April 20, 1926. 1,581,879

J. M. SIMS ET AL

BOLTED STEEL TUBE STILL FOR DISTILLING OIL

Filed Oct. 24, 1924 2 Sheets-Sheet 1

FIG. 1

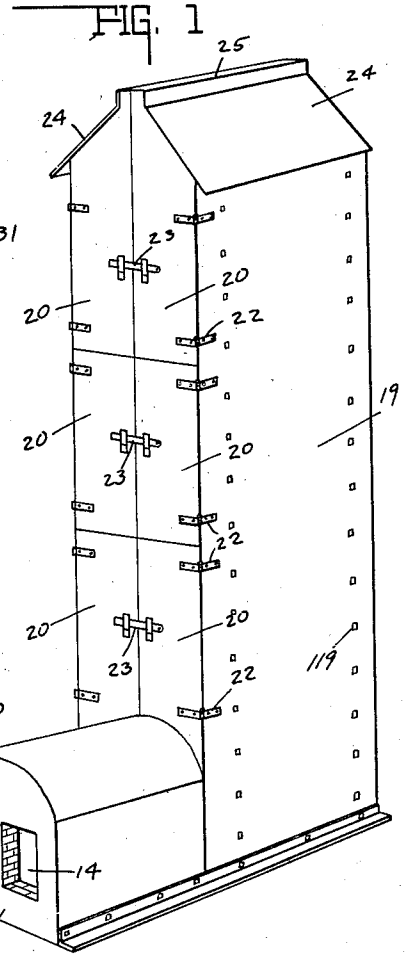
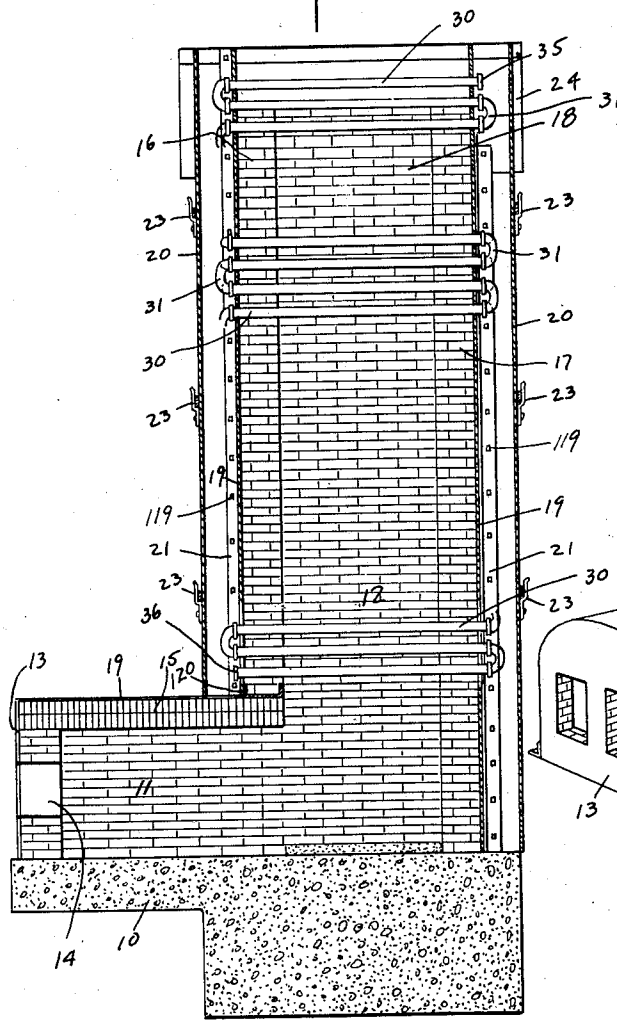


