Dec. 12, 1933. H. T. DYER 1,939,254

SMOKESTACK

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FIG. 1.

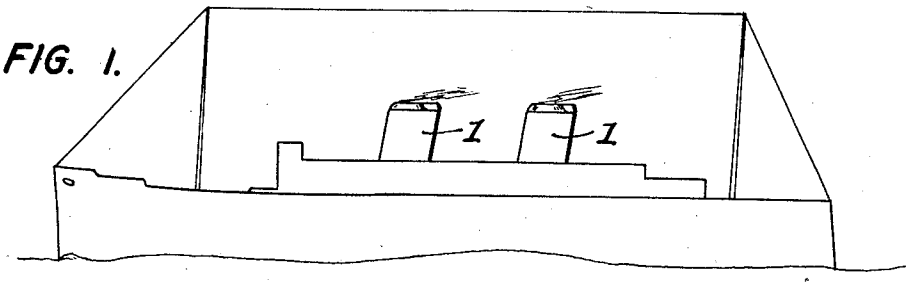


FIG. 2.

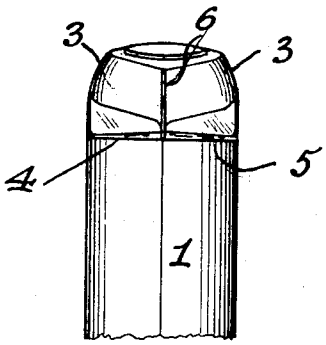


FIG. 3.

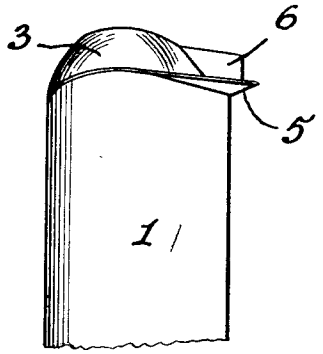
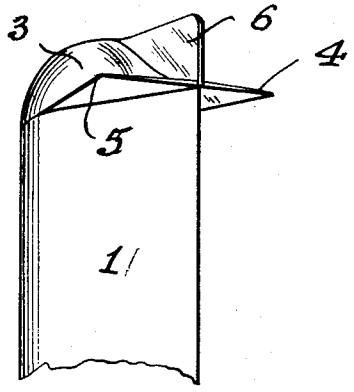


FIG 4.



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FIG. 5.

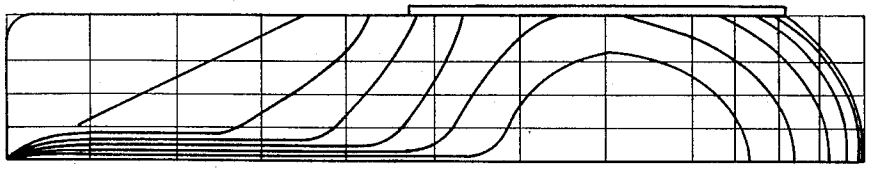


FIG. 6.

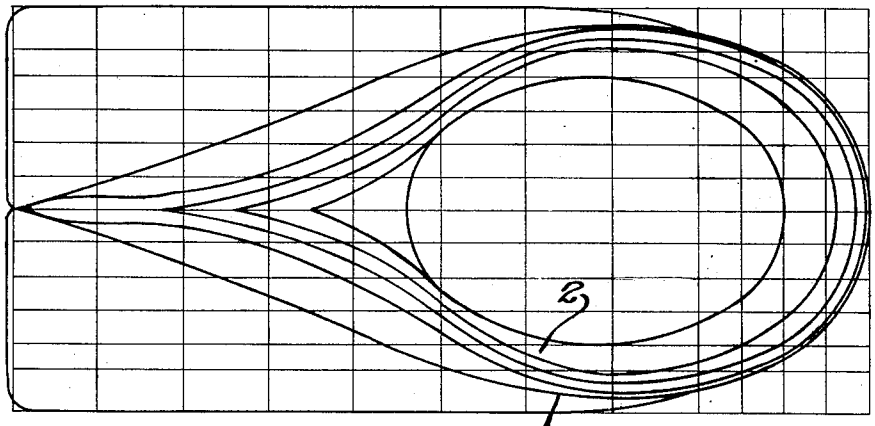
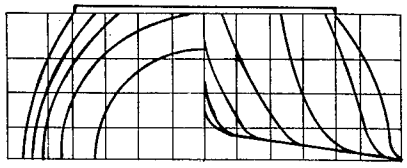


FIG. 7.



