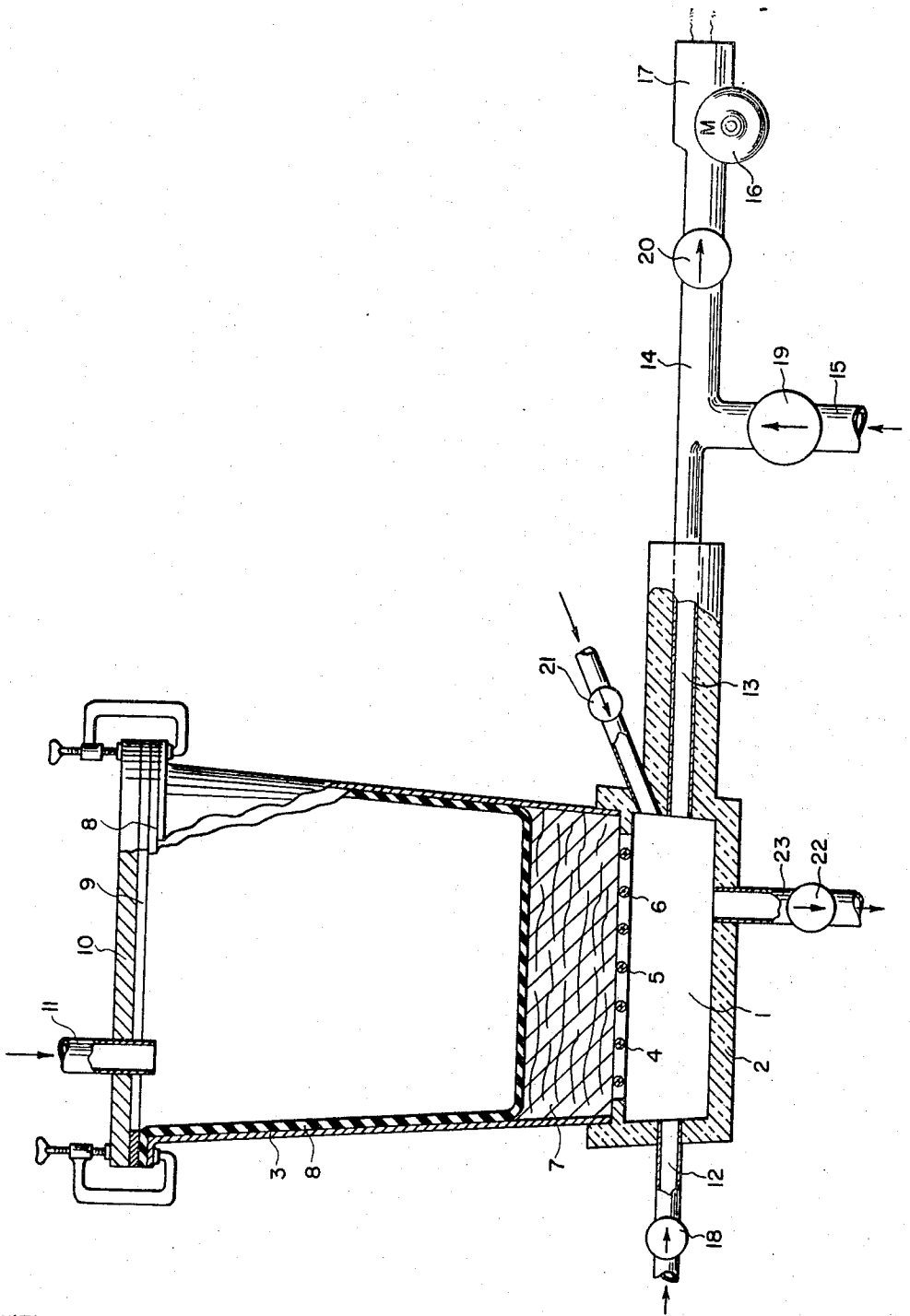
Dec. 12, 1967 B. MILLER 3,357,376

WASTE INCINERATOR

Filed Feb. 27, 1964



WITNESSES

Theodore F. Wrobel

James F. Young

INVENTOR

Bernard Miller

BY

Robert T. Frank

ATTORNEY

United States Patent Office 3,357,376 Patented Dec. 12, 1967

3,357,376

WASTE INCINERATOR

Bernard Miller, Glenshaw, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Feb. 27, 1964, Ser. No. 347,886
4 Claims. (Cl. 110—8)

This invention relates to means for disposing of oxidizable and other waste materials, such as trash, garbage and material ordinarily gathered and set aside for collection, and more particularly to the reduction of this material to clean and odorless gas with a minimum of ash.

