

# UNITED STATES PATENT OFFICE.

GUSTAV A. TREUTLER, OF BLASEWITZ, NEAR DRESDEN, SAXONY.

IMPROVEMENT IN PROCESSES FOR THE CONTINUOUS PREPARATION OF NITROGEN GAS.

Specification forming part of Letters Patent No. **207,086**, dated August 13, 1878; application filed October 24, 1877.

*To all whom it may concern:*

Be it known that I, Dr. GUSTAV A. TREUTLER, of Blasewitz, near Dresden, Kingdom of Saxony, have invented an Improvement in Processes for the Preparation of Nitrogen for Inhalation and other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention consists in a continuous separation of nitrogen from atmospheric air, the said nitrogen being separated from the oxygen with which it is mixed in atmospheric air by the aid of ferrous sulphate, which combines with the said oxygen to form ferric sulphate, which ferric sulphate is again reduced to the first-mentioned sulphate by the action of metallic iron presented to the same in the manner hereinafter set forth.

The apparatus in which this process is carried out may be varied considerably without in any wise affecting the spirit of the invention. It will therefore be sufficient to describe a simple means for securing the desired result.

The apparatus necessary is simply a vessel or vessels, preferably two ordinary wood casks, connected by a flexible connector—as, for instance, a piece of rubber hose—and a receiving vessel or vessels, preferably two ordinary gasometers, connected with one of the aforesaid casks by a branch pipe, which permits one of the said gasometers to be filling while the other is discharging its gas, the passage of the gas from the generators or casks to the said gasometers being directed and controlled by suitable cocks.

In the said generators or casks I place fine iron filings, turnings, or cuttings, preferably mixed with some hygroscopic material, by which the iron filings or cuttings may be more efficiently kept moistened. One good material for this purpose is found to be sea-weed.

Upon the said filings I then pour a solution of ferric sulphate, and by rolling or shaking the casks from time to time I cause the said solution to continually moisten the said iron filings mixed with the aforesaid hygroscopic material or some other material of a similar character.

By connecting the two gasometers with each other by a cord passing over a sheave or sheaves, and by the use of a weight alternately placed on one and the other of the said gasometers, I am able to cause air to pass into and through the generators and through the aforesaid mixture of iron filings, hygroscopic material, and solution of ferric sulphate into the rising gasometer, while I at the same time am using the gas from the descending gasometer; and, as this arrangement is very convenient, I prefer it, although other means for forcing the air through the apparatus and into the gasometers may be employed.

It will be seen that the ferric sulphate is thus made to act as a vehicle for conveying the oxygen of the air passing through the apparatus to the metallic iron, leaving the nitrogen unacted upon, and that the action will continue as long as the metallic iron remains unconsumed. When this takes place it will be necessary to recharge the generators. It will also be seen that the complete removal of the oxygen from the nitrogen may be effected by a sufficient number of generators, or by a sufficient number of transmissions through the apparatus of a limited volume of the air.

In fact, I am able to regulate and control the action of the process at will to more or less remove the oxygen from the nitrogen for the use of the latter for medical and economical purposes.

I claim—

The continuous preparation of nitrogen gas for inhaling and other purposes, the same consisting in, first, the action of ferrous sulphate upon atmospheric air, whereby the latter loses a portion of its oxygen and the iron-salt is converted into a ferric sulphate; and, second, the deoxidation of said ferric sulphate, and its reduction to ferrous sulphate by the action of metallic iron, substantially as and for the purpose specified.

This specification signed by me this 21st day of August, 1877.

DR. GUSTAV ADOLPH TREUTLER.

Witnesses:

WILHELM L. WIESENHÜTTER,  
WILHELM ZIEROLD.