

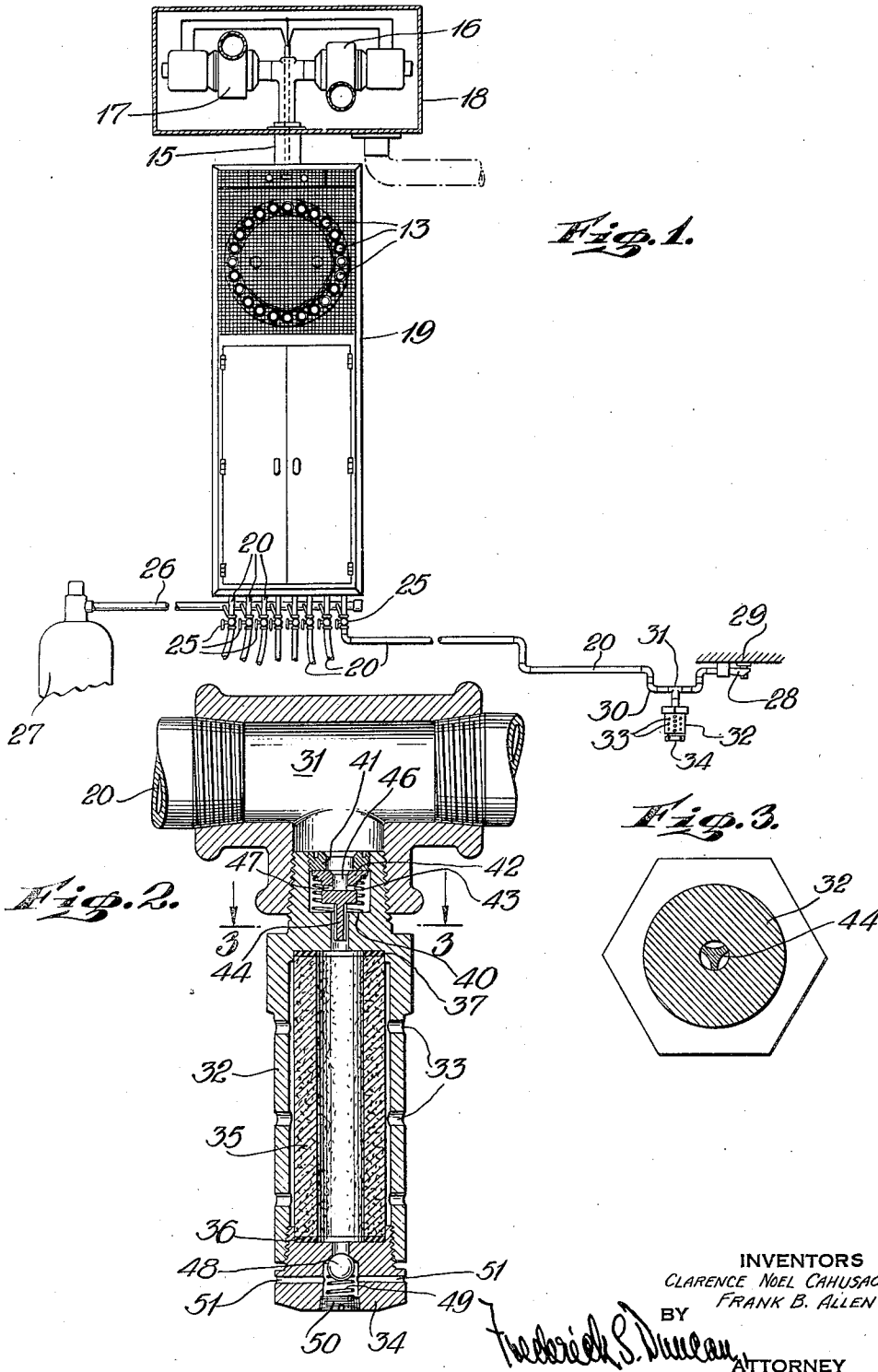
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CONDENSATE TRAP FOR SUCTION CONDUITS

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CONDENSATE TRAP FOR SUCTION
CONDUITS

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6 Claims. (Cl. 137-103)

This invention has reference to water traps adapted for use with systems and apparatus comprising tubes or pipes through which air or gas is continuously being drawn by suction and is disclosed in our copending application Ser. No. 315,194, filed January 23, 1940 of which this application is a division.

