

PATENT SPECIFICATION

Application Date: May 12, 1928: No. 14,058 / 28.

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824



PROVISIONAL SPECIFICATION.

Improvements in Heating Hydrogen or Carbon Monoxide or Gases Containing these Substances Under High Pressure.

We, KENNETH GORDON, a British Subject, of Norton Hall, The Green, Norton-on-Tees, Co. Durham and IMPERIAL CHEMICAL INDUSTRIES LIMITED, a British Company, of Broadway Buildings, Broadway, Westminster, London, S.W.1, do hereby declare the nature of this invention to be as follows:—

In certain chemical operations it is necessary to heat gases under high pressure containing hydrogen and/or carbon monoxide, for example, in the industrial synthesis of ammonia or methanol, and in the Bergius process of hydrogenation. The principal drawback of the usual methods of heating by means of heat exchangers consists in a liability of the apparatus to be attacked by the hydrogen and/or carbon monoxide, so that hitherto it has been proposed to make the apparatus, or line it with, specially resistant material with a view to avoiding corrosion by the gases. Such remedies, however, besides being troublesome to carry into effect are expensive, and a simple and economical alternative method of heating such gases would be a boon to the industries concerned. The present invention provides such a method, and consists essentially in heating hydrogen

and/or carbon monoxide-containing gases under pressure by causing them to bubble through a bath of molten metal or alloy, e.g. lead, which is chemically inert to the gases. It is essential that the gas in passing through the molten metal should not come into contact with the pressure-resisting walls of the high-pressure vessel, as otherwise the object of the invention would be defeated. A convenient means of ensuring that the gas does not reach the pressure-resisting walls consists in arranging a baffle-plate in the bath of metal so as to shield the walls of the vessel from the gas and leave a protective layer of molten metal in contact with the walls. The baffle-plate then does not require to withstand any pressure and can be made quite thin. The bath of metal may be kept at the required high temperature, e.g. 400—500° C, by external heating or in any other suitable way, e.g. by electrical induction heating as in certain steel-making furnaces.

We do not broadly claim the heating of materials by molten metal.

Dated this 11th day of May, 1928.

W. P. THOMPSON & Co.,  
12, Church Street, Liverpool.

Chartered & Registered Patent Agents.

COMPLETE SPECIFICATION.

Improvements in Heating Hydrogen or Carbon Monoxide or Gases Containing these Substances Under High Pressure.

We, KENNETH GORDON, a British Subject, of Norton Hall, The Green, Norton-on-Tees, County Durham, and IMPERIAL CHEMICAL INDUSTRIES LIMITED, a British Company, of Imperial Chemical House, Millbank, London, S.W. 1, formerly of Broadway Buildings, 50—60, Broadway, Westminster, London, S.W.1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

In certain chemical operations it is

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necessary to heat gases under high pressure containing hydrogen and/or carbon monoxide, for example, in the industrial synthesis of ammonia or methanol, and in the Bergius process of hydrogenation. The principal drawback of the usual methods of heating by means of heat exchangers consists in a liability of the apparatus to be attacked by the hydrogen and/or carbon monoxide, so that hitherto it has been proposed to make the apparatus, or line it with, specially resistant material with a view to avoiding corrosion by the gases. Such remedies,

however, besides being troublesome to carry into effect are expensive, and a simple and economical alternative method of heating such gases would be a boon to the industries concerned. The present invention provides such a method, and consists essentially in heating hydrogen and/or carbon monoxide-containing gases under pressure by causing them to bubble through a bath of molten metal or alloy, e.g. lead, which is chemically inert to the gases. It is essential that the gas in passing through the molten metal should not come into contact with the pressure-resisting walls of the high-pressure vessel, as otherwise the object of the invention would be defeated. A convenient means of ensuring that the gas does not reach the pressure-resisting walls consist in arranging a baffle-plate in the bath of metal so as to shield the walls of the vessel from the gas and leave a protective layer of molten metal in contact with the walls. The baffle-plate then does not require to withstand any pressure and can be made quite thin. The bath of metal may be kept at the required high temperature, e.g. 400—500° C, by external heating or in any other suitable way.

The invention is illustrated in the accompanying drawing.