FIG. 2



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FIG. 3

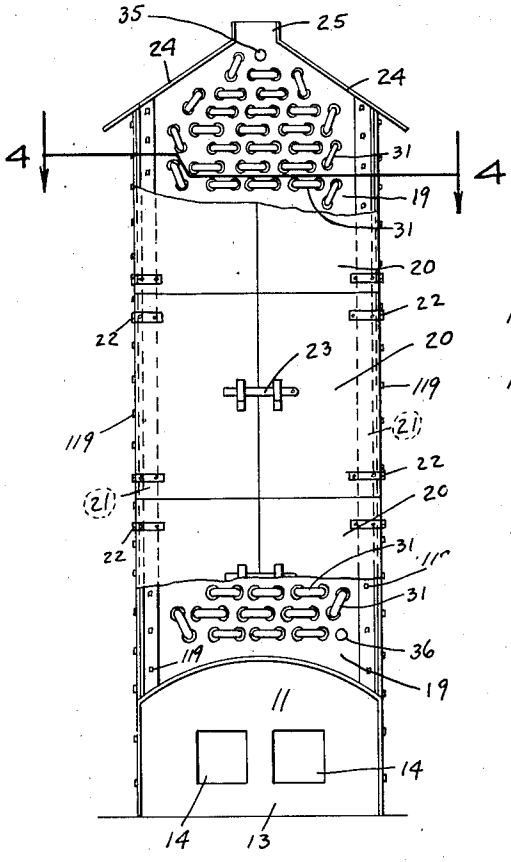


FIG. 4

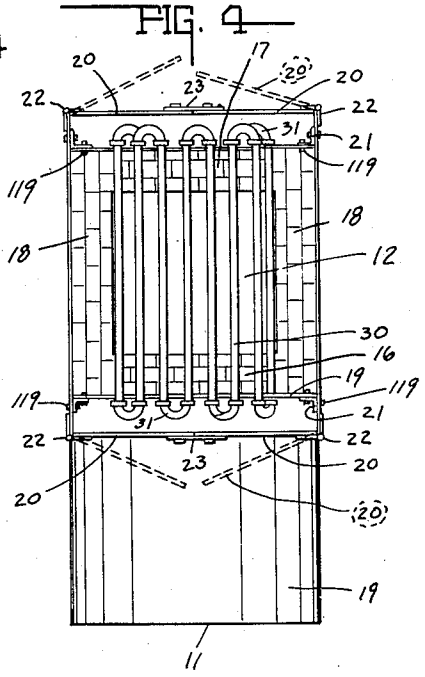
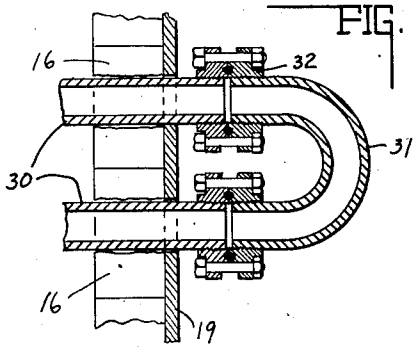


FIG. 5



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UNITED STATES PATENT OFFICE.

JAMES M. SIMS AND OLPHA M. BROOKS, OF SHREVEPORT, LOUISIANA.

BOLTED STEEL TUBE STILL FOR DISTILLING OIL.

Application filed October 24, 1924. Serial No. 745,668.

To all whom it may concern:

Be it known that we, JAMES M. SIMS and OLPHA M. BROOKS, citizens of the United States, and residents of Shreveport, parish of Caddo, and State of Louisiana, have invented a certain new and useful Bolted Steel Tube Still for Distilling Oil; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

This invention is a bolted steel tube still for distilling oil and fractionating it. The object of the invention is the reduction in the cost of distilling oil, by way of eliminating skilled labor, shortening the time of construction of the still and also of any reconstruction thereof, simplification of the still by eliminating the smoke boxes and stack, and the improvement in the operation of the still in treating the oil, as hereafter will more fully appear.

One feature of the invention consists in providing a vertical heating or coil chamber in which the coil is arranged transversely, and which chamber serves as a flue or stack for the oven and also for the heating of the coil containing the oil being treated. In carrying out this feature of the invention, the coil is made up of many short tubes arranged transversely of the heating chamber and extending through the walls thereof with removable return bends at the ends of the tubes and outside the wall thereof, whereby any return bend or tube may be readily removed for cleaning the same and replaced. Also by reason of the tubes being short many advantages result as hereinafter specified.

Another feature of the invention consists in said still being formed of steel plates bolted together and lined with brick or other clay material; and also in having two opposite sides thereof arranged to be readily opened like doors for rendering accessible the return bends and the ends of the individual tubes of the coil, for the ready removal and replacement thereof.

The full nature of the invention will be fully understood by the accompanying drawings and the following description and claims:

Fig. 1 is the perspective view of the still showing the front and the right-hand side and top thereof. Fig. 2 is a central vertical section of the still longitudinal of the furnace with portions of the coil omitted. Fig. 3 is a front elevation with the doors partly broken away. Fig. 4 is a horizontal section through the still on line 4—4 of Fig. 3. Fig. 5 is a central section through a return bend and the ends of the two associated tubes and the adjacent walls, parts being broken away.

This still is a bolted steel tube erected on a concrete foundation with a horizontal oven 11 and a vertical heating chamber 12 leading from the end thereof. The wall of the oven is formed of steel plates 19 bolted together, with the front wall 13 and side walls lined with brick, and the top arch 15 built of brick or other clay material. The front wall has door opening 14. At its rear end the oven communicates with the vertically disposed heating chamber 12. This heating chamber is also built of steel plates 19, bolted together by bolts 119. The steel tube thus formed is lined with brick or other clay material, forming a front lining 16, a rear lining 17 and side lining 18. Over the rear end of the oven there is a channel iron 120, and each corner of the steel tube is braced by angle-irons 21.

