

[54] SMOG ELIMINATOR

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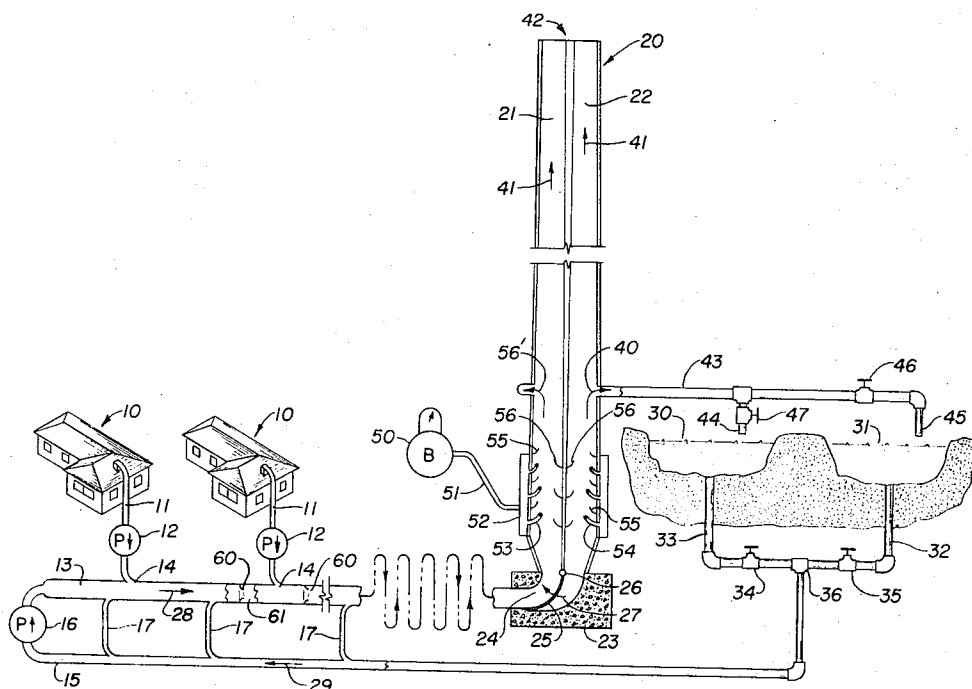
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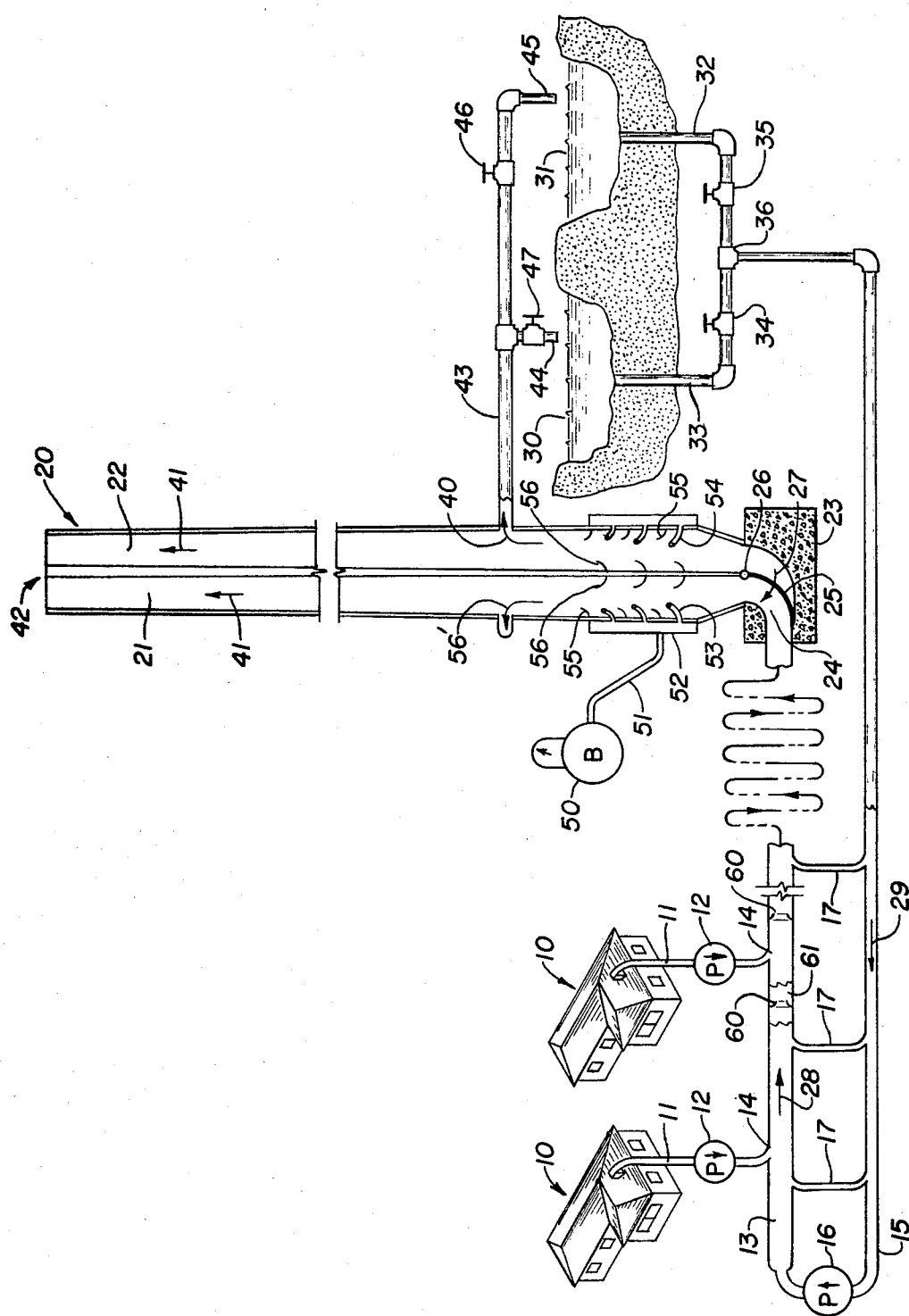
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ABSTRACT

