J. A. BURWELL.

GARBAGE BURNER.

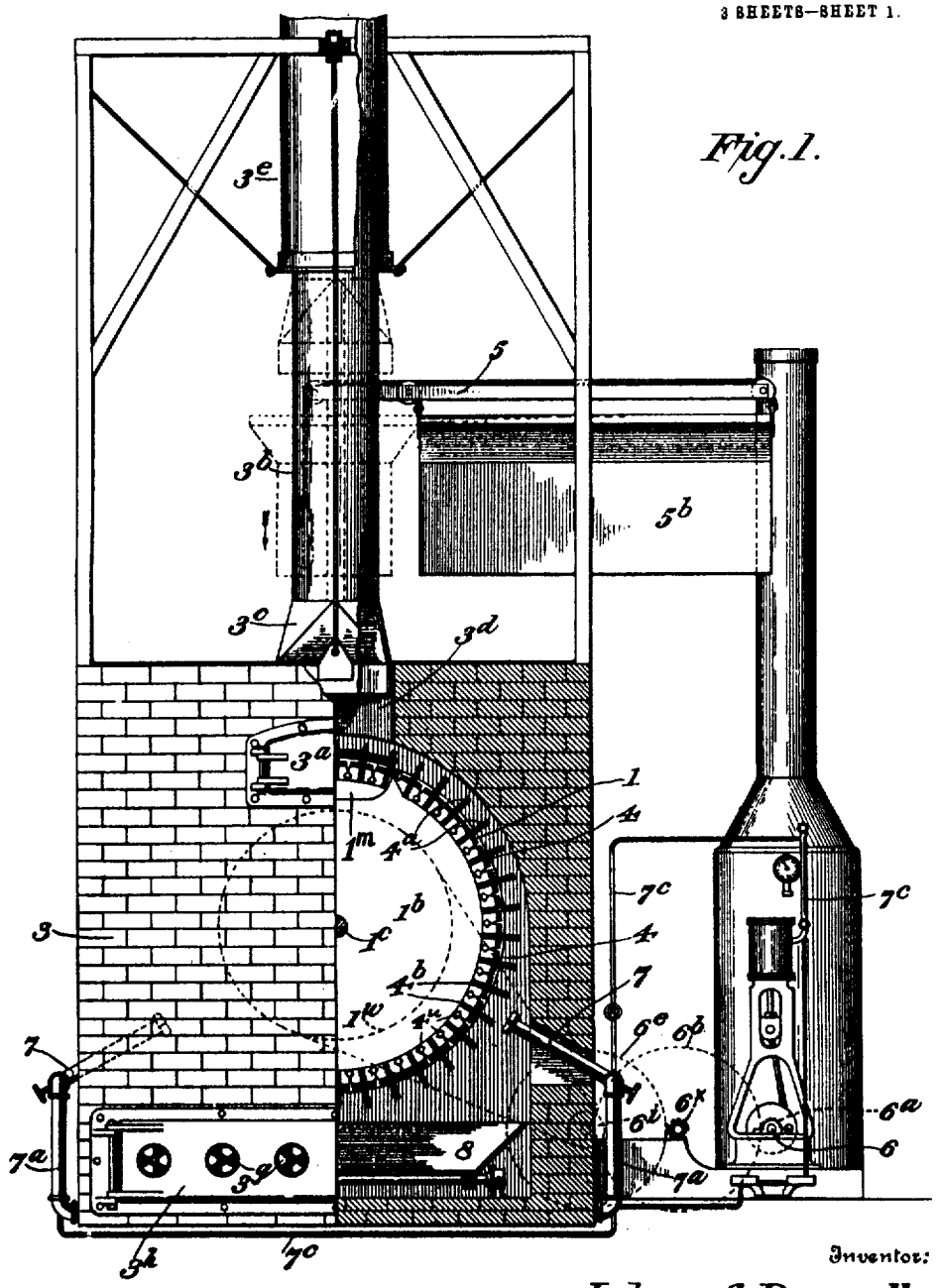
APPLICATION FILED SEPT. 17, 1908.

911,375.

