

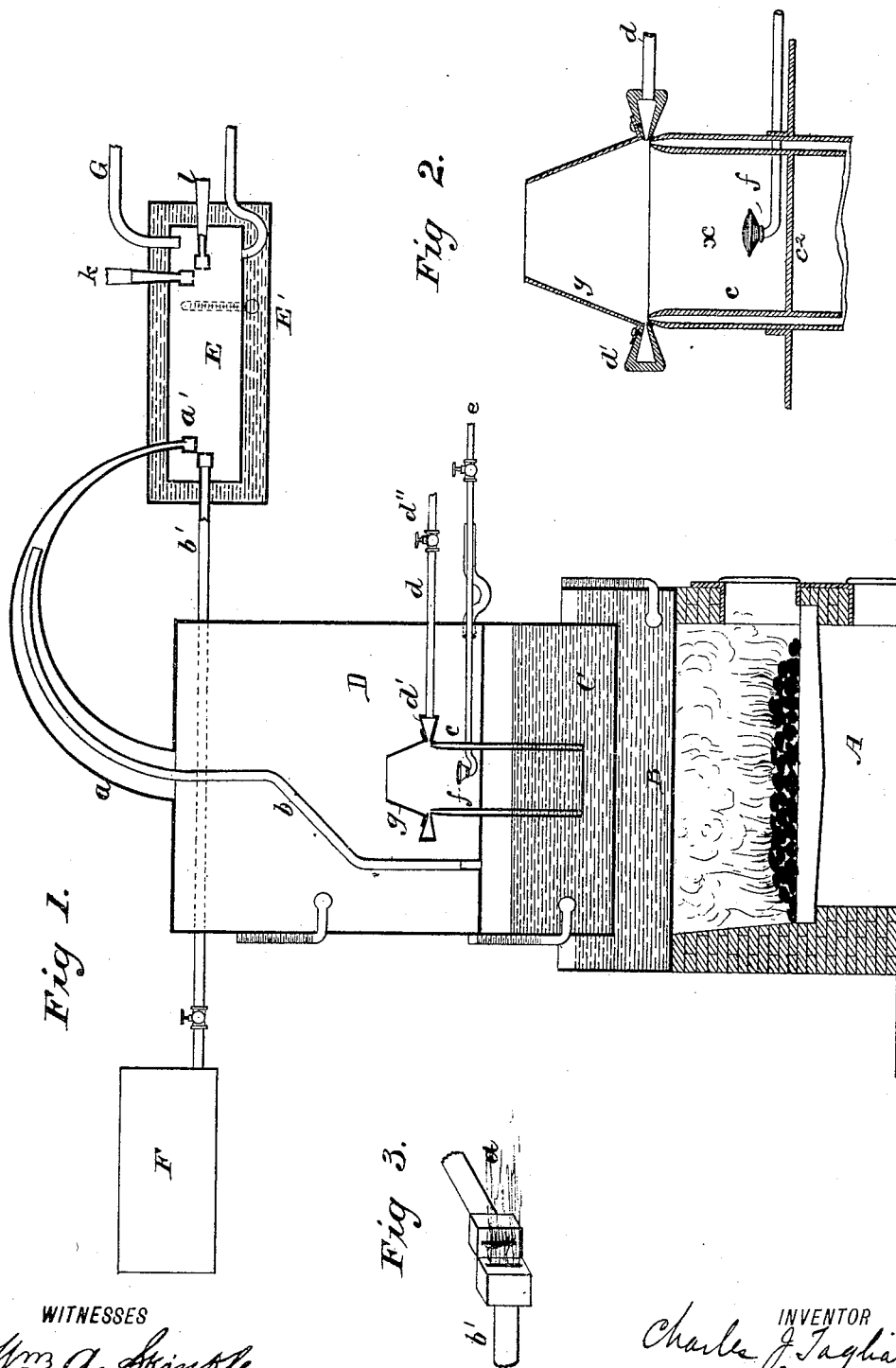
(No Model.)

C. J. TAGLIABUE.

APPARATUS FOR AND PROCESS OF DISTILLING PETROLEUM.

No. 265,462.

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WITNESSES
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APPARATUS FOR AND PROCESS OF DISTILLING PETROLEUM.

SPECIFICATION forming part of Letters Patent No. 265,462, dated October 3, 1882.

Application filed March 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. TAGLIABUE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in the Process of and Apparatus for Distilling Petroleum, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to an improvement on the invention for which Letters Patent of the United States No. 254,176 were granted to me February 28, 1882. The object of that invention is to effect the distillation of petroleum 15 without destroying the vaporized product by oxidation or the product drawn from the vapor-chamber by carbonization. That invention is applicable to the manufacture of burning-oils, and also to increase the fire-test of the distillate 20 produced in the ordinary manner by destructive distillation, as also to reduce paraffine-oils to any desired specific gravity. Paraffine-oils are thus adapted for purposes of lubrication, being freed from all traces of acids and alkalies and made 25 superior to lard-oils. That invention is also applicable to the reduction of heavy black oils.