A smog eliminator for removing smoke and gas from the by-products of combustible materials. An underground pipe system has pressurized water flowing therethrough mixing with the smoke and gas produced by dwelling house heaters or factories or anything creating gas or smoke. The smoke and gas is thoroughly mixed with the water in the underground pipe system and is then routed to a vertical chimney having nozzles emitting upwardly directed steam. The pressurized water flows from the chimney carrying therewith dissolved gases and particulate matter. The undissolved gas passes out of the chimney into the atmosphere. Two bodies of water are utilized for receiving the unclean water from the chimney and for circulating fresh water back to the underground pipe system.

10 Claims, 1 Drawing Figure





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SMOG ELIMINATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is in the field of smoke washing devices for removing gases and particulate matter from smoke.

2. Description of the Prior Art

The polluted smoke emitted from dwelling house and factory chimneys is undesirable. Several devices have been conceived for spraying water into the smoke thereby removing some of the pollutants. Some of these devices are shown in the following U. S. patents:

517,297 issued to Reiss; 1,617,534 issued to Mathews; 1,620,826 issued to Mitchell; 2,643,105 issued to Lipowitz; and 2,720,386 issued to Bungas. Other smoke cleansing devices are shown in the following U. S. patents:

1,398,734 issued to McGahan; 1,799,084 issued to Brdar; and 3,406,098 issued to Humez.

The prior art devices are typically utilized with a single smoke emitter. The invention disclosed herein provides for a smog eliminator which is an improvement over the prior art in that it provides for a system of smog elimination by receiving the smoke and gases emitted from a plurality of smoke emitters such as dwelling house heaters. Thus, the present smog eliminator may be utilized to reduce or eliminate smog in relatively large communities or cities. An advantage over the prior art is that the smog eliminator makes use of existing underground sewer pipes therefore reducing the installation cost of the system. Due to the extremely long length of underground piping, the smoke and gases are washed by pressurized water thereby dissolving the gases and removing particulate matter in an amount previously unknown.

SUMMARY OF THE INVENTION

One embodiment of the present invention is a smog eliminator comprising emitters of smoke and gas, underground pipe means having pressurized water flowing therethrough, said means being connected to said emitters receiving said smoke and gas, first pressure means operable to force said water through said pipe means so as to mix with said smoke and gas, and, a chimney having an entrance connected to said pipe means receiving said water and said smoke and gas, said chimney having a first outlet elevated at least fifty feet above said entrance with said water along with soluble gases and particulate matter passing therethrough and a second outlet above said first outlet with the undissolved gas passing therethrough.

It is an object of the present invention to provide a device for eliminating smog.

It is a further object of the present invention to provide a smog eliminator which utilizes existing underground sewer pipes.

Yet another object of the present invention is a device for receiving the smoke and gases emitted by dwelling house heaters and for dissolving gases and removing particulate matter therefrom.