Patented Feb. 2, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

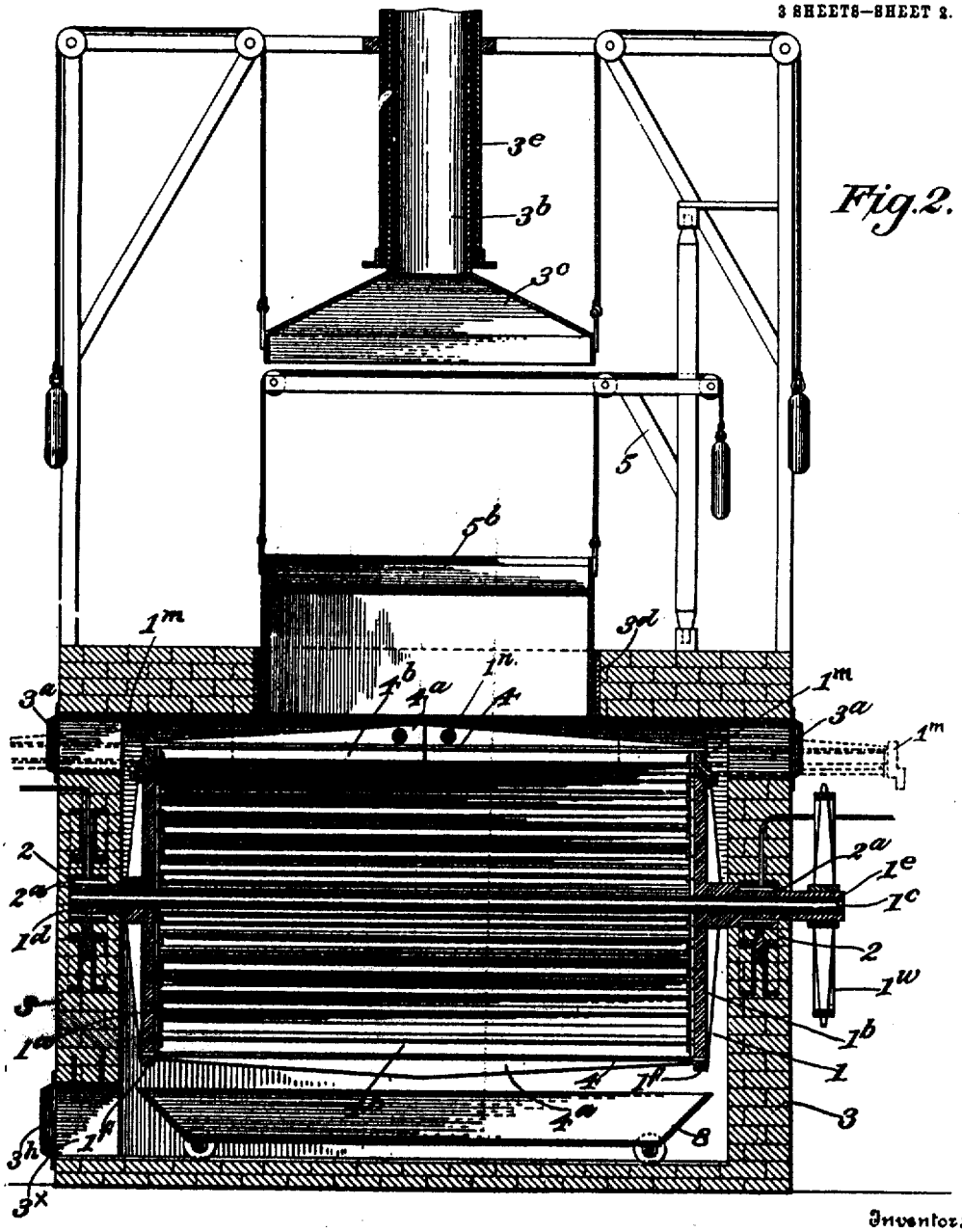

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 3.

