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GARBAGE OR REFUSE INCINERATOR

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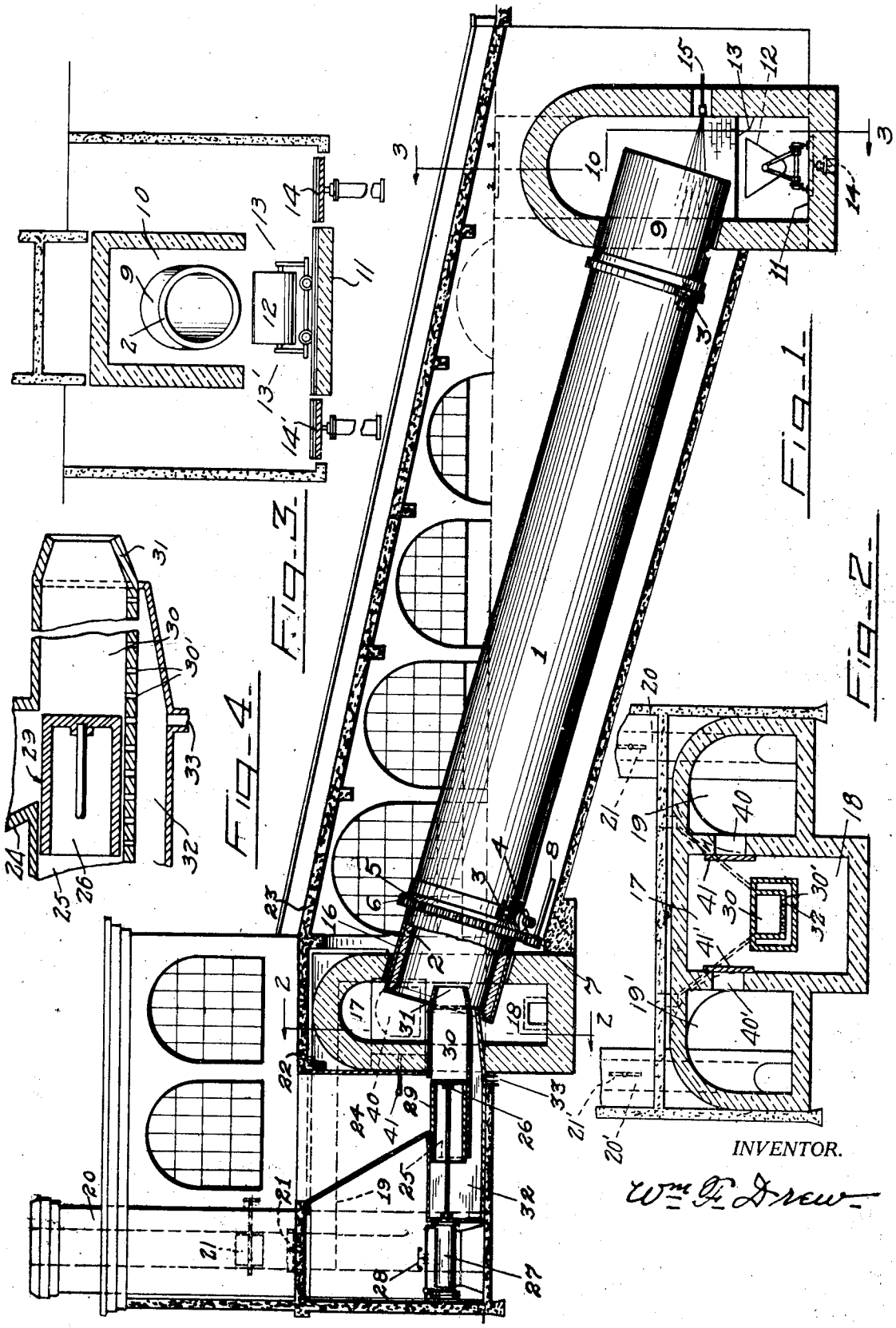

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

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GARBAGE OR REFUSE INCINERATOR.

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The object of my invention is to provide a simple easily operated and efficient incinerator relative to the labor and sanitary requirements involved.

