# Canadian Patents Database

01/09/2002 - 08:17:26
(11) **CA 267008**

(12) **Patent:**

(54) METHANOL AND ETHANOL PRODUCTION

(54) PRODUCTION DE METHANOL ET D'ETHANOL

| | |
|---|---|
| (72) Inventors (Country): | **LUIGI CASALE** (Not Available) |
| (73) Owners (Country): | **LUIGI CASALE** |
| (71) Applicants (Country): | |
| (74) Agent: | |
| (45) Issued on: | **Dec. 28, 1926** |
| (22) Filed on: | |
| (43) Laid open on: | |
| (52) Canadian Class (CPC): | **260/638** |
| (51) International Class (IPC): | **N/A** |
| Patent Cooperation Treaty (PCT): | **No** |
| (30) Application priority data: | **None** |
| Availability of licence: | **N/A** |
| Language of filing: | **Unknown** |

ABSTRACT:

CLAIMS: Show all claims

*** Note: Data on abstracts and claims is shown in the official language in which it was submitted.

View or Download Images :

- Cover Page Image
- Abstract Image
- Claims Image
- Disclosures Image
- Drawings Image

26700;
26700-8

Dr. LUIGI C A S A L E, ROME, ITALY

# PROCESS FOR PREPARING METHANOL, ETHANOL AND OTHER OXYGENATED ORGANIC COMPOUNDS BY MEANS OF CATALYTIC REACTIONS BETWEEN CARBON MONOXIDE OR CARBON DIOXIDE AND HYDROGEN OR GASEOUS HYDROCARBONS.

---

This invention relates to a process for preparing methanol or ethanol either isolated or together with other oxygenated organic compounds by means of catalytic reactions between carbon monoxide or carbon dioxide and hydrogen and, or gaseous hydrocarbons, such reactions taking place continuously in a closed circuit of apperatus.

By passing a mixture of carbon monoxide and hydrogen or carbon dioxide and hydrogen or carbon monoxide, carbon dioxide and hydrogen, or such mixtures in which the hydrogen is wholly or in part replaced by gaseous hydrocarbons, over a catalyst it is possible to obtain many different compounds, the nature of which varies according to the temperature and pressure at which reaction is caused, with the catalyst employed and with the composition of the mixture.

The compounds obtained can be either methanol or ethanol or a mixture of these alcohols with other organic oxygenated compounds (chiefly higher alcohols, aldehydes, ketones and organic acids) which can be profitably used for many purposes.

Only a certain quantity of the mixture which is passed over the catalyst reacts to form one or more compounds, so that it is usual to pass the mixture remaining after the reaction products have been separated from the whole with a further quantity of mixture corresponding to that separated in the form of reaction product or products in order to keep the conditions of the reacting system unaltered.

The plant therefore comprises in addition to the catalytic apparatus an apparatus for condensing and separating the reaction products, a circulating pump which may be a piston pump or a centrifugal or a rotary pump and in some cases other kinds of apparatus such as gas purifiers, heat exchanger appliances and so on.

The use of pumps,however, has a drawback in that the gases are liable to carry along some of the oil which is used for lubrication of the pistons and stuffing boxes, and this oil must be separated with great care or it will poison the catalyst. The usual oil separators are not sufficient for such separation and purifiers for removing the very last traces of oil must be introduced into the circuit. The circulation pump, oil separator and the purifier form as a whole an expensive plant of considerable weight and the expense of operating such plant including power, lubricants, labour, repair etc. increase materially the cost of manufacture. In addition the losses by leakage of gas mixture when passing through the plant and those occasioned by the periodical purging of the oil separator must be taken into account.

The process according to the present invention has been studied with the object of avoiding said drawbacks. For this purpose in place of the circulating pump an apparatus is used which, although containing no moving part whatever, brings about the circulation of the gases in the circuit; the only condition for its operating being that the mixture admitted to the circuit should be under a pressure of a certain number of atmospheres higher than the pressure existing within the circuit itself. It is obvious that, under such conditions, the mixture entering the circuit will undergo a diminution of pressure, so that a part of its potential energy is transformed into kinetic energy. It is this kinetic power which I utilise for obtaining the circulation of the gases.

An embodiment of a circulating apparatus which can be used for carrying the invention into effect is shown in cross section in

Fig.1 of the accompanying drawings, Fig.2 representing diagrammatically a closed circuit which includes such circulating apparatus.

Referring to Fig.1 of the drawings, a designates the body of the apparatus formed with very thick walls of suitable metallic material, h is a diffuser cone, g a nozzle, d a regulating needle for the nozzle g, e a stuffing box and f a filter to retain impurities liable to obstruct the nozzle.

The fresh mixture is admitted at a through the filter f, the mixture being previously compressed to a higher pressure than that of the mixture to be circulated. The fresh mixture flows out on the nozzle g at high speed, carrying with it the mixture to be circulated which enters the apparatus at B. The excess of pressure of the mixture flowing in at A above the pressure existing in the circuit is determined by the quantity of gas mixture to be circulated, by the resistance of the apparatus forming the circuit, by the speed to be imparted to the gaseous mixture, and by the working pressure.

Such circulating apparatus may be inserted at any point in the circuit where it is deemed convenient to admit the mixture. The absence of movable parts eliminates the drawbacks connected with the use of circulation pumps, while the use of the oil separation and purifier is unnecessary. Moreover the apparatus has the advantage of being inexpensive to manufacture, is exceedingly easy to operate, and occupies a very small space. The cost of power consumed in order to admit the mixture under a pressure higher then that of the circuit is always very much lower than that incidental to operating a circulation pump.

