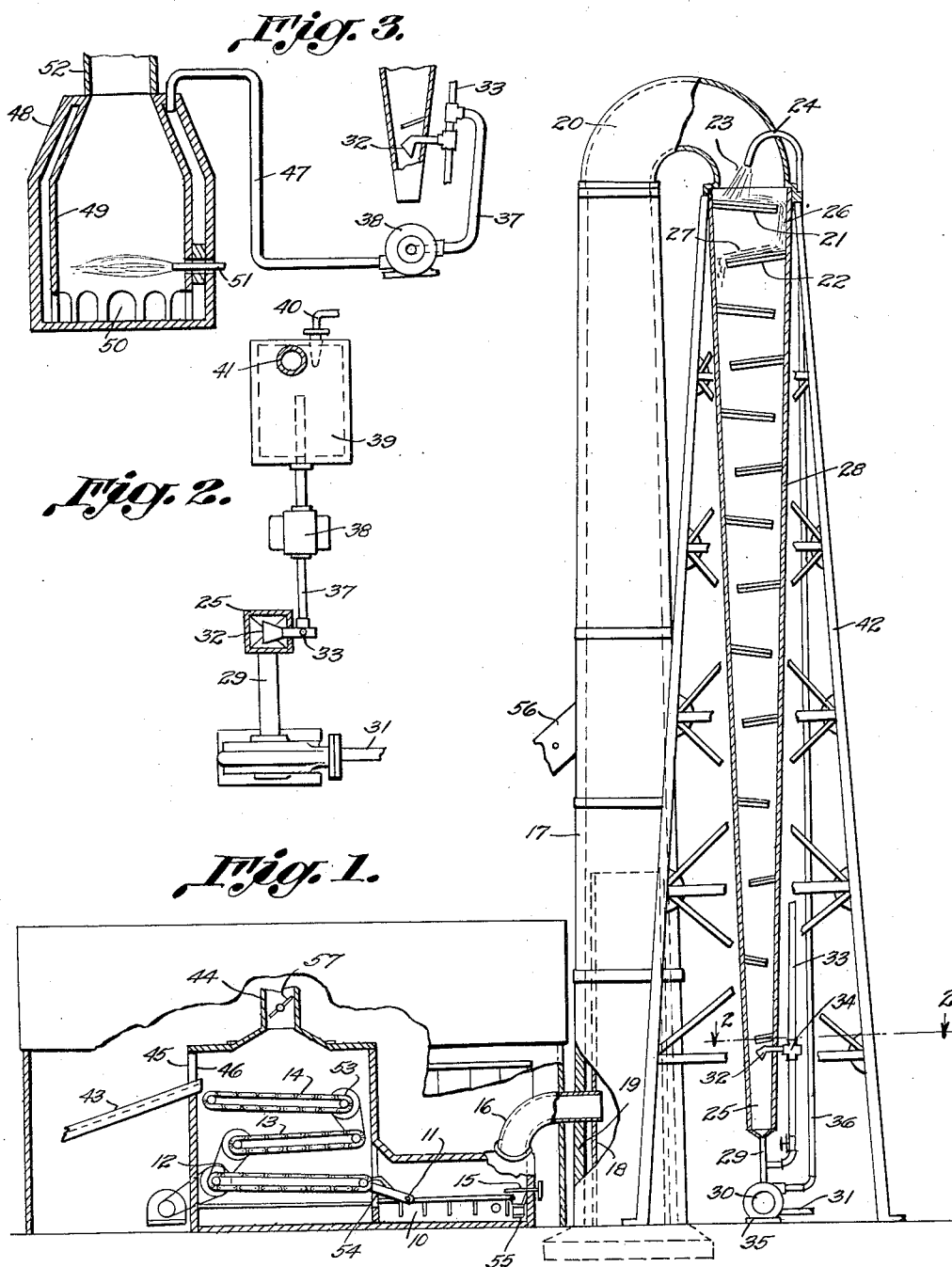


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GAS DISPOSAL APPARATUS
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GAS DISPOSAL APPARATUS

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1 Claim. (Cl. 261-111)

This invention relates to garbage disposal by incineration and is specially directed to means through which all smoke and gases produced by the incineration of the garbage are eliminated.

5 The main object of the invention is to provide a means of incineration, in which the garbage is completely disposed of, and in which all the gases issuing from the burning garbage are either burned or absorbed in water, so that during incineration of the garbage, no gases are exhausted into the atmosphere.

10 Another object of the invention is to provide, in addition to the regular incineration chamber, an auxiliary incineration chamber for burning any gases issuing from the burning garbage which cannot be collected in water.