The incinerators at present used require for operation the service of a "receiving crew" for reception and disposal of the materials to be incinerated either to storage bins or other containers or, if the furnace design is characterized as the "hand feed" type, deposit the charges, as required, directly into the furnace proper. Operation further involves the service of a "stoking crew" who by manual labor, an essential but costly method, stoke the burning charges composed of the material collected which comprise garbage, refuse, market waste and the like. These materials as collected; with their variable content of putrescent moisture often exceeding the saturation point, renders the mass difficult to destroy by incineration and in practice requires constant stoking, primarily for permeation of the mass by the oxygen (air) for combustion and to agitate and dry the charges and secondarily to periodically remove the residual clinker and ash together with the non-combustible content; tin cans, wire, etc., present when unsegregated collection is the practice.

Stoking and clinkering labor involves the greater expense of incineration, as the use of storage bins embodying gravity feed to the furnace proper, as well as mechanically operated skips and containers eliminate the greater portion of receiving crew labor.

The presence of free and easily freed moisture in the materials, as collected, form a noxious and unsanitary nuisance especially where "hand feeding" is the practice. Further, this moisture, when no means are provided for extraction from the materials before they are placed in the furnace proper, decreases the thermal efficiency of the combustible content, in the materials as collected, in maintaining temperatures of combustion within the furnace proper.

The object of my invention is to provide a means of incineration obviating "stoking", "clinkering" and "hand feeding" and eliminate the free moisture and such other moisture of saturation as may be extracted by subjecting the materials to be incinerated to pressure during the process of charging the furnace proper.

With the above and other objects in view, the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawings and set forth in the claims hereto appended.

Fig. 1 is a longitudinal section in partial elevation with superimposed ramp and building.

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Fig. 3 is a cross section on line 3—3 of Fig. 1.

Fig. 4 is an enlarged longitudinal section of the feeding and drainage mechanism.

Referring more directly to the drawings, a preferably cylindrical tube 1 constructed of steel or the like is mounted to freely rotate about its longitudinal axis inclined to the horizontal at the required angle to accomplish the required speed of travel of the contents to be incinerated through its length during a period of time sufficient for incineration. The first or feed end portion of the tube 1 acting as an agitator and dryer of the contents charged therein and the successive heat zones developed in the tube 1, by the increasing inflammability of the contents due to evaporation of the moisture content, producing successive stages of incineration until at the lower or discharge end of the tube 1 the non-combustible and ash residue is discharged directly to removal means for disposal.

The tube 1, lined with any suitable refractory material as brick 2 and mounted to freely rotate in the manner and for the purpose described, is supported by the axially parallel rollers 3 set upon suitable foundations, not shown for brevity, the tube ensemble 1 being restrained from longitudinal movement by any suitable thrust bearing as the conical rollers 4 which engage a rim 5 integral with the tube 1. The tube ensemble 1 being caused to rotate by any suitable means as a ring gear 6 integral with the tube 1 the ring gear 6 being driven by a pinion gear 7 on a shaft 8 to which requisite power (not shown) is applied.

The lower extremity 9 of the tube projects into a transverse chamber 10 the bottom or floor 11 of which is at a sufficient distance below the lowest periphery of the tube 1 to allow discharge of the non-combustible material and ash into removal means illustrated as a dump car 12 which may be withdrawn from the chamber 10 through the openings 13 and 13′ to and upon the plat-

form of either of the lifts 14 and 14' and raised to the required point of disposal at grade level as shown. Replacement of a dump car 12 being effected by reversal of the removal method using either of the lifts 14 or 14'.

For preheating the interior of the tube 1 and to assist combustion when required an auxiliary heat source is provided of any suitable design illustrated as a gas or oil burner 15. Air for combustion being admitted through the openings 13 and 13' the quantity required being controlled by dampers in the chimneys later described.

