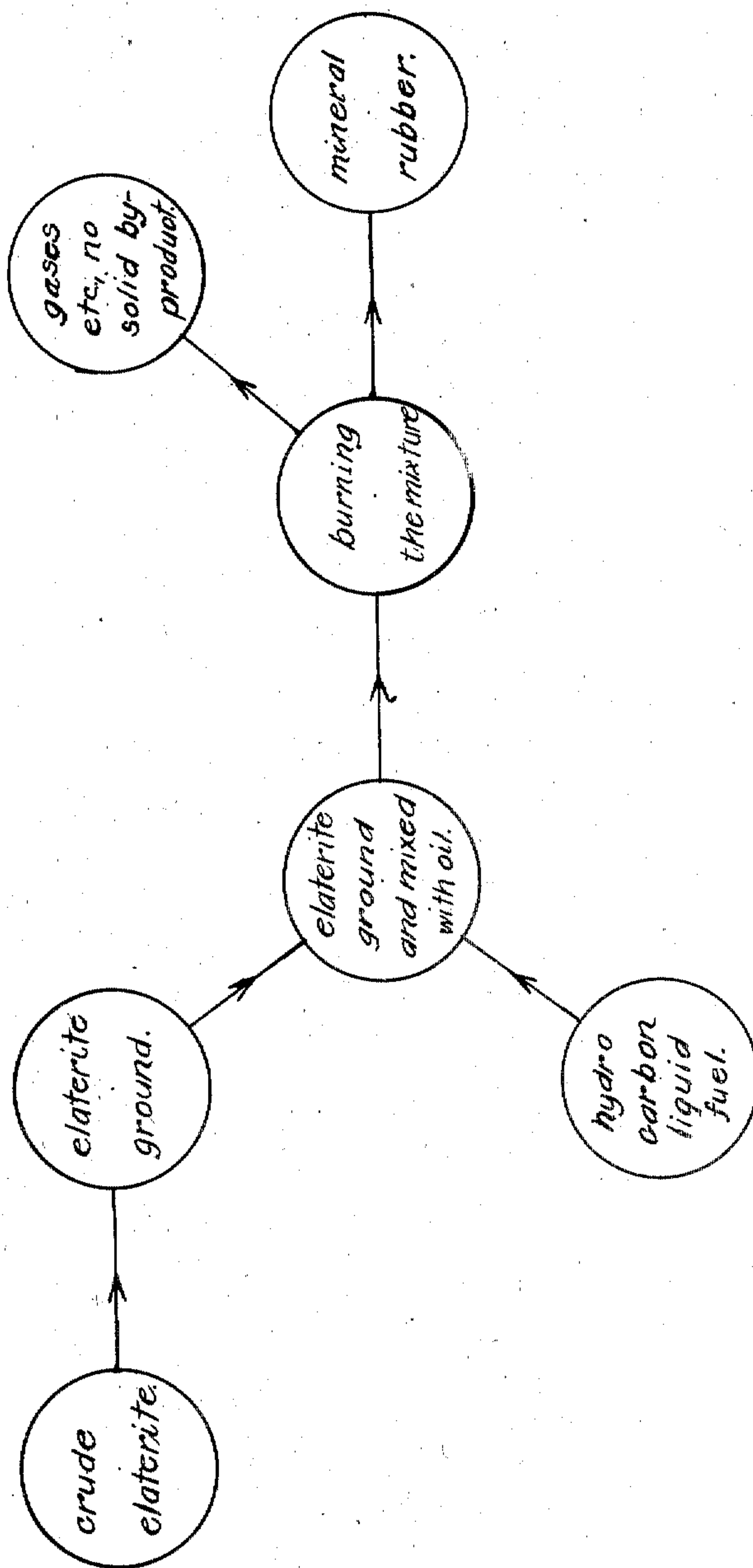


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PROCESS OF TREATING ELATERITE.  
APPLICATION FILED MAR. 30, 1908.

984,240.

Patented Feb. 14, 1911.



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# UNITED STATES PATENT OFFICE.

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## PROCESS OF TREATING ELATERITE.

984,240.

Specification of Letters Patent. Patented Feb. 14, 1911.

Application filed March 30, 1908. Serial No. 424,042.

*To all whom it may concern:*

Be it known that I, JAMES C. ROSS, a citizen of the United States of America, and resident of Colorado Springs, El Paso county, Colorado, have invented a certain new and useful Improvement in Processes of Treating Elaterite, of which the following is a specification.

