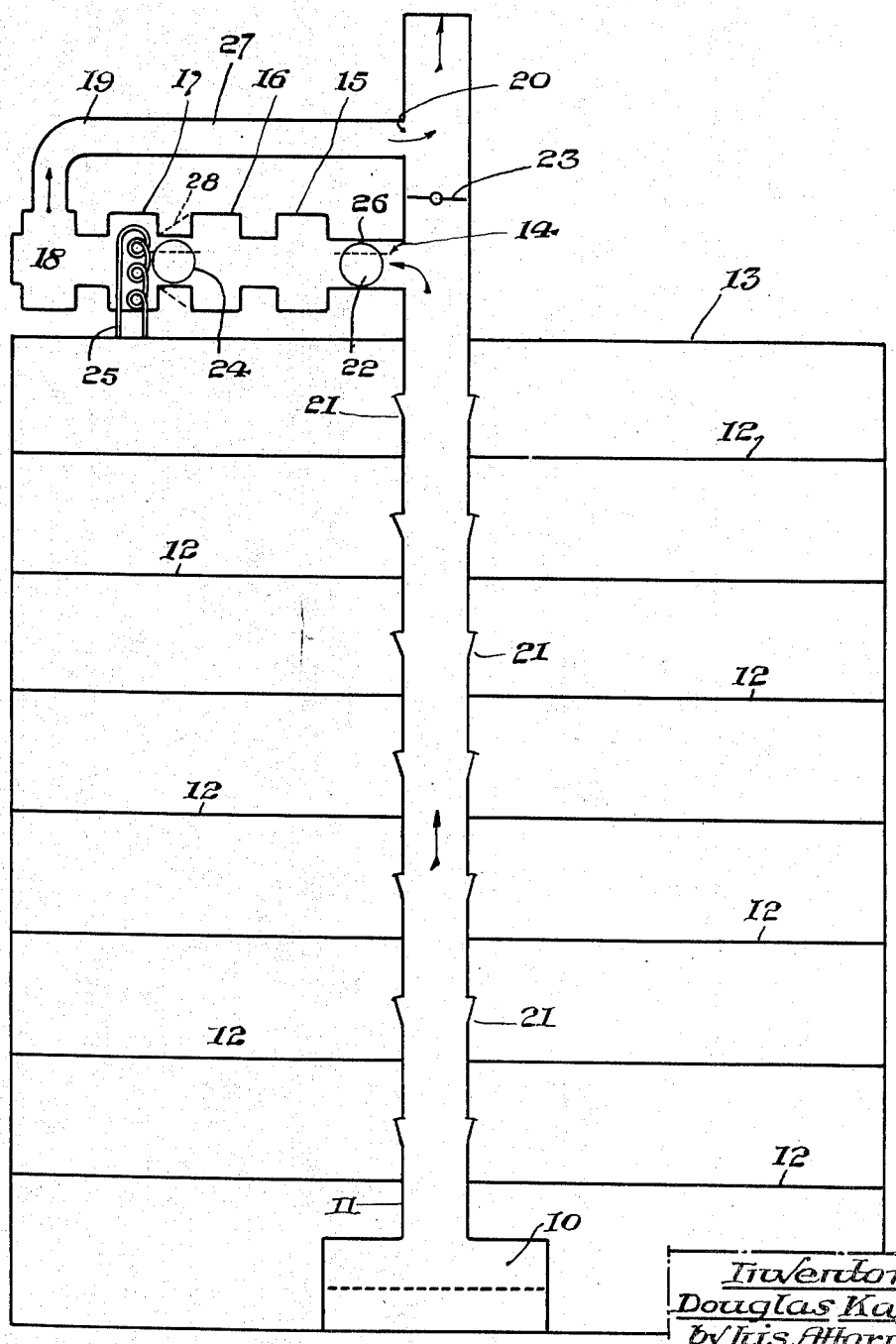
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PURIFICATION OF INCINERATOR GASES

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PURIFICATION OF INCINERATOR GASES

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2 Claims. (Cl. 110—18)

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This invention relates to an apparatus and method for eliminating air contamination as a result of combustion. Where smoke abatement has been previously practiced, the apparatus employed has consisted of fly ash control units, electrical precipitators or Ozonorators, and other auxiliary machines which serve to extract from the products of combustion those foreign materials which constitute smoke. However, where such devices have been used they have been located adjacent the fire box, or source of smoke, as a result of which they have been operated in the presence of high temperatures. The location of these devices adjacent a source of high heat has prevented them from operating at their maximum efficiency and created other problems which have strongly limited their satisfactory performance.

Accordingly, it is an object of the present invention to provide a smoke abatement means whereby the various units employed may be disposed so as to provide a maximum operational efficiency.

Another object of the present invention is to provide a smoke abatement means wherein the velocity of draught and the temperature of the gases passing through the various scavenging units may be held within optimum limits.

A further object of the present invention is to provide a smoke abatement means which may be installed in presently existing structures with a minimum amount of expense.

A feature of the present invention is the location of the smoke abatement means at a distance from and considerably above the furnace.

Another feature of the present invention is the provision of blowers to maintain a constant velocity of the stock draft.

A further feature of the present invention is the use of a heater unit whereby the temperature of the smoke passing through the scavenging units may be controlled.

The invention consists of the construction, combination and arrangement of parts, as herein illustrated, described and claimed.

The accompanying drawing is a somewhat diagrammatic showing of a complete embodiment of the present invention, as applied to an apartment house incinerator system.

