C. SORENSEN.

SMOKE CONSUMER.

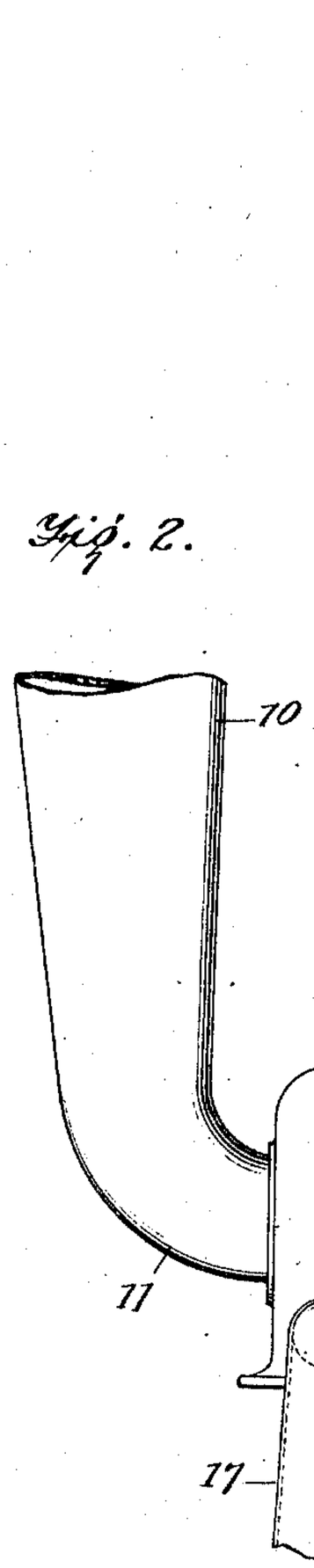
APPLICATION FILED MAY 11, 1910.

967,074.

Patented Aug. 9, 1910.

2 SHEETS—SHEET 1.

Fig. 2.



