

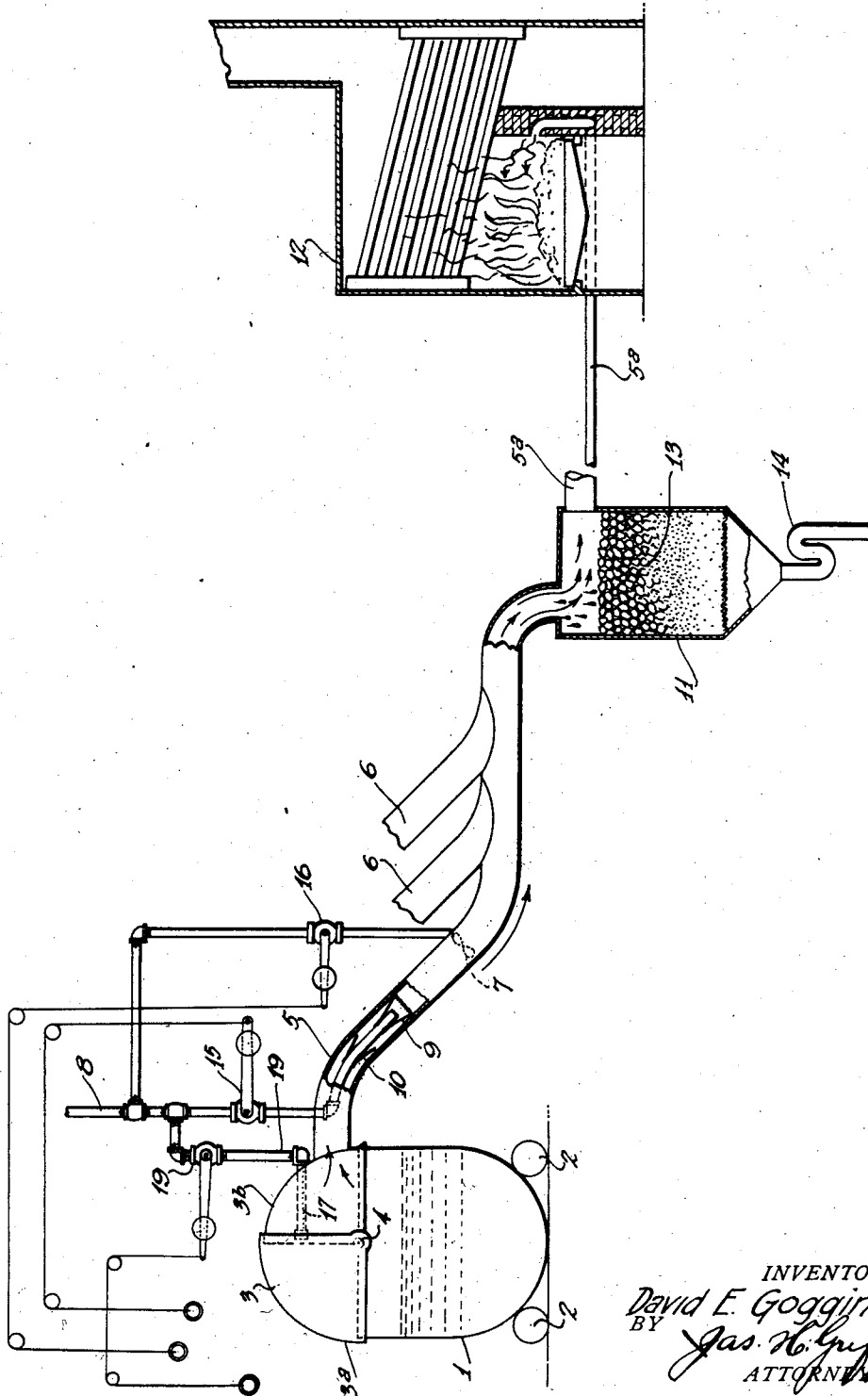
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DISPOSAL OF GASES AND VAPORS RESULTING FROM THE BOILING
OF OILS, GUMS, RESINS, AND THE LIKE
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DISPOSAL OF GASES AND VAPORS RESULTING FROM THE BOILING OF OILS, GUMS, RESINS, AND THE LIKE.

