Jan. 20, 1970 S. WARNOCK 3,490,466

SMOKE INCINERATOR FOR ASH TRAYS

Filed April 15. 1968 3 Sheets-Sheet 1

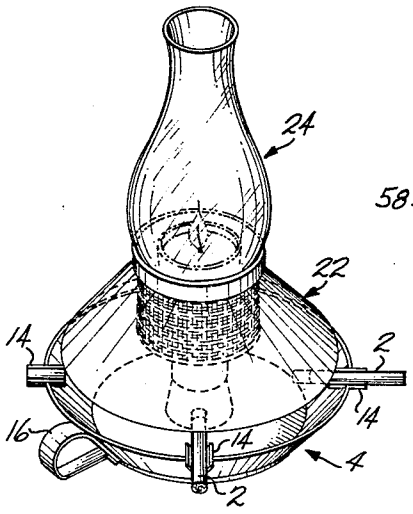
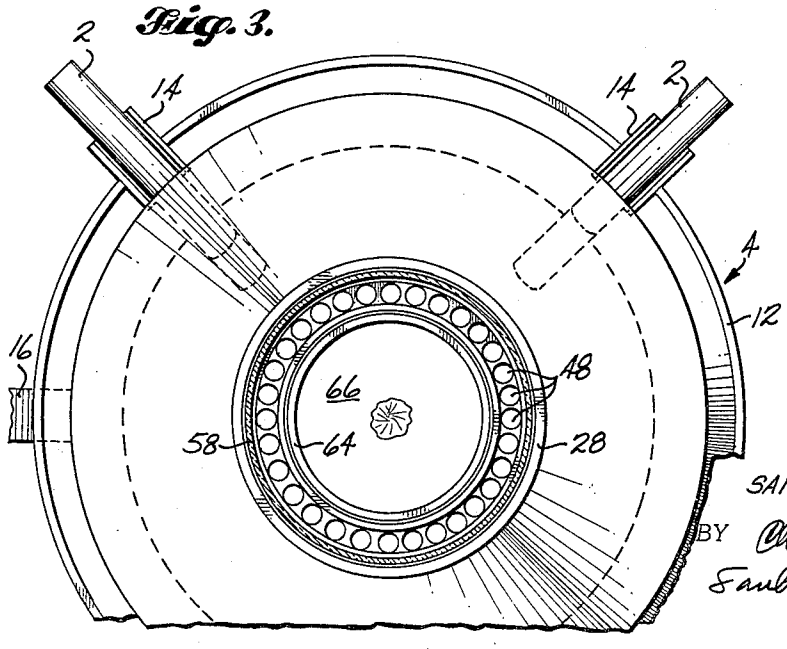


Fig. 1.

Fig. 2.

Fig. 3.



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3 Sheets-Sheet 2

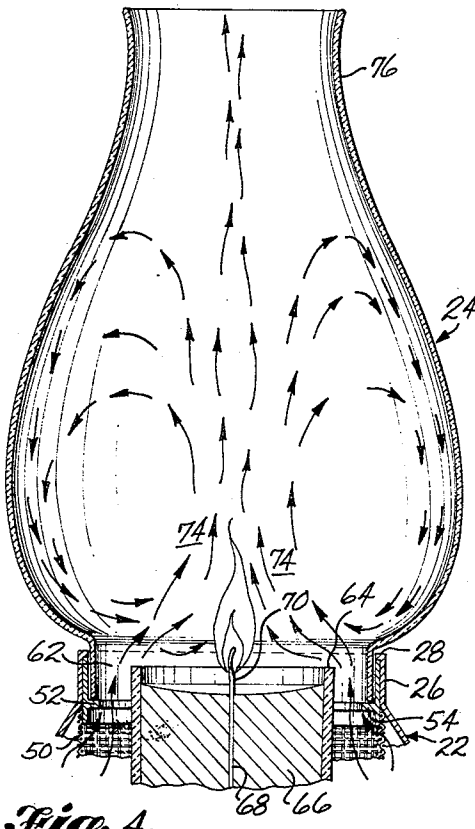


Fig. 4.

