

O. SCHÖNHERR & J. HESSBERGER.
 PROCESS FOR THE PRODUCTION OF REACTIONS IN GASES.
 APPLICATION FILED MAY 18, 1906.

991,174.

Patented May 2, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

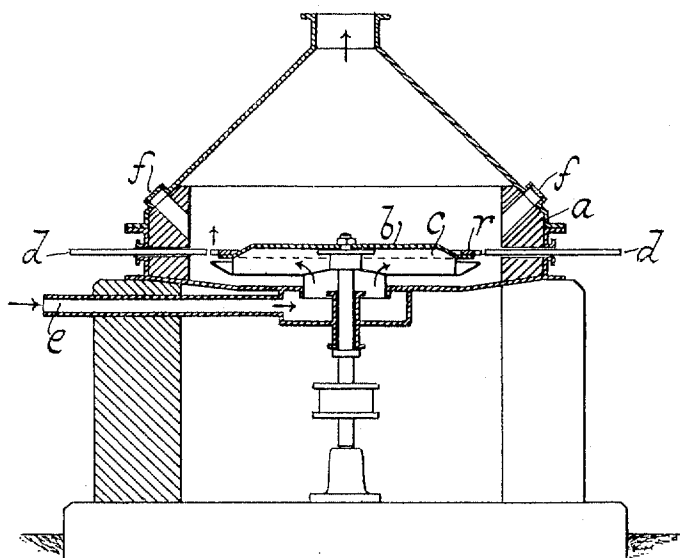
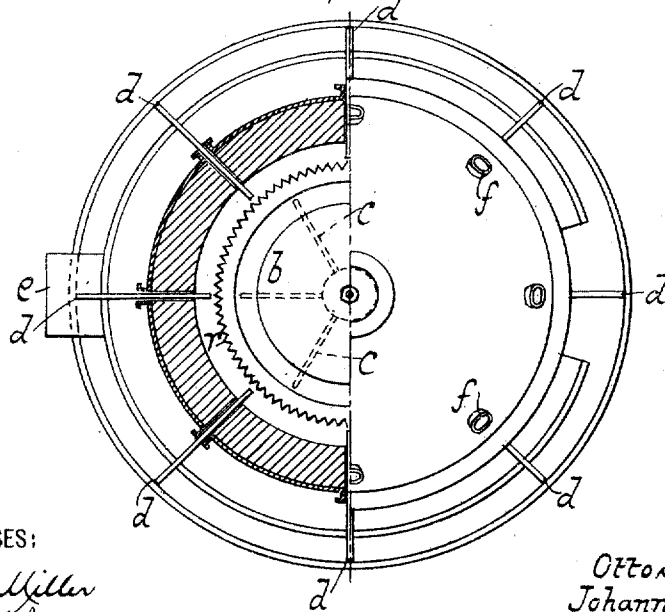


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

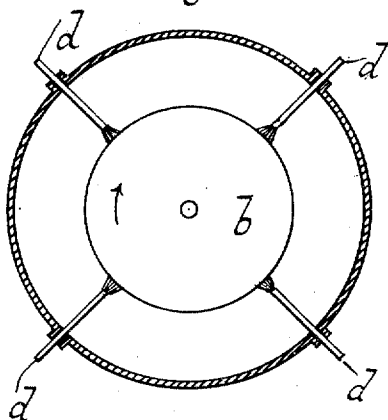
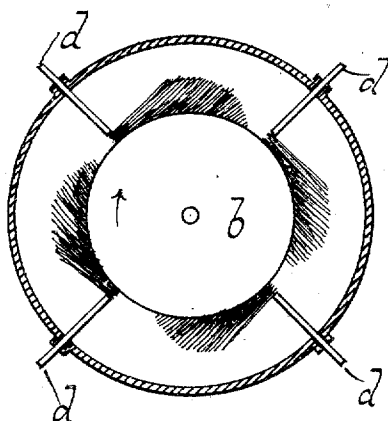


Fig. 4.



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UNITED STATES PATENT OFFICE.

OTTO SCHÖNHERR AND JOHANNES HESSBERGER, OF LUDWIGSHAFEN-ON-THE-RHINE, GERMANY, ASSIGNORS TO BADISCHE ANILIN & SODA FABRIK, OF LUDWIGSHAFEN-ON-THE-RHINE, GERMANY, A CORPORATION OF GERMANY.

PROCESS FOR THE PRODUCTION OF REACTIONS IN GASES.

991,174.

Specification of Letters Patent.

Patented May 2, 1911.

Application filed May 18, 1905. Serial No. 261,001.