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This invention relates to the disposal of gases and vapors generated during the heating or boiling of oils, gums, resins and the like and is more particularly directed to the disposal of such gases and vapors which accompany the making of varnish. In the manufacture of varnish, the constituents thereof are placed in kettles and are subjected to a relatively high degree of heat during which operation there arises from the kettle heavy vapors and gases which are obnoxious to the workmen and public in general and are dangerous because of their explosive qualities.

In most of the larger cities, ordinances prevail against the discharging of the fumes resulting from varnish making into the atmosphere and as a result numerous expedients have been resorted to to ameliorate this difficulty. These expedients, however, have not proven a practical solution of the problem either because of the expedients involved in their installation and operation or because of their complex, inconvenient and unhandy nature. The most common of such expedients consists in apparatus for chemically scrubbing the fumes and otherwise chemically acting on them in an attempt to divest them of their injurious or obnoxious characteristics after which the remaining gases are exhausted into the atmosphere usually through high stacks.

As hereinbefore stated, however, the prior methods of treating fumes of the character described have not met with favor in the trade and do not fulfill the required results. As a result municipalities in general have practically banished varnish factories from said limits and they are forced to erect plants beyond such city limits in the country or suburbs where adequate transportation facilities are lacking with resulting high cost of manufacture.

The object of the present invention is to provide for the efficient and economical disposal of fumes of the character described in such manner as to absolutely destroy their obnoxious and dangerous characteristics, and in accordance with the invention, the fumes are taken from the boiling kettle and transported to a furnace where they are burned and completely destroyed.

The fumes resulting from the preparation of varnish are very heavy and after rising to the top of the kettle flow over the upper edge

thereof and descend to the region of the floor, stratifying in a dense mass above the fire used to heat the kettle and rendering the vicinity not only dangerous to workmen, but also obnoxious to any one in such vicinity.

Prior attempts have been made to draw the fumes direct from the kettle by means of mechanically operated fans and to discharge them through pipes either to the stack or into chemical treatment apparatus, but practical experience has shown that these fumes contain such a large amount of gummy constituents that they rapidly clog such fans or blowers and necessitate almost continuous maintenance in order to keep the fans and outlet conduits clean and unobstructed. Thus, in practically carrying out the invention, I provide the kettle with a suitable hood and this hood is in turn provided with an outlet duct arranged as near as possible to the upper edge of the kettle so that the fumes will not have to be raised any higher than necessary to flow into the outlet, whence they are conveyed preferably in a downward direction to a suitable treating chamber. The down direction is practically important because of the weight of the fumes and their tendency to descend. In practice, the fumes may be fed directly to the furnace, but I preferably accelerate their flow through the outlet pipe by means of a steam or hot water injector which serves to maintain the pipe hot and thereby eliminate deposits of gummy material on the interior thereof. A blower may be also positioned within the pipe, but if such is the case, the blower is preferably a steam or hot water operated machine, so that it will in itself embody sufficient heat to maintain the products on which it operates in a liquid condition and preclude sticking or adhering of the products to the blower mechanism.

When I employ steam or hot water, the products passing through the pipe become admixed therewith and should not be directly passed into the furnace, so that in such instance, I pass the products and water or water of condensation through a suitable treating chamber to remove the excess water after which said products may be passed directly to the furnace. By this method and apparatus, the products are delivered in a composite state to the furnace where they are burned and totally destroyed.

Features of the invention, other than those

specified, will be apparent from the herein-after detailed description and claims, when read in conjunction with the accompanying drawings.

5 The accompanying drawings illustrate one practical embodiment of the invention, but the construction therein shown is to be understood as illustrative, only, and not as defining the limits of the invention.

10 The drawing shows a system or apparatus embodying the present invention in a more or less diagrammatic manner.

Referring to the drawing, 1 designates a treating kettle of which in practice there may be several. Each kettle is provided with the usual rollers 2 to permit it to be moved into and out of cooperative relation with the fire. Above the kettle is mounted a hood 3, which, in practice, is preferably made in two parts 3^a and 3^b. The part 3^b may conveniently be supported on the masonry adjacent the fire so as to be in stationary position while the part 3^a is pivoted to the part 3^b, as shown at 4. The two sections of the hood are preferably made of semispherical contour and inasmuch as the section 3^a is pivoted to the other section as described, said former section can be pivoted back over the latter to permit of the movement of the kettle into and out of cooperative relation with the hood or to inspect the interior of the kettle, although during treatment the section 3^a is in the position shown wherein it will close and seal the top of the kettle. The hood sections are made to have a good fit with the top of the kettle, so as to preclude leakage of vapors at this point.