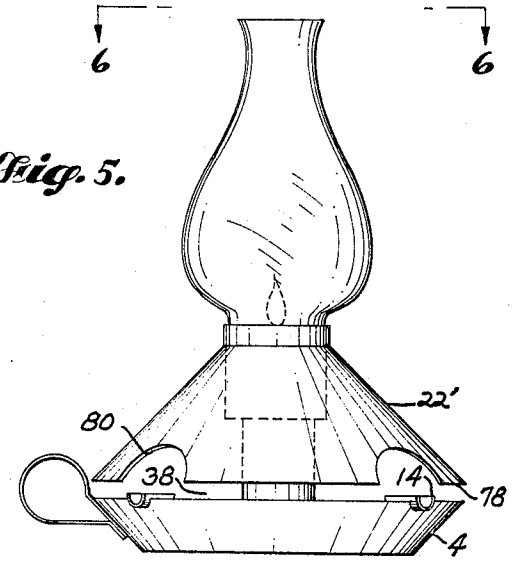


Fig. 5.

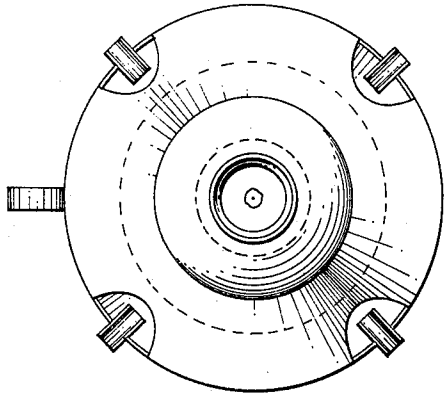


Fig. 6.

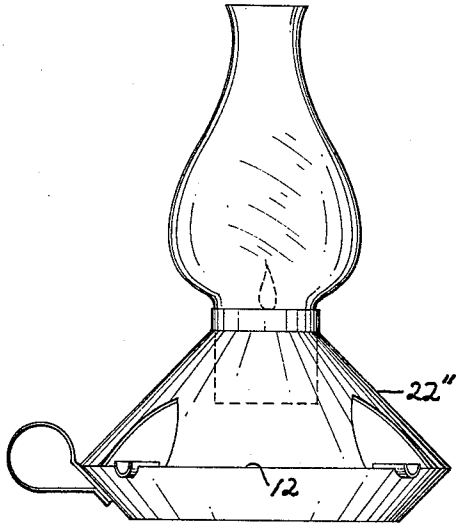


Fig. 7.

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3 Sheets-Sheet 3

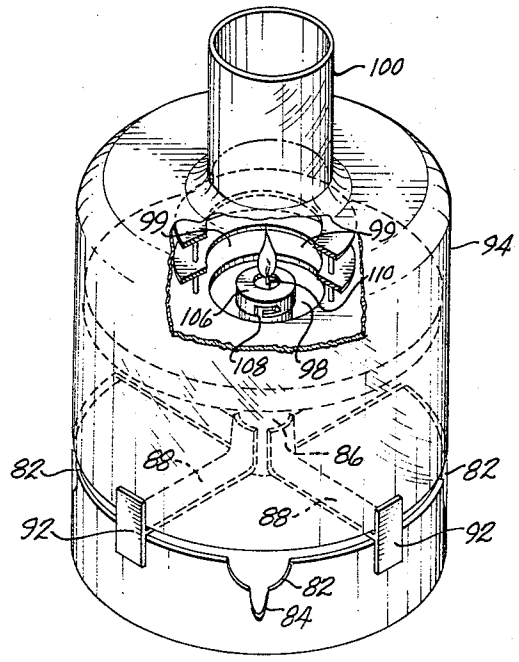


Fig. 8.

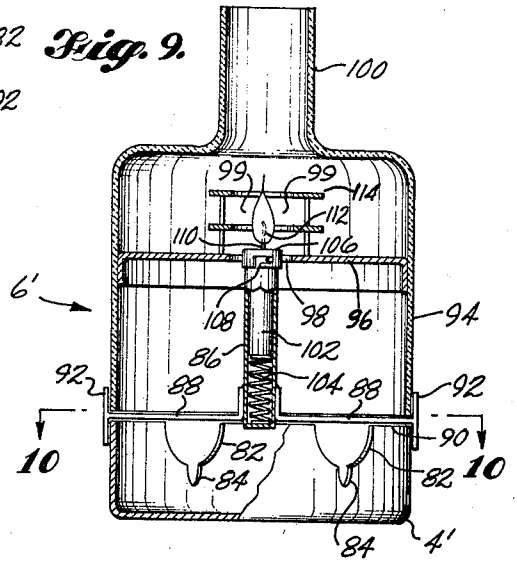


Fig. 9.