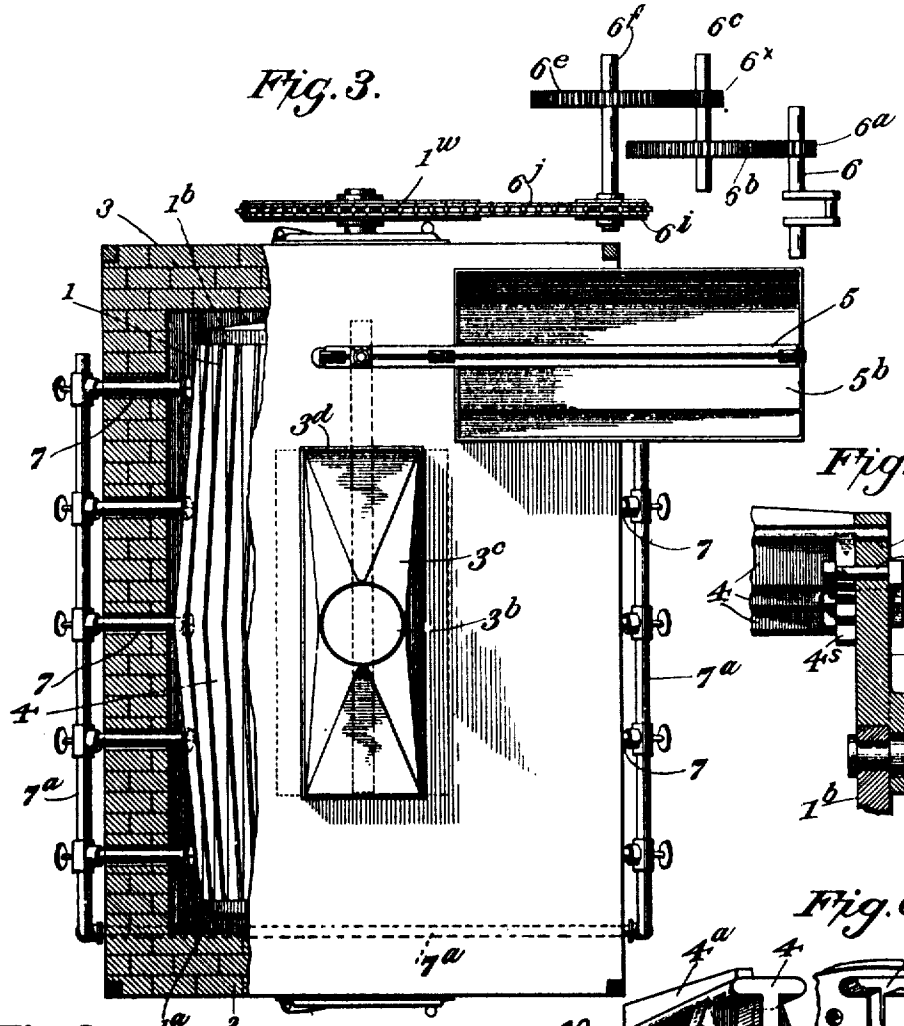


Fig. 7.

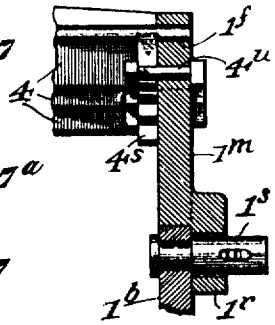


Fig. 6.

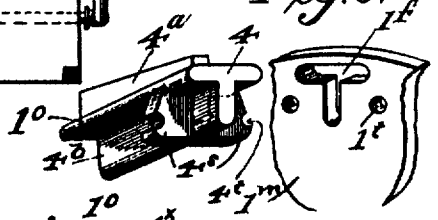
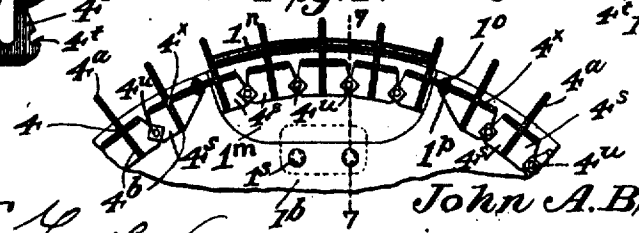


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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GARBAGE-BURNER.

No. 911,375. Specification of Letters Patent. Patented Feb. 2, 1909.

Application filed September 17, 1908. Serial No. 453,449.

To all whom it may concern:

Be it known that I, JOHN A. BURWELL, of San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Garbage-Burners; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is a novel furnace for incinerating garbage and refuse and its object is to provide a furnace having a revolving grate in which the material to be burned can be consumed and to so construct the apparatus that the waste material can be readily put into the grate while being burned, and the grate can be continually revolved so that the waste will be continually agitated and the ashes be sifted therefrom, the grate being preferably heated by means of oil or gas burners producing jets of flame which are directed against the sides of the revolving grate.

