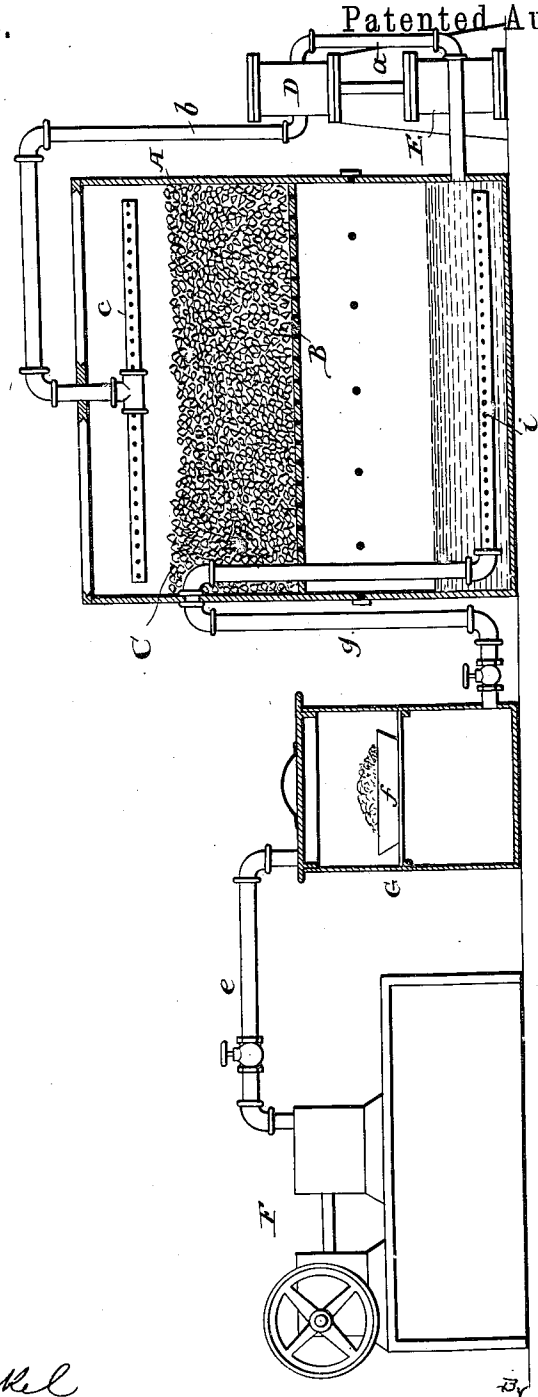
(No Model.)

G. ARCHBOLD.

METHOD OF AND MEANS FOR EXTRACTING HYDROCARBONS FROM BITUMINOUS ROCKS.

No. 503,028. Patented Aug. 8, 1893.



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METHOD OF AND MEANS FOR EXTRACTING HYDROCARBONS FROM BITUMINOUS ROCKS.

SPECIFICATION forming part of Letters Patent No. 503,028, dated August 8, 1893.

Application filed March 25, 1892. Serial No. 426,439. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ARCHBOLD, a citizen of the United States, and a resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Methods of and Means for Extracting Hydro-carbons from Bituminous Rocks, of which the following is a specification.

It has been found desirable for the production of artificial india-rubber and for other purposes to separate the ingredients or constituents of a grayish rock, which is found in abundance in the State of Texas, and which consists generally of lime and silica and mineral hydro-carbon, the object in separating the ingredients being to secure the hydro-carbon in a mass separate from the lime and silica, the said hydro-carbon when separated being in a spongy condition in which it has received the name of "terrelite."

The object of my invention is to separate the terrelite from the other constituents of the rock rapidly and at a small expense and to this end I make use of the process fully set forth hereinafter and preferably of the apparatus illustrated in the accompanying drawing, which shows the same in part sectional elevation. I have discovered that when the said grayish rock hereinafter termed bituminous rock is subjected to the action of sulphurous acid, either as gas or a liquid the chalky and silicious portions will be rapidly dissolved leaving the hydro-carbon or terrelite in a spongy condition.

