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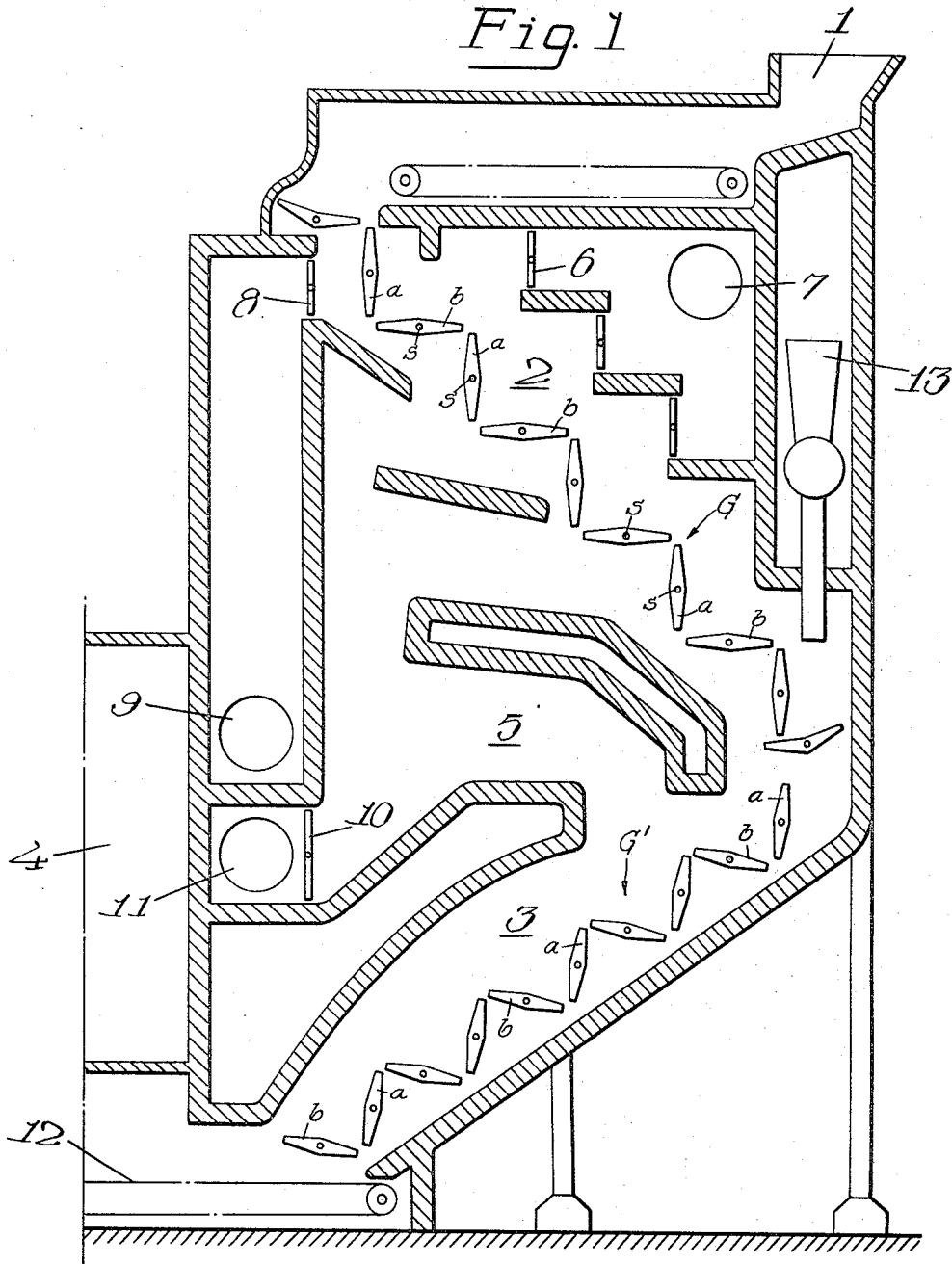
MIKIO ITO

3,332,375

REFUSE INCINERATOR

Filed May 11, 1965

2 Sheets-Sheet 1



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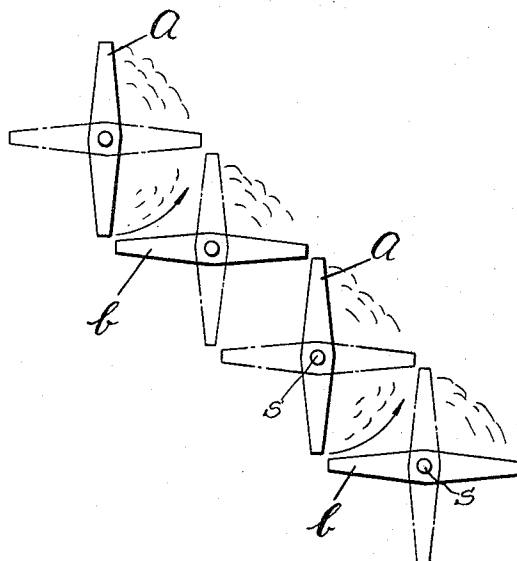
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Fig. 2



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REFUSE INCINERATOR

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2 Claims. (Cl. 110—15)

ABSTRACT OF THE DISCLOSURE

The disclosure deals with an incinerator having upper and lower communicating drying and burning chambers, and blades in at least the drying chamber in which these blades are turnable about center axes and otherwise arranged to form in one relative position a staircase of risers and treads, whereby on turning successive blades in certain opposite directions refuse is progressively worked downwardly over the staircase and simultaneously turned over and mixed.

