This invention relates to a mobile pick-up unit, and more especially to mobile apparatus for collecting combustible and incombustible refuse, in which the former is burned as fast as it is picked up and the latter is stored for convenient transfer to a servicing vehicle, such as disclosed in my pending application Serial No. 591,198, filed June 13, 1956, now Patent No. 2,961,977, of which this is a continuation-in-part.

The principal objects of the invention are to provide an apparatus which is mobile and can therefore travel to the places where collections of refuse are to be made; to provide for the combustible refuse may be immediately and continuously consumed at the place of and while en route to the next place of pick up so as to be useful for servicing large areas without recourse to a dump; and which will also provide storage for a large quantity of incombustible material in such fashion that it can be easily discharged when necessary to servicing vehicles; to provide apparatus in which both dry and wet refuse including garbage may be entirely consumed without producing offensive smoke and/or odor; to provide apparatus in which the hot gases produced by combustion may be cooled sufficiently to be discharged without danger to personnel or damage to foliage along the route of the vehicle; to provide apparatus in which the residue of ash and non-combustibles is discharged into a receptacle from which it may readily be removed without handling; to provide an apparatus which is efficient and economical of fuel, and to provide an apparatus which is durable and dependable.

As herein illustrated, the apparatus comprises a truck chassis upon which there is mounted a refractory lined, horizontally disposed, cylindrical combustion chamber. The combustion chamber is mounted at its rear and forwardly at one side of the chassis, for tilting of the forward part of the chamber downwardly so that it inclines forwardly and downwardly. A forwardly and downwardly inclined baffle is at the forward end of the combustion chamber which traps and prevents unburned refuse from falling directly through the discharge opening. A burner is mounted at the rear end of the combustion chamber, below the grate, for igniting refuse on the grate. A blower is also located at the rear end of the combustion chamber for producing a draft forwardly in the combustion chamber, beneath the grate, and there is means for feeding refuse continuously onto the upper end of the grate including a screw arranged to force the refuse through a suitable opening at the rear end of the chamber onto the grate, and a conveyor for lifting refuse from the rear end of the chamber upwardly to the screw. The convolutions of the screw gate the opening at the rear end of the combustion chamber, thereby preventing possible blow-back. There is a hot gas discharge opening in the top of the combustion chamber near its rear end and a baffle spaced from the top of the combustion chamber for causing the hot gaseous products of combustion to travel rearwardly over the forward part of the grate before they are exhausted through the discharge opening. A cooler is mounted on the top of the combustion chamber which has a rear opening to the atmosphere and a connection forwardly of the rear opening to the hot gas discharge opening in the combustion chamber. A conductor is connected to the forward end of the cooler, at one end at its opposite end to an exhaust fan, there being a filter interposed in the conductor between the cooler and the exhaust fan. The combustion chamber and appurtenances are enclosed within a hood mounted on the chassis. The top of the hood is spaced from the top of the combustion chamber and the cooler and contains a plurality of vents. A conduit is connected to the discharge side of the exhaust fan and is provided with a plurality of laterals which extend therefrom to the vents.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

FIG. 1 is an elevation of the right-hand side of the apparatus in relation to the direction of travel;
FIG. 2 is a plan view of the apparatus;
FIG. 3 is a vertical section diametrically of the combustion chamber;
FIG. 4 is an elevation of the storage chamber for incombustibles and the driving mechanism associated therewith; and
FIG. 5 is a section taken on the line 5—5 of FIG. 2.

Referring to the drawings, FIG. 1, there is shown the chassis 10 of a motor vehicle, upon which there is mounted a platform 13 and cab 14. Rearwardly of the cab there are stanchions 16 and 18 having bearings 20 at their upper ends, in which are disposed trunnion pins 22 which extend laterally from opposite sides of a horizontally disposed, cylindrical combustion chamber 24, which is suitably lined and insulated with refractory material.

The forward stanchions contain a plurality of openings 25 by means of which their height relative to the platform may be adjusted, thereby to adjust the position of the chamber from a horizontal one, such as shown in FIG. 1, to various degrees of inclination, forwardly and downwardly.

The combustion chamber contains a forwardly and downwardly inclined grate 28 (FIG. 3), supported at its rear end on a transversely extending bar 30 so as to be movable about the axis of the bar as a center and at its forward end by a spring supported plunger 32, so that its forward end is yieldable. A cam 34, disposed beneath the grate in contact therewith is operable by rotation to oscillate or vibrate the grate so that refuse placed upon its upper end will be kept in a state of agitation and will be caused to gravitate toward its lower end. At the forward end of the combustion chamber there is a discharge opening 36 through which the ash and incombustible material is discharged. A baffle 38 is mounted on the forward end wall so that it inclines rearwardly and downwardly toward the forward end of the grate to prevent any refuse except for fine ash and small pieces of incombustible material from falling downwardly over the end of the grate through the discharge opening. A pipe 39 conducts the ash from the opening into a receptacle 41 at the underside of the chassis.

