

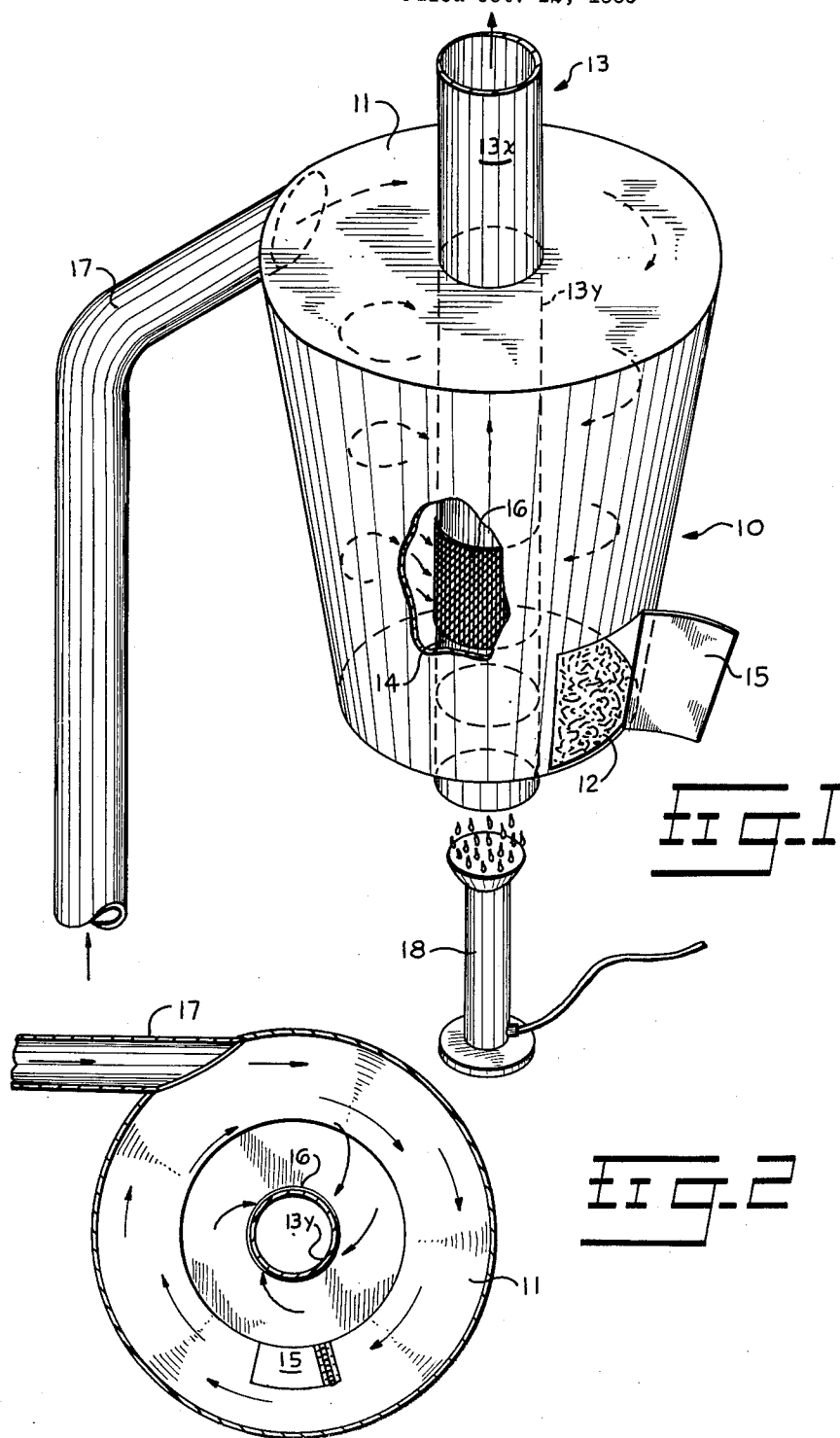
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DEVICE FOR ABATEMENT OF AIR POLLUTION

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DEVICE FOR ABATEMENT OF AIR POLLUTION
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1 Claim. (Cl. 183—6)

This invention relates to a device for abatement of air pollution.

It is an object of this invention to eliminate or to substantially eliminate smoke, soot, cinders, flyash, dust, odors, obnoxious gases and fumes present in the exhaust gases of combustion devices.

It is another objective of this invention to abate air pollution by controlling the emission into the atmosphere of smoke, soot, cinders, flyash, odors, fumes and obnoxious gases from combustion equipment.

Air pollution is a serious problem of our civilization. It is a nuisance in that homes and buildings are soiled as well as the wearing apparel of residents and pedestrians. Moreover, human beings and animals are made uncomfortable and at times ill by polluted air. Furthermore air pollution damages vegetation, corrodes metal and decomposes stone and other building material.

While many devices are known that have as their purpose abatement of air pollution, none of them are fully satisfactory since they remove but one or a few of the pollutants.

The present invention removes both solid and gaseous pollutants from the exhaust gases of various combustion equipment, such as incinerators of all kinds, for example, residential incinerators, municipal incinerators, etc., as well as from the exhaust gases of boilers of every description, etc.

This invention is illustrated by an accompanying drawing in which:

FIG. 1 is a side view, broken away in part, showing the screen for removing solid particles from an exhaust gas, and

FIG. 2 is a top view of the device of FIG. 1.

