

March 16, 1965

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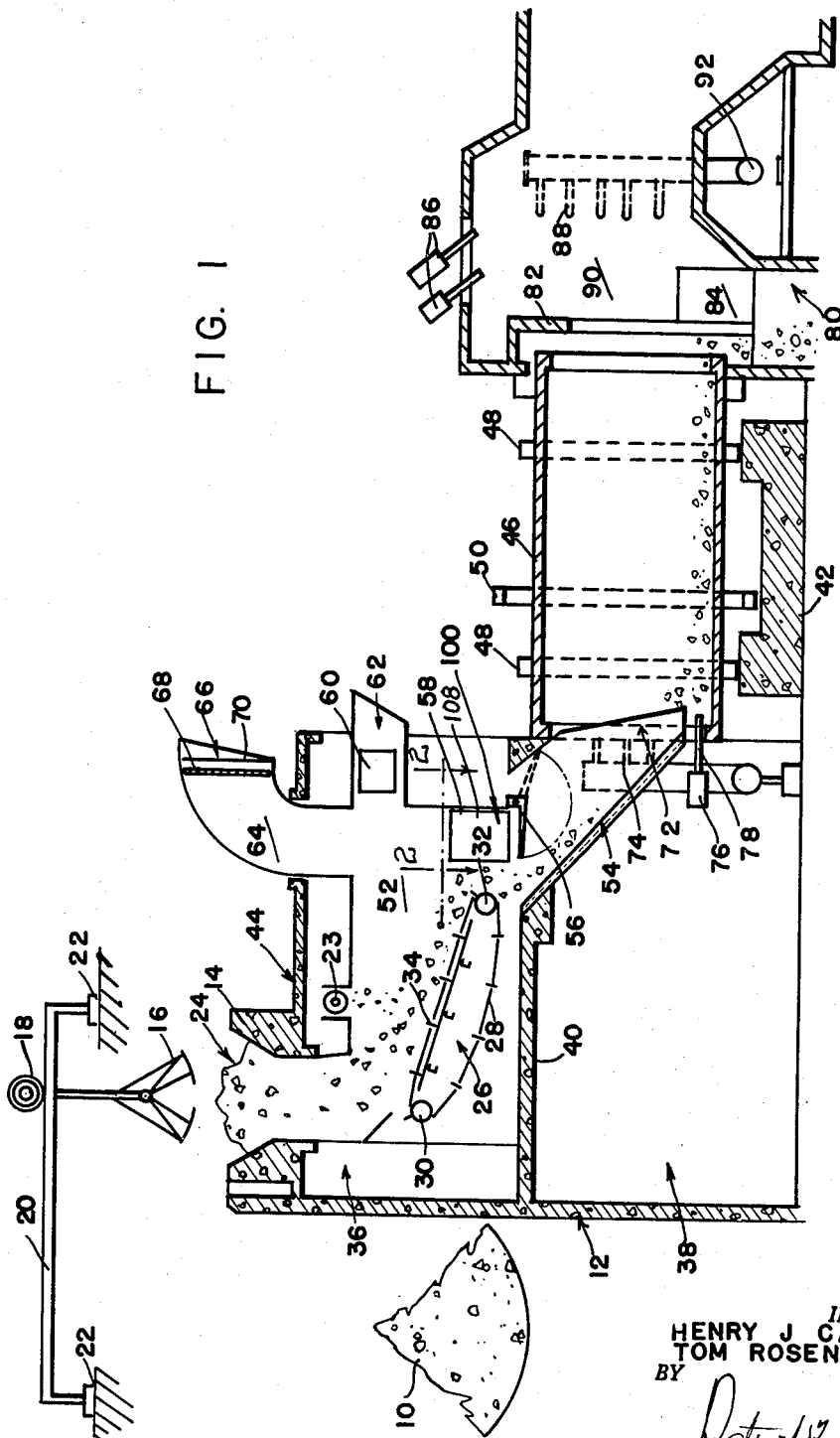
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INCINERATORS