1 is a high pressure vessel, having a

cover 2 held in position by studs 3. 4 is the baffle which extends nearly to the bottom of the vessel 1 and dips into the molten metal 5. The gas enters by pipe 6 and leaves at 7. The baffle is provided at its upper end with a screwed-in plate 8 which prevents any gas coming into contact with the pressure resisting walls of the vessel.

We do not broadly claim the heating of gases by means of molten metal.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Method of heating gases under high pressure containing hydrogen and/or carbon monoxide which consists in bringing the gases into contact with molten metal or alloy which is inert to the gases so that the gases do not come into contact with the pressure resisting walls of the apparatus.

2. Method as claimed in Claim 1 in which a baffle plate is arranged in the bath of metal so as to prevent the gas coming into contact with the walls.

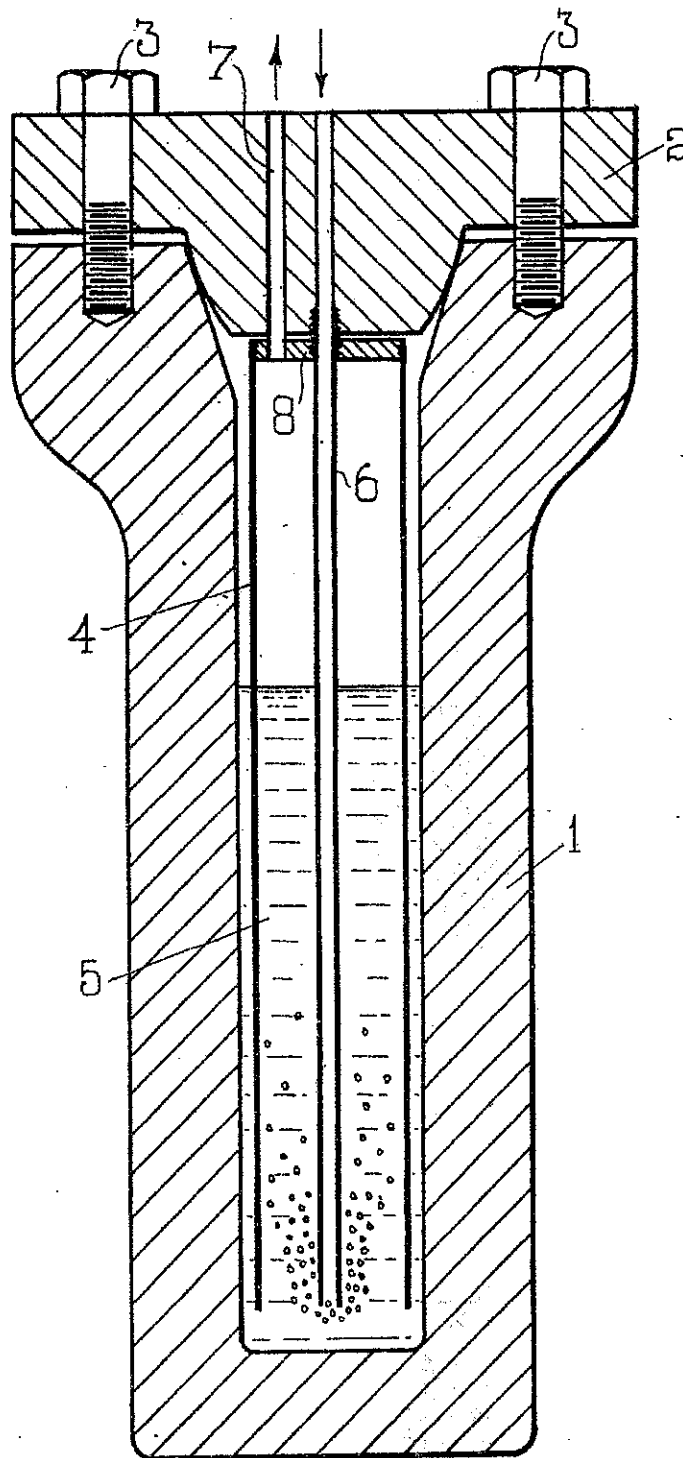
Dated this 9th day of February, 1929.

W. P. THOMPSON & Co.,

12, Church Street, Liverpool.

Chartered & Registered Patent Agents.

2nd Edition



[This Drawing is a reproduction of the Original on a reduced scale.]