PROCESS OF SUBTERRANEAN DISTILLATION OF VOLATILE MINERAL SUBSTANCES

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INVENTOR.

Cornelius Clark

BY

ATTORNEY
To all whom it may concern:

Be it known that I, Cornelius Clark, a citizen of the United States, residing at Lodi, county of San Joaquin, State of California, have invented certain new and useful Improvements in Processes of Subterranean Distillation of Volatile Mineral Substances; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to the destructive distillation by heat of volatile mineral substances, particularly such substances as are classed under the general head of carbohydrates, the distilling whereof, as is well known, being for the purpose of freeing the volatile substances from which gasoline, benzine, kerosene and other useful liquids are ultimately obtained.

I have in mind a process particularly intended and adapted for use in connection with what is known as oil shale deposits, which contain a good percentage of the above named products, the principal object of my invention being to provide a process by means of which the shale may be decomposed and the volatile substances therein freed without the necessity of first mining or removing the shale from the earth. In other words, I distill the substances from the shale directly from the beds or deposits of the latter where found, using the earth or surrounding substance as a retort or crucible in which the distillation is carried on.

Other than the obvious necessity of sinking a bore from the surface of the earth to and into the deposit to be worked, my process embodies no expense of mining operations, since as above stated, the deposit, other than that removed when sinking the bore, is left where it lies underground, and serves as the walls of the natural retort thus formed.

Since the cost of operation of distillation itself with my process is no more than that incurred with the usual form of distillation, I am firmly of the belief that with its use, deposits the cost of mining or extraction of which precludes competition with other sources of supply at present, may be successfully worked and the volatile substances thereof extracted at a cost enabling competition to be met and with a profit to the operators.

To more readily explain the process, I refer to the accompanying drawing, which shows, more or less diagrammatically, the application of the process to an underground bed of a mineral substance having the required properties, such as the oil-shale as above stated.

In carrying out the process, a bore 1 of suitable size is first sunk from the surface of the ground to and into the deposit 2 of oil shale or the like.

Electric-current cables 3, thoroughly insulated against heat by a suitable covering 4 of asbestos and the like, are lowered into the bore, and are connected at their lower ends to a bare heating element 5 of suitable construction, said element being of a nature to develop, and be able to withstand, great heat.

The upper end of the bore 1, or at least above the deposit 2, is sealed as at 6 so as to develop, and be able to withstand, great heat.

Another pipe 8 leads from the bore to the outside thereof, having branches 9 if desired leading to individual receiving tanks 10 from which air is excluded, shut-off valves 11 being interposed in the branches so as to control the flow to the different tanks, and to enable one such tank if desired receiving the flow of liberated gas of one certain density, while the other tank may then receive only gas of different density, since gases of different densities are liberated with different degrees of heat.

Any suitable condensing apparatus—not shown—would preferably be included in the surface system, either ahead of or beyond the receiving tanks, so as to reduce the gases to the liquid state in which they are ordinarily marketed and used.

It will therefore be evident that a retort for the destructive distillation of the deposit 2 is formed in the bowels of the earth.
by the deposit itself or its surrounding materials.

The heat generated by the element 5 acts on the deposit to liberate the volatile gases therein, which having no other outlet than the pipe 8 pass into the latter. As the process is continued and the material lining the bore becomes highly heated, said material after giving off its volatile constituents, becomes calcined and crumbles away, being greatly reduced in bulk or volume, and falling to the bottom of the bore. Fresh material is then exposed to the action of the heat, and this material in turn shrinks in bulk and falls away.

This action is gradual and continuous, resulting finally in an enlarged cavity being formed at the bottom of the bore, and the process may thus be carried on indefinitely with the one bore as an outlet or until the deposit is exhausted, which will of course be evident to and noted by those on the surface from the quantity of gas passing into the pipe 8.

While as before stated, I have particularly in mind to apply this process to oil-shale deposits, I believe it may be used with success in the distillation or liberation of volatile gases from the oil of wells which are no longer flowing, thereby eliminating the necessity of installing expensive outfits to bring the oil to the surface for distillation.

It will therefore be seen that I have produced a process which substantially fulfills the objects of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. A process for the destructive distillation of volatile mineral substances consisting essentially in sinking a bore into a deposit of such substance providing a source of heat in said bore in the plane of the substance, sealing the bore above said source providing an outlet past the seal for the escape of gases from the substance, air being excluded from admission to said outlet, and providing means for removing or neutralizing the oxygen initially in the bore after the seal is placed and prior to the operation of the heat means.

2. A process for the destructive distillation of volatile mineral substances consisting essentially in sinking a bore into a deposit of such substance, providing a source of heat in said bore in the plane of the substance, sealing the bore above said source, providing an outlet past the seal for the escape of gases from the substance, air being excluded from admission to said outlet, and providing a pipe leading past the seal into the bore whereby the air initially therein may be removed and a gas free of oxygen admitted thereto.

In testimony whereof I affix my signature.

CORNELIUS CLARK.