Related objects and advantages of the present invention will be apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWING

The drawing is a somewhat schematic diagram of a smog eliminating system incorporating the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing, there is shown a schematic diagram of a system for eliminating smog. The system receives the smoke and gases emitted from the chimneys of dwelling houses. The drawing shows only two dwelling houses 10; however, it is understood that additional dwelling houses may be connected to the smog eliminating system. The system utilizes existing underground sewer pipes for conveying the smoke and gases from the dwelling house chimneys through pressurized water which dissolves the gases and separates the particulate matter. For simplicity, only a single underground pipe 13 is shown; however, it is understood that many underground pipes would be connected in an underground arrangement and configuration so as to receive the smoke and gases from various dwelling houses scattered throughout the community.

Houses 10 each have a flat insulated pipe 11 which extends from the furnace within the house and outwardly from the house to pipe 13. These flat insulated pipes 11 may be routed across the rafters in the attic of the house with the normal top exit of the chimney being sealed so as to allow the smoke and gas to pass from the chimney only through the flat insulated pipes 11. A source of air pressure is required to force the smoke and gas from the insulated pipes 11 to the underground pipe system 13. Thus, a fan blower or pump 12 may be mounted to each pipe 11 to force the smoke and gas toward the underground pipe. As the insulated pipe extends outwardly from the attic of the dwelling house, the insulated pipe makes a generally right angle bend downward. Fan 12 may be located immediately below the downward turned angle of the insulated pipe.

Underground pipe 13 is filled with water flowing in the direction of arrow 28. The insulated pipes 11 are joined obliquely to underground pipe 13 at locations 14 so as to allow the smoke and gas to exit from the insulated pipes in the direction of the flow of water or in the direction of arrow 28. A suitable sized pump 16 is connected to pipe 13 so as to force the water in the direction of arrow 28 into chimney 20. Fresh water is obtained from a pair of lakes 30 and 31 and is routed via return pipe 15 in the direction of arrow 29 through pump 16 and in to pipe 13. Intermediate pipes 17 connect the return pipe 15 to pipe 13 at intervals along the length of pipe 13. Additional pumps may be required for forcing the water through pipes 17 into pipe 13. By allowing the fresh water from pipe 15 to enter pipe 13 at intervals along the length of pipe 13, the pressure of the water within pipe 13 is maintained. It is necessary to thoroughly mix the smoke and gas from insulated pipes 11 with the water within pipe 13 and as a result, the water within pipe 13 must be under relatively high pressure. Various safety pop-off valves (not shown) may be located along the length of pipe 13 for safety purposes in case the pipe becomes blocked by matter therein. In most installations, the internal diameter of pipe 13 will increase toward the proximity of chimney

20. That is, the diameter of pipe 13 will be the smallest at the location furthest away from chimney 20. Thus, the intermediate pipes 17 will help to maintain the pressure within pipe 13 as the internal diameter increases.

Chimney 20 is approximately 2000 feet in height and is mounted to a concrete base 23 which receives the smoke and gases as well as water from pipe 13. The concrete base 23 is provided with a contoured channel 24 which guides the water through a 90 degree turn so as to flow vertically into the chimney. The chimney has a pair of vertical ducts 21 and 22 which are completely separate. A gate 25 is pivotally mounted to the wall 26 separating the ducts 21 and 22 and is movable in the direction of arrow 27 so as to direct the flow of water into a single vertical duct. In the position shown, the gate 25 directs the flow of water into duct 21. By pivoting gate 25 in the direction of arrow 27, duct 21 is closed and the flow of water is directed into duct 22 thereby allowing use of a single vertical duct facilitating, if necessary, the repair and maintenance of the other duct. The water being under extreme pressure flows upwardly into the chimney to a water outlet pipe 43 which communicates with both ducts of the chimney. Pipe 43 is connected to each duct 21 and 22. The water within duct 22 flows in the direction of arrow 40 into the duct whereas the water within duct 21 flows in the direction of arrow 56' into pipe 43. A Y-connection (not shown) with suitable valving is provided in pipe 43 so as to allow water withdrawal from a single vertical duct without allowing the water withdrawn to run into the adjacent vertical duct. The pair of large bodies of water 30 and 31 are utilized for the drainage of the water within pipe 43. The water within pipe 43 flows out through pipe 44 into lake 30 and out through pipe 45 into lake 31. A pair of shut-off valves 46 and 47 are provided so as to control the flow of water to lakes 30 and 31. As the unclean water from chimney 20 is being placed into one of the lakes, fresh water is withdrawn from the other lake being routed through pipe 15 and back into pipe 13. Outlet pipes 32 and 33 are respectively connected to lakes 31 and 30 being joined together by T-coupling 36 to the return pipe 15. Valves 34 and 35 are provided so as to control the flow of water from the lake. The pair of lakes are provided so as to prevent stagnation of the water within either lake.

