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T. A. CLAYTON.  
DISINFECTING APPARATUS.  
APPLICATION FILED MAY 8, 1906.

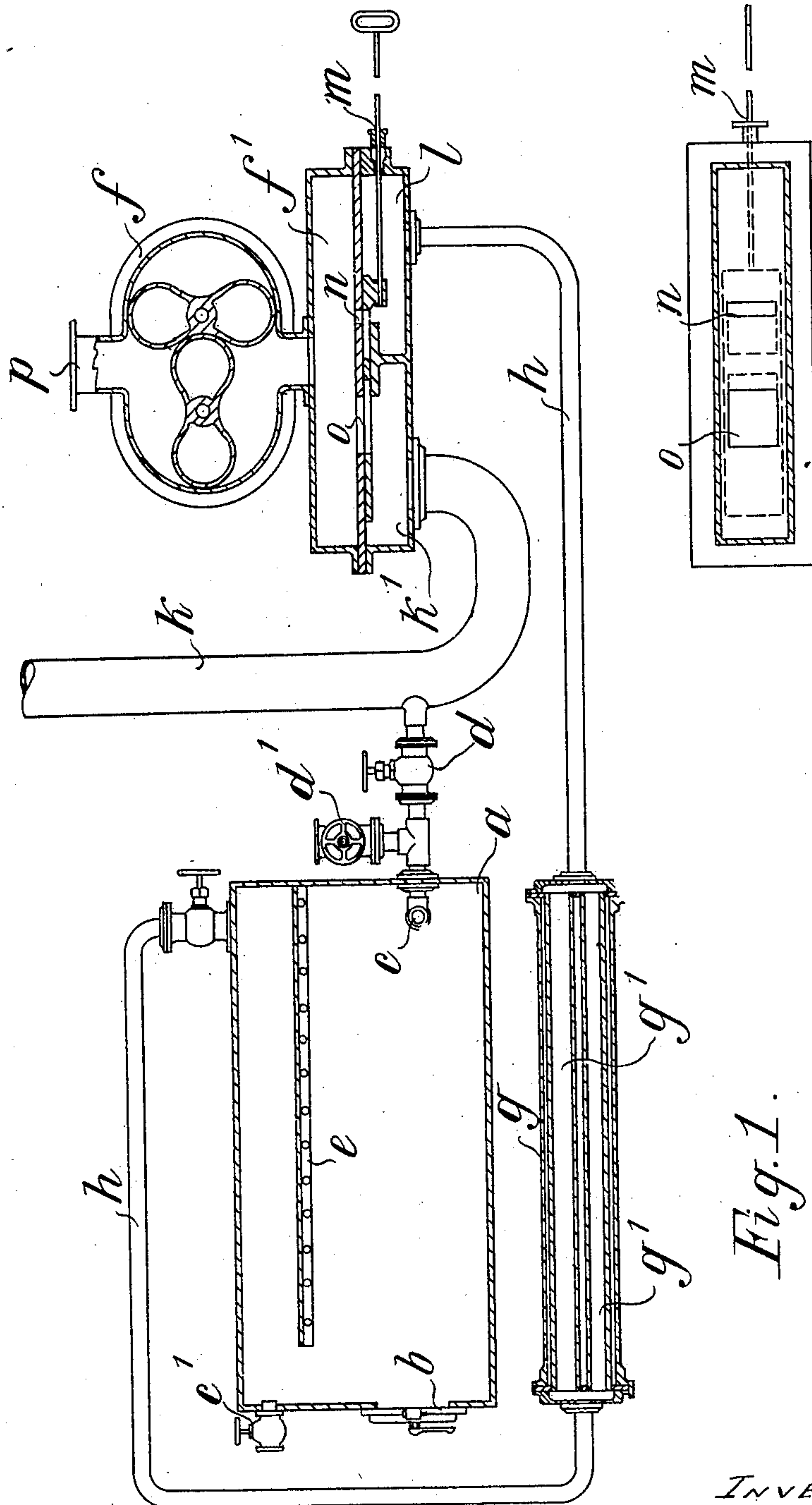


Fig. 1.

