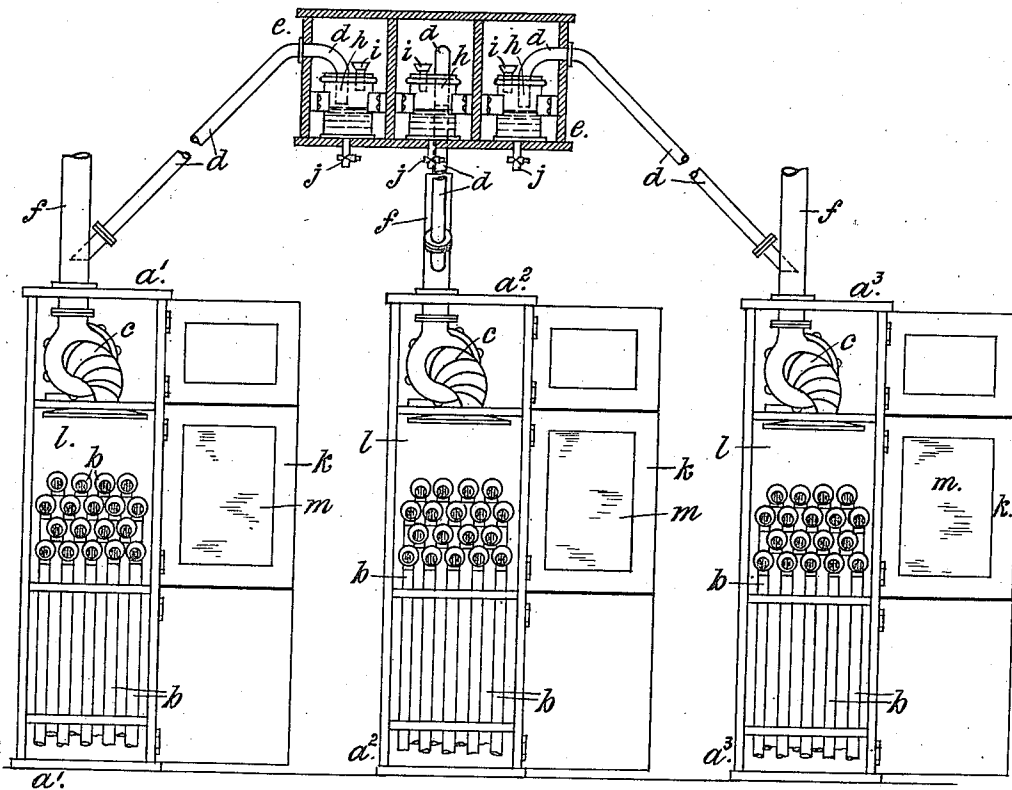


W. RICH.
 APPARATUS FOR INDICATING FIRES IN COMPARTMENTS AT A DISTANCE.
 APPLICATION FILED NOV. 10, 1914.

1,154,128.

Patented Sept. 21, 1915.



WITNESSES:
John C. Sanders
Dudley B. Howard

INVENTOR:
William Rich
 BY *Wm. Melan White*
 ATT'Y.

UNITED STATES PATENT OFFICE.

WILLIAM RICH, OF LIVERPOOL, ENGLAND.

APPARATUS FOR INDICATING FIRES IN COMPARTMENTS AT A DISTANCE.

1,154,128.

Specification of Letters Patent. Patented Sept. 21, 1915.

Application filed November 10, 1914. Serial No. 871,289.

To all whom it may concern:

Be it known that I, WILLIAM RICH, a citizen of the United States of America, and resident of Liverpool, in the county of Lancaster, England, have invented new and useful Improvements in Apparatus for Indicating Fires in Compartments at a Distance, of which the following is a specification.

This invention has reference to systems and apparatus for detecting fire in compartments or rooms or spaces, at a distance, from a place of detection or observation; and it relates more particularly to that type of system in which pipes extend between separate compartments or rooms, and the said place of detection or observation; and through which air is continuously, or at intervals, drawn or caused to pass from the separate compartments or rooms, so that if a fire breaks out in any one of the compartments or rooms, smoke is automatically drawn or caused to flow to the place of observation, and it is made known that a fire exists in that compartment or room; and when it is so ascertained, steam is adapted to be transmitted through that particular smoke conveying and indicating tube to the compartment or room, and the fire smothered.