Extending to one side of the hood and preferably as close to the lower edge as possible is an outlet duct or pipe 5 which leads in a generally downward direction away from the hood. This pipe is provided with a number of branch pipes 6 leading from additional kettles, so that the fumes from the several kettles may be fed into the common disposal pipe.

If the treatment kettles are positioned above the level of the furnace of the manufactory in which the installation is made, the fumes may be fed through the pipes direct from the kettles to the furnace by gravity, but, in practice, I preferably positively propel them to insure rapid passage of the fumes to the furnace. To effect this operation, one or more blowers 7 are preferably employed and these blowers are preferably steam or hot water operated so as to maintain the fumes in a heated condition and preclude the depositing of gummy constituents either upon the interior of a pipe or upon the mechanical parts of the blower.

In the preferred form of the invention, however, the flow of fumes is preferably accelerated by means of a steam or hot water injector, which may be used with or to the

exclusion of the blower or blowers 7. The steam or hot water is fed through a pipe 8 to an atomizer or injector 9 positioned within the pipe 5 and the steam or hot water is introduced into the pipe under sufficient pressure and in the direction of flow of fumes to accelerate the flow and at the same time become admixed with the fumes, so as the dilute them sufficiently to at least partially divest them of their sticky characteristics, so that they will not be so apt to stick to the pipe 5.

Another important function inherent in the use of hot water or steam is that the heat of these fluids will maintain the fumes at a sufficiently high temperature to further preclude sticking and which would result in clogging of the apparatus. It will be noted moreover that a considerable portion of the pipe 8 extends into the pipe 5 and such part of the pipe 8 as is interior of the discharge pipe may be in the form of a heating coil if desired. One or more baffles 10 are shown in the pipe 5 to preclude all possibility of retrograde movement of the gases.

When steam or hot water are employed in carrying out the present invention, the fumes are first passed through an intermediate treating chamber before being conveyed to the furnace and in the drawing this treating chamber is designated by the reference character 11. The gases are fed into the top of the chamber and out of one side thereof through a pipe 5^a to the furnace designated in the drawing by the reference character 12. The chamber 11 preferably contains charcoal 13 or some other suitable filtering medium, so that during the passage of the fumes through the chamber 11, the water or condensate will drop out while the volatile vapors or fixed gases will pass across the chamber and out through the pipe 5^a to the furnace. The solids and liquids which are arrested in the chamber 11 will filter down through the charcoal 13 and flow out of said chamber through a trapped outlet 14. The filtering medium is preferably employed so that the water recovery may be used as boiler feed water or may be fed back and suitable preheated to be used again.

The gases and vapors passing through the pipe 5^a may be accelerated by a blower if desired and the blower is preferably used so that the gases will be rapidly discharged into the fire within the furnace.

It will of course be understood that steam for operating the injector is subject to control by a valve 15 and in like manner the steam for operating the blower is controlled by a valve 16. These valves are preferably so positioned that they may be conveniently and manually operated.

As a protection against hazards of fire within the kettle, I may, though it is not essential, provide within the hood a perfo-

rated pipe 17 connected to a branch pipe 18 leading from the steam supply pipe 8 and having a control valve 19 which, in the event of fire within the kettle, can be opened to produce a steam blanket within the kettle.

The method and apparatus of this invention will expeditiously and efficiently remove the fumes from the kettle and feed them to a furnace where they are totally destroyed so that they are rendered no longer obnoxious or dangerous. The feeding of aqueous vapor into a delivery pipe either in the form of steam or water produces a pronounced scrubbing action on the fumes and aside from keeping the fumes warm will absolutely preclude any possibility of a fire starting within the conduit. I have shown in the drawings the pipe 5^a for conveying the products from the treating chamber to the furnace as leading through the wall of the furnace and through the bridge wall into the firebox, so that during the passage of the gases through the wall of the furnace, they will be further heated and rendered more combustible.

I preferably in practice utilize the heat of the furnace to preheat the gases either in this manner or in any other suitable and convenient manner although I may if desired preheat in any desired way or with any suitable means. I may also provide within the treating chamber a heating coil buried in the charcoal or otherwise for heating the charcoal to a sufficient temperature to volatilize or vaporize the inflammable constituents which may be trapped by the charcoal to such degree that they will be carried along with the gases into the furnace and burned therein.