Fig. 2.

WITNESSES

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# UNITED STATES PATENT OFFICE.

THOMAS ADAM CLAYTON, OF PARIS, FRANCE.

## DISINFECTING APPARATUS.

No. 885,435.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed May 8, 1906. Serial No. 315,835.

*To all whom it may concern:*

Be it known that I, THOMAS ADAM CLAYTON, citizen of the United States of America, residing at Paris, France, have invented new and useful Improvements in Disinfecting Apparatus, of which the following is a specification.

This invention relates to the gaseous fumigation and disinfection of closed compartments with  $\text{SO}_2$  as described in the U. S. Patent #661,496 granted to me and has particular reference to apparatus consisting of a furnace, a cooler and a fan or blower for introducing air from the compartment being treated, along a pipe called the "outlet" or "return" through the furnace, where it is converted into a disinfecting gas, through the cooler where it is brought to a normal temperature, and then forcing the cool disinfecting gas along another pipe called the "inlet" or "discharge."

The object of this invention is the provision of means for increasing the capacity of the apparatus as worked under the methods described so that a larger volume of compartment can be effectively treated without a corresponding increase in the size of the apparatus.

To carry this invention into effect, I take a portion only of the air from the "return" pipe to the furnace and in the latter, I transform the said air into a high strength disinfecting gas. The remaining portion of the returning air passes direct to the blower or fan and mixes with this high strength gaseous disinfectant forming a large volume of low strength disinfecting gas with a comparatively smaller furnace and cooler than at present necessary. By this arrangement the atmosphere of the compartment is at the same time continuously circulated, thereby insuring thorough penetration of the disinfecting gas into all crevices and corners of the compartment under treatment, whereas under the system as described above and employed at present the circulation by the return pipe has to be suppressed a long time before the atmosphere of the compartment is fully charged with the gas.

It will be understood that after a certain time it will be necessary to cut off the supply of air from the return pipe to the furnace owing to the presence of sulfurous acid gas  $\text{SO}_2$ . The air for the combustion of the sulfur must then be taken from outside and the resulting gas will mix with the circulat-

ing air from the return pipe which will naturally be reduced in volume by the amount taken into the furnace from the outside. And in order that my invention may be the better understood I now proceed to describe the same with reference to the drawings hereto annexed and to the letters and figures marked thereon.

Figure 1 is a longitudinal section through the generator, the cooler, and the blower, or fan. Fig. 2 is a plan of the valve under the blower determining the amount of gas or return air admitted to the blower.

In Fig. 1,  $a$  is the furnace for making the sulfurous acid gas ( $\text{SO}_2$ ) with a door  $b$  for charging the lower portion with sulfur, and a separate admission pipe for air  $c^1$ , to be only used occasionally. The sulfurous acid gas  $\text{SO}_2$  passes round the baffle plate  $e$ , by the pipe  $h$  through the cooler  $g$ , and thence by the pipe  $h$  to the chamber  $l$ , under one side of the valve  $m$ , a small aperture  $n$  being left, through which the highly concentrated gas is drawn by the blower  $f$ , and sent by the delivery pipe  $p$  to the closed chamber.

$k$  is the return pipe from the closed chamber which is bent around so as to enter the other chamber  $k^1$  in the blower, below the valve  $m$ , where a much larger hole  $o$  is provided by which the air from the closed chamber is mixed in the blower with the highly concentrated  $\text{SO}_2$  gas, received through the passage  $n$ .

From one side of the return pipe  $k$ , a branch pipe  $c$  is led to the furnace, the said pipe having a closing valve  $d$ , and another side entrance through a pipe, with another closing valve  $d^1$ , open to the external atmosphere. Now if the valve  $m$  is moved from left to right it will close the aperture  $o$  through which the air from the closed chamber enters to the blower, while still keeping open the aperture  $n$  through which the highly concentrated  $\text{SO}_2$  gas enters. Now the blower  $f$ , driven by suitable force, creates a partial vacuum in the space  $f^1$  below it, and the valve  $m$  is so adjusted that only a portion of the contents of the return pipe  $k$  whose pressure may be taken at atmospheric pressure is allowed to enter into the blower direct. It will then be found that if the pressure of about 13 lbs absolute be found in the chamber  $f^1$ , the excess pressure in the pipe  $k$  will cause some of the air to be forced through the furnace  $a$ , (the pipe and valve  $d^1$  being closed and the valve  $d$  being open)



