T. S. WILKINSON.

SMOKE APPARATUS.

APPLICATION FILED MAR. 29, 1918.

1,303,749.

Patented May 13, 1919.

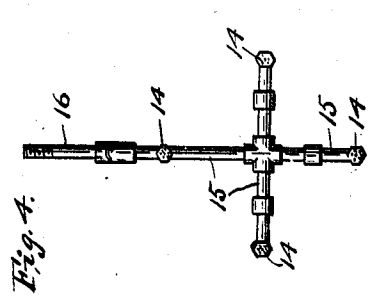


Fig. 4.

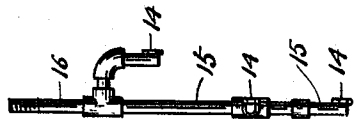
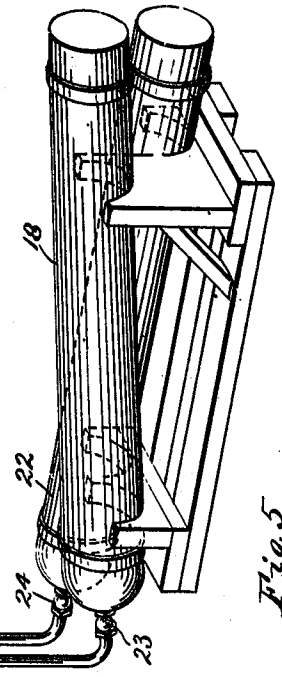


Fig. 3.



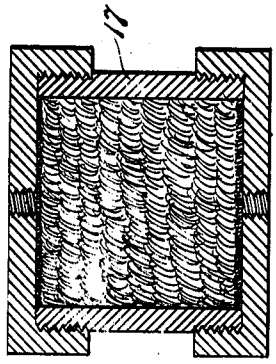


Fig. 5

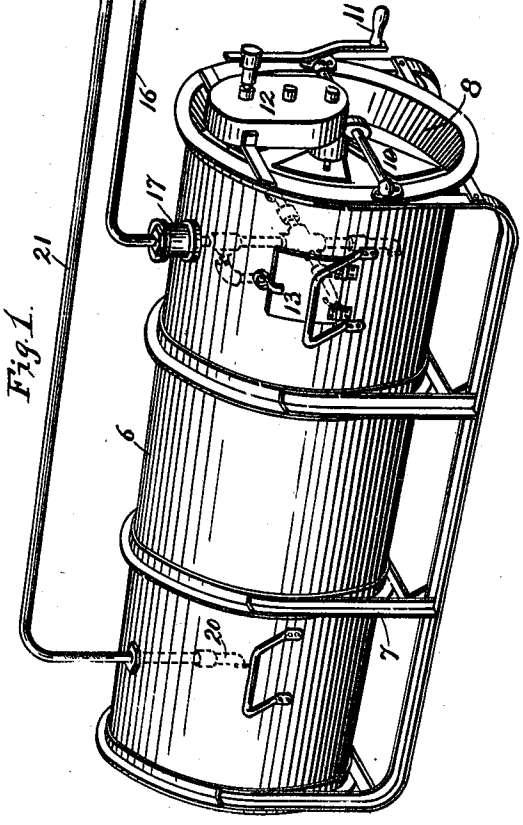


Fig. 1.

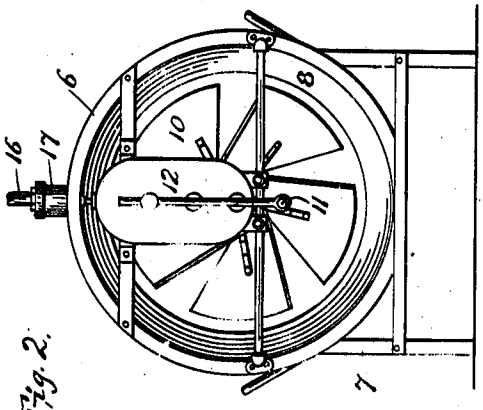


Fig. 2.

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UNITED STATES PATENT OFFICE.

THEODORE S. WILKINSON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE GOVERNMENT OF THE UNITED STATES.

SMOKE APPARATUS.

1,303,749. Specification of Letters Patent. Patented May 13, 1919.

Application filed March 29, 1918. Serial No. 225,526.

To all whom it may concern:

Be it known that I, THEODORE S. WILKINSON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Smoke Apparatus, of which the following is a specification.

This invention relates to what may be termed smoke apparatus for use on boats of all kinds for the purpose of emitting a dense screen of smoke, vapor or gas adapted to obscure the maneuvers of a boat. Devices of this general character are particularly advantageous for use on merchant ships for the purpose of screening the same from the view of a pursuing submarine.

