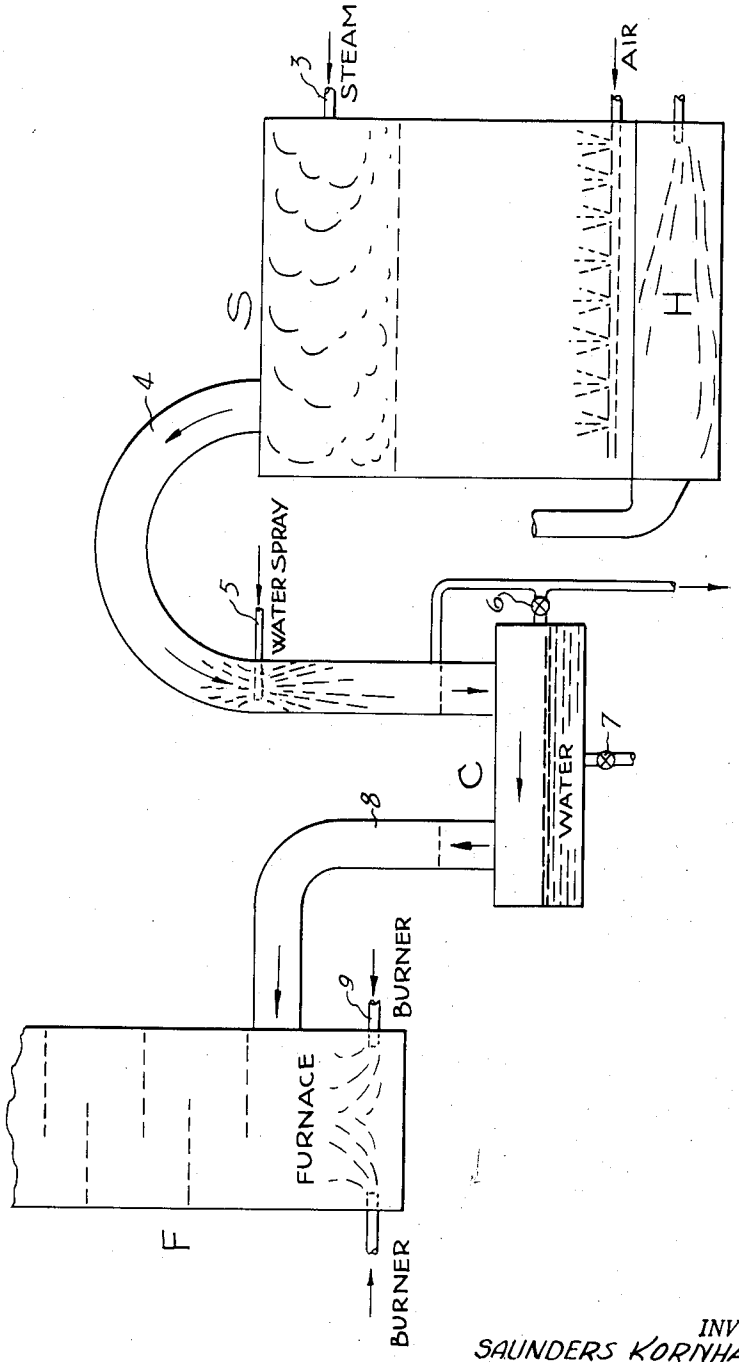
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FUME CONTROL APPARATUS

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FUME CONTROL APPARATUS

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In some industrial operations, fumes are generated which are noxious and in some cases poisonous. If discharged to the atmosphere, more or less air-pollution results, and this may become serious if near populous districts. By the present invention, however, it now becomes possible to control such fume nuisances, and without recourse to unduly complicated and expensive equipment. Other objects and advantages will appear from the following description.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings the sole figure is a semi-schematic illustration of apparatus embodying the invention.

Industrial fumes may involve various kinds of components, such as fixed gases, condensible vapors, and suspended fine mist articles of liquids and solids; and of these variously some may be water-soluble while others are insoluble. In the present system all of these may be taken care of.

In typical illustration, the invention may be described in accordance with an asphalt manufacturing plant. Such a plant generates fumes which contain offensive sulphur compounds, vaporous hydrocarbons, irritating oxidized hydrocarbons and aerosol hydrocarbons and complex tarry matters. Thus, for example: A source of fumes S is an asphalt oxidizer having air pipe **2** at the bottom with sufficient surface ramifications and perforations to distributively blow air up into a mass of heated petroleum residuum thereabove. Underneath is heating means of any suitable form, as a fire tube or chamber, indicated conventionally by heater H. Above the liquid mass is a steam inlet pipe **3** which supplies steam to blanket the space. A fume offtake pipe **4** leads to a collection drum C, and in the pipe **4** is a water spray **5**. A peculiarity of this is that it sprays water upwardly, as well as down. This washes down suspended mists, and condenses some vapors, and dissolves some matters. The water collects in the drum, and a small amount of washed-down tar matters settles on the bottom. An overflow outlet with valve **6** can permit the water to drain to a further treating-pond if necessary or to the sewer. Bottom settlings may be drawn off from time to time by valved outlet **7**. From the drum a fume pipe **8** leads to a furnace F which may be fired for example by gas or oil burners, and which may have baffling or coarse checker-work as desired to provide suitable intermixing

and turbulence. Here, whatever components go past the water-treating zone is so minimal and diluted out into air as to be acceptable by municipal standards. With an operating temperature of 400–500° F. in the oxidizer S, there may be an average fume volume e. g. of 3200 cu. ft. per minute with temperature maximum 490° F.; and at a water spray rate of around ten gallons per minute the scrubbed fumes leave at a temperature of around 225° and the temperature of the discharge water is about 150–175° F. As a feature of the invention, the drum combination provides a versatility of actions. Thus for example, if it is desired to shut down the tank S while running fumes from another to the furnace, the valve **6** is closed and water backs up to the upper overflow level, and the drum acts as a valve. In asphalt tank arrangements heretofore it has been customary to have an adjustable damper in the fume offtake pipe. Such dampers have occasioned trouble by reason of accumulation of tarry condensate thereon. The present arrangement wholly obviates this.

Similarly, with any fume source, the offtake pipe **4**, **8**, with interposed collection drum C and adjustable overflow, and furnace, afford a positive and dependable arrangement for fume control.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

We therefore particularly point out and distinctly claim as our invention:

1. In apparatus of the character described, the combination of a tank for asphaltic petroleum stock, means for injecting air at the bottom thereof, means for supplying steam at the top, a fume pipe leading from the top of the tank, a water spray in said fume pipe, settling-sump means and unit shut-off means combined, including a chamber with an inlet into its top from said fume pipe, an outlet in the top of said chamber spaced from said inlet and on substantially the same liquid level, a liquid-overflow in said first-named fume pipe at a level above said chamber, and means to open a passageway between said inlet and said outlet and for flood-closing such passageway, comprising a closable lateral liquid-overflow in said chamber at a level below said inlet and outlet.

2. In apparatus of the character described, the combination of fume-generating means and a fume-conducting pipe, a water spray therein, a furnace to which said pipe leads, and interposed ahead of the furnace settling-sump means and unit shut-off means combined, including a chamber with an inlet into its top from said fume pipe, an outlet in the top of said chamber spaced from said inlet and on substantially the same liquid level, a liquid-overflow in said first-named fume pipe at a level above said chamber, and means to open a passageway between said inlet and said outlet and for flood-closing such passageway, comprising a closable lateral liquid-overflow in said chamber at a level below said inlet and outlet.

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