

J. E. MARSH.
SMOKE CONSUMER.
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1,258,588.

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Fig. 1.

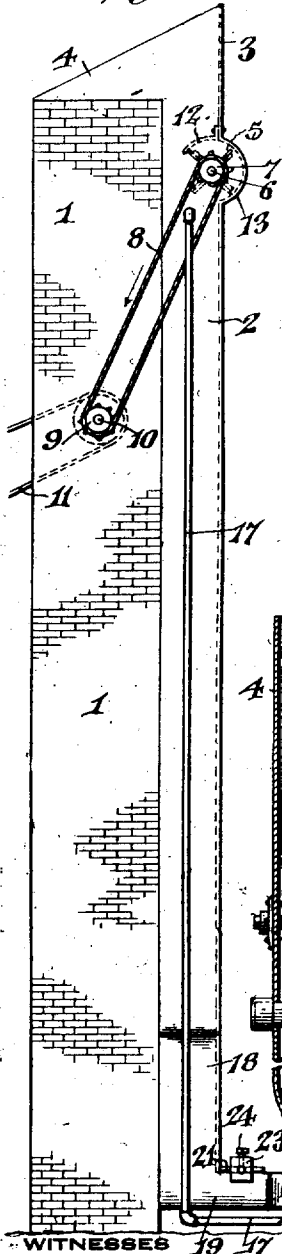


Fig. 2.

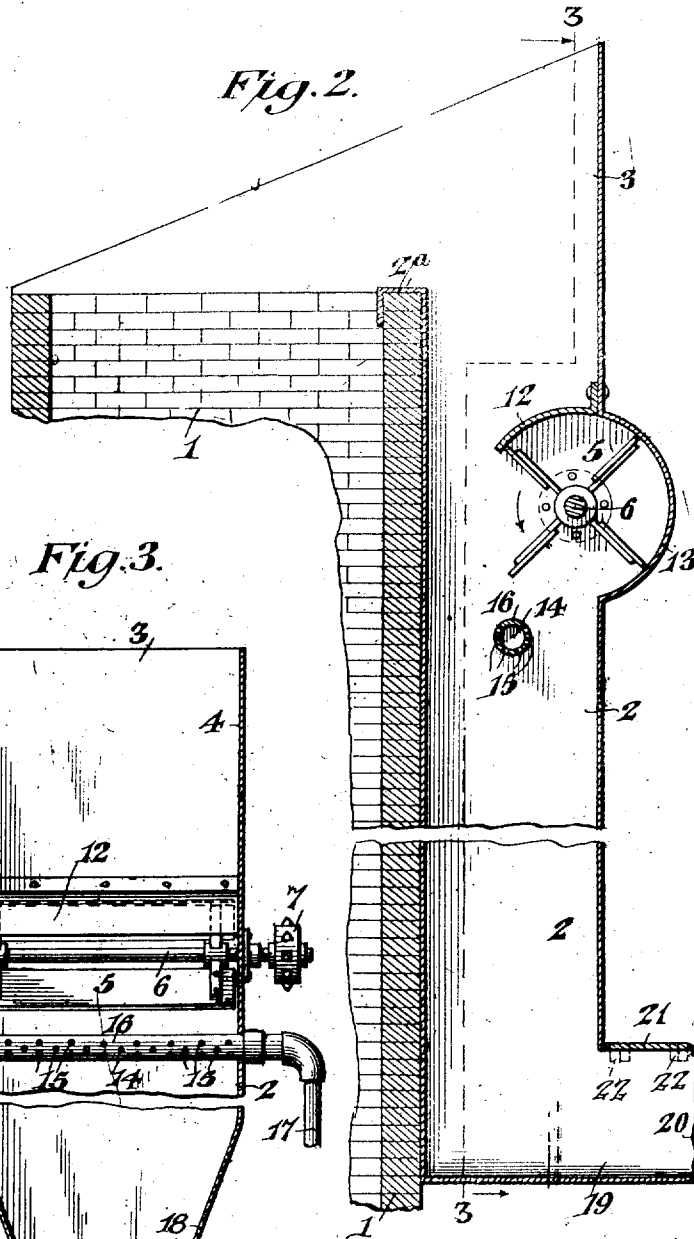
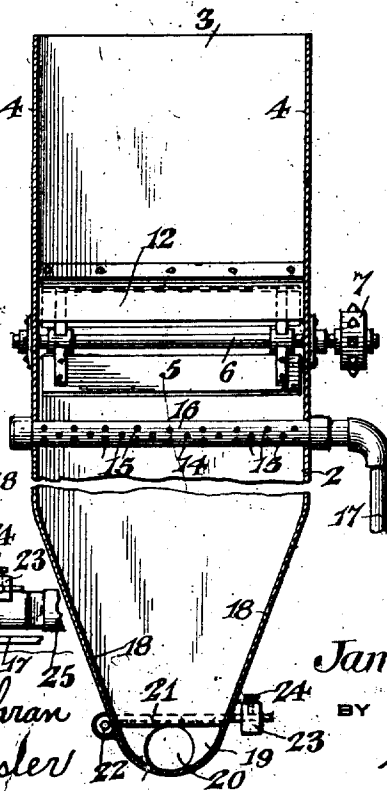


Fig. 3.



