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Method for production of nitrous gasses by means of the electrical discharges

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The invention described below concern a method for production of nitrogen containing gasses from air or other oxygen-nitrogen mixtures, by where the electrical effects are moved strongly into the foreground compared to the thermal effects by choice of the test conditions. The electric arc is driven by DC current and the distance between the electrodes, as well as the per square unit of the falling energy is kept so small that the result of the heat conduction through the electrodes, a relatively cold electric arc is achieved. The cathode is hereby kept sufficiently warm and eventually made from a material, so that the relatively low current density at the exit area for the discharge, a quiet burning of the arc takes place. Such a cathode can for instance consist of Iridium covered by some limestone. If the cathode is not maintaining a sufficiently high temperature from the current itself, will it in some or another way, for instance by a helping current, brought to a white glow. The anode remains cold and in this condition, unless this is achieved by the dimensions and natural cooling, maintained by a special cooling. It is advantageous to make the anode hollow and channel the gasses which has been treated by the arc, through the same. By moving the cathode towards the anode, a short arc is established, where the voltage can be very low.

One succeeded for instance in using a current of 0,1-0,2 Ampere and a voltage of 120-300 volt to make a DC arc burn quietly between the electrodes. This makes it possible to operate at as well at normal pressure as at lightly lowered pressure, for instance 500 mm mercury. Under these conditions a yield of 90 g HNO₃ per kilowatt hour was achieved. The movement of the current in the arc consist hereby mainly in a transfer of free negative electrons from the cathode to the anode, which on their way contribute to the formation of nitrous products through ionic impact, without reaching a high temperature. Since the anode is cold and the cathode remains not far above 1500 ° warm, will the heat transfer make it impossible to, at the short distance between them, make a significantly higher temperature. With this arrangement it is possible to extract nitrogen oxides either at lower concentrations with an outstanding yield or with a very high concentration and lower yield.

CLAIMS:

1. Method for production of nitrogen oxides through electricity, characterized by between a hot cathode and cold anode establishes a DC arc – appropriate under slight under pressure – whereby the distance between the electrodes and the per square of these coming energy is kept small because of heat conductivity at the electrodes a relatively cold arc is achieved.
2. In an embodiment of the method given in claim 1, characterized by extracting the gasses through the cold anode which for this purpose is made hollow.