The invention of the patent involves, first, the heating of the oil by passing or distributing the heat through whale-oil or other suitable substance maintained at a temperature 30 of, say, 800° Fahrenheit. The oil to be treated or distilled having been raised to this or the necessary temperature, a steam-atomizer is put in operation to break up the oil into fine particles in the vapor-chamber, the fine spray of 35 oil produced at the intersection of the steam and oil pipes being vaporized within said chamber. A water-atomizer is also used, the function of which is to assist in the extraction of 40 the oil already vaporized in the said chamber and to condense it, the water-atomizer leading into a condenser in which the condensed vapors fall, and from which they may be drawn.

The operation described in the patent, briefly 45 considered, embraces therefore, first, the subjecting of the oil to heat transmitted through a liquid bath, but in a manner not permitting of carbonization, breaking it up by a steam-atomizer, and then extracting and condensing 50 the vapor by a water-atomizer.

The patented invention also contemplates the use, when working benzine and in the manufacture of the lighter products, such as gasoline, of 86° and 90° Baumé, of hot water with the atomizer connected with the condenser. 55

My present invention is designed to improve on that described in my previous patent; and it consists in a process and apparatus as hereinafter set forth.

The process forming a part of my present 60 invention consists in the subjection of the oil to be treated to heat in a manner not permitting of carbonization, breaking it up by successive operations of a steam-atomizer and of a jet or jets of hydrogen gas or hot air, and 65 then condensing the vapor. The process embraces, further, the condensation of the vapors by carrying them over to a condenser of regulated temperature and subjecting them in a filmy state to a jet or film of hot or cold water 70 under pressure and to the further action of a steam and hot or cold water atomizer, all as hereinafter more particularly set forth.

My improvements on the apparatus heretofore patented to me consist in the construction 75 of the steam-atomizer so that it will the more perfectly and completely atomize the oil, the atomizer causing the attenuating or drawing of the bodies of steam and oil into opposing thin films or bodies, and being used in connection 80 with a means of retarding or preventing the immediate escape into the vapor-chamber of so much of the oil as is not entirely broken up by the steam-atomizer, whereby it may be again and again subjected to the action of the 85 atomizer and more perfectly vaporized.

The improvements consist, further, in the combination, with the steam-atomizer and its attendant parts, of a pipe having a perforated cap or rose, the office of which pipe and rose 90 is to mix a stream or series of jets of hydrogen gas or hot air with the oil and steam during the act of atomizing the oil, as an aid in producing this result.

The improvements consist, further, in the 95 construction of the water-atomizer used in connection with the condenser, whereby the vapor and water meet in the form of thin films or sheets, and in the use, with the water-atomizer, of pipes constituting what I term a 100

"steam" and "water" atomizer, which may, if desired, have the same character of construction, the whole operating together to more rapidly and effectually condense the vapors.

The improvements embrace, further, a construction whereby the discharge or escape pipe leading from the condenser is guarded by the steam and water atomizer, so that no vapor can escape without encountering the spray of this atomizer and being further condensed.

The improvements consist, further, in inclosing the condenser in a bath of liquid, such as whale-oil, which will not to any considerable extent evaporate at a temperature below 500° Fahrenheit. By using a liquid possessing this property a given temperature may be maintained in the condenser, and only the vapors be condensed which will not vaporize at the existing temperature of the bath. The lighter vapors will thus remain uncondensed, and may be passed on to another condenser, and so on till all the different products are separated by different acts of condensation. The heavier products—say those which will not vaporize at less than 650° Fahrenheit—would be condensed in the vapor or refining chamber, while the lighter products would pass to the first condenser, those still lighter to a second condenser, and so on till all the products desired are obtained.

The improvements consist, lastly, in other details of improvement and in their combinations, as hereinafter set forth.

In the drawings, Figure 1 is an elevation of the entire apparatus. Fig. 2 shows on an enlarged scale the construction of the steam-atomizer, and Fig. 3 of the water-atomizer.

A is a furnace, over which a bath or vessel, B, to receive whale-oil or other suitable substance, is placed. C is a tank, designed to hold the oil to be treated. This tank is situated at the base of the vapor-chamber D. A neck or pipe, *a*, extends from the upper part of the vapor-chamber D, diminishing in diameter at its outer end and leading to the closed condenser E. A vent-pipe, *b*, extends from the oil-tank C through the vapor-chamber and into the neck or pipe *a* of the vapor-chamber D, terminating near its end. An annular oil-pipe, *c*, extends from the tank C within the vapor-chamber D. At a right angle to the oil-pipe *c* is the steam-pipe *d*, having a ring or annular pipe, *d'*, at its inner end. The construction of the pipes *c* and *d* *d'* is such that at their uniting edges they form two opposing annular openings. The annular steam-pipe *d'* is supplied with steam through the pipe *d*, which leads to a suitable generator, and is provided with a valve, *d''*. Placed upon the top of the annular steam-pipe *d'* is a cap, *g*, in the form of a hollow truncated cone, which serves to contract the opening or passage from the steam-atomizer to the vapor-chamber D. The cone or cap *g* may be secured to the sides of the vapor-chamber by suitable braces or stays. The

