No. 633,807. Patented Sept. 26, 1899.

T. A. CLAYTON.

METHOD OF AND APPARATUS FOR FUMIGATING AND EXTINGUISHING FIRES IN CLOSED COMPARTMENTS.

(No Model.) (Application filed June 7, 1899.)

FIG. 1.

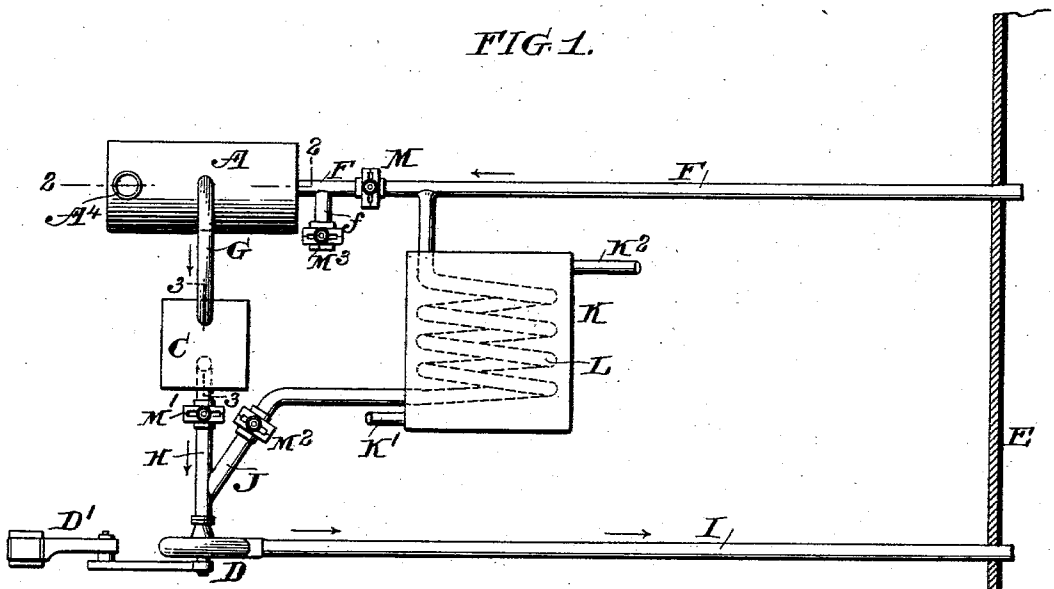


FIG. 2.

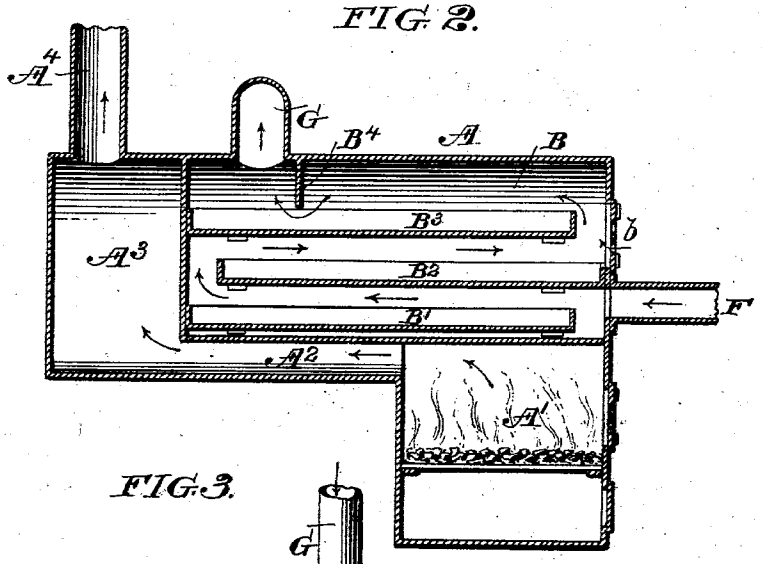
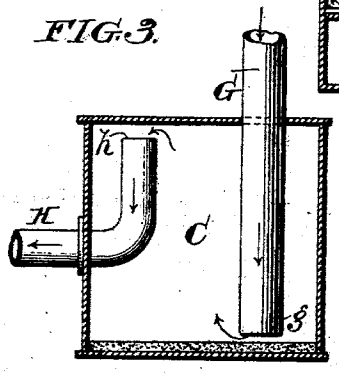


FIG. 3.



