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WATERPROOF VENTILATOR

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FIG. 1

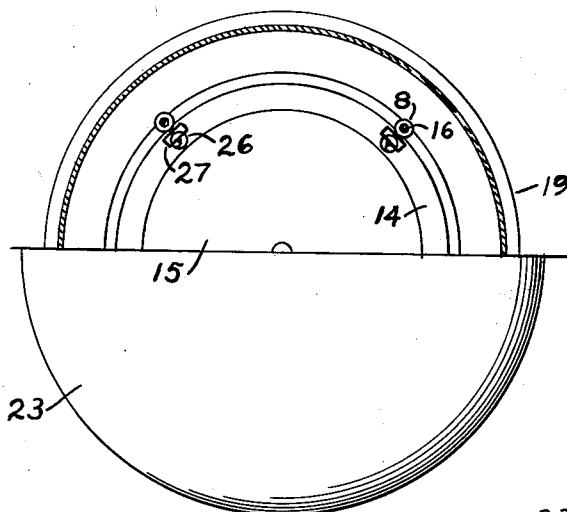


FIG. 2

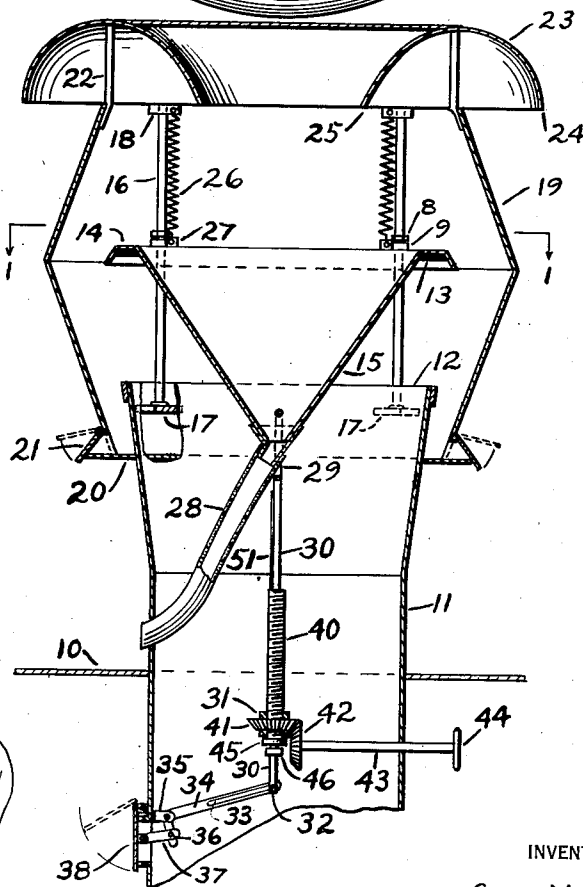
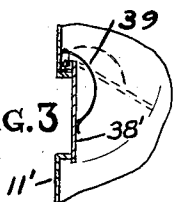


FIG. 3



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WATERPROOF VENTILATOR

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18 Claims. (Cl. 98—64)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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

5 It is a 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 there-
10 through.

A further object is to provide ventilators as above stated, adapted for naval vessels, and which are equipped with means whereby they may be
15 closed locally by power or by hand or at a distance as 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
20 in the invention and in their mode of operation.

In accomplishing these and other objects, there is provided the improved details of construction, the preferred forms of which are illustrated in
25 the accompanying drawing, wherein—

Fig. 1 is a horizontal sectional view of a ventilator embodying the present invention taken on
line 1—1 of Fig. 2.

Fig. 2 is a vertical sectional view through the
30 ventilator.

Fig. 3 is a sectional view of a modified form of the vacuum releasing valve.

Referring more in detail to the several views of the drawing:

35 There is shown at 10 what may be the deck of a ship or boat into which extends a ventilator trunk 11. The upper edge 12 of the ventilator trunk 11 is finished true to cooperate with a gasket 13 on the underside of the rim 14 of the
40 funnel 15. Extending through sleeves 9 in funnel rim 14 are a plurality of supporting and guide rods 16 whose lower ends are mounted on brackets 17 secured to the ventilator trunk 11, the rods 16
45 being provided with stops 8 limiting the upward movement of funnel 15. Brackets 18 at the upper end of the guide rods 16 serve to support the ventilator shell 19, the lower end of the shell 19
50 being mounted on annular shelf 20 extending from the outer side of the ventilator trunk 11.

