April 8, 1930. T. T. GRAY 1,753,859

TREATMENT OF FLUIDS WITH SOLID SUBSTANCES

Filed Jan. 18, 1926

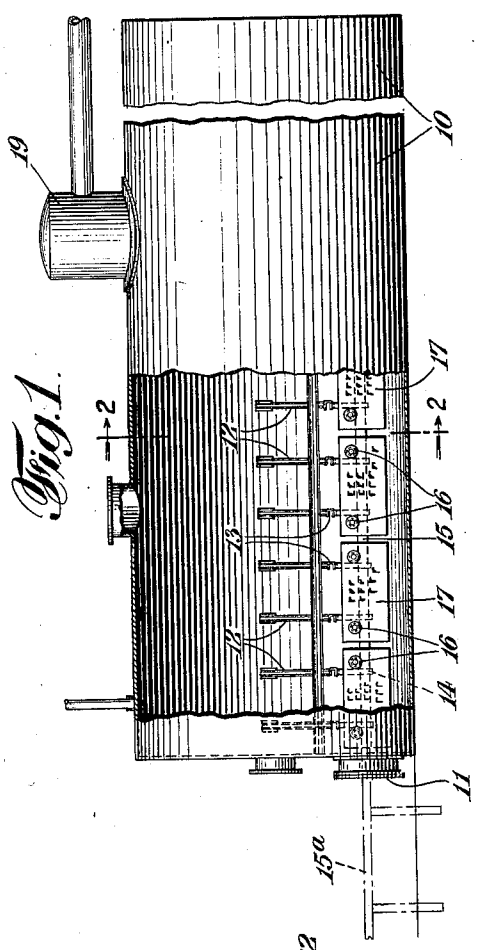


Fig. 1.

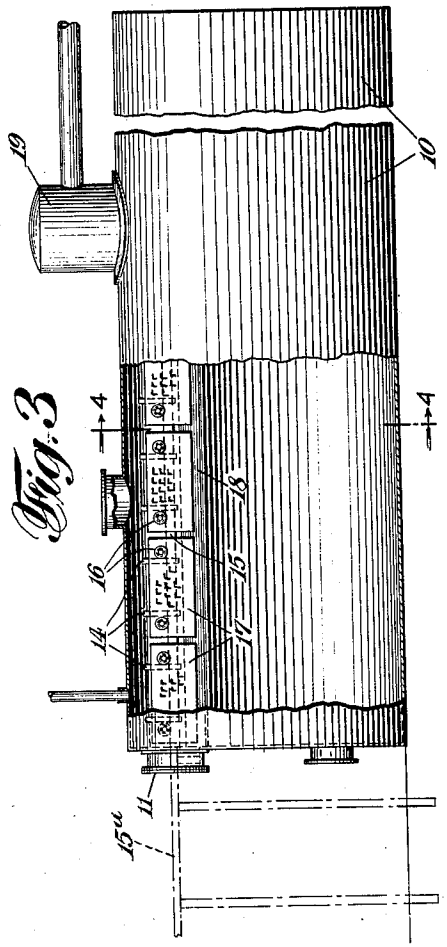


Fig. 3.

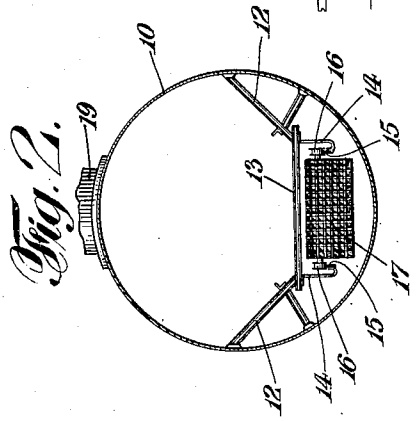


Fig. 2.

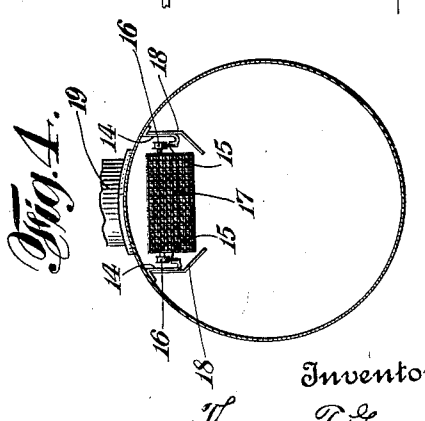


Fig. 4.

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UNITED STATES PATENT OFFICE

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TREATMENT OF FLUIDS WITH SOLID SUBSTANCES

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This invention relates to treatment of fluids with solid substances, more especially to treatment of petroleum products by contact with solid substances to effect desirable changes in the petroleum products.