A plurality of baffles 55 and 56 are provided in each vertical duct 21 and 22 so as to retard downward flow of water within the ducts. These baffles extend radially inward being directed up toward the outlet 42 of the chimney. A plurality of nozzles 53 and 54 are respectively mounted interiorly in ducts 21 and 22 of chimney 20. The nozzles emit steam upwardly into the water receiving the steam from manifold 52 communicating with pipe 51 connected to boiler 50. The scrubbing action of the pressurized water within pipe 13 with the smoke and gases in conjunction with the relatively high temperature steam emitted by nozzles 53 and 54 result in dissolution of the gases and separation of the particulate matter therefrom. Dissolved gases and particulate matter as well as the water will flow out of chimney 20 into pipe 43 whereas the undissolved gases will pass upward in the direction of arrows 41 through the top outlet of the chimney. It has been determined that the outlet of pipe 43 must be elevated at least 50 feet above

the entrance or the connection between chimney 20 and pipe 13. In a chimney having a height of 2000 feet, the water outlet of chimney 20 which is connected to pipe 43 should be located approximately 200 feet above the water entrance into the chimney. The underground pipe 13 should have a length of approximately 200 miles and thus, it will most likely be necessary to curve pipe 13 in a back and forth serpentine manner to achieve the relatively long distance. At discrete intervals along the length of pipe 13, flush rings 60 will be mounted to the circumferential interior thereof so as to project radially inward toward the direction of flow of the water. The flush rings will assist in the mixing of the water, smoke and gas. The rings may be welded or may be bolted to the interior wall of the pipe. Pipe 13 is fragmented at location 61 so as to more clearly illustrate one of the rings 60.

Many variations in the smog eliminator are contemplated and included in this invention. For example, a variety of means may be utilized to close one of the vertical ducts 21 and 22 in lieu of the curved gate 25 which abuts the contoured interior of concrete base 23. In any event, it is desirable to have a gate so as to allow opening of only one of the vertical ducts at a time. It is also desirable to provide various walkways around chimney 20 to facilitate the repair of the chimney as needed. The smoke and gases which result from the combustibles burned within the heaters of the dwelling houses 10, or factories or anything creating gas and smoke, will be most efficiently removed if the length of the pipes and chimney 20 discussed herein are followed.

The invention claimed is:

1. A smog eliminator comprising:

emitters of smoke and gas;
underground pipe means having pressurized water flowing therethrough, said means being connected to said emitters receiving said smoke and gas;
first pressure means operable to force said water through said pipe means so as to mix with said smoke and gas; and,
a chimney having an entrance connected to said pipe means receiving said water and said smoke and gas, said chimney having a first outlet elevated at least 50 feet above said entrance with said water along with soluble gases and particulate matter passing therethrough and a second outlet above said first outlet with the undissolved gases passing therethrough.

2. The smog eliminator of claim 1 and further comprising:

a plurality of nozzles mounted interiorly to said chimney and emitting steam upwardly into said water.

3. The eliminator of claim 2 and further comprising: second pressure means connected to said emitters and being operable to force said smoke and gas from said emitters to said pipe means.

4. The eliminator of claim 3 and further comprising: a body of water receiving water from said first outlet with said first pressure means recirculating water from said body to said pipe means.

5. The eliminator of claim 4 wherein:

said pipe means has flush rings secured to the circumferential interior thereof and projecting radially inward toward the direction of flow of said water mixing with said smoke and gas.

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6. The eliminator of claim 5 wherein:

said chimney has a pair of vertical pipes with a gate pivotally mounted thereto and movable to open only one of said vertical pipes at a time, said vertical pipes each have baffles secured interiorly to retard downward flow of water. 5

7. The eliminator of claim 6 wherein:

said chimney has a concrete base connected to said pipe means, said base has a contoured interior gradually directing said water from said pipe means through a 90 degree bend to said vertical pipes. 10

8. The eliminator of claim 7 wherein:

said chimney is approximately 2000 feet in height and said first outlet is approximately 200 feet 15

above said entrance;

said body of water is a lake;

said emitters are heaters;

said underwater pipe means circulate said water, gas and smoke therein over a distance of approximately 200 miles prior to entering said chimney.

9. The eliminator of claim 8 and further comprising: flat insulated pipes extending from said emitters being obliquely joined to said pipe means in the direction of flow of water.

10. The eliminator of claim 9 wherein:

water is forced into said pipe means at spaced positions along the length thereof.

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