April 12, 1938. H. W. THOMAS 2,114,257

INCINERATOR

Filed July 13, 1935

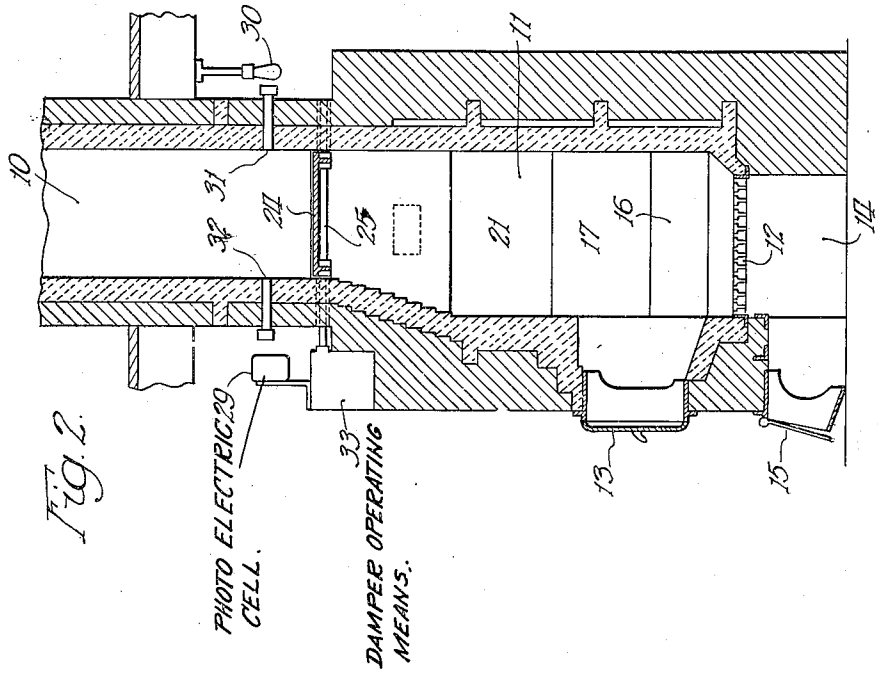

Fig. 2.

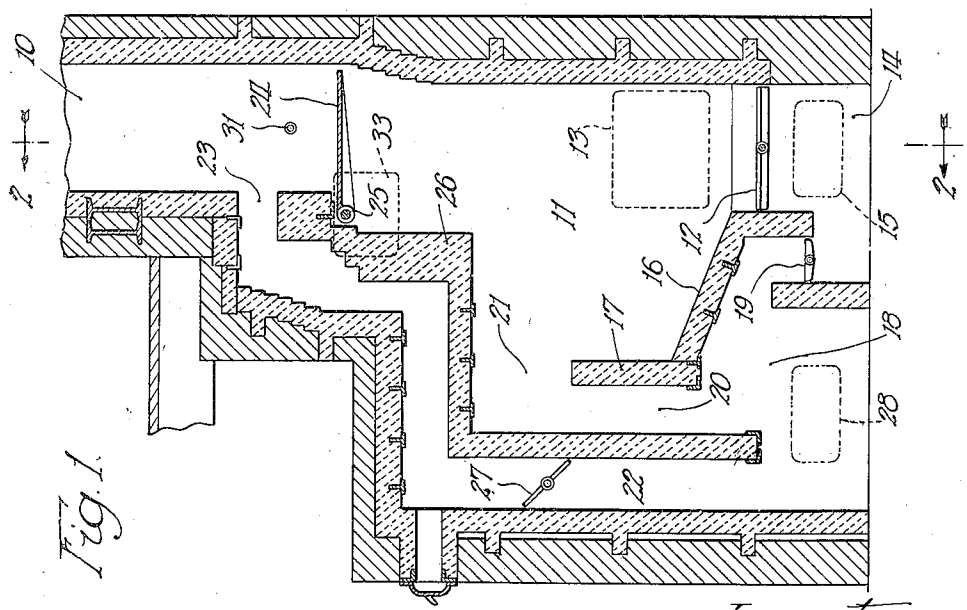

Fig. 1.

