

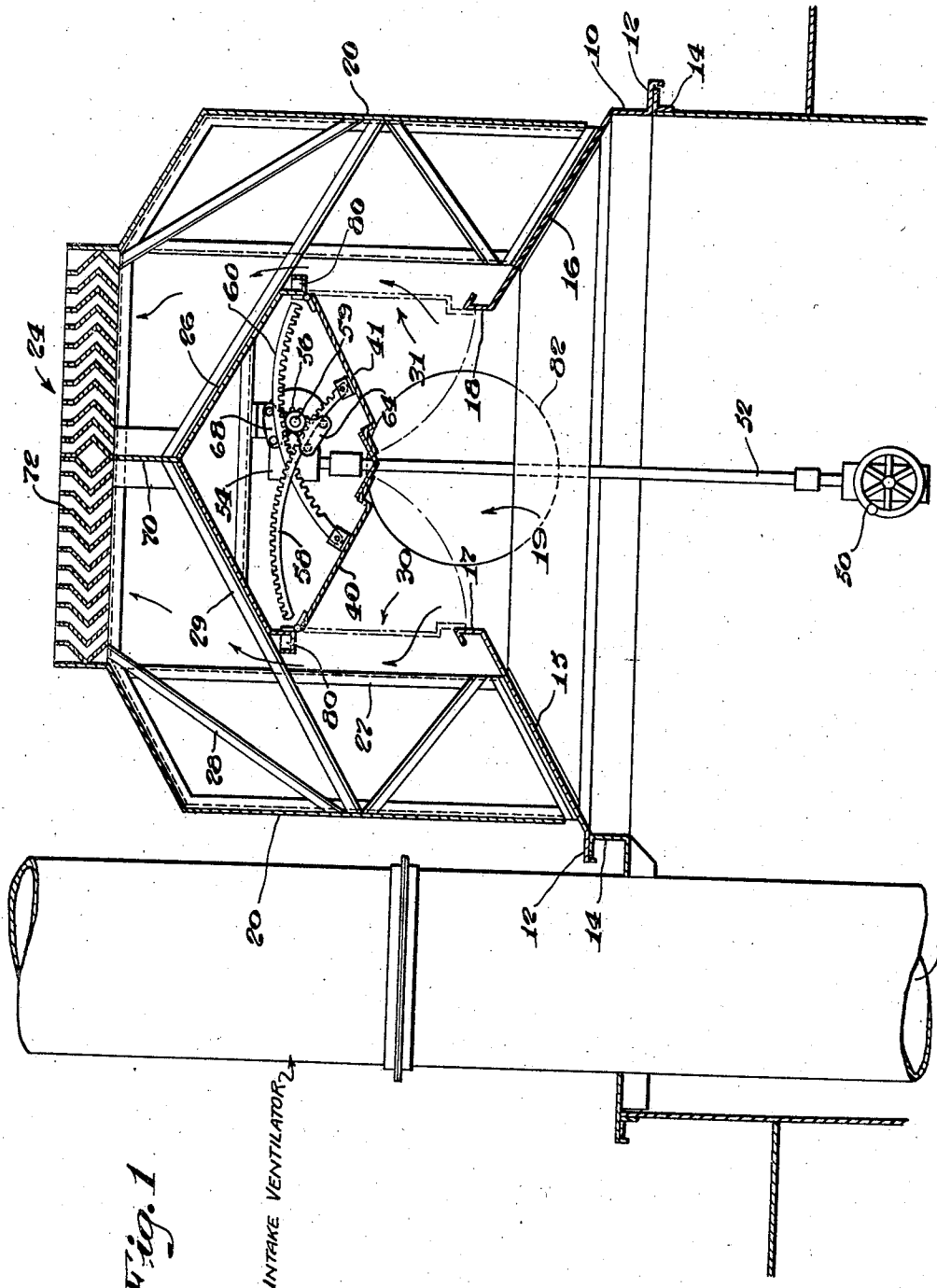
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L. J. SHUMAKER
VENTILATING APPARATUS