55 Scupper valves 21 are mounted over openings formed in the lower end of the ventilator shell 19 below the level of the edge 12 of the trunk 11 thereby providing drainage means for water that may collect in the trough between the lower end of the ventilator shell 19 and the upper end of the

ventilator trunk 11. The scupper valves open outwardly and are mounted with their axes athwart-ship so as not to swing open with the roll of the ship and are, therefore, tight against water pressure from the outside.

Supporting arms 22 extending upwardly from the ventilator shell 19 support the ventilator top or hood 23 in such a manner that all the air that enters must enter below the outer annular edge 24 of the top 23 and travel over the upper edge
10 of the ventilator shell 19 and be deflected downwardly by the inner annular edge 25 provided in the ventilator top or hood 23, the circumference of the inner annular edge 25 being substantially less than the maximum inner circumference of the
15 funnel 15.

The funnel 15 is suspended from the brackets 18 by means of springs 26 and brackets 27. The lower end of the funnel 15 is connected to a flexible conduit 28 leading into an aperture in the side of the trunk 11 above the deck 10. The
20 springs 26 are so proportioned in strength that they will hold the funnel in the upper or open ventilator position when water enters at a rate not faster than that at which it will run out
25 through the flexible funnel drain or conduit 28. Any greater weight of water will cause the funnel springs 26 to extend themselves, permitting the funnel 15 to drop downwardly until the gasket 13 contacts the edge 12 of the ventilator trunk
30 11 thereby automatically sealing the ventilator against entrance of either liquids or air, whenever any great quantity of water should be present in the ventilator. Counter weights may be substituted for springs 26 in an obvious manner. The
35 lower end of the funnel 15 is provided with a yoke 29 formed at the upper end of a guide rod 30. This guide rod 30 extends through a bracket 31 and is provided at its lower end with a pin 32 cooperating with a slot 33 in one end of a bell crank 34. The
40 bell crank 34 is pivoted to a bracket 35 and has its other end pivoted at 36 to a connecting rod 37 pinned to the inside of a flap valve 38 extending through the side of the ventilator trunk 11 below
45 deck 10. As funnel 15 closes against the ventilator trunk edge 12, the bell crank 34 automatically opens the valve flap 38 thereby preventing the formation of a vacuum within the ventilator trunk 11 and allowing the springs to auto-
50 matically re-open the ventilator as soon as the weight of water therein has been sufficiently reduced to avoid danger of water entering through the ventilator.

There is shown in Fig. 3 a modified form of the

ventilator valve flap 38' which opens inwardly into the ventilator trunk 11' against a bow spring 39 to act as a vacuum breaker within the ventilator trunk whenever the ventilator is closed.

5 The means for manually closing the ventilator includes an externally extending sleeve 40 extending about the guide rod 30 and adapted to pass through the bracket 31. A feather 51 on the guide rod 30 cooperates with a cooperative groove inside the sleeve 40 preventing the sleeve 10 40 from rotating. An internally threaded pinion 41 is operable by a beveled pinion 42 on shaft 43 carrying a hand wheel 44 for drawing the sleeve 40 downwardly therethrough until it has closed the ventilator funnel 15 against the funnel trunk edge 12, the lower end of the sleeve 40 having a stop 45 which cooperates with a stop 46 on the guide rod 30 thereby permitting the guide rod 30 to operate independently there- 20 through for automatically opening and closing so long as the sleeve 40 is in a position to permit the ventilator to remain open, but when hand wheel 44 has been rotated to draw the sleeve 40 downwardly through the bracket 31, then the stops 45 and 46 prevent the ventilator from auto- 25 matically opening.

Obviously, power means may be connected to operating shaft 43 for closing the ventilator from a remote location, if desired.

30 While the preferred form of this invention has been shown and set forth, it will be understood that this invention is not limited to the particular detailed structure hereinbefore disclosed but that modifications and changes may be made within the scope of what is hereinafter disclosed.

