3 Sheets—Sheet 1.

J. COLE, Jr.

Apparatus for Distilling Petroleum.

No. 220,962. Patented Oct. 28, 1879.

Fig. 1.

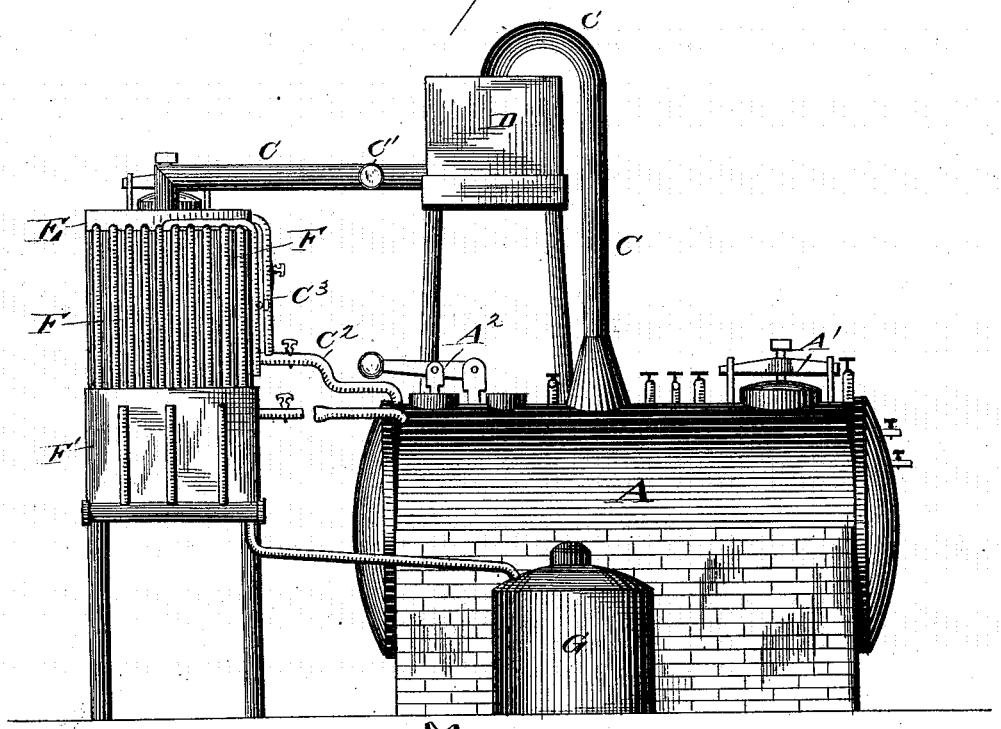
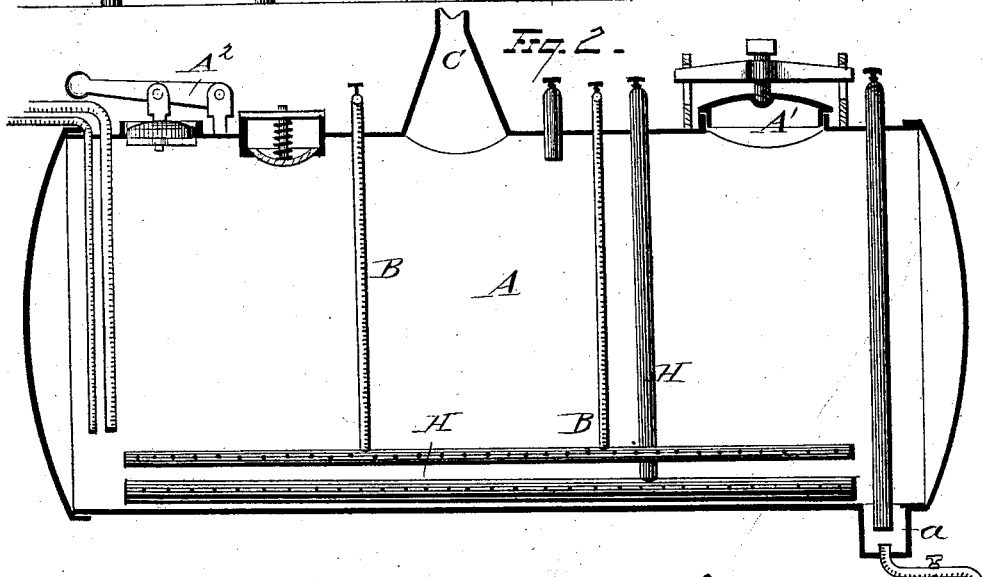


Fig. 2.



WITNESSES

E. D. Nottingham

A. M. Bright

INVENTOR

James Cole Jr.

By Leggett and Leggett,

ATTORNEY

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Fig. 3.

