

Aug. 1, 1944.

M. EPSTEIN ET AL

2,354,747

INCINERATOR

Filed March 29, 1943

2 Sheets-Sheet 1

FIG. 1.

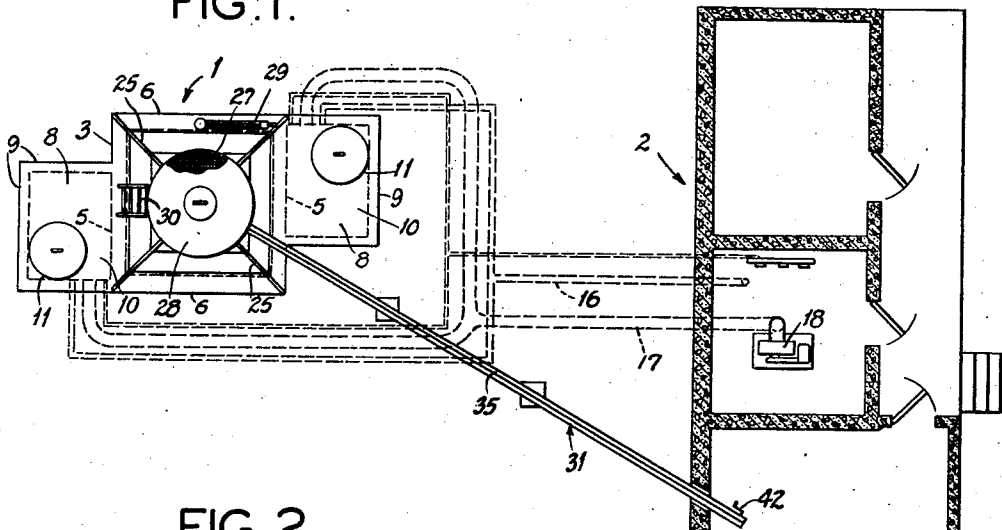
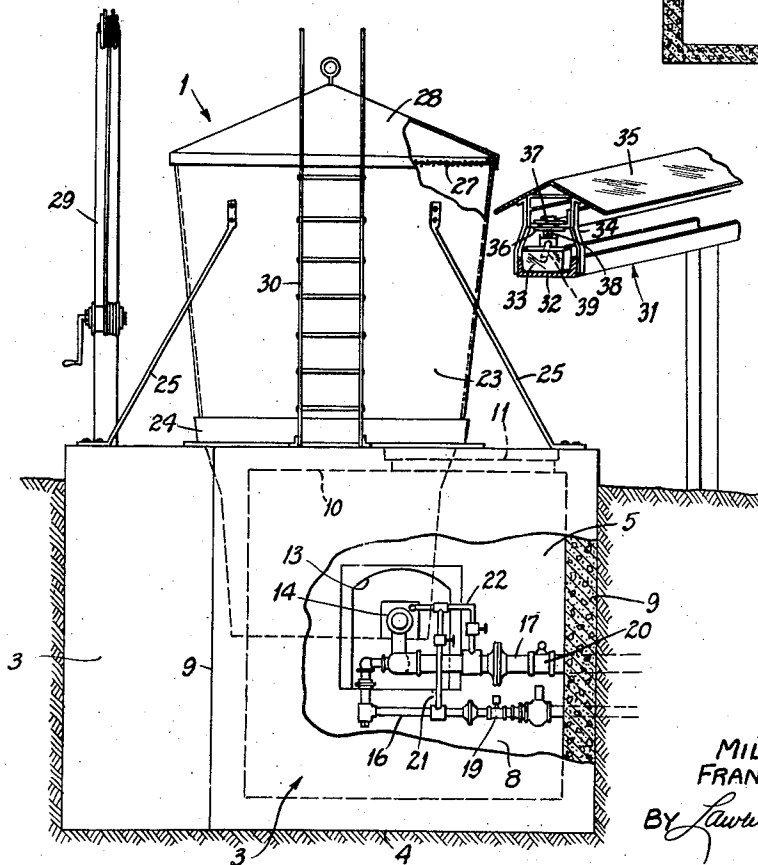


FIG. 2.



