cooling in the consumer process.

List of reference numerals

[0054]

1. 1 arrangement
2. 2 device
3. 3 storage tank
4. 4 first vaporizing means
5. 5 second vaporizing means
6. 6 turbine
7. 7 outlet
8. 8 control unit
9. 9 consumer process installation
10. 10 cooling installation
11. 11 electric terminal
12. 12 generator
13. 13 heat exchange circuit
14. 14 first branch
15. 15 second branch
16. 16 heat exchanger
17. 17 vaporizer

REFERENCES CITED IN THE DESCRIPTION

Cited references

Patent documents cited in the description

- WO2021118470A1 [0003]
- US20080202161A1 [0003]
- US4995234A [0003]

Patentkrav

1. Fremgangsmåde, der omfatter:
a) tilvejebringelse af en gas i en flydende tilstand,
b) føring af gassen tilvejebragt i trin a) gennem en første fordampningsanordning (4) på en sådan måde, at gassen fordampes delvist,
c) færing af en første fraktion af gassen fra den første fordampningsanordning (4) via en turbine (6) til en forbrugerproces, og føring af en anden fraktion af gassen fra den første fordampningsanordning (4) via en anden fordampningsanordning (5) og turbinen (6) til forbrugerprocessen, **kendetegnet ved, at** den anden fraktion har en større procentandel af gassen i den flydende tilstand end den anden fraktion, når den forlader den første fordampningsanordning (4), og hvor turbinen (6) driver en generator (12) for at generere elektrisk energi.

2. Fremgangsmåde ifølge krav 1, hvor mindst 80 % af den første fraktion af gassen er i en gasformig tilstand og/eller mindst 80 % af den anden fraktion af gassen er i den flydende tilstand, når den forlader den første fordampningsanordning (4).

3. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor den anden fordampningsanordning (5) bruges som en reserve for den første fordampningsanordning (4) i trin c).

4. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, hvor den elektriske energi, der genereres med generatoren (12) i trin c) bruges mindst delvist til at strømforsynes en styreenhed (8), der er konfigureret til at styre fremgangsmåden.

5. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, der yderligere omfatter d) udførelse af forbrugerprocessen ved hjælp af den gas, der leveres i henhold til trin c).

6. Fremgangsmåde ifølge krav 5, hvor den elektriske energi, der genereres med generatoren (12) i trin c) bruges mindst delvist i forbrugerprocessen i henhold til trin d).

7. Fremgangsmåde ifølge krav 5 eller 6, hvor den første fordampningsanordning (4), der bruges i trin c), mindst midlertidigt opereres med et varmevekslingsmedie, der bruges til en køling i forbrugerprocessen.

8. Anordning (2) til forsyning af en gas, der omfatter:
- en lagertank (3) til opbevaring af gassen i en flydende tilstand,
- en første fordampningsanordning (4),
- en anden fordampningsanordning (5),
- en turbine (6) og en generator (12), der er forbundet til denne,
- et udtag (7) til gassen,

hvor lagertanken (3) er væskeforbundet via den første fordampningsanordning (4), den anden fordampningsanordning (5) og turbinen (6) til udtaget (7), så en anden fraktion af gassen kan føres fra den første fordampningsanordning (4) via den anden fordampningsanordning (5) og turbinen (6) til udtaget (7), og hvor den første fordampningsanordning (4) yderligere er væskeforbundet til turbinen (6), så den anden fordampningsanordning (5) omgås, og så en første fraktion af gassen kan føres fra den første fordampningsanordning (4) via turbinen (6) til udtaget (7), og **kendetegnet ved, at** anordningen (2) er konfigureret, så den anden fraktion omfatter en større procentandel af gassen i den flydende tilstand end den første fraktion, når den forlader den første fordampningsanordning (4).

9. Anordning (2) ifølge krav 8, der yderligere omfatter en styreenhed (8), der er konfigureret til at styre anordningen (2) med en fremgangsmåde ifølge ét af kravene 1 til 7.