In the refinement of elaterite and similar mineral deposits, preparatory to using the same as a substitute for ordinary rubber, it has heretofore been customary, so far as I am aware, to subject the elaterite to the distilling action of a retort or other receptacle in which the same can be heated for the purpose of gasifying and thereby driving off the impurities. A product thus obtained has been employed in many ways as a substitute for rubber vulcanite, and also for soft rubber, said product possessing considerable elasticity and resiliency when mixed with sulfur and vulcanized in the ordinary way. Furthermore, it has proved to be of exceptional value in the electrical arts, as a substitute for the ordinary rubber or fiber insulation, insulations made from refined or properly treated elaterite being practically fire and water proof. The process of obtaining this product by refinement of the elaterite in a retort or other receptacle has, however, been found to be more or less expensive, and in some ways at least not always productive of good results.

After an extended investigation, and after considerable laboratory and experimental work, I have discovered a new process of extracting or manufacturing product from elaterite. In practicing my improved process, I first take the crude elaterite and grind it and pulverize it or reduce it to comminuted form, in any suitable manner. The elaterite thus prepared is then mixed with a suitable quantity of hydrocarbon or other liquid fuel, and the mixture placed on or in a suitable support. The highly combustible preparation thus formed is then ignited and allowed to burn in a natural manner until the fire goes out and combustion ceases. As soon as this has been done, it will then be found that all of the undesirable elements have been consumed and driven off, leaving only the product in a melted or viscous or semi-viscous condition. During the burning operation no forcing of the combustion is necessary, as the elements and properties which are to be driven off are of such character

that they burn readily under ordinary and natural conditions, and are adapted to support combustion without any artificial conditions. In other words, it is simply necessary to ignite the mass or mixture, and the same then burns naturally and of its own accord until everything combustible in the elaterite has been driven off, leaving only the desired product. The elaterite will, I find, burn alone and without the admixture of hydrocarbon or other liquid fuel, but for the purpose of facilitating combustion, I prefer to practice the process commercially by using a liquid fuel that will readily ignite. As a result of the burning operation, only the product is left, there being practically no other solid matter or by-product, everything else having been consumed to support or aid combustion.

It will be seen, therefore, that my invention is based upon the discovery that the burning of elaterite will not burn or consume the desired product contained therein—that is to say, is based upon the discovery that the product does not burn or ignite or suffer deterioration by direct contact with fire or combustion at a temperature at which the undesirable elements of the elaterite will readily ignite and burn and be driven off by combustion in the open air. It will be seen that such a process is entirely different from the ordinary process of distillation, through the medium of a retort or still, such as those heretofore employed for refining elaterite. My process is comparatively economical, as well as surprisingly effective, because of the fact that it requires practically no apparatus, it being only necessary to grind or break up the elaterite and mix it with enough liquid fuel to make it ignite readily, and to then burn it off in the open air, or in the combustion chamber of some sort of a stove or furnace.

The accompanying drawing is a diagram illustrating the different steps involved in my improved process of extracting a product from elaterite or other similar mineral deposits.

As previously stated, the elaterite is first ground or broken up, or otherwise reduced to comminuted form by any suitable machinery, or by hand if desired. Next, the elaterite thus pulverized or ground is mixed with petroleum, or any of the derivatives thereof, the quantity of oil or hydrocarbon necessary for this purpose being simply



enough to saturate or wet down the mass of elaterite—that is to say, merely enough to cause the mass to ignite readily and uniformly. The elaterite will burn by itself, and without the admixture of any fuel whatever; but for commercial purposes I prefer to use a fuel which will mix readily with the same, preferably a liquid fuel, as this, I find, gives better results, there being no residue. Dry fuel can be used, but in that case there is a residue; and, furthermore, with a liquid fuel the entire mass ignites at once and burns evenly. The elaterite thus prepared can then be burned in the open air on a table or support, or it can be placed in the combustion chamber of a suitably constructed stove or furnace. During such burning or combustion, the product melts and becomes viscous or semiviscous, but does not burn. All other elements or properties of the elaterite are burned up and consumed, passing off with the smoke and fumes of combustion, so that the product is the only thing left, there being practically no other solid matter or by-products existing at the time that the fire goes out and the combustion ceases for want of combustible fuel. This melted product or residue shows a melting point of about 125° centigrade; that is to say, when small or moderate sized pieces are subjected to ordinary and well known tests for this purpose under atmospheric pressure. The melted product or rubber-like mass can be gathered or discharged from the support on which the elaterite is burned, or can be recovered from the burning mass in any suitable or desired manner. It is then ready for treatment after the fashion of ordinary rubber, being readily susceptible to the ordinary vulcanizing processes, and when thus cured is suitable for use in various ways, such as the manufacture of hard and soft rubber articles. I find also that instead of adding liquid fuel to the ground or comminuted elaterite, the same can be heated or raised to comparatively high temperature, and that it will then ignite readily and burn.

