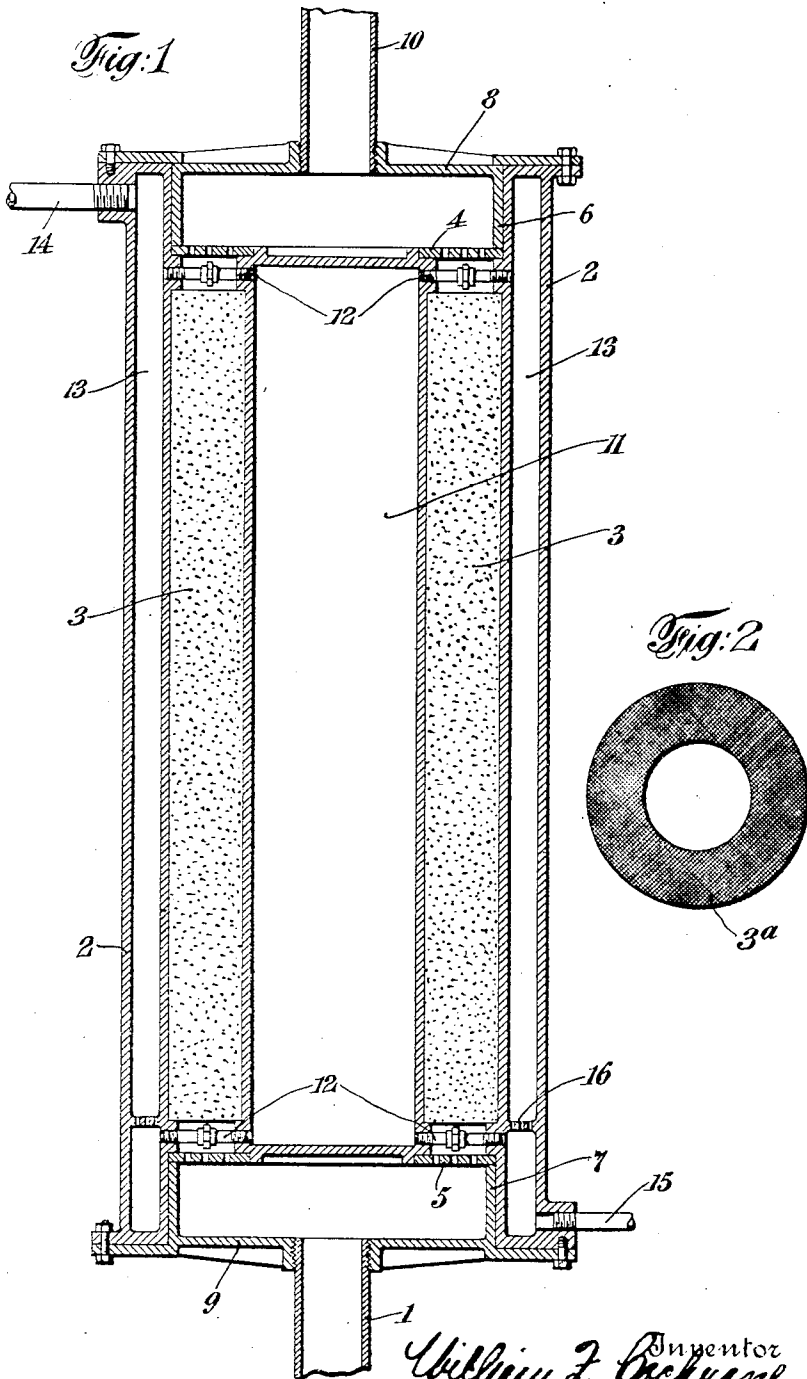


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CATALYZER APPARATUS.
APPLICATION FILED JUNE 13, 1918.

1,396,358.

Patented Nov. 8, 1921.



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UNITED STATES PATENT OFFICE.

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CATALYZER APPARATUS.

1,396,358.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM F. COCHRANE, of Baltimore, in the State of Maryland, have invented a certain new and useful Improvement in Catalyzer Apparatus, and do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates particularly to an apparatus for use in the production of aldehydes from alcohols.

The object of my invention is to provide a catalyzer apparatus of an advantageous character, by means of which a heated catalytic agent, as for example finely divided copper, may be effectively applied to alcohols to produce aldehydes, as for example in the production of acetaldehyde from ethyl alcohol, and in such a manner that the necessary temperature may be effectively maintained throughout all portions of the catalyzer.

A further object is to provide an apparatus of this character which is so arranged that the necessary temperature will be applied throughout all portions of the catalyzer, while at the same time the capacity of the apparatus is made sufficiently large to treat large quantities of the alcohol. By means of my invention I am able, therefore, to avoid the disadvantages of other types of catalyzer apparatus in which the catalyzer was ineffectively or unevenly heated when large quantities of the catalyzer were being used to treat correspondingly large quantities of the alcohol, or in which it was necessary to provide the apparatus with only a small capacity if the catalyzer was effectively and uniformly heated.

