May 1, 1928. 1,667,736

F. N. NELSON

VENTILATOR

Filed March 14, 1925 2 Sheets-Sheet 1

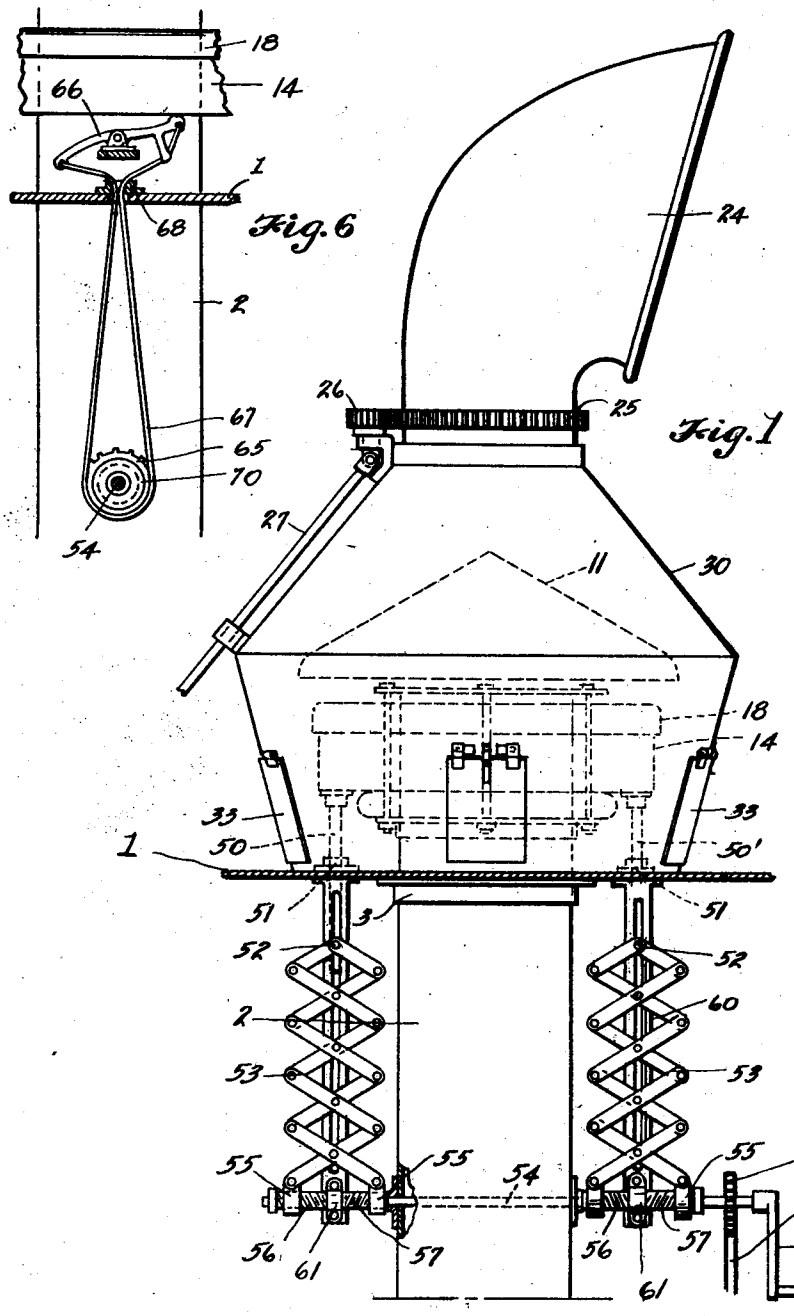


Fig. 6

Fig. 1

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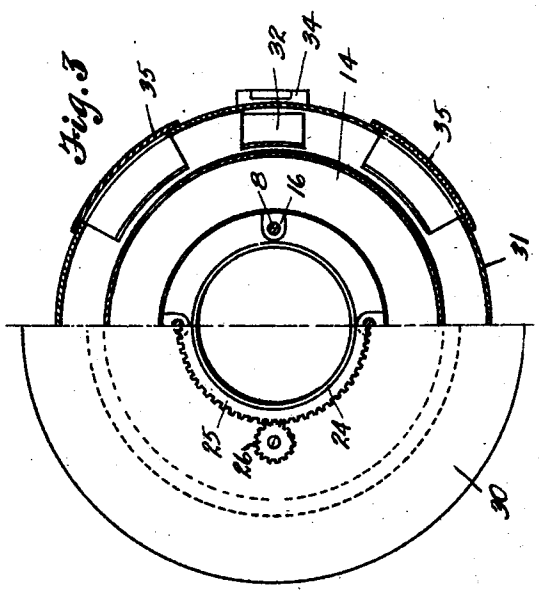
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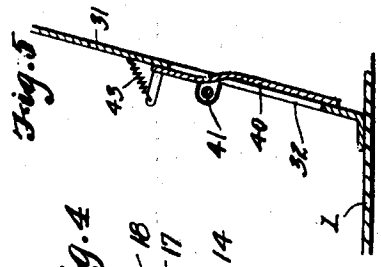
