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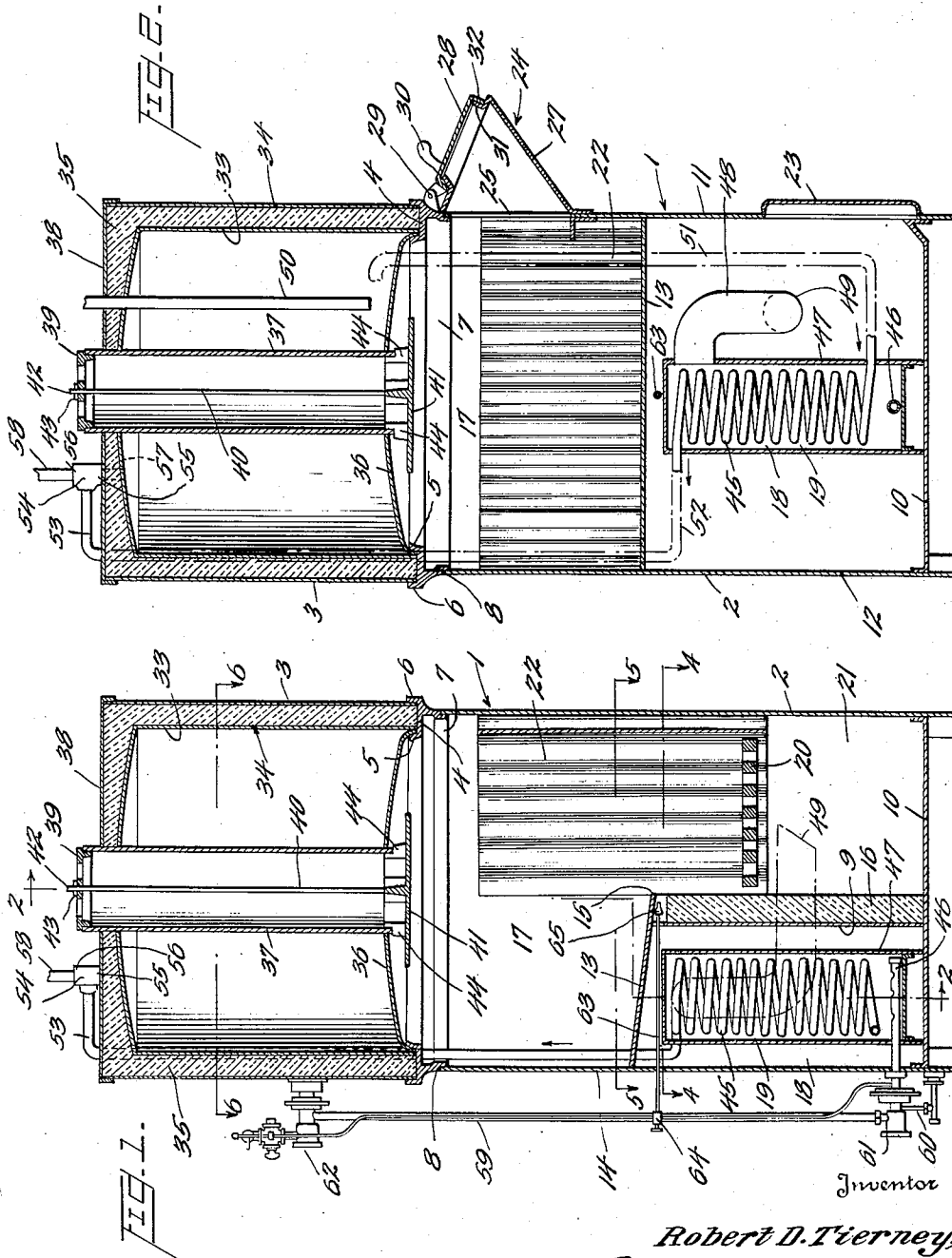
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2,120,165