In its broader aspects, it will be seen that my invention relates to many hydrocarbons of a solid or semi-solid nature. I have used my improved process for the purpose of refining elaterite (sometimes called wurtzilite), but it is obvious that the same process may be used for refining or treating similar hydrocarbons. Preferably, as explained, the elaterite, wurtzilite or other crude material is first ground or comminuted or broken up in some suitable manner, so as to reduce it to small pieces, as I find that when allowed to remain in its crude form, or in relatively large pieces, it does not yield readily to the herein-described process, as the liquid fuel used to facilitate the process will not penetrate deeply, and combustion is liable to cease before all of the crude material

has been properly treated. The ground or comminuted material is preferably spread out on a flat surface, and the requisite amount of liquid fuel to be used can be readily determined, and can be varied according to the quality of the material and the particular results desired. For general purposes, and in the treatment of elaterite, or wurtzilite as it is sometimes called, twenty (20) gallons of coal oil can be used to every ton of crude material, and this I find gives very good results. The crude material being thus set on fire will be found to yield very readily and very quickly to the process, which latter, of course, is a progressive one, and where the heat is thus concentrated by direct combustion, the process progresses very rapidly and in a very efficient manner.

When the material is treated by distillation, in the old manner, a much longer period of treatment is necessary, and the temperature must be carefully judged and controlled throughout the period of treatment. My improved process, however, is in one sense self-regulating, as after combustion is once started there is then no further necessity for the exercise of judgment or control on the part of the operator or attendant. After the material is once ignited, it then simply continues to burn until the desired result is obtained, and there is no danger of the combustion taking place too fast or too slow, and no necessity for any attempt to control such combustion. When the material to be treated is elaterite (or wurtzilite) the result or product is quite different from that which is obtained by distillation of the same materials in a retort or other similar apparatus. The product obtained by my improved process, when used for treating elaterite or wurtzilite, is of different chemical composition from that obtained by said process of distillation, being, for example, of much higher fusibility. An elaterite or wurtzilite product produced by my improved process will, I find, when used commercially in small or moderate sized pieces, not flow or yield to any perceptible degree when subjected to atmospheric temperatures of 120° centigrade, that is to say, it remains solid at any temperature lower than this, whereby it is useful in many places and for many purposes where similar products produced by the old processes are not suitable. There are also other ways in which a product produced from elaterite or wurtzilite, by my improved process, as herein described, is quite different in chemical composition from those heretofore produced from the same kinds of crude material.

It will be seen, therefore, that I not only produce a process or method of treatment which is entirely different from anything heretofore proposed for this purpose, but that I also produce a product which is dif-



ferent from those heretofore produced from materials of this kind. Obviously, therefore, and regardless of whether the product is the same or different, my invention contemplates a new and efficient process for treating materials. It also contemplates an elaterite or wurtzilite product which is of different chemical composition than those heretofore produced from such crude material.

What I claim as my invention is:

1. The process of producing a wurtzilite or elaterite product, which consists in grinding or comminuting the crude mineral, adding a liquid fuel thereto, burning the mixture in the open air, so that the atmosphere will have free access to all parts thereof, permitting the fire to progress freely and as rapidly as possible until it goes out of its own accord, leaving the product in a melted condition, and allowing the said product to cool and harden.

2. The process of producing a wurtzilite or elaterite product, which consists in grinding or comminuting the crude mineral, burning said mineral in the open air, so that the atmosphere will have free access to all parts thereof, permitting the fire to progress freely and as rapidly as possible until it goes out of its own accord, leaving the product in a melted condition, and allowing the said product to cool and harden.

3. As an article of manufacture, a solid and coherent material which remains as the final residue from burned elaterite, which residue has a melting point of about 125° centigrade under atmospheric pressures.

Signed by me at Chicago, Illinois, this 10th day of March, 1908.

JAMES C. ROSS.

Witnesses:

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E. H. CLEGG.