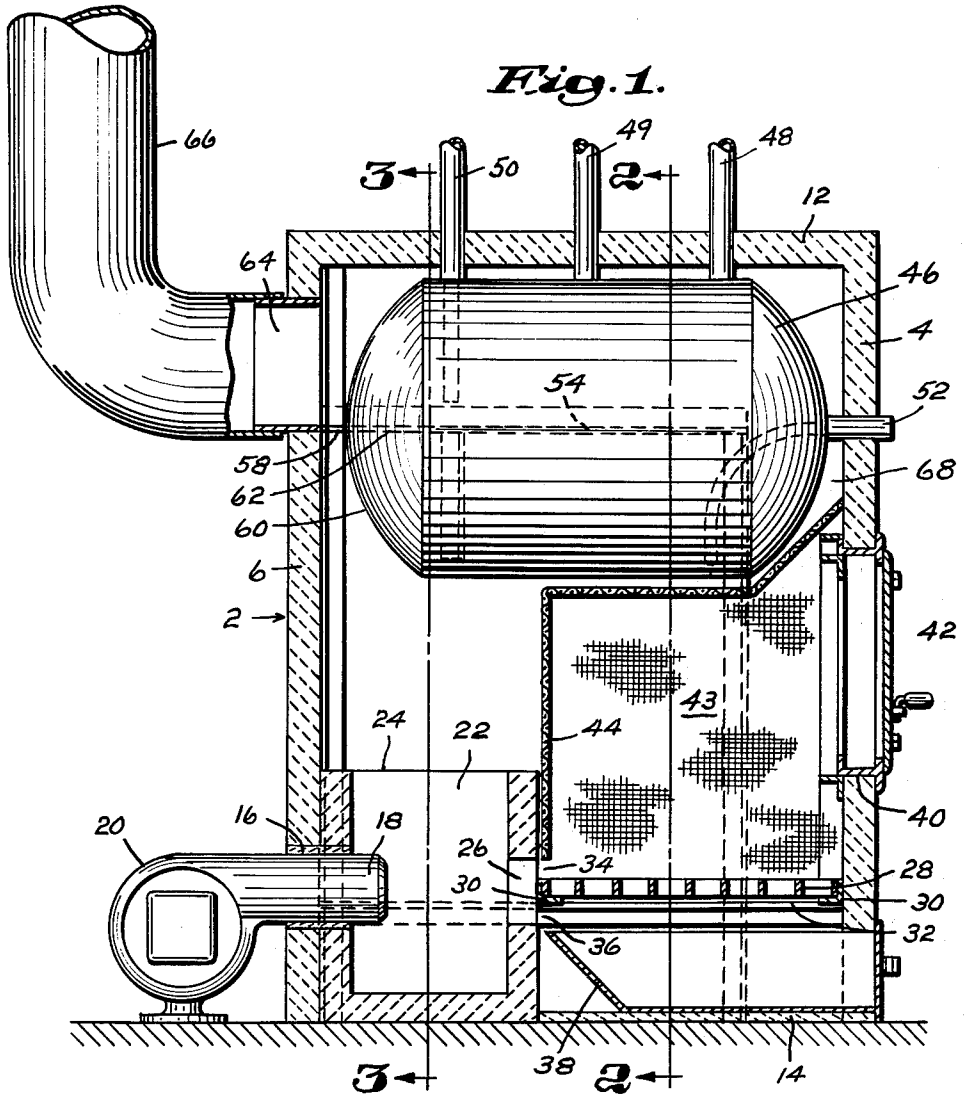
May 17, 1966 J. H. BRODY ETAL 3,251,345

COMBINATION INCINERATOR AND HOT WATER HEATER

Filed May 1, 1964 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

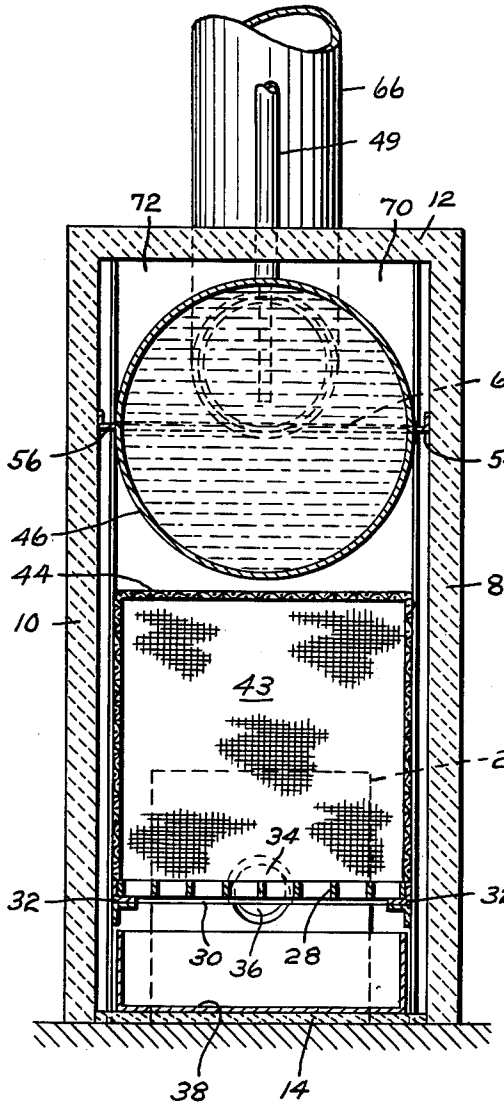
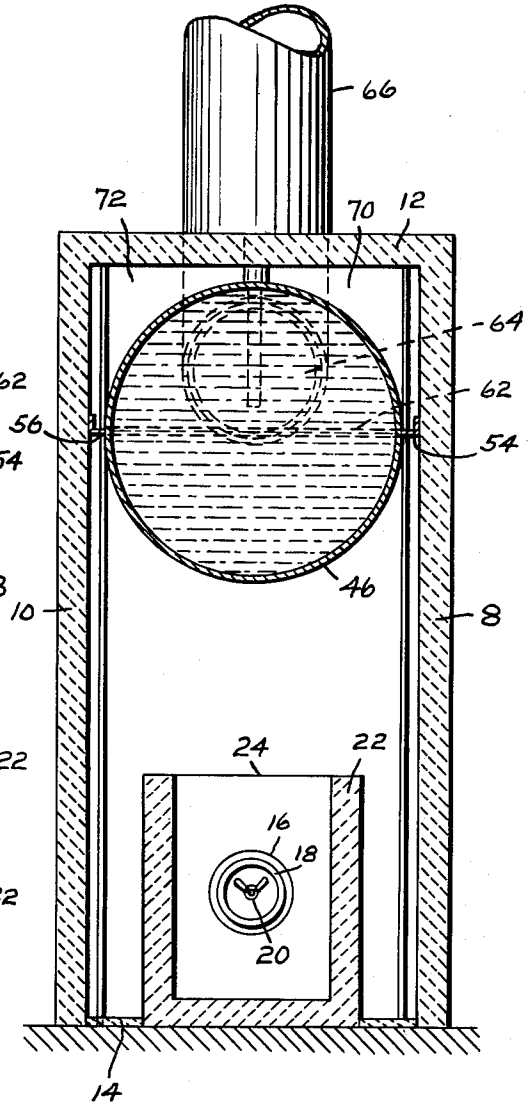


Fig. 3.



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COMBINATION INCINERATOR AND HOT WATER HEATER

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2 Claims. (Cl. 122—2)

This invention relates to a combination incinerator and hot water heater in which the heat that acts on the water tank is supplied by a conventional gas or oil burner supplement by heat produced in the burning of garbage, rubbish, trash and the like, all of which occurs within the confines of a single unitary housing.

A principal object of the invention is to provide a simple but effective means to incinerate material, such as garbage, rubbish, trash and the like, and at the same time to supply hot water with the heat coming from one or a combination of two sources. (For convenience, the material being burned in the incinerator will hereinafter be referred to as rubbish, regardless of its particular nature.) An oil or gas burner is the primary source of heat, and this is preferably controlled to go on and off automatically under the influence of conventional thermostatic controls positioned within the hot water tank. When rubbish is to be burned, the flame from the fuel burner is arranged to come into direct contact with the rubbish so that it promptly commences to burn. The heat from the burning rubbish augments the heat supplied by the fuel burner, thus heating the water in the tank faster. As soon as the temperature of the water has risen to a predetermined degree to satisfy the thermostatic controls, the fuel burner will be cut off; but any remaining rubbish still burning will continue to supply additional heat to the water tank.

A further object of the invention is to have means incorporated within the housing between the rubbish combustion area and the flue for trapping that type of ash known as "fly ash" which would otherwise go up the flue and be discharged into the immediate atmosphere. This is an important feature, since the present device will ordinarily be used in residences rather than in commercial buildings. The discharge of "fly ash" from a chimney in a residential area is obviously undesirable.

Another object of the invention is to have incorporated within the unitary housing a removable ash tray so that the residue falling through the grate may be periodically removed for disposal.