COMBINED WATER HEATER AND INCINERATOR

Filed Aug. 21, 1936

2 Sheets-Sheet 1



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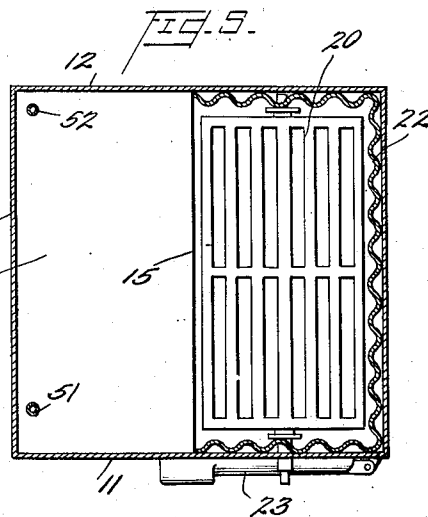
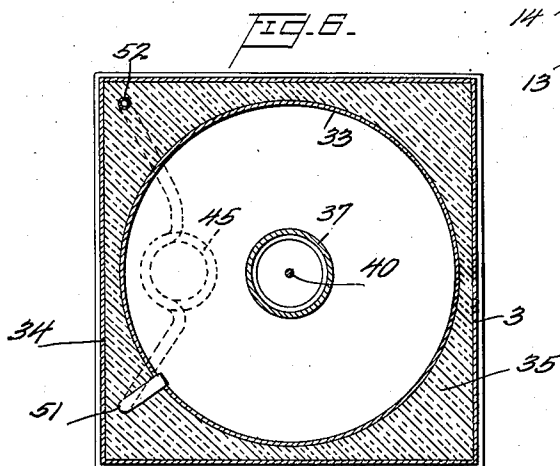
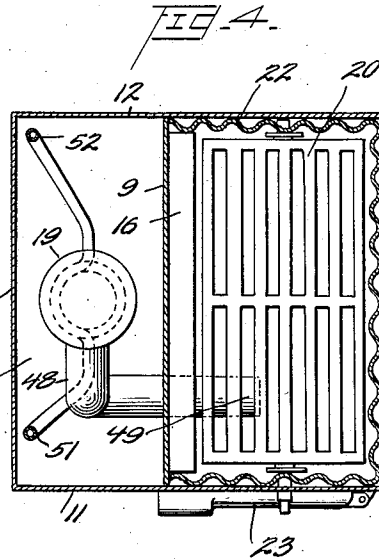
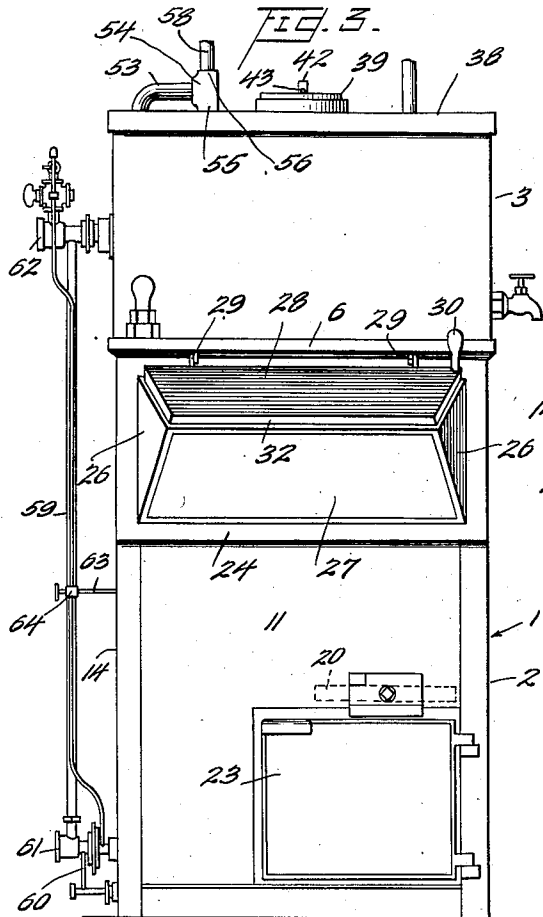
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COMBINED WATER HEATER AND INCINERATOR

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2 Sheets-Sheet 2



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COMBINED WATER HEATER AND
INCINERATOR

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8 Claims. (Cl. 122-2)

The invention relates to a combined water heater and incinerator.

