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3,714,912

INCINERATOR

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FIG. 1

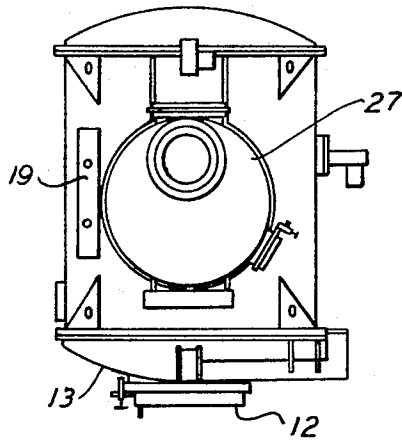


FIG. 2

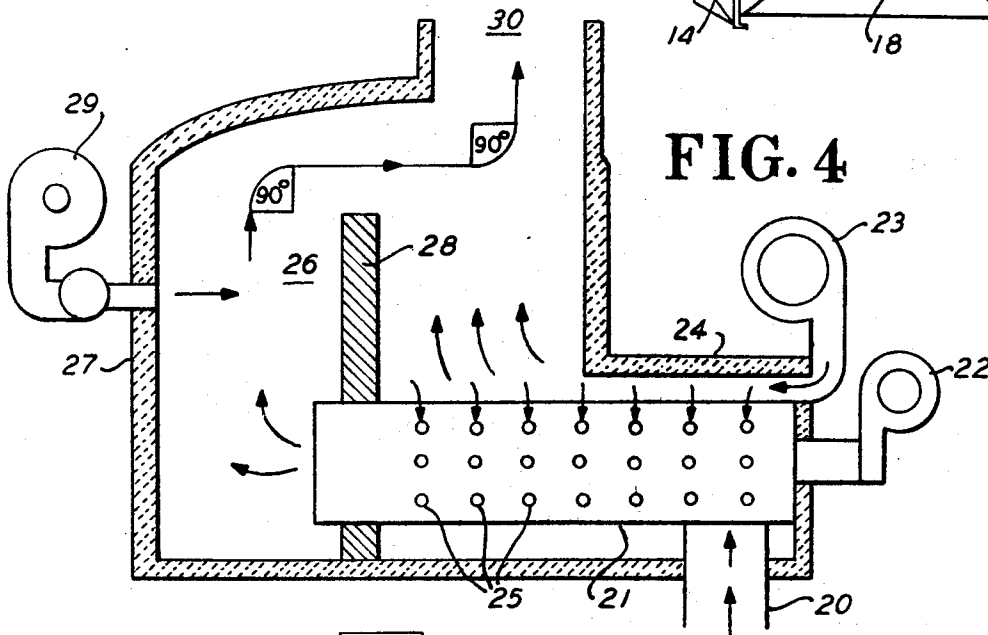
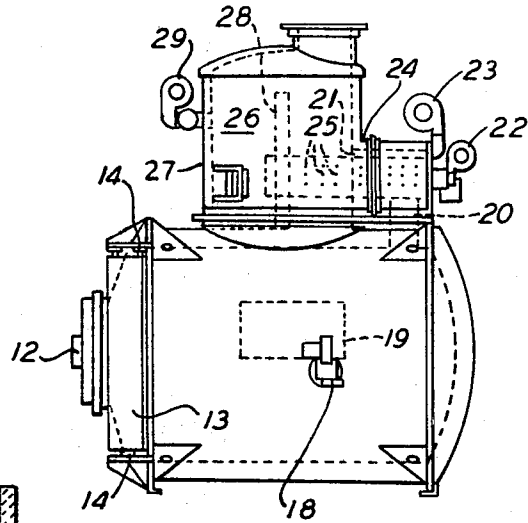
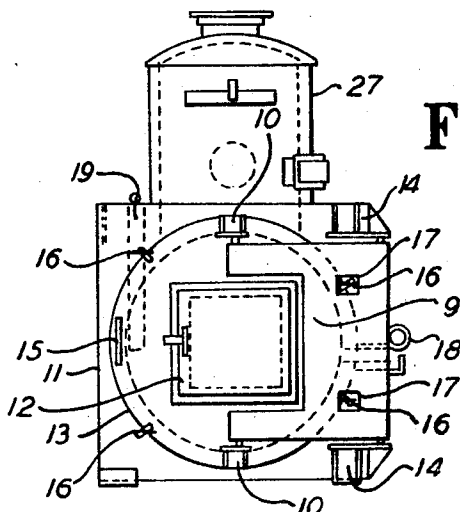


FIG. 4

FIG. 3



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INCINERATOR

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5 Claims

ABSTRACT OF THE DISCLOSURE

An incinerator wherein there is a primary and a secondary combustion chamber. The output of the primary combustion chamber discharging into a perforate sleeve in the secondary combustion chamber; a portion of the secondary combustion chamber surrounds the sleeve; a blower discharging air in the secondary combustion chamber, in a direction transverse to the direction of movement of gaseous combustion products, whereby the rate of flow of products of combustion is related.

