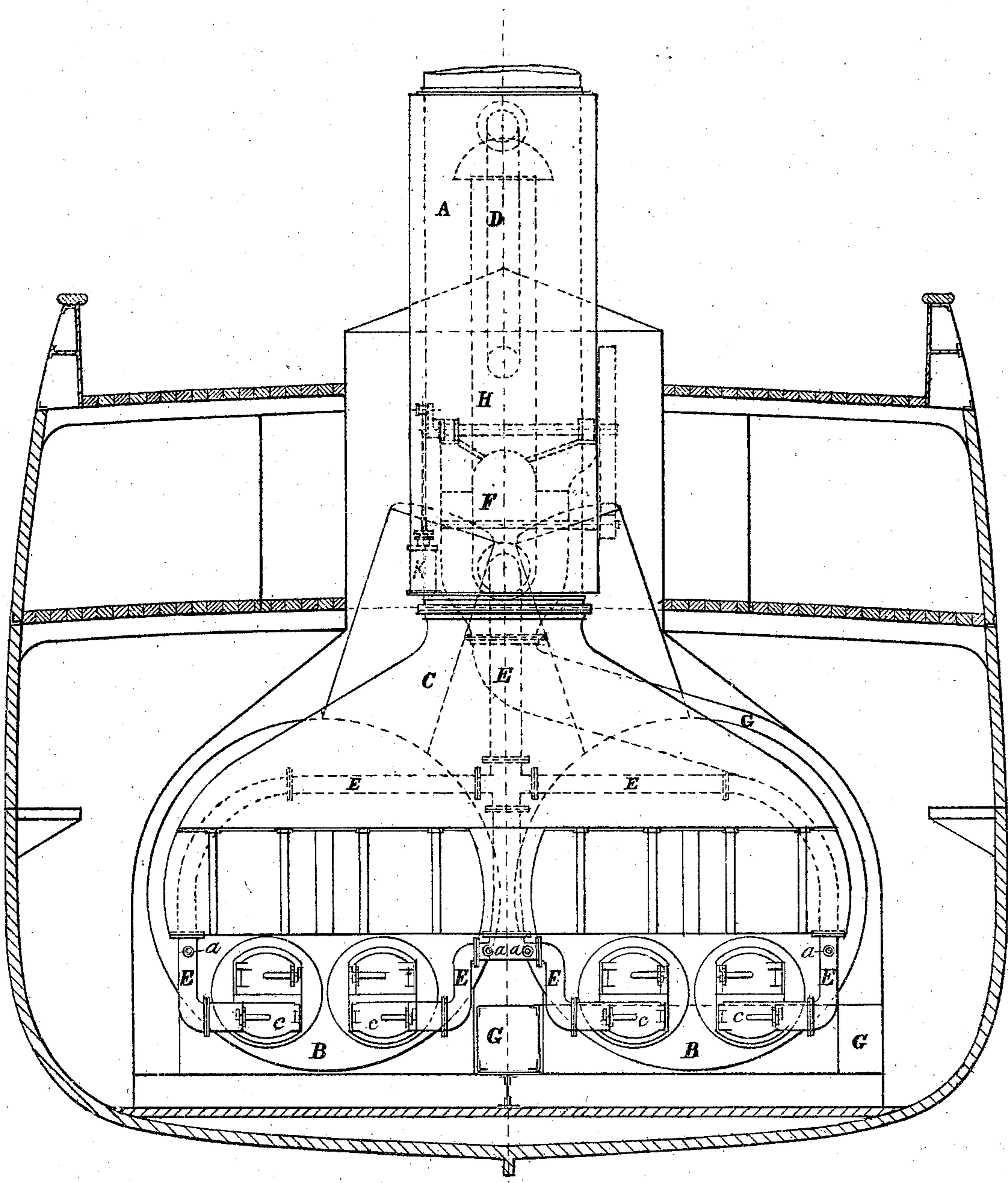


J. THOMAS.
Apparatus for Ventilating Ships and Heating
Steam-Boilers.

No. 140,741.

Patented July 8, 1873.

FIG. 1.



Witnesses:

Chas M Higgins.
Arthur C. Fraser.