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FIG. 3.

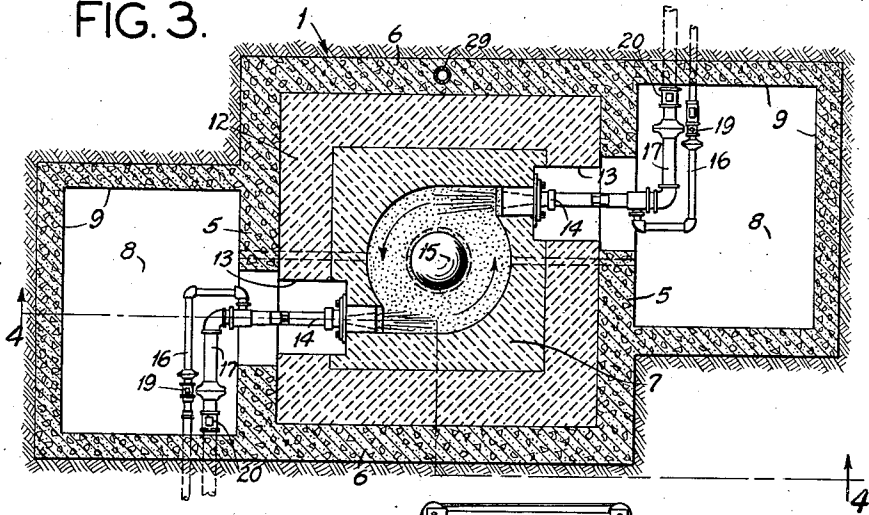
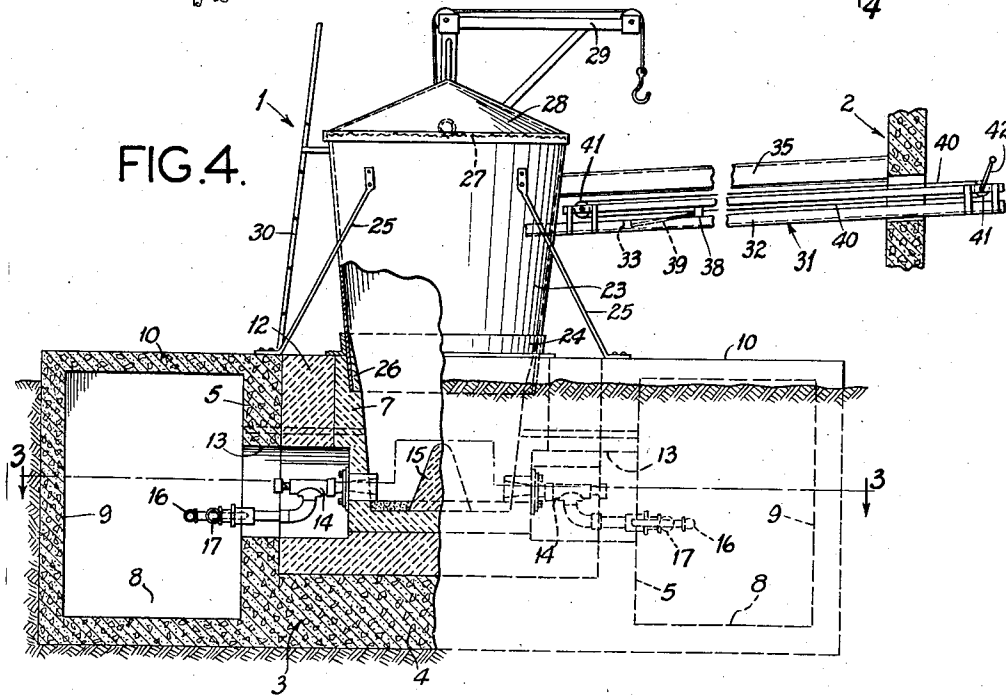


FIG. 4.



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INCINERATOR

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Application March 29, 1943, Serial No. 481,034

4 Claims. (Cl. 110—7)

This invention relates to improvements in means and methods for the disposal of waste or scrap explosive materials such as comprises offal in the manufacture of ordnance, and the principal object of the invention is to provide an improved incinerator plant for the immediate, complete and safe disposal of such materials.