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FIG. 8.

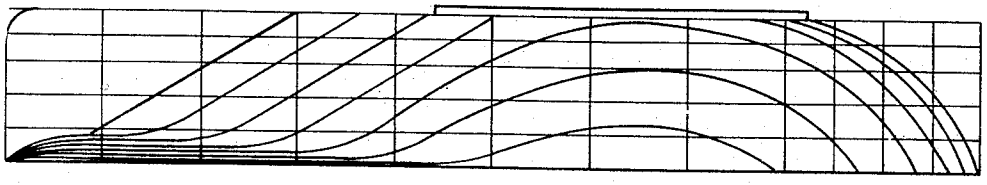


FIG. 9.

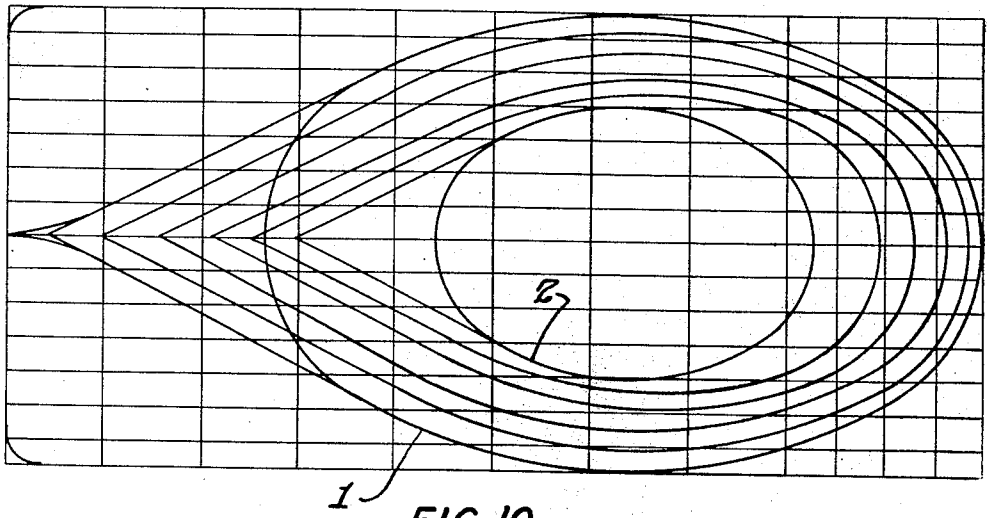
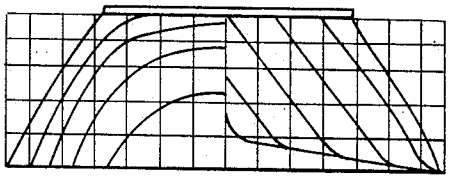


FIG. 10.