2,406,168

Filed May 5, 1943

2 Sheets-Sheet 1



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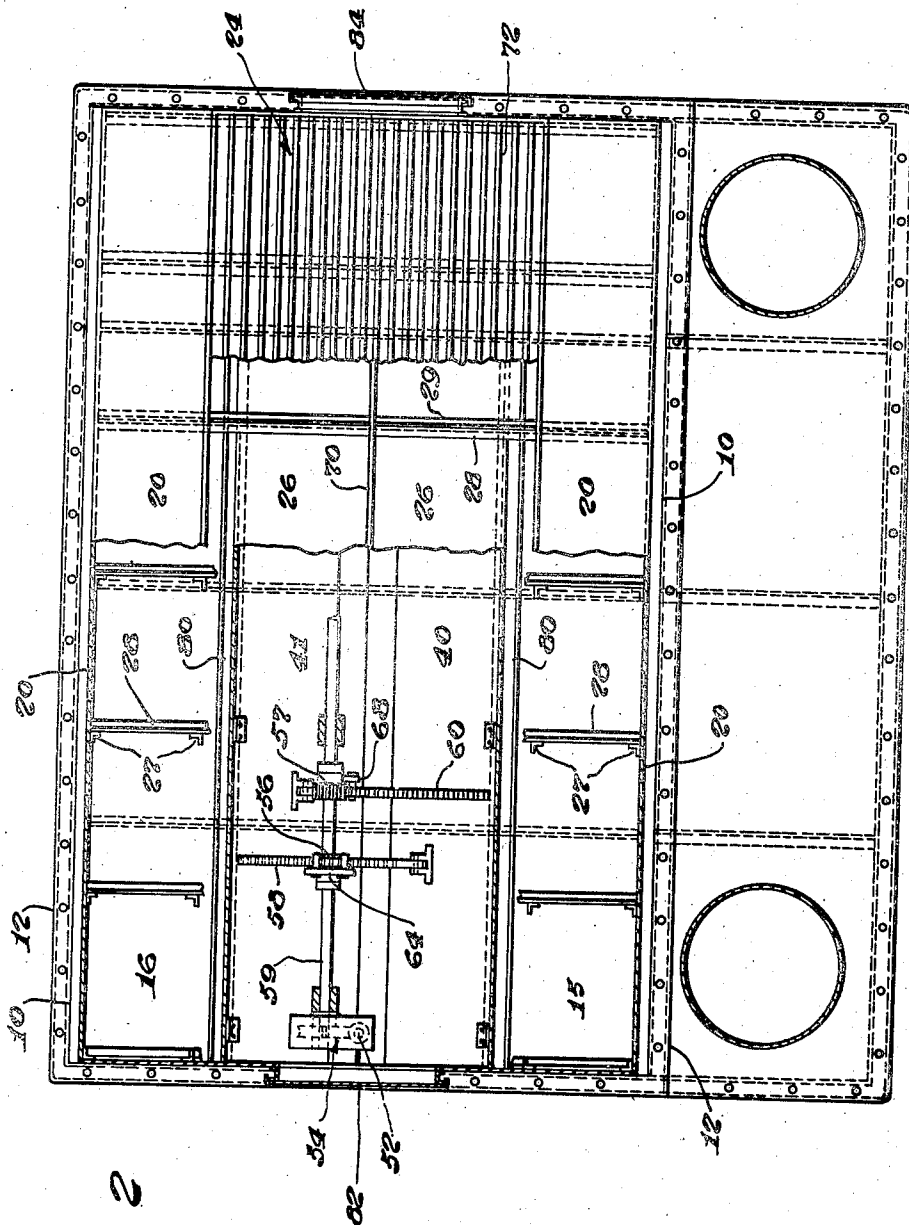


Fig. 2

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VENTILATING APPARATUS

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5 Claims. (Cl. 98—42)

1

This invention relates to ventilating apparatus. One object of the invention is to provide a novel and improved construction of ventilating apparatus which is adapted for general use and particularly for use upon buildings and other structures from which it is desired to exhaust air during black-outs, without permitting light from within the structure to pass outwardly through the ventilator.

A further and more specific object of the invention is to provide a novel prefabricated ventilating unit for use as a ship ventilator and whose design is such as to readily adapt it for use in newly constructed ships, on ships of present construction, and also on any ships which are now in service, and whose construction is such as to enable the ventilator to continue in operation while the ship is in a combat zone without permitting light to emerge through the ventilator.

With these general objects in view, and such others as may hereinafter appear, the invention consists in the ventilating apparatus and in the ship ventilating system hereinafter described and particularly pointed out in the claims at the end of this specification.