10. Anordning (2) ifølge krav 8 eller 9, hvor turbinen (6) er en mikroturbine.

11. Anordning (2) ifølge et hvilket som helst af kravene 8 til 10, hvor den første fordampningsanordning (4) omfatter en varmeveksler (16) og/eller en fordamper (17).

12. Anordning (2) ifølge et hvilket som helst af kravene 8 til 11, hvor den anden fordampningsanordning (5) er en omgivende luftfordamper.

13. Opstilling (1), der omfatter:
- en anordning (2) til forsyning af en gas ifølge ét af kravene 8 til 12,
- en forbrugerprocesinstallation (9),
hvor forbrugerprocesinstallationen (9) er væskeforbundet med udtaget (7) på anordningen (2).

14. Opstilling (1) ifølge krav 13, hvor generatoren (12) for anordningen (2) er forbundet elektriske til en styreenhed (8) for anordningen (2) og/eller til forbrugerprocesinstallationen (9).

15. Opstilling (1) ifølge krav 13 eller 14, der yderligere omfatter en køleinstallation (10), der er termisk forbundet til den første fordampningsanordning (4) for anordningen (2) og til forbrugerprocesinstallationen (9).

DRAWINGS

Drawing

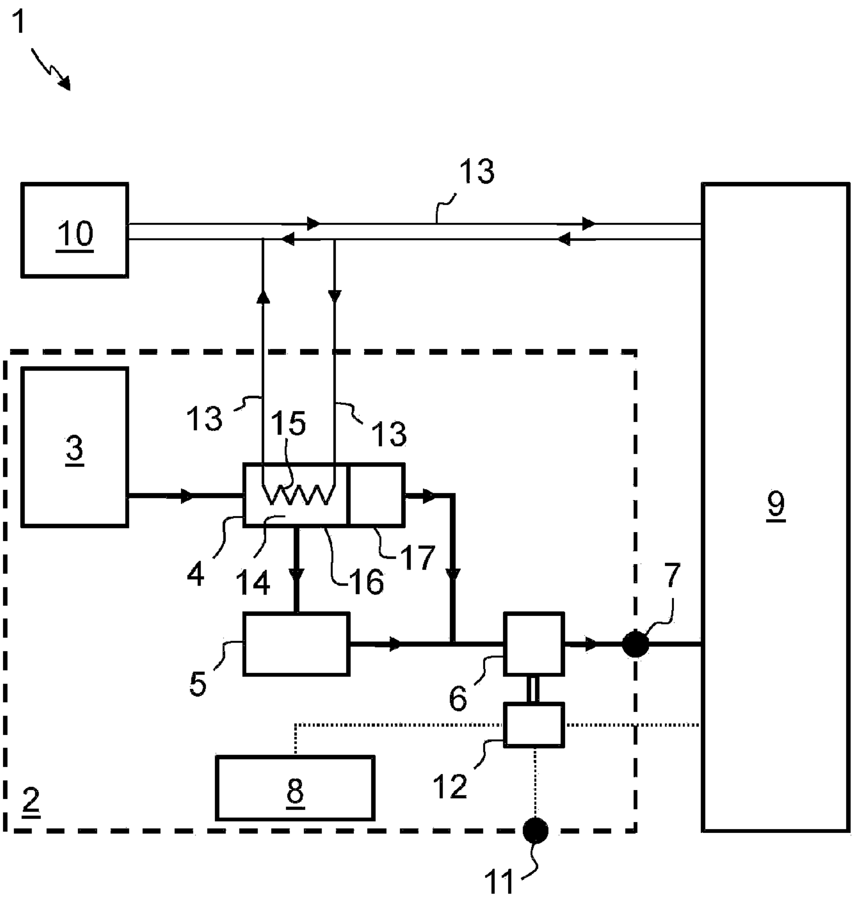

Fig. 1