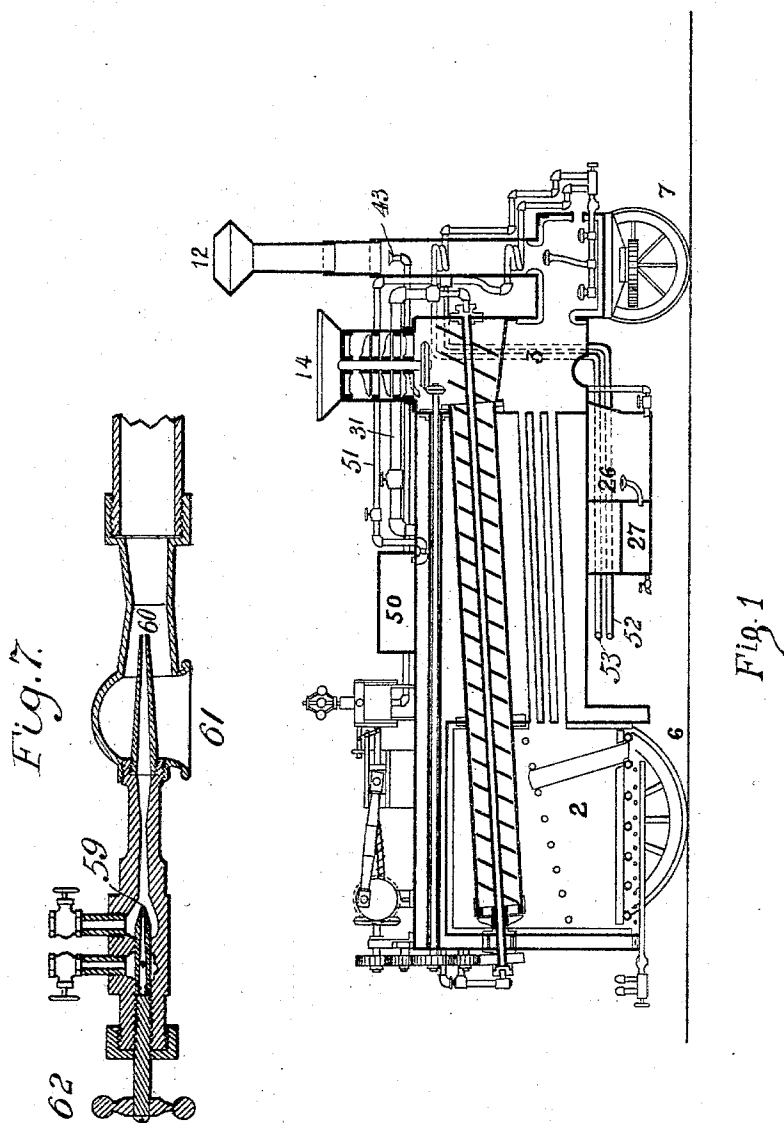


(No Model.)

6 Sheets—Sheet 1.

H. C. FELLENBAUM.
PORTABLE GARBAGE INCINERATOR OR DESTROYER.
No. 546,396. Patented Sept. 17, 1895.



WITNESSES:

W. Hermann Apper,
L. M. Gilligan

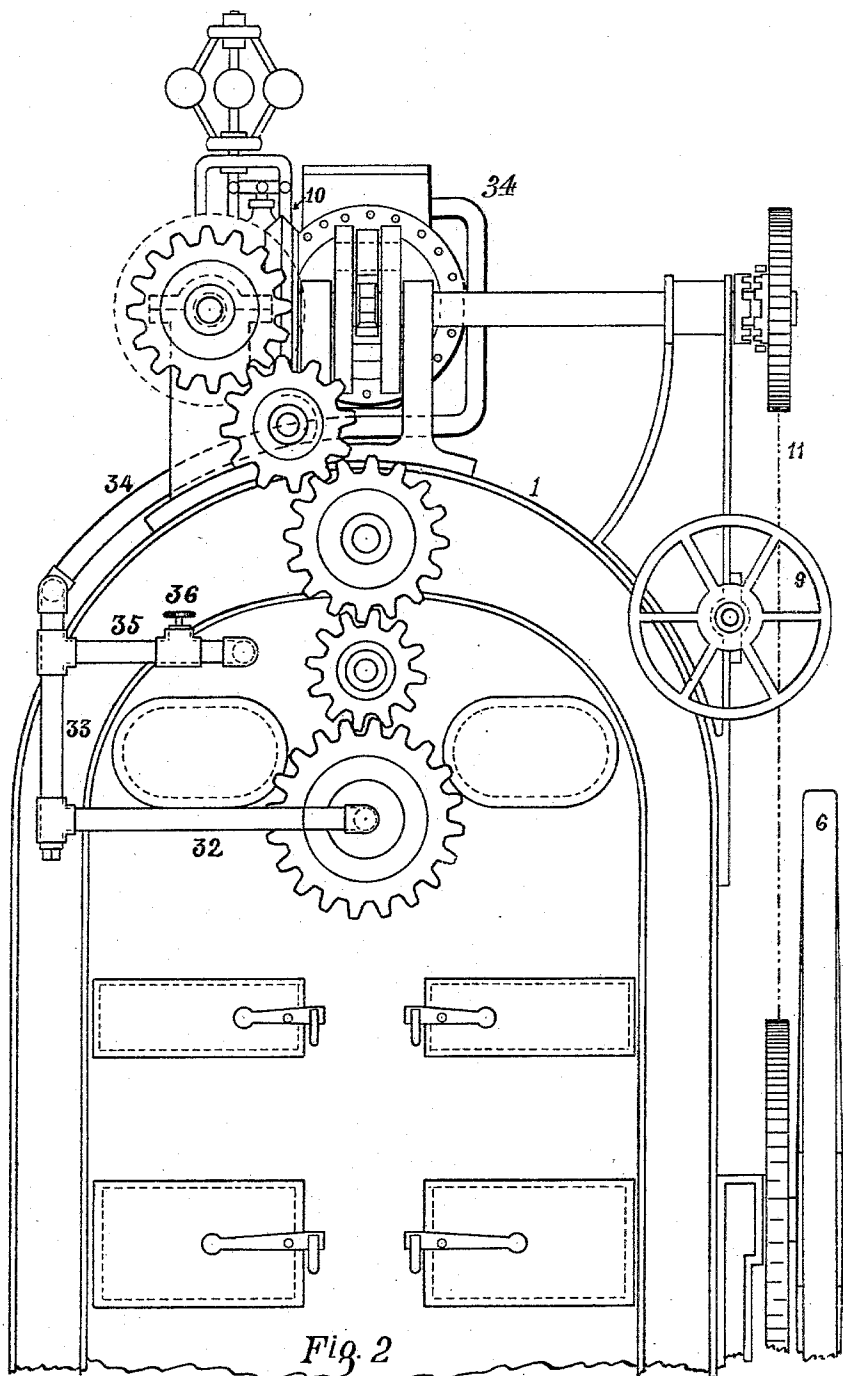
INVENTOR

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(No Model.)