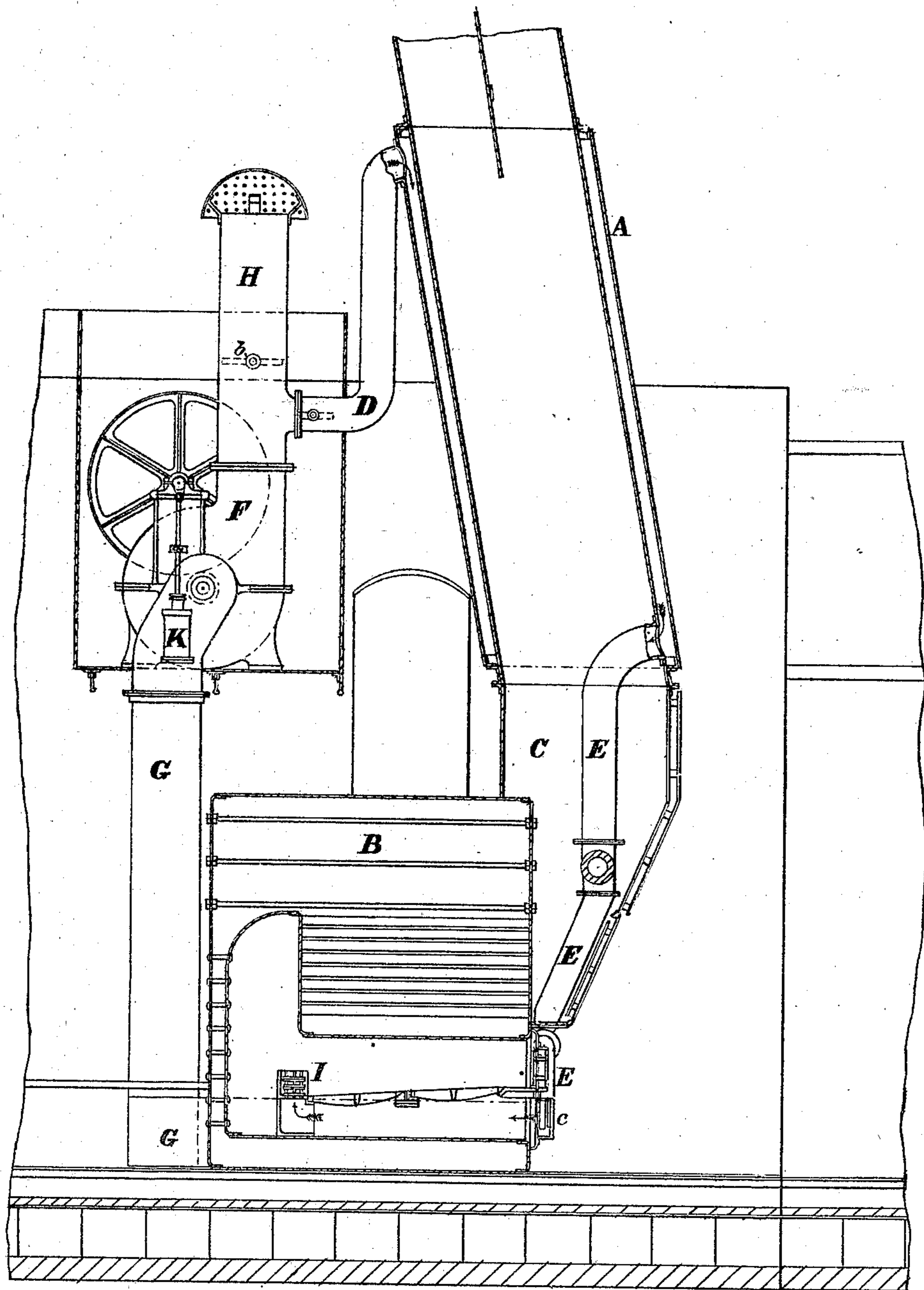
Inventor:

John Thomas,
per Burke & Fraser attys.

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FIG. 2.



Witnesses:

Chas M Higgins
Arthur C. Fraser

Inventor:

John Thomas.
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UNITED STATES PATENT OFFICE.

JOHN THOMAS, OF MIDDLESBROUGH, ENGLAND.

IMPROVEMENT IN APPARATUS FOR VENTILATING SHIPS AND HEATING STEAM-BOILERS.

Specification forming part of Letters Patent No. 140,741, dated July 8, 1873; application filed May 24, 1873.

To all whom it may concern:

Be it known that I, JOHN THOMAS, of Middlesbrough, England, have invented or discovered certain new and useful Improvements in the means and apparatus for heating steam-boilers, consuming smoke, and ventilating the stoke-holes, engine-rooms, or other parts of steamships; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters and figures marked thereon—that is to say:

The principal objects of my invention are the ventilation of the stoke-holes and engine-rooms of steamships and the perfect combustion of the gases and smoke, and thereby the saving of fuel. My invention consists in a fan or other blowing-machine, connected at its air-inlets with a pipe or pipes communicating with the stoke-hole, engine-room, or other portions of the steamship requiring ventilation, and its air-outlet connected with a jacket, surrounding the funnel or chimney, into which the air is forced to be heated, and from thence, by a series of pipes, distributed to the various furnaces, where the heated air is forced partly through the grate and partly through a perforated bridge, effecting thereby the ventilation of the various apartments with which the inlet-pipes communicate, and also a better combustion of the fuel in the furnaces and the consumption of the smoke.

Figure 1 of the annexed drawings is a mid-ship section, and Fig. 2 is a longitudinal section of a steamship provided with apparatus constructed according to my invention.