The foregoing detailed description sets forth the invention in its preferred practical form, but the invention is to be understood as fully commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. The herein described method of destroying fumes resulting from the boiling of materials carrying gummy substances in the fumes thereof, which consists in collecting said fumes as they separate from the materials and rise from the treating kettle, leading said fumes into the path of a current of steam, while the fumes are sufficiently hot to preclude detrimental deposits of gummy substances, conveying said fumes by said current of steam and feeding them to a furnace, and burning them within the furnace.

2. The herein described method of destroying fumes resulting from the boiling of materials carrying gummy substances in the fumes thereof, which consists in collecting said fumes as they separate from the

materials and rise from the treating kettle, leading said fumes into the path of a current of steam substantially as soon as they leave the kettle, conveying said fumes, by current of steam through a conduit and maintaining them, during such travel, at sufficiently high temperature to preclude the deposit of excess gummy substances in the conduit, thereafter removing condensate from the mixture of steam and fumes, and thereafter feeding the uncondensed vapors and fumes to a furnace and burning them therein.

3. The herein described method of destroying fumes resulting from the boiling of materials carrying gummy substances in the fumes thereof, which consists in collecting the fumes as they rise from the treating kettle, blowing them through a duct to a separator and maintaining them hot during such passage to preclude detrimental gummy deposits in the duct, removing condensate from the fumes during their passage through the separator, and thereafter conveying the fumes to and burning them in a furnace.

4. The herein described method of destroying fumes resulting from the boiling of materials carrying gummy substances in the fumes thereof, which consist in collecting the fumes as they rise from the treating kettle, forcing said fumes through a duct to a separator by a heating and propelling medium, removing condensate from the fumes during their passage through the separator, and thereafter conveying the fumes to and burning them in a furnace.

5. The herein described method of destroying fumes resulting from the boiling of materials carrying gummy substances in the fumes thereof, which consist in leading said fumes as they separate from the material kettle, and while they are sufficiently hot to preclude detrimental deposits of gummy substances, into a current of a heating and propelling medium, conveying said fumes and keeping them hot by said current and feeding them to a furnace, and burning them in the furnace.

6. The herein described method of handling fumes resulting from the boiling of materials carrying gummy substances in the fumes thereof, which consists in introducing the fumes, as they separate from the materials and while they are sufficiently hot to preclude detrimental deposits of gummy substances, into a current of steam, and conveying said fumes away from the boiling materials in said current of steam.

7. The herein described method of handling fumes resulting from the boiling of materials carrying gummy substances in the fumes thereof, which consists in introducing the fumes, as they separate from the materials and while they are sufficiently hot to preclude detrimental deposits of gummy

substances, into a current of steam, conveying said fumes away from the boiling materials in said current of steam, and thereafter disposing of said fumes and steam.

5 8. Apparatus of the character described embodying a treating kettle, a hood covering the kettle to collect fumes as they separate and rise from the material in the kettle, a furnace, a conduit for conveying said fumes
10 from the hood to the furnace, and means for delivering a heating and propelling medium into the conduit adjacent to and in a direction away from the hood to propel the fumes through the conduit and maintain them at
15 sufficiently high temperature to preclude detrimental deposits of gummy substances in the conduit.

9. Apparatus of the character described embodying a treating kettle provided with a
20 hood covering its top, a furnace, a separator, a duct leading from the hood to the separator for conveying fumes from the former to the latter, a conduit leading from

the separator to the furnace to convey said fumes to the furnace, and means for heating 25 fumes during substantially their entire passage through the duct from the hood to the separator.

10. Apparatus of the character described embodying a treating kettle, a furnace, a 30 hood associated with the treating kettle, and a conduit leading from the hood in relatively close proximity to the upper edge of the treating kettle and thence extending at a lower level to the furnace, and means for 35 introducing steam into the conduit at a point adjacent the hood and causing said steam to pass through the conduit in a direction away from the hood to separate the fumes from the material under treatment and to main- 40 tain the fumes at a sufficiently high temperature and thereby preclude the deposit of gummy substances in the conduit.

In testimony whereof I have signed the foregoing specification.

DAVID E. GOGGIN.