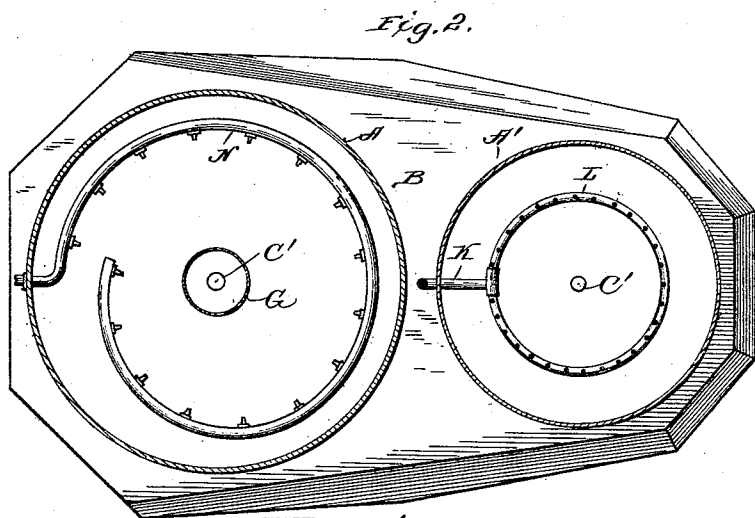
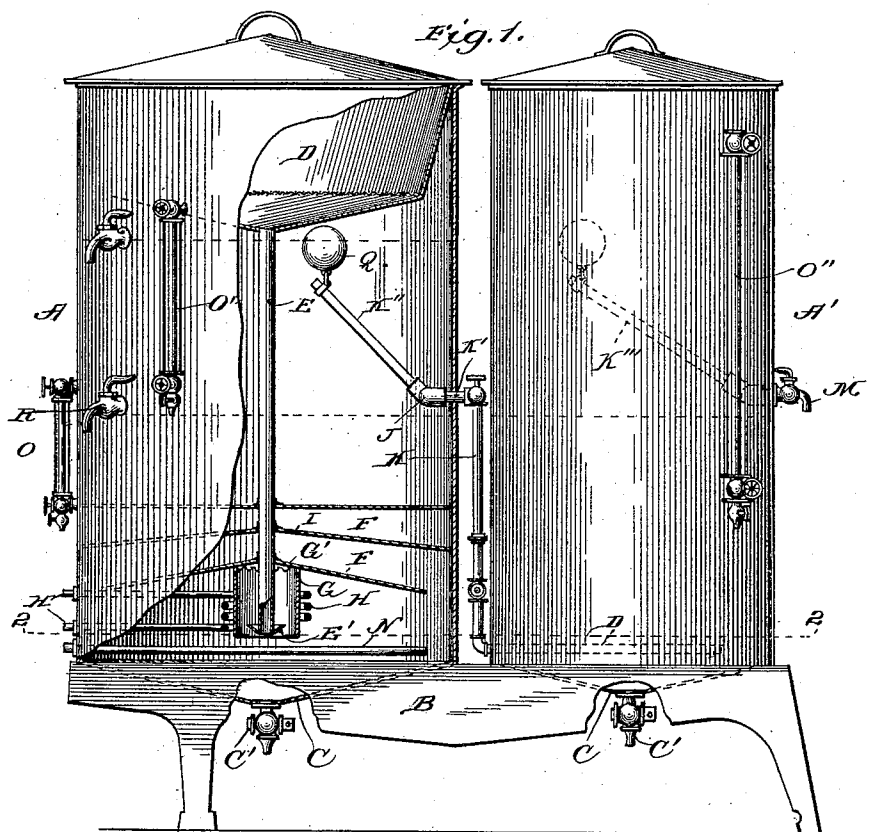


(No Model.)

M. D. HOGAN.
WASTE OIL PURIFIER.

No. 513,787.

Patented Jan. 30, 1894.

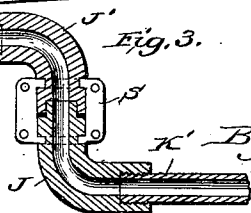


Witnesses:

Harry D. Rohrer.

Chas F. Miller

Fig. 3.



Inventor.

Michael D. Hogan.

By Miles & Moore,

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UNITED STATES PATENT OFFICE.

MICHAEL D. HOGAN, OF BETHESDA, ASSIGNOR OF ONE-THIRD TO HERBERT CLAUDE, OF ANNAPOLIS, MARYLAND.

WASTE-OIL PURIFIER.

SPECIFICATION forming part of Letters Patent No. 513,787, dated January 30, 1894.

Application filed June 28, 1893. Serial No. 479,020. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL D. HOGAN, a citizen of the United States, residing at Bethesda, in the county of Montgomery and State of Maryland, have invented certain new and useful Improvements in Waste-Oil Purifiers; 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 appertains to make and use the same.

This improvement relates to purifying oil by subjecting it while gently heated and divided or spread out so as to have a great deal of surface, to the action of water, whereby most of the impurities are removed. The oil is introduced into the lower part of a body of water and set free. It then rises and crawls along the lower surfaces of a series of shelves or diaphragms placed one above the other beneath the surface of the water passing back and forth until the last shelf is passed when it rises to the surface of the water and collects in a space provided to receive it. Thence it passes to the lower part of a second body of water where it is again subdivided and set free, to again rise and collect above the water. From this point it is drawn off for use as desired.