I carry out my invention as follows: I make an iron door and frame, *c*, and properly fix the same to the ash-hole of the boiler. It must fit tight against the boiler, and there must be a branch pipe through the frame, and I connect a pipe to the branch for leading air into the ash-hole under the furnace-bars. I build the fire-bridge *I*, Fig. 2, with perforated bricks, which bricks I build on hollow iron bearers, so that the perforations are in direct communication with the ash-hole door; or, if preferred, I lay a perforated pipe within the brick-work of the fire-bridge with proper openings for the emission of air through the bridge, so that the air may intercept the gas and smoke that

evolve from the fire on the grate. I then make an iron casing, *A*, for incasing the chimney; and this casing must be large enough to leave a clear space between it and the chimney of from four to six inches all round. The casing may be of any convenient height, but commencing it at or near the smoke-box and continuing it up through the upper deck, and six or eight feet above, will be found in practice, sufficient for my purpose. I firmly fasten the casing to the chimney, both at the lower and upper part of the same, and in or near the upper end of the casing I make a hole of sufficient size for letting air into it, and at the bottom of the casing I make a similar hole for conveying the air to the fires. I make a pipe, *E*, with as many branches or outlets as there are fires, in or under the boilers; and I set this pipe in a horizontal position over the boilers; or, if convenient, I pass it through the smoke-box, as shown in Figs. 1 and 2, and I connect this pipe with the casing *A*, and I also connect it with the branches in the ash-hole frame; and in each of these pipes, which connect to the ash-holes under the grate, I fix a valve, *a*, to regulate the admission of air. I then attach a machine, *F*, for exhausting and blowing air, which machine may be of the cylinder or force-blast form, or fan-machine, or any of the various machines now in use for blowing air; and I either connect this machine to the propelling-engines of the ship, or I erect a small engine, *K*, specially for driving the same. I connect a pipe, *G*, to the air-inlets of the blowing-machine and lead the same to the stoke-hole, engine-room, or any part of the ship that needs ventilation. Flexible tubes may be led from a branch on this pipe to any part of the ship. I also fix a pipe, *D*, to the air-outlet of the exhausting blowing-machine, and carry this pipe up and connect it to the hole in the upper part of the casing or jacket *A* that surrounds the chimney. On the pipe *H* I fix a valve, *b*, for letting off any surplus air, so as not to drive any more air into the casing than may be required for combustion.

Having fixed my apparatus, I proceed to light the fires in the boilers, and to do this I open the ash-hole doors *c* and let the chimney draw air through the grate in the ordi-

nary way, and when the steam is up high enough to start the engines, I close the ash-hole doors and set on the exhausting-blower, and it will draw or exhaust the vitiated air from the stoke-hole or from any part where the inlet-pipe may be led, and as fast as the vitiated air is drawn off good air will descend to occupy its place. The machine will blow the vitiated air up into the casing A, the heat that is radiated by the chimney will be taken up by this air, and the heated air will enter the ash-hole. A part of it will pass up through the fuel on the bars, and the other part will pass up through the perforations of the bridge I, as shown in Fig. 2. The heated air that rises up through the bridge will enter into immediate combustion with the gases evolved from the grate, and will perfectly consume the smoke, and the air being supplied to the ash-hole under pressure will more effectually consume the small cinders that ordinarily fall through the grate-bars unconsumed.

To work this apparatus it will be necessary to regulate the admission of air to the fire-places, and to keep some loose clinkers on the furnace-bars and a thick coal fire on them, and to regulate the chimney-damper so as to exhaust the flame and heat in and around the boilers.

I have hereinbefore described the working of the exhausting-blower by the power of the propelling-engines of the ship; but I would prefer to erect a small special engine for driving the same, and to get the steam from the auxiliary boiler where there is one. In this way the main boiler fires may be lighted and steam got up in half the time by the aid of the blowing-machine forcing air in through the fire on the grate and up through the fire-bridge, and the great quantity of smoke will thus be prevented.

A is an air-tight casing or jacket around the chimney, and secured to the chimney at its top

and bottom ends, leaving a space of from four to six inches between the chimney and case all round. B B are a pair of ordinary marine boilers. C is the smoke-box or uptake to the chimney. D is the air-delivery pipe to the casing A from exhausting engine or fan F. E E are the hot-air delivery-pipes to the ash-pits, which ash-pits are supplied with doors *c*, while the pipes are furnished with throttle-valves *a* for regulating the quantity of blast to each furnace. G is the suction-pipe from the stoke-hole to the exhausting-fan F, through which pipe the bad air is drawn to be subsequently discharged into the pipe D and jacket A. The surplus air not required for consuming the smoke is discharged overboard through the pipe H. Pipes may be connected to the suction-pipe G and led to any part of the ship requiring ventilation. I is the fire-bridge, formed of perforated bricks. K is a small cylinder for operating the fan.

What I claim, and desire to secure by Letters Patent, is—

1. The arrangement of the pipe or pipes G and D in combination with the fan F, or its equivalent, jacket A, distributing-pipes E E, and perforated bridge I, substantially as shown and described, for the purpose set forth.

2. The pipe H and valve *b*, in combination with the fan F, or its equivalent, jacket A, and distributing-pipes E E, substantially as set forth.

In witness whereof I, the said JOHN THOMAS, have hereunto set my hand this twenty-ninth day of November, one thousand eight hundred and seventy-two.

JOHN THOMAS.

Witnesses:

I. C. NEWBURN,
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GEO. BACON,
169 Fleet street, London.