3 Sheets—Sheet 1.

A. F. YARROW.
Ventilating Ships.

No. 207,335. Patented Aug. 20, 1878.

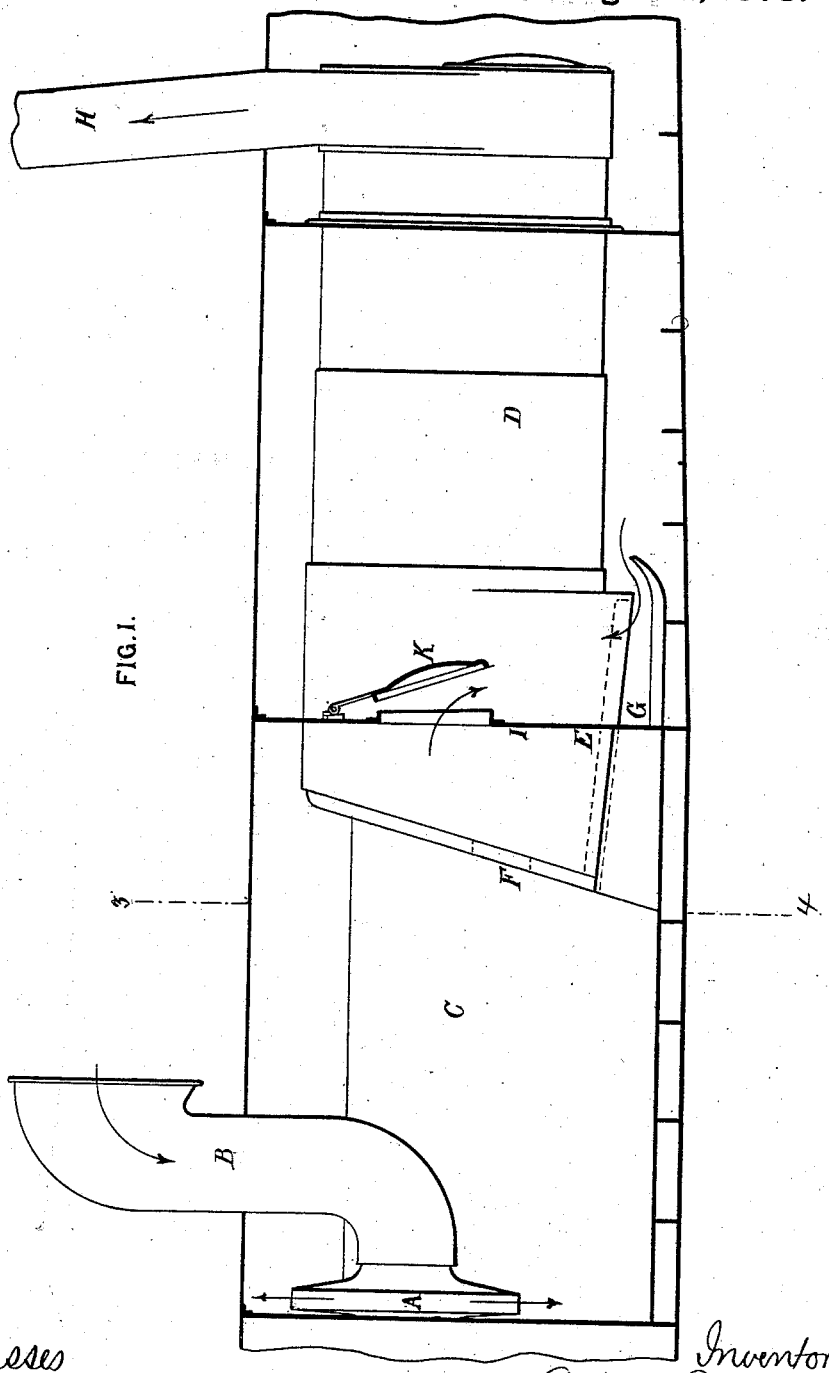

FIG. 1.