More particularly it is an object of our invention to provide a plant of this character wherein the furnaces in which the waste explosives are consumed are located remotely from a charging and control station therefor so as to minimize hazard to the operating personnel.

Another object of our invention is achieved in the provision of an improved furnace especially adapted for the rapid and complete incineration of explosive materials.

Yet another object is to provide improved mechanism for conveying the materials from the charging station to the furnaces.

These and other objects and advantages will appear from the following description and accompanying drawings illustrating in detail a preferred embodiment of our invention.

In the drawings,

Fig. 1 is a plan view of the incinerator plant hereof;

Fig. 2 is an elevational view, partly in section, showing the furnace structure and a portion of the conveyor;

Fig. 3 is a sectional plan view taken at line 3—3 of Fig. 4; and

Fig. 4 is a partly sectional elevational view taken at line 4—4 of Fig. 3.

Referring now by characters of reference to the drawings, the furnace structure generally is designated 1. The loading and control station comprise a separate structure 2 located at a distance from the furnace. In the illustrated installation a single furnace is shown but in practice it is desirable to provide several separated furnace structures similar in design and construction to the one herein described, each adapted to be charged and controlled from the station 2, such provision permitting of the periodic cleaning and required repair work without necessitating complete shut-down of the plant.

The furnace proper includes a concrete foundation structure 3, preferably cast in situ below the ground level, and consists of a base slab 4 and side walls 5 and 6 rising therefrom which together define a cubiform chamber or combustion pit, open at the top, for reception of the fire-pot or crucible 7. The base slab extends laterally beyond the walls 5 to provide floor por-

tions for valve chambers 8 which enclose the burner equipment, these chambers having concrete walls 9 and roof slabs 10 located at or slightly above the ground level. Openings in the roof slabs for access to the burners are provided with suitable removable closure plates 11.

The combustion pit is lined with fire brick 12, openings 13 communicating with the chambers 8 being provided at suitable locations for accommodating the burners 14. The fire pot or crucible 7 is formed of plastic refractory material to provide a burning chamber of circular cross-section, the inner wall surfaces of the crucible sloping outwardly from the floor to upper edge. A built-in cone 15 of refractory material rises centrally from the floor of the crucible to a height which is preferably in excess of one-third of the depth of the crucible.

The combustion equipment includes the pair of burners 14 which may be either of gas or oil burning type, and these extend through and are tightly sealed within the side openings 13 near the bottom of the pit, being directed tangentially of the crucible space so that they coact to produce a swirling flame of high velocity. Fuel and combustion air are supplied the burners through pipes 16 and 17 which extend underground from the control building 2, a blower 18 in the control room providing combustion air at the required pressure. Suitable magnetic or motor operated valves 19 and 20 for the fuel and air lines 16 and 17 are located in the chamber 8 and have control agencies located in the control room of building 2. These valves proportion the air and fuel to maintain proper combustion within the crucible. A pilot flame is supplied with fuel and combustion air through pipes 21 and 22 leading from pipes 16 and 17, individual hand valves being provided for the pilot supply pipes.

Surmounting the crucible is a tapered cupola 23 which is secured in place by an annular base flange 24, and guy rods 25, the lower edges of the cupola being embedded in the refractory material of the crucible as indicated at 26, Fig. 4. A wire screen 27 mounted on the upper end of the cupola serves to arrest sparks and unconsumed particles and a conical cap 28 provides a closure and rain shed for the structure when not in use. Suitable provision for facilitating removal of the cap and screen is provided in the crane 29, and a ladder 30 enables easy access to the interior, as for cleaning purposes.

The described furnace is fed with the waste materials by means of a conveyor 31 which extends slopingly from the charging station of

building 2 to the furnace through openings in the walls of these structures, the conveyor comprising a trough 32 preferably consisting of a length of channel iron, in which is disposed to slide a pusher block 33. Brackets 34 secured at suitable intervals along the channel support an angulate roof or rain shed 35 and also support a track 36 for a slide member 37. The track 36 is desirably formed of lengths of oppositely disposed angle irons and the slide member 37 is comprised of a pair of plates secured one above the other in spaced relation to provide lateral groove ways to receive the inner edges of the track angles. A depending device 38 secured to the slide member being pivotally connected thereto one end of a pusher rod 39, the opposite end of this rod being secured to the pusher block 33 which is shaped to the contour of the trough and preferably formed of non-ferrous material such as bronze.