Turning to the drawing, a container 10 preferably in the shape of an inverted truncated cone and of suitable height is provided with a top preferably flat wall 11 and a bottom wall 12.

The top wall 11 is provided with a central pipe or flue conduit 13 secured as by welding to the wall. Conduit 13 comprises a top portion 13X extending above wall 11 and a bottom portion 13Y extending a suitable distance into the container 10. The top conduit portion 13X and the bottom conduit portion 13Y are preferably portions of an integral pipe.

The bottom wall 12 is provided with a centrally disposed conduit or pipe 14 preferably of a diameter equal to that of pipe 13.

As shown in FIG. 1, upright pipe 14 is disposed in axial linear relationship to pipe 13 and is preferably welded and disposed perpendicularly to wall 12. Pipe 14 may extend below bottom wall 12 if desired.

The container 10 is provided with a suitable clean out door 15 secured to the container wall by conventional hinge means adjacent the bottom wall 12. Any soot or solid material deposited upon wall 12 is removed through the door 15.

A cylindrical screen 16 of suitable height and preferably of stainless steel and of a diameter equal to that of pipes 13 and 14 is secured as by welding to both pipes 13 and 14. The mesh of the screen 16 is such as to physically screen out selected size solid particles from gases passing therethrough. Thus for example, fly ash pollutants are physically separated from gaseous pollutants

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by screen 16 and fall by gravity to the bottom wall 12.

The container 10 is provided adjacent its top wall 11 with a suitable aperture and a flue stack or pipe 17 from for example, a residential incinerator is secured as by welding to the container at the aperture.

As shown in FIG. 2 the flue stack 17 is secured in tangential relationship to the container so that solid particles in the exhaust gases in pipe 17 travel around the inside of container 10 adjacent its inner surface. Container 10 is in effect a cyclone separator for solid particles entering therein through pipe 17.

An important feature of this invention is the provision of a burner or combustion means 18, for example, a gaseous flame in the bottom pipe 14.

The flame from the burner 18 is of a temperature suitable to burn or decompose gaseous pollutants such as obnoxious molecules, for example, hydrogen sulfide, sulfur dioxide, etc., often found in exhaust gases. The temperature of the flame at the screen 16 should be at least about 1,000° F. and preferably above 1,400° F. to effect incandescence of screen 16.

In the operation of this invention the hot exhaust gases in pipe 17 from for example, a municipal incinerator are led by convection current into the container 10. Due to the changing speed of the gases in container 10 and because of their tangential direction in container 10 the exhaust gases deposit solid particles of suitable size. The smaller particles which are not removed by the cyclone effect are physically removed by the screen 16.

The gases passing through screen 16 are substantially free of all solid particles except for minute smoke particles which pass the openings in screen 16. The gases often containing obnoxious and even poisonous molecules are subjected to the hot flame of burner 18 which decomposes the obnoxious molecules to harmless molecules.

The solid particles of a combustible nature such as soot particles, particles of carbonized paper, etc., deposited on screen 16 are burned off the screen since the screen 16 is at a suitable glowing temperature due to the flame of burner 16.

This invention has been shown by an illustrative embodiment but other embodiments fall within its ambit or scope.

Thus the burner screen may be insulated and made to glow by electrical means such as suitable resistance wires. Also the screen may be made from suitable alloys to perform a catalytic effect in decomposing obnoxious molecules at the temperatures indicated. Thus the screen may be made of platinum or chromium, etc., for the catalytic effect when used at the temperatures recited above.

The length of the pipe portion 13Y is such that the screen 16 is suitably far removed from the top wall 11. The upright wall 14 is of a height sufficient to allow accumulation of soot on the bottom floor 12.

A modification of this invention is an integral pipe having foraminous portion having a plurality of suitable small apertures disposed a suitable distance above the bottom wall 12, said apertures functioning as and in lieu of a screen 16.

The device of this invention may be provided with an automatic electrical smoke alarm located in pipe 17 which will turn on and light the gas of the burner 18 whenever the density of the smoke exceeds a pre-determined amount.

This invention may be secured to existing incinerators or it may be incorporated into new incinerators, etc.

The principle of this invention is the elimination of the heavier solid particles from exhaust gases having a draft by a cyclone separator followed by combustion with decomposition of the substantially solids free gases. The combustion of the solids free gases creates a secondary draft in the pipe 13 so that the draft from the incinerator is augmented by the draft due to burner 18.

Clearly this invention is of generic scope and is not limited to its illustrations.

We claim:

An air pollution abatement apparatus for converting combustion products comprising an inverted truncated conical container, a top wall hermetically secured to the top of said container, a bottom wall hermetically secured to bottom of said container, an inlet pipe for exhaust combustion gases secured tangentially to said container adjacent the top wall, a vertical top pipe disposed centrally and hermetically in the top wall and extending suitably into said container, a vertical bottom pipe disposed centrally and hermetically in the bottom wall and extending a suitable distance into said container, said top pipe and said bottom pipe being disposed in suitable spaced-apart relationship in said container, and a cylindrical

foraminous means secured hermetically to said top and bottom pipes, gas burner means for causing said foraminous means to become suitably incandescent disposed centrally beneath said bottom pipe and a clean-out door secured hingedly to said container adjacent said bottom wall, whereby substantially pollutant free air, free also of obnoxious odors, is released to the atmosphere.

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