Dec. 12, 1933. A. C. BENNETT 1,939,248

SMOKE CLEANER

Original Filed July 24, 1930

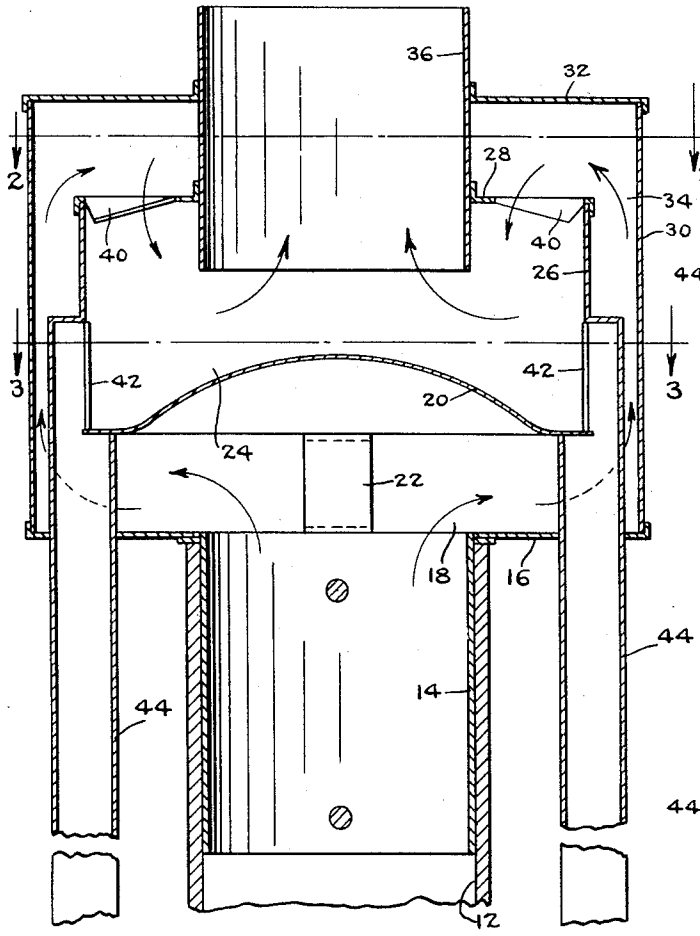

Fig.-1

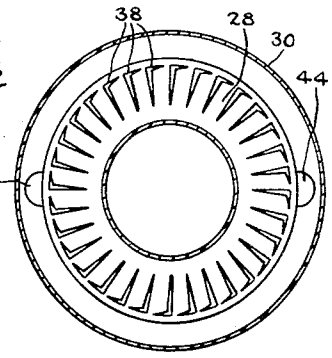

Fig.-2

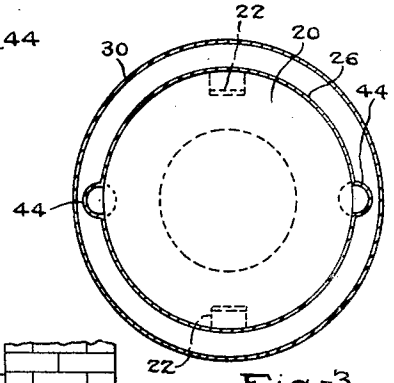

Fig.-3

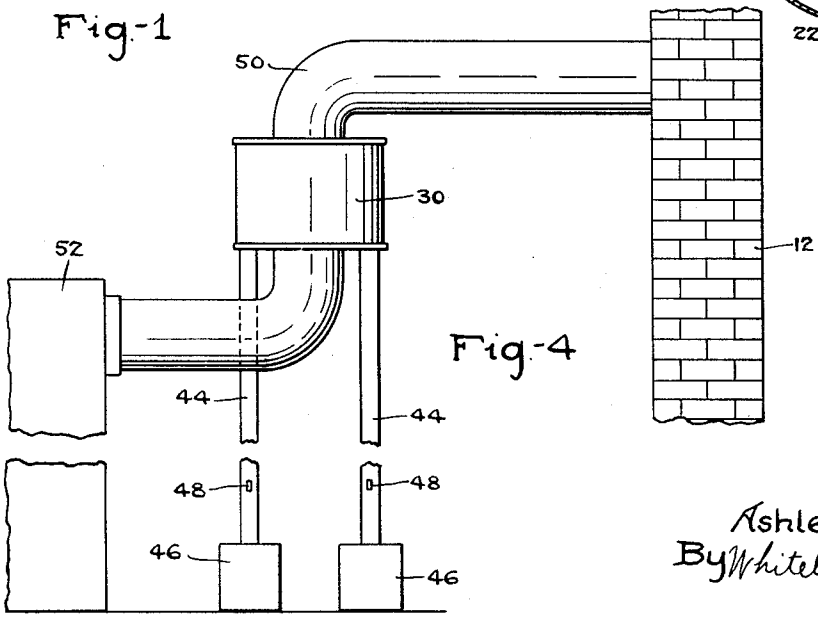

Fig.-4

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SMOKE CLEANER

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Original application July 24, 1930, Serial No. 470,390. Divided and this application August 10, 1933. Serial No. 684,537

3 Claims. (Cl. 183—91)

My invention relates to smoke cleaners and more particularly to means for cleaning particles of solid matter from smoke and furnace gases discharged from chimneys connected with furnaces and has for its object to remove from furnace gases or smoke, all particles of solid matter of appreciable weight before the gases escape from the chimney.

A very inexpensive and satisfactory fuel for making steam for various purposes including the heating of buildings is what is known as "powdered coal". Fuel in this condition has advantages not only in regard to economy since coal can be used which otherwise is not well adapted for fuel, but also it is an effective steam making agent producing a very hot and well-distributed flame. In practice in the burning of "powdered coal", it is blown into the fire chamber under forced draft which together with the natural draft up tall smoke stacks commonly referred to as chimneys produces a very strong movement of the air up the shaft of the chimney. "Powdered coal" as produced contains a certain percentage of material which does not burn; this material is caught in the strong draft and carried up and out of the chimney, scattering about and collecting on the roofs of buildings and spaces around chimneys. Serious difficulties have been encountered in burning "powdered coal" because of these facts.