The primary object of the present invention is to provide a combined water heater and incinerator, wherein the waste heated gas or gases, or heated air or fumes, as the case may be, which at present is allowed to escape unused from the water heater is now utilized for dehydrating material or other matter in the incinerator to be burned.

Another object of the present invention is to provide a simple, practical and comparatively inexpensive combined water heater and incinerator of strong and durable construction characterized by the utilization of the heat ordinarily wasted, from a gas water heater, to dehydrate household refuse so that the refuse including garbage will burn completely and in burning heat water, thereby saving gas.

A further object of the invention is to provide a combined water heater and incinerator in which gas is burned for heating water in a coil and the burnt gas subsequently utilized for drying garbage and other refuse instead of escaping to the chimney or flue and being wasted.

A further object of the invention is to provide a combined water heater and incinerator having means for first heating the water by a direct contact of the burning gas with the water coils and for then venting the burnt gas into the ash pit of the incinerator to thereby utilize for drying garbage and other household refuse gas heat ordinarily wasted.

Another object of the invention is to prevent or minimize precipitation of burnt gas entering the chimney or flue by introducing the burnt gas into the incinerator chamber and causing the burnt gas to sift or pass through the refuse and thereby be subjected to chemical change which reduces the tendency of the gas to precipitate when it enters the chimney or flue.

A further object of the invention is to provide a combined water heater and incinerator in which the burnt gas after heating the water will be utilized for dehydrating garbage prior to the burning of the latter, thereby eliminating the odors incident to burning wet garbage.

Another object of the invention is to provide a combined water heater and incinerator in which gas, oil, wood or other fuel may be used for heating the water.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts herein after fully described, illustrated in the accom-

panying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion and details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—

Fig. 1 is a transverse sectional view of the combined water heater and incinerator constructed in accordance with this invention.

Fig. 2 is a vertical sectional view of the same taken on the line 2-2 of Fig. 1.

Fig. 3 is a front elevation of the combined water heater and incinerator.

Fig. 4 is a horizontal sectional view taken substantially on the line 4-4 of Fig. 1.

Fig. 5 is a similar view taken on the line 5-5 of Fig. 1.

Fig. 6 is a horizontal sectional view taken on the line 6-6 of Fig. 1.

In the accompanying drawings in which is illustrated the preferred embodiment of the invention the combined water heater and incinerator comprises in its construction a casing 1 constructed of sheet metal or other suitable material and composed of a lower section 2 and an upper section 3 arranged upon the lower section which is provided at the juncture between the upper and lower sections with an inwardly extending horizontal supporting ledge 4. The casing is preferably of rectangular form and the supporting ledge preferably consists of a rectangular frame member provided with inner and outer substantially parallel flanges 5 and 6 and having a depending flange 7 which is fitted upon and suitably secured to the upper edge of the lower section of the casing. The depending flange 7 is preferably provided with a recess 8 to receive the upper edge of the lower section of the casing. The rectangular frame member 4 has its depending flange 7 fitted within the upper end of the lower section of the casing but the frame member 4 may be mounted upon the lower section of the casing in any other suitable manner.

The lower section of the casing is provided preferably at one side of the center with a vertical partition 9 extending upwardly from the bottom 10 of the lower section to the central portion of the same and from the front 11 of the lower section to the back 12 of the same. An inclined top partition 13 extends upwardly and outwardly from the top of the vertical partition to the side wall 14 of the lower section of the casing. The lower inner edge 15 of the inclined

top partition extends inwardly beyond the vertical partition 9 and is arranged over a lining 16 of fire brick or other suitable material which is fitted against the vertical partition 9. The partitions 9 and 13 which are suitably secured in position define an upper incinerating chamber 17 and a lower side compartment 18 for the reception of a water heater 19.