Filed Nov. 13, 1961

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FIG. 1



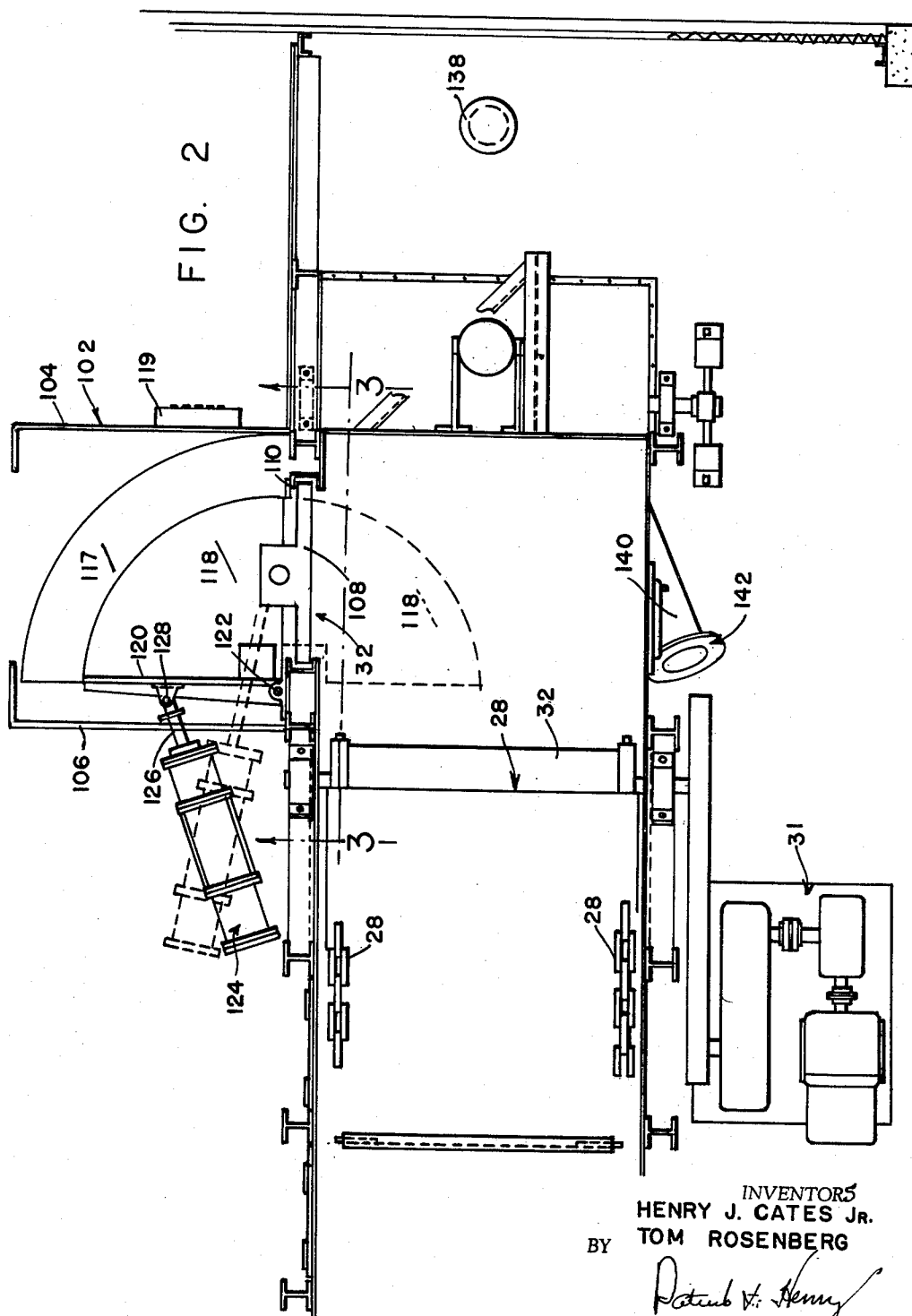
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4 Sheets-Sheet 2



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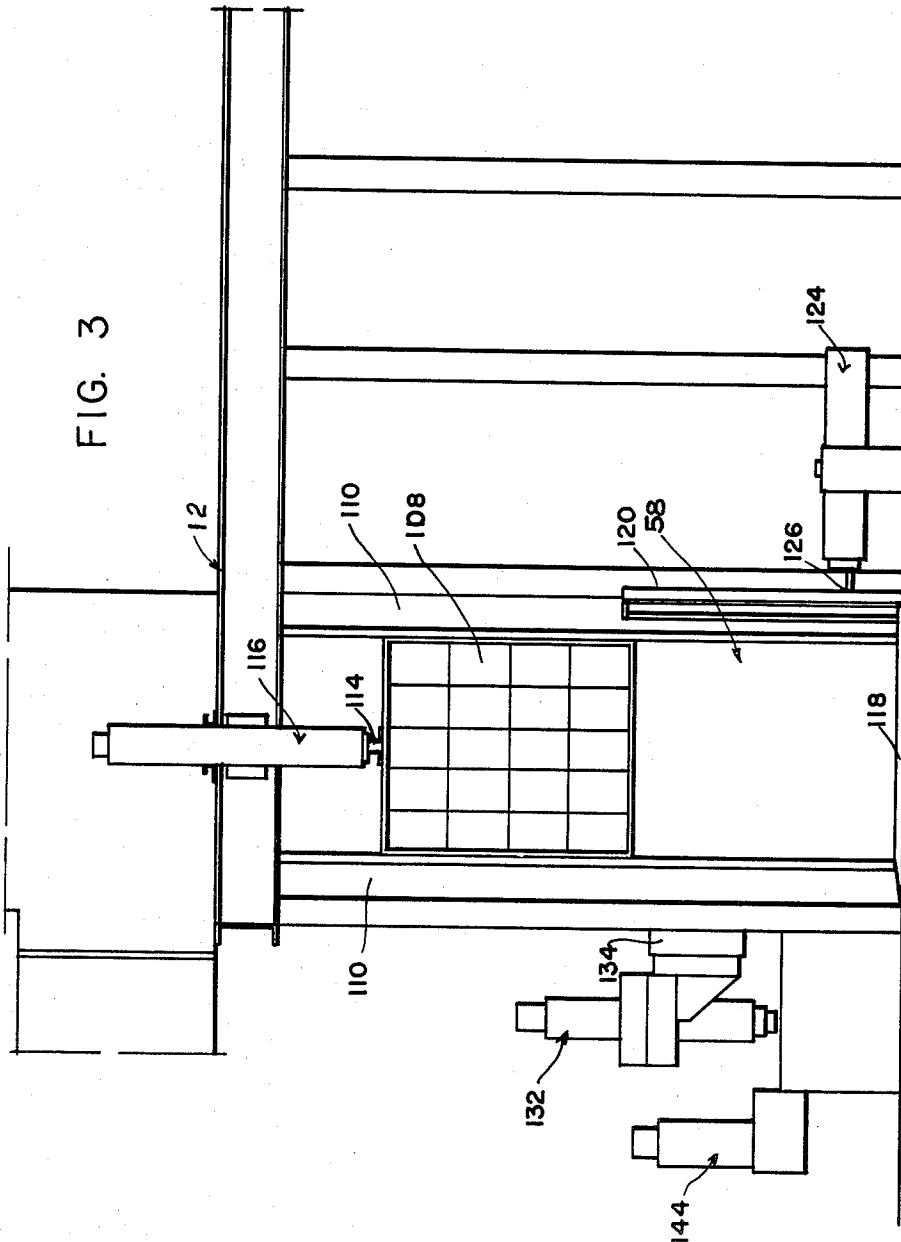
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4 Sheets-Sheet 3