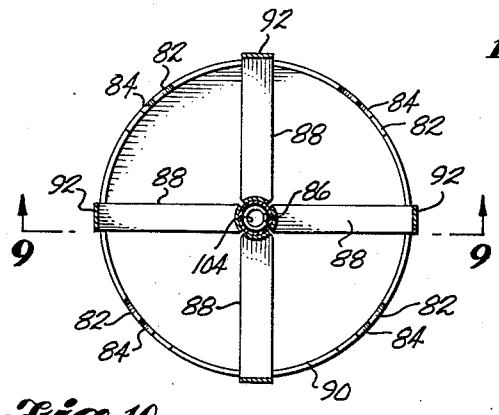


Fig. 10.

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3,490,466

SMOKE INCINERATOR FOR ASH TRAYS

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U.S. Cl. 131—238 16 Claims

ABSTRACT OF THE DISCLOSURE

A smoke incinerator for ash trays comprising an elongated, open-ended, upright tubular device for collecting the smoke from an ash tray and releasing it into the ambient atmosphere thereabove, in a clarified condition. The device has a body of liquid-burning fuel such as paraffin wax or kerosene disposed therein, and the fuel body has means such as a capillary wick connected therewith to support an open flame. In addition, there are smoke channeling means on the device which define an intermediate throat therein that is reduced in diameter relative to the lower end opening of the device. The throat is arranged about the wick so that the smoke is channeled through the contiguous region of the flame in reaching the ambient atmosphere above the ash tray.

FIELD OF THE INVENTION

This invention relates to a smoke incinerator for collecting the smoke from an ash tray and releasing it into the ambient atmosphere thereabove, in a clarified condition.

BACKGROUND OF THE INVENTION INCLUDING CERTAIN OBJECTS THEREOF

The smoke from lighted tobacco-burners such as cigars, cigarettes, and pipes contains unburned particles and fumes which tend to collect in a closed room and become objectionable to those occupying it. The smoke is particularly objectionable in the area about an ash tray on which a lighted tobacco-burner is allowed to stand and burn. Therefore, numerous devices have been proposed for elevating the smoke to a level above the heads of those in the room. However, these devices do nothing to clarify the smoke; and as a consequence, the objectionable ingredients of the smoke continue to go into suspension in the room and ultimately form a "halo" which drops into the breathing zone of those in the room.

One object of the present invention is to provide a device for clarifying the smoke from an ash tray before the hot gases in the smoke are released into the ambient atmosphere thereabove. By "clarify," I mean a condition in which the unburned particles and fumes are removed from the smoke and the effluent is essentially hot gases which are readily assimilated in the normal atmosphere of a room. Another object of the invention is to provide a device of this nature in which the clarification process is carried out by means of incineration, that is, "afterburning" of the unburned particles and fumes. A still further object is to provide a device of this nature in which the incineration process is carried out by means of an open flame, so as to be as thorough and efficacious as possible. Other objects include the provision of a device of this nature as which the incinerator is safely and simply constructed, is easily employed by the untrained, and is also attractive in appearance so as to contribute to the decor of the room in which it is used. Still further objects will be apparent from the description of the invention which follows hereafter.