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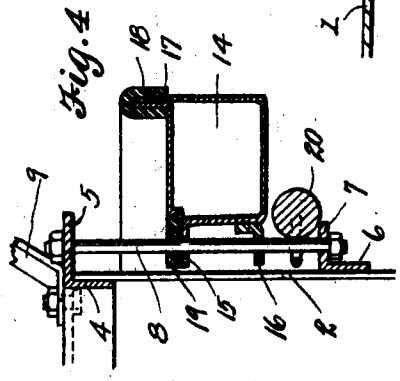
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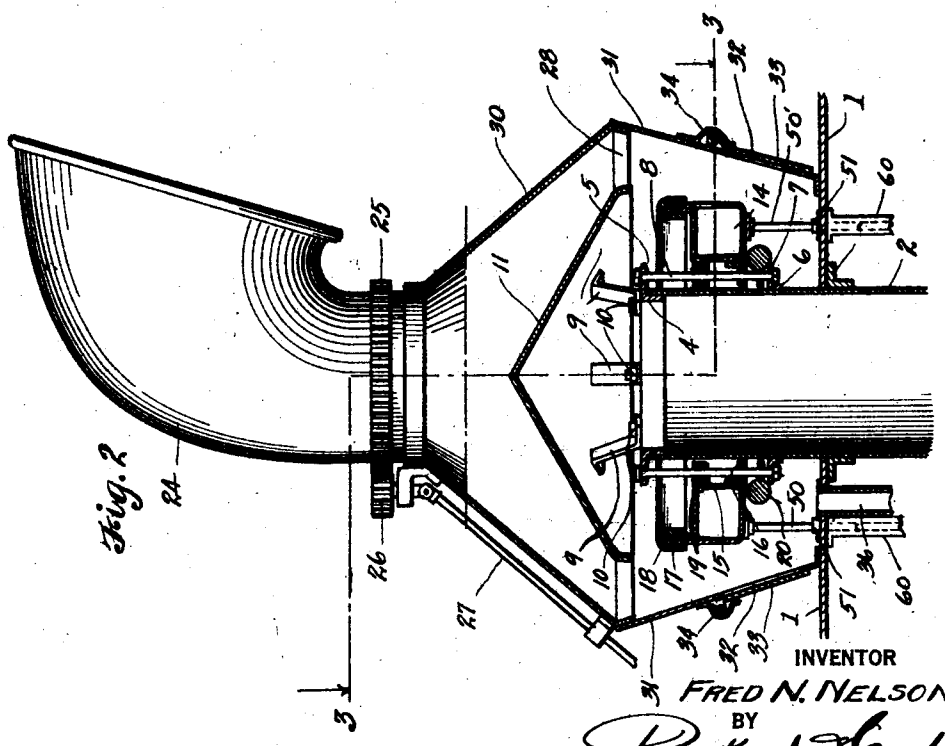
VENTILATOR

Filed March 14, 1925 2 Sheets-Sheet 2









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Patented May 1, 1928.

1,667,736

UNITED STATES PATENT OFFICE.