While the general concept of utilizing an automatically controlled fuel burner and simultaneously burning rubbish in a single housing to heat a hot water tank is an old concept, still an investigation of the commercial market will show that the prior art devices have obtained little, if any, acceptance in the trade. Thus the present invention resides in a novel arrangement of generally old elements which results in a very compact, relatively low-cost, high-efficiency means for heating hot water while at the same time providing for the incineration of normal household quantities of rubbish in a manner that completely prevents the development of noxious odors within the building. Such odors as may emanate from the chimney to which the unit is connected are quickly diluted sufficiently to provide a condition which will not be objectionable to adjacent residents.

These and other objects of the invention will become more apparent as the description proceeds with the aid of the accompanying drawings in which:

FIG. 1 is a vertical longitudinal sectional view of the unit;

FIG. 2 is a vertical cross-sectional view of the unit taken on the line 2—2 of FIG. 1; and

FIG. 3 is a vertical cross-sectional view taken on the line 3—3 of FIG. 1.

The combined incinerator and hot water heater comprises an outer housing **2** having front and rear walls **4** and **6**, side walls **8** and **10**, a top **12**, and a bottom **14**. All walls of the unit are preferably insulated. An opening **16** in wall **6** is positioned at a suitable height to receive the gun portion **18** of a conventional oil burner **20**. While an oil burner is shown herein, it will be understood that any other type of burner capable of projecting the flame forwardly in a horizontal direction could be used.

The flame from the oil burner is delivered into a firebox **22**, which preferably is circular in horizontal section, although it may be of other configurations if desired. The firebox is open at the top as at **24** so that heat from the oil burner flame may flow upwardly without restraint.

At the far side of the firebox directly opposite the nozzle of burner **20**, there is provided a circular opening **26**, this opening being close enough to the burner so that the flame may pass therethrough. Aligned with opening **26** is a grate **28** supported at its ends and sides in any convenient manner. In the construction shown, angle irons **30** and **32** are utilized. The grate is so positioned that part of the flame from the burner may pass through the upper space **34** and another part of the flame through lower space **36**. Below the grate is a removable ash tray **38**, which may be withdrawn from time to time to permit disposal of accumulated ash.

Through the wall **12** is an opening **40**, normally closed by a door **42**. When the door **42** is open, rubbish may be introduced into the unit to fall on the grate **28**. It will be understood from the description thus far that incineration of rubbish occurs in that area **43** immediately above grate **28** while the major portion of the heat from burner **20** ascends through the open top of firebox **22**.

In a preferred form of the invention, the area **43** where incineration takes place may be surrounded in whole or in part by a screen **44** of suitable mesh to prevent the escape from the incineration area of small particles of very light ash known generally as "fly ash." The screen, however, does not appreciably block the upward flow of heat from the incineration area.

Mounted in the top portion of the housing **2** is a water tank **46** having any required or desired water connections **48**, **49** and **50**. In addition, any suitable type of thermostatic controls as suggested at **52** for starting and stopping operation of burner **20** may be included. The piping arrangements to the tank **46** and the thermostatic controls are all conventional and constitute no part of the invention.

The tank **46** is supported by horizontal angle irons **54** and **56** at the sides and by a crosswise extending angle iron **58** at the rear. The space between the end **60** of the tank **46** and the walls **6**, **8** and **10** is closed by a baffle **62** which is on the same level as the supporting members **54**, **56** and **58**.

Immediately above the crosswire extending angle iron **58** and the related baffle **62** is an opening **64** through wall is connected with the flue or chimney **66**.

The length of the tank is such that it is directly above both the burner flame and the rubbish flame, thus providing a large tank area for absorbing and transmitting heat to the water.

From the description thus far, it is believed apparent that hot gases rising from burner **20** and the incinerator area **43** will first impinge on the bottom half of tank **46**. The gases then move to the end of the tank and flow upwardly through the space **68** around the righthand end of the tank as viewed in FIG. 1, thence horizontally along the top of the tank through those are as designated **70** and **72** in FIGS. 2 and 3, and finally out to the flue or chimney

through the opening **64**. This long distance of hot gas engagement with the tank results in high efficiency.

The various modes of operation are as follows:

If there is no rubbish in the incinerator and the tempereature of the water in the tank **46** drops below a predetermined degree, the thermostatic control **52** will put the burner **20** in operation. The burner continues in operation until the temperature of the water has risen to a higher predetermined degree, at which degree the burner will be shut off by the thermostatic controls. The heat from the burner travels about the tank in the same manner as heretofore described.