At the rear end of the combustion chamber there is a burner nozzle 40 which extends through a hole in the rear end, beneath the rear end of the grate, for igniting refuse on the grate and for assisting in the combustion of the refuse if it is unusually wet and slow burning. The burner is supplied with suitable fuel from storage tanks of fuel mounted on the chassis, for example propane gas with which extremely hot flames may be produced. There is also located at the rear of the combustion chamber an inlet opening 42, through which air may be supplied to the chamber by means of a blower or fan 44. Air under forced draft is supplied to the combustion chamber beneath the grate so that it travels forwardly in the chamber and upwardly through the in-
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3. Cooled grate. The fan is driven by a suitable motor M mounted on the chassis near the rear end.

To assist in complete burning of the refuse as it travels downward along the grate and complete combustion of the gases produced by combustion, a hot gas discharge port 50 is provided at the top of the combustion chamber, near the rear end, and a baffle 52 is disposed at the underside of the top of the combustion chamber so as to cause the gases produced to travel rearwardly to some extent over the forward end of the grate before they pass out through the exhaust opening.

A cooler, in the form of a chamber 54, is mounted on top of the combustion chamber, parallel thereto, which has a rear opening 56 to the atmosphere. A conductor 58 connects the hot gas opening 50 to the cooler, forwardly of the rear opening 56, and a second conductor 60 connects the forward end of the cooler to the intake side of an exhaust fan 52 mounted on the chassis, at the rear of the combustion chamber, the conductor 60 passing downwardly over the forward end of the combustion chamber and then rearwardly beneath it to the fan and, at some suitable point, intermediate the forward end of the cooler and the fan, there is a filter box 64 for trapping fly ash.

The whole apparatus is enclosed with a hood 66 mounted on the chassis, having side and end walls which conceal the combustion chamber and its appurtenances and a top which is spaced from the top of the combustion chamber and substantially parallel thereto, along which there are a series of vent openings 68. A conduit 70 extends from the discharge side of the exhaust fan 52, upwardly behind the rear end of the combustion chamber, and is provided with a series of laterals 72, which are connected to the vents in the top.

The length of the cooling chamber and the conductors, plus the fact that fresh air is induced with the hot gases, cools them sufficiently so that when they are discharged through the vents the temperature is such as not to harm either the personnel using the equipment or surrounding structures or foliage. The combined action of the conduction and exhaust fans sets up a sufficiently strong draft so that the exhaust has been ignited its combustion may be continued to completion without further use of fuel except where the refuse is unusually wet or there is a large proportion of non-burnable material.

At the rear end of the combustion chamber and within the housing or hood there is mounted means for lifting the refuse and forcing it into the rear end of the combustion chamber onto the rear end of the grate. As herein shown, there is a flight conveyor 74 mounted within a supporting housing 76, the lower end of which is in the form of a trough which extends transversely of the vehicle, into which the refuse may be thrown by attendants. At the upper end of the housing there is a down-take 87, into which the refuse falls as it reaches the top of the housing, onto a screw 89 mounted in the bottom of the down-take. The down-take has a forwardly extending tube or housing 84 through which the screw extends into the rear end of the combustion chamber over the upper side of the grate and rotation of the screw forces the refuse forwardly into the combustion chamber. The convolutions of the screw substantially fill the forwardly extending tube, thereby acting as a gate therein which prevents danger of blow-back.

The motor M, which as previously explained, provided power for the fans 44 and 52, also provides the power necessary for driving the flight conveyor and screw and these are driven simultaneously so that whenever the flight conveyor is delivering refuse to the top of the down-take the screw is simultaneously feeding refuse from the bottom of the intake into the combustion chamber.

As previously explained, the aforesaid combustion chamber and its appurtenances are confined for the most part to one side of the chassis and to the platform 12, so as to make the opposite side of the platform available for a receptacle for receiving incombustible material. The receptacle, as shown in FIG. 4, is a large rectangular sheet metal box 78, open at the top, which may be removable fastened to the platform, parallel to the combustion chamber. As herein illustrated, the box has at its outer side a hinged portion 90, which may be rearwardly and downwardly so as to provide an inclined discharge platform. Suitable abutments 81 are fastened to the box below the hinged section to hold the latter at an angle thereto when swung outwardly. Within the box there is a movable lift plate 82 which is coextensive with the bottom of the box and which has at its corners eye bolts 85, to which are fastened cables 86. Near the top of the box there are pulleys 88 mounted on brackets 90 fastened to the outer side of the box, over which the cables pass and are entrained at their lower ends about a winch 94, by means of which the cables may be shortened so as to raise the elevator plate. At the near side of the box there are stops 95 which engage the front edge of the plate as it is raised to a level with the bottom of the hinged section 89 and on the rear side there are other stops 96 situated at a higher level so that as the plate 82 is raised it is tilted forwardly and hence any matter resting on the plate will be caused to slide forwardly and downwardly out of the box into a truck or the like, or merely for the purpose of discharge into a dumping area. To permit such tilting the cables 86 contain spring section 97.