Referring to the drawing, 10 indicates a furnace which may be the combustion chamber for either an incinerator, boiler, gas generating furnace, or the like, located in the basement or lowermost floor of a building. A stack 11 leads from the furnace 10 upwardly through the building, and eventually above and beyond the roof 13 thereof. The various floors of the building have been diagrammatically indicated at 12, although it is understood that the proportions shown have been arbitrarily chosen for the sake of clarity of the description.

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At a level substantially above the fire box 10, and which is shown in the drawing as that of the roof 13, there is provided an opening 14 in the stack 11. The gases of combustion, together with the smoke are led out of the stack 11 through the opening 14 by a suitable duct 26. The duct 26 communicates with a suitable mechanical separator 15 which may be in the nature of a fly ash control unit or the like. Emerging from the separator 15, the smoke is led through a blower 16 which serves to maintain the draught in the stack 11 at a constant velocity, despite variations brought about, for example by the opening and closing of incinerator chute doors 21. The constant velocity of the gases passing through the various scavenging units also makes it possible to operate said units at their maximum efficiency. Additionally, the location of the various units above and away from the fire box will insure a freedom from high temperatures prevalent in the furnace room, which temperatures are detrimental to the operating efficiency of the scavenging units.

The blower 16 forces the smoke through the duct 26 into a heater unit 17. This unit 17 may consist of either a series of coils 25 through which steam is passed, or electrical resistance units (not shown) capable of heating the air passed therebetween. The heater unit 17 serves to maintain the smoke that passes therethrough at a constant temperature, despite variations in the actual temperature of the smoke which reaches the heater unit by way of the stack 11 and opening 14.

As a result, the smoke which emerges from the heater unit 17 is under complete control insofar as temperature is concerned, so as to achieve the maximum efficiency from the electrical precipitator 18, Ozonorator or some heat medium, capable of burning the remaining particles therein, through which said smoke is passed after it leaves the heater 17. The remaining gases are then allowed to return to the stack 11 by way of the duct 27 and thereafter escape to the atmosphere in the usual manner.

In the event that it becomes necessary for any reason to by-pass the above described apparatus, there is provided a damper 23 in the stack 11 between the openings 14 and 20, through which

the smoke is normally passed in and out of said scavenging device. In the normal operation and smoke abatement cycle, the damper 23 is in the closed position, shown in the drawing. As a protection against sudden excessively high drafts within the stack 11, which draughts might interfere with the operation of the various units employed, there is provided a barometric damper 22 in the duct 26 immediately before the mechanical separator 15.

A second barometric damper 24 is located between the blower 16 and the heater unit 17. The operation of the barometric dampers is such that any sudden increase in draft, passing through the duct 26, will cause the dampers to swing open, admitting outside air and substantially checking the surge within the duct.

As an alternate form to the above described smoke abatement mechanism and method, it has been found that the smoke leaving the mechanical separator 15 has been purged of approximately 70% of the foreign matter therein. The remaining 30% may be dissipated to a degree which is well within the satisfactory operational limits, by means of introducing a stream of auxiliary air in the ratio of, for example, five to one. The auxiliary air may be introduced into the scavenging system at a point immediately beyond the blower 16. The introduction of the air may be accomplished by means of louvres indicated at 28 by the dashed lines. Alternately, the barometric damper 24 may be employed for this purpose.

The remaining particles are thus dissipated within the mixture to such an extent that the smoke is invisible as it leaves the stack. By use of the stream of auxiliary air it will be possible to eliminate the need for the heating unit 25 and the costly electrical precipitator 18, or similar unit.

From the foregoing, it will be seen that there has been provided a smoke abatement device and method, which eliminates the difficulties encountered by presently known devices, and provides a closely controlled, highly efficient structure for the desired purposes.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States, is:

1. In an incinerator smoke abatement structure, a furnace, a refuse receiving and smoke conducting stack extending upwardly from said furnace and vertically through floors of a building in which the furnace is located and protruding upwardly from the roof of the building, said stack having side inlets for said refuse material to be treated located in the building in cooperating relation to floors of the building, a first duct connected with the stack and extending substantially horizontally from the upper portion of the stack above the roof of the building and constituting a bypass for products of combustion, smoke scavenging means within said duct, a blower associated with said smoke scavenging means adapted to create a regulated flow of products of combustion outwardly from said stack through said duct, an electric precipitator communicating with the discharge end of said duct, a second duct connected at one end to the discharge end of the electric precipitator and at its other end being connected with a side of the stack above the first duct, and an impervious baffle mounted in the stack between the first and second ducts and movable to opened and closed positions.

2. In an incinerator smoke abatement structure, a furnace, a refuse receiving and smoke conducting stack extending upwardly from said furnace and vertically through floors of a building in which the furnace is located and protruding upwardly from the roof of the building, said stack having side inlets for said refuse material to be treated located in the building in cooperating relation to floors of the building, a first duct connected with the stack and extending substantially horizontally from the upper portion of the stack above the floor of the building with which the uppermost one of said side inlets communicates and constituting a bypass for products of combustion, smoke scavenging means within said first duct, a blower in said first duct associated with said smoke scavenging means and adapted to create a regulated flow of products of combustion outwardly from said stack through said first duct, a second duct connected at one end to the discharge end of said first duct and at its other end being connected with a side of the stack above said first duct, and an impervious baffle mounted in the stack between the first and second ducts and movable to opened and closed positions.

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