Witnesses
Henry Howson Jr.
Harry Smith

Inventor
Alfred F. Yarrow
by his Attorney
Howson and Son

3 Sheets—Sheet 2.

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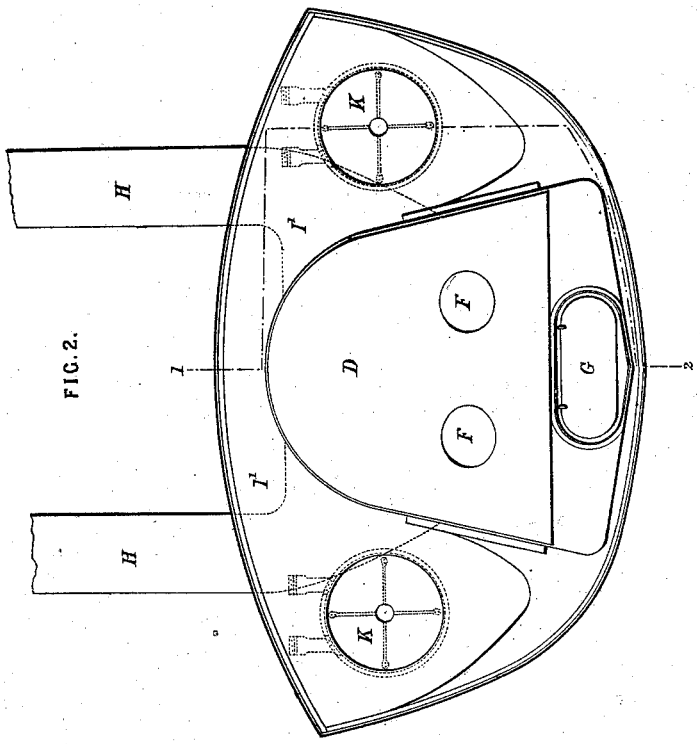

FIG. 2.

Witnesses
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Inventor,
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3 Sheets—Sheet 3.

A. F. YARROW.
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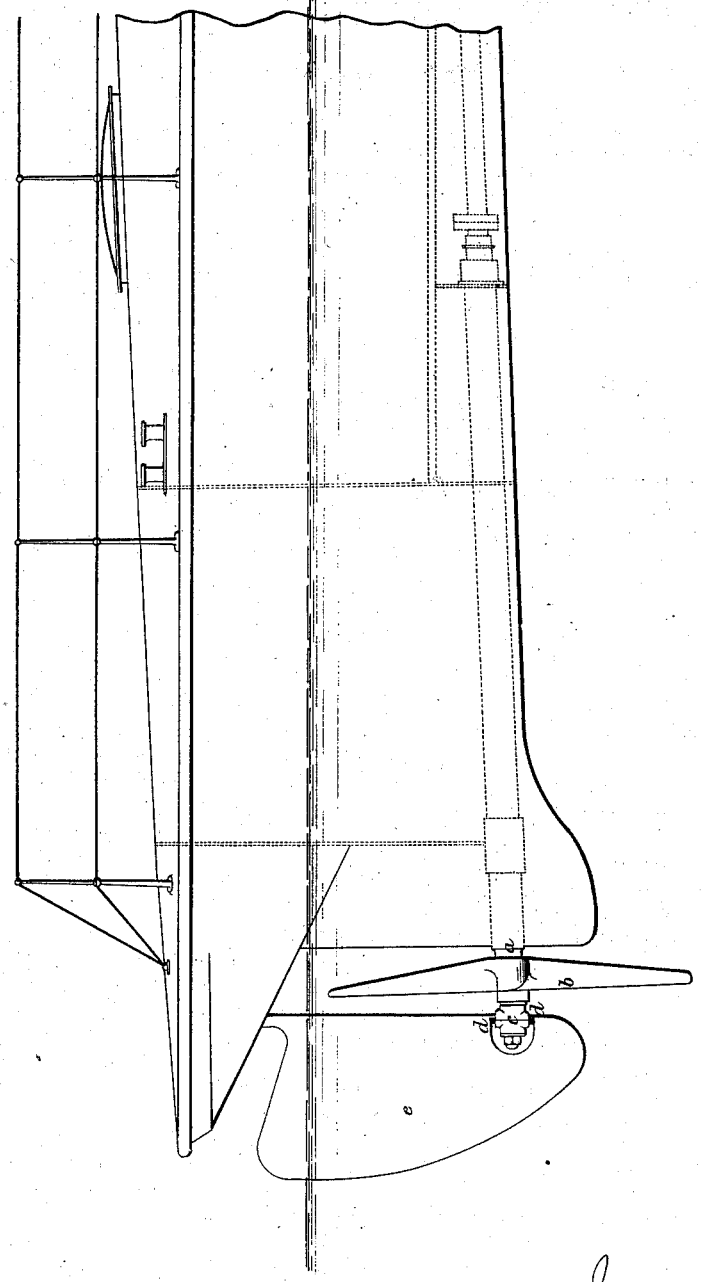

FIG.3.

Witnesses
Henry Howson Jr.
Harry Smith

Inventor
Alfred F. Yarrow
by his Attorneys
Howson and Son

UNITED STATES PATENT OFFICE.

ALFRED F. YARROW, OF ISLE OF DOGS, POPLAR, ENGLAND.

IMPROVEMENT IN VENTILATING SHIPS.

Specification forming part of Letters Patent No. **207,335**, dated August 20, 1878; application filed July 22, 1878.