6 Sheets—Sheet 2.

H. C. FELLENBAUM.
PORTABLE GARBAGE INCINERATOR OR DESTROYER.
No. 546,396. Patented Sept. 17, 1895.



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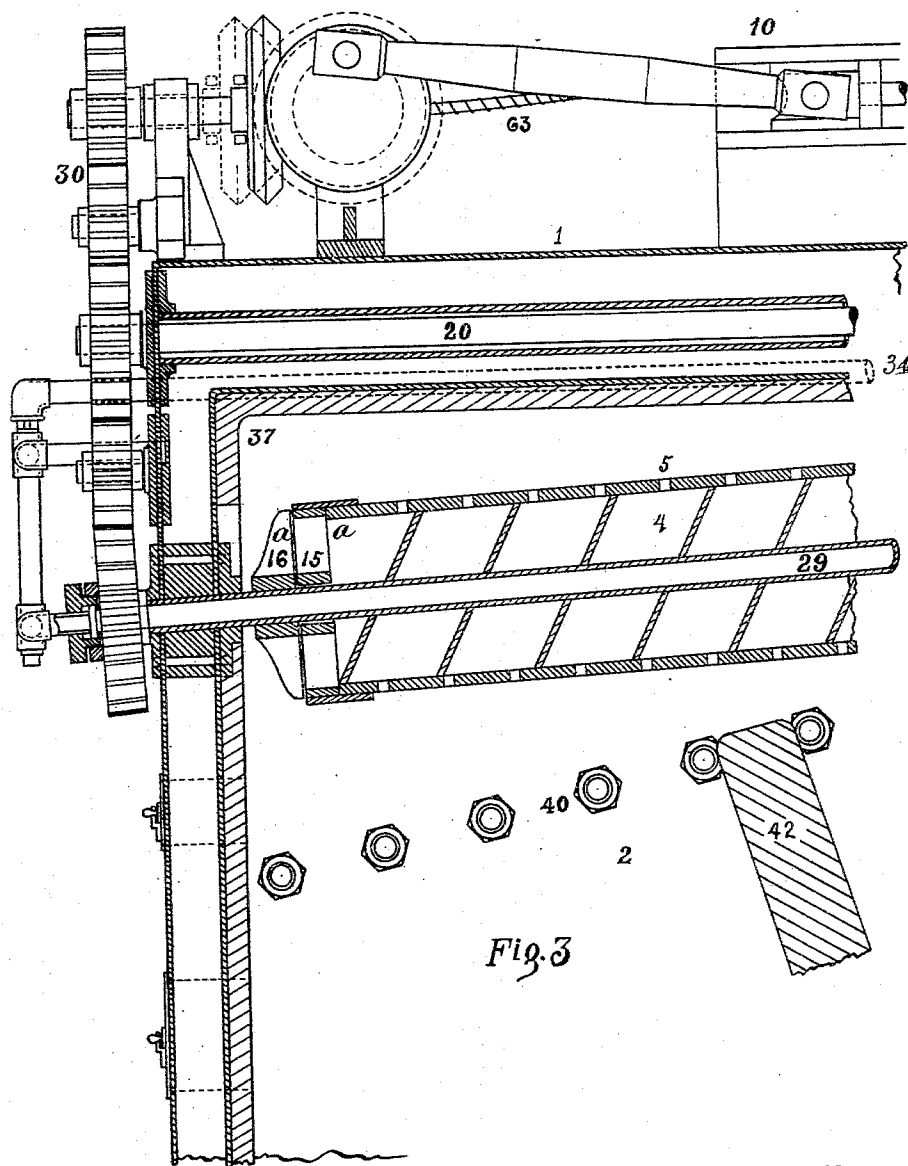
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PORTABLE GARBAGE INCINERATOR OR DESTROYER.

No. 546,396.

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PORTABLE GARBAGE INCINERATOR OR DESTROYER.