With the said apparatus it is also possible to obtain the circulation of the gases when no reaction is taking place between them, this corresponding in practice to the period when the apparatus

is being started or stopped.

A plant for obtaining the above mentioned compounds in accordance with the invention is illustrated diagrammatically in Fig. 2 in which 1 shows a one, or more, stage compressor, 2 the piping through which the compressed gases flow, 3 the circulating apparatus illustrated in Fig. 1, while 4, 5, 6 and 7 represent different apparatus inserted in the circuit. Although four of such apparatus are shown they may also be of a number greater or smaller than four, because their number and the purpose of each will depend on the process of synthesis effected and on the point of the circuit at which the admission of the mixture is deemed convenient. 8 is a pipe connecting the circuit through which the gases flow, with the suction pipe 9 of the compressor, while 10 is a cock, the opening of which may be regulated at will, and 11 is a pipe connecting the different apparatus of the circuit. The arrows indicate the passage of the gases. It is clear that by using an arrangement of apparatus such as is illustrated it will be sufficient to regulate the opening of the cock 10 to realize the same conditions existing when reaction is taking place.

LVM.

I Claim :-

1. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reaction between carbon monoxide and hydrogen executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

2. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon monoxide and hydrocarbons executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

3. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon monoxide, hydrogen and hydrocarbons executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the

mixture admitted into the circuit under higher pressure than the pressure of the circuit.

4. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon dioxide and hydrocarbons executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

5. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon dioxide and hydrogen executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

6. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon dioxide, hydrogen and hydrocarbons executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

7. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon monoxide, carbon dioxide and hydrogen executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

8/ A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon monoxide, carbon dioxide and hydrocarbons executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

9. A process for producing methanol and ethanol either isolated or mixed with other oxygenated organic compounds by means of catalytic reactions between carbon monoxide, carbon dioxide, hydrogen and hydrocarbons executed in a closed circuit of apparatus characterized by the fact that the reacting gases are caused to flow through said closed circuit of apparatus by means of an apparatus having no moving parts and utilizing therein the kinetic energy obtained by transformation of part of the potential energy of the mixture admitted into the circuit under higher pressure than the pressure of the circuit.

10. Means for carrying out the process for producing methanol, ethanol or other oxygenated organic compounds by catalysis comprising an apparatus similar to an injector, in the thick walled body of which is arranged a diffuser cone behind a nozzle regulated by a needle, the gases approaching the nozzle by means of two ducts, one of which admits the fresh gaseous mixture and is furnished with a filter.

11. A method for causing the gases to circulate through a closed circuit of apparatus by means of a device having no movable parts, in which in starting and stopping the apparatus a portion of the gaseous mixture is drawn off from the catalysis cycle and is replaced by an equivalent quantity of the reaction mixture admitted to the circulating device at a higher pressure.

...ess for Preparing ...ethanol, Ethanol, &c. 267008

(267008)

Fig. 1

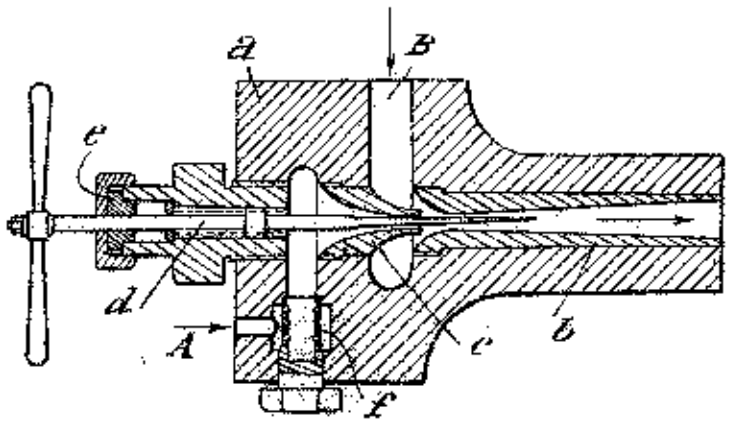
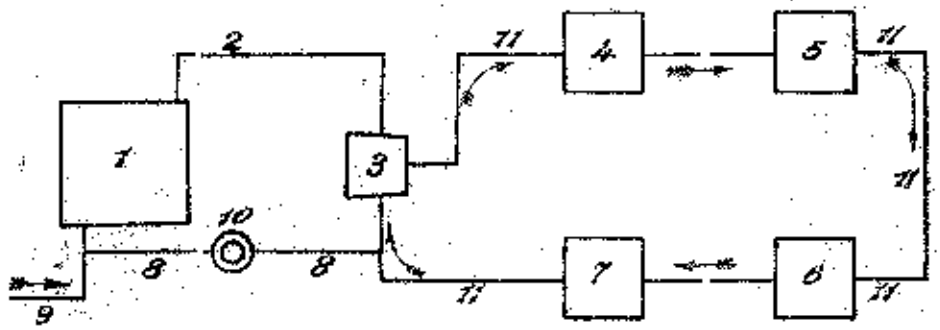



Fig. 2




Certified to be the drawings referred to in the specification hereto annexed.
New York, N.Y., Sept. 22, 1925.

LUIGI CASALE
Inventor
By ... Attorneys