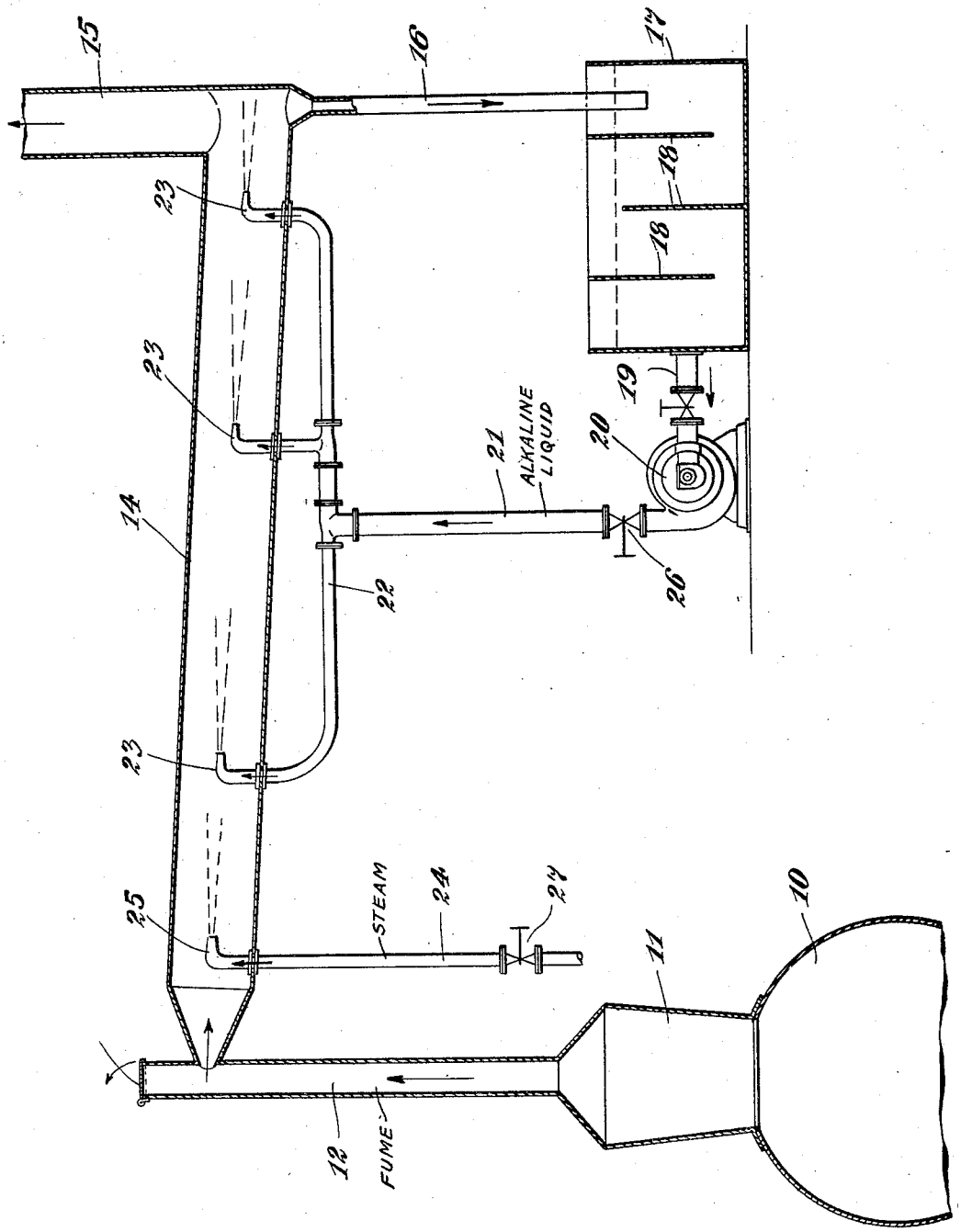
April 7, 1931. R. S. PERRY 1,799,177

PROCESS FOR THE CONTROL AND TREATMENT OF FUMES

Filed July 10, 1926



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PROCESS FOR THE CONTROL AND TREATMENT OF FUMES

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My invention relates to the control and treatment of fumes and refers particularly to the control and treatment of fumes produced by the heat treatment of oleaginous, fatty and waxy material.

The fumes evolved by the heat treatment of oleaginous, fatty and waxy materials frequently contain products of different chemical compositions requiring different methods for their respective recovery and each of these recovery steps requires devices particularly suitable therefor, the complete device is comparatively expensive in construction and occupies considerable space, in addition to which there is the supervising care necessary to the successful operation of all of the separable elements.

As an example of the processes necessary for the carrying out of such fume control and treatment, I make mention of that involved in the manufacture of varnish, although I wish to be understood as not limiting my process to that particular manufacture.

In the recovery of fume contents in the production of varnish, a portion of the fume content is condensed by means of surface condensation and a further portion is condensed by liquid spray condensation. After the removal of the fume condensates just mentioned, the fume still contains certain chemical compounds which are exceedingly disagreeable and objectionable because of their odor, and in order to remove these and eliminate occupational and neighborhood nuisances, it has been suggested to pass the fume through an alkaline liquid.