construction of the steam-atomizer is shown more particularly in Fig. 2. Arranged centrally within the pipe *c*, and at the base of the vapor-chamber D, is the hydrogen-gas or hot-air pipe *e*, the end of which, within the pipe *c*, is provided with a rose, *f*. The end of the pipe *a*, where it enters the condenser E, is T-shaped, as shown more specially in the detail view, Fig. 3. A water-pipe, *b'*, connects with an elevated water-tank, F, or with a pump or other source of supply or pressure, and passes through or around the vapor-chamber D into the condenser E, terminating at the point *a'*, at which it also is T-shaped, and where it is met by the T end of the pipe *a*. The opposing openings at the T ends of the pipes *a* and *b* are in the form of thin longitudinal slots. A steam-pipe, *k*, enters the condenser E, and is met at a right angle by a water-pipe, *l*, the pipes *k* and *l* forming together the steam and water atomizer. *G* is an outlet, situated back of and guarded by the steam and water atomizer, whereby the vapors cannot pass from the condenser without being acted on by the said atomizer. The condenser E is surrounded by or immersed in a liquid which will not to any considerable extent evaporate below a temperature of 500° Fahrenheit. The vessel E' holds this liquid. The object of thus immersing the condenser E in a liquid is explained above.

The operation, stated in general terms, is substantially the same as that described in my Patent No. 254,176, the oil being heated by the furnace and lifted from the tank C to the vapor-chamber, and atomized at the junction of the pipes, which, in combination, form the steam-atomizer, the vapors being conveyed or carried over to the condenser and brought in contact with the water-atomizer, as described in the patent. This operation is, however, improved by the use of annular pipes, forming the steam-atomizer, and the cone which contracts the avenue of escape into the vapor-chamber and diverts the heavier particles into the cylinder *x*, formed by the pipe *c*, and the top of oil-tank C, or a plate or diaphragm, *c'*, of the annular pipe *c*, as is shown in Fig. 2. The substances entering this cylinder are blown up, lifted, or scattered by the jets of hydrogen gas or hot air, and again and again brought into contact with the steam-atomizer. The lighter particles escape immediately over the neck of the cone into the vapor-chamber, and the heavier particles are vaporized and carried over by repeated actions of the agencies employed, as here described. The products of the oil, which are thoroughly vaporized, pass through the cone into the refining or vapor chamber D, where the heavier vapors are either condensed by reducing the temperature of the whale-oil bath or (if the temperature be not lowered) carried over to the condenser E. This part of the process is specially adapted for producing lubricating-oils or for increasing the fire-test of burning-oils. It is also intended to extract the oil from paraffine-wax or to pro-

duce hard wax from soft, rendering unnecessary the hydraulic process now in use. In extracting oil from paraffine-wax by my process the wax is melted and while in a liquid state is subjected to the steam-atomizer, the oil being vaporized and carried over to the condenser, the wax falling down into the refining or vapor chamber. By a little experience any desired melting-point can be obtained.

10 The special advantages of the condensing apparatus entering into my present invention have been referred to, and are important in their character.

I disclaim the heating of crude oil, the mixing of its vapors with superheated steam, and the carrying of the mixture to a condenser where the vapors are condensed by jets of water. Neither do I claim the employment, in an oil-refining apparatus, of the combination of steam and oil atomizers and a refining-chamber, nor the combination of condenser and air or vacuum pumps, nor the use of a rose through which oil is forced in contact with a current of steam, nor, further, the employment of a body of oil through which heat is transmitted to the oil to be treated, such uses and inventions having been before known.

I am aware of the English Patent No. 2,458, granted A. D. 1870, which sets forth the method of atomizing or destroying the molecular condition of oil by a jet or jets of steam which are made to strike or impinge against the stream of oil as it enters the still.

Having described my invention, I claim—

35 1. The within-described process of distilling petroleum, which consists, first, in heating the

oil, then breaking up the same by successive operations of a steam-atomizer, and of a jet or jets of hydrogen gas or hot air, mingling it with vapor which has not been submitted to the process of atomization and condensing the mixed vapors, substantially as herein set forth.

2. In an apparatus for distilling petroleum, the combination of the still or oil-tank C, vapor-chamber D, and annular oil-pipe *c*, with means for heating the still and a vapor-condenser connected with the chamber D, as and for the purpose set forth.

3. The combination of the cone-shaped cap *g* with the steam-atomizer *cd'*, gas-pipe *f*, steam-pipe *d*, vapor-chamber D, and still or oil-tank C, as and for the purpose set forth.

4. In an apparatus for distilling petroleum, the combination of the annular oil-pipe *c*, having a cylinder or chamber, *x*, and the gas-inlet pipe located therein, with the steam-pipe *d*, vapor-chamber D, and still or oil-tank C, as and for the purpose set forth.

5. The combination of the condenser having T-headed vapor and water pipes at one end, T-headed steam and water pipes at the other end, and an outlet-pipe located in rear of said steam and water pipes, with a petroleum-still having vapor-discharge pipes, as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. TAGLIABUE.

Witnesses:

JOSEPH NASSANER,
WILLIAM J. BARKER.