

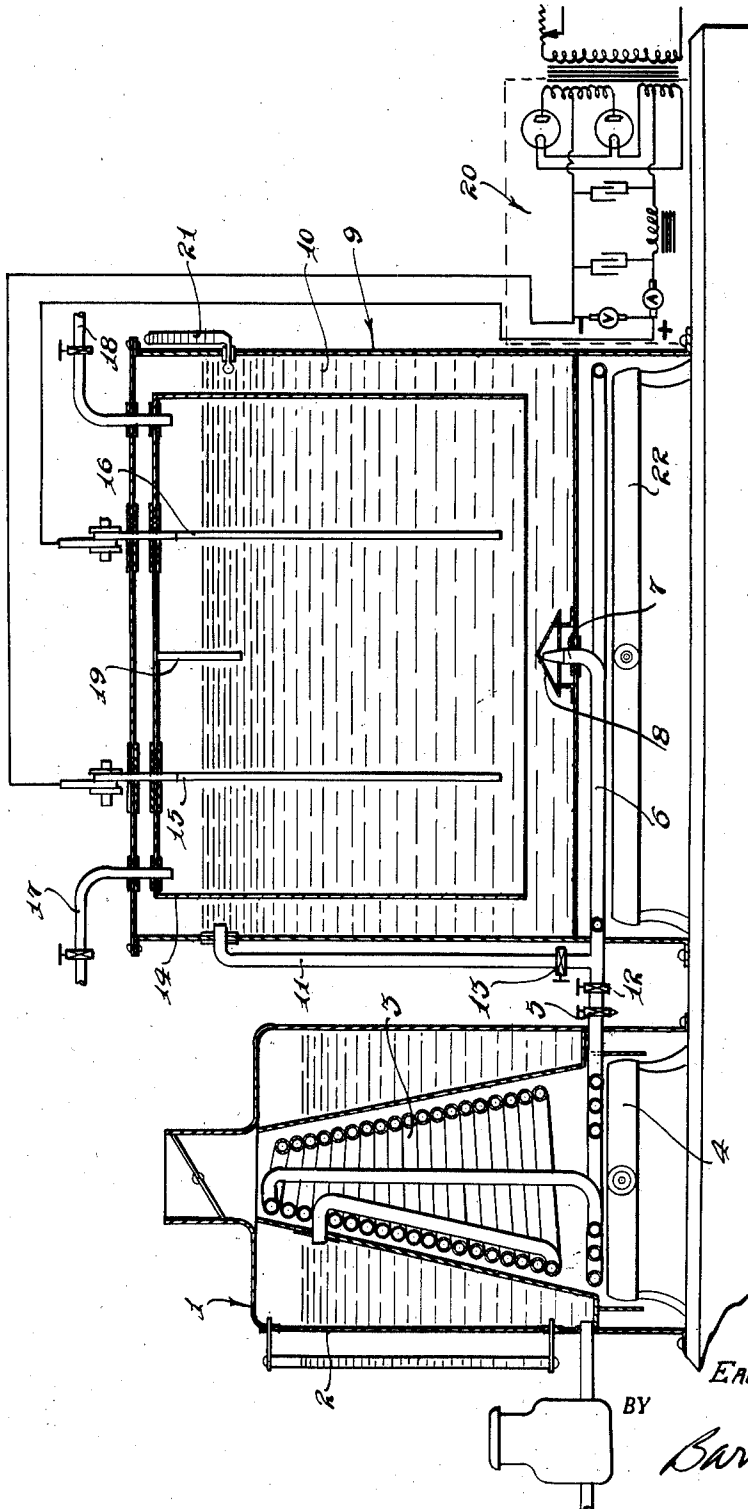
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APPARATUS FOR PRODUCING GASES BY ELECTROLYSIS

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APPARATUS FOR PRODUCING GASES BY ELECTROLYSIS

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This invention relates to an apparatus for producing gases by electrolysis, and has to do particularly with a novel method of producing hydrogen gas from water.

Heretofore in the production of hydrogen as a commercial gas, it has been the general practice to obtain the same by subjecting water to an electrolytic action. Various methods and apparatus have been provided in attempting to accelerate the decomposition of water by means of electrolysis, but so far as I am aware the majority of these methods have been directed towards improvements in connection with the electrolytic action. However, with the fastest method now in use, the production of hydrogen from water is considered a relative expensive process and requires the expenditure of a large amount of electrical units in transforming the liquid to a stable gas that may be collected.