BACKGROUND OF THE INVENTION

Field of invention

This invention relates generally to incinerators and particularly to incinerators wherein the rate of combustion is carefully balanced and controlled as to the speed of progress of materials through the combustion chamber so as to permit complete combustion.

Prior art

In the field of retail merchandizing, large quantities of packaging material from merchandise being unpackaged is often generated and must be disposed of. One practice is to transport it to a distant point and burn it. Another alternative is to bale it and ship it for regeneration. Numerous materials, however, which have been once regenerated, cannot again be regenerated as they are unsuitable for such purpose but may only be disposed of. Problems arise for storing this material prior to regeneration or prior to transportation for destruction. Large areas of space must be devoted to the storage of this material. The material presents a fire hazard. It is, therefore, desirable to devise a means for immediate disposition of waste material so that it will not be accumulated and occupy large amount of costly space. Incineration presents a problem because it is difficult to accomplish it in a small compact space, and yet accomplish it in such a manner that the atmosphere is not contaminated by the discharge of incompletely burned materials. An incinerator may discharge into the premises where the incineration takes place, discharging quantities of the products of combustion. Thus the disposition of waste materials usually involves their removal to remote areas for incineration requiring thereby the use of storage space, prior to transportation, and the expense of transportation. The cost of handling is another factor. A highly desirable facility would be one wherein waste material, as it accumulates, could immediately be disposed of so that no space would be required. Numerous devices have been tried to accomplish such purposes, but have been found to be unsuitable, for many reasons, including extraordinary size, inability to control the products of combustion and keep them out of normal business areas, difficulty of opera-

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tion, unsatisfactory incineration resulting in discharging of solid and odorous waste into the atmosphere surrounding the business premises.

SUMMARY OF THE INVENTION

It has been found that in premises incinerator can be devised wherein after primary combustion, a secondary combustion chamber effectively disposes completely of the solid and odorous products of combustion. This is accomplished by the secondary combustion chamber controlling the rate of combustion in the first combustion chamber, and also controlling the rate of combustion and flow of the discharged materials from the first combustion chamber, as they traverse the second combustion chamber. This accomplishes complete combustion with a minimal discharge of solid products of combustion into the atmosphere, particularly unburned gases and solid particles carried therewith.

DRAWINGS

These objects and advantages as well as other objects and advantages are attained by the device shown by way of illustration in the drawings in which:

FIG. 1 is a top plan view of the incinerator;

FIG. 2 is a side elevational view thereof;

FIG. 3 is a front elevational view thereof; and

FIG. 4 is a side sectional view of the secondary combustion chamber.

PREFERRED EMBODIMENT

There is provided a conventional primary combustion chamber 11 having a loading door 12 for the introduction of material to be incinerated. This door is a large door 13. The loading door 12 is for the manual introduction of material to be incinerated. The large door 13 is to enable the cleansing of the incineration material and the discharge of solid wastes and residues therein. This large door is mounted on pivots 10 carried by bifurcated support arm 9 which swings on hinges 14. A gas fired power burner 18 ignites and consumes the materials deposited in the primary combustion chamber 11. An auxiliary hydraulically operated loading door 19 is provided for cooperation with an automatic feed device if such type of loading is required.

The products of combustion in the primary chamber 11 expand and becoming lighter, and have a mixture of solid materials and gases, are propelled by the force of combustion through the exit port 20 of the chamber 11 into a cylindrical perforate sleeve 21 disposed in a generally horizontal direction. A second power burner 22 burns in this sleeve 21, further consuming the products of combustion derived from the primary combustion chamber 11. In this perforate sleeve 21, great turbulence and driving force is produced in the products of combustion, and their temperature is further raised to the range of more complete combustion. The sleeve 21 is surrounded by a refractory lined shell 24 which is part of the secondary combustion chamber. A blower 23 charges air into this shell 24, from which part of the air enters the perforate sleeve 21 through numerous orifices 25 completely surrounding the perforate sleeve 21, thereby to assist in completing combustion. Another part of the air from the blower 23 which part does not pass through the orifices 25 leaves the shell 24 and enters the space behind the bridge wall 28 and rises to the stack 30. The end of the

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sleeve 21 is open and discharges into a vertical column 26 defined by the outer wall of the secondary combustion chamber 27 and a bridge wall 28. This secondary combustion chamber 27 may be provided separately as an auxiliary apparatus to be attached to numerous known primary combustion chambers. It is this secondary combustion chamber which is one of the principal features of the invention.