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METHOD OF AND APPARATUS FOR FUMIGATING AND EXTINGUISHING FIRES IN CLOSED COMPARTMENTS.

SPECIFICATION forming part of Letters Patent No. 633,807, dated September 26, 1899.

Application filed June 7, 1899. Serial No. 719,638. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. CLAYTON, a citizen of the United States of America, residing in New Orleans, in the parish of Orleans, in the State of Louisiana, have invented certain new and useful Improvements in Methods of and Apparatus for Fumigating and Extinguishing Fires in Closed Compartments, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to a method and apparatus for fumigating closed compartments, with particular reference to the extinguishment of fires therein, although my invention is also useful in the fumigation of compartments with a view of disinfecting their contents and with a particular view of preventing the occurrence of fire in the compartment as a result of fumigation.

Generally speaking, my invention consists in forcing the gas or vapor into the compartment until the desired result, with regard to the character of the gases with which the chamber is filled, is secured, and then causing such gases to circulate through the chamber and a refrigerating apparatus situated outside of the chamber until the temperature is reduced to the desired degree and the danger of fire occurring on the admission of air to the compartment obviated. Preferably I contemplate the generation of gases or vapors in a furnace the intake and outlet of which are connected with a closed compartment and through which and the compartment a forced circulation is maintained, so that the gases will be rapidly enriched to the desired point, whereupon I cut the furnace out of the circuit by means of a by-pass and maintain the forced circulation through the chamber and a conduit including the by-pass until the temperature is lowered to the degree desired, this result being hastened by including in the circuit a refrigerating apparatus, by means of which the temperature of the gases is rapidly lowered. Further, I prefer to use a furnace embodying a closed retort, with which retort the circulating-pipes are connected and in which retort the gases are generated, and I have found the best results in using such a retort-furnace as is shown and described in the patent granted to Samuel R. Olliphant and myself for a fumigating apparatus January 31, 1893, No. 490,981, using, as in said former patent, sulfur heated by the furnace as the means of generating sulfurous-acid gas, which is of the utmost value both as a disinfectant and a fire-extinguisher.

Reference being now had to the drawings, which illustrate an apparatus adapted for use with my method, Figure 1 is a plan view of such apparatus; Fig. 2, a sectional view through the furnace on the line 2 2 of Fig. 1; and Fig. 3, a sectional view through the receiver or trap, taken as on the section-line 3 3 of Fig. 1.

A indicates the furnace, A′ being the fire-box, and A^2 and A^3 flue-spaces leading from the fire-box to the stack A^4.

B is what I may properly call the "retort-chamber," situated in the furnace A and in which, as in the former patent above referred to, are situated a series of shallow trays B′, B^2, and B^3, arranged to make a tortuous passage through the retort and in practice filled with sulfur, which is of course melted by the heat of the furnace.

B^4 is a baffle-plate leading from the top of the retort-chamber down nearly to the level of the sulfur in the uppermost tray B^3.

E indicates the closed compartment to be fumigated for the extinguishment of fire or for other reason. F is a conduit leading from this closed compartment into the lower part of the retort-chamber B.

G is a conduit leading from the upper part of the retort-chamber B to a receiver or trap-chamber C, the pipe G leading to the bottom of this chamber.

H is a conduit leading from the top of the trap-chamber C to a circulating-fan D, driven, as shown, by an engine D′ and with which connects the conduit I, leading back to the closed compartment E.

J is a by-pass the function of which is to connect the circulating-conduit outside of the furnace. As shown, it connects the pipes or conduits F and H.

K indicates a refrigerating apparatus which by preference is situated, as shown, in the by-pass conduit J. It may consist of any convenient kind of apparatus for cooling gases, and as illustrated is simply a tank having a conduit for the admission of water leading into its bottom, as indicated at K′, and an overflow-conduit at its top, as indicated at K^2, while in the tank is situated a coil L, which is connected at top and bottom with the by-

pass conduit J. I may state that while I prefer to place the refrigerating apparatus in the by-pass it may be placed in any part of the conduit leading from the closed compartment except that which is cut out by the by-pass.