The invention consists in the novel construction and combinations of parts hereinafter more fully described, and set forth in the claims; and the accompanying drawings illustrate a practical form of the invention, and I will now describe the same in detail with reference thereto.

In said drawings: Figure 1 is a front elevation of the apparatus partly in section, and also showing—in dotted lines—a telescopic section of the smoke stack raised; and the receiving and charging hopper in position over the grate. Fig. 2 is a central longitudinal section through the apparatus showing the smoke stack elevated and the charging hopper in position over the grate, and also showing in dotted lines the removable sections of the grate drawn out. Fig. 3 is a plan view of the apparatus partly broken away, and also showing in dotted lines the receiving hopper in position over the grate. Fig. 4 is a detail view of the revolving grate enlarged. Figs. 5 and 6 are enlarged detail sectional views of the grate. Fig. 7 is an enlarged section on line 7—7, Fig. 4.

The revolving grate or container 1 is cylindric in form and of novel construction. It comprises end plates 1^a, 1^b, which are connected to a central shaft 1^c which extends into the hubs 1^d, 1^e, of said end plates, which latter are journaled in bearings 2 which may be of any suitable construction, and are preferably of metal and embedded in the end walls 3 of the furnace casing, which is preferably made of brick and may be lined interiorly with fire brick and made of sufficient thickness to prevent loss of heat by external radiation. If desired the bearings may be provided with rollers, as indicated at 2^a, in the drawings, to reduce friction.

The end plates 1^a, 1^b, are provided near their peripheries with annular series of slots 1^f in which are secured the ends of grate bars 4 which are preferably ribbed as indicated at 4^a on their outer faces and also provided with longitudinal ribs 4^b on their inner faces; and when all these grate bars are in position and connected to the end plates 1^a, 1^b, they form therewith a hollow cylindrical grate adapted to contain the garbage to be burned.

In order to facilitate placing garbage in the grate, a certain number of the grate bars are made removable or adjustable. As shown the end plates 1^a, 1^b are provided with removable sections 1^m to each of which sections the ends of five grate bars are attached, see Fig. 4. These five grate bars are cut in two and are fastened together at their inner ends by means of tie-rods and separators 1^n by which their inner ends are rigidly united. The outermost bars of these sections are provided with side flanges 1^o which engage grooved portions 1^p in the adjacent grate bars 4^x, and thereby support the removable sections as they are slid in and out. When the grate is stopped with these sections uppermost they come directly under an opening 3^d in the top wall of the furnace; then while in this position the plates 1^m with the connected sectional grate bars, can be drawn outward, through openings 3^a in the walls of the furnace, as shown in Fig. 2, said openings being closable by suitable doors. When the grate sections are drawn out as indicated in dotted lines in Fig. 2 any refuse charged through opening 3^d will fall directly into the grate. After the grate is filled the removable grate sections are slid inward and secured by means of plates 1^r removably attached to the end plates 1^a, 1^b, by means of bolts 1^s, as indicated in the drawings.

The opening 3^d is normally closed by a metallic hood 3^c which connects with a stack section 3^b which telescopes into a superposed stack section 3^a suitably supported above the furnace, as indicated in the drawings. The hood 3^c can be raised and section

3^b telescoped into stack 3^e as indicated in Figs. 1 and 2 of the drawings, when it is desired to charge the grate.

To facilitate charging the grate a crane 5 is provided at one side of the stack and carries a hopper 5^b which corresponds in size to the opening 3^d and when the hood 3^c is raised this hopper 5^b can be moved in under the hood or over the opening 3^d as shown in Fig. 2 and indicated in dotted lines in Figs. 1 and 3, so as to deliver material previously placed in the hopper directly into the cylindrical grate. After the grate is charged the hopper can be swung back out of the way as indicated in full lines in Figs. 1 and 3 the hood 3^c is then lowered and after the movable grate bars have been replaced in position the furnace is ready for operation.

The grate is rotated during the burning of the garbage by suitable means. As shown a sprocket 1^w is placed on the hub 1^e outside the furnace, and can be driven by a sprocket chain 6^j from a small sprocket 6^i on a shaft 6^f, which has a gear 6^e meshing with a pinion 6^x on a shaft 6^a carrying a gear 6^b meshing with a pinion 6^a on an engine or motor shaft 6; the gearing being so proportioned as to properly reduce the speed between the engine shaft and the cylinder. In practice I propose to rotate the cylindrical grate about one or two revolutions per minute.

