

PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in the Synthesis, Distillation, Cracking, and Hydrogenation of Hydrocarbon Oils.

I, JOSEPH TRAUTMANN, of 33, Halske-
strasse, Berlin-Südende, Germany, of
German nationality, do hereby declare the
nature of this invention and in what
5 manner the same is to be performed, to
be particularly described and ascertained
in and by the following statement:—

The present invention relates to the
synthesis, distillation, cracking, and
10 hydrogenation of hydrocarbon oils, and
more particularly to a method of improv-
ing the quality of the resulting fuel, and
it involves the manner of application of
the heat necessary for the treatment.

15 According to the invention the heat is
transmitted rapidly and the operations
intensified by using metal in finely
divided condition as the heat conveyor,
and spraying it into the reaction chamber
20 either in powdered form, or as liquid or
vapour.

In the application of the heat in this
manner other conditions may be taken
into consideration which arise in the
25 synthesis, distillation, cracking and
hydrogenation of hydrocarbon oils.

In similar operations it is known to
force the raw material through a bath of
liquid metal which is externally heated.
30 In that case, however, the surfaces of
contact between the ascending gas bubbles
and the metal bath are comparatively
small and are further reduced, in that the
gas bubbles tend to combine to form
35 larger bubbles.

According to the invention the surface
of contact between the hot metal and the
substances undergoing reaction is
enlarged to the largest possible degree, so
40 that the admixture, transmission of heat,
intensification of the operations, and the
catalytic action are all simultaneously
improved to the greatest possible extent.

The atomization of the liquid metal or
45 the distribution of the powdered metal is
effected, for instance, by spraying nozzles
of any suitable form; furthermore, gase-
ous substances may be employed as car-
rier gas or spraying gas for assisting
50 atomization. Moreover, the metal may be
injected through nozzles in gaseous condi-
tion.

The heat which is necessary for carry-
[Price 1s.]

ing out the desired physical or chemical
processes is introduced completely or 55
partly by means of the injected metal.
It will be understood that it is also
possible to introduce heat in known
manner, for instance, by gas heating or
electrical heating, or to heat the raw 60
material to be treated before its entry into
the reaction chamber.

The method of transmitting heat
according to the invention by means of
metals in solid, liquid, or gaseous and, 65
in all cases, finely divided condition can
be employed for purely physical processes
that require the introduction of heat, also
for chemical processes which are carried
out while heat is being introduced, and if 70
necessary, by the use of a catalyst. One
example is the distillation of oils in which
the heat necessary can be introduced by
the injection, in the form of spray, of
heated metal, such for example, as lead, 75
tin or copper. The metal may be sup-
plied in the form of powder or in liquid
form, or it may be in fine drops, or as jets
of vapour. In introducing powdered 80
metal a jet of gas is advantageously
employed as the carrying medium for the
powdered metal. The liquid may be
injected either with a carrier gas or alone.

An example of a process in which,
according to the invention, heat is sup- 85
plied through hot metal is presented by
the hydrogenation of hydrocarbon oils,
and in this case tin is advantageously
used as the heat carrying medium. A
further instance of a chemical process 90
according to the invention is the cracking
of hydrocarbon compounds in which tin
may be employed for transmitting the
heat.

The intimate admixture and contact of 95
the injected metals with the reaction
substances may be secured by the use of
concentric tubes or nozzles, the reaction
substances being fed in advantageously
through the centre opening and the 100
atomized, sprayed or injected metal being
fed advantageously through the annular
space. Co-axial tubes or nozzles may be
adjustably disposed opposite to one
another for influencing the dimensions 105
and formation of the jet. Good results

may be secured by the use of a plurality of nozzles, which are adjustable with respect to each other in the reaction chamber in such manner that the jets 5 impinge upon one another and become intimately mixed together.

In addition to the reaction substances, and the hot metal, special catalysers may be introduced into the reaction chamber, if necessary in finely divided condition. 10 Thus, in the treatment of oil, tin in molten condition may be used for the supply of heat, and powdered nickel may be used as the special catalyser, the nickel 15 being fed simultaneously with the tin into the reaction chamber.

It may be desirable in the application of the invention, in certain circumstances, to maintain the reaction chamber under pressure. This may be effected by pump- 20 ing the reaction substances into the reaction chamber under a high pressure, in which case the metal used for supplying the heat, for example, molten tin, must 25 be fed into the reaction chamber at a correspondingly high pressure.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is 30 to be performed, I declare that what I claim is:—

1. A method for effecting the synthesis, distillation, cracking and hydrogenation of hydrocarbon oils, characterised in that 35 the substances to be treated are supplied with the necessary heat for treatment from previously heated metal, which is sprayed into the reaction chamber in the form of powder, liquid or vapour in such 40 manner that extremely fine distribution of the atomised metal is secured in the reaction chamber and also a large surface of contact between the metal and the sub- 45 stances to be heated, substantially as hereinbefore described.

2. A method as specified in Claim 1,

in which, in addition to the reaction substances and the hot metal, special catalysers are introduced into the reaction chamber, if necessary in finely divided condition, substantially as hereinbefore 50 described.

3. A method as specified in any of the preceding claims, in which the liquid or gaseous metal is atomized through a nozzle or the like, the reaction substances them- 55 selves being used, if desired, to assist in the atomization, substantially as hereinbefore described.

4. A method as specified in any of the preceding claims, in which the reaction substances and the liquid or gaseous metal are fed into the reaction chamber through 60 concentric adjustable nozzles or the like, substantially as hereinbefore described.

5. A method as specified in any of the preceding claims in which the nozzles are so arranged that the various reaction sub- 65 stances or catalysers fed in are as thoroughly mixed together as possible on leaving the nozzles, substantially as hereinbefore described.

6. A method as specified in any of the preceding claims, in which the reaction substances or the liquid or gaseous metal or catalyser are fed through a plurality of 70 nozzles which nozzles can be so adjusted that the single jets impinge against one another and mix thoroughly together, substantially as hereinbefore described.

7. A method as specified in any of the preceding claims, in which the reaction chamber is maintained under pressure, 75 substantially as hereinbefore described.

8. A method of carrying out the synthesis, distillation, cracking and hydrogenation of hydrocarbon oils, sub- 80 stantially as hereinbefore described.

Dated this 20th day of November, 1926.

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