

UNITED STATES PATENT OFFICE.

JAMES YOUNG, OF MANCHESTER, ENGLAND.

IMPROVEMENT IN MAKING PARAFFINE-OIL.

Specification forming part of Letters Patent No. 8,833, dated March 23, 1852.

To all whom it may concern:

Be it known that I, JAMES YOUNG, of Manchester, England, have invented improvements in the treatment of certain bituminous mineral substances and in obtaining products therefrom; and I do hereby declare the following to be a full, clear, and exact description of the same.

My said invention consists in treating bituminous coals in such manner as to obtain therefrom an oil containing paraffine, (which I call "paraffine-oil,") and from which oil I obtain paraffine. The coals which I deem to be best fitted for this purpose are such as are usually called "parrot-coal," "cannel-coal," and "gas-coal," and which are much used in the manufacture of gas for the purpose of illumination, because they yield upon distillation at a high temperature olefiant and other highly illuminating gases in considerable quantity, and although some coals last described contain a large amount of earthy matters, those matters do not interfere materially with the performance of my process.

To obtain paraffine-oil from coals I proceed as follows: The coals are to be broken into small pieces of about the size of a hen's egg or less for the purpose of facilitating the operation. The coal is then to be put into a common gas-retort, to which is attached a worm-pipe passing through a refrigerator, and kept at a temperature of about 55° of Fahrenheit's thermometer by a stream of cold water. The temperature of the refrigerator should not be made too low, lest the product of the distillation should congeal and stop up the pipe, and I find that a temperature of about 55° Fahrenheit is sufficient. The retort, being closed in the usual manner, is then to be gradually heated up to a low red heat, at which it is to be kept until volatile products cease to come off. Care must be taken to keep the temperature of the retort from rising above that of a low red heat, so as to prevent as much as possible the desired products of the process being converted into permanent gas. The coke or residue may then be withdrawn from the retort, which, being allowed to cool down below a visible red heat, (to prevent waste of the fresh material to be introduced,) may be again charged with a quantity of coals to be treated in like manner, as I have described. The crude paraffine-oil distilled or driven off from the coals as a vapor

will be condensed into a liquid in passing through the cold worm-pipe, from which it will fall into a vessel, which must be provided to receive it.

Instead of obtaining the whole of the paraffine-oil by distillation or driving off, as just described, a portion of it may in some cases, if thought desirable, be run from the retort through an opening and pipe to be provided, in the anterior and lower part of the retort for that purpose after it has separated from the coal and assumed a liquid form. I prefer, however, in every case to distill or drive off the whole of the paraffine-oil to be obtained from the coal.

The production of the desired products from a charge of coals in a retort will be known to be finished by the liquid ceasing to run from the worm. The crude product of this process is an oil containing paraffine, which, as I have already stated, I call "paraffine-oil." This oil will sometimes, upon cooling at a temperature of about 40° Fahrenheit, deposit paraffine. Other arrangements of apparatus may be used for subjecting coals to the process for obtaining paraffine-oil therefrom, as I have described; but I prefer to use the apparatus above mentioned, as being well known and easily managed; but in order to obtain the largest quantity of crude paraffine-oil from coals by means of this process, and produce the smallest quantity of permanent gas by the action of the heat employed, whatever may be the apparatus used, care must be taken to heat the coals gradually and to apply the lowest temperature necessary to complete the operation. During the distillation or driving off which I have described a permanent gas will be produced, and this gas may either be collected or suffered to escape, as may be thought expedient. I purify the crude oil obtained, as already described, in the following manner: I put the oil into a cistern and heat it (by a steam-pipe or other means) to a temperature of about 150° Fahrenheit. When thus heated water and undissolved impurities contained in the oil will separate more readily from it than when cold, and the oil being left in a state of rest and kept warm for about a day, many of those impurities will fall to the bottom of the cistern, and the oil may then be run off into another vessel, leaving the residuum behind. I then proceed to distill the oil, for which operation I

