I. HELSETH.

INCINERATOR.

APPLICATION FILED MAR. 8, 1916.

1,245,914.

Patented Nov. 6, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

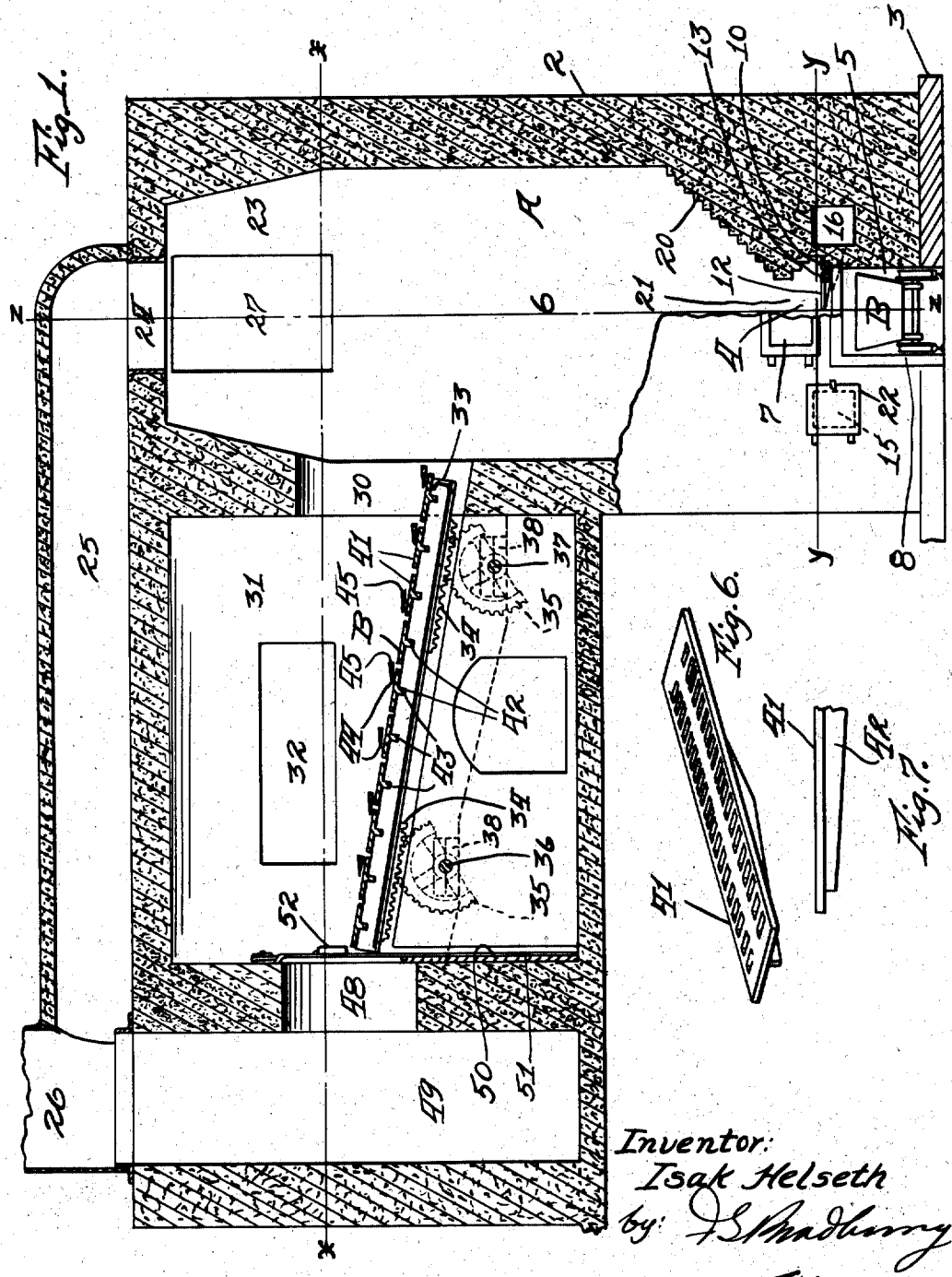


Fig. 6.

Fig. 7.

Inventor:
Isak Helseth
by: F. S. Bradbury
Attorney.

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3 SHEETS—SHEET 2.

