

No. 777,988.

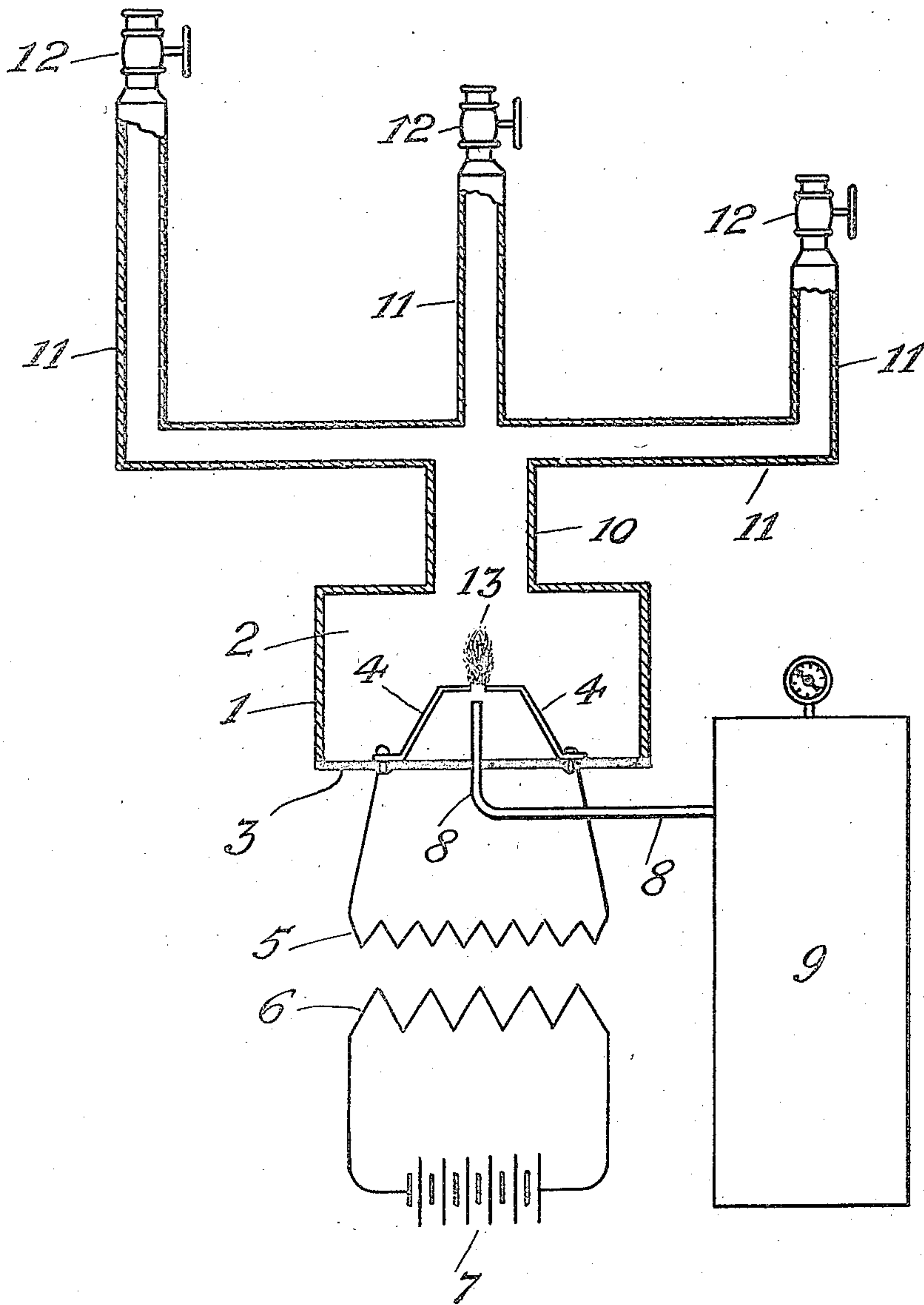
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E. E. WERNER.

PROCESS OF GENERATING GASES FROM AIR.

APPLICATION FILED AUG. 6, 1904.

NO MODEL.



Witnesses  
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H. G. Bowman.

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# UNITED STATES PATENT OFFICE.

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## PROCESS OF GENERATING GASES FROM AIR.

SPECIFICATION forming part of Letters Patent No. 777,988, dated December 20, 1904.

Application filed August 6, 1904. Serial No. 219,801.

*To all whom it may concern:*

Be it known that I, ERNEST E. WERNER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Processes of Generating Gases from Air, of which the following is a specification.

My invention relates to a process of generating gases from air by means of an electric discharge; and its principal object is the production of a suitable gaseous body for use in the treatment of flour to bleach it.