WITNESSES

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JAMES E. MARSH, OF REEDVILLE, VIRGINIA.

SMOKE-CONSUMER.

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To all whom it may concern:

Be it known that I, JAMES E. MARSH, a citizen of the United States, residing at Reedville, in the county of Northumberland and State of Virginia, have invented a new and useful Smoke-Consumer, of which the following is a specification.

This invention relates to smoke consumers.

10 An object of the invention is to provide an attachment for stacks which will prevent the escape of smoke and obnoxious gases into the atmosphere.

15 Another object of the invention is to provide a construction in which relatively large volumes of smoke may be quickly and thoroughly treated by using a minimum amount of water.

20 The invention is embodied in a construction in which the end of the stack is open to the atmosphere. The smoke, however, is deflected by taking advantage of the fact that it tends to follow the high side of an obstruction or the like. By deflecting the smoke to one side of the stack, it may be drawn down an adjacent condenser or smoke consumer by means of a power driven fan. The smoke is next treated with water.

25 In the accompanying drawing I have illustrated one embodiment of my invention, in which:

Figure 1 is a side elevation of a smoke stack showing my attachment thereon, the lower portions of the stack and attachment 35 being broken away.

Fig. 2 is a sectional elevation of the same on an enlarged scale with parts broken away.

40 Fig. 3 is a vertical sectional view on the line 3-3 of Fig. 2, looking in the direction of the arrows.

In the embodiment of the invention here illustrated, the stack 1 is shown as square in cross section and built up of brick in the usual manner. The stack may communicate at the lower end with a furnace from which the products of combustion and smoke may escape with the obnoxious gases through the stack. The stack is open at its upper end to allow the smoke to freely issue therefrom, so as not to interfere with the natural draft through the stack.

My attachment comprises a condenser 2 supported in part by a hook 2^a at its upper end fitting over the upper edge of one side 55 of the stack. As clearly shown in Fig. 1, this condenser extends substantially from

the lower end of the stack to the upper end thereof and is of a width substantially one-half that of the stack as shown.

The upper end of the condenser 2 is open, 60 communicates with the atmosphere, and projects at the side thereof remote from the stack beyond the end of the latter, as indicated at 3. Arranged at right angles to the projecting portion 3, and attached to the 65 vertical edges thereof are triangular sides 4 which extend over and in vertical alinement with the sides of the stack at right angles to the portion 3. These triangular sides are attached to the upper edges of these sides 70 of the stack and support the condenser in part. The projecting portion 3 and sides 4 constitute an open top conduit connecting the stack with the condenser. As the smoke and gases issue from the stack the projecting 75 portion 3 of the condenser 2 exerts an attraction upon the smoke, tending to cause the same to be deflected to the right, looking at Fig. 2.

Mounted within the condenser 2 at the 80 outer side thereof and at a point slightly below the upper end of the stack is a fan 5 adapted to rotate in the direction of the arrow to draw the deflected smoke down through the condenser 2. The fan 5 is fixed 85 to a shaft 6 suitably journaled within the condenser and is positively driven through the sprocket wheel 7, sprocket chain 8 and sprocket wheel 9 fixed to the shaft 10 journaled within the stack or elsewhere and 90 driven from any suitable source of power by means of the belt 11. It is to be understood, however, that I do not intend to limit myself to any particular means or source of power for driving the fan. The power, 95 however, must be sufficient to cause the fan to draw substantially all the deflected smoke into the condenser, and assist in deflecting it.

In order to prevent updraft resulting from the rotation of the fan I have provided 100 a suitable deflector 12, which projects inwardly from the outer side of the condenser 2 and is located above the fan, substantially as shown in Fig. 2. This deflector causes the currents of air and smoke to be directed 105 downwardly through the space between the fan and the wall of the condenser opposite thereto. The condenser 2 adjacent to the fan is bent outwardly, as indicated at 13, to permit of the rotation of the fan. 110

Extending transversely and centrally through the portion of the condenser di-

rectly below the fan is a spraying device or pipe 14. The lower portion of this pipe is provided with perforations 15, while the upper portion thereof, as indicated at 16, is imperforate, whereby water issuing therefrom will be directed outwardly and downwardly but not upwardly, thereby keeping the fan dry and preventing the splashing of the water. A pipe 17 of reduced diameter communicates with the pipe 14 and is connected with any suitable source of water supply. The water mixes with the smoke, condensing the same, and dissolves and cleans the gases.

The lower portion of the condenser 2 tapers, as indicated at 18, Fig. 3, and gradually becomes reduced in size toward its lower end. The extreme lower end of the condenser is directed outwardly horizontally, as indicated at 19, Fig. 1, and provides a reduced passage 20 therethrough.