To all whom it may concern:

Be it known that I, ALFRED FERNANDEZ YARROW, of the firm of Yarrow & Co., of the Isle of Dogs, Poplar, in the county of Middlesex and Kingdom of England, ship-builders, have invented Improvements in Steamships or Vessels, and in the machinery or apparatus employed therein, of which the following is a specification:

My invention relates more particularly to torpedo and other fast vessels; and consists, first, of improvements having for their object securing an immunity from danger to the engineers on duty in the event of a failure of some portion of the boiler or boilers taking place; secondly, of a mode of carrying the rudder in those cases where the rudder is placed aft of the screw, whereby the heavy frame-work (termed the "stern-frame") ordinarily employed for that purpose is dispensed with, and the resistance to the forward motion of the vessel and the weight are accordingly reduced.

In carrying out the first part of my said invention, in order to effect the object before mentioned, I interpose between the fan or blowing apparatus, usually adopted where a forced draft is employed, and the fire or fires, a valve or valves, arranged in such a manner as to admit the air to pass freely in one direction—that is to say, from the fan or blowing apparatus to the fire or fires—but to close and prevent the egress of the flame, gases, or steam in the opposite direction.

The second part of my invention consists in carrying the rudder in such a manner that the side strain is received by the shaft of the screw-propeller in lieu of by the said stern-frame. This part of my said invention may be conveniently carried out by continuing the shaft or boss of the screw-propeller aft of the screw, and forming a suitable provision at its extremity for the reception of the rudder-spindle.

And in order that the said invention may be fully understood, I shall now proceed more particularly to describe the same, and for that purpose shall refer to the several figures on the annexed sheet of drawings, the same letters of reference indicating corresponding parts in all the figures.

Figure 1 of my drawings represents a longitudinal section (taken along the line 1 2 in Fig. 2) of so much of a ship or vessel as is sufficient to illustrate a mode of carrying out the first part of my said invention, with the same applied thereto; and Fig. 2 is a transverse section taken along the line 3 4 in Fig. 1, and corresponding to that figure. Fig. 3 is a side elevation of a portion of a ship or vessel illustrating a mode of carrying out the second part of my said invention.

Referring to Figs. 1 and 2, A is the fan, driven in any usual or suitable manner, so as to draw air from the external atmosphere through a pipe, B, and direct the same into the stoke-hole C. D is the boiler, and E are the furnaces, with their fire-doors F F and ash-pit at G, and H H are the chimneys or flues for the escape of the products of combustion. I provide bulk-heads at I I′, the central one, I′, of which is thus interposed between the fan A and the fires at E, and in this central bulk-head I′ I form openings, which are fitted with valves K, arranged in such a manner as to be opened by the air, to allow it to pass freely in the direction indicated by the corresponding arrows from the fan to the fires, but to be closed by a current in the opposite direction.

The fire door or doors I arrange in any suitable manner, to close either by their own gravity or by springs or otherwise, so that the door or doors may be always closed, unless opened by force, at the will of the stoker.

By means of the arrangement hereinbefore described, greater safety is secured to the engineers on duty, as in the event of a failure of some portion of the boiler or boilers taking place, inducing a current in the opposite direction to that indicated by the arrows, the valves will close and prevent the egress of any steam or flame gases.

The second part of my said invention, which is illustrated by Fig. 3 of my drawings, relates to the mode of carrying the rudder when the same is placed aft of the screw. Heretofore, when the rudder was placed in this position, heavy frame-work was employed for the purpose of carrying it, which frame-work not only added to the weight of the vessel, but also contributed to the resistance to the forward motion of the vessel. According to my said invention, I dispense with the frame-work heretofore employed for this purpose, and carry the

rudder in such a manner that the side strain is received by the shaft of the screw-propeller in lieu of by the said frame-work. The method of carrying out this part of my said invention may be varied in its details; but the arrangement illustrated in Fig. 3 will be found convenient in practice. Referring to that figure, I continue the shaft *a* of the screw-propeller *b* aft of the screw, and fit on the said extended portion of the shaft a sleeve or collar, *c*, in which I form bearings for the reception of the pintles *d d* of the rudder *e*, the shaft *a* being free to turn in the sleeve or collar *c*, while affording a firm support to the rudder *e*, and receiving the side strain transmitted by the same.

If preferred, in lieu of extending the shaft of the propeller, the boss of the propeller may be provided with a projection to receive the sleeve or collar carrying the rudder, whereby a similar result will be obtained.

I claim as my invention—

1. The combination, in a vessel, of a blowing apparatus and the fire-space with an intermediate bulk-head, having a valve or valves opening from said blowing apparatus, substantially as described.

2. The combination of the rudder and propeller-shaft of a vessel with a collar, *c*, secured to the outer end of the shaft or to the propeller-hub, and provided with bearings for the rudder-pintles, substantially as described.

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses.

A. F. YARROW.

Witnesses:

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