The hinged section 89 has an opening 100 midway between its ends to facilitate throwing refuse into the box without having to reach over the top edge. This opening may be provided with one or more removable plates 102, there being three shown herein, so that as the box is filled the opening may be closed more and more.

From the foregoing it will thus be seen that the apparatus is especially adapted to be used for picking up and disposing of combustible material immediately so that its capacity as a unit is extremely great in comparison to conventional equipment which must proceed, at frequent intervals, to a dumping area hence taking it out of use and making it necessary to employ a large number of units for performing the same service that one of the units, herein shown, is capable. The instant apparatus is particularly useful along toll highways for disposing of grass, shrubbery of garbage, leaves, twigs, branches, leaves, bushes, etc., and for other purposes.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A mobile incinerator unit comprising a truck chassis, a refractory lined, horizontally disposed, cylindrical combustible chamber, including a vent, having an opening at its forward end adjacent the forward end of the grate through which is discharged ash and incombustible materials, an inlet at the rear end of the combustion chamber above the grate through which is discharged ash and incombustible materials, a baffle at the forward end of the chamber inclined downwardly and rearwardly toward the
forward end of the grate to prevent unburned refuse from falling directly through the discharge opening, a baffle spaced from the top of the combustion chamber, a hot gas discharge opening in the top behind the baffle, a cooler disposed on the top of the combustion chamber, and parallel thereto, said cooler having at its rear end an inlet from the atmosphere, a conductor connecting the cooler to the hot gas discharge opening, an induction fan on the chassis, a conductor extending from the forward end of the cooler to the induction fan, a filter situated in the conductor between the cooler and the induction fan, an enclosing hood on the chassis, of which is spaced from the combustion chamber and cooler and which contains a plurality of vent openings, and a conductor connected to the discharge side of the induction fan from which extend a plurality of ducts, the latter being connected to the vents in said top of the hood.

2. A mobile incinerator unit comprising a truck chassis, a refractory lined, horizontally disposed, cylindrical combustion chamber, means mounting the combustion chamber at its rear and forward ends, at one side of the chassis, for tilting of the forward end downwardly so as to adjust the inclination of the chamber downwardly from the horizontal, a forwardly and downwardly inclined grate disposed in the combustion chamber, means for vibrating the grate, said combustion chamber having a discharge opening at its forward end adjacent the forward end of the grate through which is discharged ash and incombustibles, a baffle inclined downwardly and rearwardly relative to the forward end of the grate to prevent unburned refuse falling directly through the discharge opening, a burner at the rear end of the combustion chamber, situated below the grate, a blower at said rear end to produce draft forwardly through the chamber beneath the grate, and means for charging refuse onto the upper end of the grate including a feed screw for pushing refuse directly onto the rear end of the grate, a flight conveyor mounted on the chassis for elevating refuse to the feed screw, and means on the chassis for effecting simultaneous operation of the flight conveyor and screw.

3. A mobile incinerator unit according to claim 1, wherein there is a receptacle situated below the chassis in direct communication with the discharge opening at the forward end of the combustion chamber for receiving ash and incombustibles.

4. A mobile incinerator unit according to claim 1, wherein there is a receptacle situated below the chassis in direct communication with the discharge opening at the forward end of the combustion chamber, and means for emptying the receptacle.

5. A mobile incinerator unit according to claim 1, wherein the combustion chamber and associated parts are confined primarily to one side of the chassis, reserving the other side for transportation of incombustibles.

6. In a refuse disposal truck, a truck chassis, an incinerator mounted on the chassis, said incinerator having a loading opening at the rear end thereof, a loading elevator mounted at the rear end of the chassis for lifting combustible material up to the loading opening and injecting the material therethrough, a container for noncombustible material mounted on the chassis parallel to the incinerator, and independently thereof so that it can be loaded and unloaded without interfering with the continuous operation of the incinerator and loading thereof, said container comprising a box-like structure of large capacity having an open top and side walls parallel to the sides of the chassis, a hinged panel at the upper part of an outer side wall of the container, said hinged panel being adapted normally to be held upright but to be folded downwardly when unloading, a support disposed within the container near the bottom, stops mounted on the inner face of said outer side wall below the hinged panel, and means for elevating the support and tilting it outwardly about said stops and about a horizontal axis parallel to the side of the chassis to discharge the refuse accumulated within the container through the side opening provided by folding the hinged panel outwardly.

References Cited in the file of this patent

UNITED STATES PATENTS

572,258 Hogan 1896 Dec. 1
1,160,379 Conrad 1915 Nov. 16
1,250,554 Bryan et al. 1917 Dec. 18
1,603,889 Felton 1926 Oct. 19
2,005,082 Greenawalt 1935 June 18
2,127,328 Egan 1938 Aug. 16
2,601,657 Brandt et al. 1952 June 24

FOREIGN PATENTS

308,037 Germany 1916 Sept. 24