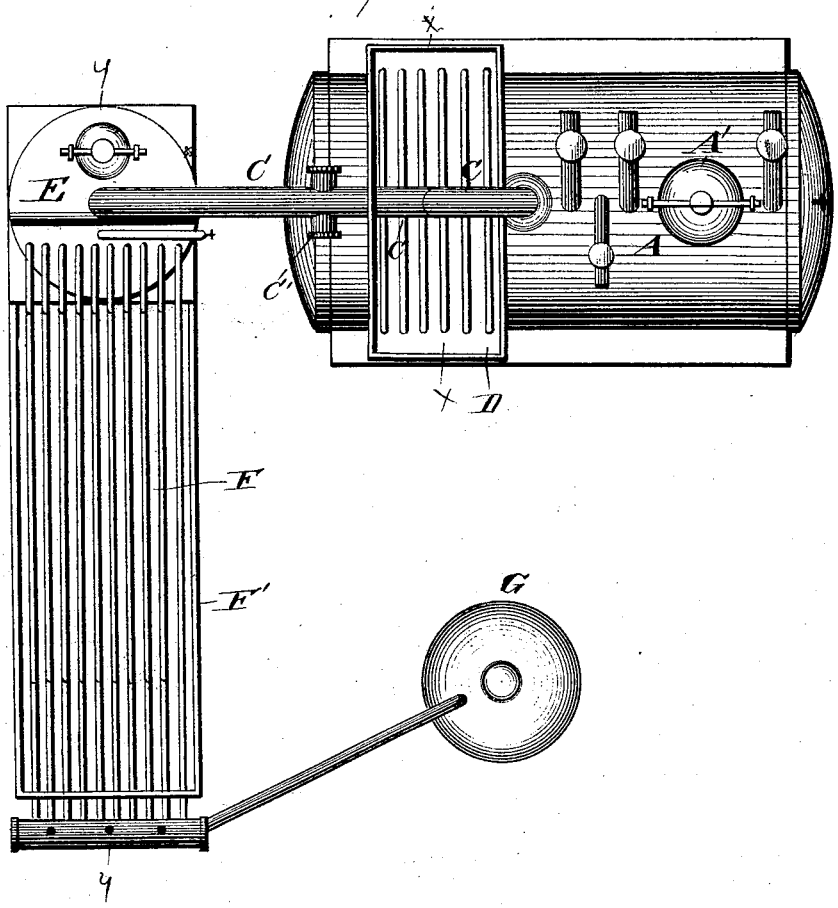


Fig. 4

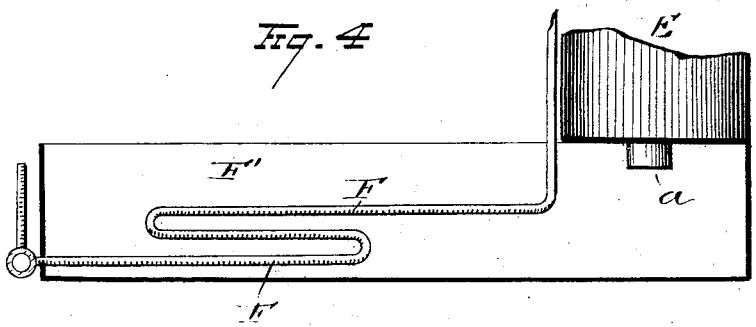
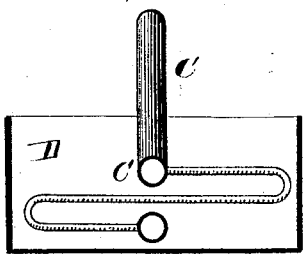


Fig. 5.



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E. J. Nottingham

A. M. Bright

INVENTOR

James Cole Jr.

By Leggett & Leggett.

ATTORNEYS

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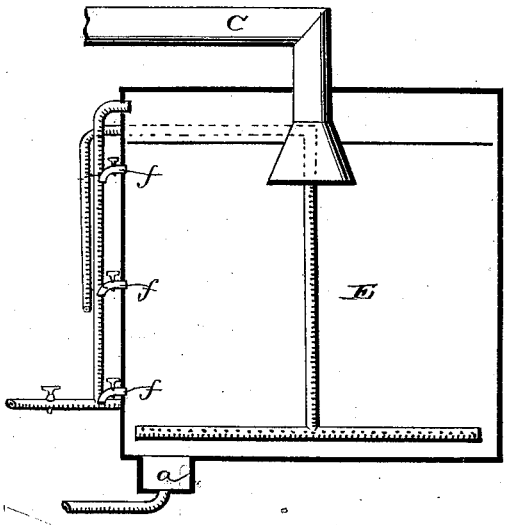
Fig. 6.



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ATTORNEYS.

UNITED STATES PATENT OFFICE.

JAMES COLE, JR., OF CLEVELAND, OHIO.

IMPROVEMENT IN APPARATUS FOR DISTILLING PETROLEUM.