Apparatus of this type has been subject to one very serious objection to its use on ships or in buildings. The high temperature air drawn from a compartment or room is capable of carrying a large amount of moisture and if the tube carrying the air passes through a very cold room on its way to the observation cabinet some of the moisture in the air will drop out as it passes through the colder region. This moisture becomes liquid and stays in the suction tube collecting at the lowest point in the tube. The amount of moisture so collected may decrease the area of the suction tube and thus reduce the amount of air drawn through the suction tube thereby decreasing the efficiency of the detecting system or it may close the suction tube to all discharge of air this defeating the whole purpose of the system. Or if this collection of liquid takes place in a region close to the detecting cabinet and a powerful suction force is used some of the liquid may be drawn into the detecting cabinet interfering with the observation of the air drawn past the observation windows or if the temperature in such region is lower than freezing, the collected liquid may freeze and definitely close the suction tube.

It is accordingly an object of this invention to provide an improved device which will remove any condensed liquid in such region in the suction tubes before it can prevent the detecting system from functioning at its highest efficiency. In accordance with this object the invention consists in improved means for trapping the products of condensation in such regions in the suction tubes and for disposal of the same without reducing the amount of suction created by the suction means in the suction tubes and which also functions so as to prevent a reduction of pressure in case the suction tubes are used for delivering fire extinguishing liquid to the compartments which they connect to the central detecting station so as to extinguish fire in the compartments in which fire has been detected by the detecting system.

Other objects of the invention will appear from the following description taken in connection with the drawing, in which—

Fig. 1 is a front elevational view of the de-

tor cabinet disclosed in said copending application and shows a suction producing cabinet in vertical section and a suction tube extending to a compartment;

Fig. 2 is a vertical section through our improved means for trapping products of condensation collecting in low points of the suction tubes; and

Fig. 3 is a horizontal section on the line 3-3 of Fig. 2.

The apparatus illustrated for the purpose of disclosing the invention is the same as that disclosed in said copending application but as is obvious the invention may be used with other types of apparatus. The apparatus includes a hollow detector housing constructed as a casting and of circular form provided with observation windows 13 communicating with an equal number of radially extending detector chambers (not herein disclosed) communicating with a central chamber in the casing in which is located a source of light and which is connected by a pipe 15 to one of the other of the suction pumps 16 or 17 mounted in a housing 18 supported on a detector cabinet 19 in which the detector housing is supported. Each of the radially extending detector chambers is connected to a suction tube 20 which leads to one of a number of compartments or rooms so that when either of the suction pumps is operated air will be drawn from each of the compartments to which the tubes are connected if the three way valve 25 is in such a position as to connect the tubes 20 to the detector chambers. When any one of the valves is in the other of its operative positions it will connect the manifold 26 to the corresponding suction tube 20. The manifold 26 is connected to a suitable fire extinguishing liquid dispensing device indicated generally at 27 which may be operated in any suitable manner to discharge its contents through the manifold 26 and the connected suction tube 20 and a suitable nozzle 28 connected to the ceiling 29 of the room or compartment to which the suction tube extends and from which smoke laden air has been drawn.

The suction tubes, such for example as the suction tube 20 diagrammatically illustrated in Fig. 1, may have a low point such as 30 in which moisture may condense and water collect, if the air passing through the suction tube at this point is fully saturated and if its temperature is reduced as it passes through this point.

The improved means for trapping the products of condensation in the suction tubes 20 and

connected thereto by a T-head coupling 31 consists of a cylindrical casing 32 threadedly connected to the T-head 31. The cylindrical wall of the casing 32 is perforated at 33 and its lower end is closed by a threaded perforated plug 34 by means of which the porous ceramic cylinder 35 is held in position in the casing 32, gaskets 36 and 37 being provided to seal the ceramic cylinder 35 between the plug and a shoulder in the casing.