FRED N. NELSON, OF SEATTLE, WASHINGTON.

VENTILATOR.

Application filed March 14, 1925. Serial No. 15,462.

This invention relates to improvements in ventilators and more particularly to that type of ventilators used in ships for inducing fresh air into the holds or compartments.

It is the principal object of this invention to provide ventilators of the above character for use principally on ships, barges, boats and similar vessels, which are normally open to admit air but which embody automatically operating mechanism for preventing the entrance of water therethrough.

A further object is to provide ventilators as above stated, adapted for naval vessels, and which are equipped with means whereby they may be closed by power or by hand from the bridge, or elsewhere, to protect the crew against attack by poison gas, liquid fire and the like, as is used in warfare.

Other objects reside in the various objects, of construction and combination of parts embodied in the invention and in their mode of operation.

In accomplishing these and other objects, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of a ventilator embodied by the present invention, particularly illustrating the mechanical means for closing the same.

Figure 2 is a view, partly in elevation and partly in central vertical section of the ventilator.

Figure 3 is a horizontal, sectional view of the same, taken on the line 3—3 in Figure 2.

Figure 4 is an enlarged sectional view showing the construction of the float.

Figure 5 is a detail view showing an alternative construction and means for closing the doors of the clearing ports.

Figure 6 is a view illustrating an alternative means for manually closing the ventilator.

Referring more in detail to the several views of the drawings—

1 designates what may be the deck of a ship, or boat, and 2 a ventilator tube extending vertically through an opening in the deck and secured thereto by means of an angle iron band 3. To the upper end of tube 2, a ring 4 (see Figure 2) having an annular, outwardly extending horizontal flange 5, is fixed by rivets or other suitable devices and secured about the tube just above the deck and in spaced relation with respect to the ring 4 is a ring 6 having a horizontal flange 7. A plurality of rods 8, which serve as guides for the mounting of a float, as is presently described, are extended vertically between and fixed at their ends in the flanges 5 and 7 of rings 4 and 6, respectively.

Supported concentrically over the upper end of the tube 2 by means of a plurality of brackets 9 that are fixed by bolts 10 to the flange 5 of ring 4, is a conically shaped hood 11. This is spaced somewhat above the tube so as to provide for the passage of air into the latter and its peripheral edge extends considerably beyond the ring 4 and serves as an abutment against which the float, above mentioned, may be lifted to close the entrance into tube 2.

The float consists of an annular, hollow ring 14 disposed about the tube 2 and supported slidably on the guide rods 8 which extend through openings provided in a flange 15 and lugs 16 that are fixed to the inner surface of the ring. Seated over a vertical flange 17 about the periphery of the float is a gasket 18 and upon the flange 15 is a gasket 19 and these two gaskets are adapted, when the float is lifted, to seat respectively against the under surface of hood 11 and flange 5 of ring 4 to effect a water tight closure of the opening into tube 2. In some constructions it might be more desirable to secure a gasket to the under side of the hood against which the flange 17 of the float may seat instead of placing the gasket 16 on the flange 17.

When a ventilator of this type is used in a vessel of the smaller type, I provide a float closing weight, in the form of a ring 20 that is located below the float and is slidable on the rods 8 and is of such weight that it will serve, should the boat be capsized from any cause, to forcibly close the float against the hood to prevent the entrance of water into tube 2 and thus

avoid the flooding of the vessel before it could be righted again.

Secured to the deck about the upper end of pipe 2 and over the hood 11 is a cowl 24, the upper portion of which may be of the usual form and rotatably mounted so that it may be turned as desired by any suitable type of turning gear, here shown as comprising a ring gear 25 fixed about the cowl and a driving gear 26 in mesh therewith fixed to the end of a jointed turning shaft 27. The upper portion of the cowl has an inlet opening of substantially the same diameter as tube 2, but the lower part, or base, for the cowl is enlarged to provide an annular clearance space 28 between it and the periphery of the hood 11. This base portion for the cowl is made in upper and lower sections; the upper section 30 of which is of frustro-conical form and may constitute a single piece that is secured rigidly to the upper edge of the lower section 31. The lower section is also of frustro-conical form, inverted and is provided with a number of clearing ports 32 over which spring pressed covers 33, that are hingedly fixed to the outer surface of the section as at 34, are yieldably held but which will swing outwardly when pressed by water from within. This lower portion of the base for the cowl may also be constructed with a plurality of removable sections or plates 35 to facilitate adjustment of the enclosed parts, for painting or for other purposes.