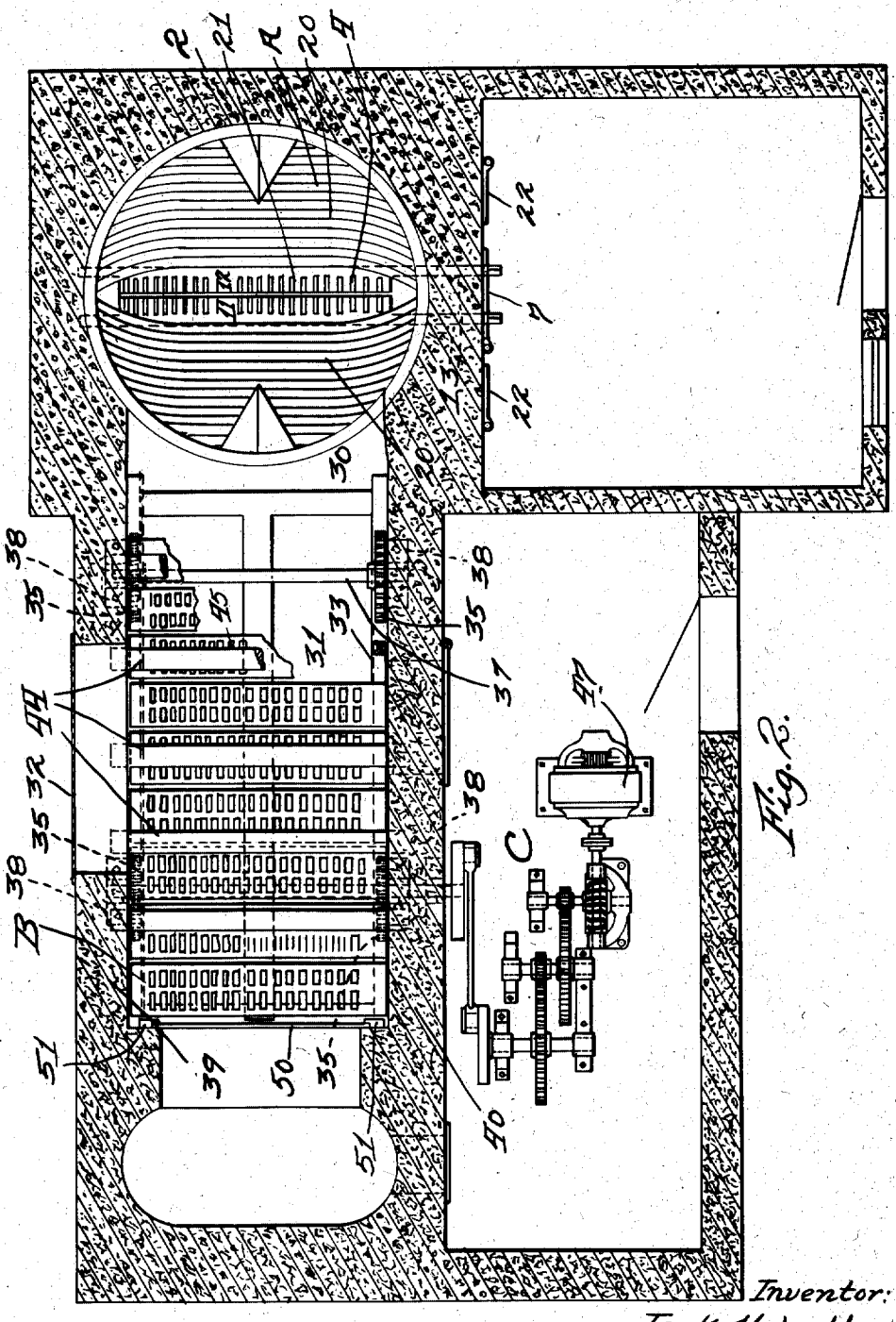


Fig. 2.

Inventor:
Isak Helseth
by: F. Bradbury
Attorney

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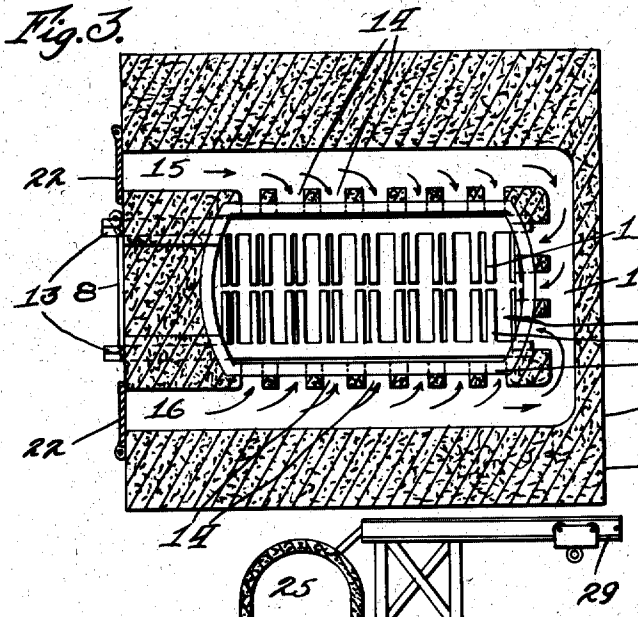
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3 SHEETS—SHEET 3.