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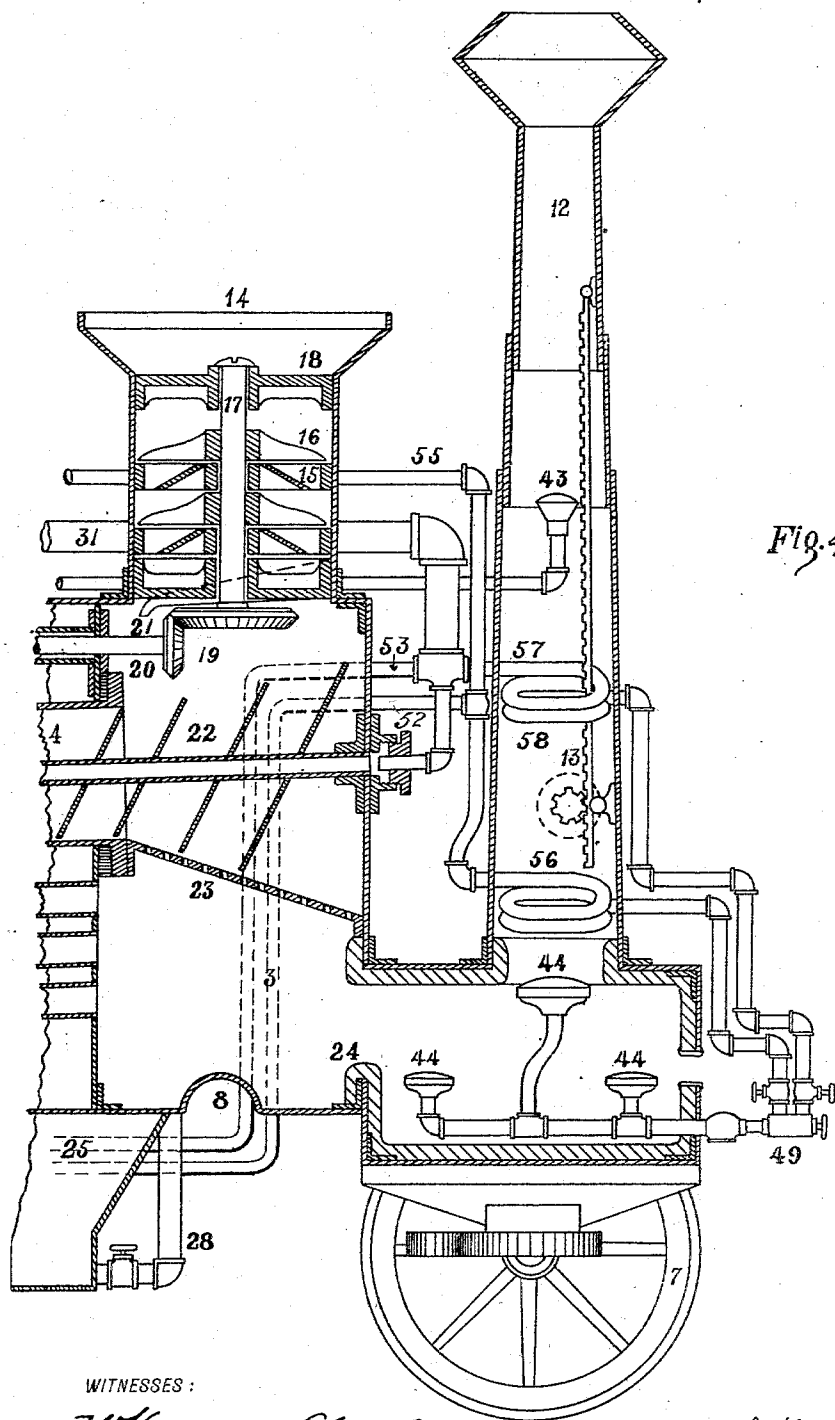


Fig. 4

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(No Model.)

6 Sheets—Sheet 5.

H. C. FELLEBAUM.

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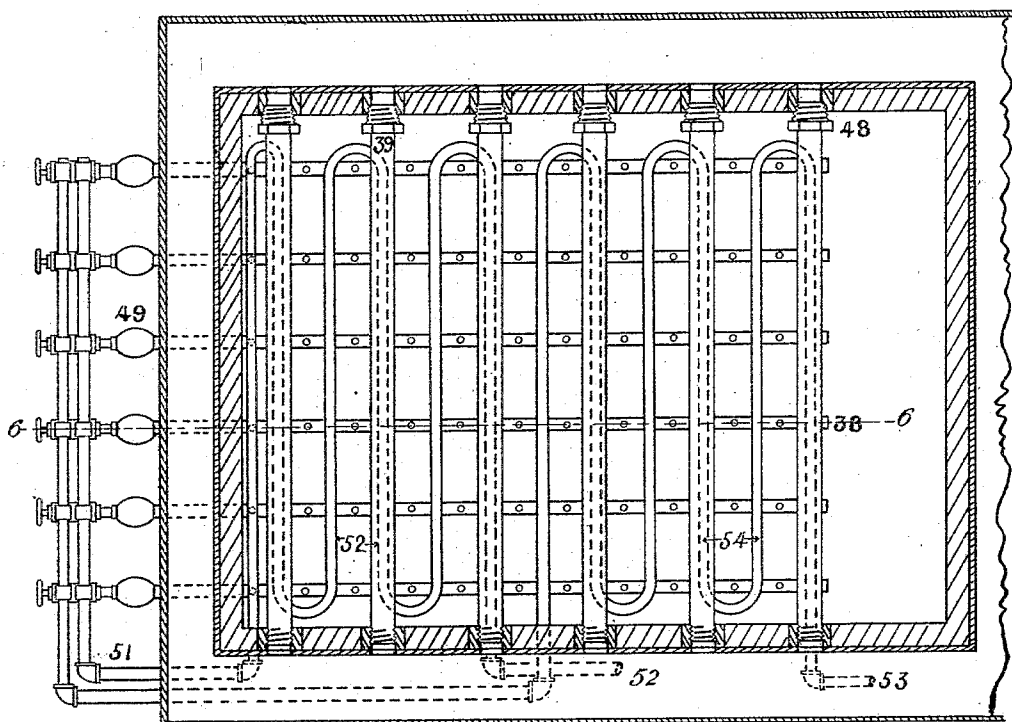