In the drawings Fig. 1 is a vertical sectional view of the present ventilator forming a part of a ship ventilating system and erected upon the usual curbing which now projects above the boat deck and upon which the present hatches and skylights forming a part of the present ventilating system now used are mounted; and Fig. 2 is a plan view of the complete ventilating unit with portions broken away to illustrate the construction thereof.

In its broader aspects, the invention contemplates a novel and superior construction of ventilator of the stationary type which is designed to permit efficient exhaustion of air from within the building, to prevent the entrance of rain through the ventilator and at the same time to prevent the emission of light through the ventilator from within the building, thus enabling the ventilator to continue in operation during black-out periods. While the ventilating apparatus embodying the invention may be used with advantage for general purposes, the invention is preferably embodied in a ship ventilating system and the construction and design of the ventilating unit is such as to adapt it to be readily substituted for the hatches and skylights now used as a part of standard ship ventilators, as will be described, and in addition the construction is such as to permit the ventilator to be continued in operation at all times without

2

liability of emission of light through the ventilator from within the ship. Provision is made for enabling the amount of ventilation to be controlled and the ventilator to be closed during exceptionally rough weather to prevent the entrance of sea water into the ship through the ventilator.

Referring now to the drawings in which the different features of the invention have been illustrated as embodied in a ship ventilator adapted to be used instead of the open hatches and skylights above referred to, the improved ventilator comprises a completely assembled unit having a base portion 10 rectangular in shape and provided with flanges 12 around the periphery thereof adapted to fit over the usual combing or casing 14 which forms part of the structure of the ship's deck or engine room and is removably secured thereto by bolts or otherwise. The base 10 is, in the illustrated structure, inclined upwardly at its sides 15, 16, and the sides and vertical ends 17, 18 terminate in an elongated rectangular opening 19 comprising the throat of the ventilator. The base 10 has erected thereon a suction band 20 of general rectangular shape having the sides thereof inclined upwardly and terminating in an upstanding portion which cooperates with the upper portion of the end walls to form a rectangular frame within which black-out louvers indicated generally at 24 are mounted, as will be described. The suction band 20, louvers 24 and a cap member, indicated generally at 26 are preferably mounted upon structural framework erected upon and supported by the ventilator base to form a unit therewith. The structural framework for supporting these parts comprises uprights 27, diagonals 28, and cap supporting members 29, as clearly illustrated in the drawings. The cap member 26 is of a size at least covering the ventilator throat 19 and is mounted upon the framework to be spaced a substantial distance from the throat to provide lateral air outlet passageways 30, 31 through which air may readily pass upwardly from the throat and over the cap and out through the black-out louvers 24 at the top of the ventilator.

The suction band 20 is spaced a substantial distance from the ventilator throat 19 to enable the air to pass from the ventilator throat outwardly through the lateral outlet passageways 30, 31, and thence upwardly between the cap and the suction band and then through the black-out louvers 24 at the top of the ventilator. In order to control the exhaustion of the air

from within the ship by the ventilator the outlet passages 30, 31 are arranged to be closed or partially closed by damper members 40, 41, which as herein shown are pivoted upon the under sides of the ventilator cap in a position such that when swung downwardly the offset lower ends thereof rest against the inner sides of the throat 19 and serve to close the lateral outlet passageways 30, 31, such position being indicated in dotted lines in Fig. 1. In their elevated positions the lower ends of the dampers are arranged to abut or substantially abut, to form deflecting members for deflecting the air as it passes upwardly through the ventilator throat in an outward direction and through the outlet passageways 30, 31. The dampers may be suspended at different angular positions to partially close the outlet openings and thereby control the amount of ventilation desired. In the embodiment of the invention herein shown, provision is made for enabling the dampers 40, 41 to be simultaneously operated by mechanism including a hand operated wheel 50 mounted within the engine room or other portion of the ship immediately below the ventilator, and as the hand wheel is rotated, the rotations thereof are transmitted through the vertical operating shaft 52 and worm and worm wheel, indicated generally at 54, to turn pinions 56, 57 arranged to mesh with segmental racks 58, 60, one rack being mounted upon each damper. The racks 58, 60, are held in mesh with the pinions 56, 57 by guide members 64, 68 separated as shown in Fig. 2 and are pivotally mounted on the pinion shaft 59 and provided with rollers for engaging the back of the racks.