The object of the present invention is to provide improvements in connection with systems and apparatus of fire detection and extinction by which certain objections hereinafter referred to are obviated, and the system as a whole, is improved.

The system as hitherto arranged and worked, has been open to objection in some cases as applied to and used on ships, in connection with which it is very advantageous. The objections were largely that the place of detection and observation of the system was located in a wheelhouse or similar house of the ship, which, especially in large ships, is occupied by an officer in charge, so that if a fire broke out, it could be immediately seen here by the officer in charge; but inasmuch as in this observation apparatus, in which the terminals of the pipes are placed, an electric motor and fans are used, the noise of them is found disturbing to the officer; and the further disadvantage is, especially in large ships, that the apparatus is necessarily very large, and occupies therefore a large space, whether built in one large one or in several parts, say placed side by side; and this latter applies, whether the appa-

ratus were placed in the wheel-house, or whatever room it was placed in.

According to this invention, the pipe terminal station case, with its air fan and electric motor, do not constitute the main or chief observation or detecting means; but the chief or main detecting means and observation parts of the system are separate from the pipe terminal station case, but connected with each of them through a pipe; and they are placed in the wheel-house or other house, as the case may be, where they will be under the observation of an officer or other authority; and in this part of the apparatus, the existence of smoke is made known and observed. The pipe terminal station boxes—which may be conveniently termed “sub-stations”—are distributed in different parts of the ship, at which they may be conveniently or advantageously located; and they also serve as means of observing the condition of the various holds or rooms of the ship, and a means of detecting fire.

The main or terminal detecting and observing station apparatus is without moving parts and silent, and occupies relatively only very small space. In all cases, this terminal detecting apparatus will be such that the presence of the smoke will be seen or indicated by it; and preferably this is effected by the employment of a chemical indicating means, by which the presence of smoke or products of combustion will act upon a chemical which will change color, and so give an indication of its presence. Advantageously, this change of color indication may be effected by the use of lime water, whose appearance becomes changed by the presence of the carbon dioxid which usually accompanies the smoke, which is passed to the liquid or lime-water through the pipe from the sub-station pipe terminal case. Each terminal pipe sub-station will, in most cases, be connected up with a detecting and observation appliance in the terminal station; so that if there are three sub-station cases, there will be three detecting and observation instruments or appliances in the main terminal station.

The invention will be further described with the aid of the accompanying drawings which illustrate it. In the example shown there are three sub-station apparatus shown, operating in connection with a single terminal detecting and observation apparatus;

and it will be assumed that this sub-station apparatus will be disposed in different parts of the ship where it may be conveniently placed, seen, attended to, and used, and where the noise of the motor fan is not objectionable or disturbing, and where the steam connections can be conveniently laid.

Referring to the drawings a^1 , a^2 , a^3 , represent the sub-station boxes or cases, each having in the lower part of it, the ends of the tubes b which extend between the case and different compartments of the ship, and each of the pipe terminals will have a fitting, to which the union of a hose-pipe connected with the source of supply of steam is connected; while in the upper part it is provided with a fan c which is electrically driven, either continuously or intermittently; its starting and stopping being controlled by a suitable clock which opens and closes the circuit to the motor of the fan.

The terminal station box or case is marked e , and each of the instruments within it is connected with a sub-station case by a pipe d , the end of which at the sub-station enters the pipe f , which conducts the surplus air or air and smoke from the fan or propeller c away to a place of discharge. The lower ends of the pipes d are open, and project into the pipes f , so that any smoke that passes into any of the cases a from any of the pipes b , will be drawn by the fan c , and forced by way of the pipe d up into the instrument in the case e ; and this will be detected and indicated.

The sub-station cases a^1 , a^2 , a^3 , have doors k on them, and the part m , of the doors, opposite the mouths of the pipes b , to which the steam supply pipe will be coupled as stated, will be glazed to form a window through which, in case of fire, smoke passing from any of the pipes, will be seen; so that the sub-stations in themselves constitute additional detecting and observation means.