The discharge gases originating from the sleeve 21, rise in the column 26 changing direction from:

- (a) horizontal in the chamber 21,
- (b) to vertical direction in the column 26

The power burner 22 reinforces the drive of the burning materials leaving the primary combustion chamber 13 and passing upwardly and horizontally through the horizontal perforate sleeve 21, so that they may ultimately achieve complete incineration, especially as they rise through the column 26. In order to slow the flow of the burning gases and solid materials with which they are invested, a throttling blower 29 is mounted in the column 29 below the level of the top of the bridge wall 28 and discharging transversely across the column 26. The velocity of the burning gases is retarded by this discharge of the air transversely across the column 26, the speed of the burning gases is retarded to a sufficiently slow speed to accomplish total combustion with the auxiliary air provided by the throttling blower 29. The throttling blower 29, however, must be carefully balanced so as not to too strongly impede the movement of the burning gases through the column 26 and the sleeve 21. This involves careful balancing of blowers 23 and 29 in conjunction with the adjustment of the needle valve of the adjustable burner 22. No rule can be established that will prescribe precisely how the blowers and the burner must be balanced but this can be accomplished without difficulty by trial and error.

The burner 22 must impart sufficient flame and velocity to maintain the temperature of the burning gases at a sufficiently high level of combustion so that incineration will proceed rapidly. Likewise the blower 23 must be regulated and tuned to provide sufficient air through the orifices 21 to feed complete combustion. Also the throttling blower 29 must provide sufficient air to support the ultimate combustion of the rising gases in the column 26, and also must act as a brake against the too rapid movement of the burning gases in the column 26, so that they will not be discharged from the stack 30 before having been completely burned. Retardation of the movement of the burning gases is also accomplished by the fact that the discharge from the column 26 is accompanied by a 90° turn and the entrance into the stack 30 is also accompanied by a 90° turn of the burning gases.

After passing to the top of the column 26 the gases flow over the top of the bridge wall 28 to reach the stack 30 during the course of which, after another 90° turn they are discharged.

The incinerator is useful for the disposition of wastes such as cartons and wrapping materials accumulated in retailing establishments in the form of discarded shipping containers and the like. However, it is to be understood

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that the incinerator is not to be limited to that type of incineration for it can be adapted equally well to the disposition of waste gaseous materials and also to the disposition of garbage. Wastes from lumber mill, animal residue from slaughter houses, waste materials from hospitals, plastic shavings, chips and fragments considered waste at manufacturing establishments can also be handled with efficiency as long as the products of decomposition do not include toxic gases.

What is claimed is:

1. An incinerator comprising:

- (a) a secondary combustion chamber,
- (b) a perforate sleeve in the secondary combustion chamber,
- (c) a power burner, burning in the perforate sleeve,
- (d) a vertical wall in the secondary combustion chamber defining a column,
- (e) the perforate sleeve passing through the vertical column and discharging on the other side of the column,
- (f) a power burner discharging transversely across the column and intercepting the discharge from the sleeve,
- (g) a portion of the combustion chamber surrounding the perforate sleeve,
- (h) a power blower discharging into the portion of the secondary combustion chamber surrounding the sleeve.

2. An incinerator comprising:

- (a) the device according to claim 1 and
- (b) a primary combustion chamber discharging into the perforate sleeve.

3. An incinerator comprising:

- (a) the device according to claim 1 and
- (b) the power blower discharging into the portion of the secondary combustion chamber surrounding the sleeve, also discharging partly into the secondary combustion chamber on the one side of the wall.

4. An incinerator comprising:

- (a) the device according to claim 1 and
- (b) a stack in the secondary combustion chamber offset from the column, whereby discharge gases in the chamber, emanating from the perforate sleeve, make a 90° turn upwardly, a 90° turn on the top of the vertical wall, and a 90° turn to go out the stack.

5. An incinerator comprising:

- (a) the device according to claim 1 and,
- (b) the power burner discharging transversely across the column being positioned to discharge toward the vertical column and below the top of that column.

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