SUMMARY OF THE INVENTION

These objects are realized by a smoke incinerator of

my invention comprising an elongated, open-ended, upright tubular device for collecting the smoke from the ash tray and releasing it into the ambient atmosphere thereabove, in a clarified condition. The device has an intermediate throat therein that is reduced in diameter relative to the lower end opening thereof. The throat operates to channel the smoke upwardly through the device; and there is a burner element adjacent the throat which is openly disposed in the path of the smoke for supporting an afterburning effect therein. The element has means connected therewith which are operative to generate a temperature in the region contiguous thereto, having a magnitude adapted to incinerate unburned particles and fumes in the smoke. For example, the burner may comprise an electrical resistor grid or a propane gas fed nozzle; but in all of my preferred embodiments, it takes the form of a capillary wick for supporting an open flame generated by a liquid burning fuel such as paraffin wax or kerosene. The throat is arranged about the wick so that the smoke is channeled through the contiguous region of the flame in reaching the ambient atmosphere above the ash tray. Preferably, the wick is upstanding from the fuel body, and the throat is annular in form and arranged about the lower end portion thereof so as to feed the smoke upwardly through the contiguous region of the flame. Moreover, I also prefer to employ an open ended frustoconical shroud between the throat and the lower end opening of the device, so that the smoke is funneled upwardly through the throat with the minimal turbulence. However, turbulence or eddying is desirable on the upper side of the throat so as to recirculate the smoke through the region of the flame for the maximum clarification effect. Accordingly, I prefer to connect a bulbous or divergent-convergent flue to the upper end opening of the shroud, and to locate the throat adjacent to this end with the capillary wick upstanding from the fuel body in the flue. In fact, in the case of a solid fuel body such as a candle, having a relatively short wick, I normally mount the body to terminate within the throat so that the flame can operate in the divergent portion of the flue under capillary action.

The device may be supported on the ash tray or separate from it. For example, the fuel body may be carried in a base which rests on the ash tray and has the device supported thereon. Or the device may rest on the ash tray and have the fuel body supported thereon. Various other arrangements are also possible, but in all cases it is preferred to elevate the wick to a level well above the bottom of the ash tray, i.e., 5–12 inches thereabove, so that the smoke has ample space in which to coalesce before it is discharged into the contiguous region of the flame. For this reason, the fuel body is usually mounted on a pedestal at a point well above the bottom of the ash tray. Each of the shroud and the carrying base mentioned above may serve as such a pedestal for the fuel body.

Another feature of my invention contemplates the provision of means for maintaining the level of the flame in relation to the throat. Still another contemplates the insertion of a particle filter between the throat and the lower end opening of the device.

These features and advantages will be better understood by referring to the accompanying drawings wherein I have illustrated several embodiments of my invention, but of course without any intention of limiting the invention to these embodiments.

In the drawing, FIGURE 1 is a perspective view of one embodiment;

FIGURE 2 is a vertical cross-sectional view through the center of this embodiment;

FIGURE 3 is a partial horizontal cross-sectional view along the line 3—3 of FIGURE 2;

FIGURE 4 is a part vertical center cross-sectional view through the flue portion of the shroud in FIGURES 1–3;

FIGURE 5 is an elevational view of another embodiment;

FIGURE 6 is a plan view of this second embodiment as indicated by the lines **6—6** in FIGURE 5;

FIGURE 7 is an elevational view of a third embodiment;

FIGURE 8 is a perspective view of a fourth embodiment; and

FIGURES 9 and 10 are vertical and horizontal cross-sectional views of this fourth embodiment along the lines **9—9** and **10—10**, respectively, of the figures.

Referring firstly to the embodiment illustrated in FIGURES 1–4, it will be seen that a pair of cigarettes **2** have been placed on an ash tray **4** having a smoke incinerator **6** thereabove which is constructed in accord with the present invention. The ash tray **4** has a circular base **8** and a relatively outwardly flared wall **10** upstanding therearound at the periphery of the base. The rim **12** of the wall is indented at equally circumferentially spaced points to receive short U-shaped channels **14** which provide resting points for the cigarettes. The ash tray is gripped and moved about by means of a looped handle **16** attached to the wall on one side of the ash tray. The ash tray is formed and shaped from metal and in the shaping process a slightly frusto-conical dais **18** is raised at the center of the base. The upper end edge of the dais is indented therearound to form a ledge **20** on which to support the smoke incinerator as shall be explained.

The smoke incinerator **6** has an elongated, open-ended, upright tubular construction and includes a telescoping shroud and flue, **22** and **24**, respectively. The shroud **22** has a frusto-conical cross-section which flares into a short cylindrical cap **26** at the top. The cap is inwardly flanged at the rim **28** so that the shroud can be supported on a pedestal upstanding therein. The pedestal is seen at **30** and in this instance comprises a hollow cylindrical post **32** having a similarly cross-sectioned but relatively enlarged candle holder **34** at the top. In erecting the assembly, the pedestal is telescoped onto the ledge **20** of the dais **18** and the shroud **22** is then lowered over the pedestal until the rim flange **28** rests on the rim of the candle holder. As seen the skirt **36** of the shroud is such as to leave a narrow circumferential slot opening **38** between the shroud and the rim of the ash tray. This opening admits fresh air to the shroud and facilitates use of the ash tray.