This invention may be manufactured and used by or for the Government of the United States without the payment of royalty thereon.

I claim:

40 1. A ventilator comprising a ventilator trunk, an annular shelf about said ventilator trunk spaced below its upper edge, a ventilator shell of greater diameter than said ventilator trunk, the lower edge of said shell being supported on said shelf, a ventilator top supported on said ventila- 45 tor shell, a funnel yieldably supported in the mouth of said ventilator trunk, means for guiding said funnel into sealing position with said ventilator trunk edge and flexible drain means connecting to the lower end of said funnel and 50 extending through said ventilator trunk.

2. A ventilator comprising a ventilator tube having a water collecting trough formed thereon by a flange and a ventilator shell extending up- 55 wardly from said flange, a ventilator hood supported on said shell; a funnel yieldably supported above the inner edge of said trough and having means to cooperatively seal said funnel against said inner edge and a flexible drainage tube ex- 60 tending from the lower end of said funnel through said ventilator tube.

3. A ventilator comprising a ventilator tube having a water collecting trough formed thereon by a flange and a ventilator shell extending up- 65 wardly from said flange, a ventilator hood supported on said shell, a funnel yieldably supported above the inner edge of said trough and having means to cooperatively seal said funnel against said inner edge, a flexible drainage tube extend- 70 ing from the lower end of said funnel through said ventilator tube, scupper valve means secured to said trough permitting drainage therefrom, guide means yoked to the lower end of said funnel, a vacuum flap valve extending through said 75 ventilator tube, and means connected to the lower

end of said guide means cooperating with said flap valve to open the same as the funnel descends toward sealing position.

4. A ventilator comprising a ventilator tube having a water collecting trough formed thereon 5 by a flange and a ventilator shell extending upwardly from said flange, a ventilator hood supported on said shell, a funnel yieldably supported above the inner edge of said trough and having means to cooperatively seal said funnel against 10 said inner edge, a flexible drainage tube extending from the lower end of said funnel through said ventilator tube, scupper valve means secured to said trough permitting drainage therefrom, guide means yoked to the lower end of said fun- 15 nel, and a vacuum flap valve extending through said ventilator tube.

5. A ventilator comprising a ventilator tube having a water collecting trough formed there- 20 on by a flange and a ventilator shell extending upwardly from said flange, a ventilator hood supported on said shell, a funnel yieldably supported above the inner edge of said trough and having means to cooperatively seal said funnel against 25 said inner edge, a flexible drainage tube extending from the lower end of said funnel through said ventilator tube, scupper valve means secured to said trough permitting drainage therefrom, guide means yoked to the lower end of said funnel, and means cooperating with said guide means 30 for positively drawing said funnel downwardly to ventilator sealing position, said last mentioned means including an internally threaded pinion on said last mentioned means and a beveled pinion cooperating with said first mentioned pinion for 35 controlling the same.

6. A ventilator comprising a ventilator tube having a water collecting trough formed thereon by a flange and a ventilator shell extending up- 40 wardly from said flange, supporting rods secured to the inner edge of said trough, bracket means securing the upper edge of said shell to the upper end of said supporting rods, a funnel, means for yieldably supporting said funnel above the 45 edge of said trough, said funnel having means for cooperatively sealing the same against the inner edge of said trough, and drainage means extending from the lower end of said funnel.

7. A ventilator comprising a ventilator tube having a water collecting trough formed thereon 50 by a flange and a ventilator shell extending upwardly from said flange, supporting rods secured to the inner edge of said trough, bracket means securing the upper edge of said shell to the upper end of said supporting rods, a funnel, 55 means for yieldably supporting said funnel above the edge of said trough, said funnel having means for cooperatively sealing the same against the inner edge of said trough, said funnel having means for cooperating with said supporting rods 60 guiding the vertical movement of said funnel, and drainage means extending from the lower end of said funnel.

8. A ventilator comprising a ventilator tube having a water collecting trough formed thereon 65 by a flange and a ventilator shell extending upwardly from said flange, rods extending upwardly from the inner edge of said trough to support the upper edge of said ventilator shell, a funnel yieldably guided on said supporting rods having 70 means for sealing said funnel against the inner edge of said trough, and drainage means extending from the bottom of said funnel.