In the drawings,—Figure 1 is a partly sectional side elevation of the complete apparatus. Fig. 2 is a section on the line 2—2, Fig. 1. Fig. 3 is a detail section of one of the pipe unions employed.

In these figures, A, A' are respectively a main and a settling tank, supported upon a suitable base B and both provided with downwardly convex or conical bottoms C each having a valved central outlet C'. The upper part of the tank A supports an oil reservoir D from the middle of which depends a pipe E. The open lower end of this pipe is surrounded by an upwardly divergent rim E' which serves to deflect from the pipe the oil that escapes from its lower end. The pipe carries a series of rigidly attached shelves F, F' that extend nearly to the wall of the tank, and from the first or lower of these depends a cylinder G that surrounds the lower portion of the pipe but at some distance from it, and that has at its upper end a series of small

perforations G'. The reservoir, pipe, shelves and cylinder form a rigid structure that may be lifted bodily from the tank at will. A coiled steam pipe H surrounds the cylinder without touching it, the pipe forming the coil entering and leaving the tank through the side walls. Now the tank being filled to a point somewhat above the upper shelf with water or other liquid somewhat heavier than oil, oil is placed in the reservoir and steam is admitted to the coil. The steam heats the water around the cylinder and also to a less degree that within it; but as the water within escapes by rising only slowly through the apertures at the top, even at first, and not at all after a little oil has accumulated above the water, the latter becomes hotter than the water outside, except where the latter is in close proximity to the pipe. The oil from the reservoir passes down the central tube and is discharged into the warm water in the cylinder, the latter effectually preventing it from coming in contact with the steam pipe. As it escapes from the pipe it rises and is spread out by the divergent rim and exposed to the action of the water which gently heats and washes it. On reaching the top of the cylinder it escapes through the lateral apertures, being now highly liquid owing to its increased temperature, and crawls slowly outward to the shelf's edge whence it rises to the second shelf. By the time it reaches this edge it has several hundred times the surface that was exposed as it left the pipe, and as it leaves this edge it takes the form of minute globules, and in so doing exposes fresh surface to the water. When the globules reach the second shelf they again spread out and crawl inward to escape through a series of apertures I near the center and rise to the next shelf, if there be more than two, and to crawl outward to the edge of this as it did to the edge of the first. It is plain that it is spread out beneath the first shelf and re-collected below the second, and so on. This is of the greatest importance as thereby every part of the oil is brought into contact with the water, and it is to such contact that the apparatus owes its efficiency. Upon escaping from the last shelf the oil rises to the surface of the water and collects in the space above it. A

pipe K, K' enters this space near the water line and by means of a hinged section or flexible open pipe K'', held at a fixed distance below the surface of the oil by a float, conveys
 5 oil from near the top of the body collected to the bottom of the settling tank A', where it is again subdivided and discharged through the apertures in an endless perforated pipe L. This tank like the other is partly filled
 10 with water, and as the oil escapes from the endless pipe it rises and collects above the water, whence it is drawn through a faucet M, the oil being always taken from near the top of whatever amount may have collected,
 15 by the use of a flexible or jointed pipe shown in dotted lines and similar to that in the first tank. It is thus in both cases drawn from the top because the oil at the top is slightly purer than that near the bottom. The hinge
 20 joint in the pipes is shown in axial section in Fig. 3.

In the main tank a considerable amount of waste matter will be separated out from the oil and this will collect upon the bottom. If
 25 the valve at the center be opened some of this will pass out with the escaping water, but much of it will not nor is it easy to remove it if no special devices for the purpose have been provided. There is therefore provided a steam pipe N which enters the side
 30 of the tank just above the bottom and passes around it near the tank wall. This pipe is provided with a series of lateral perforations that deliver small jets of steam obliquely
 35 against the bottom and toward the outlet, and the accumulation, at the same time highly heated and acted upon by a strong mechanical force, is at once swept out through the aperture, leaving the bottom in excellent condition.
 40

For convenience the two tanks are provided with gage-glasses that show at all times the height of the water and the oil, and also, preferably, with additional faucets for use
 45 in case of need.

It is to be observed that since the internal parts of the first tank may be lifted out together as easily as a cover can be removed, and since both tanks can be as easily cleansed as a milk can, there is no deterioration of the apparatus by continued use.

What I claim is—

1. In a waste oil purifier, the combination with a suitable vessel, of approximately horizontal plates, one above the other therein, arranged to allow the upward escape of oil only from non-corresponding parts of the successive plates, and means for discharging oil beneath the lower plate; whereby oil in passing the plates must crawl along the lower surfaces of the plates, successively.

2. The combination with the tank containing liquid of a greater specific gravity than oil, of means for discharging oil in the lower part of said liquid; a pipe arranged to heat the liquid about the discharge point of the oil, and a wall surrounding the discharge point and preventing the oil from coming in contact with the heating pipe.

3. The combination with a tank, of an oil reservoir supported in the upper part of the same, a tube leading from the reservoir to the lower part of the space within the tank, a plurality of shelves, one above the other, projecting out from the pipe upon all sides and arranged to allow oil rising beneath them to escape marginally from the one and centrally from the next; whereby when the tank is filled to a point above the shelves with a liquid heavier than oil, oil discharged by said tube beneath the lower shelf can rise to the surface of the liquid only by passing to and fro along the under sides of all the shelves.

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

MICHAEL D. HOGAN.

Witnesses:

HUGH M. STERLING,
 WALLACE GREENE.