

PATENT SPECIFICATION

343.160

Convention Date (Germany): Nov. 15, 1928.

Application Date (in United Kingdom): Nov. 15, 1929. No. 34,993/29:

Complete Accepted: Feb. 16, 1931.

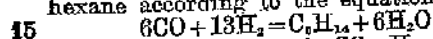
COMPLETE SPECIFICATION.

Improved Process for the Production of a Mixed Gas Containing Carbon Monoxide and Hydrogen.



We, GUTERHOFFNUNGSHÜTTE OBERHAUSEN
AKTIENGESELLSCHAFT, of Oberhausen,
Rheinland, Germany, a German Com-
pany, 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:—

The proportion of carbon monoxide and
hydrogen such as is formed in the produc-
tion of water gas is not convenient for all
purposes of application. For example, if
the gas is to be used for the synthesis of
hexane according to the equation



the volume ratio of CO : H₂ must be
approximately 1 : 2, whereas actually it is
about 1 : 1.

In the process according to the present
invention, mixed gases are produced
which consist substantially of carbon
monoxide and hydrogen, one having to a
very large extent however the power of
varying the quantity ratio of the two gases
during the production.

If, for example, electric currents of
very high frequency (above 50,000
cycles/sec.) and high tension (e.g. above
30,000 volts) are passed through a column
of coke or other carbonaceous material
inserted between the poles of a high fre-
quency-current generator so that luminous
discharges are also formed thereby, and
water or water vapour is allowed to stream
through the coke at the same time, then
the coke or other material, acting as resist-
ance to the current, warms up and a com-
bustible gas mixture is formed. The
latter had, for example, the following
composition:

	A	B	C
CO ₂	12.0%	7.8%	9.2%
C _n H _m	1.2	0.1	1.1
O ₂	0.0	0.6	3.4
CO	19.6	30.2	28.0
H ₂	56.0	53.8	55.0
CH ₄	7.5	0.6	1.7
N ₂	3.7	6.9	3.5

These gas mixtures were obtained at the
following voltages and frequencies:
A, 60,000 volts and 150,000 periods;
B, 80,000 volts and 300,000 periods;
C, 80,000 volts and 400,000 periods; the

current strength, of course, was extremely
small and scarcely measureable.

As these examples show it is possible
substantially to vary the composition of
the gas which is formed. This is attained
by effecting variations in the frequency
and tension of the current and in the
streaming velocity of the water or water
vapour. This is of importance, for
example, for the technique of the synthesis
of benzene from carbon monoxide and
hydrogen. Since in the gas C of the above
table, for instance, the ratio of CO : H₂
is equal to 1 : 2, the two reactants are
obtained forthwith in a stoichiometric
ratio advantageous for the synthesis.

Of course, a gas mixture corresponding
to the normal water gas may also be pro-
duced.

The process herein described may be
carried out uninterruptedly.

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

1. Process for producing a mixed gas
containing carbon monoxide and hydrogen
from coke or other carbonaceous sub-
stances and water or water vapour, char-
acterised by the feature that the mixed
gas is produced by subjecting a column
of the carbonaceous material to luminous
discharges in an electric field produced
between the poles of a generator of high
frequency current of high tension.

2. Process as claimed in claim 1, char-
acterised by the feature that the com-
position of the mixed gas which is formed,
more particularly with respect to the con-
tent in carbon monoxide and hydrogen is
varied by varying the frequency, tension,
and streaming velocity of the water or
water vapour.

3. The improved process for producing
a mixed gas containing carbon monoxide
and hydrogen, substantially as herebefore
described.

Dated this 15th day of November, 1929.

MARKS & CLERK.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1931
[Price 1/-]