In Figure 5 is shown an alternative construction in which the openings 32 in the base of the ventilator are closed by trap doors 40 mounted by hinge rods 41. The lower part of the doors lie against the outside of the housing but their upper end portions extend inside of the opening and engage the inner side of the housing across the top of the openings. These doors are normally held closed by coiled springs 43 that are fixed to the housing wall above the openings 32 and to posts that extend inwardly from the top edges of the doors.

I have also provided a drain pipe 36 leading downwardly through the deck from within the cowl base for carrying off the ordinary spray that may enter the cowl during inclement weather.

With the device so constructed, should water break over a vessel, any water entering the cowl would be prevented from falling directly into tube 2 by means of the hood 11. Should the amount of water entering not be excessive, it will be discharged through the drain pipe 36 and clearing ports 32 but should an excessive amount suddenly be dashed in, the float valve 14, which ordinarily remains at rest a spaced distance below the hood, will be lifted by the buoyancy of the water against the hood and flange 5 and will effectively close the entrance to the tube 2 until the water has passed out through the clearing ports 32. The valve then automatically opens and provides again for the passage of air into the ventilator tube.

Should the boat be capsized from any cause, the weighted ring forces the float to a closed position and water cannot enter the ventilator. Thus the vessel will be kept from flooding until it can be righted again.

Ordinarily this counter weight 20 would be omitted in larger vessels, but would be provided on smaller boats that are apt to capsize and which could be righted again.

The means that I have provided for mechanically closing the ventilator comprises a pair of vertically disposed lifting rods 50—50′ that extend slidably through stuffing boxes 51 in the deck so that at their upper ends they engage with the under surface of the float at diametrically opposite points. The lower ends of the rods are pivotally joined, as at 52, with the upper ends of paired sets of lazy tongs 53 supported on a revolubly mounted shaft 54 that extends horizontally through the tube 2. The paired links at the lower ends of the lazy tongs are pivotally connected with nuts 55 which are mounted on right and left hand threaded portions 56 and 57 in shaft 54 and the shaft is provided at one end with a crank 58 whereby it may be manually revolved to cause the nuts to move toward or from each other for the purpose of extending or retracting the tongs. When the tongs are extended, they will cause rods 50—51′ to engage and lift the float against the hood 11 to close the ventilator. As a feature of construction, the lazy tongs are operable along channel iron bars 60 that are secured at their upper ends to the under side of the deck so that the lower ends of rods 50—50′ operate slidably therein, and at their lower ends are provided with bearings 61 in which shaft 54 is rotatable.

As a means for closing the ventilator by mechanical power under the control of one stationed, for example, on the bridge of the vessel, I have equipped the shaft 54 with a sprocket wheel, or drum, 62, over which a mechanically driven chain or cable 63, may be extended. With all ventilators of a ship so equipped, all could be simultaneously closed from a single control.

In Figure 6, I have shown an alternative construction wherein the lazy tongs are replaced by a mechanism comprising sprocket wheels, or drums, 65 on shaft 54 and levers 66 pivotally supported within the cowl base with ends engageable with the float. Chains, or cables, 67, extend about the sprocket wheels or drums through guides 68 in the deck and are connected at their ends to opposite ends of the levers 66. Rotation of the

shaft 54 causes the levers to be actuated to engage and lift the float to close the ventilator and it may be held in this position by a set screw, or the like, adapted to be tightened against the shaft 54 to hold it against rotation. The sprocket wheels, or drums, also may be equipped with sheaves 70 to receive a belt or other means whereby they may be operated mechanically.