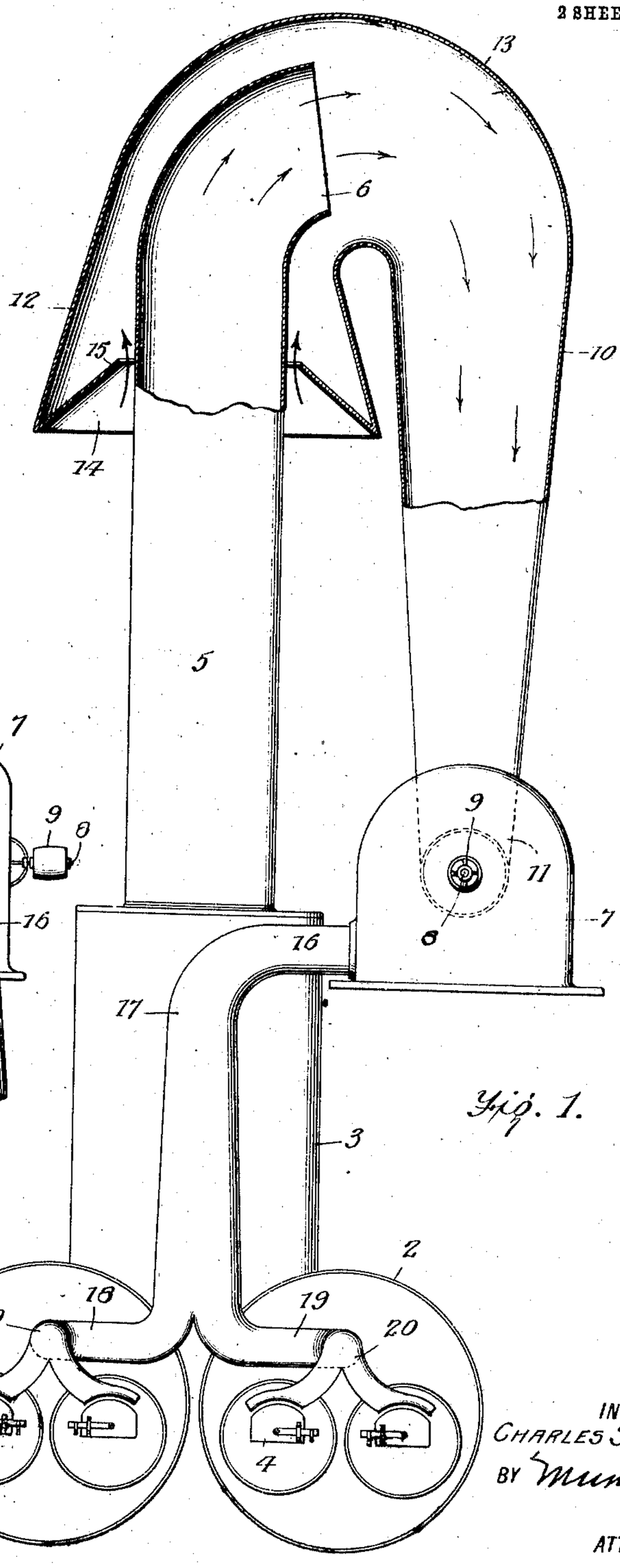


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

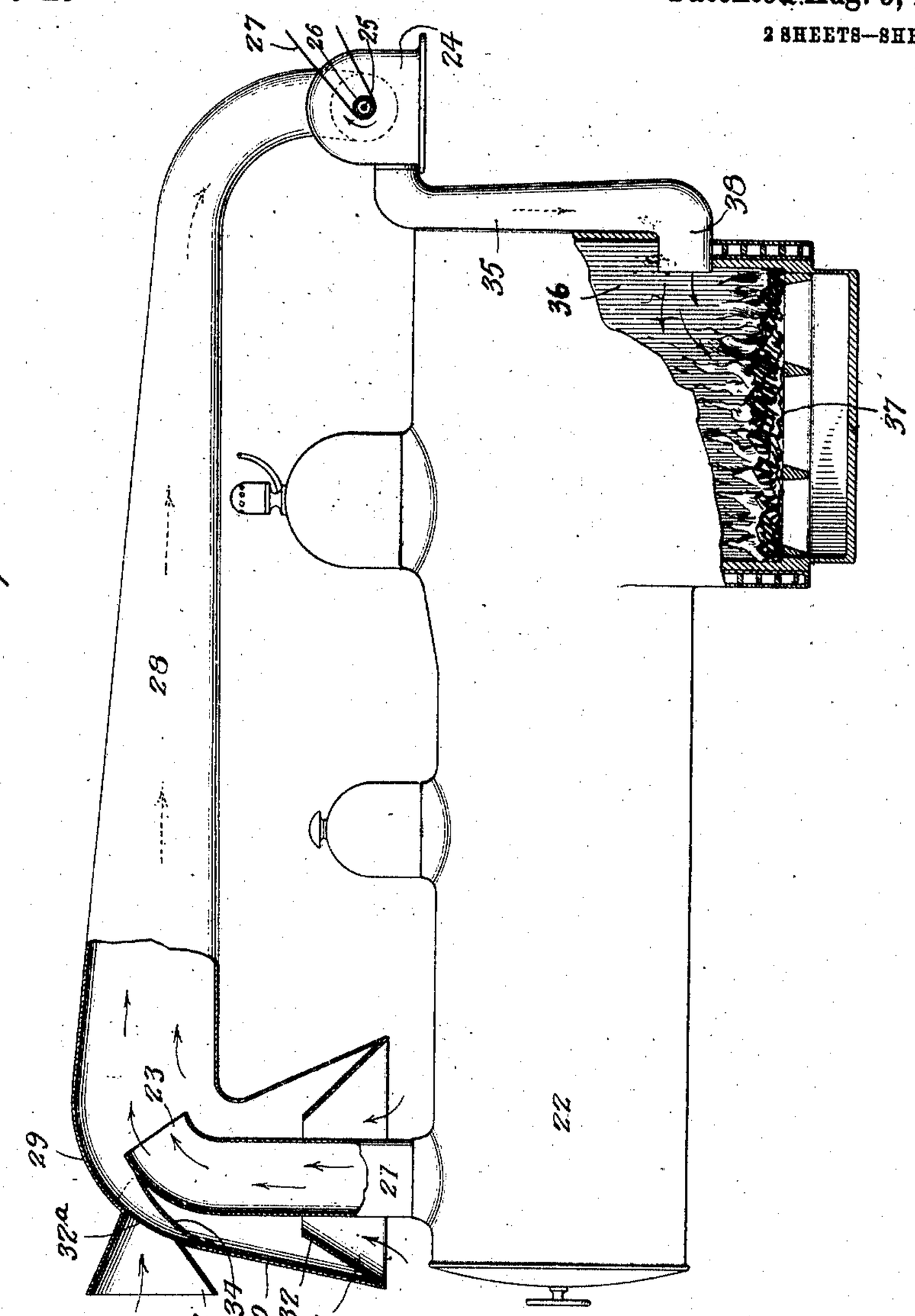
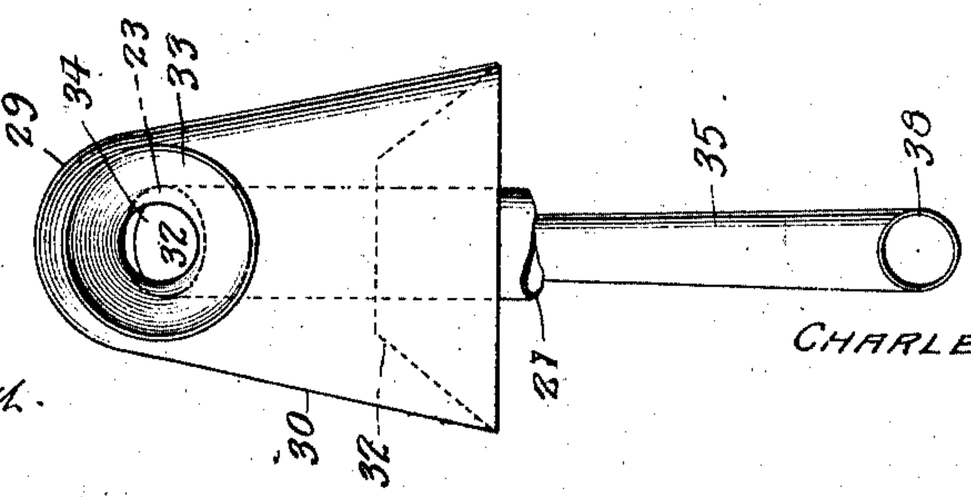