The incinerating chamber 17 extends downwardly below the plane of the upper edge of the vertical partition 9 and is provided with a grate 20 and the space 21 below the grate forms an ash pit. The incinerating chamber is provided at each side with a corrugated lining 22 of iron or any other suitable material extending downwardly to the grate 20 as clearly illustrated in Fig. 1 of the drawings. The grate 20 is preferably a dumping grate and the corrugated lining assists in the discharge of ashes through the grate 20 into the ash pit 21. The lower section is provided at the front with a lower hinged ash door 23 to permit ready removal of the ashes and it has a refuse hopper 24 at its upper portion communicating with the incinerator chamber.

The refuse hopper which is mounted on the lower section of the casing at the upper portion thereof at an opening 25 in the front wall of the lower section 2 is approximately triangular in cross section and consists of triangular end pieces 26, an inclined bottom wall 27 and an inclined door 28 forming the top wall of the hopper. The door 28 is suitably hinged at its upper edge at 29 preferably to the frame member 4, suitable lugs or ears being provided on the frame member and on the door for such purpose as clearly shown in Fig. 2 of the drawings. A handle 30 is provided at one end of the door or lid 28 preferably adjacent the upper hinged edge thereof for enabling the door or lid of the hopper to be readily opened and closed. The body of the hopper formed by the lower inclined wall 27 and the end walls 26 is preferably flanged at its upper edge at 31 to receive a marginal flange 32 of the lid or door to form a tight fit and prevent the escape of gases. The hopper is preferably tapered outwardly, the end walls being slightly converged as clearly illustrated in Fig. 3 of the drawings.

The upper section of the casing contains a tank 33 preferably of substantially cylindrical form and spaced from the upper section of the casing to provide an intervening space 34 for the reception of suitable insulating material 35. The tank 33 which is seated upon the frame member is provided with a concavo-convex bottom 36 which forms a dome shaped top wall for the incinerator chamber 17.

A centrally arranged smoke pipe 37 extends from the bottom of the tank through the latter to the top of the tank and through the top wall 38 of the upper section of the casing and projects slightly above the same for the attachment of an exterior smoke pipe (not shown) designed to connect with a suitable chimney or flue.

The smoke pipe 37 is provided at its upper end with a spider 39 seated upon the upper end of the smoke pipe and having secured to it the upper end of a centrally arranged vertically disposed hanger rod 40, to the lower end of which is secured a horizontal baffle plate 41. The upper end 42 of the hanger rod 40 is preferably threaded for the reception of a nut 43 but any other suitable means may of course be employed for securing it to the spider which provides openings for the passage of the smoke and other products of combustion to the chimney or flue. The hori-

zontal baffle plate 41 which is preferably in the form of a disk is of greater diameter than the lower end of the smoke pipe and is spaced therefrom to permit the products of combustion to pass around its periphery and escape through the smoke pipe 37. The horizontal baffle plate spreads the products of combustion and causes the same to impinge against a relatively large area of the bottom of the tank and also against the walls of the smoke pipe to obtain a maximum heating effect of the products of combustion before permitting the same to pass off into the chimney or flue. The baffle is provided at its upper face with spacing lugs 44.

The spacing lugs 44 are approximately L-shaped to engage the lower edge of the smoke pipe and center the baffle plate with relation to the lower end of the smoke pipe. The lower end of the hanger rod may be connected to the baffle plate in any suitable manner.

The water heater 19 comprises a coil 45 and a gas burner 46 arranged within a cylindrical casing 47 mounted upon the bottom 10 of the lower section of the casing and extending upwardly to within a short distance of the inclined top partition 13 and spaced from the side wall 14 and from the vertical partition 9. The water heater casing 47 is provided with a vent pipe 48 of substantially elbow formation connected with the casing 47 at the upper portion thereof and having its terminal portion 49 extending through the partition 9 and the lining 16 to a point beneath the grate 20 for discharging the burnt gas beneath the grate for causing the burnt gas to pass upwardly through the incinerator chamber before passing through the smoke pipe 37 and escaping to the chimney or flue. The burning gas from a burner 46 directly heats the water within the coil 45 so that the primary heat of the gas burner is employed for heating the coil and the hot gas vented from the burner casing 47 and usually wasted is caused to pass through the incinerator chamber for drying refuse and assisting in heating water within the tank. Obviously, instead of a gas burner 46, any suitably fired burner may be used. For instance, an oil burner may supplant the gas burner 46. In other words, gas, oil and other fuels, or any other suitable burner or means may be utilized to heat the water in the water heater 19.