Fig. 3.



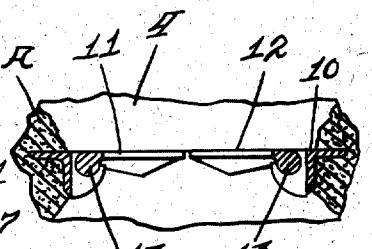


Fig. 5.

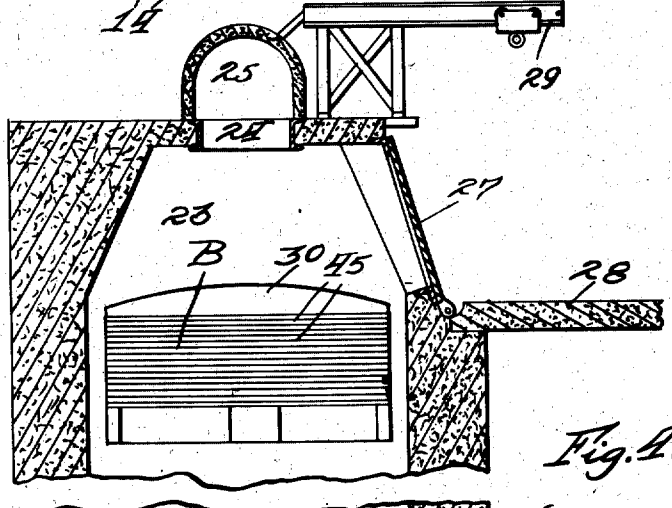
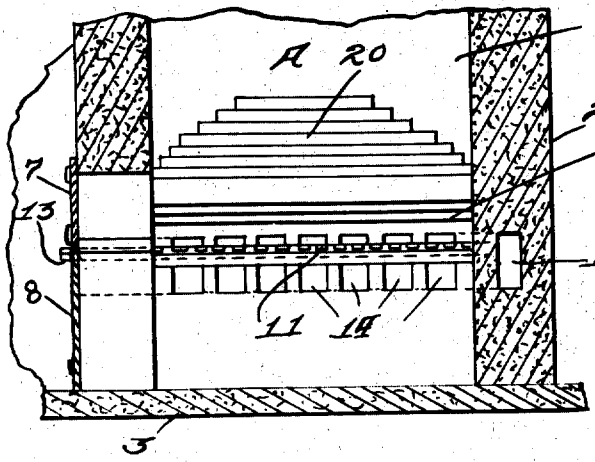


Fig. 4.



Inventor:
Isak Helseth
by: J. Bradbury
Attorney

UNITED STATES PATENT OFFICE.

ISAK HELSETH, OF THIEF RIVER FALLS, MINNESOTA.

INCINERATOR.

1,245,914. Specification of Letters Patent. Patented Nov. 6, 1917.

Application filed March 8, 1916. Serial No. 82,930.

To all whom it may concern:

Be it known that I, ISAK HELSETH, a citizen of the United States, residing at Thief River Falls, in the county of Pennington and State of Minnesota, have invented a new and useful Improvement in Incinerators, of which the following is a specification.

This invention relates to improvements in incinerators for the burning or incineration of garbage, refuse and the like, one of its objects being to provide a simple and effective apparatus whereby the material may be conveniently and economically destroyed and the residue removed for disposal.

A further object of the invention is to provide a garbage or refuse burner including a furnace having improved means for maintaining combustion, so as to secure rapid and free burning of the material and for supporting such material in efficient position upon the grate and within the combustion chamber.

A still further object of the invention is to provide improved means for feeding the material and supplying air to the grate for the purpose of most effectively burning the mass and promoting combustion to a high degree.

To these ends my invention comprises the features of construction and combination and arrangements of parts hereinafter more fully described and claimed.