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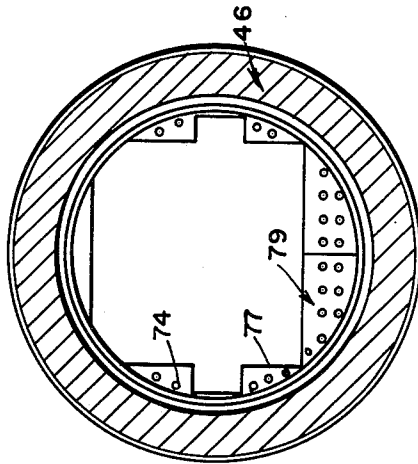


FIG. 5

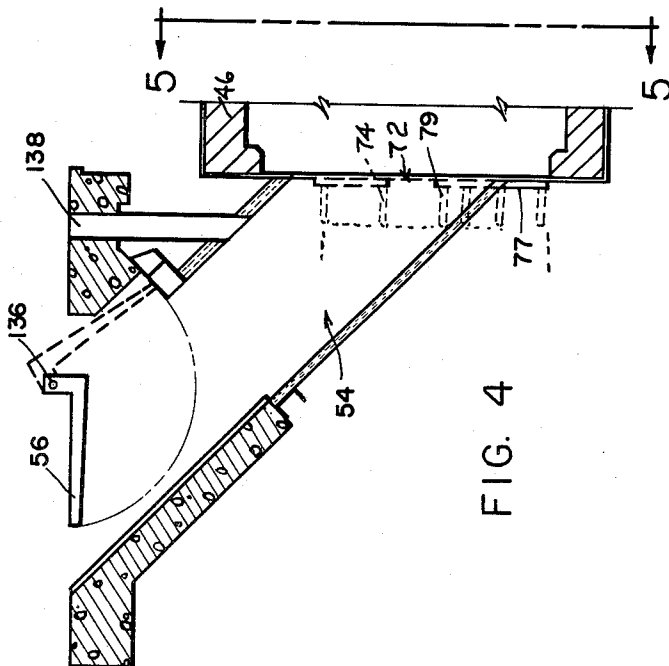


FIG. 4

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3,173,389

INCINERATORS

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Filed Nov. 13, 1961, Ser. No. 151,619
6 Claims. (Cl. 110-14)

This invention relates to an incinerator and particularly to an incinerator having an explosion-proof arrangement therein for handling highly inflammable and even somewhat explosive materials, such as plastic waste material and the like.

The art of continuous incineration involves the employment of a large building structure into which at one end is fed the refuse to be burned and at the other end is provision for removing the small amount of residual material which is usually a fine ash. Such incinerators are generally adapted to burn all types of waste material and are commonly constructed and used both for municipal and industrial purposes. When such incinerators are used primarily for industrial purposes, it may be anticipated that various types of highly volatile or inflammable and even somewhat explosive materials will be introduced into the incinerator. This presents no substantial problem as long as these materials are mixed in small amounts with other materials, but in some instances this is not possible since the material is brought to the incinerator in large volume and even having previously been packed in drums or bales.