the pipes  $h$ , and the pipes  $g^1$  of the cooler  $g$ , until this arrives as a highly concentrated  $\text{SO}_2$  gas to the chamber  $l$ , and thence to the blower  $f$ . After a certain time when the atmosphere of the closed chamber has become sufficiently saturated with  $\text{SO}_2$ , the valve  $d$  is closed while the valve  $d^1$  is opened so that a charge of air from the atmosphere is admitted direct to the furnace. When the amount of generation of  $\text{SO}_2$  has proved sufficient the movement of the valve  $m$  from right to left will close the aperture  $n$ , the valve  $d$  being closed down, when the whole contents of the chamber can be circulated by the blower  $f$ , from and to, the chamber.

Having now described my invention I declare that what I claim and desire to secure by Letters Patent is:—

1. In an apparatus for disinfecting closed compartments in combination a furnace, a cooler, a blower, a valve chest, a pipe connecting the furnace and cooler, a pipe connecting the cooler and valve chest, a pipe leading from the valve chest to the blower, a pipe leading from the blower to the compartment to be disinfected, a return pipe the inner end of which opens into the compartment, the outer end of the return pipe being connected to the said valve chest and not to the cooler, a by pass from the said return pipe to the furnace, the said valve chest having a single valve operating over two orifices, one of these orifices conveying the contents of the return pipe to the blower, and the other admitting a stream of highly concentrated gas from the furnace, an undivided portion of the valve chest situated above the said orifices, where the said gas is mixed with the contents of the return pipe, said blower being situated above the valve chest, so that the mixed gases are drawn from the orifices of the valve chest and forced into the inlet pipe of the compartment.

2. In an apparatus for disinfecting closed compartments in combination a furnace, a cooler, a blower, a valve chest, a pipe connecting the furnace and cooler, a pipe connecting the cooler and valve chest, a pipe leading from the valve chest to the blower, a pipe leading from the blower to the compartment to be disinfected, a return pipe the inner end of which opens into the compartment, the outer end of the return pipe of large area being connected to the said valve chest, a by pass of relatively small area con-

nected from the return pipe to the furnace, a shut down valve therein, an ingress from the atmosphere fixed between the valve and the furnace, a shut down valve therein, a single valve in the said valve chest operating over two orifices, one of a large size conveying the contents of the return pipe to the blower, the other of relatively small size admitting highly concentrated gas from the furnace, an undivided portion of the valve chest situated above the said orifices where the said gas is mixed with the contents of the return pipe, said blower being situated above the valve chest so that the mixed gases are drawn and forced to the inlet pipe of the compartment.

3. In an apparatus for disinfecting closed compartments in combination a furnace, a cooler, a blower, a valve chest, a pipe connecting the furnace and cooler, a pipe connecting the cooler and valve chest, a pipe leading from the valve chest to the blower, a pipe leading from the blower to the compartment to be disinfected, a return pipe the inner end of which opens into the compartment, the outer end of the return pipe of large area being connected at its outer end to the said valve chest, a by-pass of relatively small area connected from the return pipe to the furnace, a central transverse web in the said valve chest having two ports therein, an under vertical division dividing the under portion of the chest between the two ports in the transverse web, one of these ports being of relatively large size, making a communication between the said return pipe and the upper undivided portion of the valve chest, the other port of relatively small size making a communication between the gas inlet from the furnace and the said upper portion of the valve chest, a sliding valve upon the under side of the transverse web with two ports therein, one a port larger towards the center of the valve than the port above it, the other a larger orifice towards the center of the valve than the small aperture above it, and a handle to operate the said valve passing through a stuffing box.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS ADAM CLAYTON.

Witnesses:

OTTER EDWARD,  
JEAN GAUTIER.