In order to avoid back pressure within the condenser 2 and the faulty operation of the attachment, there has been provided a device for automatically controlling the pressure within the attachment. For this purpose, a valve 21 pivoted at 22 is mounted upon the horizontally extending portion 19. This valve is controlled by the pressure of air or gas within the condenser 2, whereby, when the pressure exceeds a certain amount, the valve will be forced open, allowing the escape of part of the air or gas, reducing the pressure. The pressure at which this valve opens can be regulated by means of the weight 23 mounted upon the valve and adjustable toward and away from the pivot 22 of the valve. This weight may be held in adjusted position by means of a set screw 24.

The horizontally extending portion 19 of the attachment has connected to it a discharge pipe 25 which may communicate with any suitable point, such as a tank for receiving the water and sediment and to allow the gases to escape into the atmosphere after passing through the water in the tank if need be.

By my construction very little water is needed to clean the gas and condense the smoke. The water can be collected in a tank, so that it can be reused, if desired. If the water contains any sediment of commercial value, it may be filtered to remove the same.

While I have shown and described one embodiment of my invention, it is to be understood that I do not desire to be limited to the details of construction herein shown and described, for obvious modifications will be apparent to anyone skilled in the art.

What is claimed is:—

1. The combination with a vertically extending stack, of a vertical condenser open at its top and projecting at the side thereof remote from said stack beyond the end of the latter and communicating therewith at

the top, a power-driven fan in said condenser below the upper end of said stack for drawing the smoke downwardly through the condenser from said stack, and a transversely extended spray pipe mounted in said condenser.

2. The combination with a vertically extending stack having an upper open end, of a vertical condenser at one side of the stack, open at its top and communicating at its upper end with the upper end of the stack, certain of the walls of the condenser being extended beyond the upper end of the stack, a power-driven fan mounted in said condenser at one side thereof below the upper end of said stack, and a spray pipe mounted below said fan centrally of said condenser.

3. The combination with a vertically extending stack, of a vertically extending condenser open at its top with one side thereof remote from said stack extended beyond the same for communication therewith at its top, a power-driven fan mounted in said condenser at one side thereof below the upper end of the stack, a deflector attached to said condenser over said fan and projecting inwardly of said condenser leaving a space for the downward passage of smoke through said condenser, and a spraying pipe below said fan.

4. The combination with a stack, of a condenser having an open top communicating with the stack, and its side remote from the latter being extended beyond the upper end thereof, a fan within said condenser, and a spraying device in said condenser spaced from the fan.

5. The combination with a vertically extending stack open to the atmosphere at the top, of a vertically extending condenser at one side of said stack having the side thereof remote from the stack projecting beyond the end of the stack, said condenser opening into the atmosphere and communicating with said stack, a power driven fan within said condenser below the end of the stack, and a spraying device below said fan.

6. The combination with a vertically extending stack open at the top, of a vertically extending condenser at one side of said stack, the side of said condenser remote from the stack projecting beyond the end thereof and the sides at right angles to the projecting portion being attached to the vertical edges thereof and extending over and in alignment with the sides of said stack at right angles to the projecting portion forming an open top conduit between the stack and condenser, a fan within said condenser below the upper end of the stack, and a spraying device below said fan.

7. The combination with a vertically extending stack, of a vertically extending condenser at one side of said stack communicating therewith, a fan within said condenser

below the end of said stack, a spraying device within said condenser below the fan, and a valve at the lower end of said condenser for controlling the pressure within the latter.

8. The combination with a vertically extending stack, of a vertically extending condenser at one side of said stack communicating therewith, a power driven fan within said condenser below the upper end of said stack, a spraying device below said fan, and a pressure controlled regulating valve at the lower end of said condenser.

9. The combination with a vertically extending stack, of a vertically extending condenser at one side of said stack communicating therewith, a power driven fan in said condenser below the upper end of said stack, a spraying device below said fan within said condenser, the lower portion of said condenser being reduced in cross section, a pressure controlled valve mounted upon the reduced portion of said condenser, and means for regulating the pressure at which said valve operates.

10. The combination with a vertically extending stack open at the top and communi-

cating with the atmosphere, of a vertically extending condenser, the side of said condenser remote from the stack projecting beyond the end thereof, the sides of said condenser at right angles to said first mentioned side projecting above the stack and over the same and forming an open top conduit between the stack and condenser, a fan mounted within said condenser at the outer side thereof slightly below the end of said stack, a deflector within said condenser above said fan, a spraying pipe below the fan having an imperforate upper portion and a perforate lower portion and arranged transversely and centrally of said condenser, the lower portion of said condenser tapering toward the bottom, and an automatic pressure controlled valve at the bottom of said condenser.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES E. MARSH.

Witnesses:

J. OTHO MARSH,
HOWARD O. MARSH.