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AFTERBURNER FOR INHIBITING EMISSION OF SMOG FROM A COMBUSTION DEVICE

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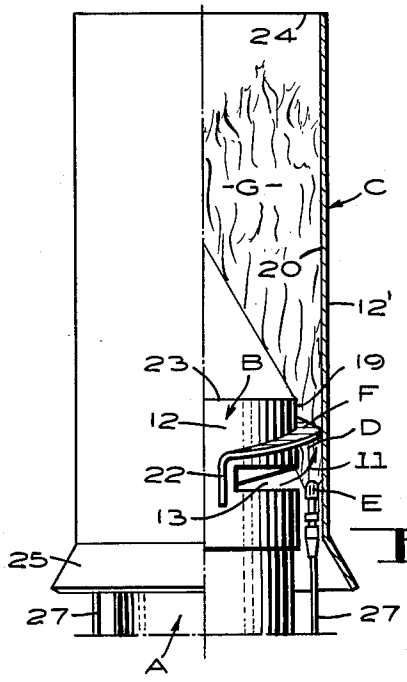


FIG. 1

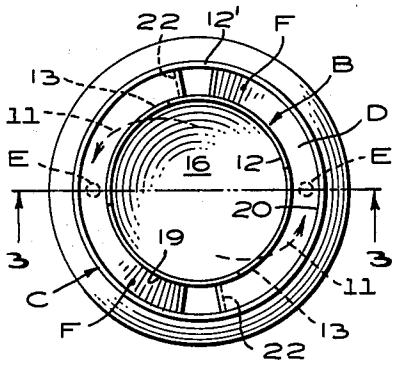


FIG. 2

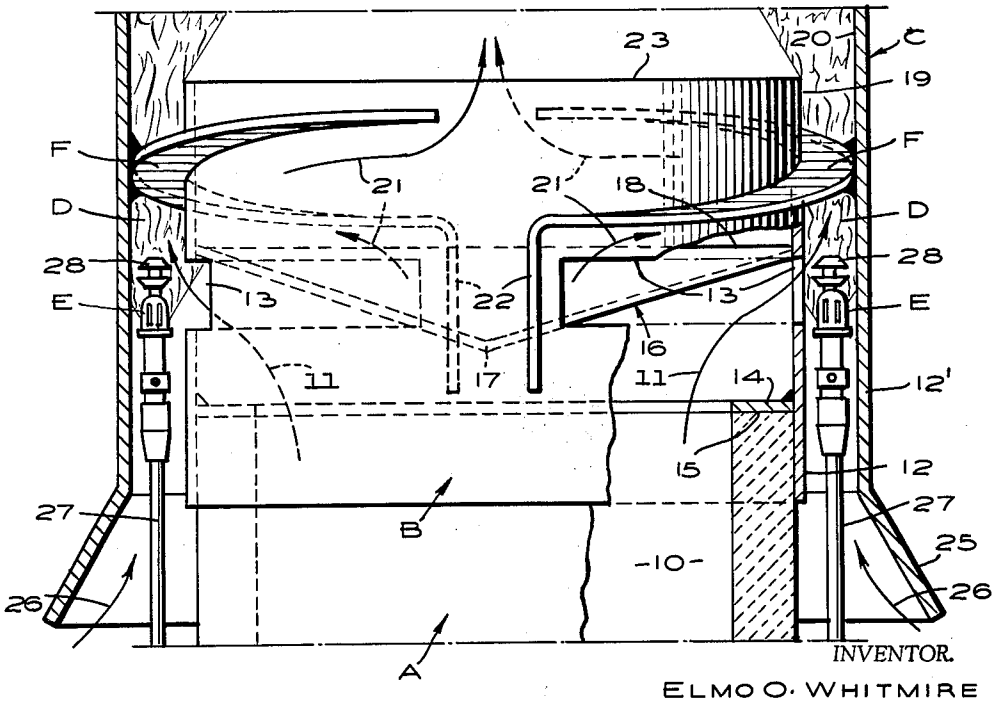


FIG. 3

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AFTERBURNER FOR INHIBITING EMISSION OF SMOG FROM A COMBUSTION DEVICE

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7 Claims. (Cl. 23—277)

The present invention relates to improvements in an after-burner for inhibiting emulsion of smog from a combustion device. It has particular reference to an afterburner attachment for incinerators, industrial smoke-stacks, exhaust pipes of vehicles, and the like, so as to prevent emission of smog-producing products to the atmosphere.

It has been proposed in the art to use a gas flame across the upper part of a smoke-stack to burn residual carbon and other smog-producing contaminants from the smoke, the gas flame being provided by jets arranged around the rim of the stack and directing their flames toward the center of the stack. However, in larger stacks, there are voids in the flames and unburned smoke can escape to the atmosphere.

Accordingly, it is proposed to provide an afterburner having means communicating with an outlet of a combustion device to receive smoke and other undesirable products of combustion therefrom, and defining a restricted passageway through which the smoke and products must pass before escaping to the atmosphere. Moreover, burners are arranged to produce flames in the restricted passageway completely occupying the exit path of the smoke and products flowing through the passageway, irrespective of the size of the combustion device outlet, whereby emission of the smoke and products to the atmosphere will be effectively inhibited.