Generally described, the present invention employs a building structure of reinforced concrete or the like having upper and lower sections in which is located the elements of continuous incinerator. Refuse is deposited near the front or outside of the building and an overhead crane or the like is arranged to remove the refuse from time to time and to deposit it through a hopper arrangement forming a part of the entrance to the incinerator. A continuously moving drying grate structure is located in a closed compartment beneath the hopper and is adapted to receive and to move and dry the refuse which is deposited through the hopper. In close communication with one end of the chamber in which the drying grate is located is a feed chute arrangement sealed from the outside and having provision therein to direct the material from the end of the drying grate to the entrance end of a rotating kiln connected therewith. In the present embodiment, there is a means provided in the form of a movable pallet feeding through a closed door to transfer bales or drums of combustible or somewhat explosive materials into the incinerator in the vicinity of the feed chute. In connection with this, there is located a drop gate or door onto which the combustible or explosive material is deposited and from which the material is dropped after the explosive proof door and pallet arrangement has returned to sealed condition. Material, including the explosive or combustible material, delivered down the feed chute is fed into the sealed entrance of the rotary kiln which has air blast means associated therewith and has a portion thereof cooled by water cooling tubes. After the material is fed through the rotary kiln and burned and reduced substantially therein, it is exited in a particular baffle arch arrangement at which point the incineration of the material is completed as contemplated in the present arrangement.

The arrangement mentioned above for introducing the highly volatile or explosive material into the incineration process comprises a separate entrance into the incinerator in the vicinity of and above the feed chute including a movable pallet which is rotatable from outside of the incinerator to the inside of the incinerator through an explosive proof door which is lifted by means of a hydraulic

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cylinder operable by suitable controls. The pallet is so arranged as to be removable when empty from inside of the incinerator while the explosive proof door is closed. Inside of the incinerator there is a drop gate or charging grid tilterly mounted and adapted to be controlled by means of a hydraulic cylinder to drop the material after it has been deposited on the charging grid by means of the removable pallet. Located above the charging grid and the feed chute is a large vent over the top of the feed chute which opens to the outside of the building to relieve any explosions which might take place in the incinerator. Primary combustion air is damper controlled to the top of the feeder and travels down the feed chute to the kiln.

Refuse at some industrial plants consists of plastics, paper, boxes and other solids of high B.t.u. content, plus many non-burnable solids. Most of the waste products from laboratories are extremely hazardous. Toxic, reactive or explosive, these items, although usually small in volume, are frequently the hardest disposal problems.

Safe and efficient disposal of these materials may be accomplished through the use of the present incinerator. Chemical wastes, plastics, still residues and even plant rubbish have a much higher B.t.u. content than ordinary garbage and refuse. The hydrocarbon nature of most of the wastes produces a very dense black smoke, and occasionally a drum or can of chemicals explode in the fire. A typical rotary kiln incinerator of the type disclosed in the present application may be designed to burn many tons per day of mixed refuse, including plastics, rubbish and drums of chemicals. Refuse, except full drums and packs of hazardous material, is dumped into a refuse pit. An overhead crane or other traveling hoist is used to mix the refuse and elevated to the charging hopper. From the charging hopper, the refuse falls by gravity onto a drag chain conveyor located inside a feeder housing.

Packs and drums are dropped down the feed chute with a hydraulically operated feed device. This gives maximum protection to the operator and workers. A large vent over the feed chute opens to the outside of the building, to relieve any explosions that might take place in the kiln. Primary combustion air is damper controlled through the top of the feeder and travels down the feed chute to the kiln. The feeder may be under negative head from the stack. The charging door or opening to the feed chute is closed before the packs and drums are released to the chute. This insures safety in the vicinity of the drum charging area. Each pack and drum charging unit consists of a special system attached to a part of the feed unit. Each system comprises a pack and drum pallet, a vertical safety gate, a charging grid, suitable oil operated power cylinder complete with solenoid valves, oil piping, hydraulic oil pumps, interlocking switches, etc., all as disclosed in the drawings.

A primary object of this invention is to provide a continuous operating incinerator which will burn highly burnable materials such as packs or drums of plastics and other materials.

Another object of this invention resides in the novel arrangement for charging the incinerator with the packs or drums or units of the highly combustible materials such as plastics and the like.

Still another object of this invention resides in the arrangement of the continuously operating incinerator whereby packs and drums of highly explosive or highly burnable materials may be charged into the incinerator at any time without impeding the incineration operation and including suitable safety means to protect against explosions which may occur inside the incinerator.

Another object of this invention is to provide a continuously operating incinerator with a special charging

unit whereby highly combustible materials may be fed into the incinerator and including suitable venting and primary air for accommodating these highly burnable materials as they are charged into the system from time to time.

Other and further objects and advantages of my invention will become apparent upon reading the following specification taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a diagrammatic cross-sectional view of an incinerator plant constructed in accordance with the present invention.

FIG. 2 is a top plan view of the drum and pack charging unit taken substantially along line 2—2 in FIG. 1 and showing the drum and pack pallet moved into position in dotted lines.

FIG. 3 is a front elevation view of the drum and pack charging unit shown in FIG. 2 and taken substantially along lines 3—3 therein.