The upper end of the casing 32 is provided with an upwardly facing valve seat 40 and a removable ring shaped downwardly facing valve seat 41 against which a valve 42 is held by a spring 43 when the fluid pressure in the suction tube 20 is low or is negative. The valve 42 is provided with a grooved stem 44 which guides the valve in its movements and permits products of condensation to pass into the ceramic cylinder 35. The body of the valve is provided with an axial bore 45 which cooperates with radially extending ports 47 so that products of condensation may pass through the valve when the valve is in the position indicated in Fig. 2. The valve is normally held in the position indicated in Fig. 2 permitting the products of condensation to pass through the valve into the ceramic cylinder 35 which permits condensed fluid, such as water, to pass through its walls and thence through holes 33 in the casing 32. The high pressure fire extinguishing fluid discharged into the suction tube 20 depresses the valve and seats it on the lower seat 40 in the casing 32 preventing the high pressure fluid from entering the ceramic cylinder and escaping therethrough to the atmosphere or breaking said cylinder. In order to prevent pressure from building up within the ceramic cylinder to an amount sufficient to break the same, the plug 34 is provided with a ball valve 48 held seated by a light spring 49 seated on the plug 50. The chamber of this valve communicates with the atmosphere through radial ports 51.

For operating purposes one or the other of the motors is set in operation and air is drawn through each of the detector chambers past the observation windows. Smoke contained in the air drawn from any of the compartments may be observed through the respective observation window and if desired a three way valve may be operated so as to connect the fire extinguishing apparatus to the suction tube serving the compartments from which smoke has been drawn and fire extinguishing liquid may be delivered through this tube to extinguish the fire in said compartment.

While we have disclosed the invention in connection with the particular apparatus disclosed in our copending parent application, it is to be understood that this has been done merely for convenience and to which reference may be made for a more extended disclosure of the system or apparatus with which the subject matter of this invention is now being used and that such illustration is to be considered as merely made for purposes of disclosure of this invention and that we reserve the right to all such changes as fall within the principles of this invention and the scope of the appended claims.

We claim:

1. A trap for catching products of condensation and permitting them to escape to the air, comprising a casing having a reduced bore in its upper end to conduct products of condensation thereinto, the side walls of said casing be-

ing perforated, a hollow porous member located within said casing having its bore in registry with the bore in said end of said casing, and means for closing the lower end of said casing and sealing said porous member against said means and the upper end of said casing.

2. A trap for catching products of condensation and permitting them to escape to the air, comprising a casing having a reduced bore in its upper end to conduct products of condensation into said casing, the side walls of said casing being perforated, a hollow porous member located within said casing having its bore in registry with said bore in the said end of said casing, and means for closing the lower end of said casing and sealing said porous member against said means and against the upper end of said casing about said bore in said upper end of said casing, said means being provided with a port, and an outwardly opening low pressure valve normally closing said port.

3. A trap for catching products of condensation and permitting them to escape to the air, comprising a vertically disposed cylindrical casing having a bore in its upper end to conduct products of condensation into the interior of the casing, the cylindrical walls of said casing being perforated, a hollow porous ceramic cylinder located within said casing, means for closing the lower end of said casing and sealing said ceramic member against said means and about said bore in the upper end of said casing and through which the products of condensation flow into said ceramic member, and said bore having an enlarged portion providing an upwardly facing valve seat, a perforated closure for the end of said enlarged portion of the bore having a downwardly facing valve seat, a valve between said valve seats normally pressed upwardly against said upper valve seat, said valve being provided with an axial bore in its upper end communicating with radial bores and said valve also being provided with a valve stem extending into the smaller section of said bore to guide the movements of said valve stem in said bore and said valve being of smaller cross sectional area than said smaller section of said bore to permit products of condensation to pass into said ceramic cylinder, and a spring normally pressing said valve upwardly against its upper seat, said spring being so chosen that it will maintain the valve normally seated against its upper seat but will yield under downward high pressure on said valve to permit seating of said valve against said lower seat.

4. In combination with a low section of a tube, a trap for catching and disposing of products of condensation in the tube, comprising a hollow porous member communicating with said tube through the lower wall of the tube, and a normally open downwardly seating valve adapted to be closed by positive pressure in said tube to cut off communication between said tube and trap.

5. In combination with a low section of a tube, a trap for catching and disposing of products of condensation in the tube, comprising a hollow porous member communicating with said tube through the lower wall of the tube, a normally open downwardly seating valve adapted to be closed by positive pressure in said tube to cut off communication between said tube and trap, and an upwardly seating low pressure relief valve associated with said trap and operable

by positive pressure in said trap communicated thereto from said tube.

6. In combination with a low section of a tube, a trap for catching and disposing of products of condensation in the tube, comprising a hollow porous member of sufficient porosity to permit the escape of products of condensation

when the pressure in said tube is zero or negative, and means for preventing communication between said tube and trap upon the establishment of a positive pressure in said tube.

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