The bottom **40** of the candle holder is disc-shaped and has a pair of spaced, shallow, concentric ring walls **42** and **44** upstanding therefrom. The relatively outer wall **42** is spaced from the peripheral edge of the bottom, to form a narrow ledge **46** therearound; and in addition the space between the walls is perforated by a series of holes **48** extending about the full circumference of the holder. The ledge **46** and outer wall **42** provide a seat for a stiff cylindrical metal screen **50** which has a band **52** of metal welded to the upper end thereof to form the rim of the holder. The band has an annular flange around the inside thereof to form a narrow ledge **54** therewithin. The inside diameter of the ledge **54** is considerably greater than the diameter of the relatively inner ring wall **44** on the bottom of the holder.

In use, the candle holder **34** supports both a cup candle **56** and a bulbous chimney glass **58**. The candle **56** is inserted to rest on the bottom **40** of the holder **34** within the inner ring wall **44** thereof. Thereafter, the bottom edge **60** of the chimney glass is rested on the ledge **54** formed within the band **52**. Because of the difference in diameter between the ledge **54** and the inner ring wall **44**, a narrow annular throat **62** is formed between the edge **60** of the glass and the cup **64** of the candle. This throat provides for escape of the smoke from the shroud **22** into the glass **58**. As will be seen, it also provides for

"afterburning" the smoke in the manner of the invention.

The candle cup **64** contains a body of solid candle fuel **66** having a capillary wick **68** immersed therein but projecting at one end **70** above the body to support an open flame. Referring in particular to FIGURE 2, it will be seen that the smoke from the cigarettes rises up through the holes **48** in the bottom **40** of the candle holder, as well as up through the screen **50** around the holder. In the case of the latter portion, particles and fumes in the smoke are to some extent filtered out onto the screen; however, air and other gases in the smoke escape through the screen into the annular channel **72** formed between the candle and the screen. As a result, the smoke mass in the channel **72** exits through the throat **62** in a relatively diluted condition, so that when the smoke is drawn into the region **74** contiguous to the flame, there is sufficient oxygen present to assure that the unburned particles and fumes in the smoke are readily incinerated. Moreover, most of those which are not so incinerated on their first pass through the region of the flame, are subsequently recirculated through the region **74** in the manner illustrated in FIGURE 4. Note the eddying currents set up by the divergent-convergent cross-sectional character of the chimney glass **58**. As a sum total of these effects, the effluent passing through the top **76** of the glass has a considerably reduced quantity of particles and fumes which are objectionable in nature.

In order to trap the maximum quantity of smoke, it is desirable that the shroud cover the entire open area of the ash tray. The embodiment illustrated in FIGURES 5 and 6 employs a shroud **22'** whose rim **78** has a diameter equal to that of the ash tray **4**. As a consequence, the shroud more closely canopies the ash tray, and the height of the annular opening **38** therebetween is reduced. However, semi-circular notches **80** are formed in the rim **78** of the shroud at the locations of the rests **14** to allow for convenient use of the ash tray.

If desired, the incinerator may rest on the rim **12** of the ash tray so as to simplify the entire construction. In FIGURE 7 the shroud **22''** is constructed so that it registers with the rim **12** of the ash tray. In such a case, the shroud also acts as a pedestal to support the candle holder and chimney glass on the ash tray.

In FIGURES 8–10 the ash tray takes the form of a simple circular dish **4'** having semi-circular indentations **82** in the side walls thereof which are notched at the bottom **84** to engage cigarettes rested therein. The smoke incinerator **6'** comprises an upright tubular candle holder **86** having four L-shaped spokes or legs **88** which are equiangularly arranged as a spider about the bottom of the holder **86** and welded thereto. The legs **88** rest on the rim **90** of the dish and are equipped with cleats **92** at their ends to center the holder on the dish. A cylindrical chimney glass **94** is supported on the legs within the cleats, to form a shroud over the dish, about the candle holder. Inserted within the glass, is an annular smoke baffle **96** which is sized to be frictionally retained at the level of the top of the holder **86**. The inside diameter of the baffle **96** forms a narrow throat **98** with the candle holder which allows the smoke in the shroud to escape into the region **99** contiguous to the flame of the candle. Moreover, the chimney glass is inwardly flared at the top **100** so that the smoke rising through the throat expands into a divergent-convergent flow pattern as in the earlier embodiments.