In each side of the grate are arranged a series of oil or gas burning jet heads 7 which communicate with supply pipes 7^a connected to any suitable reservoir or fuel supply, and which may also be supplied with steam from the boiler by a pipe 7^c; the burner being provided with suitable valves and devices to insure proper regulation of the several jets.

It will be observed that the jets are directed against the exterior of the revolving grate and will of course heat the furnace chamber and the entire grate, and as the latter revolves the jets of flame will directly contact with the garbage in the grate through the interstices between the grate bars and quickly reduce the contents of the grate to cinders or ashes. As the grate is constantly revolved its contents are continually stirred and agitated by reason of the ribs 4^b which tend to pick up and carry the matters around in the grate. This stirring of the garbage facilitates the evaporation of the moisture therein which is discharged through the uptake and insures the rapid incineration of the refuse. As all the matter is confined in the grate, light refuse cannot be blown out of the chimney but will be retained in the grate until incinerated, while the ashes will sift out of the grate into the ash car 8, which is preferably wheeled and can be introduced into the furnace, under the grate through an opening 3^x in the front wall closable by a suitable door 3^h which may be provided with air valves 3^g, to insure a sufficient supply of oxygen to the combustion chamber. The sliding sections of the grate can be easily operated, and there is nothing about them to get out of place during the rotation of the grate; and as the opening in the grate when such sections are drawn out is very large, a large quantity of garbage can be quickly emptied into the grate at each operation, and animal bodies can be placed therein and incinerated if desired.

The furnace does not have to be stopped in order to remove the ashes, and one ash car can be withdrawn and another one run into place without stopping the fire.

By using a telescopic smoke stack or removable hood 3^c I am able to utilize the outlet opening of the furnace for the charging opening of the grate and at the most advantageous position for charging the grate. During the charging operations the burners should be cut off. The furnace can be built practically air-tight as no fuel inlet openings have to be made therein and the combustion chamber is practically wholly inclosed within thick fire-brick walls, so that no odors can escape except through the smoke stack, which can be made sufficiently high to carry the odors out of the way. If desired a small stream of water can be directed on each of the journal bearings of the grate so as to keep them cool.

The grate-bars are preferably secured to the end plates 1^a, 1^b, and the plates 1^m, by having said plates provided with T-slots 1^f to which the ends of the grate bars are fitted as indicated in Figs. 6 and 7; and the said bars are provided adjacent their ends with lateral flanges 4^e which are provided with notches 4^t which are engaged by bolts 4^u passing through perforations 1^t in the plates. The flanges 4^e of adjacent bars come so near together that one bolt 4^u assists in securing two grate bars in position.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a refuse burning apparatus the combination of a furnace chamber, a cylindrical grate therein comprising circular end plates rotatably mounted in the furnace walls, and having removable sections, grate bars connected to said end plates, and sectional grate bars connected to said removable sections, substantially as described.

2. In a refuse burning apparatus the combination of a furnace chamber, a cylindrical grate therein comprising circular end plates rotatably mounted in the furnace walls, ribbed grate bars connected to said end plates; said end plates having removable sections, a set of sectional grate bars connected to said removable sections, the outermost sectional grate bars having ribs engaging grooves in the adjacent ribbed grate bars, substantially as described.

3. In a garbage burning plant the combination of a furnace, a rotatable cylindrical grate therein comprising circular end plates rotatably mounted in the furnace walls and having removable sections, grate bars connecting said end plates, and sectional grate bars connected to said removable sections and forming the door of the grate; with means for heating the furnace, means for charging the grate, and means for rotating the grate.

4. In a garbage burning apparatus the combination of a furnace having an opening in its roof, a stack above the opening, an adjustable hood covering said opening and telescoping with the stack, a rotatable cylindrical grate in the furnace adapted to be charged through said opening when the hood is raised, and a hopper for charging the grate through said opening.

5. A garbage burning apparatus comprising a furnace having an opening in its roof, a stack above the opening, a removable hood over said opening communicating with the stack, a rotatable cylindrical grate in the furnace having a slidable side section adapted to be opened when the grate is stopped with said section under the opening in the furnace, so that the grate can be charged through said opening, and doors in the end walls of the furnace to permit access to the grate sections, means for slowly rotating the grate when closed, and jet burners at the sides of the furnace adapted to discharge jets of flame against the grate.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

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Witnesses:
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