9. A ventilator comprising a ventilator trunk, an annular shell secured adjacent the upper edge 75

of said trunk, a ventilator shell having its lower edge supported on said shelf thereby providing a water collecting trough, a plurality of shell reinforcing rods extending upwardly from the upper edge of said trunk and bracketed to the upper edge of said shell, a ventilator hood supported from the upper edge of said shell, a drainage funnel yieldably and guidably supported above the edge of said ventilator trunk, drainage means extending from said funnel through said trunk, said funnel having a plurality of sleeves therethrough cooperating with said reinforcing rods whereby said rods act to guide the same in vertical movement, sealing means adapted to cooperate between said funnel and said trunk edge, and means for yieldably supporting the funnel comprising a plurality of springs which will permit the funnel to drop to sealing position whenever the weight of entrapped water is greater than its drainage capacity.

10. A ventilator comprising a ventilator trunk, an annular shelf secured adjacent the upper edge of said trunk, a ventilator shell having its lower edge supported on said shelf thereby providing a water collecting trough, a plurality of shell reinforcing rods extending upwardly from the upper edge of said trunk and bracketed to the upper edge of said shell, a ventilator hood supported from the upper edge of said shell, a drainage funnel yieldably and guidably supported above the edge of said ventilator trunk, drainage means extending from said funnel through said trunk, said funnel having a plurality of sleeves therethrough cooperating with said reinforcing rods whereby said rods act to guide the same in vertical movement, sealing means adapted to cooperate between said funnel and said trunk edge, means for yieldably supporting the funnel comprising a plurality of springs which will permit the funnel to drop to sealing position whenever the weight of entrapped water is greater than its drainage capacity, additional guide means yoked to the lower end of said funnel, means cooperating with said additional guide means for positively drawing said funnel into ventilator sealing position, and a vacuum release valve extending through the side of said ventilator trunk.

11. A ventilator comprising a ventilator trunk, an annular shelf secured adjacent the upper edge of said trunk, a ventilator shell having its lower edge supported on said shelf thereby providing a water collecting trough, a plurality of shell reinforcing rods extending upwardly from the upper edge of said trunk and bracketed to the upper edge of said shell, a ventilator hood supported from the upper edge of said shell, a drainage funnel yieldably and guidably supported above the edge of said ventilator trunk, drainage means extending from said funnel through said trunk, said funnel having a plurality of sleeves therethrough cooperating with said reinforcing rods whereby said rods act to guide the same in vertical movement, sealing means adapted to cooperate between said funnel and said trunk edge, means for yieldably supporting the funnel comprising a plurality of springs which will permit the funnel to drop to sealing position whenever the weight of entrapped water is greater than its drainage capacity, additional guide means yoked to the lower end of said funnel, means cooperating with said additional guide means for positively drawing said funnel into ventilator sealing position, and a vacuum release valve extending through the side of said ventilator trunk,

the cooperative means between said additional guide means and said vacuum release valve automatically opening said vacuum release valve as said funnel approaches sealing position.

12. A ventilator comprising a ventilator trunk, an annular shelf secured adjacent the upper edge of said trunk, a ventilator shell having its lower edge supported on said shelf thereby providing a water collecting trough, a plurality of shell reinforcing rods extending upwardly from the upper edge of said trunk and bracketed to the upper edge of said shell, a ventilator hood supported from the upper edge of said shell, a drainage funnel yieldably and guidably supported above the edge of said ventilator trunk, drainage means extending from said funnel through said trunk, said funnel having a plurality of sleeves therethrough cooperating with said reinforcing rods whereby said rods act to guide the same in vertical movement, sealing means adapted to cooperate between said funnel and said trunk edge, means for yieldably supporting the funnel comprising a plurality of springs which will permit the funnel to drop to sealing position whenever the weight of entrapped water is greater than its drainage capacity, additional guide means yoked to the lower end of said funnel, means cooperating with said additional guide means for positively drawing said funnel into ventilator sealing position, and a vacuum release valve extending through the side of said ventilator trunk, the cooperative means between said additional guide means and said vacuum release valve automatically opening said vacuum release valve as said funnel approaches sealing position, said cooperative means comprising a bell crank joined to said vacuum release valve and a pin and slot connection between said bell crank and said yoked guide means.