The detection and observation indicating means in the terminal station e , consist of glass or other transparent vessels h —or they may be provided with an opening for observation—having in them lime water, or other chemical which will change in the presence of smoke or the products of combustion due to the production of a white precipitate in the colorless solution used; and into these vessels the bent down ends of the pipe d dip, extending either just over the liquid, or into it; so that the smoke or products of combustion passing up the pipe d will act upon the liquid and affect it and change its color. The vessels h can be filled with liquid through the funnels i , and can be emptied through the draw-off pipes j ; while smoke and air passing into the vessels h can also pass away by the funnels i , the lower end of which lie above the level of the liquid. In use, if a fire breaks

out in one of the compartments of a ship connected with one of the sub-stations a^1 , a^2 , a^3 , smoke is drawn into the casing of it by the fan c in it, through one of the terminals of the pipes b in the chamber l ; and this smoke in the chamber l will be drawn by the fan c and forced into the pipe f , and so into the lower open end of the pipe d , by which it will be conducted into the vessel h of the detecting apparatus e which is connected with this particular sub-station apparatus.

The smoke, in consequence of its contents of carbonic acid, makes the lime water contained in the vessel h milky; and the officer in charge therefore sees that smoke has been drawn through the sub-station case a connected with this particular bottle or vessel h . In consequence of this the sub-station case connected with this bottle or vessel is at once examined, and it can at once be ascertained in which compartment of the ship a fire has broken out.

It will be seen that the whole of the air is not driven through the pipe d , but only a portion of it, and that the remainder is discharged through the pipe f into the atmosphere. Upon the pipe f there may be used a suitable throttle or other controlling valve or stopping device, which will be so arranged that the greater part of the air is driven into the open, and only enough air is driven through the pipe b that, if smoke is present, a sufficient quantity of smoke reaches the indicating vessel h to cause the reaction in the lime water.

When the fire is extinguished, the lime water—which will be colored dark gray by the smoke—is let out of the bottle h by means of the cock j , and the bottle is refilled through the funnel i .

What is claimed is:—

1. In a system of detecting fire in compartments, rooms or spaces, at a distance, a pipe terminal station apparatus having an air moving apparatus adapted to cause air to pass through the pipes between the compartments, rooms or spaces, and the terminal apparatus; and a second or main terminal station apparatus connected by a pipe with a part of the aforesaid pipe terminal station apparatus, into which the said air is delivered by the air moving means; and an indicating means in the latter main terminal station apparatus whereby smoke or carbonic acid gas passing with the air to this apparatus, will be indicated and observed here; substantially as set forth.

2. In a system of detecting fire in compartments, rooms or spaces, at a distance, a multiple pipe terminal station apparatus having an air moving apparatus adapted to cause air to pass through the pipes between the compartments, rooms or spaces, and this terminal apparatus; and a second or main

terminal station apparatus connected with the part of the aforesaid pipe terminal station apparatus, into which the said air is delivered by the air moving means, and comprising a chemical detecting or indicating means, by which the introduction of smoke or carbonic acid gas passing from the pipe terminal station to this said chemical means produces a change, and effects the indication of the presence of same; substantially as set forth.

3. In a system of detecting fire in compartments, rooms or spaces, at a distance; the combination of a plurality of pipes extending between the compartments, rooms, or spaces, at a distance, and a pipe terminal station in a part of which the ends of the said pipes open; an air moving apparatus adapted to create a partial vacuum within the chamber or spaces within which the open ends of the pipes are located; a pipe communicating between the part of the pipe terminal station apparatus to which the air

moving means forces the air, and a second or main terminal indicating station apparatus, containing liquid, which will change in the presence of smoke or carbonic acid gas; substantially as set forth.

4. In a system of detecting fire in compartments, rooms, or spaces at a distance, the combination of a plurality of pipes *b*; pipe terminal station apparatus as *a*¹, *a*², *a*³, an electrically operated fan *c* in the said station apparatus; a discharge conduit *f*; a main indicating terminal station apparatus, as *e*, having a plurality of liquid containing vessels *h*; and a pipe *d* extending between each of the said pipes *f* and the vessels *h*; substantially as set forth.

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

WILLIAM RICH.

Witnesses:

SOMERVILLE GOODALL,
ANDREW TAYLOR.