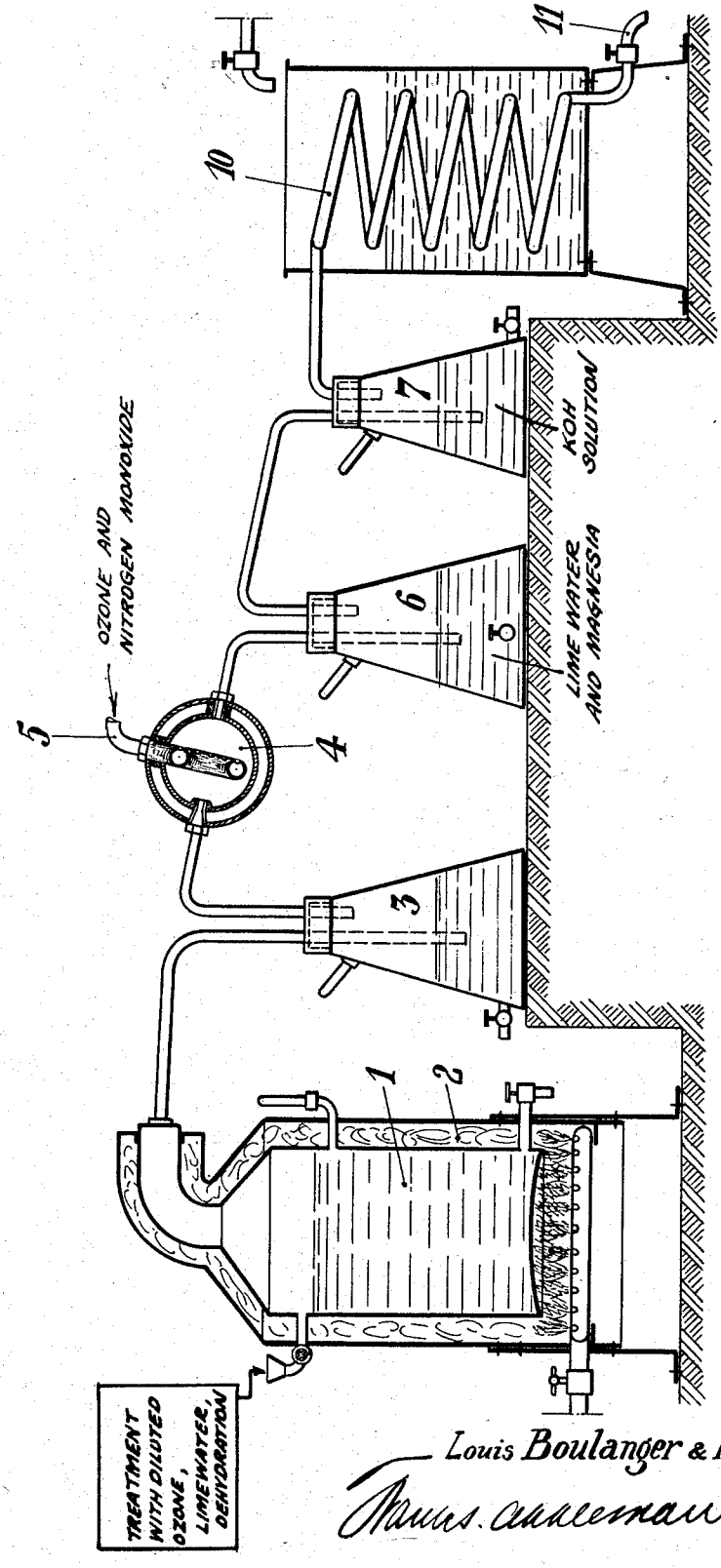
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PROCESS OF CRACKING TAR AND BITUMINOUS SCHIST OILS WITH RECOVERY OF BY-PRODUCTS

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PROCESS OF CRACKING TAR AND BITUMINOUS SCHIST OILS WITH RECOVERY OF BY-PRODUCTS

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This invention has for its object a process for cracking tar and bituminous schist oils, more particularly applicable to the primary oils of low temperature distillation of coal. A further object of this invention is to effect the recovery of the by-products, namely colorless benzol.