FIG. 4 is an enlarged side elevation view of the feed chute shown in FIG. 1.

FIG. 5 is a front end elevation view of the water cooled input end of the rotary kiln taken substantially along lines 5—5 in FIG. 4.

Referring initially to FIG. 1 for an overall discussion of the entire incinerator plant and then later on into various other figures of the drawing for details of different sections of the incinerator, refuse or waste material 10 stored outside of the plant structure 12 is transported into the fixed hopper arrangement 14 by means of an overhead traveling crane 16 running on a pulley 18 across a beam 20 supported on pillows 22. A screw conveyor 23 conveys other types of materials into the feed unit and drops the material onto conveyor 28.

The fixed hopper arrangement 14 which is constructed partly from reinforced concrete includes a tapered mouth 24 into which waste material is fed falling upon a continuously driven conveyor and drying means 26 employing a continuous chain conveyor 28 driven by a power motor reducer unit 31 across spaced drive rollers 32. The conveyor or feed conveyor 26 has placed on the continuous conveyor chain 28 a number of spaced barriers 34 protruding upwardly from the surface of the conveyor chains 28 and forming spaced refuse carrying devices.

The overall incinerator structure 12 is housed in a closed building, preferably constructed from reinforced concrete and the like, having an upper lever area 36 and a lower level area 38 separated by suitable overheads 40. Reinforced concrete pillows and supports 42 are located on the ground at convenient locations for supporting various elements of the incinerator 12. The top of the incinerator in the vicinity of and forming a part with the hopper 14 is designated generally at 44 and is essentially a roof structure constituting the top portion of the building structure 12.

The concrete supports 42 support a retaining means for a rotary kiln 46 which retaining means comprises spaced kiln supports 48 rotatably supporting the shell of kiln 46 therein. Kiln 46 is driven by a drive gear arrangement 50.

Conveyor 28 is located in a compartment 52 connected by means of a feed chute 54 with the entrance to the rotary kiln 46. Feed chute 54 is water cooled by means of water circulating in tubes associated therewith. Within the entranceway portion of the feed chute 54, there is located the drum or pack charging grid 56 which, when operated, pivots, from the full line position shown to the dotted line position shown, to drop a drum or pack charged from the outside of the incinerator through the normally closed drum or pack charging opening 58 formed in the wall of the compartment 52.

Located above the drum or pack charging opening 58 is an inside air intake 60 and adjacent thereto there is an outside air intake 62. Above the drum or pack charging opening 58 and in open communication therewith, there is a duct work arrangement 64 leading to the outside and

being closed by means of an automatic explosion relief vent arrangement 66 comprising an open grill or grid 68 having an asbestos curtain 70 covering the outside face thereof and being attached only at one end whereby the curtain 70 will be blown outwardly upon the occurrence of an abnormal pressure through the duct work 64.

Associated with the rotary kiln 46 there is a water cooled seal arrangement at the front end of kiln 46 designated generally by the reference number 72 and in the vicinity thereof there is an over fired air duct and nozzle arrangement 74. A tar burner 76 is located below the chute 54 at the entrance to kiln 46 and employs a nozzle 78 projecting into the inside of kiln 46. Plates 77 confine nozzle 74 in a water chamber 79.

Connected to and associated with the outward end of kiln 46 is the ash removal conveyor 80 and the baffle arch arrangement 82 provided with an access opening 84. At the top of the vicinity of the baffle arch arrangement 82, there are located a pair of after burners 86 for completing the ignition of remaining trash and residue and, in addition, there are nozzles 88 in the vicinity of the chamber 90 located near the baffle arch 82. A turbulence air duct 92 is located below the nozzles 88 and is adapted to provide an air turbulence.

The explosion relief vent arrangement 66 at the top of the incinerator and extending to the outside of the building is for the purpose of relieving the unit in case of explosion either in the kiln or feed unit. The curtain 70 is a light weight flame-proof device of asbestos or the like which opens and closes by gravity to permit relief of an explosion to the outside, but normally is closed and prevents the entrance of air. The top of the curtain 70 is fastened by any suitable fastening means such as staples, bolts or the like (not shown).

The feed conveyor 28 consists of strands of heat treated alloy steel of rivetless type chain designed for a high ultimate strength. The members 34 are welded or otherwise attached to the top leading edge of the chains, thereby providing a series of suitable teeth-like devices for clawing cardboard, paper, etc., to assist in feeding. The conveyors are preferably driven by variable speed motor, speed reducer and chain drive units (not shown).

Pack and drum charging unit

The pack and drum charging unit designated generally 100 comprises the mechanism and elements including the opening 58 and the charging grid 56 shown in FIG. 1. Reference to the other figures of the drawings, and particularly FIGS. 2 and 3, will assist in a further understanding of the details of the charging unit 100.