One of the objects of the present invention is to provide a smoke apparatus of the above general character, of light portable construction which may be easily and quickly installed on the deck of a boat. Another object is to provide a simple and practical apparatus of the above general character which will be relatively inexpensive to manufacture and operate. A further object is to provide an apparatus of the above general character, which will produce a thick screening smoke, preferably of lightish color, and of sufficient specific gravity to rest on the surface of the water and spread upwardly therefrom for a relatively long length of time.

Other objects will be in part obvious from the annexed drawings and in part indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts and in the unique relations of the members and in the relative proportioning and disposition thereof; all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, drawings depicting a preferred form have been annexed as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:—

Figure 1 is a perspective elevational view of the complete apparatus, Fig. 2 is an end view, and Figs. 3, 4 and 5 are detail views.

Referring to the drawings in detail, 6 indicates a cylindrical open-ended chamber approximately two feet in diameter and seven feet long, which may be made of any suitable material, but preferably sheet iron, in view of its durability and relative inexpensiveness. This chamber is supported in a metallic framework, or cradle 7, of any desired type adapted to rest on the deck of the boat. In operation, this chamber is placed with the left hand end (Fig. 1) outboard and downwind. The opposite end is provided with an inwardly tapering funnel 8, in the center of which is mounted a fan 10 of any desired type for delivering the maximum amount of air through the chamber. This fan is preferably driven by rotating the crank arm 11 to actuate intervening power transmitting mechanism, such as a chain of gears (not shown) positioned within the casing 12. These parts, which revolve in a ratio of about 30 to 1, should be suitably balanced to avoid vibration under high speed.

Near one end of the casing 6 and at the side thereof is a hand-hole 13 adapted to permit access to the spray nozzles 14, shown in Fig. 5. These spray nozzles, preferably 4 in number, are mounted on suitable cross arms 15 and connected with a pipe 16 leading through a strainer 17 and thence to a supply tank 18 resting on the deck at one side of the chamber 6. This supply tank 18 may be tilted as shown. At the forward end of the chamber is mounted a second single spray nozzle 20, which communicates through the top of the chamber and piping 21 to a second supply tank 22. Both of the pipes leading to the spray nozzles are provided with suitable valves 23 and 24 for closing the same when desired.

The cylinders 22 and 18 contain liquefied ammonia and liquid silicon tetrachlorid respectively, the former being a gas which is liquefied, compressed and stored under its own pressure. The silicon tetrachlorid, however, is a liquid under ordinary temperatures, that is under 133 degrees Fahrenheit, and must be sprayed by artificial gas pressure. This gas pressure is preferably supplied by filling the cylinders only partially with the liquid silicon tetrachlorid and charging the residual space with dry carbon-dioxid gas under pressure of about 300 pounds per square inch. The tetra-

chlorid cylinder is connected with the four spray nozzles 14 while the ammonia cylinder is connected with the single spray nozzle 20 at the forward open end of the chamber.

In order to produce the most economical and effective mixture, about two pounds of tetrachlorid are required for every pound of ammonia. The cylinders are therefore supplied charged correspondingly with 180 and 100 pounds of the respective chemicals, this quantity being sufficient to produce a smoke for about a half hour, and the desired proportioning of the mixture is preferably provided for in the sizes of the nozzle orifices and pressures in the cylinders.

In action the moisture ordinarily present in sea air breaks down the tetrachlorid as the draft from the fan 10 carries the spray through the funnel, thus producing hydrochloric gas, which combines with the ammonia gas directly to produce a dense cloud of white smoke. The ammonium chlorid thus formed by the mixing of these gases is cool and entirely harmless to the operator. Any action from excess hydrochloric acid may be avoided by operating the fan slowly for several minutes after finishing the run, with the ammonia valve slightly open. A second product of the decomposition of the silicon tetrachlorid is silicic acid, which gelatinizes or hardens and is apt to cause plugging of the spray nozzles. To prevent this objection, the nozzles should be blown out with dry air immediately after each run.

It is to be understood that apparatus of this character is always kept in ready conditon, that is with filled or charged gas cylinders connected with the spray nozzles whereby it is only necessary to start the fan 10 and open the valves 23 and 24 communicating with the gas cylinders. Immediately after starting the apparatus a dense white cloud of smoke will be emitted from the open end of the funnel and hang close to the water, spreading slowly upwardly, and maintaining substantially its original density for at least ten or fifteen minutes. At the end of the run, or when the pursuing boat has been eluded, the cylinders are disconnected and the nozzles blown out, as above described. The exhausted tubes should immediately be replaced and the apparatus made ready for further immediate use.

It is thus seen that the present invention provides a simple and practical apparatus designed to produce a thick, dense cloud of white smoke, which will be safe and easy to handle, as the gases produced are neither poisonous nor combustible. The invention is therefore believed to accomplish among others all of the objects and advantages herein set forth.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

I claim as my invention:

1. In an apparatus for producing smoke clouds, in combination, a smoke chamber having air injecting means at one end and fluid ejecting nozzles in front of said means.