Different means may be employed for facilitating the application of the sulphurous acid to the bituminous rock. Thus, I make use of a water pipe tank or receptacle A, having a grate or partition B, upon which the rock is deposited in a mass C, preferably in lumps of about three or four inches in thickness affording ample interstices for the passage of the acid, and I make use of a pump D, driven by a motor E of any suitable character with pipes *a*, *b*, through which the acid is drawn from the bottom of the tank and thrown upward to the top of the tank or conveyed to a suitable distributer *c*, consisting of a perforated pipe discharging the acid in small streams on the mass of rock. Any other suitable form of distributer and elevating apparatus may be employed.

In order to manufacture the sulphurous acid rapidly and economically and further to secure the same in both a gaseous and liquid condition, I pass a current of air over burning sulphur and then into a perforated pipe lying in a body of water at the bottom of the receptacle A. As it would take twenty-four hours to burn a cubic foot of sulphur in the open air I expedite the combustion by making use of compressed air a current of air at sixty pounds pressure insuring the combustion of a cubic foot of sulphur in six hours. Thus, I conduct the air from a pump F through a pipe *e*, to an air-tight reservoir or casing G, in which is arranged a pan *f*, containing the sulphur to be burned and I so restrict the outlet as to secure the desired pressure in the tank G and I connect the latter through the medium of a pipe *g*, with a perforated pipe *i*, extending along the bottom of the tank A, and the air forced by the pump F, into the tank G, takes up the fumes of the sulphur burning in the said tank and conducts the same to the water in the tank A, which combines with the sulphur forming sulphurous acid in the liquid state while sufficient air is permitted through openings *x*, into the tank A to combine with the sulphur if that forced by the pump is not sufficient to form sulphurous acid in a gaseous condition, so that sulphurous acid gas flows upward through the mass of rock while the liquid sulphurous acid flows downward over the rock which is thereby speedily disintegrated. The acid of course combines with the earthy matters of the rock and after the water in the tank A becomes saturated with sulphites of said earthy matters in solution the solution is withdrawn and replaced by fresh water and if desired the same may be subsequently treated to separate the ingredients, while the terrelite is withdrawn to give place to an additional charge of bituminous rock.

I am aware that it has been proposed to use naphtha for the purpose of dissolving out bitumen or hydro-carbon substances from minerals, and subsequently separating the bitumen or hydro-carbon from the naphtha in

which it is held in solution by treating it with steam which carries off the naphtha. But the action of the steam results in carrying off along with the naphtha the volatile oils of the hydro-carbons which are thereby lost. My process differs from this process just referred to in that I employ an acid which does not drive off or effect the volatile oils but extracts the earthy matters only, leaving the hydro-carbon in a plastic condition resulting from the retention of the volatile oils.

Without limiting myself to the use of the apparatus constructed as shown, I claim as my invention—

1. The within described method of separating earthy matters from the hydro-carbons in bituminous rock the same consisting in subjecting a mass of said rock to the action of sulphurous acid, substantially as set forth.

2. In the treatment of bituminous rock which separates the earthy matters and the hydro-carbons, subjecting a mass of said rock to the action of sulphurous acid in both a liquid and gaseous condition, substantially as set forth.

3. The combination of a tank having a support for bituminous rock, a pump and pipe arranged to pump sulphurous acid onto the rock from a position below said support, means for generating sulphurous acid gas and for conducting the same to a body of water below said support, substantially as set forth.

4. The combination with the tank supporting a mass of bituminous rock a receptacle for water below said mass and a pump for pumping the liquid from the receptacle to the top of the mass, a casing G with a support for burning sulphur and a pipe connecting said casing with the water receptacle, and means for pumping the air under pressure into the casing, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE ARCHBOLD.

Witnesses:
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