In the accompanying drawings forming part of this specification, Figure 1 is a longitudinal section; Fig. 2 is a section taken on the line X—X of Fig. 1; Fig. 3 is a section taken on the line Y—Y of Fig. 1; Fig. 4 is a section taken on the line Z—Z of Fig. 1; Fig. 5 is a section of a detail; Fig. 6 is a perspective of one of the grate bars and Fig. 7 is a side elevation of a detail of one of the grate bars.

In carrying my invention into practice, I provide a furnace A, the body walls 2 of which are constructed of brick or other suitable material resting upon a concrete foundation 3. The furnace is provided with a fire place or box 4, an ash pit 5 and combustion chamber 6, said ash pit being so constructed that a truck B may be employed to receive the ashes and remove them. The fire box and ash pit have at the front of the furnace, doors 7 and 8 respectively for the supply of fuel and the removal of the truck. Within the bottom of the fire box is arranged a grate to support the body of fuel employed, which grate preferably consists of a metallic frame work 10 carrying rocking grate bar sections 11 and 12. These grate bar sections have rods or shafts 13 projecting through the furnace wall which are adapted to be engaged by a lever or other means for transmitting rocking motion to the grate sections to dump the ashes, etc.

Formed in the furnace wall around the grate is an air feed duct comprising a pair of parallel channels 15 and 16 located on opposite sides of the fire box and connected at the rear by a cross channel 17, (see Fig. 4), which channels surround the fire box on three sides and communicate through ports 14 in line with and above and below the grate, whereby a course of circulation for the supply of air in the fire box around, above and below the grate is provided to support combustion to a highly efficient degree, the air being preheated during its passage by the hot walls of the furnace, so as to oxygenate the burning mass of fuel to the highest possible degree.

The fire box and combustion chamber are provided with an interior lining of fire brick or the like and the fire box communicates at its upper portion with the base of the combustion chamber. As shown the base of the combustion chamber is provided at two of its opposite sides with downwardly converging sloping walls 20, which are preferably stepped and which overhang and contract the top of the fire box forming an oblong rectangular passage 21 to permit the flames from the bed of fuel on the grate to pass upward into the combustion chamber, while at the same time holding the body of garbage or refuse material supported against any tendency to smother the flames or choke the flame outlet. By this means the body of fuel will be protected and provision made for insuring the incineration of the garbage or material above in a rapid manner. A draft door 22 of suitable construction may be provided for controlling the end of each of the air flues 15 and 16.

The body of the combustion chamber is of substantially uniform diameter and extends up to a predetermined height. The upper end of the combustion chamber is

formed with a cone shaped dome 23 terminating at its upper extremity in an outlet 24 for smoke and gases and leading through an arched flue 25 to a smoke stack 26. At one side of the upper part of the combustion chamber is an outwardly swinging door 27 through which the refuse, garbage or any material to be incinerated is placed in the furnace. When the door is tipped back it acts as a chute from the platform 28, so that material can be unloaded readily from wagons or receptacles and guided into the furnace. The top walls or lining of the furnace may be made out of any suitable fire resisting material. The rail or beam truck 29 disposed above the platform 28 facilitates the handling and discharging of heavy material above the platform 28 and into the furnace.

Communicating with the upper part of the combustion chamber through a lateral passage 30 is a receiving or drying chamber 31. This chamber is provided at one side with a door 32 through which wet garbage or material to be incinerated is introduced by any suitable means. This material on its introduction into the drying chamber deposits on a drying table B extending from the back of the drying chamber downwardly at an angle into the upper portion of the combustion chamber of the furnace, thus forming an inclined drying plane, whereby the material is delivered to the combustion chamber through the arched opening 30. The drying table consists of a rectangular skeleton frame 33 having four racks 34 substantially equally distributed apart, said racks riding upon four geared sectors 35. These sectors are mounted upon a pair of laterally disposed shafts 36 and 37, which are journaled in bearings 38, said bearings being supported by the side walls 39 and 40 of the drying chamber. Rocking motion is imparted to one of the shafts 36 by any suitable drive mechanism, such as C, and as a result longitudinal reciprocating motion is imparted to the drying table B. Mounted upon the frame 33 are a plurality of grate bars or sections 41, which are formed with longitudinal depending ribs 42, said ribs being removably seated in grooves 43 in the sides of the frame 33 whereby the grate bars can be removed from time to time for cleaning or replacing. The upper surfaces of the grate bars 41 lie in a substantially single plane, and immediately above the surfaces of said grate bars are disposed a plurality of transverse slicer bars 44, the ends of which are seated in the opposite walls 39 and 40. These slicer bars taper toward their upper receiving edges and terminate at their lower delivery edges in abrupt shoulders 45. As the drying table is moved backward and forward the cutting edges of the slicer bars loosen the material which is supported upon the grate bars, and guide the same downward toward and into the combustion chamber 6 and the shoulders 45 catch and hold the advancing material against return movement during the upward stroke of the drying table. As a result the reciprocating drying table feeds the material, which is being dried and consumed on the grate bars, step by step downwardly into the combustion chamber 6. The reciprocating motion imparted to the shaft 36 may be produced by an electric motor 47 or other prime mover and suitable mechanism connected with said motor and with said shaft for converting revolving motion into reciprocating motion and reducing speed during the transmission of the power such as illustrated. Leading from the drying chamber is an air duct or channel 48 through which the hot air and gases from the furnace may escape to the flue 49 and to the stack after passing over or beneath the wet refuse and garbage. A damper 50 running in the channels 51 serves to regulate the size of the opening in the duct 48, through which the heated air and gases may pass. It will of course be understood that the combustion chamber may be charged at intervals with substantially dry material to be burned, and that while one charge is being burned in the combustion chamber another or succeeding charge may be dried upon the drying table so that when fed to the combustion chamber it may be burned more quickly and with less expenditure of fuel than would be possible if the moist material were fed directly into the combustion chamber. The walls of the drying chamber may have their inner surfaces constructed of any suitable high heat resisting material. The burner or incinerator may be made of any size and working capacity that may be desired for private, town or city use and may be employed for incinerating garbage and refuse of all kinds.