Fig. 4.



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SMOKE-CONSUMER.

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Application filed May 11, 1910. Serial No. 560,599.

To all whom it may concern:

Be it known that I, CHARLES SORENSEN, a citizen of the United States, and a resident of Gulfport, in the county of Harrison and State of Mississippi, have made certain new and useful Improvements in Smoke-Consumers, of which the following is a specification.

My invention is an improvement in smoke consumers, and consists in certain novel constructions, and combinations of parts, hereinafter described and claimed.

The object of the invention is to provide a simple and inexpensive device of the character specified, for attachment to heating plants, for perfectly consuming all of the combustible portions of the fuel, by passing the products of combustion repeatedly through the fire box, with a suitable mixture of air.

Referring to the drawings forming a part hereof, Figure 1 is a front view of the improvement applied to a battery of boilers, a part thereof being broken away. Fig. 2 is a view of a portion of Fig. 1, at right angles to the said figure, Fig. 3 is a side view of the improvement applied to a locomotive, partly broken away, and Fig. 4 is an end view of Fig. 3, from the front.

The embodiment of the invention shown in Figs. 1 and 2, is shown applied to a battery of boilers 1 and 2, having a common stack 3, to which the fire box of the boilers deliver, each fire box having a door 4. The stack 3 is provided at its upper end with a reduced portion 5, having at its free end an elbow 6.

A fan casing 7 is arranged adjacent to the boilers, and the shaft 8 of the fan is provided with a pulley 9 for connection with a suitable source of power to run the fan. A tubular casing 10 communicates with one side of the fan casing by an elbow 11, and the said casing gradually increases in cross section from the fan casing to its free end which is bell-shaped as shown at 12.

Adjacent to the bell, the tubular casing is doubled upon itself as at 13, so that the bell is substantially parallel with the casing, and the elbow 6 of the reduced portion 5 of the stack extends into the bell, as shown in Fig. 1, the elbow having the same curve as the tubular casing and being arranged at the center thereof.

The edge of the bell 12 is provided with an internal annular flange 14, which extends inwardly and upwardly toward the stack, and the free edge of the flange is spaced apart from the outer surface of the stack as shown to form an annular air passage 15 between the flange and the stack.

Near its bottom, the fan casing 7 is provided with a laterally extending discharge pipe 16, gradually increasing in cross section from the fan casing and being bent at right angles at 17 to pass downwardly toward the fire box. At its lower end the discharge pipe divides into branch pipes 18 and 19, each of which extends laterally at right angles from the inner pipe, and each branch again divides in branches as indicative at 20.

The ultimate branches of the pipe 17 correspond in number to the number of the fire boxes, each of the said ultimate branches opening into a fire box above the door 4, so that the unconsumed gases and the like are passed through the fire boxes by the fan.

As the gaseous products of combustion pass from the stack, they are mixed with a suitable quantity of air, and returned to the fire box under forced draft by the fan, and this process is repeated until every particle of combustible material is oxidized. Sufficient air is passed into the fire box to insure combustion, so that the full heat value of the fuel is obtained.

In Figs. 3 and 4, the stack 21 of the boiler 22 is provided at its free end with a rearwardly bent elbow 23, and the fan casing 24 is arranged at the rear of the boiler. The shaft 25 of the fan is provided with a pulley 26, connected by a belt 27 with a moving part of the engine, and a tubular casing 28 connects the fan casing with the stack.