13. A ventilator comprising a ventilator trunk, an annular shelf secured adjacent the upper edge of said trunk, a ventilator shell having its lower edge supported on said shelf thereby providing a water collecting trough, a plurality of shell reinforcing rods extending upwardly from the upper edge of said trunk and bracketed to the upper edge of said shell, a ventilator hood supported from the upper edge of said shell, a drainage funnel yieldably and guidably supported above the edge of said ventilator trunk, drainage means extending from said funnel through said trunk, said funnel having a plurality of sleeves therethrough cooperating with said reinforcing rods whereby said rods act to guide the same in vertical movement, sealing means adapted to cooperate between said funnel and said trunk edge, and means for yieldably supporting the funnel comprising a plurality of springs which will permit the funnel to drop to sealing position whenever the weight of entrapped water is greater than its drainage capacity, additional guide means yoked to the lower end of said funnel, means cooperating with said additional guide means for positively drawing said funnel into ventilator sealing position, said means for positively drawing said funnel downwardly comprising an externally threaded sleeve embracing said additional guide means, and an internally threaded gear on said sleeve and means for rotating said gear to draw said sleeve and embraced guide means downwardly.

14. A ventilator comprising a ventilator trunk, an annular shelf secured adjacent the upper edge of said trunk, a ventilator shell having its lower edge supported on said shelf thereby providing a

water collecting trough, a plurality of shell reinforcing rods extending upwardly from the upper edge of said trunk and bracketed to the upper edge of said shell, a ventilator hood supported from the upper edge of said shell, a drainage funnel yieldably and guidably supported above the edge of said ventilator trunk, drainage means extending from said funnel through said trunk said funnel having a plurality of sleeves therethrough cooperating with said reinforcing rods whereby said rods act to guide the same in vertical movement, sealing means adapted to cooperate between said funnel and said trunk edge, means for yieldably supporting the funnel comprising a plurality of springs which will permit the funnel to drop to sealing position whenever the weight of entrapped water is greater than its drainage capacity, additional guide means yoked to the lower end of said funnel, means cooperating with said additional guide means for positively drawing said funnel into ventilator sealing position, a vacuum release valve extending through the side of said ventilator trunk, said means for positively drawing said funnel downwardly comprising an externally threaded sleeve embracing said additional guide means, an internally threaded gear on said sleeve and means for rotating said gear to draw said sleeve and embraced guide means downwardly.

15. A ventilator comprising a ventilator trunk, an annular shelf about said ventilator trunk spaced below its upper edge, a ventilator shell of greater diameter than said ventilator, the lower edge of said shell being supported on said shelf, a ventilator top supported on said ventilator shell, a receptacle yieldably supported in the mouth of said ventilator trunk, means for guiding said receptacle into sealing position with

said ventilator trunk edge, and drain means connecting the bottom of said receptacle and extending through said ventilator.

16. A ventilator comprising a ventilator tube having a water collecting trough formed thereon by a flange and a ventilator shell extending upwardly from said flange, a ventilator hood supported on said shell; a receptacle yieldably supported above the inner edge of said trough and having means to cooperatively seal said receptacle against said inner edge, and a drainage means extending from the bottom of said receptacle through said ventilator.

17. A ventilator comprising a ventilator tube having a water collecting trough formed thereon by a flange and a ventilator shell extending upwardly from said flange, supporting means secured to said ventilator tube, means bracing the upper edge of said shell to the upper end of said supporting means, a receptacle, means for yieldably supporting said receptacle above the edge of said trough, said receptacle having means for cooperatively sealing the same against the inner edge of said trough, and drainage means extending from the bottom of said receptacle.

18. A ventilator comprising a ventilator tube having a water collecting trough formed thereon by a flange and a ventilator shell extending upwardly from the outer edge of said flange, supporting means extending upwardly from the inner edge of said ventilator tube to brace the upper edge of said ventilator shell, a receptacle yieldably guided on said supporting means, said receptacle having means for sealing said receptacle against the inner edge of said trough, and drainage means extending from the bottom of said receptacle.

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