I have discovered that if the air and exhaust gases going up the chimney are caused to rotate with a certain degree of velocity and then to be reversed in direction, the particles of solid material carried upward in the furnace draft will be thrown out of it by the action of centrifugal force and gravity, with the result that such particles may be accumulated and carried to a bin and the combustion gases will go out of the chimney free from all solid particles excepting those very fine carbon and mineral particles which make light smoke content. A feature of the invention consists in providing a receiving bin or receptacle which is normally air tight in order to prevent up-draft in the discharge stack or tubular member which extends down from the vicinity of the separator into said receptacle.

In practice I may locate the device for whirling and reversing the direction of the air either outside or inside the chimney, and either at a point near the furnace or at a point near the top of the chimney, depending upon the character of the furnace employed and of the building where or near where the chimney is located and the heating devices employed.

The full objects and advantages of my invention will appear in connection with the detailed description thereof, and the novel features embodied in my inventive idea will be particularly pointed out in the claims.

In the accompanying drawing which illustrates one of the forms in which my invention may be embodied,—

Fig. 1 is a vertical sectional view showing the invention. Fig. 2 is a view in horizontal section on the line 2—2 of Fig. 1. Fig. 3 is a view in horizontal section on the line 3—3 of Fig. 1. Fig. 4 is an elevational view of a construction similar to that of Fig. 1, but showing it installed in the smoke pipe leading from the furnace instead of being installed in the chimney.

