

# UNITED STATES PATENT OFFICE.

WILLIAM ATWOOD, OF BROOKLYN, NEW YORK.

## PETROLEUM DISTILLATE FOR LUBRICATING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 226,153, dated April 6, 1880.

Application filed September 1, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM ATWOOD, of Brooklyn, in the county of Kings and State of New York, have invented a new, useful, and Improved Article of Manufacture consisting of a Petroleum Distillate for Lubricating Purposes; and I do hereby declare the following to be a full, clear, and exact description thereof, and of the mode in which I manufacture the same.

My improved lubricator or machinery oil is a distillate of petroleum of light-yellow color, of great viscosity and of a gravity ranging from 20° down to 16° Baumé, and is substantially free from light oils and from offensive odor.

The heavy distillates of petroleum procured by the ordinary process of distillation necessarily contain admixed with them a large percentage of oil of lighter gravity, which makes them of higher gravity than they otherwise would be, and lessens their viscosity; they are also apt to contain a sufficient amount of the offensive odorous particles which are generated in the distillation of petroleum, and with which the heavy-gravity distillates are peculiarly liable to be contaminated.

I have invented a new process of distillation of hydrocarbon oils, by means of which I am enabled to produce a distillate of petroleum which is of very low specific gravity Baumé, is substantially free from offensive odor, and is of an exceptional degree of viscosity, forming a new article of manufacture.

This process, which forms the subject-matter of a separate application for Letters Patent, is substantially as follows: The oil to be distilled may be either crude petroleum or a distillate of petroleum, and may be subjected to the ordinary treatment with acid and alkali, either before or after being subjected to the process of distillation which I am about to describe. The oil is charged into a still of any ordinary construction, which is heated with fire. Steam also may be employed to facilitate evaporation of the oil, it being desirable to vaporize it as rapidly as possible. The still has a low dome or goose-neck, so that the vapors of distillation may pass off from it as rapidly as possible, in order that none, or as little as possible, of the vaporized oil may run

back into the still, it being desirable by my process to avoid the result known in the art as "cracking." As near as possible to the still is a small receptacle, into which the goose-neck from the still enters, and into which it discharges the vapor condensed before reaching that point. From this receptacle rises a coil of pipe of large diameter, which is preferably coiled immediately above the still, so as to be subjected to the heat radiated therefrom. Through this coil, which I call an "air-condenser," the uncondensed vapor rises, and the heavy particles of vapor are condensed in it, and run down through it into the receptacle before mentioned, and in so doing meet the ascending hot vapors from the still. From the top of this air-condenser the pipe is reduced in diameter, and thence has a downward inclination from the air-condenser to a refrigerating-coil immersed in a tank which is supplied with a constant stream of influent cold water, and from the farther extremity of this refrigerating coil or condenser the pipe conducts the condensed distillate to a suitable receptacle.

The distillate thus procured is oil of comparatively light gravity, and not the heavy distillate which forms the subject of my present invention, because all the light-oil vapors and the volatile particles which give the peculiar disgusting odor to petroleum distillates rise up through the air-condenser and past its highest point into the descending pipe, and thus are prevented from mingling with the heavier vapors condensed in the air-condenser.

The petroleum vapors which condense in the air-condenser run down into the receptacle first described. From this heavy-oil receptacle a pipe leads to a separate coil in the refrigerator before mentioned, or into a separate refrigerator, as preferred. Between this receptacle and the refrigerating-coil is a trap or liquid seal, which may be simply a U-shaped bend in the pipe. This trap is always full of condensed vapor or heavy oil, and prevents the passage of any vapors, gases, or volatile particles, while it allows the free passage of the condensed heavy distillate to the refrigerating-worm. This refrigerating-worm does not act as a condenser, because nothing but condensed oil can reach it; but it is employed



to cool the distillate out of contact with the atmosphere, as otherwise its great heat would cause it to ignite on contact with the air.

If crude oil is subjected to this treatment 5 the first run of distillate through the trap and cooling-worm, although heavier in gravity than that which runs from the upper worm or condenser, will not be of sufficient gravity for lubricating-oil, but as the gravity increases 10 with the continuance of the process, toward the latter part of the run the distillate will be found to have reached as low a gravity as 20° Baumé, and will continue to run of decreasing gravity down as low as 16° Baumé. This 15 heavy distillate is my improved product of machinery-oil, and is caught in a separate receptacle. It is of orange color with a slight greenish tinge, of a gravity of 20° Baumé or under, of great viscosity, and almost entirely 20 free from offensive odor, but having an oily smell.

The oil thus produced may be used for lubricating purposes as it runs from the cooling-worm, or, if not previously so treated, may be 25 bleached with acid and alkali in the ordinary and well-known manner.

This product is essentially different and readily distinguishable from the heavy residuum of distillation of petroleum purified from

fixed carbon and other coloring-matter by 30 filtration, as that oil, although it may be obtained of as low a gravity as 20° Baumé, is, owing to its being a residuum and not a distillate, charged with amorphous paraffine in an uncrystallizable condition. My oil, on the 35 contrary, is a distillate, and the paraffine which it contains is in a crystallizable state, and not amorphous. It is also of a lower gravity, ranging from 20° down to 16° Baumé.

The distillate thus procured is a product 40 hitherto unknown to the trade, and is of great utility as machinery-oil.

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

The above-described heavy hydrocarbon distillate, having an orange color with slight 45 greenish tinge, of a gravity from 20° to 16° Baumé, and high degree of viscosity, and substantially free from offensive odor, with a slight oily smell, and containing paraffine in 50 a crystallizable state, as a new article of manufacture.

In testimony whereof I, the said WILLIAM ATWOOD, have hereunto set my hand.

WM. ATWOOD.

Witnesses:

R. W. BURKE,

CHAS. W. MORSE.