2. In an apparatus for producing smoke clouds, in combination, a smoke chamber having air injecting means at one end, and ejecting nozzles in front of said means, said nozzles being of different size, and fluid containers connecting with said nozzles.

3. In an apparatus for producing smoke clouds, in combination, an elongated cylindrical chamber having air injecting means at one end, a nozzle positioned adjacent to said air injecting means adapted to be connected with a fluid container, and a second nozzle near the opposite end of said chamber adapted to be connected to a second container.

4. In an apparatus for producing smoke clouds, in combination, an elongated cylindrical chamber having open ends, a fan near one end for driving a current of air therethrough, a plurality of fluid ejecting means positioned in front of said fan, a fluid container connected with said fluid injecting means, and a second fluid ejecting means located near the opposite end of said chamber, and a second fluid container connected with said second means.

5. In an apparatus for producing smoke clouds, in combination, an elongated cylindrical chamber having open ends, a fan near one end for driving a current of air therethrough, a plurality of fluid ejecting nozzles positioned in front of said fan, a fluid container connected with said nozzles, a second nozzle unit located near the opposite end of said chamber, a second fluid container connected with said second nozzle unit, and means for permitting access to said nozzles for cleaning the same.

6. In an apparatus for producing smoke clouds, in combination, a chamber, means for forcing a current of air through said chamber, a plurality of nozzle units positioned within said chamber and in the path of said air currents, and gas cylinders connected respectively with each nozzle unit.

7. In an apparatus for producing smoke clouds, in combination, a mixing chamber having inlet nozzles, a container of ammonia

gas connected with one of said nozzles, and a container of silicon tetrachlorid under gaseous pressure connected with the other of said nozzles.

8. In an apparatus for producing smoke clouds, in combination, a mixing chamber having inlet nozzles therein, a container of ammonia gas connected with one of said nozzles, a container of silicon tetrachlorid connected with the other of said nozzles, said container of silicon tetrachlorid being under the gaseous pressure of carbon-dioxid.

9. In an apparatus for producing smoke clouds, in combination, a mixing chamber having inlet nozzles therein, a container of ammonia gas connected with one of said nozzles, a container of silicon tetrachlorid under pressure of carbon-dioxid connected with the other of said nozzles, and means for intimately mixing said gases as they leave said nozzles in the presence of air.

10. In an apparatus for producing smoke clouds, in combination, an elongated cylinder having a fan near one end, a spray nozzle positioned in front of said fan, a container of silicon tetrachlorid under pressure connected with said nozzle, a second nozzle at the other end of said cylinder, and a container of ammonia gas connected with said forward nozzle.

11. In an apparatus for producing smoke clouds, in combination, an elongated cylinder having a fan near one end, a spray nozzle unit positioned in front of said fan, a container of silicon tetrachlorid under pressure connected with said nozzle unit, and a second nozzle unit at the other end of said cylinder, a container of ammonia gas connected with said second nozzle unit, said container of silicon tetrachlorid being under pressure of carbon-dioxid and positioned at an angle with respect to the horizontal whereby the silicon tetrachlorid will be forced out at the bottom of said container.

12. In an apparatus for producing smoke clouds, in combination, a mixing chamber having inlet nozzles, containers for ammonia and silicon tetrachlorid connected with said nozzles, and filtering means associated with that one of said nozzles through which the silicon tetrachlorid issues.

13. In an apparatus for producing smoke clouds, means to produce a current of moist air, spraying means adapted to discharge silicon tetrachlorid into said current at a point relatively near the source of said current, and spraying means adapted to discharge into said current ammonia gas at a point relatively remote from said source.

14. An apparatus for producing smoke clouds, comprising a tubular member open at both ends whereby a current of air may pass therethrough, means for injecting a tetrachlorid gas into said member at one point in front of one open end through which the air enters and means for injecting a second gas into said tubular member at another point whereby the gases mix within said member and issue at the opposite open end in the form of a smoke cloud.

15. An apparatus for producing smoke clouds comprising means for storing liquefied ammonia under pressure, means for storing liquid silicon-tetra-chlorid charged with carbon dioxid under pressure, spraying means for delivering the liquid silicon-tetrachlorid in the form of a spray to a current of air, and spraying means for delivering ammonia gas in the form of a spray to the hydrochloric gas generated by the action between the silicon-tetra-chlorid and the moist air.

16. An apparatus for producing smoke clouds comprising means for storing liquefied ammonia under pressure, means for storing liquid silicon-tetra-chlorid charged with carbon dioxid under pressure, means for producing a current of moist air, spraying means for delivering the liquid silicon-tetra-chlorid in the form of a spray to the current of moist air, and spraying means for delivering ammonia gas in the form of a spray to the hydrochloric gas generated by the action between the silicon-tetrachlorid and the moist air.

Signed at Washington, D. C., this 8th day of January, 1918.

THEODORE S. WILKINSON.