If there is rubbish in the incinerator, nothing will happen until the temperature of the water in the tank **46** drops below a predetermined degree. At this predetermined degree, the burner **20** goes into operation and the forward end of the flame of the burner will pass through the openings **34** and **36** and directly engage the rubbish on grate **28**. If the rubbish is dry, it will be immediately ignited; if it is wet, the heat from the burner will soon dry it and it will commence to burn. Under these joint combustion conditions, the combined heat from the burner flowing up through the open upper side of firebox **22** and from the burning rubbish on grate **28** flowing up through the screen **44** will act together to raise the temperature of the water in tank **46**. The products of combustion from both sources flow along the bottom of the tank, upwardly through the space **68** at the righthand end of the tank as viewed in FIG. 1, and thence to the left along the top half of the tank to the chimney **66**. As soon as the temperature of the water in the tank reaches the upper predetermined degree, burner **20** will stop operation. If all of the rubbish in the incinerator has not been consumed, such rubbish will continue to burn until reduced to ash. This will add some further heat to the water in the tank. It will be understood, of course, that the tank will be equipped with the usual safety valves so that if by any chance the continued burning of rubbish in the incinerator should raise the water temperature as high as the boiling point, there would be no danger of explosion. Experience has shown, however, that completing the burning of an ordinary charge of rubbish in the incinerator after shutdown of burner **20** will not cause an excessive rise in the temperature of the water.

It will be further understood, of course, that once the rubbish is burning in the incinerator, additional rubbish may be added at will. In such event, the burning rubbish alone would supply the heat for the water, for under such conditions the thermostatic controls would not put the burner back in operation unless at that time substantial quantities of hot water were being used.

Such ash as falls downwardly through grate **28** will collect in the ash tray **38**. This tray may be removed periodically for removal of the ash from the unit.

The entire unit is of such dimensions that it may be readily installed in a building without the need of special foundations or other supporting structure. It may stand directly on the floor in any convenient position for connection to the chimney and the required water pipes. The burner **20** and the thermostatic controls **52** are electrically operated, so in the ordinary case electric current is an essential requirement. If is, of course, essential that the length of the flame emitted by the burner be long enough to enter the incinerator grate area so that the rubbish therein will be positively ignited.

It is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

We claim:

1. A combustion incinerator and hot water heater comprising a housing, a fuel burner positioned at one end of said housing with its flame directed horizontally within said housing, a combustion chamber for said flame, said chamber open at the top and having an aperture through the side thereof remote from the burner and aligned with the burner flame, an incinerator comprising a grate beyond said combustion chamber and within said housing, a door through a wall of the housing through which material to be incinerated may be deposited on said grate, said grate being not higher than said aperture whereby material on said grate will be engaged directly by the flame passing through said aperture thereby to be ignited, a water tank in said housing of such length that it extends over said combustion chamber and grate so that heat from said burner and burning material on the grate will individually when in sole operation or together when in joint operation be directly effective to heat the under side of said tank, the end of said tank above said grate being spaced from the adjacent wall of said housing, the top of said tank being spaced from the top of said housing, baffles extending laterally from the sides and other end of said tank to the adjacent walls of said housing and a flue from said housing at the burner end thereof and above said baffles, and a screen positioned within said housing above said grate through which all products of combustion from the incinerated material must pass on the way to said flue, whereby heat from said burner and burning material will be compelled to pass along the under side of the tank to the end opposite the burner, thence upwardly around the tank end and horizontally along the upper part of the tank to the flue.

2. A combination incinerator and hot water heater comprising a housing, a fuel burner positioned at one end of said housing with its flame directed horizontally within said housing, a combustion chamber for said flame, said chamber open at the top and having an aperture through the side thereof remote from the burner and aligned with the burner flame, an incinerator comprising a grate beyond said combustion chamber and within said housing, a door through a wall of the housing through which material to be incinerated may be deposited on said grate, said grate being not higher than said aperture whereby material on said grate will be engaged directly by the flame passing through said aperture thereby to be ignited, a water tank in said housing of such length that it extends over said combustion chamber and grate so that heat from said burner and burning material on the grate will individually when in sole operation or together when in joint operation be directly effective to heat the under side of said tank, the end of said tank above said grate being spaced from the adjacent wall of said housing, the top of said tank being spaced from the top of said housing, baffles extending laterally from the sides and other end of said tank to the adjacent walls of said housing and a flue from said housing at the burner end thereof and above said baffles, and perforate means above said grate to limit the height to which material to be incinerated can be positioned, thereby to insure an always open passage from the said combustion chamber to said flue, whereby heat from said burner and burning material will be compelled to pass along the under side of the tank to the end opposite the burner, thence upwardly around the tank end and horizontally along the upper part of the tank to the flue.

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