Inventor
Herbert W. Thomas
By: Roland C. Rehm Atty

Patented Apr. 12, 1938 2,114,257

UNITED STATES PATENT OFFICE

2,114,257

INCINERATOR

Herbert W. Thomas, New York, N. Y., assignor to Morse Boulger Destructor Company, New York, N. Y., a corporation of Delaware

Application July 13, 1935, Serial No. 31,162

2 Claims. (Cl. 110—8)

This invention relates to flue fed incinerators and, among other objects, aims to provide an improved incinerator of this type capable of destroying waste to a clean, fine ash without the production of smoke, odor or fly ash and of allowing the addition of waste to the incinerator during the process of destruction.

The nature of the invention may be readily understood by reference to one incinerator embodying the invention and illustrated in the accompanying drawing.

In said drawing:

Fig. 1 is a sectional elevation of the incinerator and a part of the flue; and

Fig. 2 is a sectional elevation taken on the plane 2—2 of Fig. 1.

The utility of the flue fed incinerator resides largely in the convenience by which waste may be delivered thereto, it being necessary merely to introduce the waste into the flue at a convenient point. Because of the large size of the flue, the natural draft is so great during the burning of the waste as to carry out fly ash and result in inefficient and incomplete destruction of the waste, producing odors and smoke, and thereby frequently constituting a nuisance. This is avoided only by closing the flue during destruction so as to control the draft and by otherwise designing the incinerator so that complete destruction can be effected. Closing the flue (this does not literally mean complete closing so as to cut off all draft) considerably interferes with the convenience in the use of the incinerator and makes it impossible or impractical to add waste to the incinerator during the actual process of destruction.

The incinerator here illustrated destroys the waste to a clean, fine ash without smoke, odor or fly ash and automatically allows the addition of waste during actual operation of the destructor. Waste is introduced through the flue 10 (which for that purpose is substantially larger in cross section than that necessary merely for the creation of draft) by means of inlet doors located at the various floors of the building. Normally the waste falls into the destructor chamber 11 which is so designed as to secure effective destruction of waste. As here shown, the destructor comprises a flat grate 12 located practically directly below the flue and on which the waste initially falls. The grate 12 is preferably a dumping grate. In front of and above the grate is a door 13 and below the grate is an ash space 14 provided with a clean-out and draft door 15. Rising from the grate is an inclined hearth 16 terminating in a back wall 17. Below the hearth 16 is an enlarged secondary combustion and settling space 18 provided with a secondary heating element, in this case in the form of a fuel grate 19, by which heat and flames are provided to maintain adequate temperatures in the secondary combustion chamber 18 and to supply flame to complete the combustion of fumes and gases passing out of the primary combustion chamber above hearth 16. Oil or gas burning nozzles may be provided in place of the fuel grate 19 if this be desired.

Communication between the primary combustion space and the secondary combustion space is provided by the passage 20 which enters the primary combustion space at 21 above the wall 17. It will be noted that the space 18 is substantially larger than the cross section of passage 20, thereby resulting in a very substantial reduction in velocity of the gases, allowing any solid material carried with the gases to settle out at this point. The flue 22 leads from the secondary combustion space 18 and enters the main flue 10 at a point 23 some distance above the point of entrance to the chamber 11.

During actual destruction of waste, the main flue 10 is closed by a swinging damper 24 hinged at 25 adjacent one edge and adapted to swing down to open the flue. The damper may advantageously be counterbalanced to facilitate its operation. The flue wall is here shown offset at 26 below the damper pivot to allow the damper when hanging in open position completely to clear the line of the flue wall and thereby make it impossible for waste to lodge upon any portion of it while in open position. Flue 22 is provided with an adjustable damper 27 for controlling the draft through the destructor during its actual operation, damper 24 being closed during such operation.

Contrary to what is generally supposed, the ordinary waste delivered to flue fed destructors is not readily combustible, being composed of wet garbage and other wet or difficultly combustible waste. It is generally not possible to dry such waste to a point where it alone will furnish adequate readily combustible matter to generate sufficiently high temperatures to effect complete destruction of odors, fumes and smoke. The waste is therefore initially burned in the chamber 11 with such additional fuel, introduced through door 13, as may be necessary to induce combustion. The hot gases passing over the material on the inclined hearth 16 tend to dry the waste thereon to a point where it will burn. The

smoke, fumes, etc. from such initial combustion pass into the secondary combustion space 18 where their velocity is substantially reduced and they encounter the high temperature produced from a fire on fuel grate 19 or other heating and flame producing means. The result is that complete combustion takes place in the chamber 19 at such high temperatures as to destroy smoke, fumes and odors and any combustible solid material which may be carried with the gases. The ash from the latter settles at the bottom of the space 19 from which it may be removed from time to time through clean-out door 28. The draft door 15 and damper 27 are of course adjusted to secure the desired operation. The draft being limited and controlled, it is impossible to carry fly ash up the flue, the latter all settling at the bottom of space 18.