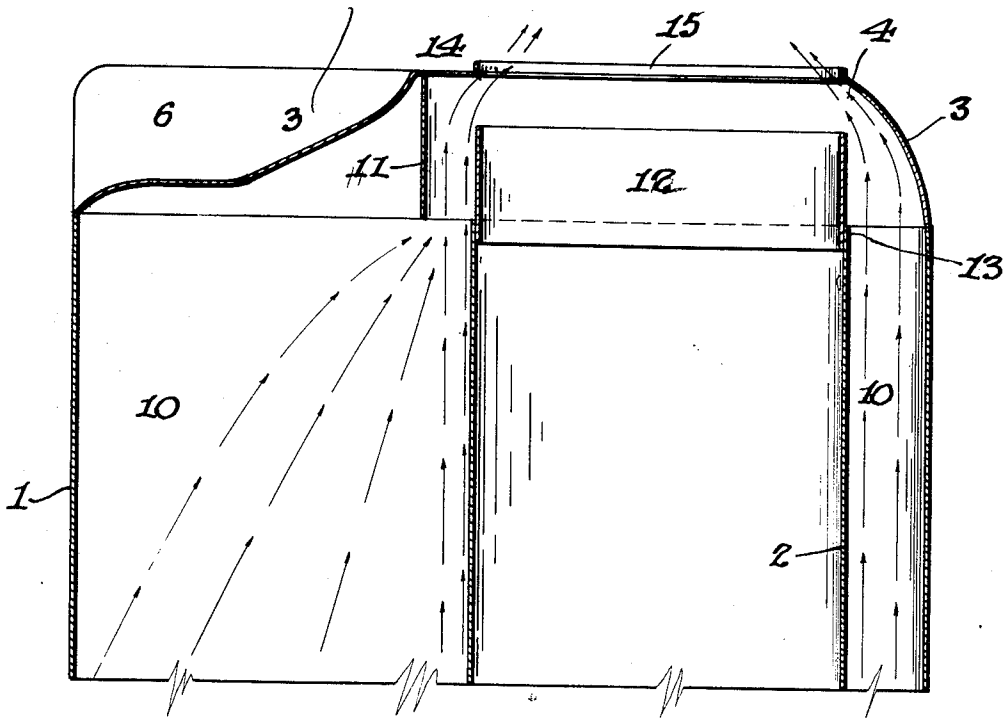
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FIG. 11.



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1,939,254

SMOKESTACK

Horace T. Dyer, Coscob, Conn.

Application October 26, 1932. Serial No. 639,577

12 Claims. (Cl. 114—187)

My invention is designed to provide a construction which is designed primarily for ships which will have the effect of preventing the products of combustion, emitted by the stack, from immediately traveling in a downward direction after they emerge from the stack.

My invention relates more particularly to smoke stacks for ships although it will be apparent to those skilled in the art that it might be applied with more or less efficiency to any type of smoke stack where it is desired to cause the products of combustion to ascend upwardly upon emerging from the stack.

It is well known in the older type of ships where the stacks were comparatively taller and, many in number that the smoke etc., was carried upwardly with sufficient velocity to keep the decks of the vessel comparatively free from cinders and the disagreeable gases emitted from the stack. In the modern type of vessel, however, in which the stacks are sometimes built very low the gases and other products of combustion upon emergence from the stack travel downwardly at the rear of the stack, along the deck and have even been known to travel into the passageways leading to the cabins and travel forwardly in these passageways with very disagreeable results to the passengers. These stacks comprise an outer stack and an inner main stack which is connected to the boiler to carry the products of combustion away. It is customary to connect the interior of the ship to the space intermediate the walls of the outer stack and the main stack to permit the escape of the heated air from the ship. It is well known that provision has to be made to prevent the rain from entering this space intermediate the inner stack and the outer stack, yet the ventilation must be maintained.

My invention has for its principal object to provide a construction for stacks which will entirely eliminate the tendency of the gases and other products of combustion to act in this objectionable manner and which will also insure their traveling in an upwardly direction until they have entirely cleared the ship. I have found in practice that by the use of my improvement applied to the stack of a ship that I am able to maintain these very desirable results while the wind is more or less ahead.

My means for accomplishing the foregoing object may be more readily understood by having reference to the accompanying drawings which are hereunto annexed and made a part hereof, in which

Fig. 1 is a diagrammatic outline of a ship, the funnels of which are equipped with my improvement;

Fig. 2 is a fragmentary view of a stack taken from the rear;

Fig. 3 is an isometric perspective view from the side of the stack;

Fig. 4 is a perspective view of the same from the quarter;

Fig. 5 is a diagram for the lines and offsets for the buttocks for the stack top.

Fig. 6 is a diagram in top plan view of the same;

Fig. 7 is a diagram of the forward and after sections the forward section being shown on the left hand and the after sections on the right hand of said diagram;

Fig. 8 is a diagram of a modified form for the lines and offsets for the buttocks for the stack top;

Fig. 9 is a diagram of a modified form of the top plan view of the same;

Fig. 10 is a diagram of a modified form of the forward and after sections, the forward section being shown on the left hand and the after sections on the right hand of said diagram; and

Fig. 11 is a vertical sectional view through a fragmentary portion of the outer and inner stacks adjacent the top.