The suction band 20 acts as a wind baffle which prevents wind or rain from entering between the cap 26 and the base 10. The black-out louvers 24 and an adjacent baffle 70 prevents light from being emitted from within the ventilator. It will be observed by reference to Fig. 1 that the black-out louvers 24 comprise a series of baffles bent into angular shape, as shown, with a small vertical section 72 at the top. This vertical section 72 is so designed that if air passes in any direction across the top of the ventilator it does not retard the exhaust air. Therefore, if a ship were travelling in the same direction as the wind, the angle baffles 24 would not act as a scoop and force the air down into the ventilator but would permit the air to pass freely across the top of the ventilator, creating a suction action. The baffle 70 consists of a flat piece of metal or other material extending the full length of the ventilators, and it functions to prevent light from the right side of the ventilator entering the left side of the black-out louver and also to prevent light from the left side of the ventilator from entering the right side of the black-out louver.

The baffle 70, cap 26, ventilator throat 19 and black-out louvers 24 are spaced with relation to one another so as to insure that any light emerging through the throat from within the ship or other structure is reflected three times before emerging from the top of the ventilator, and it has been found that such an arrangement insures the desired black-out, thus permitting the ship to operate in combat zones without the necessity of closing the ventilating system. Heretofore the hatches or operating skylights, which have been hinged upon the deck curbing 14, permitted light to emerge from these hatches or skylights when opened, thus rendering the ship a target for enemy action. Consequently it has been the practice to close the hatches and sky-

lights, thus destroying the ventilating system so that temperatures continue to rise in the engine room. In addition these prior hatches and skylights have offered little protection against the entrance of sea water and as a result in practice have been closed a substantial part of the time, thus destroying the ventilating system.

It will be observed that the ventilator base may be bolted or welded to the raised curbing above the boat deck, permitting removal of the ventilator and rendering the engine room accessible through a large opening. The base is sloped upwardly from the curbing to the throat of the ventilator, and this slope raises the throat of the ventilator considerably higher than the boat deck so that if "green water" should wash over the deck it would not necessarily enter the ventilator throat until it reached a substantial height. It will also be observed that in the present structure of ventilator, should rain enter the ventilator through the black-out louvers, it is drained from the cap into gutters 80 and these gutters 80 spill the water onto the base, and the base due to its slope directs the water through the opening between the suction band and the base, allowing the water to wash onto the ship's deck.

Prior to the present invention the matter of escape from the engine room has presented substantial difficulty during those periods when the usual skylights and hatches have been closed. Particularly during black-out periods when black-out louvers and screens has been placed in the skylights, the method of escape was restricted to the intake ventilators. In accordance with the present invention, escape hatches 82, 84 are provided at least at one end and preferably at both ends of the ventilator unit and these are disposed so as to permit ready escape from the engine room irrespective as to whether the dampers are closed or open.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. A ventilating unit comprising a base provided with an opening forming the ventilator throat, a ventilator cap supported a substantial distance above the ventilator throat providing lateral air exhaust openings between it and the ventilator base, said ventilator cap having side portions projecting outwardly beyond the opening of said ventilator throat, opposed dampers having one of their side edges pivotally mounted at the side edge portions of said cap and arranged to swing outwardly into a position to close said openings and inwardly until the opposite edges thereof are in substantially abutting position to form deflectors for the air emerging from said throat, said dampers extending upwardly and outwardly in opposite directions from their substantially abutting edges and operating to prevent entrapment of the outgoing air under the ventilator cap, and a suction band mounted upon the base and surrounding said cap and spaced a substantial distance therefrom to form an air passage communicating with said lateral air exhaust openings, said band extending above the cap and below said ventilator throat, and terminating at its upper end in an opening.

2. A ventilating unit comprising a base provided with an opening forming the ventilator throat, a ventilator cap supported a substantial

5

distance above the ventilator throat providing lateral air exhaust openings between it and the ventilator base, said ventilator cap having side portions projecting outwardly beyond the opening of said ventilator throat, opposed dampers having one of their side edges hingedly connected to an edge portion of said cap and arranged to swing outwardly into a position to close said openings and inwardly until the opposite edges thereof are in substantially abutting position to form deflectors for the air emerging from said throat, said dampers extending upwardly and outwardly in opposite directions from their abutting edges and operating to prevent entrapment of the outgoing air under the ventilator cap, a suction band mounted upon the base and surrounding said cap and spaced a substantial distance therefrom to form an air passage communicating with said lateral air exhaust openings, said band extending above the cap and below said ventilator throat, and terminating at its upper end in an opening, and a series of blackout louvers in said opening shaped to prevent the emission of light from within the ventilator base through said opening while permitting passage of air therethrough.