It is to be noted that in order to carry out the process just described, there must be a surface condensation device, a liquid spray condensation device and a device for passing the fume through the alkaline liquid.

Further, a draft must be produced through the several devices, in order that the fumes may be forced, or drawn, therethrough and the employment of a fan, or pump, for this purpose is highly objectionable because of the tendency of the gummy condition of the fume content, which clogs the fan, or pump, and renders it inoperative.

The process of my invention overcomes all of the above mentioned, and other, objectionable features and presents a means whereby the surface condensation step, the liquid spray condensation step, the alkaline liquid treatment and the draft step are all performed practically simultaneously and within one device or chamber.

Further, the liquid employed in the draft force pump of my process is alkaline in character and of such lubricity as to prevent the clogging of the pump, thus allowing of its continuous operation.

In the process of my invention, I employ the necessary alkaline liquid as a spray condensing medium, the force of the alkaline liquid spray acting as a draft producing means, the operation being performed in a conduit, or chamber, which acts also as a surface condenser.

It will thus be seen that the one operation of my process performs all of the acts and functions of the three operations incident to the described process, and at the same time eliminates the difficulty incident to the pump, or fan, employment in the described process.

The process of my invention not only materially reduces the steps of operation but also materially reduces the devices necessary for following of the process.

The process of my invention will be clearly understood by a consideration of this specification and its accompanying drawings.

In the accompanying drawings, illustrating one form of the device adapted for my process, similar parts are designated by similar numerals.

The figure is a side view of a diagrammatic form of device, the operation of which is described in the following:—

The particular device shown in the accompanying drawing and suitable for the following of my process comprises a heating kettle 10, having an extended neck 11 and a vertical stack, or flue, 12. An explosion door, or cover, 13 is hingedly attached to the upper portion of the stack 12 and covers the same.

Connected to the vertical stack 12 is an inclined treatment conduit 14, the other ex-

tremity of which is connected with the exit stack 15.

A condensate conduit 16 connected with the lower extremity of the treatment conduit 14, enters a separating receptacle 17 having a plurality of baffle-plates 18, 18 and an exit pipe 19.

A rotary force pump 20 has its intake end connected to the pipe 19 and its outlet end connected to the pipe 21 which in turn is connected with the manifold 22 and a plurality of jets 23, 23 within the treatment conduit 14 are connected to the manifold 22.

A pipe 24, connected with a source of steam (not shown) has the jet 25 within the treatment conduit 14.

The pipe 21 carries the valve 26 and the pipe 24 carries the valve 27.

The operation of the device is as follows:—

Valve 27 is closed, valve 26 is opened and a suitable alkaline solution is placed within the separator 17.

The contents of the kettle 10 are then heated until the fumes arising therefrom ascend through the stack 12 and into the treatment conduit 14. The pump 20 is then started and the alkaline solution in the separator 17 is forced upwardly through the pipe 21, the manifold 22 and the sprays 23.

The operation of the alkaline solution thus forced through the sprays is three-fold; it materially aids and increases the draft in the treatment conduit 14, thus driving the uncondensed portions of the fumes through the stack 15 into the atmosphere; it acts as a liquid, or spray, condenser for those portions of the fumes capable of condensation under the conditions of operation, and it combines chemically with certain portions of the fumes which are largely of objectionable odor converting them into unobjectionable condensates.

The condensates thus formed flow downwardly through the pipe 16 into the separator 17, in which the baffle-plates 18, 18 prevent an agitation of the liquid due to the influx of liquid through the pipe 16 and its exit through the pipe 19. During this comparatively unagitated condition of the mixture in the separator 17, the condensates separate by gravity from the alkaline solution, and the comparatively uncontaminated latter, due to the position of the pipe 19, recirculates through the system. The condensates may be removed from the separator 17 as desired.

If desirable, in order to heat the fumes in the treatment conduit, increase the draft, facilitate the reaction between the alkaline solution and the fume conduit or for other reasons, the valve 27 may be opened and steam forced through the spray 25.

It is to be noted that four operations are performed continuously and practically simultaneously in the treatment conduit, and these are surface condensation due to the walls of the treatment conduit, liquid or spray condensaton due to the alkaline liquid, a draft production due to the force of the alkaline liquid through the sprays and a chemical combination between the alkali of the liquid and certain objectionable contents of the fumes.

It is to be further noted that my process is continuous, the fume condensates being practically removed from the alkaline liquid during the process, and the alkaline liquid thus purified being fed continuously to the system.

The economy of plant construction and simplicity of operation of my process over those processes in which the several steps are performed in sequence are evident.

I do not limit myself to the particular size, shape, number, or arrangement of parts or to the particular materials employed as illustrated and described as these are given simply as a means for clearly describing my invention.

What I claim is:—

In a process for the recovery of organic ingredients of fumes produced in the production of varnish, the steps which comprise passing the fumes arising therefrom through a treatment conduit having an open end, spraying an alkaline liquid within the conduit and toward the open end thereof, collecting the thus produced condensates with the alkaline liquid, practically separating said condensates from said alkaline liquid and employing the thus separated alkaline liquid for spraying within the conduit.

Signed at New York city, in the county of New York and State of New York, this 2nd day of July, 1926.

ROBERT S. PERRY.