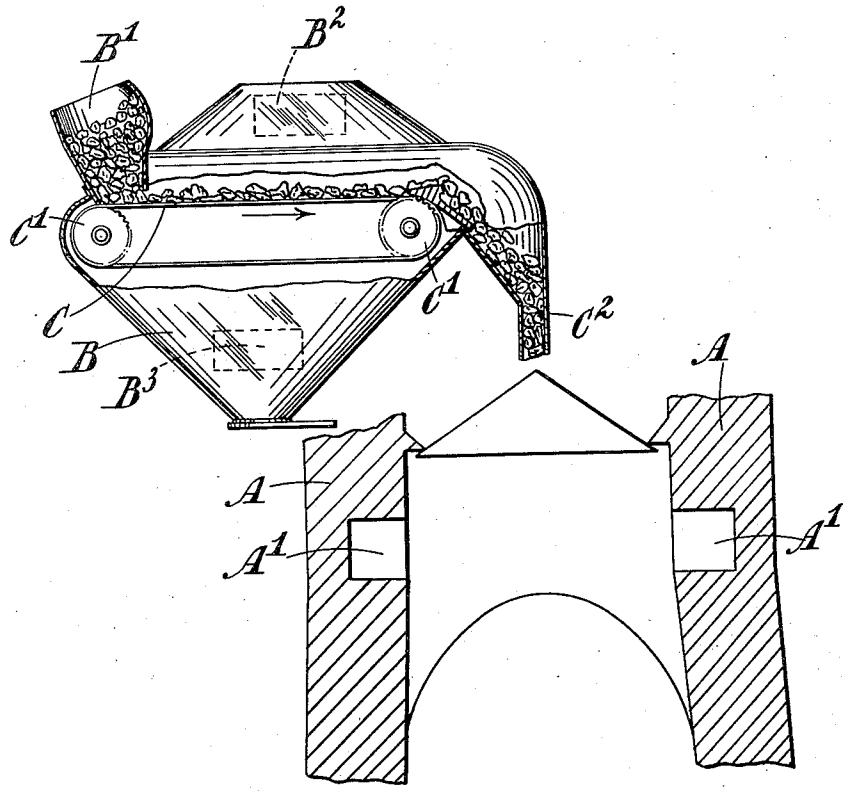
A. C. MICHIE AND E. G. WEEKS.

LOW TEMPERATURE DISTILLATION.

APPLICATION FILED NOV. 12, 1919.

1,423,134. Patented July 18, 1922.



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ARTHUR CUMMING MICHIE, OF NEWCASTLE-UPON-TYNE, AND EDMUND GEORGE WEEKS, OF NORTHUMBERLAND, ENGLAND, ASSIGNORS TO CHARLES HESTERMAN MERZ AND WILLIAM McLELLAN, BOTH OF WESTMINSTER, LONDON, ENGLAND.

LOW-TEMPERATURE DISTILLATION.

1,423,134. Specification of Letters Patent. Patented July 18, 1922.

Application filed November 12, 1919. Serial No. 337,573.

To all whom it may concern:

Be it known that we, ARTHUR CUMMING MICHIE and EDMUND GEORGE WEEKS, both subjects of the King of England, residing, respectively, at Jesmond, Newcastle-upon-Tyne, England, and Monkseaton, Northumberland, England, have invented certain new and useful Improvements in Low-Temperature Distillation, of which the following is a specification.

This invention is for improvements in or relating to low-temperature distillation of fuel, and has for its object to provide a process whereby such distillation can be carried out more efficiently than has heretofore been possible while securing the advantages of continuous working both as to fuel feed and distillation.

The process to which this invention relates is that in which fuel, for example coal, is distilled by passing superheated steam or other hot gases through the fuel, the temperature of these gases being comparatively low, say, for example, 500° C. In carrying out such a process continuously it is necessary to feed the retort with successive charges of fresh fuel while distillation is taking place, and in all such cases it has been found in practice that a binding together of the fuel occurs which prevents the proper passage of the gases through the fuel, and the retort tends to become blocked up.

The present inventors have found by experiment that this sticking is due to the condensation of a portion of the products of distillation on the surface of the cold fuel, which produces a semi-plastic "pudding-like" mass, and that by taking suitable precautions to prevent the contact of distillation products with fuel at a temperature below the temperature of condensation of the distillate, this action can be prevented and the yield of oils increased.