A cold water pipe 50 extends through the top of the casing and downwardly into the tank and preferably terminates at a point adjacent the bottom thereof. The coil is supplied with water from the tank by a pipe 51 connected with the lower end of the coil which has its upper end connected with a hot water pipe 52 extending through the casing to the top thereof and located beyond the tank 33. The hot water pipe 52 extends above the casing 1 and has a horizontal arm 53 at its upper end which is connected with a T-coupling 54. The T-coupling 54 has opposite vertically disposed arms 55 and 56 connected respectively with a nipple 57 with the tank 33 and with a hot water supply pipe 58.

Gas is supplied to the burner 46 by a gas pipe 59 by a suitable connection 60 having a safety pilot 61 of ordinary well known construction. The temperature of the water within the tank is controlled by an automatic heat regulator 62 which is connected with the gas pipe and which controls the flow of gas to the burner. As the heat regulator and the safety pilot may be of any well known construction detailed illustration and description thereof are deemed unnecessary.

As the coil 45 is fed with water from the tank the hot water from the coil will flow back into the tank if the hot water service pipe is not used for drawing off hot water and the circulation of water from the tank through the coil back into the tank will continue until the temperature of the tank reaches a predetermined degree when the flow of gas to the burner will be automatically cut off by the heat regulator. As the water is drawn from the tank by consumption through the hot water supply pipe cold water will flow into the tank through the cold water pipe 50 and when the water within the tank falls below a predetermined degree the automatic heat regulator will feed to the burner gas which will be automatically ignited by the pilot light. The hot burnt gas from the water heater usually wasted is vented by the vent pipe 48 and discharged at a point below the grate 20 so that the hot gas is caused to pass upwardly through the incinerator chamber to the smoke pipe 37. By this construction and arrangement the hot gas which is usually wasted may be utilized for drying garbage and other refuse which may be burnt within the incinerator chamber in a dry condition thereby eliminating all disagreeable odors incident to the burning of wet garbage and the like. The smoke and other products of combustion from the burning refuse or fuel within the incinerator chamber pass upwardly around the baffle plate and into the smoke pipe and are caused to impinge against the bottom of the tank and the interior surface of the smoke pipe thereby obtaining a maximum heating effect from the products of combustion for heating the water within the tank. This raises the temperature of the water fed to the coil of the water heater and correspondingly reduces the consumption of gas for heating water by the burner. Also the incinerator may be used for burning wood and other fuel for heating water within the tank without the use of the water heater 19.

A suitable valve not shown is provided for controlling the flow of gas to the heat regulating device. Also a refuse lighter 63 consisting of a horizontal pipe is connected with the gas pipe 59 for lighting refuse within the incinerator chamber. The refuse lighter 63 which is controlled by a suitable valve 64 extends through the vertical partition 9 and also through the heat insulating lining 16 and is provided at its inner end with a suitable tip 65 for discharging gas and for enabling a flame to be maintained within the combustion chamber at a point above the grate for a sufficient length of time to ignite refuse. When the refuse is ignited the flow of gas to the refuse lighter may be cut off by the valve 64. The refuse is introduced into the incinerator chamber through the door or lid 28 of the hopper 24 and the inclined top partition 13 forms a convenient shelf on which wet garbage may be placed for drying preparatory to burning, however, wet garbage may be directly placed upon the grate to be dried by burnt gas from the water heater.