While I have not specified the kind of material from which the ventilator is to be constructed it is to be understood that the cowl and ventilator tube would be made of the usual sheet metal and the float and associated parts would be of light, durable, non-corrosive material. The ring 20 would be of any suitable material of sufficient weight to serve the purpose for which the ring is intended.

It is further to be understood that the forms of construction illustrated may be modified to suit a deck, housing, skid beams, boiler hatches, air trunks, etc., and likewise may be used with or without the cowl. It would serve satisfactorily without the cowl, on engine casings of that character described in my co-pending application, Serial No. 736,852, filed September 10, 1924.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent, is:

1. In a ventilator, an air tube having an angle ring fixed within its upper end with a horizontal flange extending about the tube, brackets fixed to the ring, a hood supported by said brackets in spaced relation above the end of the tube, a float surrounding the tube and adapted to be lifted against the said horizontal flange of the angle ring and against the hood to close the entrance of the tube.

2. In a ventilator, an air tube having an outturned, peripheral flange about its upper end, a hood supported in spaced relation above the upper end of the tube, a ring fixed about the tube in spaced relation to the end flange, guide rods fixed at their ends in said ring and flange, a float encircling the tube and slidable on said guide rods from and against said hood and flange at the upper end of the tube to close off the passage into the tube.

3. In a ventilator, an air tube having an outturned, peripheral flange about its upper end, a hood supported in spaced relation above the upper end of the tube, a ring fixed about the tube in spaced relation to the end flange, guide rods extended between said ring and flange, a float encircling the tube and slidable on said guide rods from and against the said hood and flange at the upper end of the tube to close off the passage into the tube and a weighted ring slidable on the rods below the float.

4. In a ventilator, an air tube, a ring fixed in the upper end of said tube having an outturned peripheral flange, a ring fixed about the tube in spaced relation to said end ring and having an outwardly extending flange, a plurality of guide rods extended between the said flanges, brackets mounted on the upper ring, a conical hood supported by said brackets in spaced relation above the end of the tube, a ring-like float encircling the tube and slidable vertically on said guide rods, gaskets mounted on said float and movable therewith against the hood and flange of the upper end ring to close off the entrance to the tube, and a weight slidable on the guide rods below the float.

5. A ventilator of the class described, comprising a vertically directed ventilator tube, a hood supported in spaced relation above the upper end of said tube and a cowl having a base enclosing the said hood and upper end of the ventilator provided with clearing ports and outwardly yieldable closures for said ports.

6. A ventilator of the class described comprising a vertically directed ventilator tube, a hood supported in spaced relation above the upper end of said tube, a cowl having a base housing enclosing the upper end of the ventilator tube and hood and having drainage ports in its lower portion, a float valve encircling the tube and adapted to be lifted against the hood to close the entrance to the ventilator tube and outwardly yieldable closures for said drainage ports.

7. A ventilator of the class described, comprising in combination with a deck, a ventilator tube extended upwardly through the deck, having a peripheral flange about its upper end, a conical hood supported in spaced relation above the end of the tube, a cowl having a base housing supported from the deck about said upper end of the ventilator tube and hood and having a plurality of clearing ports about its lower body portion, closures for said ports, yieldable means for normally retaining said closure in closed position, and a float disposed about the upper end of the ventilator tube and adapted to be lifted against the hood and flanged end of the tube to close the inlet into the ventilator tube.

8. A ventilator comprising in combination with a deck, or the like, a ventilator tube extended through the deck, a peripheral flange about the upper end of the tube, a hood supported in spaced relation above the end of the tube, a float encircling the tube and movable against the hood and flange to close the entrance to the tube, and a lazy tong mechanism operable from below the deck for lifting the float to closed position.

9. A ventilator comprising in combination with a deck, or the like, a ventilator tube extended through the deck, a periph-

eral flange about the upper end of the tube, a hood supported in spaced relation above the end of the tube, a float encircling the tube and movable against the hood and flange to close the entrance to the tube, a pair of rods slidable through the deck to engage and lift the float, a lazy tong connected with each rod and means for extending the tongs to move the float into closed position.

Signed at Seattle, King County, Washington, this 5th day of March, 1925.

FRED N. NELSON.