(No Model.)

H. R. ANGUS.

APPARATUS FOR TREATING AND IMPROVING PETROLEUM DISTILLATE.

No. 301,470. Patented July 8, 1884.

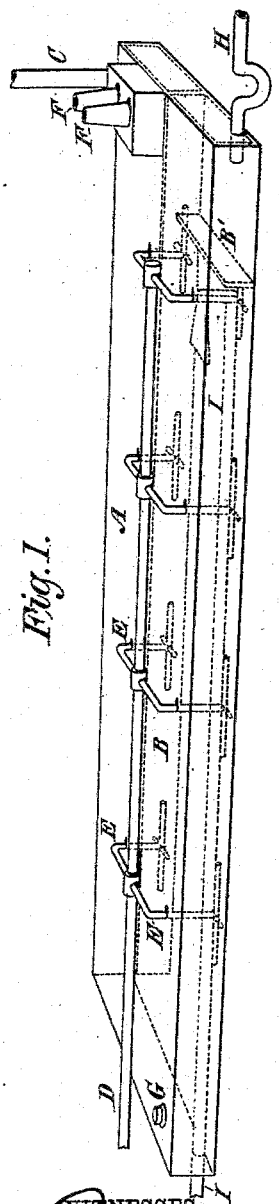

Fig. 1.

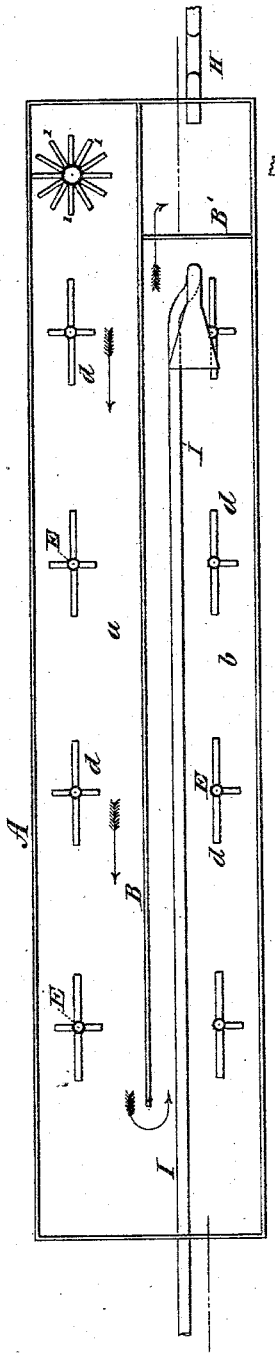

Fig. 2.

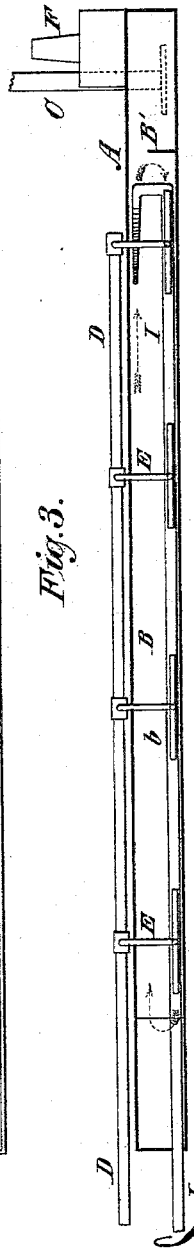

Fig. 3.

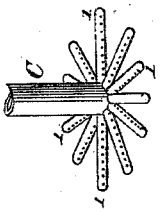

Fig. 5.

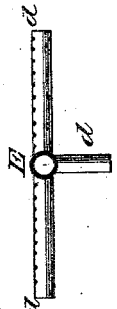

Fig. 4.

WITNESSES:

Gustave Peterich

Fred Hustwohl

INVENTOR

Henry R. Angus

BY Earle H. Smith

ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY R. ANGUS, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO DANIEL MESSMORE, OF SAME PLACE.

APPARATUS FOR TREATING AND IMPROVING PETROLEUM DISTILLATE.

SPECIFICATION forming part of Letters Patent No. 301,470, dated July 8, 1884.

Application filed September 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY R. ANGUS, of New York, N. Y., have invented a new and useful Apparatus to be Employed in Treating and Improving Petroleum Distillate and other Oils, whereof the following is a specification.

My invention is particularly applicable in the process of eliminating the volatile components of petroleum distillate for enhancing its capability to sustain the flame-test, but is useful in deodorization of oils and for other purposes.

The invention is illustrated in the annexed drawings, wherein Figure 1 is a perspective view of the exterior of the apparatus and indicating the interior parts in dotted lines. Fig. 2 is a plan or top view showing the arrangement of the partitions. Fig. 3 is a longitudinal section of one division of the tank. Fig. 4 is a fragment of terminal steam-pipe enlarged. Fig. 5 shows the multiple branches of oil-distributing pipe.