M is a valve or gate situated in the pipe F in the rear of the point where the by-pass J connects with it. M' is a similar device situated in the conduit G H, leading from the furnace in advance of the point where the by-pass J connects with it. M^2 is a similar device situated in the by-pass G, and M^3 a similar gate or valve situated in an open passage *f*, opening into the conduit F, its use being to permit of a regulated supply of air to the furnace-retort when it is desired, a function which is also served by a regulable damper, as indicated at *b* in Fig. 2.

When it is desired to extinguish a fire in the compartment E or to fumigate it for other purposes, a fire is lighted and maintained in the fire-box A' of the furnace and the circulating-fan D set in operation. The air from the compartment E is then drawn through the conduit F into the retort-chamber B, passing over the trays in the retort and combining with the sulfur to form sulfurous-acid gas which passes out of the retort-chamber through the pipe G, depositing such flowers of sulfur as may be carried with it into the trap C, and is then forced through the conduit I back into the closed compartment E. This circulation is maintained with the naturally-rapid enrichment of the gas and also with the elimination of oxygen by reason of combustion in the chamber, if fire exists there, until the gases are no longer capable of maintaining combustion. The fire in the compartment, if one exists, will be then extinguished; but the temperature may be still so high as will result in a reignition of the material in the chamber on the admission of air. To overcome this tendency to reignite, I cut out the furnace by closing the valves M and M', and then opening the valve M^2 in the by-pass I maintain the circulation through the refrigerator K, rapidly cooling down the gases until they and the chamber from which they are constantly passing have reached the point where the danger of ignition is no longer to be feared.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The method of fumigating closed compartments which consists in generating fumes in a furnace, both the intake and outlet of which are connected to the compartment to be treated causing a forced circulation through the furnace and compartment until the circulating fumes or gases are of the desired strength and then cutting the furnace out of the circulating-conduit and maintaining the circulation through the compartment and a system of conduits outside of the compartment until the gases have cooled down.

2. The method of fumigating closed compartments which consists in generating fumes in a retort, both the intake and outlet of which are connected to the compartment to be treated causing a forced circulation through the retort and compartment until the circulating fumes or gases are of the desired strength and then cutting the retort out of the circulating-conduit and maintaining the circulation through the compartment and a system of conduits outside of the compartments until the gases have cooled down.

3. The method of fumigating closed compartments which consists in generating fumes in a furnace, both the intake and outlet of which are connected to the compartment to be treated causing a forced circulation through the furnace and compartment until the circulating fumes or gases are of the desired strength and then cutting the furnace out of the circulating-conduit and maintaining the circulation through the compartment and a refrigerating apparatus connected in the conduit until the gases have cooled down.

4. The method of fumigating closed compartments which consists in heating sulfur in the retort of a furnace, connecting the intake and outlet of said retort with a closed compartment, maintaining a circulation of the air and gases through the compartment and retort until the gases have reached the condition required and then cutting the retort out of the circulating-conduit and maintaining the circulation through a refrigerating apparatus.

5. The combination of a closed compartment, a furnace, conduits connecting the intake and outlet of said furnace with the closed compartment, a by-pass conduit cutting out the furnace, valves controlling the course of the gases through the furnace and by-pass, a circulating device connected in the conduit to maintain forced circulation either through the furnace or the by-pass and a refrigerating device situated in the circuit as specified.

6. The combination of a closed compartment, a furnace-heated retort, conduits connecting the intake and outlet of said furnace-retort with the closed compartment, a by-pass conduit cutting out the furnace-retort, valves controlling the course of the gases through the furnace-retort and by-pass, a circulating device connected in the circuit to maintain forced circulation either through the furnace retort or the by-pass and a refrigerating device situated in the circuit as specified.

7. The method of extinguishing fire in closed compartments which consists in forcing gases incapable of supporting combustion into said compartment until the fire is subdued and then causing said gases to circulate through said compartment and a refrigerating apparatus until the heat of the compartment is reduced to a safe degree.

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