In the building structure 12 but outside of the combustion area thereof, there is the drum pack and charging outside accessibility area shown generally by the reference 102 in FIG. 2 and being partially enclosed by heavy steel plates 104, 106 and the like defining an accessibility area permitting workmen to bring in drums of combustible material or packages of combustible material to be fed into the incineration process through the charging opening 58. The charging opening 58 is closed by a large hydraulically operated gate or door 108 mounted in suitable retaining members 110 on opposite sides of the opening 58. Frame members 110 form on the opposed faces thereof a sliding frame into which is slideably mounted the gate 108. Gate 108 is fabricated from heavy duty steel construction adapted to withstand the forces of heat and pressure generated inside of the incinerator. The top of gate 108 has connected thereto a piston rod 114 of a hydraulic cylinder 116 which is controlled by suitable hydraulic control apparatus from a control panel 119 located outside of the incinerator in the vicinity of the access area 102. Hydraulic cylinder 116 is adapted selectively to drive the piston 114 substantially in a vertical direction to raise and lower the gate 108 controlled by the operator.

Supported on the frame structure of the incinerator

building and attached with the access area 104, there is a heavy steel ramp and bearing ring structure 117 of semi-circular formation and extending substantially in a horizontal direction substantially parallel with the horizontal floors of the incinerator. Mounted for support on and sliding relationship with the bearing ring and ramp 117 is a pallet structure 118 having a heavy duty semi-circular bottom sliding on the top of the bearing ring and ramp 117 and having a back, upstanding swinging gate member 120. The pallet 118 and the integral gate member 120 therewith are pivotally mounted on journals 122 to swing from an open position outside of the opening 58 and outside of the incinerator resting on the bearing ring and ramp 117 to a position inside of the incinerator under the gate 108 and through the opening 58 to the dotted line position shown in FIG. 2 at which position it is directly over the charging grid 56 a hydraulic cylinder arrangement 124 having a piston member 126 connected by means of a pivotal connection 128 with the swinging gate 120 on the pallet 118. Hydraulic cylinder 124 is connected by suitable hydraulic line (not shown) and controlled by suitable controls (not shown) from the control panel 119 selectively to operate the cylinder to cause the piston 126 to move the pallet and swinging gate 118, 120 from its outside loading position on bearing ring and ramp 116 to the inside position. In the operation of the device, when it is desired to load, a pack or drum of highly volatile or explosive material such as plastic and the like, it is brought by any suitable transportation means such as truck or otherwise to the vicinity of the bearing ring and loading ramp 116 and placed thereon and then moved into position on the pallet 118. Then, by actuation of the controls 119, the gate 108 is caused to rise to the position shown in FIG. 3 by actuation of the hydraulic operating means to operate the hydraulic cylinder 116 and the controls 119 are operated to cause cylinder 124 to drive piston 126 to move the pallet and the contents thereof into position shown in the dotted lines of FIG. 2. In this position, the retractable pallet 118 is in position over the charging grid 56 and gate 108 is lowered to close the opening 58. Then, the controls 119 are operated to cause the hydraulic cylinder 124 to withdraw the movable pallet 118 which is withdrawn from the bottom of the closed gate 108 leaving the contents, such as a tank or drum of material, on the charging grid 56.

By means of a hydraulic cylinder and drive arrangement 132 connected by suitable housed connection 134 with the shaft 136 of charging grid 56, the charging grid 56 may be caused selectively by operation at the control panel 119 to drop from the full line position shown in FIG. 4 at which position it extends over a substantial portion of the mouth of the water cooled feed chute 54 to the translated position shown in dotted lines in FIG. 4, at which point it clears the opening of the feed chute 54 and, at the same time, by gravity drops the contents, such as a package or drum of highly combustible or explosive material, into the water cooled feed chute 54. Door 108 has previously been closed and there is no danger of a blow-back or explosion out through the opening 58 which would possibly injure workmen outside of the incinerator. Above chute 54 is a poke hole 138 through which a rod may be inserted to clear the chute if it becomes obstructed.

In order to observe the combustion which is taking place and for any other reason there is provided a tubular member 140 covered by a glass cover and ring assembly 142 providing an observation port looking into the inside of the feed chute and surrounding territory so that the operation therein may be observed at any time.

The charging grid 56 should consist of heavy duty grids suitably designed for occasional explosive pressure fluctuations within the unit, etc. The grid 56 should have perhaps not less than 75% free area in order not to restrict the flow of the combustion air and the grid would,

of course, be arranged to be operated by the hydraulic cylinder and connection arrangement 132, 134 with proper adjustment of minimum and maximum travel.

Similarly, the vertical safety gate 108 should consist of a heavy duty arrangement designed for the service, including an occasional explosive pressure and fluctuations of pressure within the feed unit. The hydraulic cylinder 116 and piston 114 should be arranged for adjustment with the gate of minimum and maximum travel and for maximum safety an interlock cylinder arrangement 144 is provided to assure the positioning of the gate 108 prior to the actual charging of a possible explosive pack from the charging grid 56.