To confine the gases of incineration resulting in the tube 1 the upper extremity 16 of the tube 1 projects into a transverse refractory lined chamber 17 provided with an ash and dust pit 18. Additional retention of dust is accomplished by means of auxiliary dust chambers 19 and 19' adjacent to the chamber 17 and connected thereto by means of the openings 40 and 40' provided with dampers 41 and 41' which permit the volitional use of either or both the dust chambers 19 and 19' and allow shut down of either for the purpose of cleaning while the plant is in operation.

The auxiliary dust chambers 19 and 19' are provided with chimneys 20 and 20' respectively having a damper 21 and 21' respectively for the purpose hereinbefore described of regulating the volume of air required for combustion of the contents of the tube 1 as continuously fed materials to be incinerated are supplied by means of the feed mechanism later described.

Storage capacity is provided of any suitable type or form for the materials to be incinerated. A receiving floor 22 forms a continuation of the inclined roadway or ramp 23 which serves the double purpose of roof and ramp with resultant economy of the housing structure. The floor 22 is provided with a dependent bin 24 the lower extremity terminating in a chamber 25, of desired form, in which works a plunger or ram 26 power actuated to reciprocate in the chamber 25 by any suitable means illustrated as a hydraulic or compressed air cylinder 27 controlled by a suitable valve 28. This is a well known device requiring no further description. The plunger 26 is so constructed that the upper surface thereof 29 forms an automatic feed control gate for the contents of the bin 24 as illustrated in the closed position on the power stroke. An extension 30 is provided with perforations or apertures 30' for the purpose of draining the liquids freed by compression of the material in the chamber 25 and extension 30. The extension 30 of the chamber 25 extends through the refractory lined chamber 17 and into the open upper extremity 16 of the tube 1 forming thereby a feeding means for the successively compressed charges of the plunger 26. The perforated, apertured extension 30, or a structure of equivalent functions, forms a drainage container of the materials compressed therein. The walls of the extension 30 of the chamber 25 converge or are otherwise made constrictive to the passage of the contents thus producing compression of the successive charges propelled therein by the plunger or ram 26. As illustrated, the function of constriction is accomplished by means of the converging tip 31.

The chamber 25 and extension 30 are suitably housed by a reservoir 32, or required form, for receiving the freed liquids of the compressed contents with means for desired disposal illustrated as a sewer connection 33.

It is worthy of note; that as length, diameter, inclination and revolutions per minute determine capacity of incineration in the tube 1, the additional labor of the receiving "floor" crew remain nominal.

Operation: The materials to be incinerated having been deposited in the bin 24 and the auxiliary heat source as the gas or oil burner 15 applied to produce initial temperatures of combustion in the tube 1 the plunger 26 is then operated to compress, drain and intrude the material into the tube 1. The control of the plunger 26 may be synchronized by mechanical mechanism or operated by manual control, the process of incineration thus becoming continuous. The labor involved being that of storage by the receiving "floor" crew and the periodical removal of and replacement of the residual disposal means illustrated as the dump car 12.

By means set forth and described the materials to be incinerated are subjected to an efficient and continuous cycle; agitation and resultant drying, heating to the ignition point, incineration of combustible and sterilization of residuals, without manual labor.

Having thus described my invention, I claim:

1. In a garbage or refuse incinerator, bin means for feeding said garbage or refuse into a chamber provided with apertures, said chamber terminating in a constricted tip, a power actuated plunger in said chamber to compress said garbage or refuse for extracting the liquid therefrom and simultaneously feed said garbage or refuse into a refractory lined tube for the purpose described.

2. In a garbage or refuse incinerator, a receiving floor for storage disposal of said garbage or refuse, a chamber, said chamber provided with apertures for drainage of said garbage or refuse, said chamber further provided with a power actuated plunger for compressing and feeding said garbage or refuse, said chamber interposed between said receiving floor and an axially inclined rotatable refractory lined tube for the purpose described.

3. In a garbage or refuse incinerator, a receiving floor with a dependent bin for storage of said garbage or refuse, said bin terminating in a chamber provided with apertures, said chamber further provided with a constricted tip, said chamber still further provided with a power actuated plunger adapted to compress said garbage or refuse for extracting the liquid therefrom and simultaneously feed said garbage or refuse into a refractory lined tube for the purpose described.

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