prefer to use an iron still with a worm-pipe connected to it passing through a refrigeratory apparatus, as before mentioned, the refrigerator being kept at or about the temperature of 55° Fahrenheit, as I have already mentioned. I heat the still by a fire underneath it, which I keep up until the whole of the oil has been distilled over, and it will then be found that the still contains some dry carbonaceous residue, which should be taken out before the still is again used. The oil is to be run from the condensing apparatus as it distills over into a leaden vessel, where to each one hundred gallons I gradually add ten gallons of the oil of vitriol of commerce. After this mixture has been well stirred for about an hour I allow it to remain at rest for about twelve hours, so that the oil of vitriol and impurities with which it has combined may settle at the bottom. I then draw off the supernatant oil into an iron vessel, and to each one hundred gallons I add four gallons of a solution of caustic soda of a specific gravity 1.300, water being 1.000. The soda and oil are stirred together for about an hour, so as to neutralize any acid which may remain in the oil, and also take up any impurities capable of combining with it, after which the contents of the vessel are allowed to remain at rest for about six or eight hours, so that the solution of soda may subside, and then the supernatant oil is to be drawn off and again distilled in the same manner as I have already described. Paraffine-oil obtained from the last-mentioned distillation contains a fluid more volatile than paraffine, and I separate a considerable portion of this fluid from the oil and obtain it in a separate state, as follows: I put the oil into an iron still connected with a worm-pipe passing through a refrigeratory apparatus, adding to the oil half its bulk of water, and boiling the contents of the still for about twelve hours, adding water from time to time, so as to keep about the same proportions of the oil and water in the still. The volatile fluid will pass over along with steam, and can be condensed in the worm-pipe by the refrigeratory apparatus. This fluid will be clear and transparent, and as it is lighter than water it separates, on standing, from the water with which it will be mixed as it leaves the worm-pipe of the still. This fluid may be burned for the purpose of illumination or applied to any other useful purpose to which it may be applicable. The last-named process will separate the greater portion of the volatile fluid I have mentioned from the oil; but a larger quantity may be separated by prolonging the operation. The oil left in the still after the completion of the process lastly described is then to be carefully separated from all the remaining water (upon which it will float) and conveyed into a leaden vessel, where to each one hundred gallons I add two gallons of oil of vitriol. This mixture is to be well stirred for six or eight hours, after which I allow it to stand undisturbed for twenty-four hours in order that the vitriol may settle to the bottom of the leaden

vessel, carrying with it all impurities with which it has combined. The supernatant oil is now to be drawn off into another vessel, and to each one hundred gallons there is added twenty-eight pounds of chalk, ground up with a little water into a thin paste. The oil and chalk are then to be well agitated until the oil becomes freed from sulphurous acid. This oil is to be kept warm—say at 100° Fahrenheit—in any convenient vessel for about a week to allow impurities to settle, and it is then fit to be used for lubricating purposes, either by itself or mixed with an animal or vegetable oil; or it may be burned by itself in Argand lamps for the purpose of illumination; and this oil may be further purified, if required, by distilling it over again.

To extract paraffine from the purified paraffine-oil obtained in the manner I have described, the oil is to be cooled to a low temperature—say to 30° or 40° Fahrenheit—and the lower the temperature the larger will be the quantity of paraffine separated from the oil. In this way paraffine is made to crystallize, and in this state it may be separated from the oil by filtration through woollen or other cloths, and then squeezing it on a powerful press, by which means it will be made sufficiently pure to be employed for lubricating and some other useful purposes; but the paraffine may be further purified, if required, by treating it several times at a temperature of about 160° Fahrenheit, alternately with its own bulk of oil of vitriol, and with a similar quantity of a solution of caustic soda, (of the specific gravity already mentioned,) until the paraffine ceases to render the oil of vitriol black. It is then to be washed in a weak solution of soda, and lastly with boiling water until the water ceases to change the color of red litmus paper.

To obtain paraffine from paraffine-oil I sometimes put the oil into a still and distill over one-half or more of its contents. The portion then remaining will contain a much larger proportion of paraffine than the paraffine-oil at first put into the still contained. This residue being then distilled over into a separate vessel and allowed to cool, paraffine may be separated by filtration and squeezing in cloths, and also purified by treatment with oil of vitriol and soda, as before described. Paraffine-oil from which paraffine has been separated, as above described, still contains paraffine in solution, and is suitable for lubricating or lighting purposes, as already mentioned.

What I claim as my invention, and desire to secure by Letters Patent, is—

The obtaining of paraffine-oil, or an oil containing paraffine, and paraffine from bituminous coals by treating them in manner hereinbefore described.

JAMES YOUNG.

Witnesses:

EDW. WM. BURNET,
Manchester, Solicitor.

JOHN FALL,
His Clerk.