Specification forming part of Letters Patent No. **220,962**, dated October 28, 1879; application filed December 2, 1878.

To all whom it may concern:

Be it known that I, JAMES COLE, Jr., of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Distilling Petroleum or its distillates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to apparatus for the distillation of petroleum or its distillates for a double purpose—either for raising the fire-test of an illuminating oil or for obtaining specific distillates; and it consists in the parts and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 represents a side view of one form of apparatus suitable for carrying out my process. Fig. 2 represents a section of the primary reservoir or still. Fig. 3 is a plan view of the apparatus. Fig. 4 is a detail sectional view of the same through line *y y* of Fig. 3. Fig. 5 is a similar view through line *x x* of Fig. 3. Fig. 6 is a view representing more minutely the secondary still.

A is what may be termed the "primary reservoir or still." It is, preferably, constructed from boiler-iron or other material adapted to withstand a considerable degree of pressure or exposure. Into the reservoir A the substance to be refined is first placed and the reservoir then tightly closed. This reservoir I prefer to provide with suitable man-holes A′ and safety-valve A^2. Into the reservoir A, I lead one or more steam-pipes, B, which are extended at or near the bottom of said reservoir, and suitably perforated to admit of the escape of steam into the contents thereof, and it is by the action of this steam that distillation is effected.

C is a pipe leading from the reservoir A to the primary condenser D, which is filled with water or any suitable cooling medium. The pipe C, as it enters the primary condenser D, is divided into a number of smaller pipes; or, instead of this, it may be in any suitable manner formed into a worm or the like, so that the vapor shall be sufficiently exposed to the action of the cooling medium in the primary condenser D. Beyond the condenser D the pipe C proceeds to connect with the secondary still E, and at any suitable point between the condenser D and still E the pipe C may be provided with an inspection-window, C′, through which may be seen the amount of liquid passing through the pipe.

The secondary still E, like the primary still, is a closed chamber, into which also pass suitable steam-pipes for heating its contents in a similar manner to that already described for the primary still A. Each still A and E is provided with a catch-basin, *a*, for collecting the water that may be found in the petroleum or that resulting from condensation of the steam. This water, falling to the bottom, is collected in the basin *a*, and from this led away by any suitable pipe arrangement. These pipes should, of course, be provided with stop-cocks for manifest purposes.

C^2 is a pipe whereby condensed matter formed in the secondary still E is returned to the primary still A for redistillation, and in order to provide a free flow through this pipe I connect it by the pipe C^3 with the upper portion of the still E. This acts as a vent and facilitates the flow through the pipe C^2.

The secondary still E may also be provided with a suitable man-hole and other appliances for examining, repairing, and cleaning purposes. The vapors arising from the distillation in the chamber are passed through a number of pipes, F, which are made to pass in a tortuous or serpentine manner through a sufficient amount of water or other cooling medium contained in a tank, F′, which may be termed the "secondary condenser."

I do not limit myself to any specified number of stills or accompanying condensers, as this number will be determined entirely by the degree of refinement to be reached, or by the desired distillates sought. The distillates of higher gravity will come off first, and it will thus be obvious that to obtain products of different grades an appropriate construction of apparatus will be required containing a greater or less number of stills and condensers, as may be necessary. The pipes F (which are in reality but a continuation of the pipe C) are finally led into a cistern, G, which will

contain in a condensed form the lightest distillates.

I do not limit the use of my invention to the refinement of petroleum and the separation from it of its distillates, inasmuch as naphtha may be placed in the still A, and by the process before specified its lighter distillates may be separated and collected in the same manner as already described.

Instead of injecting steam through the pipe B, hot air may be forced into the still; or the pipes B, if desired, may be altogether omitted, and the contents of the still heated by any suitable external appliances.

H is a blow-pipe similar in construction to the perforated pipe B, already specified, and this is used for the purpose of injecting air, either hot or cold, for the purpose of blowing out from the still any volatile and uncondensed vapor that may remain behind, thus entirely freeing the contents of the primary still from these lighter products.

The secondary still is provided with a vertical series of cocks, *f*, adapted for determining the height of liquid in said still; also, for drawing and testing the gravity of the oils; also, for drawing off the oils if the latter are of suitable fire-test and redistillation is not desired.

What I claim is—

1. The combination, with the primary still, primary condenser, secondary still, and pipe C, which passes through said condenser and opens into the secondary still, of an independent pipe, C^2, connecting the secondary still with the primary still, substantially as set forth.

2. The combination, with the primary still, primary condenser, secondary still, and pipe C, which passes through said condenser and opens into the secondary still, of an independent pipe, C^2, connecting the lower portion of the secondary still with the primary still, and pipe C^3, connecting the upper portion of the secondary still with said pipe C^2, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES COLE, JR.

Witnesses:
JNO. CROWELL, JR.,
W. E. DONNELLY.