15 Other objects and advantages of the invention will become apparent as the following description is read on the drawing forming a part of this specification, and in which similar reference characters are used to indicate similar parts throughout the several views, of which:

20 Fig. 1 is a side elevation of apparatus which is specifically designed to carry out our method of garbage incineration, the view being partly shown in section.

Fig. 2 is a section taken on line 2-2 of Fig. 1.

Fig. 3 is a section through a modified form of gas burner.

30 Our invention utilizes a system of incineration and gas elimination as is clearly indicated in Fig. 1, in which an incineration furnace 10 is provided with an agitating and conveying grate 11, which is fed by a conveyor 12, which is in turn fed by superposed and opposed conveyor grates 13 and 14, which conveyors 14, 13 and 12 successively run at increased speeds, so as to provide a complete and even distribution of the garbage before it is deposited on the traveling and agitating grate 11 in the furnace 10, the garbage being initially dumped on to the conveyor 43 and carried thereby to the grate 14.

40 Considerable heat will be produced by the burning garbage, yet due to the moisture content, additional heat will be required, and for this purpose external heating means is provided which may consist of a gas burner, or oil burner 15, which operates at the end opposite the feed end of the furnace, the furnace having a gas outlet 16 directly over the burner, so as to carry most of the gases formed from the garbage previous to combustion within the hottest zone of the combustion area.

45 The furnace outlet 16 discharges into a U-shaped stack, the lower end of one leg 17 of which is provided with an inner wall 18 providing an air space 19 between the inner wall 18 and the leg 17.

50 The leg 17 is provided at the top with a U bend 20 which connects with the other leg 28 of the

U-shaped stack, as is clearly indicated, and which other leg forms the downdraft and adsorption column. This downdraft and adsorption column is provided with a plurality of opposed baffles 21 and 22, over which a stream of water 23, issuing from a pipe 24 flows successively over the series of baffles to the bottom of the leg 28, the gases passing through the veils of water 26 and dropping from one baffle to the next, the surface water on the baffles 27 also adsorbing certain constituents of the gases as the gases pass downwardly through the leg 28. The leg 28 of the stack is gradually restricted in size from top to bottom, and is provided with an outlet 29, which is in communication with the intake of a centrifugal pump 30, 15 which pump discharges the water received from the leg 28 through a pipe 31 to waste, thereby creating a draft, drawing the gases through outlet 16.

A vent 32 communicates with the interior of the 20 lower portion of the leg 28, from which any gases not adsorbed are permitted to escape through the escape conduit 33, a suitable valve being provided at 34 where it is desired to return the gases for rewashing, which may be done by gathering the 25 gases in conjunction with the fresh water supply, to discharge with the water at 23. The water 23 is provided by a second centrifugal pump 35 which discharges through a pipe 36, through the return bend 24, discharging as indicated at 23.

30 A second pipe 37, is in communication with the pipe 33 and with the intake of a pump or blower 38 which discharges into an auxiliary furnace 39 which is also provided with a burner 40, for burning any unadsorbed gases received at 35 the lower end 25 of the other leg 28 of the stack, the burned gases from this portion escaping through a stack 41, at which point the gases issuing will be substantially free of both smoke and odor.

4 It will be noted that the gases issuing from stack 41 are at a very high temperature and that these gases may be utilized in any desired manner, such as for the purpose of heating water, or the gases may be returned to the furnace through 45 the stack 44 whereby the heat will be absorbed by the garbage being transported on the conveying grates 14, 13 and 12, additional air for combustion being admitted either adjacent to the burner 15 or through the opening 45, suitable 50 chain or other flexible curtain being provided for this opening as indicated at 46.

55 It will be noted that the gases are drawn down to the lower end 25 of the leg 28, both by the stream of water passing over the baffles, by the vacuum created by cooling, condensation and adsorption, and also by the suction created by the pump 30, thereby providing the required draft for the furnace 10.

A modification of the gas incinerator is shown 60

in Fig. 3 in which the centrifugal pump or blower 38 is connected to the incinerator by a pipe 47, the incinerator comprising an outer shell 48 and an inner shell 49, the two shells being spaced apart to provide a chamber therebetween, the gases discharging from the pipe 47 to a point at the top of this chamber and escaping therefrom through openings 50 formed at the bottom of the inner shell 49, so that the gases are discharged into the incinerator at a point below the burner 51, whereby the gases are compelled to flow directly through the sheet of flame issuing from the burner 51, thereby bringing every particle of the gas directly through the combustion zone. The products of combustion from the burner 51, and the burnt gases issuing through the ports 50 escape through the stack 52, these gases being at a high temperature may be returned to the stack 44 on the garbage furnace or used for other heating purposes. This type of furnace is preferred to that shown in Fig. 2, as it is more efficient in the complete combustion of the gases.