In a general way my invention may be said to consist in establishing and maintaining an electric arc or discharge between terminals and deflecting its course and elongating its body by the impulsive and expansive effects of compressed air projected against the arc in direction transverse to its direct course between the terminals. This method of proceeding results in elongating the arc by deflecting it in lateral direction to an extent proportioned to the force of the air-pressure against it, and the air being then free to expand in the body of the discharge tends to expand and somewhat disintegrate it, but without breaking the arc, and the air is thus subjected to a maximum electrical action. Furthermore, the cooling effect of the expansion of the compressed air is highly beneficial in reducing the temperature of the electrodes and the gases.

In carrying out this process I may employ apparatus of the character illustrated in the accompanying drawing, in which the figure shows diagrammatically an apparatus capable of being used to practice my process.

In such drawing, 1 indicates a casing inclosing an air-tight chamber 2 and having an insulating-bottom 3. On this bottom are supported the terminals 4, preferably formed of thin strips of metal and having their ends arranged a short distance apart, so that an arc may be produced between them. The terminals are connected to the ends of the secondary 5 of a transformer. The primary 6 of the transformer is supplied with current from any suitable source of electric energy, as, for

illustration, by means of a battery 7. The transformer may be of any suitable form, and in practice I preferably use the form commonly known as an "induction-coil."

For supplying air under pressure to the arc formed between the terminals a supply-pipe 8, which enters through the bottom 3, is arranged with its discharging end adjacent to and preferably below the gap between the terminals 4. The discharge of air may be made through a single orifice; but it is preferable to provide numerous small openings. The pipe 8 leads from a supply-tank 9, in which the air to be subjected to the action of the electric discharge is contained under pressure, preferably from twenty to fifty pounds.

To the casing 1 is connected a discharge-conduit 10 for the discharge of the gases, and this main conduit may have a plurality of branches 11, each of which is provided with a valve 12 or other means for controlling the flow of gas to the points where it is to be used. When these valves are opened to a considerable extent, the discharge of the gases will be free and normal and there will be little back pressure in the chamber 2, and the incoming flow of air through the pipe 8 will also be normal, and its impact against the side of the arc will serve to deflect and elongate it laterally in the manner indicated at 13 in the drawing. In case one of the valves 12 is closed an appreciable back pressure in the chamber 2 will be produced, which will result in a measurable reduction of the deflection and lengthening of the arc, and if two of them are closed a still greater back pressure and corresponding reduction of the arc will take place, and if all of them are closed the air from the tank will enter the chamber with decreasing force until there will be no effective lateral pressure upon the arc, and it will pass in practically a straight course from terminal to terminal. I have found in practice that if the escape of gas is entirely prevented the arc between the terminals will be broken after a short period of time and as soon as the air in the chamber has been thoroughly treated, and thus the action of the arc will be entirely stopped. In this



manner the size of the arc is automatically regulated by and proportioned to the volume of air injected against it, and a uniform treatment of the air, whether its volume is increased or decreased, is effected. In practice I find that air thus treated will contain substantially the same amount of compounds of oxygen and nitrogen when the apparatus is working at full capacity as when only a small quantity of air is permitted to pass through the apparatus.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

15 1. The process of generating gases from air, which consists in maintaining an electric discharge between terminals, and causing compressed air to be released and permitted to expand in the gap between the terminals.

20 2. The process of generating gases from air, which consists in establishing an arc between electric terminals, and projecting compressed air transversely into the path of the arc to deflect and elongate it in lateral direction without breaking it.

25 3. The process of generating gases from air, which consists in establishing an arc between electric terminals, projecting compressed air into the path of the arc to deflect and elongate the arc without breaking it, and subjecting the expanding air to the action of the arc.

30 4. The process of generating gases from air, which consists in establishing an arc between electric terminals and subjecting it to the expansive effect of compressed air acting upon it in transverse direction.

5. The process, which consists in generating gases from air by maintaining an arc between two electric terminals in a chamber, causing compressed air to be released and permitted to expand in the gap between the terminals, and regulating the volume of compressed air released by varying the outflow of the treated gases.

6. The process of generating gases from air, which consists in establishing an arc between electric terminals, projecting compressed air into the path of the arc to deflect and elongate the arc without breaking it, and regulating the extent of such deflection and elongation proportionately to the volume of air introduced.

7. The process, which consists in generating gases from air by maintaining an arc between two electric terminals in a chamber, causing compressed air to be released and permitted to expand in the gap between the terminals, to deflect and elongate the arc in lateral direction without breaking it, regulating the extent of such deflection and elongation proportionately to the volume of air released, and regulating the volume of compressed air released by varying the outflow of the treated gases.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 1st day of August, 1904.

ERNEST E. WERNER.

Witnesses:

BERTHA WERNER,  
F. R. HATTERSLEY.