According to the present invention, in the process for the continuous low-temperature distillation of fuel by the passage of superheated steam or hot gases through it (without external heat) wherein during the process of distillation fresh charges of fuel are admitted into the retort, there is provided means for heating each charge of incoming fuel, before it is fed to the retort, to a temperature above the temperature of condensation of the distillate but not high enough to cause any appreciable decomposition of the fuel. The fuel is heated prior to its entering the retort, by waste steam or other heat-containing gases which are at such a temperature as to be incapable of raising the fuel to such a temperature as would cause any appreciable decomposition. Thus the apparatus is provided with a preheating chamber in which the coal or other fuel is heated by steam, hot producer-gas, or hot waste gases, such as boiler-flue gases, being passed through it, the temperature of such gases being high enough to raise the temperature of the fuel sufficiently to prevent the condensation of the oils in the retort when the said fuel is fed from the preheating chamber into the retort. It will be appreciated that this preheating may be effected by gases whose heat has hitherto been lost, and thus the efficiency of the whole plant is increased and a larger delivery of oils from a given quantity of fuel is effected. It is known that in low-temperature distillation processes of the present type, which are generally conducted at temperatures ranging from approximately 400–600° C., the temperatures at which the products of distillation would condense are in the majority of cases, somewhere in the region below 150° C., although the temperature of condensation will vary somewhat, as is well-known, according to the type of fuel undergoing treatment. Broadly speaking, therefore, the temperature to which preheating is to be carried should be approximately 150° C., or above and generally should not exceed 250° C.

Those skilled in the art of low-temperature distillation will thoroughly appreciate that the temperatures above referred to are approximate, but are close to the actual temperature which will have to be practised with, for example, medium grades of slack coal and for practical purposes if the preheating temperature be in the region of from 150° C. to 250° C. the objects of the present invention will be attained.

Hitherto many proposals have been made for the preheating of fuel to be fed to retorts. Thus it has frequently been suggested to preheat fuel before it is fed to high-temperature distillation retorts, but the present invention, however, deals only with

a specific difficulty which arises in connection with low-temperature distillation by passing hot gases through the fuel—a difficulty which does not arise in high-temperature distillation, and this invention does not include any high-temperature distillation system.

The invention will be more clearly understood from the following description taken in connection with the accompanying drawing which illustrates, partly in section, one form of apparatus for carrying the invention into effect:—

The upper end only of retort A is illustrated, and constructed conveniently in relation to the retort is a preheater, designated as a whole by the reference letter B. The preheater may be of any convenient construction, and preferably comprises an outer casing in which is an endless band C mounted on rollers C^1. At one end of the upper surface of the band, and projecting through the casing B is a hopper B^1 which supplies coal to the surface of the band, and by which it is carried in the direction of the arrow towards an outlet C^3 from which it is discharged on to the feeding cone of the retort A. The preheater is heated with gases which may be steam or waste furnace or other hot gases which enter the casing B through the port B^2 and are removed therefrom through a port B^3.

Thus the fuel in its passage through the preheater B becomes heated to a temperature which prevents the condensation on it of the products of distillation which it meets on entering the retort A, the said products being conveniently removed through a duct A^1 in connection with any convenient form of extractor apparatus located outside the retort.

What we claim as our invention and desire to secure by Letters Patent is:—

1. The process of continuously distilling fuel, which consists in passing a heating medium through a body of such fuel, providing fresh charges of fuel separate from the said body of fuel, heating said charges to a temperature above the temperature of condensation of the distillate but below a temperature that will effect appreciable decomposition of the fuel, and delivering the said charges while so heated to the body of fuel that is subjected to the heating medium.

2. The process of continuously distilling fuel which consists in passing a heating medium through a body of said fuel, providing fresh charges of fuel separate from the said body of fuel, passing a heating medium through the charges and raising the temperature thereof above the temperature of condensation of the distillate but below a temperature that will effect appreciable decomposition of the fuel, and delivering the said charges while so heated to the body of fuel.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ARTHUR CUMMING MICHIE.
EDMUND GEORGE WEEKS.

Witnesses:
J. W. Mono,
Evelyn Urquhart.