A. H. STOW.

METHOD OF AND MEANS FOR PRODUCING SMOKE SCREENS FOR SHIPS.

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1,296,226. **Patented Mar. 4, 1919.**

Fig. 1.

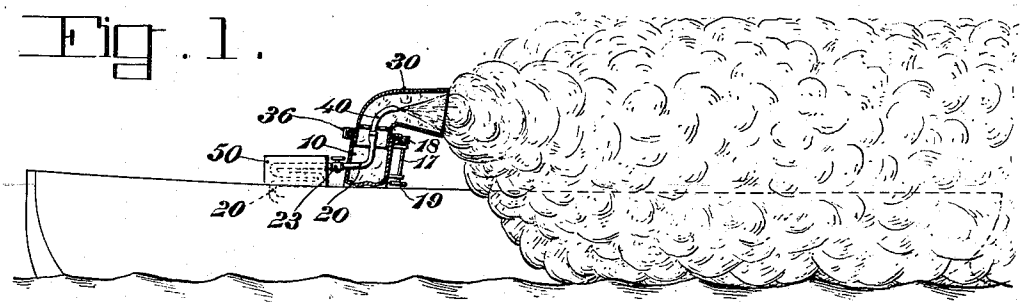


Fig. 2.

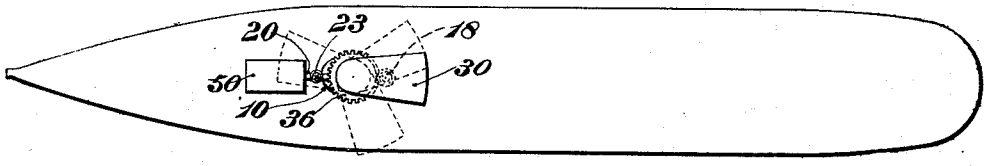


Fig. 3.

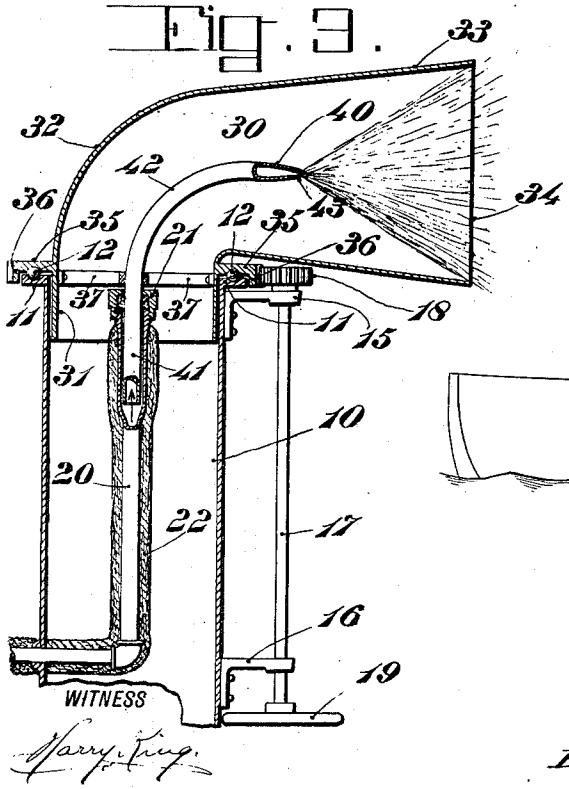
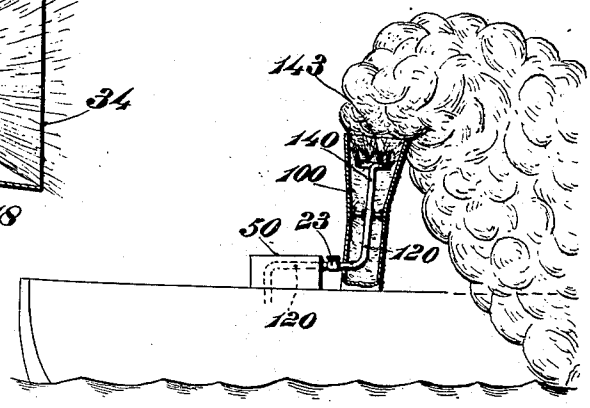


Fig. 4



WITNESS

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METHOD OF AND MEANS FOR PRODUCING SMOKE SCREENS FOR SHIPS.