A is the closed tank or chamber. It is divided into two compartments, *a* and *b*, and the latter is divided laterally by a cross-partition, B′, about one-half the height of the interior, and this governs the level or height of the water, being practically the termination or discharge end of the water-tank proper. The vertical longitudinal partition B is hermetically joined both to the bottom and top of the interior. It is, however, united to one end only of the tank, and does not reach to the opposite end, and thus the two compartments are so united that in the conduct of the refining process the interior is to be considered as of a box half the width of the exterior, and, say, twice the length.

The oil is introduced through a pipe, C, arranged to discharge into the tank near the bottom at the closed end of one of the compartments, *a*, and in operation passes around into the other, *b*, and thence out. I prefer to introduce the oil into the heated water in a finely-divided condition. For that purpose the inlet-pipe C terminates in multiple branches 1, and for a further division the branches have perforations in their sides or underneath. From these branches the oil is delivered in small globules, which rise through the heated water to the surface and there unite to form a thin film or layer. The effect is that the heat of the water begins to act immediately upon the oil thus subdivided and raises its temperature to that of the water while passing up through it, as described.

D is the main supply-pipe of the steam for heating the water. The pipe is led along the top of the tank, and has a number of branches, E, which pass down into the tank nearly to the bottom, and each branch terminates preferably in a number of nozzles and openings, *d*, of such form or structure as will so facilitate the condensation of the steam in the water contained in the tank that the water will be maintained at the desired temperature without producing ebullition at its surface.

To remove the volatile products evolved in the process I use a fan either to force a current of air through the vapor-chamber or to exhaust the air from the said chamber and remove the vapors, &c., by suction.

In the drawings, I is a pipe for an inflowing current of air. The pipe enters that end of the tank opposite oil and water outlet, and is carried to the partition or bulk-head B′, passing close to the discharging ends *d* of the steam-pipes E, then rises above the level of the water and oil thereon, and has the open end flattened, so that the air emitted is spread over the surface of the oil from side to side of the compartment. By arranging the air-pipe in close proximity to the discharging steam-pipes the air coming in is heated far more quickly and a much shorter pipe can be used than would be necessary if only the hot water in the tank were employed to heat such pipe.

The tank is filled with water through an orifice, as G, to the height of the partition or bulk-head B, and the orifice has a screw-cap for closing it. The oil is next let in through the inlet-pipe, and being discharged near the bottom of the tank rises to the surface of the water, forming a thin layer thereon which begins to move with the water, and, as indicated by the arrows in Fig. 2, follows around the partition B toward the bulk-head B′, and, flowing over it into the well or space beyond, induces a downward movement of the water at the

bulk-head, and thence a back or return current at the bottom of the tank, then up and forward again, and so on, somewhat as indicated by the arrows in Fig. 1. Meantime the vapor and gases evolved by the heat and rising from the oil are continuously expelled through the vapor-pipes F F or otherwise removed.

A patent was granted to Henry C. Smith, November 28, 1882, No. 268,302, which shows an oil-refining apparatus embracing a tank containing partitions, but they do not reach to the bottom so as to divide the body of water into a course (or courses) as in my contrivance, the water being free to move laterally back and forth under the partitions in every direction. In my structure and system the water is confined, as it were, between side walls integral with the bottom of the tank from the inlet for the oil to the bulk-head B′ or end of the water-tank proper.

The outlet-pipe H is formed of a "trap" shape, in order to retain sufficient fluid to prevent the escape of vapors, &c., by the way of the well.

The tank may be made narrower and longer than shown, and the longitudinal partition be dispensed with. On the other hand, two or more partitions may be used, and the tank may be made wider.

I do not here claim the process of refining petroleum distillate, as that is secured to me in another patent of even date herewith.

I claim as my invention—

1. In an apparatus for improving the fire-test of petroleum distillate, the combination, with a closed tank or chamber having an oil-inlet, of steam-pipes discharging into the tank near the bottom, and an air-pipe arranged in proximity to the discharging ends of the steam pipe or pipes, whereby the air-pipe is heated by direct action of the steam thereon.

2. In combination, the closed tank or chamber divided by a longitudinal partition joined to the top, bottom, and one end, substantially as specified, the bulk-head B′, an oil-inlet, a pipe for supplying free steam, and an oil and water outlet.

3. In combination, the closed tank or chamber provided with a longitudinal partition joined thereto above and below, substantially as and with the effect set forth, an oil-inlet, a pipe for supplying free steam, an oil and water outlet, and discharge-pipes for carrying off the volatile products for condensation.

HENRY R. ANGUS.

Witnesses:
JAMES M. TULLY,
JONATHAN MARSHALL.