An object of this invention is to bring solid substances in contact with fluid substances and at the same time prevent dispersion of the solid substances through the liquid substance; specifically, to treat fluid petroleum products with solid adsorptive substances within the processing still.

This object is attained by supporting within the processing still a plurality of containers charged with solid treating substances, said container being so constructed as to permit the flow of the fluid substances through the solid substances in the containers but preventing passage of the solid substances from the containers. Preferably, the containers are metal baskets or bags formed from fine metal screen which are suspended in the still by tracks along which they are movable and the still is provided with a manhole through which the containers are run into and out of the still over temporary tracks provided for this purpose. The tracks may be arranged above or below the level of the liquid in the still, depending upon whether it is desirable to bring the material in the still into contact with the solid substances in vaporous or liquid condition. The solid substances within the containers depend upon the fluid to be treated or the type of treatment to which the fluid is to be subjected. The material in the different containers may be different or may be the same, depending upon the type of treatment.

With this arrangement, the treating material is easily introduced or withdrawn from the still and different materials can be used at the same time and still be kept separate. The treating materials used are kept out of contact with the still, thereby preventing local overheating and contamination and are also prevented from being carried off with the discharge from the still. Where the treating materials have been immersed in the liquid treated, the containers will drain as the liquid is pumped from the still and can be further rid of the treated fluid by introducing steam into the still after each run.

Other objects and features of this invention will be apparent from the following specification and accompanying drawings wherein—

Fig. 1 is a side elevation partially broken away of a still embodying the invention as adapted for treating liquids;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 1 embodying the invention as adapted for treating vapors; and

Fig. 4 is a section on the line 4—4 of Fig. 3.

Referring now to Figs. 1 and 2, 10 is a still or other suitable holder for liquids having at one end a manhole closed by a cover 11. Along each side of the still is provided a set of supports 12 projecting downwardly into the still, their ends being connected by cross members 13. To the under surface of the cross members 13 are attached brackets 14 supporting rails 15 extending the length of the still and being in alignment with the manhole. A series of baskets 17 are supported from the rails 15 above their centers of gravity by trunnions and sheave wheels 16 turning on the rails 15.

The baskets 17 preferably are built up of perforated metal plates having a lining of fine mesh wire cloth of suitable metal. The wire cloth prevents escape of the material from the baskets while the plates supply the strength necessary to support the material. The baskets may be provided with suitable covers which may be opened to allow the filling or emptying of the baskets. A removable section 15^a of track is provided to connect the tracks or rails within the still with permanent outside track, so that the baskets may be readily drawn out from the still to be dumped and recharged. The tracks 15 are arranged at such a level in the still that the baskets 17 are completely immersed within the liquid to be treated.

Referring now to Figs. 3 and 4, the tracks 15 are supported by brackets 14 bolted to the top of the still and the manhole is arranged near the top in alignment with the tracks. The baskets 17 are similar to those disclosed

in Figs. 1 and 2. Plates 18 extend along the brackets and then downward at an angle slightly below the bottom line of the baskets. This arrangement is designed for use when it is desired to treat vapors emanating from a liquid contained in the lower part of the still, the plates 18 serving to force the vapor into contact with the baskets before it can escape through the dome 19.

While this arrangement is adapted for the treatment of any desired fluid with any desired solid substance, it is particularly adapted for treating petroleum products for the removal of any desired material, such, for example, as sulphur. The solid substances contained within the baskets may be adsorptive or metallized adsorptive materials such as silicious substances, fuller's earth, bauxite or copperized fuller's earth. Other solids having an affinity for sulphur may be used such as iron, lead, zinc, manganese or their salts and bases, either alone or mixed with the clays. Also finely divided copper, nickel, iron or other metals, their oxides or bases, as well as lime, caustic, alkalies, etc., may constitute the charge in the baskets depending upon the treatment to which it is desired to subject the petroleum products.

It is of course understood that changes may be made in the structure of the apparatus above described and that the apparatus may be used in connection with substances other than those above enumerated without in any way departing from the spirit of the invention as set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The process of refining hydrocarbon liquid which comprises heating a body of such liquid, suspending within said body of liquid and in contact therewith a plurality of treating agents solid at the refining temperature, and confining each treating agent within a limited space thereby effecting separation of the different agents and preventing dispersion thereof in the liquid.

2. The process of refining hydrocarbon oil which comprises distilling the same, contacting the oil with a plurality of treating agents solid at the distillation temperature and confining the treating agents within separate limited spaces thereby preventing intermingling of the agents and the dispersion thereof in the oil.

In testimony whereof, I have signed my name to this specification.

THOMAS T. GRAY.