What is claimed is:

1. A combined water heater and incinerator including a casing, a partition extending upwardly from the bottom of the casing, an inclined top partition extending from the said partition from one side of the casing, said partitions defining an incinerator chamber and a water heater compartment and said inclined top partition also forming a shelf within the incinerator chamber, a water heater located within said compartment

along one side of the upright partition, a grate at the other side of said partition, and means for conducting burnt gas from the water heater and discharging the same below the grate.

2. A combined water heater and incinerator including a casing, a vertical partition extending upwardly from the bottom of the casing, a top partition extending from the vertical partition to one side of the casing, said partition defining an incinerator chamber and a water heater compartment located at one side of the vertical partition, a grate located at the opposite side of the vertical partition and arranged below the plane of the top partition, a water heater located within said compartment, and a vent pipe extending from the water heater through the vertical partition and terminating below the grate for causing burnt gas to pass upwardly through the grate into the combustion chamber.

3. A combined water heater and incinerator including a casing having upper and lower sections, the lower section being provided with an incinerator chamber, a tank arranged within the upper section of the casing, a water heater arranged within the lower section of the casing and including a water heater compartment separate from and exteriorly of the incinerator and confining the flame of the water heater within it and having a coil, a vent pipe for conducting the products of combustion from the water heater compartment to the incinerator, a pipe connecting one end of the coil with the tank, a hot water pipe extending from the other end of the coil, means for supplying cold water to the tank, and means for connecting the hot water pipe with the tank and with a hot water supply pipe.

4. A combined water heater and incinerator including an incinerator chamber, a tank located above the incinerator chamber and forming a top wall for the same and having an outlet flue extending therethrough for the discharge of heat products from the incinerator and to assist in heating water within the tank, a water heater comprising a coil connected with the tank, a burner for heating the coil, and a casing separate from and exteriorly of the incinerator chamber and enclosing the coil and the burner and confining the flame of the burner within it and provided with an outlet conducting the products of combustion from the burner to the incinerator chamber for drying garbage whereby the garbage may be burned in the incinerator and the heat of the burning garbage utilized for heating water within the tank.

5. A combined water heater and incinerator including an incinerator chamber, a tank located above the incinerator chamber and forming a top wall for the same having an outlet flue extending vertically through the tank and having a lower inlet opening above the incinerator chamber, a water heater comprising a coil connected with the tank, a gas burner for heating the coil, a casing separate from and exteriorly of the incinerator chamber and enclosing the coil and the gas burner and confining the flame of the burner within it, and a vent pipe extending from the burner casing to the incinerator for conducting the hot burnt gas from the water heater to the incinerator for drying garbage whereby garbage may be burned and the heat of the burning garbage utilized for heating water within the tank.

6. A combined water heater and incinerator including an incinerator chamber, a tank located above the incinerator chamber and forming a

top wall for the same having an outlet flue extending vertically through the tank and having a lower inlet opening above the incinerator chamber, a water heater comprising a coil connected
5 with the tank, a gas burner for heating the coil, a casing separate from and exteriorly of the incinerator chamber and enclosing the coil and the gas burner and confining the flame of the burner within it, and a vent pipe extending from the
10 water heater casing to a point beneath the grate of the incinerator for causing the hot burnt gas from the burner to pass upward through the grate into the incinerator chamber for drying garbage whereby garbage may be burned and
15 the heat of the burning garbage utilized for heating water within the tank.

7. The method of heating water and dehydrating garbage or other waste materials which consists first in subjecting the water to the action

of a heating means to heat the same and utilizing the waste heat products issuing from the water heating means to dehydrate the waste material prior to igniting the same to condition the waste materials for ready burning, and finally igniting
5 the waste material to consume the same.

8. The method of heating water and dehydrating garbage or other waste materials which consists first in subjecting the water to the action of a primary heating means to heat the same and
10 utilizing the waste heat products issuing from the water heating means to dehydrate the waste material prior to igniting the same to condition the waste materials for ready burning, and finally igniting the waste material to consume the same
15 to further heat the water after the primary heating means has been cut off.

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