Appliances known as incinerators for the disposal of waste by burning are conventional, but these are generally fired by gas and require substantial elaborate installation arrangements including hot gas disposal means, such as chimneys. In accordance with the present invention, the device is electrical and may be housed as a unit placed among other conventional household units, such as clothes washers and clothes dryers, and requires no more hot gas disposal means than a piece of plastic tubing such as that required by clothes dryers, and that is needed more to avoid overheating the room in which the disposer is installed than for any other reason, for the gaseous product of combustion coming from the present device is a clear odorless gas less than 200° F. in temperature.

The present invention has particular utility in connection with a combustion chamber, in which oxidizable material is used as one wall thereof, and which is provided with electrical means installed therein to induce combustion of this material. A supply of fresh air is piped into the combustion chamber to maintain combustion at the face of the mass of material and a vent is provided to exhaust the chamber of the products of combustion. A temperature, within this chamber, sufficiently high to reduce these products of combustion to a colorless and odorless gas, is maintained and this gas is vented, cooled, partly by dilution with cool air, and expelled in the same manner as the heated air of the conventional clothes dryer. While an after burner, as in conventional incinerators, could be provided for burning smoke and other gases externally of the combustion chamber, for purpose of efficiency all combustion is made to take place within the combustion chamber where a temperature to eliminate smoke and odor is maintained, and hence no afterburner is needed. By way of example, a temperature of 1500° F. has been found to be sufficient to eliminate smoke and odor.

Combustion apparatus of the type just described briefly is the subject matter of copending application Ser. No. 329,044, filed Dec. 9, 1963 and now Patent No. 3,313,253, for Waste Disposer, in the name of Franklin S. Malick, and assigned to the assignee of the present application.

A feature of the present invention is means to form the waste material into a compact and imporous plug and to confine the combustion thereof to the one face of the plug which acts as one wall of the combustion chamber. For this purpose a means to apply pressure to the top of the mass of waste material in the trash bin is provided. As shown herein, this means comprises an air tight bag of rubberized material which may be inflated from some conventional source of air or liquid pressure. The expansion of this bag acts as a bellows or as a piston means to crush and compact the waste material and to force the compacted plug always toward the combustion chamber. This bag must be air tight so that no air will be provided at the top or back of the plug to sustain unwanted combustion at any point of the plug except the bottom or end face thereof which forms the one wall of the combustion chamber. Hence the plug becomes a

heat insulator, since combustion thereof is held to the end face and sufficient heat cannot reach the pressure bag to damage it.

The inflatable bag is fixed to a cover for the said trash bin so that it may be deflated and the cover removed to charge the trash bin with more waste. Gasket means must be provided along with clamping means to render the trash bin air tight before the bag is again inflated.

Another feature of the invention is the arrangement whereby the trash bin may be charged while the device is in operation. With the trash bin surmounting the combustion chamber and the plug of compacted material, in itself imporous, forming a seal at the one face of the combustion chamber, the compacting bag may be deflated and the cover removed for a short period of time without having combustion creep up along the sides of the bin. Expressed in another manner, the rate at which ignition along the edges of the plug next to the walls of the trash bin might take place would be so very slow that sufficient time is available to recharge the trash bin in comfort by the operator and without danger of sustaining a burn.

Another feature of the invention is the provision of a completely air tight trash bin as well as an air tight inflatable pressure bag within such bin, whereby any source of air behind the burning plug of oxidizable material is avoided.

Other features of the invention will appear hereinafter.

The drawing consists of a single sheet having a single figure, which is a diagrammatic view, generally in cross section, showing the various components of the invention and of the combustion apparatus with which they may be utilized.

A combustion chamber **1** is fashioned substantially of insulating material **2**. The top of this component is open so that it may register with the open bottom of the sheet metal trash bin **3**. At the junction of the combustion chamber **1** and the trash bin **3**, there is located a grill or grid consisting of a plurality of sheathed resistance heating elements **4**, **5**, **6** and so on, so that when oxidizable material **7** is placed in this trash bin, such grid acts as a waste-movement-restricting means which halts downward movement of such material under action of the pressure bag to result in its compaction with a leading face at this point. Placed within the trash bin **3** is an inflatable bag **8**. When a gasket or seal **9** is placed over the edge of the bag **8** and a cover **10** clamped thereover, the trash bin becomes air tight so that no air can move downwardly through the material **7**. A pipe **11** supplies air under pressure whereby the bag **8** is inflated and the material **7** is compacted into an imporous mass which through distillation and carbonization at the lower face thereof becomes even more impermeable. The compacted mass of material therefore becomes a heat insulator to protect the bag **8**, shown fully extended in the drawing, and to keep the lower portion of the trash bin cool so that this does not become a personal or a fire hazard.