The casing 28 gradually increases in cross section from the fan casing to the stack, and adjacent to the stack is bent downwardly at 29, opening into a bell 30 which incloses the stack. An internally and upwardly extending annular flange 31 is arranged at the edge of the bell, and extends toward the stack, the free edge of the flange being spaced apart from the stack to form an air passage 32.

The curve of the elbow 23 of the stack follows that of the bend 29 of the tubular casing, and adjacent to the end of the elbow, the angular portion 29 of the tubular casing is provided with an opening 32ª, which is encircled by a funnel-shaped flange 33. A baffle plate 34 is secured to the inner face of the tubular casing below the opening 32ª,

and directs the air entering above the opening of the elbow 23.

The discharge pipe 35 of the fan casing leads from near the bottom thereof, and opens into the fire box 36, of the locomotive above the level of the fuel 37, by an elbow 38. The inlet pipe in both cases opens into the fan casing axial to the fan shaft.

In the operation of the construction shown in Figs. 3 and 4, the products of combustion pass in the direction of the arrows from the stack to the fan casing, receiving a sufficient mixture of air through the annular passage 32, and also through the opening 32ª, and are discharged into the fire box.

Sufficient draft is permitted in the last described embodiment of the invention by the opening 32, and the amount of draft is in accordance with the speed of the locomotive. In both cases the full heat value of the fuel is utilized.

It will be evident that the construction shown in Figs. 1 and 2 might be provided with the opening 32ª in the bell or hood of the tubular casing or pipe leading from the stack to the fan casing. In stationary heating plants however, the opening would be of slight advantage. The bends in the stack and tubular casing are on arcs of large circles, so that but little friction is offered to the passage of the products of combustion.

I claim—

1. In combination with the fire box and the smoke stack leading therefrom, of a fan casing a discharge pipe leading from the fan casing to the fire box and opening above the level of the fuel therein, a pipe leading from the stack to the fan casing and opening thereinto axially to the fan, said pipe gradually decreasing in cross section from the stack to the fan casing, and having a hood inclosing the stack, said hood having an inwardly extending marginal flange, the free edge thereof being spaced apart to form an annular air passage between the flange and the stack, said hood having an opening in the front thereof adjacent to the top of the stack, an annular flaring flange encircling the opening, and a baffle plate below the opening for deflecting the entering air above the top of the stack.

2. In combination with the fire box and the smoke stack leading therefrom, of a fan casing a discharge pipe leading from the fan casing to the fire box and opening above the level of the fuel therein, a pipe leading from the stack to the fan casing and opening thereinto axially to the fan, said pipe gradually decreasing in cross section from the stack to the fan casing, and having a hood inclosing the stack, said hood having an inwardly extending marginal flange, the free edge thereof being spaced apart to form an annular air passage between the flange and the stack, said hood having an opening in the front thereof, adjacent to the top of the stack, and an annular flaring flange encircling the opening.

3. In combination with the fire box and the smoke stack leading therefrom, of a fan casing a discharge pipe leading from the fan casing to the fire box and opening above the level of the fuel therein, a pipe leading from the stack to the fan casing and opening thereinto axially to the fan, said pipe gradually decreasing in cross section from the stack to the fan casing, and having a hood inclosing the stack, said hood having an inwardly extending marginal flange, the free edge thereof being spaced apart to form an annular air passage between the flange and the stack, said hood having an opening in the front thereof adjacent to the top of the stack.

4. In combination with the fire box and the smoke stack leading therefrom, of a fan casing a discharge pipe leading from the fan casing to the fire box and opening above the level of the fuel therein, a pipe leading from the stack to the fan casing and opening thereinto axially to the fan, said pipe gradually decreasing in cross section from the stack to the fan casing and having a hood inclosing the stack, said hood having an inwardly extending marginal flange the free edge thereof being spaced apart to form an annular air passage between the flange and the stack.

5. In combination with the fire box and the smoke stack leading therefrom, of a fan casing a discharge pipe leading from the fan casing to the fire box and opening above the level of the fuel therein, a pipe leading from the stack to the fan casing and opening thereinto axially to the fan, said pipe having a hood inclosing the stack and spaced apart from the outer wall thereof to form an annular air passage, and having an opening in its front at approximately the level of the top of the stack.

6. In combination with the fire box and the smoke stack leading therefrom, of a fan casing, a discharge pipe leading from the fan casing to the fire box and opening above the level of the fuel therein, a pipe leading from the stack to the fan casing, said pipe having a hood inclosing the stack and spaced apart from the outer wall thereof to form an annular air passage, the said hood having an inwardly extending marginal flange, the free edge of the flange being spaced apart to form an annular air passage between the flange and the stack.

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