Similar reference numerals refer to similar parts throughout the entire description.

As shown in the drawings the stack comprises an outer stack 1 and an inner or main stack 2. The outer stack which is very much larger than the main stack is preferably formed on stream lines. As clearly seen in the charts, or diagrams, the walls 3 of the outer stack adjacent the top converge inwardly, upon the lines and offsets clearly seen in the diagrams in Figs. 5, 6 and 7, until they reach the plane of the main stack 2. It has been found that this construction produces an effect similar to an induced draft, by reason of the increase of the velocity of the air over the top of the stack which produces a decrease in the static pressure over the top of the stack.

At a point where the outer stack 1 begins to converge inwardly, I mount two outwardly and rearwardly extending horizontal fins 4 and 5. The combined width of these fins should preferably be equal to the diameter of the outer stack at the point where it starts to converge. Though in some cases it may be found desirable to have them wider. The fins 4 and 5 are divided by a central vertical fin 6 which extends from the converging portions 3 and the top of the main

stack 2 to the after termination of the outer stack 1. As shown in Fig. 6 these converging sections are brought in with a concave curvature as clearly seen in Fig. 6. This construction is most efficient in practice.

I have found in practice that the converging sections 3 may also be formed as shown in the diagrams, Figs. 8, 9 and 10, in which each converging section conforms precisely to the stream line configuration of the outer stack, the concave curvature being dispensed with.

I have also found in practice that when the smoke stack of a ship is constructed, following the diagrams as shown in the drawings that the deck after the outer stack of the ship will be substantially free of the product of combustion, regardless of atmospheric conditions.

My means of providing for the discharge of the air used for ventilation may be more clearly understood by inspection of Fig. 11. In this view I have shown a space 10 intermediate the walls of the outer stack 1 and the main stack 2. This space 10 may be partially closed off by means of the converging section 3 at the forward part of the stack and a wall 11 at the rear of the main stack 2. A short sleeve 12 is secured to the top 13 of the main stack 2 in any suitable or desired manner and extends almost to the top of the inwardly converging sections 3. Although I have shown a sleeve secured to the stack it will be clear to persons skilled in the art that the stack itself may be carried up to the desired plane instead of using a separate sleeve. The sections 3 are carried inwardly as at 14 until they form an opening 15 which constitutes the outlet of the stacks being in register with the outlet of the inner stack 2 and corresponding to its diameter but leaves a passageway intermediate the sleeve 12 and this outlet. This effectually prevents the rain from entering into the ventilating space and it also serves to cause the escape of the products of combustion, from the main stack 2, to act on the principle of an ejector and draw the air from the space 10 out of the opening 15 at the top of the outer stack.

Although I have shown and described specific details of construction I have done so solely for the purpose of illustrating a preferred embodiment of my invention which I have found in actual use attains the desired results, but such illustrations and drawings are not to be taken as limitations for I do not desire to be limited, either by the drawings or the terminology employed, to such details of construction except as such limitations may appear in the hereinafter contained claims.

Having described my invention what I regard as new and desire to secure by Letters Patent is:

1. A smoke stack comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, the portion of said outer stack adjacent its top converging smoothly convexly upwardly and inwardly to form an outlet which corresponds to the diameter of the main stack whereby the products of combustion will travel upwardly until they have cleared the ship.

2. A smoke stack, comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, said outer stack curving smoothly convexly upwardly and inwardly in such manner that a plurality of superposed sections taken through said curve and parallel to each other and horizontal are successively smaller in plane and slanting inwardly at said rear portion of said stack until an outlet is formed which corresponds to the outlet of the main stack.