A suitable supporting structure 42 is provided for the other leg 23 of the stack, and suitable connections may be provided for returning the discharging water from the pipe 31 into the pipe 36 for re-use, where the amount of gas adsorbed in one cycle is not sufficient to saturate the water with the adsorptive gases.

The garbage is deposited on the conveyor 43 and carried through the curtain 46, dumping on to the conveying grate 14 where it is slowly conveyed, dumping off the end 53 on to the head end of the conveyor 13, which conveyor 13 moves at an increased speed, carrying the garbage off the lower end thereof, dumping on to the head end of the grate 12, which moves at a speed greater than the conveyor 13, being discharged off the end 54 on to the conveying and agitating grate 11 and thence being carried over the forward end where it is deposited into a suitable receptacle or chute 55, or on to a conveyor for removal from the furnace.

The heat distribution from the burner 15, when the discharge from the gas incinerator is not connected to the stack 44, is as follows: The flame from the burner 15 is projected over the grate 11 and also over the grate or conveyor 12, passing about the lower end of grate 13, thence between grates 13 and 14, about the end 53, a portion of the heat and gases escaping through the stack 44 which is connected to the updraft leg 17 as indicated at 56, this stack 44 or connection 56 being provided with a suitable damper 57 for proper control of the escape of gases at this point, the major portion of the gases escaping through the gas outlet 16 into the updraft leg 17.

Where the outlet 41 or 52 of the gas incinerator is connected to the outlet 44, the stack 44 forms an intake for the distribution and drying section of the garbage incinerator, and the heated gases from the furnaces 39 or 43 pass downwardly through the stack 44 and about the ends of the conveyors 14 and 13, while the burner 15 projects the flame in a counter direction, the gases being all drawn through the outlet 16 into the updraft leg 17, thereby the hot gases from the gas incinerating furnace are used to dry the garbage and in this way the heat required from the burner 15 is considerably reduced.

The gases passing into the adsorption column through the outlet 16 or the discharge 56 are drawn about the return bend 20, and about the series of baffles 21-22 through the veils of water

26, certain constituents of the gases being dissolved and others adsorbed in the water in their downward travel through the downdraft leg 28, the water being drawn off from the bottom 25 through the pipe 29 and pump 30, discharging to waste through the pipe 31. The gases remaining escape through the vent 32 and thence either through the vent pipe 33 to atmosphere, or are drawn from the vent pipe 33 by the centrifugal blower 38 to be discharged into the furnace 39 or 48, or are drawn into the intake of the pump 30 and discharged through the discharge outlet 31, or they may be discharged through the pipe 36, and through the outlet 23 back to the head of the downdraft leg for retreatment.

It will be noted that the garbage is effectively presented to the flame within the combustion zone of the furnace 10, being advanced toward the fire end for complete combustion, the gases escaping into the updraft leg of the stack, thence continuing down the downdraft leg, being drawn by means of the pumps which are in communication with the lower end of the downdraft leg of the stack, the gases passing successively in contact with each water surface, and thence through a water veil and continuing successively from one surface and water veil to the next, until the bottom of the stack is reached, in this way completing cooling the gases and adsorbing all soluble constituents in the water, and after all the soluble constituents are dissolved in the water, the gases are forwarded to the second combustion chamber which is provided with any suitable type of burner, preferably oil or gas, and retained at such a heat that all combustible constituents of the washed gas are completely burned, thus completely eliminating the smoke and vapor nuisance of the usual garbage incinerator.

Having described an operative method and an operative structure, it will be understood that 40 variations in structure which are consistent with the appended claim, may be resorted to without detracting from the spirit or scope of the invention, or sacrificing any of the advantages thereof.

We claim:

In a gas disposal apparatus, a stack of inverted U-shaped form providing an updraft arm and a downdraft arm having its upper end communicating with the upper end of the updraft arm, the downdraft arm being tapered towards its lower end, a series of baffles extending transversely in said downdraft arm and extending from opposed portions of its walls in vertical spaced relation to each other with the baffles projecting from one wall portion overlapped by the baffles extending from the opposed wall portion, a water supply pipe extending vertically of the stack externally thereof with its upper end extending into the stack over the upper baffle, a pump having an outlet communicating with the lower end of said water pipe and an inlet tube communicating with the lower end of the downdraft arm, a waste water outlet being provided with the pump, a gas pipe leading from said inlet tube and extending upwardly externally of the downdraft arm, a by-pass tube leading from said gas pipe into the downdraft arm below the lower one of said baffles in spaced relation to the lower end of the downdraft arm, and a valve in the gas pipe between its lower end and the by-pass tube for controlling flow through the gas pipe.

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