Each side plate 19, forming the heating chamber, extends laterally beyond the front and rear walls, as shown in Fig. 4. Steel doors 20 are hinged at 22 and held closed by latches 23, as shown in Fig. 1. The same door construction is located on both the front and rear of the structure as is shown in Fig. 4. The roof of the construction forming the heating chamber is composed of sloping steel plates 24 secured to the upper ends of the steel side plates 19 and between the two roof plates 24. At the top there is an opening or flue outlet 25 as seen in Figs. 1 and 3.

The coil is composed of short pipes 30 arranged horizontally in the front and rear walls of the heating chamber 12, and each short tube extends just beyond the steel wall 19 thereof, as shown in Fig. 2 and the outer ends of the adjacent tubes 30 communicate with each other through return bends 31, and are removably connected therewith as shown in Fig. 5 by unions 32 of any desired construction, which are readily removable and which renders an air-tight joint between the tubes 30 and return bends 31. The union shown has two members screwed on the tube

and bend and bolted together. The inlet to the coil is at the upper end at 35 and the outlet at the lower end at 36.

The construction of stills for distilling oil is a simple one and by arranging the heating chamber vertically and utilizing it as a flue, smoke boxes and smoke stacks are eliminated; and the coil receives the full effect of the heating gases coming directly from the furnace and passing through the heating chamber containing the coil to the outlet of the heating chamber, which is also the outlet of the flue. Since the tubes 30 are relatively short in this construction they cannot sag under heat and practically the entire length of each of the tubes is exposed to the heat and absorbs substantially an equal amount thereof per square inch.

With so many short tubes in the coil, exposed to the fire, the heat strain on any one tube is minimized and the heat and strain are very thoroughly distributed throughout the entire coil, which gives a uniform distillation or treatment of all the oil passing through the coil. Furthermore, by the coils being composed of so many short tubes and return bends, the oil is very effectively and thoroughly agitated and that causes ready displacement of the oil in each return bend and eliminates all chances for the settling of any oil at any particular bend and therefore burning the tubes.

By opening the doors 21 the return bends 31 and also the ends of the short tubes 30 are rendered easily accessible for removal and replacement, as is necessary in keeping the still clean and causing the still to successfully operate. This means for removing and replacing the tubes and return bends enables any repair to be made at minimum cost and causes a very brief shut down for that purpose.

This construction of stills very effectively superheats the vapor. That is the oil in the coil comes in at the top of the heating chamber and becomes heated more and more as it descends and is converted into a vapor after it has descended about half way, and that vapor is superheated as it proceeds down because of the increasing heat and increasing pressure and velocity of the vapor in the coil. This increase of pressure and velocity is due to the expansion and confinement of the vapor, and it expands as the heat increases, and also it is confined because of the column of oil above, and the vapor passes from the lower outlet at 36 in the coil into a tower not shown.

The construction of this still practically eliminates the necessity for skilled labor and materially reduces the cost of initial construction and also the cost of reconstruction, for about 90% of the material can be salvaged because of its bolted steel construction also effectively superheats the vapor.

The invention claimed is:

1. A still for distilling oil having a coil heating chamber formed of bolted steel tubes lined with clay material, and a continuous coil for the oil formed of a series of short tubes mounted in the wall and extending transversely of the heating chamber, and return bends removably connecting the ends of the adjacent tubes and located outside of the walls of the heating chamber, substantially as set forth.

2. A still for distilling oil having an oven, a coil heating chamber extending vertically therefrom which also serves as a flue for the oven, the walls of said heating chamber being built of steel plates bolted together and lined with clay material, and a continuous coil for the oil formed of a series of short tubes mounted in the wall of the heating chamber and extending transversely of the heating chamber, and return bends removably connecting the ends of adjacent tubes and located outside of the walls of the heating chamber, whereby any of the tubes or return bends will be readily accessible for any purpose.

3. A still for distilling oil as set forth in claim 2, with the adjacent ends of said tubes and return bends being threaded, and means for uniting the same consisting of two members adapted to be screwed on a tube and return bend respectively and bolted together to perfect a tight and readily removable union.

4. A still for distilling oil as set forth in claim 2, and steel doors enclosing the opposite walls of the heating chamber carrying the return bends of the coil, and means for securing said doors in closed position.

5. A still for distilling oil having an oven, a coil heating chamber extending vertically from the oven and serving also as a flue, the walls of said chamber being built of bolted steel plates lined with clay material, the steel plates forming two opposite sides of the chamber extending beyond the other walls, a coil for the oil consisting of short horizontal tubes mounted cross-wise in the heating chamber and the walls thereof and extending beyond the latter, and return bends connecting the tubes and located outside of the walls and between said extended steel plates, doors mounted on the extended portions of said steel plates, and means for latching the doors.

6. A still for distilling oil as set forth in claim 5, with steel plates on the upper ends of said steel side plates sloping upwardly toward each other and forming a roof and arranged to leave a centrally located flue outlet in the upper end thereof.

In witness whereof, we have hereunto affixed our signatures.

JAMES M. SIMS.
OLPHA M. BROOKS.