The embodiments in FIGURES 8 and 9 also employ another feature of the invention which assures that the level of the flame will remain at the level of the throat as the candle burns down. It will be seen that the candle body **102** is tubular in form and is retained within the holder **86** between a caged spring **104** and a cap **106** which is twisted into engagement on the holder by means of a bayonet joint **108**. The cap has a hole **110** in the center to pass the projecting end of the wick **112**. As the body of the candle is consumed, the bias of the spring **104** raises

it against the cap **106** so as to maintain the level of the wick **112** and thus the level of the flame, relative to the throat **98**.

If desired, secondary baffles may be employed in the flue to prolong the exposure of the smoke to the flame.

What is claimed is:

1. A smoke incinerator for ash trays comprising an elongated, open-ended, upright tubular device for collecting the smoke from an ash tray, and releasing it into the ambient atmosphere thereabove, in a clarified condition, said device having a body of liquid-burning fuel disposed therein, which fuel body has means connected therewith to support an open flame, and smoke channeling means in the device which define an intermediate throat therein that is reduced in diameter relative to the lower end opening of the device, and arranged about the flame supporting means so that the smoke is channeled through the contiguous region of the flame in reaching the ambient atmosphere.

2. The smoke incinerator according to claim **1** wherein the flame supporting means include a capillary wick.

3. The smoke incinerator according to claim **2** wherein the wick is upstanding from the fuel body, and the throat is annular in form and arranged about the lower end portion thereof to feed the smoke upwardly through the region of the flame.

4. The smoke incinerator according to claim **1** wherein there is an open ended frusto-conical shroud formed between the throat and the lower end opening of the device.

5. The smoke incinerator according to claim **4** wherein there is a bulbous flue connected to the upper end opening of the shroud.

6. The smoke incinerator according to claim **5** wherein the throat is disposed adjacent the upper end opening of the shroud and the flame supporting means include a capillary wick which is upstanding from the fuel body in the flue.

7. The smoke incinerator according to claim **6** wherein the fuel body is solid and disposed to terminate within the throat.

8. The smoke incinerator according to claim **1** further comprising means for maintaining the level of the flame in relation to the throat.

9. The smoke incinerator according to claim **1** further comprising a particle filter interposed between the throat and the lower end opening of the device.

10. In combination, an ash tray having a peripheral surface thereabout for supporting cigars and cigarettes, and an elongated, open-ended, upright tubular device supported thereabove to collect the smoke from the ash tray, and to release it into the ambient atmosphere thereabove, in a clarified condition, said device having a body of liquid-burning fuel disposed therein, which fuel body has means connected therewith to support an open flame, and smoke channeling means in the device which define an intermediate throat therein that is reduced in diameter relative to the lower end opening of the device, and arranged about the flame supporting means so that the smoke is channeled through the contiguous region of the flame in reaching the ambient atmosphere.

11. The combination according to claim **10** wherein the device is supported on the ash tray.

12. The combination according to claim **11** wherein the fuel body is carried in a base which rests on the ash tray and has the device supported thereon.

13. The combination according to claim **11** wherein the device rests on the ash tray and has the fuel body supported thereon.

14. The combination according to claim **10** further comprising a pedestal for supporting the fuel body above the surface of the ash tray.

15. In combination, an ash tray having a peripheral surface thereabout for supporting cigars and cigarettes, and an elongated, open-ended upright tubular device supported thereabove to collect the smoke from the ash tray, and to release it into the ambient atmosphere thereabove, in a clarified condition, said device having an intermediate throat therein that is reduced in diameter relative to the lower end opening thereof, for channeling the smoke upwardly through the device, and a burner element adjacent the throat which is openly disposed in the path of the smoke for supporting an afterburning effect therein, there being means connected with the element to generate a temperature in the region contiguous thereto, having a magnitude adapted to incinerate unburned particles and fumes in the smoke.

16. The combination according to claim **15** wherein the burner element comprises a wick, and the incineration means includes a body of fuel connected to burn thereon when ignited.

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U.S. Cl. X.R.

23—277; 431—202