

Set of even number of generators of gas with hydrogen and oxygen content by electrolysis of water for multiphase voltage with inverter of phase supply

Technology area

The invention relates to construction and connection of generator of gas with hydrogen and oxygen content (hereinafter referred to as gas) by electrolysis of water for multiphase voltage with the inverter of phase supply.

Present condition of technology

Currently, the gas production systems are mainly from fossil resources, gas production by electrolysis holds about 4 % of total production in the world, because it is known that electrolysis is ineffective. Another disadvantage of electrolysis is that electrical energy is still more expensive, so also the resulting gas produced by electrolysis is more expensive. Generators commonly used in the world get warmer and therefore the significant part of inserted energy changes into the heat instead of being used for electrolysis. Set of even number of generators of gas by electrolysis of water for multiphase voltage with the inverter of phase supply solves more efficient and cheaper decomposition of water onto gas by structure of positive fields of sinusoid of direct multiphase voltage. Generator does not get warmer and has high gas production at low input power.

Generating hydrogen and oxygen by this means for use as a combustible gas mixture has advantages over the use of bottled gases in that the generating apparatus may be made relatively portable, and the basic material for generating the gas mixture, namely water, is easily obtainable even at most sites. Widespread adoption of apparatus of this nature has not however occurred. For example, electrodes used for applying electric current to the water for effecting electrolysis may erode and cause metal slugs and other deposits to form which may cause damaging short-circuits to occur in the apparatus, so that the lifetime of the apparatus and operational reliability may not be satisfactory.

Principle of technical solution

The above deficiencies largely solves set of even number of generators of gas by electrolysis of water for multiphase voltage with the inverter of phase supply in accordance with this technical solution that uses for gas production the multiphase voltage and structure of electrodes and a number of seals which is suitable for efficient electrolysis. Electrode assembly and sealing is based on the construction of other generators, so-called dry cells, but it is unique in the supply of direct unsmoothed multiphase voltage. Assembly in accordance with this technical solution consists of generators, which are made up of faces, electrodes, input and output of electrolyte and gas, distance seals and tightening nuts and bolts, where between the faces the certain number of electrodes and distance seals is stored that is best for the production of gas, further consists of multiphase voltage rectifier and inverter of supply. Onto the electrodes of generator the direct unfiltered multiphase voltage is brought and the and the generator is filled with electrolyte. By unfiltered direct multiphase voltage the oscillation of the electrolyte and its subsequent efficient decomposition is achieved.

In one aspect, the invention provides a method of generating hydrogen and oxygen by electrolysis of an aqueous electrolyte wherein the electrolysis is effected by passing pulsating electric current through the electrolyte. The electrolyte may be formed from water. The method may be practised so as to avoid or at least limit sludge formation in the electrolyte.

The current may be unidirectional. Preferably, the current is provided by application of a reduced voltage during start-up.

In another aspect the invention provides a method of electrolytic generation of hydrogen and oxygen from water which is sludge free using is a controlled pulse current source.

The invention also provides a device for generating hydrogen and oxygen by electrolysis of an aqueous electrolyte, comprising an electrolyser for containing the aqueous

electrolyte and provided with electrodes for application of electric current to the electrolyte, and electric supply means for providing said electric current, characterised in that the electric supply means comprises means for generating a pulsating current.

In another aspect, the invention provides a device for generating hydrogen and oxygen by electrolysis of an aqueous electrolyte, comprising an electrolyser for containing the aqueous electrolyte and provided with electrodes for application of electric current to the electrolyte, wherein the electrolyser comprises a lengthwise extending series of chambers divided by transverse walls which are formed by spaced transversely extending electrodes, the electrodes having openings there through to permit flow of electrolyte through the chambers and to permit take-off of released hydrogen and oxygen when electric current is applied to electrolyte within the electrolyser. A tank may be provided for containing the electrolyte, which communicates with the interior of said chambers and which is arranged whereby released hydrogen and oxygen may enter the tank and cause influx of electrolyte from the tank into the chambers under influence of pressure of released hydrogen and oxygen in the tank.

In another aspect the invention provides a device for generating hydrogen and oxygen by electrolysis of an aqueous electrolyte, comprising an electrolyser for containing the aqueous electrolyte and provided with electrodes for application of electric current to the electrolyte, the electrolyser including a tank for containing the electrolyte, which communicates with the interior of said chambers and which is arranged whereby released hydrogen and oxygen may enter the tank and cause influx of electrolyte from the tank into the chambers under influence of pressure of released hydrogen and oxygen in the tank, the electrolyte in the tank being in use pressurised to a low pressure such as to a pressure not more than 1.5 bar. This pressurisation may be controlled by setting a pressure switch at a maximum of, for example, 1.5 bar. This assists in efficient gas production by minimising the resistance of electricity flow between electrodes of the electrolyser.

In a still further aspect the invention provides a device for generating hydrogen and oxygen by electrolysis of an aqueous electrolyte, comprising an electrolyser for containing the aqueous electrolyte and provided with electrodes for application of electric current to the electrolyte, the device having an outlet for the hydrogen and oxygen and a flashback arrester arranged such that released hydrogen and oxygen from the electrolyser flows in use through the flashback arrester to the outlet, wherein the flashback arrester includes a chamber having coolant therein and through which released hydrogen and oxygen passes in use to the outlet.

The gas arrester may include valve means effective to close communication from the gas arrester to the outlet when flashback occurs therein. The valve means may comprise a nonreturn valve.

The invention also provides a method of preventing flashback in the electrolytic generation of hydrogen and oxygen by the use of a coolant and a non-return valve