It is the object of the present invention to greatly accelerate the production of hydrogen from water and with a minimum expenditure of electrical units. More specifically, the present invention makes use of the fact that water in the form of live steam is as close to being decomposed into its elements as it is physically possible and working on this principle I have discovered that if the water is introduced into the electrolyte bath in the form of live steam and is maintained in this substantially decomposed form during the electrolytic action, that the breaking up of the water into hydrogen and oxygen is accomplished with great rapidity.

An additional feature of the present invention resides in the material decrease of electric energy required per molecular unit in breaking up the steam as compared to the standard method of breaking up water directly from its liquid form.

In the drawing I have illustrated one embodiment of the invention wherein means are disclosed for rectifying electric current and for producing a continuous supply of steam, in addition to the electrolysis unit.

Both the method and apparatus may be best understood by describing the illustrated embodiment, although it will be understood that various forms of apparatus may be uti-

lized in carrying out the steps of the method.

Any suitable means may be used for producing steam and I have shown a suitable steam generator which may be generally designated 1. This generator may consist of a storage container 2, flash coils 3 and a suitable burner 4.

A valve 5 controls the flow of steam to a superheater 6. The superheater coil 6 is designed to discharge the steam through the jet 7 and against the deflector member 8. The jet 7 discharges into a tank 9 which may be called the electrolyte tank and is designed to hold a supply of electrolyte 10. Circulation within the tank 9 is maintained by means of a suitable convection tube 11 and check valves 12 and 13 insure the isolation of the electrolyte or acid in the correct part of the system.

An inverted gas container 14 is positioned within the tank 9 and may be more or less standard in that it contains a negative electrode plate 15, a positive electrode plate 16 and oxygen and hydrogen outlets 17 and 18, respectively. A suitable baffle plate 19 may be positioned as shown whereby to positively separate the inverted container 14 into two separate gas chambers.

In case of an A. C. current supply, any suitable rectifying equipment, such as generally indicated at 20, may be utilized as will be well understood by those skilled in the art. A thermometer may be located as at 21 so as to enable the electrolyte to be maintained at a constant temperature through the medium of a burner 22.

In operation the container 9 is filled to a predetermined level with electrolyte and the container 14 is inserted in the main tank to a depth that will submerge both electrodes and form an electrical connection with the electrolyte, direct current being fed into the electrodes as indicated in the drawing. Superheated steam is then forced into the electrolyte through the pipe 6 and jet 7 which electrolyte is preferably maintained at a temperature sufficient to prevent condensation of the steam before the gases have separated. This steam passes through the electric field created by the current traveling between the electrodes and as the hydrogen and oxygen ele-

ments are as near their separation point as possible when in the form of steam, it will be obvious that very little more energy is required to completely separate the hydrogen and oxygen. Therefore, as the steam passes into the electric field decomposition of the same will take place, the hydrogen positives being drawn to the negative electrode 15 and the oxygen negatives being drawn to the positive electrode 16. Due to the baffle 19, it will be obvious that the separated oxygen and hydrogen gases will be collected in their respective chambers and drawn off through the pipes 17 and 18 to be stored or used as desired.

It will thus be seen that I have provided means for greatly accelerating decomposition of water into hydrogen and oxygen as a greater part of the work is accomplished in changing the water to steam before the electrolytic action. Further, the amount of current required is considerably reduced, as it will be obvious that very little current is required to complete the breaking up which is substantially accomplished by changing the water to steam. I obtain the best results by maintaining the electrolyte at a temperature sufficient to prevent any condensing of the steam, but it will be understood that I do not wish to be limited to any specific temperature as it may be possible to obtain efficient results at a substantially lower temperature; and it may be possible to obtain efficient results by applying the heat at different points than at the bottom of the tank 9.

What I claim is:

1. A device of the character described, comprising a tank for holding a quantity of liquid electrolyte, an inverted gas container divided into a plurality of chambers, electrodes in said chambers, means for maintaining said electrolyte at a predetermined temperature, means for introducing steam into said electrolyte, and means for baffling said steam whereby to initially distribute the same throughout the electrolyte.

2. A device of the character described, comprising a tank for holding a quantity of liquid electrolyte, an inverted gas container divided into a plurality of chambers, electrodes in each of said chamber, means for maintaining said electrolyte at a predetermined temperature, means for introducing steam into said electrolyte, and means for causing a positive circulation of the electrolyte.

In testimony whereof I affix my signature.
EARL MILES CRAWFORD.