Suitable hydraulic oil piping and hydraulic oil pumps will necessarily be furnished as part of the equipment (not shown) and the operating pressure, pipe sizes and pump head and capacity shall be determined as a matter of design by the designer of the system. The particular details of this hydraulic system are a common matter of design and are well known to those experienced in the art. Preferably, the hydraulic oil system would be such that the pressure would be maintained at all times, even when the feed unit is not being used as long as the incinerator is in operation so as to hold the charging grid 56 under pressure in the proper operating position.

The operation of the pack and drum charging unit would be along the following lines:

(1) The pallet 118 is normally outside, therefore the pack or drum is placed on the pallet by manual operation.

(2) Operate controls at 119 to cause the vertical safety gate 108 to raise to the up position. A signal light (not shown) could be used to indicate that this operation is completed.

(3) Then the "pallet in" control at 119 is operated which causes the pallet 118 to move through the safety gate opening to the inside of the feed unit. Another signal light (not shown) can be used to indicate that this operation is completed. Also, as soon as the pallet 118 is in, the safety gate will automatically close by means of the interlock operation 144 unless the operator maintains pressure at the controls 119 by manual operation to purposely hold the safety gate up and permit the operator to bring the pallet to the out position should it prove desirable.

(4) Then, the "pallet out" control is operated at 119 causing the pallet 118 to move to the out position (the safety gate 108 does not entirely close, but enough space is left for the bottom of the pallet 118 to move to the out position, causing the pack or drum to be raked off onto the charging grid 56. A signal light (not shown) may be used to indicate this operation is completed.

(5) Then, the controls 119 are operated to slowly move the charging grid 56 to a vertical position releasing the pack or drum of material to the rotary kiln. A signal light (not shown) may be used to indicate that this operation is completed.

(6) After whatever time is required to properly consume the newly fed pack or drum, the controls 119 may be operated to place the unit into the initial position as takes place before the pack and drum feeder system is operated.

The various interlocking switches (not shown) which are a matter of systematic and well known design on the hydraulic cylinders are electrically interlocked in their above noted sequence of operations in order to have as safe a system as is practical. Unless the operator purposely circumvents the interlocking sequence of operations by manual operation at control panel 119, this will assure that nothing occurs accidentally which may be harmful to the operator.

While we have shown and described a particular embodiment of our invention together with suggested matters of design associated therewith, this is only one embodiment for patent purposes and is not to be construed as any sort of limitation on the scope of our invention since

various alterations, substitutions, changes, eliminations, deviations and modifications may be made in the embodiment shown and described without departing from the scope of our invention as defined in the appended claims.

I claim:

1. In a continuously operating incinerator adapted to continuously burn refuse fed therein and to exhaust the residue therefrom, and wherein said incinerator includes an opening through which refuse is fed and a means for closed incineration operation except for openings therein to provide air for combustion and the like, the combination of: a conveyor means in said incinerator receiving refuse delivered continuously therein and transporting same within said incinerator, a kiln in said incinerator having an entrance therein and an exhaust for delivering the ash therefrom, means connecting said conveyor means with said kiln entrance to deliver refuse from said conveyor means to said kiln, an entrance located in said incinerator in the vicinity of said kiln, an explosion-proof door normally closing said entrance in said incinerator, means for opening and closing said explosion-proof door, a charging pallet normally located outside of said charging entrance, means connected with said pallet and door and being selectively operable to move same from an outside to an inside position in said incinerator, and through said charging entrance, means supporting said pallet located in flat position thereon for movement into and out of said entrance, said pallet being movable from an outside position with a drum or pack or the like of combustible material through said entrance created by moving said door and into the inside of said incinerator to deposit said pack or drum, and said pallet being withdrawable from said opening whereby the danger of explosion after depositing said drum or pack or the like is substantially reduced.

2. The device in claim 1 wherein said pallet has a portion thereof movable into position as said pallet charges to close said entrance.

3. In a continuously operating incinerator adapted to continuously burn refuse fed therein and to exhaust the residue therefrom, and wherein said incinerator includes an opening through which refuse is fed and a means for closed incineration operation except for openings therein to provide air for combustion and the like, the combination of: a conveyor means in said incinerator receiving refuse delivered continuously therein and transporting same within said incinerator, a kiln in said incinerator having an entrance therein and an exhaust for delivering the ash therefrom, a separate entrance for explosives located in said incinerator, a charging grid mounted in said incinerator and in the vicinity of said entrance to said kiln, an explosion-proof door movably mounted over said charging grid and normally closing a charging opening in said incinerator, hydraulic means for opening and closing said explosion-proof door, a charging pallet normally located outside of said charging opening, means connected with said pallet and being selectively operable to move same from an outside to an inside position in said incinerator, and through said charging opening, means normally supporting said pallet located in horizontal position thereon for horizontal movement into and out of said charging opening, said pallet being movable from an outside position with a drum or pack or like of combustible material through said opening and into the inside of said incinerator to deposit said pack or drum or the like on said charging grid, and said pallet being withdrawable from said opening whereby the danger of explosion after depositing said drum or pack or the like is substantially reduced.

