Dec. 17, 1946. F. M. POOR 2,412,694

REFUSE BURNING GRATE

Filed Sept. 1, 1942

Fig. 1

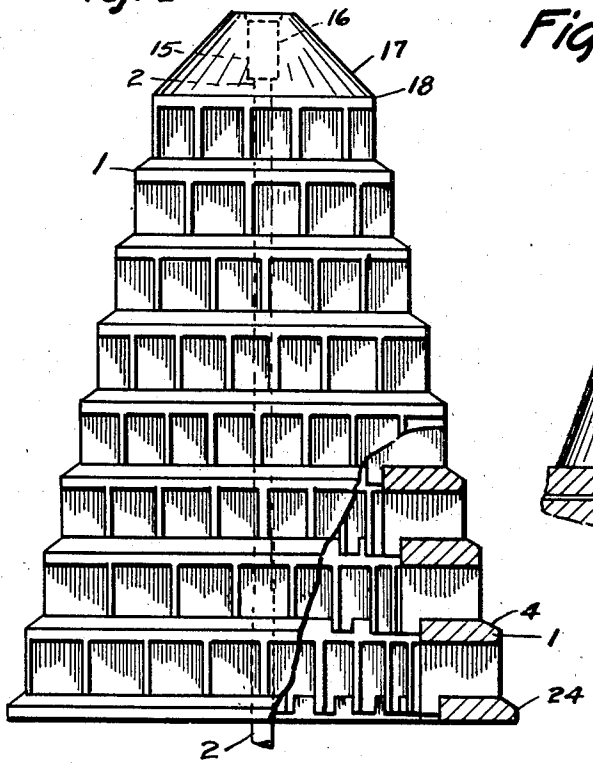


Fig. 2

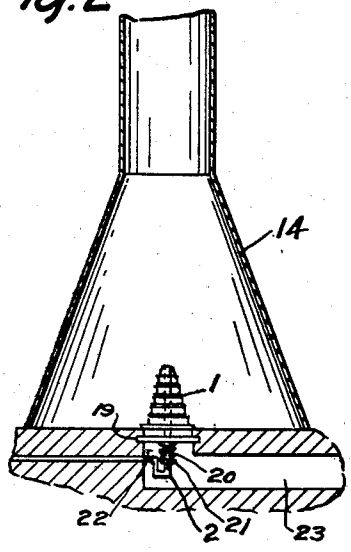


Fig. 3

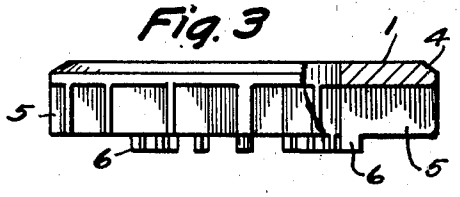


Fig. 4

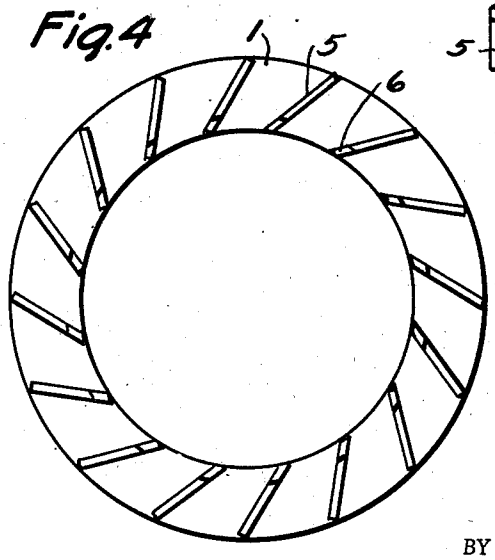
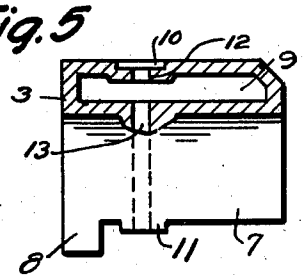


Fig. 5



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REFUSE BURNING GRATE

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5 Claims. (Cl. 110—18)

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The purpose of this invention is to improve the construction of refuse burning grates such as those used for sawdust and the like by extending the grate upward into the fire and providing a forced draft therethrough.

The invention is a burner in the form of a grate comprising a plurality of superimposed rings gradually decreasing in diameter to form a cone, with each ring provided with downwardly extending webs angularly positioned to form vanes, and with the rings locked together by a central tubular member or bolt through which air may be forced to accelerate burning.

Burners of this type have been used but in most cases the rings are relatively close together so that the air passages between them are small, and it has been found that, particularly for hemlock, a relatively large amount of air is absolutely necessary, and it is necessary to carry this air a considerable distance upward into the fire, and this is not possible with the usual type of grate.

The object of this invention is therefore, to provide a burner in the form of a grate for refuse piles and the like which has relatively large circumferential openings, and which carries a relatively large volume of air a considerable distance upward into the fire.

A further object is to provide a refuse burning grate consisting of a plurality of superimposed rings in which the rings are locked together.

And a still further object is to provide a grate for refuse and the like, which supplies air to the center of a pile, and carries the air well upward into the fire, which is of a simple and economical construction.

With these ends in view the invention embodies a comparatively thin flat ring forming a base, a plurality of superimposed rings, each succeeding ring being of a smaller diameter forming a cone, and in which each ring has downwardly and angularly positioned webs to cause air passing therethrough to swirl around the grate, a central tubular member locking the rings together, and providing a forced draft air passage, and a spring in the base of the grate.

