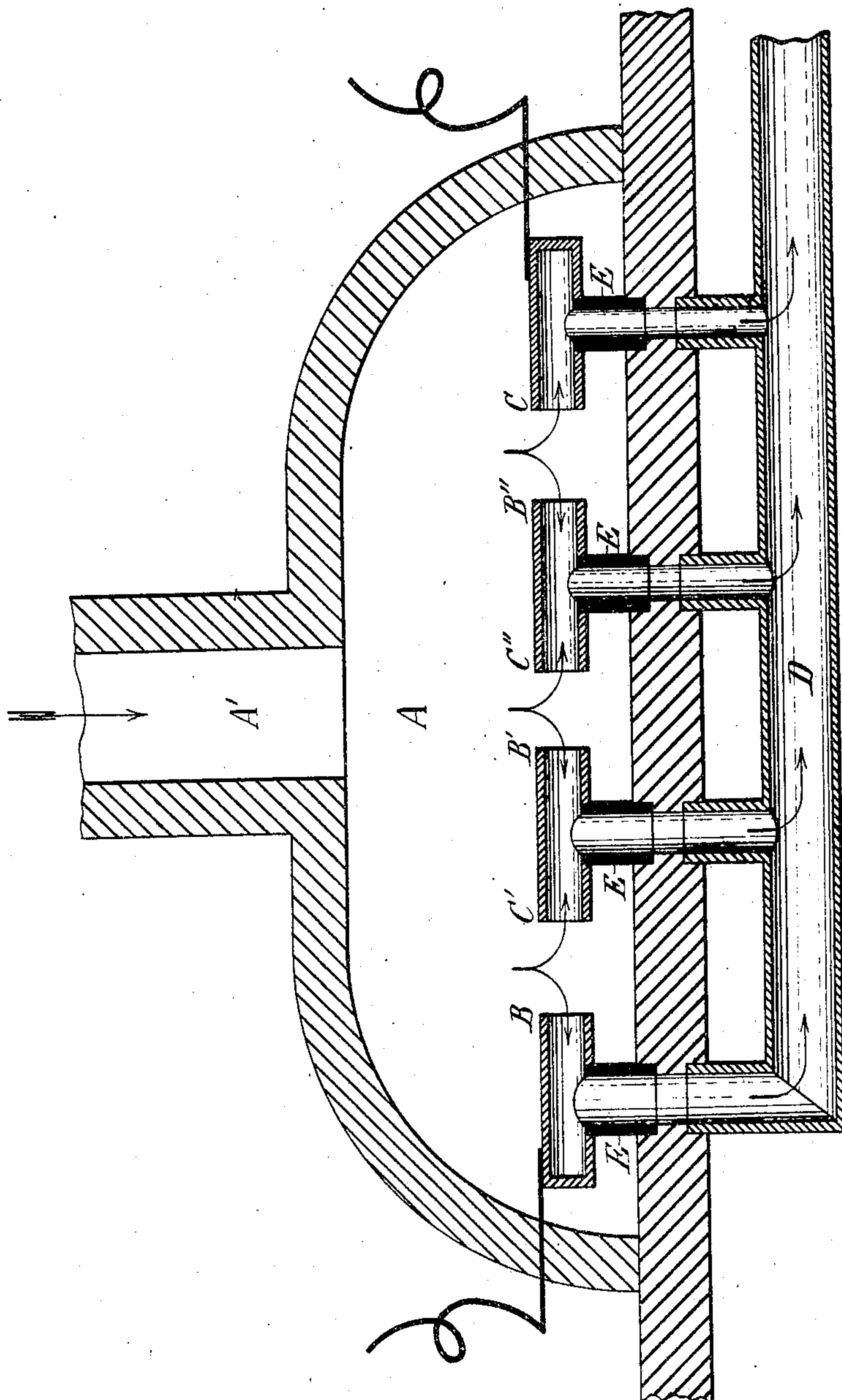


(No Model.)

A. A. NAVILLE & P. A. & C. E. GUYE  
ELECTRICAL GAS REACTION APPARATUS.

No. 569,122.

Patented Oct. 6, 1896.