3. A smoke stack comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, said outer stack curving smoothly convexly upwardly and inwardly in such manner that a plurality of superposed sections taken through said curve and parallel to each other and horizontal are successively smaller in plane and slanting inwardly at said rear portion of said stack until an outlet is formed which corresponds to the outlet of the main stack, a vertical fin which corresponds in height to the inclined sections of the outer stack, which fin extends from the converging portions of the outer stack to the rear of said outer stack and a pair of horizontal fins, one at each side of said vertical fin, located at the section where the walls of the outer stack start to converge.

4. A smoke stack comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, the portion of said outer stack adjacent its top converging inwardly to form an outlet which corresponds to the diameter of the main stack, a vertical fin which corresponds in height to the inwardly converging portion of the outer stack, which fin extends from the converging portions of the outer stack to the rear of said outer stack and a pair of horizontal fins, one at each side of said vertical fin.

5. A smoke stack comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, said outer stack curving smoothly convexly upwardly and inwardly in such manner that a plurality of superposed sections taken through said curve and parallel to each other and horizontal are successively smaller in plane and slanting inwardly at said rear portion of said stack until an outlet is formed which corresponds to the outlet of the main stack, a sleeve mounted in the top of the main stack, there being an annular space intermediate said sleeve and said outer stack, the end of said sleeve being spaced from the aperture formed by the converging portions of the outer stack, a vertical fin corresponding in height to the inclined sections of the outer stack which fin extends from the opening of the converging portions of the outer stack to the rear of said outer stack and a pair of horizontal fins one at each side of said vertical fin.

6. A smoke stack comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, the portion of said outer stack adjacent its top converging inwardly to form an outlet which corresponds to the diameter of the main stack, a vertical fin which corresponds in height to the inwardly converging portion of the outer stack, which fin extends from the opening of said converging portions of the outer stack to the rear of said outer stack and a pair of horizontal fins, one at each side of said vertical fin, and a sleeve mounted in the top of the main stack, there being an annular space intermediate said sleeve and said outer stack,

the end of said sleeve being spaced from the aperture formed by the converging portions of the outer stack.

7. A smoke stack comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly, forming what is commonly termed a stream line section, a main stack inside of said outer stack, the portion of said outer stack adjacent its top converging inwardly to form an outlet which corresponds to the diameter of the main stack, and a sleeve mounted at the top of the main stack, there being an annular space intermediate said sleeve and said outer stack, the end of said sleeve being spaced from the outlet formed by the converging portions of the outer stack.

8. A smoke stack comprising an outer and inner stack, spaced from each other, the portion of the outer stack adjacent its top converging inwardly to form an outlet which corresponds to the diameter of the inner stack.

9. A smoke stack comprising an outer and inner stack, spaced from each other, the forward walls of the outer stack being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, the portion of said outer stack adjacent its top curving inwardly to form an outlet which corresponds to the diameter of the inner stack and in register therewith, the end of the inner stack extending to a plane adjacent the outlet formed by the inwardly curving portion of the outer stack but spaced therefrom.

10. A smoke stack comprising an outer and inner stack spaced from each other, the forward walls of the outer stack being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, the portion of said outer stack adjacent its top curving inwardly to form an outlet which is in register with the inner stack and corresponds to the diameter thereof, the end of said inner stack extending to a plane adjacent the outlet formed by inwardly curving portion of the outer stack but spaced therefrom, a vertical fin which extends rearwardly from the curved portion and a pair of horizontal fins one at each side of the vertical fin.

11. A smoke stack comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, the portion of said outer stack adjacent its top converging inwardly to form an outlet which corresponds to the diameter of the main stack, a vertical fin which extends rearwardly from said converging portion, and a pair of horizontal fins one at each side of the vertical fin.

12. A smoke stack, comprising an outer stack, the forward walls being rounded in section and then tapering rearwardly forming what is commonly termed a stream line section, a main stack inside of said outer stack, said outer stack curving smoothly convexly upwardly and inwardly in such manner that a plurality of superposed sections taken through said curve and parallel to each other and horizontal are successively smaller in plane and slanting inwardly at said rear portion of said stack until an outlet is formed which corresponds to the outlet of the main stack, a vertical fin which extends rearwardly from said slanting sections, and a pair of horizontal fins, one each side of the vertical fin.

HORACE T. DYER.