Waste introduced into the flue while the damper 24 is closed, simply accumulates thereon. The damper is advantageously operated by appropriate means either to open periodically or whenever waste settles thereon to allow the latter to fall into the destructor chamber (whereupon it promptly closes). This may be effected for example by time operated mechanism or by weight controlled mechanism which allows the damper to open when sufficient weight of waste has collected on it. For the latter purpose the damper is simply counterbalanced by a weight sufficient to hold it closed until a predetermined weight of waste has collected on it.

In the present instance the damper is automatically controlled by a photo-electric cell which causes it to open automatically when waste passes the photo-electric cell in falling upon the damper. As shown particularly in Fig. 2, the photo-electric cell 29 is located outside the flue in line with a source of light 30 which reaches the cell through sight tubes 31 and 32 in the flue in alignment with the light source and the photo-electric cell. When waste intersects the beam of light in falling on damper 24, the photo-electric cell actuates appropriate electric mechanism 33 for opening the damper. The details of operating mechanism of this character are well known and need not therefore be described. Such mechanism can of course be procured on the open market. With this arrangement it is possible to maintain the flue closed permitting the operation of the destructor at any time yet allowing waste to enter it as it is introduced into the flue. It will be understood that in ordinary operation the destructor does not function continuously, it being desirable to allow waste to accumulate therein and to dry partly. Drying is facilitated by the circumstance that the air entering the incinerator (under natural draft) must pass through the grate 12 (drying the waste as it passes through it), and then over the waste lying on the inclined hearth 16 (again exerting drying action thereon). It cannot pass directly up the flue since damper 24 is closed. Moisture from excessively wet waste will of course drain down the inclined hearth 16 into the ash pit 14.

It is also possible with this arrangement to open the door 13 for inspection of the progress of destruction or for introduction of fuel or waste without the danger of creating the tremendous draft which would ensue if the damper 24 were open, thereby preventing the nuisance which would ensue by the carrying up the flue of ash, pieces of paper or other light pieces of waste.

Obviously the invention is not limited to the details of the illustrative construction since these may be variously modified. Moreover, it is not indispensable that all features of the invention be used conjointly since various features may be used to advantage in different combinations and subcombinations.

Having described my invention, I claim:

1. An incinerator of the character described comprising in combination an incinerator chamber having therein a hearth elevated above the bottom of the chamber to provide a substantial space below it, a relatively narrow flue leading from a point above the hearth to said space below, the latter being sufficiently large to reduce the velocity of the gases to allow solid particles to settle out in said space, heating means in said space to provide heat and flames for completing the combustion of gases in said space, a waste feeding flue communicating with said chamber, a damper closing said flue at a point closely adjacent said chamber and movable to a position so as to clear the flue for the passage of waste, an auxiliary flue leading from said space to said waste flue at a point beyond said damper and entering said waste flue at an angle to the flow of waste, and means controlled by waste introduced into said flue for operating said damper to admit the said waste to said incinerator chamber.

2. An incinerator of the character described comprising in combination an incinerator chamber having therein a hearth elevated above the bottom of the chamber to provide a substantial space below it, a relatively narrow flue leading from a point above the hearth to said space below, the latter being sufficiently large to reduce the velocity of the gases to allow solid particles to settle out in said space, heating means in said space to provide heat and flames for completing the combustion of gases in said space, a waste feeding flue communicating with said chamber, a damper closing said flue at a point closely adjacent said chamber and movable to a position so as to clear the flue for the passage of waste, an auxiliary flue leading from said space to said waste flue at a point beyond said damper and having draft controlling means associated therewith to control the operation of said incinerator, and means controlled by waste introduced into said flue for operating said damper to admit the said waste to said incinerator chamber.

HERBERT W. THOMAS.