This invention relates to incinerators in general, and to refuse transport grates in incinerators in particular.

A number of ways have previously been proposed for burning refuse such as garbage and rubbish, by the use of combustion gas in the incinerator, but none of them was sufficiently effective. In conventional refuse incinerators, the mixing of refuse, breaking of rubbish mass into pieces and even drying and incinerating refuse, are so inadequate that the refuse is liable to burn adjacent the inlet of the incinerator passing over a drying chamber therein, which frequently causes damage to the incinerator, and the refuse of low firing point burns very quickly before drying non-combustible materials so that only non-combustible materials are transferred to the burning chamber of the incinerator for complete incineration of the refuse.

A main object of this invention is to eliminate the above drawbacks and to provide an incinerator which is capable of mixing refuse preliminarily and completely, delivering the same to a drying chamber and a burning chamber so as to accomplish ready and complete incineration of large amounts of refuse.

Another object of this invention is to provide an incinerator wherein flame in the burning chamber will not reach into the drying chamber, thereby preventing firing of combustible materials in the drying chamber and obtaining even dryness of both, combustible and non-combustible materials on their transfer into the burning chamber.

A further object of this invention is to provide an incinerator wherein the hot gas in the burning chamber supplied to the drying chamber is controllable in amount suitable for drying up refuse.

Further objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

FIG. 1 is a vertical section through an incinerator according to the present invention;

FIG. 2 is a view illustrating the operation of a featured stepped grate in the incinerator.

The refuse incinerator as shown in FIG. 1 comprises a drying chamber 2 into which refuse is introduced through inlet 1 thereabove, a combustion chamber 3 into which refuse from the drying chamber 2 passes, and a chimney 4. Between chambers 2 and 3 is provided a

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flame interruption path 5 for preventing flame in the combustion chamber 3 from reaching into the drying chamber 2. Provided in the drying chamber is a stepped grate G. Above this stepped grate G is provided a path 7 which communicates with the chimney 4 through a damper or dampers 6, and below the stepped grate G there is a path 9 which communicates with the chimney 4 through a damper 8. In the combustion chamber 3 there is also provided a similar stepped grate G' above which is provided a path 11 which communicates with the chimney 4 through a damper 10, and below the grate G' is a combustion means 12. In order to burn the refuse more intensely there is provided a fuel feeder 13 for the combustion chamber 3.

In the stepped grate G, and preferably also in the grate GG', blades *a*, *b* are carried by substantially parallel, transversely extending rotary shafts S. Blades *a* are in this instance positioned substantially vertically and blades *b* substantially horizontally so as to form in their entirety an ascending staircase.

In operation, the blades *a* will be turned, anticlockwise for grate G and clockwise for grate G', into substantially horizontal disposition (see dot-and-dash lines in FIG. 2), thereby scraping up the refuse on the blades *b*, whereupon the horizontally disposed blades *b* are turned, clockwise for grate G and anticlockwise for grate G', into substantially vertical disposition to drop the refuse upon the blades *a* therebelow. This is repeated over and over, and the blades *a* and *b* are to this end actuated by suitable driving means (not shown) and form a moving staircase in their entirety to work the refuse downwardly.

The refuse, by turning of the blades from substantially vertical position, is scraped up, and by turning of the blades from substantially horizontal position, is dropped down, whereby turning, crushing, separating and mixing of the refuse and downward transfer thereof are performed without any difficulty.

The blades *a* and *b*, instead of being turned successively, may be turned simultaneously particularly when the refuse is more highly combustible.

Flame and hot gas produced in the combustion chamber 3 do not advance directly into the drying chamber 2 but are directed into the flame interruption path 5. Flame is there interrupted and hot gas led to the drying chamber 2, while the dampers 10, 8 and 7 are controlled according to the water content in the refuse admitted into the drying chamber. Adequate drying gas, which has been adjusted in amount and temperature, is supplied to the drying chamber for drying the refuse. Thus it is made possible to prevent firing of combustible materials in the drying chamber and deliver both, combustible and non-combustible materials at even dryness to the burning chamber 3 to effect complete incineration therein. In order to treat large amounts of refuse quickly, it is also possible to add fuel from the fuel feeder 13 to the dried refuse as it is transferred from the drying chamber 2 into the burning chamber so as to effect even more efficient incineration.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

What is claimed is:

1. A refuse incinerator, having a burning chamber and a drying chamber above, and being at its bottom in communication with, said burning chamber, and a grate in said drying chamber consisting of a plurality of relatively flat oblong blades with a longitudinal center axis, and

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means mounting said blades for rotation about their respective axes in such stepped relation to each other that in one relative position of said blades they form an ascending staircase in which successive blades form risers and treads with the lowest tread being substantially at the bottom of said drying chamber, means for turning successive ones of said blades in certain opposite directions whereby refuse is progressively worked downwardly over said staircase and simultaneously turned over and mixed until discharged into said burning chamber at the lower end of said staircase.

2. A refuse incinerator as in claim 1, in which there is provided in said burning chamber another grate identical with said grate in said drying chamber, with the staircase formed by the blades of said other grate in one

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relative position being at its upper end in refuse-receiving relation with said grate in said drying chamber.

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