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# UNITED STATES PATENT OFFICE.

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## ELECTRICAL GAS-REACTION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 569,122, dated October 3, 1896.

Application filed February 4, 1896. Serial No. 578,063. (No model.)

*To all whom it may concern:*

Be it known that we, ALOYS ADRIEN NAVILLE, PHILIPPE AUGUSTE GUYE, and CHARLES EUGÈNE GUYE, gentlemen, of Geneva, Switzerland, have invented certain new and useful Improvements in Electrical Gas-Reaction Apparatus, of which the following is a specification.

It is a well-known fact that the reactions produced by the passage of an electric spark in a gaseous mixture contained in an eudiometric tube are very often reduced by the fact that the electric spark very rapidly decomposes the products of such reactions.

Now the objects of this invention are, first, to constantly and rapidly renew the gases which are exposed to the action of the electric spark; secondly, to preserve the products formed thereby from its decomposing action; thirdly, to compel the whole of the gaseous mass to pass in immediate proximity to the spark.

A further object of the said invention is to considerably increase the produce or yield of the eudiometric reactions, which, in the apparatus used up to now, is generally limited.

Our improved gas-reaction apparatus realizes the above-mentioned three conditions. It can assume various forms of execution, and we will now proceed to describe one of them by way of example, reference being made to the accompanying drawing, in which the figure is a detail sectional view of sufficient of the apparatus to enable our invention to be clearly understood.

Our apparatus is constructed so as to have a series of sparks passing simultaneously in the same gaseous current. To this end we interpolate, as shown in the drawing, between two terminal electrodes B and C a certain number of intermediate metallic tubes B' C' B'' C'', these tubes being insulated by means of tubular bearings E of insulating material and connected to a tubular collector D. The said electrodes may also be made tubular and be connected to the collector D. They are inclosed in a bell A, provided with a pipe A', through which the gases to be treated are forced into the bell A. The said gases pass through the tubes B C, B' C', and B'' C'', where they are acted upon by the sparks pro-

duced by any suitable source of electricity, the two poles of which are connected to the said electrodes B and C. The products of the reaction escape through the tubular collector D. With this device the whole of the gases will pass through the region where the electric sparks are produced, and the products of the reaction are then led away into any suitable apparatus.

The electrodes may be composed of any suitable material—for example, coal, platinum, bronze, copper, nickel, ferro-nickel, various alloys, &c.—the selection of the materials depending essentially on the nature of the gases which are to be treated or of the reactions to be effected, the substance of the electrodes being capable of being used in such reactions, if necessary.

Our apparatus may be used without distinction with any kind of electric current (continuous variable current, alternating current, &c.) provided the tension be sufficient.

The circulation of the gases in our apparatus may be obtained in any suitable manner, for instance, by means of pumps or fans, Giffard's or Korting's injectors or exhausters, &c., producing either an exhaustion or a compression of the said gases.

It will be seen that our improved apparatus for electrical gas reactions is different from the well-known eudiometers, which can only be used with a limited volume and in which the reactions are also limited, our apparatus enabling one to produce a constant circulation of the gases which are to be treated, to increase the number of sparks, to avoid a further decomposition of the products formed, to secure a continuous renewing of the gases in proximity to the sparks, and to bring under the action of the latter the whole of the gaseous mass.

By way of example of the numerous applications of our apparatus we will point out only the production of nitric acid obtained by means of wet air circulating in an apparatus the electrodes of which are made of coal, and the production of acetylene by means of hydrogen circulating in such an apparatus.

What we claim is—

1. An apparatus for electrical gas reaction



intended to treat any kind of gases by means of any kind of electric current, comprising a series of independent insulated metallic tubes interposed in line between two electrodes connected to opposite poles of a source of electricity, and gas-conduits communicating with the inside and outside of said tubular electrodes respectively, substantially as and for the purpose specified.

2. The combination, in an apparatus for electrical gas reactions, of independent aligned tubular electrodes, a tubular collector, insulating-tubes connecting the tubular elec-

trodes with the collector, and connections between said electrodes and a suitable source of electricity, substantially as shown and described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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