Other features and advantages of the invention will appear from the following description taken in connection with the drawing, wherein—

Figure 1 shows a side elevation of the grate with part broken away showing a section therethrough.

Figure 2 shows a typical installation of the grate in a burner housing.

Figure 3 is a detail showing one of the rings of the grate.

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Figure 4 is a plan view looking upward showing one of the rings with the air deflecting vanes thereon.

Figure 5 is a section through a ring of an alternate type showing means for water cooling the rings.

In the drawing the grate is shown as it may be made wherein numeral 1 indicates one of the rings, numeral 2 the central tube or pipe, and numeral 3 a ring of an alternate design in which it is waterjacketed.

The rings 1 are relatively thin in height and their upper outer edges 4 may be beveled as shown. Each upper ring is formed with webs 5 extending downward from the under surface forming vanes and at the inner edges of the vanes are projections 6 which fit over the inner edges of the rings below providing locating and holding means.

The vanes 5 are angularly positioned as shown in Figure 4 in order to provide a swirling action of the air being forced therethrough, and it will be understood that the vanes may be at any angle and as many vanes as may be desired may be used on the rings.

The ring 3 shown in Figure 5 is also provided with vanes 7 and these have projections 8 similar to the vanes and projections of the rings 1, however the ring 3 is formed with an inner opening 9 through which water may be passed to cool the ring, and in order to pass the water from one ring to another the upper surface of the ring is provided with a recess 10 adapted to receive a lug 11 on the under side of a superimposed ring. An opening 12 connects the recess with the opening 9 and another passage 13 extends from the opening 9 through the vane to the lug 11 below carrying water to a corresponding opening 12 in a ring below. It will be understood that any means, other than that shown, may be provided for conveying cooling water through the parts of the grate.

It will be understood that other changes may be made in the construction of the grate without departing from the spirit of the invention. One of which changes may be in the shape or design of the vanes, another may be in the number of rings used in assembling the grate, and still another may be in the use of other means for holding or locking the rings together.

The construction of the grate will be readily understood from the foregoing description. In use the rings may be provided and assembled as shown and described, and for general use the complete grate may be installed in a housing 14

as shown in Figure 2 with a steam pipe 2 extending upward through the center for injecting steam into the fire to facilitate burning, or which may also be used to inject water for extinguishing the fire, and this is provided with a lock nut or coupling 15 at the upper end which corresponds with a recess 16 in an upwardly extending part 17 of the upper ring 18. The lower end of the pipe 2 extends through a cross member 19 in the grate mounting and below this member is a spring 20 with a lock nut 21 therebelow, thereby providing means resiliently holding the rings together. The pipe 2 is provided with a regulating valve 22 and extends outward as shown. Below the grate is a duct 23 through which a relatively large amount of air may be forced to the grate. At the lower end of the grate is a base ring 24 which is similar to the other rings except that the vanes are omitted.

With the rings separated by the relatively deep vanes comparatively large air areas are provided between the rings so that a large volume of air may be forced through the grate thereby facilitating burning wet sawdust from green wood and for some woods such as hemlock, steam or even oil may be forced in through the central pipe. At the same time, in case of a blackout, water may be supplied through the pipe to instantly extinguish the fire.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A refuse burning grate in the form of a cone, comprising a horizontal ring section forming a base, a plurality of superimposed concentric horizontal ring sections, each slightly smaller than the ring section upon which it is positioned and each provided with tangentially disposed relatively deep vanes spacing it from the ring section below and causing a swirling action to air currents passing outward through the grate, a central tubular member extending from a point outside of the grate, under the grate and upward through the center to the upper end thereof, and means defining an air passage also extending from a point outside of the grate, under the grate and opening into the central part thereof.

2. An acceleratory grate comprising, in combination, a plurality of superimposed concentric horizontal ring sections, each succeeding ring section slightly smaller than the ring section on which it is positioned, downwardly extending tangentially disposed webs on the under surfaces of all except the first of said ring sections, said grate forming substantially a cone, and an air duct extending under and communicating with the interior of said grate.

3. An acceleratory grate comprising, in combination, a plurality of superimposed concentric horizontal ring sections, each succeeding ring section slightly smaller than the ring section on which it is positioned, downwardly extending tangentially disposed webs on the under surfaces of all except the first of said ring sections, said grate forming substantially a cone, an air duct extending under and communicating with the interior of said grate, and a tube extending upward through said grate for ejecting additional accelerating fluids at the upper end of the grate.

4. An acceleratory grate comprising, in combination, a plurality of superimposed concentric horizontal ring sections, each succeeding ring section slightly smaller than the ring section on which it is positioned, downwardly extending tangentially disposed webs on the under surfaces of all except the first of said ring sections, said grate forming substantially a cone, and an air duct extending under and communicating with the interior of said grate, said grate characterized by locating lugs on the under surfaces of the webs.

5. An acceleratory grate comprising, in combination, a plurality of superimposed concentric horizontal ring sections, each succeeding ring section slightly smaller than the ring section on which it is positioned, downwardly extending tangentially disposed webs on the under surfaces of all except the first of said ring sections, said grate forming substantially a cone, and an air duct extending under and communicating with the interior of said grate, said grate characterized in that the said ring sections are hollow.

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