1,296,226. Specification of Letters Patent. Patented Mar. 4, 1919.

Application filed April 9, 1917. Serial No. 160,883.

To all whom it may concern:

Be it known that I, AUDLEY HART STOW, a citizen of the United States of America, residing at Maybeury, in the county of McDowell, in the State of West Virginia, have invented certain new and useful Improvements in Methods of and Means for Producing Smoke Screens for Ships, whereof the following is a specification.

This invention relates to the production of smoke screens for hiding ships from enemy vessels in time of war.

The object of the invention is to provide means for causing the funnel smoke to settle down around the vessel and for increasing the volume and opaqueness of the screen produced thereby.

Another object of the invention is to provide means for directing the smoke issuing from the funnel and for increasing and regulating the outflow thereof at the mouth of the funnel.

Figure 1 of the accompanying drawings represents an embodiment of means for carrying out this method of producing an opaque protective vapor and smoke screen, showing a side elevation of a ship adapted for producing this protective smoke screen and a vertical section of its funnel provided with a vaporizing apparatus for mixing vapor with the smoke delivered through said funnel.

Fig. 2 represents a plan view thereof.

Fig. 3 represents on an enlarged scale a vertical section of the smoke funnel with the vaporizing apparatus applied thereto.

Fig. 4 represents another embodiment of the invention, showing the spraying apparatus adapted to an ordinary upright funnel.

The same reference numbers indicate corresponding parts in the different figures.

The preferred embodiment of the invention is illustrated in Figs. 1 to 3. In this construction a funnel 10 is provided with a water supply pipe 20, with a swinging flaring horizontal funnel head 30 which admits of the delivery of the smoke or smoke and vapor horizontally in any desired direction, and with a jet pipe 40 connnected with the supply pipe 20, disposed in the funnel head and adapted to turn therewith.

The funnel 10 is provided at its upper end with a horizontal outward flange 11. The funnel 10 is also provided with horizontal bracket arms 15 and 16. A vertical actuating rod 17 is adapted to turn in bearings at the outer ends of said bracket arms. This rod is provided at its upper end with a pinion 18 and at its lower end with actuating means 19 which may be driven manually or by power.

The water supply pipe 20 is centrally disposed within the funnel 10 and terminates near the top thereof, being provided at its upper end with a stuffing box 21. This pipe is preferably bent laterally a short distance below the top of the funnel and extended through the funnel wall to the outside of the funnel, and it is preferably provided within the funnel and adjacent thereto with an insulating covering 22 composed of asbestos or other suitable material. This supply pipe 20 has means for regulating and controlling the flow of water to the jet, which means may be in the form of a cock 23.

The swinging funnel head 30 comprises a vertical shank section 31, a curved section 32 and a flaring horizontal section 33 having an enlarged delivery mouth 34, said mouth being disposed vertically or nearly so. The shank section 31 is of smaller diameter than the top of the funnel 10 so as to fit into and turn therein. This shank section is provided some distance above its lower end with a horizontal annular toothed flange 35, which constitutes a gear in fixed relation to the swinging head 30, said gear being engaged by the pinion 18 on the actuating rod 17, whereby the swinging head is made to turn on the funnel 10. A series of ball or cylinder bearings 12 are interposed between the flange 11 of the funnel 10 and the flange 35 of the swinging head 30, whereby the latter is adapted to be turned easily to any desired position for discharging the smoke sternward, bowward, or to port or starboard. The toothed flange 35 is provided with a downward lip 36 which shuts over the joint between the flanges and protects the bearings.

The jet pipe 40 is disposed axially of the funnel head 30 and comprises a straight lower end 41, a curved central portion 42 ex-

tending through the curved section 32 of the funnel head and a jet or spray nozzle 43 which extends into the inner portion of the horizontal section 33 of said funnel head. This jet pipe is attached to said funnel head by means of braces 37. The lower end of the straight section 41 extends through the stuffing box 21 into the water supply pipe 20 in the funnel 10 and is adapted to turn with the movement of the swinging funnel head 30.

A cooler 50 may be provided for cooling, when desired, the water passing through the supply pipe 20. This cooler may be in the form of an ice-box, a refrigerating apparatus or any suitable cooling means.