The reduction of this material to a clear and odorless gas is accomplished by combustion only over the lower face of this plug of material. The electrical means, herein shown as sheathed resistance heaters **4**, **5** and **6**, is used to ignite the face of the plug and to maintain the temperature necessary for the reduction of the material to a clear and odorless gas when the combustion fails to provide enough heat, as would be the case with wet material. It may be noted that this temperature is substantially 1500° F. After the lower face of the compacted material has been ignited, combustion is maintained by the supply of oxygen in the form of fresh air to the pipe **12** and the electrical heaters are thereafter used only if the temperature drops below 1500° F.

The gaseous product of combustion is exhausted from

the combustion chamber **1** through a pipe **13**, insulated to a point where the gas is cooled by admission of diluted cool air from the source **15** and thence exhausted by the fan **16** through the ducts **14** and **17**. A number of valves **18, 19, 20, 21** and **22** are provided to seal off all air from the combustion chamber so that the fire may be extinguished when desired. For efficient and economical operation, all combustion should take place within the combustion chamber so that, whereas afterburner means might be placed within the insulated duct **13** as in conventional gas fired incinerators, the present electrical incinerator is adjusted to insure complete combustion within the chamber **1** with the flow of only inert gas through the duct **13**. It should also be noted that the fresh air through the inlet pipe **12** mixes with the gas distilled from the face of the material **17** within the combustion chamber **1** and the heat generated by this combustion is mostly conveyed to the material being reduced by radiation rather than by convection. It is intended that the incoming fresh air shall create turbulence within the combustion chamber **1** without being directed against the bottom of the plug, thereby avoiding burning holes deep into the plug of material. It is intended that combustion over only the face of the material at the junction of the combustion chamber and the trash bin shall take place.

It should be noted that at the temperature maintained in the combustion chamber, the combustible material is almost completely reduced so that a minimum of ash is produced. This may be periodically removed by any conventional means. A pipe **21**, shown herein, may be used to flow water into the combustion chamber so that such ash may be flushed down a drain **23**.

It may further be noted that the exhaust gas is generally less than 200° temperature so that the exhaust duct **17** may be similar in construction to the exhaust means conventionally used for household clothes dryers.

While this invention has been shown in but one form, it will be apparent that it is not so limited but is susceptible of changes and variations without departing from the scope of the attached claims.

I claim as my invention:

1. In apparatus for reducing ordinary combustible waste to a smokeless and odorless gas and ash with no combustibles remaining, and including a combustion chamber: a waste material storage bin having an outlet opening directly into said combustion chamber, said bin having an inlet for accepting loose waste material while its outlet remains open directly to said combustion chamber, means in said bin for compacting said loose waste material into an imporous mass and for advancing said mass to said combustion chamber for burning, the last-mentioned means comprising an inflatable member, and means for introducing compressed fluid for inflating said member.

2. In apparatus for reducing ordinary combustible wastes to a smokeless and odorless gas and ash with no combustibles remaining, comprising a combustion chamber surmounted by a waste material storage bin openable to accept loose waste material while surmounting said combustion chamber and means in said bin for compacting said loose waste material into an imporous compacted mass and for forcing such compacted mass of material toward said combustion chamber: said last means consisting of an inflatable means, a means for introducing compressed fluid for inflating said inflatable means, and restricting means for halting said waste so as to become compacted with a bottom face forming the top wall of said combustion chamber.

3. An incinerator device, comprising a combustion chamber, a waste material storage bin surmounting said combustion chamber and open at its bottom thereto, closure means at the top of said bin operable for introducing loose waste material into said bin while so surmounting said combustion chamber, an inflatable bag in said bin cooperable with the walls thereof and with said closure means for compacting said loose waste material into an imporous mass and for forcing said imporous mass of waste material toward said combustion chamber, restricting means for halting advancement of said imporous mass so as to have only a leading face exposed to said combustion chamber, means for raising the temperature of the gas within said combustion chamber independently of combustion of said compacted mass, means to supply air to said combustion chamber to maintain combustion of said face, and means for exhausting the products of combustion from said combustion chamber.

4. A waste incinerator device, comprising a combustion chamber, a waste material storage bin open at its bottom to the top of said combustion chamber and openable at its top to accept loose waste material while its bottom is open to said combustion chamber, an imporous inflatable bag in said bin extendable toward said bottom to deliver a force to the top of any waste material stored therein, the fully-extended position of said bag being spaced-apart from said bottom, and waste material restricting means for resisting movement of waste to result in its compaction by said bag with a leading face forming an imporous wall at said combustion chamber.

References Cited

UNITED STATES PATENTS

214,799	4/1879	Wood	126—223
224,683	2/1880	Harper	126—223
248,391	10/1881	Bann	126—223
597,716	1/1898	Hwass	68—21
2,693,774	11/1954	Knowles	110—18
2,932,713	4/1960	Powers	110—18
2,979,897	4/1961	Studhalter	158—50.1 X
3,133,492	5/1964	Czulak et al.	68—21 XR

FREDERICK L. MATTESON, JR., *Primary Examiner.*

H. B. RAMEY, *Assistant Examiner.*