More specifically stated, it is proposed to mount a hood over an outlet of a combustion device to receive smoke and other undesirable products of combustion therefrom. This hood is formed with at least one slot in its wall, and a barrier wall is disposed across the interior of the hood so as to deflect the smoke and other products through the slot. An exterior flue-shield surrounds the hood and is spaced therefrom to define a restricted passageway through which the smoke and other products flow from the slot before escaping to the atmosphere. At least one burner is arranged in this restricted passageway with its flames completely occupying the exit path of the smoke and products, and thereby the smog-producing contaminants will be effectively burned and none will escape to the atmosphere.

Other objects and advantages will appear as the specification proceeds. The novel features will be set forth in the appended claims.

Drawing

For a better understanding of the invention, reference should be had to the acompanying drawing, forming part of this specification, in which:

FIGURE 1 is an elevational view of my afterburner for inhibiting emission of smog from a combustion device, parts being shown in section;

FIGURE 2 is a top plan view thereof; and

FIGURE 3 is an enlarged sectional view taken along the plane 3—3 of FIGURE 2, with portions being disclosed in elevation.

While I have shown only the preferred form of my invention, it should be understood that various changes, or modifications, may be made within the scope of the annexed claims without departing from the spirit thereof.

Detailed description

Referring now to the drawing in detail, a fragmentary portion of a combustion device A has been disclosed in FIGURES 1 and 3, which may be an incinerator, smoke-stack of an industrial plant, exhaust pipe of a vehicle, or the like. This combustion device has an outlet **10** for outflow of smoke and other undesirable products of combustion, as indicated by the arrows **11** in FIGURE 3, which normally are discharged directly into the atmosphere and producing smog.

It will be noted that a hood B is mounted over the outlet **10** of the combustion device A to receive the smoke and products of combustion therefrom. As clearly shown in FIGURES 1 and 3, the hood B defines a wall **12** extending circumferentially around the combustion device outlet **10**, and being fashioned with at least one slot **13** through which the smoke and products may flow, it being observed that FIGURES 2 and 3 illustrate two such slots arranged diametrically of one another and elongated circumferentially of the hood wall **12**. Of course, any suitable means may be provided for mounting the hood B on the combustion device A. For this purpose, an internal ring flange **14** has been welded to the hood wall **12**, with this flange resting on the rim **15** of the combustion device (see FIGURE 3).

A barrier wall **16** extends entirely across the interior of the hood defined by the hood wall **12** so as to deflect the smoke and products through the slots **13**. The apex **17** of the conical barrier wall extends toward the combustion device outlet **10**, while the base **18** of the cone is disposed adjacent to the slots **13** so as to deflect the smoke and products outwardly and through these slots.

In FIGURES 1 and 3, an exterior flue-shield C of tubular outline is shown as surrounding the hood B and coacting therewith to define a restricted passageway D through which the smoke and products of combustion must pass before escaping upwardly. However, burners E are arranged to produce flames in the restricted passageway D completely occupying the exit path of the smoke and products flowing through this passageway, as shown in FIGURES 1 and 3, whereby emission of smoke and the products to the atmoshphere will be effectively inhibited, irrespective of the size of the combustion device outlet **10**. The capacity of the restricted passageway D is sufficient to accommodate all smoke and products being discharged from the outlet **10**, but at the same time this passageway is restricted to the extent that the flames from the burners E will preclude escapement of the smoke and products to the atmosphere. The burners E are located in the restricted passageway D adjacent to the deflecting means provided by the conical barrier wall **16**.

The restricted passageway D extends circumferentially and entirely around the hood B, and at least one spiral baffle plate F is mounted in this passageway to extend from the exterior **19** of the hood B to the interior **20** of the wall **12'** of the flue-shield C so as to whirl the smoke and products along a spiral path during outflow thereof, as suggested by the arrows **21** in FIGURE **3**. The drawing illustrates two of these baffle plates and they are disposed downstream of the slots **13** in the hood B relative to outflow of the smoke and products of combustion. Each baffle plate F has a deflected end **22** extending upstream beyond the adjacent slot **13** to preclude the smoke and products from escaping, excepting by following the spiral path.

The spiral baffle plates F are preferably secured to both the hood B and the flue-shield C so as to provide a unitary unit, and this may be accomplished by welding.

In FIGURE 1, the exterior flue-shield C has been shown as extending well above the top **23** of the hood B

to provide a burning zone G in which further carbon and other contaminants will be burned out of the smoke and other products of combustion before escaping over the top **24** of the flue-shield.

The lower end of the exterior flue-shield C may be provided with a frusto-conical skirt **25** so as to permit air to enter the restricted passageway D, as suggested by the arrows **26** in FIGURE 3. This will aid in the burning of the smoke and products of combustion by the flames issuing from the burners E. Any suitable type of gas may be supplied to the burners E by pipes **27**, and a pilot light **28** may be associated with each burner.