Further objects of my invention will appear from the detailed description thereof contained hereinafter.

While my invention is capable of embodiment in many different forms, for the purpose of illustration I have shown only one form of the same in the accompanying drawings, in which—

Figure 1 is a vertical section of a catalyzer apparatus made in accordance with my invention; and

Fig. 2 is a plan view of an alternative form of catalyzer.

In the drawings, I have shown a catalyzer apparatus comprising an inlet tube 1 for vapors of an alcohol, as for example

ethyl alcohol, to be supplied by the same to a cylindrical catalyzer chamber 2, containing an annular body of catalyzer material 3, coaxial therewith and which may be comprised either of pumice stone carrying finely divided reduced copper, such for example as the catalyzer material made in accordance with the process disclosed in the patent of Arthur A. Backhaus upon process of making catalyzers, Patent Number 1,376,665 granted May 3, 1921, or which may be instead, if desired, comprised of a plurality of annular copper gauze sheets 3^a, carrying on their surfaces finely divided reduced copper, as shown in Fig. 2, which may be treated in accordance with one of the processes set forth in the patent of Arthur A. Backhaus and Fred V. Arentz upon process of making catalyzers, Patent Number 1,376,665, granted May 3, 1921, or the patent of Arthur A. Backhaus upon method of producing catalyzers, Number 1,375,345, granted April 19, 1921.

The catalytic material is confined within the catalyzer chamber 2 between two perforated plates 4 and 5, which may be held in place in any suitable manner, as for example by spacing rings 6 and 7, which rest against upper and lower heads 8 and 9, closing the upper and lower ends of the catalyzer chamber 2, respectively.

An outlet pipe 10 is provided to conduct away the vapors of acetaldehyde and hydrogen from the catalyzer apparatus for separation in any suitable manner.

Within the catalyzer chamber 2 there is shown a central heating chamber 11, which communicates by a plurality of radiating pipes 12 with an outer heating jacket 13, which, being also shown as substantially parallel and coaxial with the catalyzer chamber, is adapted to be supplied with a current of heated oil by means of inlet and outlet pipes 14 and 15. An annular perforated baffle 16 separates the walls of the chamber 2 and limits the movement of the heating liquid therein.

In the operation of my invention, alcohol vapors, as for example vapors of ethyl alcohol, are conveyed into the apparatus by means of the pipe 1, and said vapors then pass through the perforated plate 5 into contact with the catalytic material 3. The finely divided copper then acts upon the alcohol vapors to form acetaldehyde and

hydrogen, which pass upwardly through the perforated plate 4 and out through the exit pipe 10.

In order to bring about this change, it is necessary, however, to heat the alcohol vapors and the catalytic material to a temperature of from 250° to 350° C. This is effectively accomplished by the internal and external heating means, which comprise the external heating jacket 13 and the internal heating chamber 11, and which are continually supplied with a current of oil heated to the temperature above referred to.

By this means a large volume of alcohol vapors may be effectively treated and at the desired temperature, so that an apparatus may be provided of this character capable of producing the acetaldehyde or other aldehyde upon a large scale.

While I have described above a heating means for the catalyzer material in the form of a current of heated oil, it is to be understood that any other internal and external heating means may be applied, as for example a current of hot gases.

While I have described my invention above in detail, I wish it to be understood that many changes may be made therein without departing from the spirit of the invention.

I claim:

1. In a catalyzer apparatus for the transformation of an organic body during application of heat thereto, an outer cylindrical heating chamber, an annular catalytic cham-

ber therein having openings near its ends and containing a pervious catalytic material, conduits respectively for the introducing of the organic body and for the withdrawal of the transformation products and connected with said openings, an inner heating chamber being formed by the inner wall of said annular catalytic chamber, pipes connecting said inner heating chamber with said outer heating chamber and inlet and outlet pipes for the introduction and withdrawal of the heating medium from said heating chamber.

2. In a catalyzer apparatus for the transformation of an organic body during application of heat thereto, an outer cylindrical heating chamber, an annular catalytic chamber therein having openings near its ends and containing a pervious catalytic material, conduits respectively for the introducing of the organic body and for the withdrawal of the transformation products and connected with said openings, an inner heating chamber being formed by the inner wall of said annular catalytic chamber, passages connecting said inner heating chamber with said outer heating chamber, and inlets and outlets for the introduction and withdrawal of the heating medium from said heating chamber.

In testimony that I claim the foregoing I have hereunto set my hand.

WILLIAM F. COCHRANE.

Witness:

JOHN P. GISCHEL.