From the foregoing description, it will be understood that the invention provides an apparatus of its general character, which is simple and inexpensive in construction, and efficient in use. It is also adapted to be easily and conveniently handled. While the grate to the furnace proper is shown constructed for burning solid fuels, it will be understood that oil or other fuels may be employed when found desirable.

In accordance with the patent statutes, I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

Having described my invention, what I

claim as new and desire to protect by Letters Patent is;

1. Apparatus of the class set forth, comprising, in combination, an incinerating furnace having a combustion chamber for the reception of refuse, a chimney with which said chamber is connected, a preheater having a drying chamber connected with said combustion chamber and leading into said chimney and into which the wet refuse may be placed, a drying table upon which the wet refuse is deposited in said drying chamber and inclined downwardly toward said combustion chamber, said table being arranged in the path of draft passing below and above said table from said combustion chamber; said table comprising a frame, a plurality of grate bars carried by said frame, and oscillating means mounted in said drying chamber by which said frame is reciprocated to assist in feeding the refuse into said combustion chamber, means for driving said oscillating means, and a plurality of transverse slicer bars fixed in said drying chamber and coöperating with said grate bars to assist in feeding the refuse into the combustion chamber.

2. A garbage furnace comprising a combustion chamber having a smoke and gas outlet and a feed opening for dry refuse, a drying chamber having a feed opening for wet refuse and communicating with said combustion chamber, a shaker table downwardly inclined toward the communication between said combustion chamber and said drying chamber and disposed within said drying chamber for assisting in delivering refuse into the combustion chamber, spaced slicer bars arranged above said table for cleaning the same, each of said bars having a reduced receiving edge and an enlarged delivery edge forming a disintegrating and a stop surface for refuse and means for reciprocating said table within said drying chamber, said slicer bars and table by their conjoint action advancing the refuse into said combustion chamber.

3. A garbage furnace comprising a combustion chamber, a drying chamber associated with and opening into said combustion chamber, a shaker table disposed for reciprocating movement within said drying chamber to assist in delivering into said combustion chamber having a plurality of spaced grate sections removably mounted thereon with their upper surfaces lying in a substantially single plane, a series of slicer bars mounted above the upper faces of said sections transversely of said table, for advancing refuse over said sections toward said combustion chamber, said slicer bars tapering toward their upper receiving edges and terminating at their lower delivery edges in abrupt shoulders, and means for imparting a reciprocating movement to said frame, whereby the conjoint action of said frame and sections will deliver refuse into said combustion chamber.

4. A garbage furnace comprising a combustion chamber, a drying chamber associated with and opening into said combustion chamber, a pair of spaced shafts laterally disposed across said drying chamber, geared sectors mounted on said shafts, a frame having racks meshing with said sectors and arranged with one of its ends adjacent said combustion chamber, grate sections carried by said frame, means immovably mounted above the upper faces of said sections for assisting in disintegrating and advancing said refuse toward the combustion chamber, and means for imparting rocking movement to said shafts and a reciprocating motion to the parts carried thereby.

In testimony whereof, I have signed my name to this specification.

ISAK HELSETH.