3. In a ventilating system for a ship having a deck, a curbing projecting upwardly from the deck and surrounding an opening in the deck leading to within the ship, a ventilating unit removably erected upon said curbing forming a closure for said opening, said ventilating unit comprising a stationary ventilator having a rectangular shaped base including portions inclined upwardly and inwardly and terminating in spaced relation to form a rectangular opening forming the ventilator throat, said ventilator throat being disposed a substantial distance above said curbing, a rectangular shaped suction band mounted upon said base and having its upper end open, a ventilator cap within the suction band and disposed a substantial distance above the ventilator throat, said ventilator cap having side portions projecting outwardly beyond the opening of said ventilator throat, dampers hinged at their upper ends at the side edge portions of the cap and arranged to be swung inwardly from their closed to their open positions, the free ends of the dampers terminating at a point above the mid portion of the ventilator throat when the dampers are in their fully open positions and providing deflecting surfaces extending upwardly and outwardly from above the mid portion of the ventilator throat toward the side edges of the cap, whereby to assist in the outward movement of the air through the space between the cap and the sides of the throat and to prevent entrapment of outgoing air under the cap, and operating mechanism for actuating said dampers, said operating mechanism extending down into the ship.

4. In a ventilating system for a ship having a deck, a curbing projecting upwardly from the deck and surrounding an opening in the deck leading to within the ship, a ventilating unit removably erected upon said curbing forming a closure for said opening, said ventilating unit comprising a stationary ventilator having a rectangular shaped base including portions inclined upwardly and inwardly and terminating in spaced relation to form a rectangular opening forming the ventilator throat, said ventilator throat being disposed a substantial distance above said curb-

6

ing, a rectangular shaped suction band mounted upon said base and having its upper end open and provided with black-out louvers, a ventilator cap within the suction band and disposed a substantial distance above the ventilator throat, said ventilator cap having side portions projecting outwardly beyond the opening of said ventilator throat, dampers hinged at their upper ends at the side edge portions of the cap and arranged to be swung inwardly from their closed to their open positions, the free ends of the dampers terminating at a point above the mid portion of the ventilator throat when the dampers are in their fully open positions and providing deflecting surfaces extending upwardly and outwardly from above the mid portion of the ventilator throat toward the side edges of the cap, whereby to assist in the outward movement of the air through the space between the cap and the sides of the throat and to prevent entrapment of outgoing air under the cap, operating mechanism for actuating said dampers, said operating mechanism extending down into the ship, and a baffle member projecting upwardly from said cap and cooperating with said black-out louvers, said louvers, baffle, cap and throat being arranged to insure reflection of any light emerging from the throat at least three times before the same passes outwardly from the ventilator through said louvers.

5. A ventilating unit comprising, a base provided with an opening forming the ventilator throat, a suction band having substantially vertical side walls mounted on the base and surrounding the ventilator throat in spaced relation thereto and having a top wall provided with an opening therein for the reception of louvers, said top wall including portions extending upwardly and inwardly from the side walls of said suction band, a cap within the suction band for protecting the throat from water entering through the open upper end of the suction band, a series of longitudinally straight black-out louvers mounted upon the suction band within the open upper end thereof, each of said black-out louvers having its upper longitudinal edge disposed in a plane substantially common to the upper edge of said last-mentioned opening for preventing the scooping of air into said suction band by said louvers and including an upper vertical portion and relatively angularly disposed leg portions providing a section which is V-shaped in cross section with the legs of the V diverging relative to the horizontal, said louvers being spaced so that the apex of the V-shaped section of one louver extends at least partially into the opening of the V-shaped section of an adjacent louver, said cap including portions projecting outwardly beyond a line connecting the side of the throat and the side of the louver opening for causing light passing outwardly from the throat to be reflected from the underside of the top walls of the suction band before passing outwardly through the louvers so as to insure that light emerging through said throat is reflected at least three times before emerging through the upper end of the ventilator, and damper means disposed between the cap and ventilator throat arranged to form a water-tight closure therebetween when said damper means is in closed position.

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