According to this invention, the primary oils, or the tar oils, or the bituminous schist oils, are first oxidized, by means of a current of diluted ozone, after which they are washed with lime-water and treated in a hydro-extractor for dehydration. This process of washing the oils avoids the use of acid and the subsequent neutralization which gave uncertain results. The tar or oil is then introduced into a retort 1 (provided with stirrers and baffles) in which the oil is made to boil; the vapor of the tar or oils are overheated at a temperature over 800° C., thereby producing the cracking. The vapors thus decomposed are forced through the first of a series of three receptacles, 3; wherein a first reddish liquid, containing the major portion of the phenols is condensed; the vapors which have not been condensed are led into a second receptacle 4 wherein they are thoroughly stirred by a mixture of ozone and nitrogen monoxide. By this special treatment the sulfur compounds are transformed into soluble sulphates, the remaining phenols are reduced into benzols, and there is production of ammonia. The resultant compounds are subjected in receptacle 6 to the absorption action of a solution of lime water containing magnesia and the ammonia may be absorbed in a solution of diluted sulphuric acid. The vapors then pass through a rectifier 7 containing a solution of potassium hydroxide which absorbs phenols which may still have been carried on, and are led into a refrigerator where the benzol is condensed and collected through a siphon.

The apparatus for carrying out the process according to this invention is illustrated more or less schematically in the appended drawing, wherein certain parts are in section.

1 designates a retort into which the oils and/or tar to be cracked are introduced, after they have been, as above stated, treated by diluted ozone, in the proportion of about 20 gr. of ozone for each ton (metric) of tar, then washed by lime-water and dried in a hydro-extractor.

The bottom of the retort is heated as illustrated and the hot gases travel between the double-walls 2 of the retort, not only to vaporize the tar or oils in the bottom portion of the retort, but also to overheat the vapors of the tar or oils in the top portion of the retort. This overheating reaches 800° C. and more and produces the cracking of the vapors. The retort may be provided inside with stirrers, scrapers and baffles which are not illustrated, as being known per se. The vapors coming out of the retort are led into the receptacle 3 wherein the major portion of the phenols are condensed and therefore separated; the vapors are then led into an aluminum sphere 4, with double walls between which vacuum is produced. In this sphere the vapors, consisting of a mixture of benzol, mercaptans and other sulfur compounds, are thoroughly mixed by jets of a mixture of ozone and nitrogen monoxide. This mixture of ozone and nitrogen monoxide is supplied under a pressure of for instance four atmospheres by a pipe 5. The mercaptans and other sulfide compounds are decomposed, the phenols are reduced and transformed into benzol and the mixture of these products passes into the receptacle 6 which contains lime-water and magnesia for retaining compounds of the character of the oxides of sulfur. From receptacle 6 the vapors, which contain almost exclusively benzol, pass in a further receptacle 7 through a solution of potassium hydroxide which fixes the last traces of phenols which can still be carried away in the benzol. The receptacle 7 is preferably placed in a water-bath containing calcium chloride and maintained by ebullition at a temperature of 105° C. which maintains the vapors of benzol at a temperature of about 80° to 90° C. and allows same to pass but condenses any other vapors. The benzol now rid of the last traces of phenol and other products is finally condensed in a coil condenser 10 and is collected at 11 through a siphon which is not illustrated. The benzol thus obtained, is perfectly white and odorless.

Having now fully described our said invention, what we claim and desire to secure by Letters Patent, is:

1. In a process of cracking tar oils, primary oils of low temperature distillation of coal, or bituminous schist oils, which consists in oxidizing the oils by diluted ozone, washing said oils in lime-water and treating same in a dehydrator, vaporizing said oils in a retort and superheating the resulting vapors at a temperature above 800° C., condensing the major portion of the phenols from the vapors, mixing the vapors thoroughly with ozone and nitrogen monoxide, leading said vapors into lime-water and magnesia, thence through a solution of potassium hydroxide to retain the remaining phenols, and collecting the benzol by condensation.

2. An apparatus for cracking hydro-carbon oils comprising a retort, a partial condenser connected by pipe line to the said retort a double wall sphere adapted to have a vacuum maintained between the double walls attached to said partial condenser and means for injecting under pressure a mixture of ozone and nitrogen monoxide within the inner walls into the central space of said sphere.

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