The described pusher assembly is driven by means of a continuous cable 40 carried by a pair of sheaves 41 mounted on brackets near the opposite ends of the run-way, the cable being connected to the slide member 37. As will appear from Fig. 4 the run-way extends into the charging room and the drive sheave at this end is shown provided with a crank 42 for hand actuation.

Incineration of waste explosives is carried out in the described plant by depositing the material in paper boxes which are placed individually on the loading end of the conveyor forwardly of the pusher which is then impelled along the runway by operation of the hand crank, the paper box and contents thereby being delivered through an opening in the side of the cupola and dropping into the burning chamber. Before a subsequent charge can be delivered to the furnace the pusher must be returned to its original position, the time interval thus provided between charges assuring against overloading of the furnace.

The refractory cone in the center of the burning chamber functions to deflect the material into the direct path of the flame where there is maximum temperature and greatest turbulence. A complete and rapid burning of the material is thereby obtained. Because of the tapered construction of the fire chamber and cupola forces from the expanding gases are directed upwardly through the open top.

Having described our invention, what we claim and desire to secure by Letters Patent is:

1. An incinerator furnace comprising means forming a tapering combustion chamber which extends with gradually increasing diameter from the bottom to the top of the incinerator, the incinerator having a top opening substantially coextensive with the upper end of the combustion chamber, and a side opening at the bottom of the combustion chamber, a conical projection rising centrally from the bottom to a point above said side opening, a horizontally disposed fluid-fuel burner sealed within said side opening and directed tangentially of the chamber, said burner being adapted to produce a swirling flame circulating about the central cone.

2. An incinerator furnace comprising a foundation structure formed to provide a central chamber and a pair of valve chambers on opposite sides of the central chamber, said valve chambers having access openings and removable closure plates therefor, a lining of refractory material on the inner surface of the central chamber forming a burning space of gradually increasing diameter from bottom to top, a conical projection rising centrally from the bottom of the burning chamber, a pair of horizontally disposed burners on the opposite sides of the central chamber, projecting tangentially into the burning space from said valve chambers, sealing means about said burners separating the burning chamber from the valve chambers, and an open-topped cupola structure of gradually increasing internal diameter from bottom to top, surmounting the foundation above said central chamber, and means for feeding waste materials to the burning space through an opening in the side of said cupola structure.

3. An incinerator furnace comprising means forming a circular burning chamber of refractory material, said chamber being of gradually increasing diameter from bottom to top and having a conical projection rising centrally from the bottom, a pair of burners extending tangentially on opposite sides of said chamber near the bottom thereof, adapted to produce a swirling flame circulating about said conical projection, a cupola of gradually increasing internal diameter from bottom to top surmounting the burning chamber, said cupola having a side opening near the top thereof for the introduction of materials to be consumed, and a top opening substantially coextensive with the upper end of the cupola.

4. An incinerator furnace for the consumption of waste explosives comprising a subterranean foundation structure formed to provide an upwardly open central chamber and separate valve chambers on opposite sides of the central chamber, said valve chambers having access openings and removable closure members for said openings, a lining of refractory material on the inner surface of the central chamber forming a burning space of gradually increasing diameter from bottom to top, an upwardly convergent cone of refractory material rising centrally from the bottom of the burning chamber, a pair of horizontally disposed burners on opposite sides of the central chamber, projecting tangentially into the burning space from said valve chambers, said burners being adapted to produce a swirling flame circulating about said conical projection, a cupola of gradually increasing diameter from bottom to top, surmounting the burning chamber, said cupola having a side opening near the top thereof for the introduction of waste materials to be consumed, and a top opening which is substantially coextensive with its upper end, a spark arrestor screen and a removable closure member at said top opening.

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