4. In a continuously operating incinerator adapted to continuously burn refuse fed therein and to exhaust the residue therefrom, and wherein said incinerator includes an opening through which refuse is fed and a means for closed incineration operation except for openings therein to provide air for combustion and the like, the combina-

tion of: conveyor means in said incinerator receiving refuse delivered continuously thereto and transporting same within said incinerator, a kiln in said incinerator having an entrance therein and an exhaust for delivering the ash therefrom, means connecting said conveyor means with said kiln entrance to deliver refuse from said conveyor means to said kiln, a charging grid mounted in said incinerator in the vicinity of said entrance to said kiln, an explosion-proof door movably mounted over said charging grid and normally closing a charging opening in said incinerator, hydraulic means for opening and closing said explosion-proof door, a charging pallet normally located outside of said charging opening and said door, means connected with said pallet and being selectively operable to move same from an outside to an inside position in said incinerator, and through said charging opening, means outside said incinerator and normally supporting said pallet thereon for movement into and out of said charging opening, an explosion relief vent means located above and in association with said charging opening, an automatically operable explosion relief located on said explosion relief vent means, said pallet being movable from an outside position with a drum or pack or the like of combustible material through said opening and into the inside of said incinerator to deposit said pack or drum or the like on said charging grid, and said pallet being withdrawable from said opening, and said pallet having a portion thereof temporarily closing said opening as said pallet is pushed therethrough to deposit said drum or pack or the like on said charging grid.

5. In a continuously operating incinerator adapted to continuously burn refuse fed therein and to exhaust the residue therefrom, and wherein said incinerator includes an opening through which refuse is fed and a means for closed incineration operation except for openings therein to provide air for combustion and the like, the combination of: a conveyor means in said incinerator receiving refuse delivered continuously thereto and transporting same within said incinerator, a kiln in said incinerator having an entrance therein and an exhaust for delivering the ash therefrom, means connecting said conveyor means with said kiln entrance to deliver refuse from said conveyor means to said kiln, a charging grid mounted in said incinerator and in the vicinity of said entrance to said kiln, an explosion-proof door movably mounted over said charging grid and normally closing a charging opening in said incinerator, means for opening and closing said explosion-proof door, a charging pallet normally located outside of said charging opening and said door and comprising a pallet of substantially flat construction with a closure door mounted thereon, means connected with said pallet and door and being selectively operable to move same from an outside to an inside position in said incinerator, and through said charging opening, a support member mounted outside said incinerator and normally supporting said pallet located in flat position thereon for movement into and out of said charging opening, an explosion relief vent means located above said charging opening, automatic explosion relief means located on said explosion relief vent means, said pallet being movable from an outside position with a drum or pack or the like of combustible material through said opening created by moving said door and into the inside of said incinerator to deposit said pack or drum or the like on said charging grid, and said pallet being withdrawable from said opening with said door partially closed close to the top of said pallet whereby the danger of explosion after depositing said drum or pack or the like is substantially reduced, and said movable door on said pallet temporarily closing said opening as said pallet is pushed therethrough to deposit said drum or pack or the like on said charging grid.

6. In a continuously operating incinerator adapted to continuously burn refuse fed therein and to continuously exhaust the residue therefrom, and wherein said inciner-

ator includes an opening through which refuse is fed and a means for closed incineration operation except for openings therein to provide air for combustion and the like, the combination of: a conveyor means in said incinerator receiving refuse delivered continuously therein and transporting same within said incinerator, a rotary kiln in said incinerator having an entrance therein and an exhaust for delivering the ash therefrom, a water cooled feed chute connecting said conveyor means with said rotary kiln entrance to deliver refuse from said conveyor means to said kiln, separate entrance for explosives located in said incinerator in the vicinity of said feed chute, a charging grid mounted in said incinerator over said water cooled feed chute and in the vicinity of said entrance to said kiln, an explosion-proof door movably mounted over said charging grid and normally closing a charging opening in said incinerator, hydraulic means for opening and closing said explosion-proof door, a charging pallet normally located outside of said charging opening and said door and comprising a pallet of substantially flat construction with a movable upstanding door mounted thereon, hydraulic means connected with said pallet and door and being selectively operable to move same from an outside to an inside position in said incinerator, and through said charging opening, a bearing ring and ramp member mounted outside said incinerator and normally supporting said pallet located in flat position thereon for movement into and out of said charging opening, and over-fired air vent located above said charging opening and said chute, and air intake means, an explosion relief vent means located above said charging opening, an explosion relief device located on said explosion relief vent means and comprising a grid member having a fire-proof curtain hung thereover, said pallet being movable from an out-

side position with a drum or pack or the like of combustible material through said opening created by moving said gate and into the inside of said incinerator to deposit said pack or drum or the like on said charging grid, and said pallet being withdrawable from said opening with said gate partially closed close to the top of said pallet whereby the danger of explosion after depositing said drum or pack or the like is substantially reduced, and said movable gate on said pallet temporarily closing said opening as said pallet is pushed therethrough to deposit said drum or pack or the like on said charging grid.

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