I claim:

1. In an afterburner for inhibiting emission of smog from a combustion device:

(a) a hood mounted over an outlet of a combustion device to receive smoke and other undesirable products of combustion therefrom;

(b) an exterior flue-shield of tubular outline surrounding the hood and coacting therewith to define a restricted passageway communicating with the combustion device outlet and through which the smoke and products must pass before escaping to the atmosphere, irrespective of the size of the combustion device outlet;

(c) at least one burner arranged to produce flames in the restricted passageway completely occupying the latter;

(d) the capacity of the restricted passageway being sufficient to accommodate all smoke and products being discharged from the combustion device outlet, but at the same time this passageway being restricted to the extent that the flames from the burner will preclude escapement of the smoke and products from the combustion device to the atmosphere;

(e) said restricted passageway communicating with the combustion device outlet through at least one slot formed in the hood;

(f) said restricted passageway extending circumferentially around and being disposed laterally and outwardly beyond the combustion device outlet;

(g) a barrier wall extending entirely across the interior of the hood and arranged to deflect all of said smoke and products of combustion from the combustion device outlet laterally in an outward direction into the restricted passageway for outflow into said flames;

(h) the burner being located adjacent to the slot in the hood and near an outer rim of the barrier wall;

(i) and at least one spiral baffle plate mounted in the restricted passageway so as to create a turbulence of said smoke and products in a spiral path during outflow thereof;

(j) the spiral baffle plate being secured to both the hood and the flue-shield to provide a unitary unit, with the baffle plate constituting a support for the flue-shield.

2. The afterburner for inhibiting emission of smog from a combustion device, as set forth in claim **1**;

(k) and in which the baffle plate is disposed downstream of the slot in the hood relative to the direction of outflow of said smoke and products;

(l) the baffle plate being provided with a deflected end extending upstream beyond the slot for a sufficient distance to preclude said smoke and products from escaping around the upstream end of the baffle plate;

(m) the barrier wall being conical, with the apex of the cone extending upstream toward the combustion device outlet;

(n) the base of the conical barrier wall being disposed adjacent to and immediately upstream of the slot in the hood so as to deflect said smoke and products directly through the slot.

3. In an afterburner for inhibiting emission of smog from a combustion device:

(a) a hood mounted over an outlet of a combustion device to receive smoke and other undesirable products of combustion therefrom;

(b) an exterior flue-shield of tubular outline surrounding the hood and coacting therewith to define a restricted passageway communicating with the combustion device outlet and through which the smoke and products must pass before escaping to the atmosphere, irrespective of the size of the combustion device outlet;

(c) at least one burner arranged to produce flames in the restricted passageway completely occupying the latter;

(d) the capacity of the restricted passageway being sufficient to accommodate all smoke and products being discharged from the combustion device outlet, but at the same time this passageway being restricted to the extent that the flames from the burner will preclude escapement of the smoke and products from the combustion device to the atmosphere;

(e) said restricted passageway communicating with the combustion device outlet through at least one slot formed in the hood;

(f) said restricted passageway extending circumferentially around and being disposed laterally and outwardly beyond the combustion device outlet;

(g) and a barrier wall extending entirely across the interior of the hood and arranged to deflect all of said smoke and products of combustion from the combustion device outlet laterally in an outward direction into the restricted passageway for outflow into said flames.

4. The afterburner for inhibiting emission of smog from a combustion device, as set forth in claim **3**;

(h) and in which the burner is located adjacent to the slot in the hood and near an outer rim of the barrier wall.

5. The afterburner for inhibiting emission of smog from a combustion device, as set forth in claim **3**;

(h) and in which the baffle plate is disposed downstream of the slot in the hood relative to the direction of outflow of said smoke and products;

(i) the baffle plate being provided with a deflected end extending upstream beyond the slot for a sufficient distance to preclude said smoke and products from escaping around the upstream end of the baffle plate.

6. The afterburner for inhibiting emission of smog from a combustion device, as set forth in claim **3**;

(h) and in which the barrier wall is conical, with the apex of the cone extending upstream toward the combustion device outlet;

(i) the base of the conical barrier wall being disposed adjacent to and immediately upstream of the slot in the hood so as to deflect said smoke and products directly through the slot.

7. In an afterburner for inhibiting emission of smog from a combustion device:

(a) a hood mounted over an outlet of a combustion device to receive smoke and other undesirable products of combustion therefrom;

(b) an exterior flue-shield of tubular outline surrounding the hood and coacting therewith to define a restricted passageway communicating with the combustion device outlet and through which the smoke and products must pass before escaping to the atmosphere, irrespective of the size of the combustion device outlet;

(c) at least one burner arranged to produce flames in the restricted passageway completely occupying the latter;

(d) the capacity of the restricted passageway being sufficient to accommodate all smoke and products being discharged from the combustion device outlet, but at the same time this passageway being restricted to the extent that the flames from the burner will preclude escapement of the smoke and products from the combustion device to the atmosphere;

(e) and at least one spiral baffle plate mounted in the restricted passageway so as to create a turbulence of said smoke and products along a spiral path during outflow thereof;

(f) the spiral baffle plate being secured to both the hood and the flue-shield to provide a unitary unit, with the baffle plate constituting a support for the flue-shield.

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