Referring to the drawing, a chimney 12 is shown provided at its upper end with a thimble 14 from whose upper end an annular member 16 extends outwardly so as to form the lower member of a casing containing a chamber 18 which is closed at the top by a dome member 20. This dome member and the member 16 are connected by tie strips 22. Above the dome member 20, there is a chamber 24 formed by a cylindrical inner casing member 26 which extends from the periphery of the member 20 up to the periphery of an annular member 28. From the periphery of the member 16, a cylindrical outer casing member 30 extends up to the periphery of a top member 32 whereby an annular chamber 34 is produced. The members 28 and 32 are cut out centrally to provide for the passage of a conduit 36 which leads from the chamber 24 to the outer air. The annular member 26 constitutes a partition between the chambers 24 and 34 and around its periphery is provided with a multiplicity of slits 38 formed by striking the material downwardly to produce downwardly inclined deflectors 40. The lower portion of the inner casing member 26 is provided with openings 42 which lead into the upper ends of tubular members or stacks 44 which are closed at the top except that they have cut out portions to register with the openings 42. The stacks 44 lead downwardly into normally air tight receiving bins 46 shown in Fig. 4, these stacks being provided with dampers 48. The device shown in Fig. 4 is constructed similarly to that shown in Figs. 1, 2 and 3, but instead of being located at the top of the smoke stack is inserted in the vertical portion of a double curved smoke pipe 50 leading from a furnace 52 to the chimney 12.

The operation and advantages of my invention will be apparent in connection with the foregoing description and the accompanying drawings. The smoke and furnace gases pass up the chimney 12 or in the form shown in Fig. 4 through a smoke pipe 50 into the chamber 18 from which they pass outwardly into the annular chamber 34. From the latter chamber, they pass downwardly through the slits 38 so that they are not only reversed in direction, but are caused to have a whirling motion by the inclined deflectors 40. As the smoke is rotated in the chamber 24, solid particles carried by the smoke are thrown outwardly by centrifugal force and dropped by gravity into the stacks 44. The smoke passes from the chamber 24 out of the conduit 36 into the outside air. The solid particles drop into the bins 46 from which they may be removed from time to time. It will be noted from Fig. 1 that the chamber 24 constitutes a settling chamber having a dead air space at its bottom.

The present application is a division of my prior application Ser. No. 470,390, filed July 24, 1930, which has matured into Patent Number 1,928,808, issued October 3, 1933.

I claim:

1. Means for cleaning particles of solid matter from smoke and furnace gases discharged from smoke stacks, comprising an outer casing, an inner casing spaced within said outer casing and forming upper and lower chambers therein, said lower chamber having an inlet opening and being connected peripherally with said upper chamber, the lower wall of said upper chamber being provided with a multiplicity of peripheral slits and associated inclined deflectors, an upwardly extending conduit leading centrally from said inner casing, and downwardly extending tubular members leading from the periphery of said inner casing.

2. Means for cleaning particles of solid matter from smoke and furnace gases discharged from smoke stacks, comprising an outer casing, an inner casing, spaced within said outer casing and forming upper and lower chambers therein, said lower chamber having an inlet opening and being connected peripherally with said upper chamber, the lower wall of said upper chamber being provided with a multiplicity of peripheral slits and associated inclined deflectors, an upwardly extending conduit leading centrally from said inner casing, the bottom wall of said inner casing being dome-shaped, and downwardly extending tubular members leading from said inner casing at the periphery of said dome-shaped bottom wall.

3. Means for cleaning particles of solid matter from smoke and furnace gases discharged from smoke stacks, comprising an outer casing, an inner casing spaced within said outer casing and forming upper and lower chambers therein, said lower chamber having an inlet opening and being connected peripherally with said upper chamber, the lower wall of said upper chamber being provided with a multiplicity of peripheral slits and associated inclined deflectors, an upwardly extending conduit leading centrally from said inner casing, downwardly extending tubular members leading from the periphery of said inner casing, and normally air tight bins into which said downwardly extending tubular members discharge.

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