In carrying out this method of producing smoke screens by the use of this apparatus, the smoke stack or funnel 10 performs its usual function of conveying to the outer atmosphere the smoke and gaseous products of combustion from a boiler furnace below. The water spraying apparatus is put into operation and water cooled by the cooling device 50 passes up through the supply pipe 20 and is delivered in a fine spray at the orifice of the nozzle 43 in the same direction as the issuing smoke, spreading from the center of the volume thereof and forming a vapor commingled therewith. The action of the spraying nozzle is thus analogus to that of an injector and tends to produce a suction or forced draft in the funnel 10, and is also operative to impel the smoke further on in the desired direction; the greater the pressure of the water delivered to the spray nozzle, the greater the injective action thereof. The spray so delivered into the volume of smoke has a cooling effect thereon and thereby increases the gravity thereof and causes the smoke to descend and form a screen touching the surface of the water, which may be utilized as a protection in the movements of the ship. The swinging head 30 may be turned in any direction so as to deliver the smoke all about the ship. The ship may be maneuvered so as to keep within or behind a fog-and-smoke screen.

A certain percentage of the spray water will be carried up mechanically in the form of fine drops and as these fine drops descend by gravity their tendency will be to drag down the smoke. A percentage of the spray water will be evaporated and the evaporation will further operate to cool the smoke and tend to make it fall and hug the surface of the water. The cooling spray will add to the opaqueness of the smoke screen in two ways, namely, in that it converts into fog the steam that is mixed with the smoke and also actually produces an additional amount of fog.

In Fig. 4 the spraying device is illustrated as applied to a funnel 100 having a vertical discharge, in which case, the swinging head is omitted and the jet pipe 140 is in fixed relation to the water supply pipe 120. A cluster or plurality of nozzles 143 may be used in place of the single jet 43.

In carrying out this protective scheme, a number of smaller ships equipped with this smoke-and-fog device may sail in conjunction with a larger ship or ships and be maneuvered so as to keep the larger vessels entirely surrounded by fog and smoke no matter which way the wind may be blowing.

I have herein illustrated the preferred embodiment of the invention, but the form thereof may be varied without departing from the invention.

I claim as my invention:

1. The art of producing a smoke screen for a ship which consists in subjecting the funnel smoke adjacent to its point of delivery to a liquid spray which causes the smoke to descend and form a cloud adjacent to the ship.

2. The art of producing a smoke screen for a ship which consists in adding to the funnel smoke adjacent to its point of delivery a fog-forming liquid which increases the opaqueness of the screen-forming smoke.

3. The combination of a smoke funnel, a water supply pipe axially disposed therein, a swinging horizontal funnel head supported on said funnel, and a jet pipe connected with said water supply pipe and adapted to turn with said funnel head.

4. The combination of a smoke funnel, a water supply pipe axially disposed therein, a swinging horizontal funnel head supported on said funnel, a jet pipe connected with said water supply pipe and adapted to turn with said funnel head, and means for turning said funnel head.

5. The combination of a smoke funnel for ships, a water supply pipe extended into said funnel, a jet device connected with said water supply pipe and disposed near the delivery of said funnel, and means disposed outside said funnel for cooling water passed through said pipe.

6. The combination of a funnel for ships provided with an outward flange at its upper end, a swinging horizontal funnel head having a vertical shank adapted to fit within said funnel and provided with an outward flange, ball bearings disposed between said flanges, and means for turning said funnel head.

7. The combination of a funnel for ships provided with an outward flange at its upper end, a swinging horizontal funnel head having a vertical shank adapted to turn within said funnel and provided with an outward toothed flange, ball bearings disposed between said flanges, brackets attached to said funnel, an actuating shaft supported in said brackets and provided with a gear engaging said toothed flange, and means for turning said shaft.

8. The combination of a funnel for ships provided with an outward flange at its upper end, a swinging horizontal funnel head having a vertical shank adapted to turn within said funnel and provided with an outward toothed flange having a downward lip protecting the joint between said flanges, ball bearings disposed between said flanges, brackets attached to said funnel, an actuating shaft supported in said brackets and provided with a gear engaging said toothed flange, and means for turning said shaft.

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