To all whom it may concern:

Be it known that we, OTTO SCHÖNHERR, doctor of philosophy and chemist, a subject of the King of Saxony, and JOHANNES HESSBERGER, a subject of the King of Prussia, German Emperor, residing at Ludwigshafen-on-the-Rhine, in the Kingdom of Bavaria, German Empire, have invented new and useful Improvements in Processes for the Production of Reactions in Gases, of which the following is a specification.

Our invention relates to a process for the production of reactions in gases by means of electric arcs and consists in the provision of means whereby, in the production of such reactions, a polyphase current, without restriction as to the number of phases, can be used in one electric furnace in such a manner that large quantities of electric energy can be utilized in a simple manner in one furnace and without employing a magnetic field in the furnace to spread out the arcs.

According to our invention electric arcs are caused to spring between a rotating electrode and stationary, but adjustable, electrodes and the gases are made to spread out the arcs so that they cover the whole, or nearly the whole, of the space between the circumference of the rotating electrode and the stationary electrodes, thus compelling the whole, or practically the whole, of the gases which are drawn through the apparatus to pass through and be subjected to the action of the arcs.

We do not limit ourselves to any one precise form of apparatus for carrying out our invention, but have found that illustrated in the accompanying drawings to be suitable.

Of these, Figure 1 represents a vertical section and Fig. 2 a plan partly in horizontal section of the apparatus, and in both figures similar letters refer to similar parts, while Figs. 3 and 4 represent cross-sections taken through the electrodes.

a represents the wall of the furnace which is lined with fire-proof material and inside which the circular disk-electrode *b* is mounted centrally so as to be capable of rotation. This rotatable electrode is provided with radial wings *c* and is also provided with a circumferential ring *r* which is detachable and can therefore be removed and replaced by a fresh one when desirable. This ring *r* can with advantage be toothed on the out-

side as shown in Fig. 2. Stationary electrodes *d*, which must be well insulated, are introduced through the wall of the furnace in the same horizontal plane as that of the electrode *b*, and can be adjusted with regard to the rotating electrode.

e represents the channel through which the gas supply passes into the apparatus, and the arrows indicate the course in which the gases have to travel. The holes marked *f*, which are covered with glass or other transparent material, render it possible to see the ends of the electrodes *d* when setting the same.

We prefer to connect electrically the rotating electrode *b* and the walls of the furnace to earth so that there is no danger in touching the connections. The well insulated electrodes *d* are connected with the terminals of a generator or of a transformer or other suitable source of electric current. The disk electrode *b*, being provided with the radial wings *c*, constitutes a kind of fan, to the center of which the gases to be treated are fed and from the periphery of which they are tangentially ejected so that, in consequence of rapid rotation, the gases are forced through the space between the disk electrode and the stationary electrodes and drag the arcs with them and the electric discharge can thus be spread throughout the whole circumference of the disk electrode and the annular space through which the gases have to pass between the disk and the furnace wall be filled with arc flame. Fig. 3 shows the positions taken up by the arcs when the disk is rotating very slowly so that the action of the air does not play any part in spreading out the arcs, in which case the arcs merely spring directly from the peripheral electrodes *d* to the central circular electrode *b*. Fig. 4 on the other hand, represents the state of the arcs when they are spread out by causing the inner circular electrode *b* to rotate rapidly. The conditions thus produced are very favorable for reaction in the gases, as the arcs present a very large surface with which all the gases are compelled to come into contact.

The stationary electrodes can be radially placed with regard to the rotating electrodes, or they may be situated at any other angle thereto. The gases may be introduced in any convenient manner, for instance, they

may be introduced through the aforesaid fan-like arrangement, or they may be led in through the stationary electrodes, or through other ducts arranged for the purpose, and
 5 the number of stationary electrodes may be varied within wide limits. The smallest number which can conveniently be used is three, in the case when these three electrodes are attached respectively to the three terminals of a three-phase dynamo; we have
 10 obtained good results when working with from nine to twelve electrodes.

Now what we claim is:

The process for the production of reactions in gaseous mixtures by means of poly-
 15 phase electric currents by causing an elec-

trode to move relatively to the opposing electrodes and establishing electric arcs between the said stationary and moving electrodes, feeding the said arcs by means of poly-
 20 phase electric currents and spreading out the said arcs to a maximum volume by means of the gaseous mixture being treated, all substantially as described.

In testimony whereof we have hereunto
 25 set our hands in the presence of two subscribing witnesses.

OTTO SCHÖNHERR.

JOHANNES HESSBERGER.

Witnesses:

J. ALEC. LLOYD,

Jos. H. LEUTE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