Fig. 5

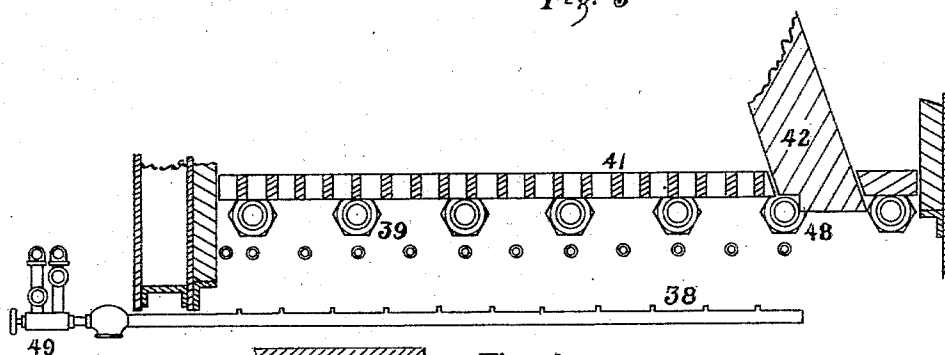
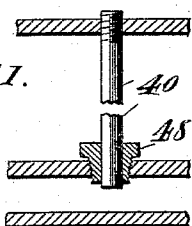


Fig. 6

Fig. 11.



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(No Model.)

6 Sheets—Sheet 6.

H. C. FELLENBAUM.

PORTABLE GARBAGE INCINERATOR OR DESTROYER.

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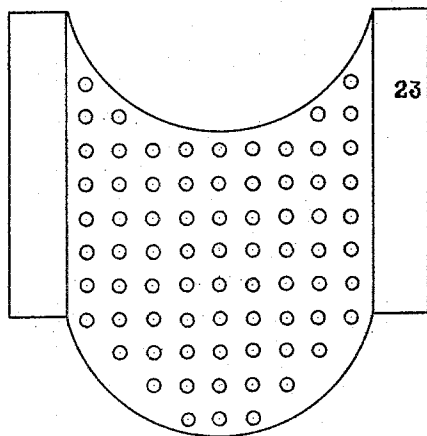


Fig. 8.

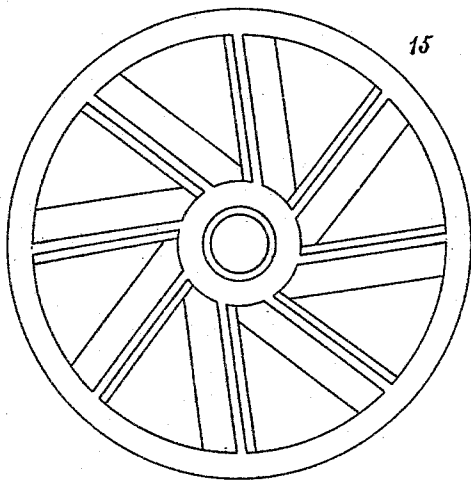


Fig. 9.

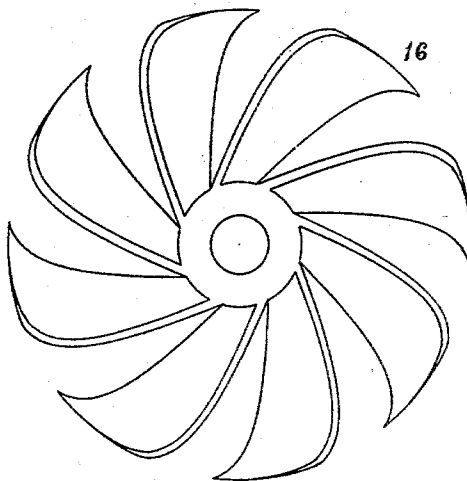


Fig. 10.

WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY C. FELLENBAUM, OF PHILADELPHIA, PENNSYLVANIA.

PORTABLE GARBAGE INCINERATOR OR DESTROYER.

SPECIFICATION forming part of Letters Patent No. 546,396, dated September 17, 1895.

Application filed April 13, 1894. Serial No. 507,387. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. FELLENBAUM, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Portable Garbage Incinerators or Destroyers, of which the following is a specification.

My invention relates, primarily, to a novel portable or traction garbage incinerator or destroyer. However, many of its novel features are susceptible of advantageous application not only to such type of apparatus, but also to fixed or immovable incinerators or furnaces. The object of my present invention is threefold; first, to provide a compact, efficient, practical, and reliable garbage incinerator or destroyer which is adapted to expeditiously, economically, and silently perform its functions without giving off odor or noxious and unpleasant fumes; second, to provide, construct, and arrange the parts of the incinerator or destroyer in such manner that it may be drawn or propelled from place to place in order to permit of the destruction or incineration of the garbage or other refuse as it is collected or while the apparatus is in motion, and, third, to construct, combine, and arrange various parts of the apparatus in such manner that they are protected from accidental injury—such as burning, bending, and warping—and in such manner that the apparatus is rendered strong and durable.

My invention consists in the improvements hereinafter described and claimed.

The nature, characteristic features, and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is an elevational view, principally in central section, illustrating a portable garbage incinerator or destroyer embodying features of my invention. Fig. 2 is an elevational view drawn to an enlarged scale and illustrating the left-hand end of the apparatus shown in Fig. 1. Fig. 3 is a sectional view illustrating the left-hand end of the apparatus shown in Fig. 1. Fig. 4 is a similar view of the right-hand end of the apparatus illustrated in Fig. 1. Fig. 5 is a top or plan view of the grate shown in Fig. 1, having the grate-

bars removed for purposes of illustration. Fig. 6 is a sectional view taken on the line 6 6 of Fig. 5, showing the grate-bars. Fig. 7 is a sectional view, drawn to an enlarged scale, and illustrating one of the injectors shown in Figs. 4 and 5. Fig. 8 is a top view of the strainer or sieve shown in Fig. 4. Fig. 9 is a top or plan view of one of the fixed cutters illustrated in Figs. 3 and 4. Fig. 10 is a similar view of one of the rotary or revoluble cutters that co-operates with the fixed cutters shown in Fig. 11, and Fig. 11 a detail view drawn to an enlarged scale and illustrating my improved connection between the water-bars and sheet of the water-leg.

In the drawings, 1 is a tubular boiler provided with a fire-box 2 and a smoke-box 3, and with a desiccating-chamber 4, that communicates with the smoke-box 3, extends through the boiler, and projects into the fire-box 2, at which place it is perforated, as at 5, Fig. 3, for purposes to be hereinafter explained. This boiler 1 may of course be provided with a stationary setting. However, as shown in the drawings, the boiler is mounted upon wheels 6 and 7. In the present instance the wheels 7 are mounted upon a pivotal axle and are adapted to run within the space 8, Fig. 4, in order to permit of the ready turning of the apparatus.

9 indicates steering-gear, which may be operated from the rear of the apparatus in order to shift the axle of the wheels 7, and thus permit of the guiding of the apparatus.

As shown in the drawings, the wheels 6 are driven by an engine 10 through the instrumentality of driving-gear 11. However, if preferred, the driving and steering gear may be dispensed with and the apparatus drawn from place to place by means of horses or mules.

12 is an off-take or funnel communicating with the smoke-box 3 and discharging into the atmosphere. In the present instance this funnel 12 is comprised of several sections, Fig. 4, telescopically fitted together and adapted to be nested or extending through the intervention of rack-and-pinion connections 13, in order to lift the discharge end of the funnel or off-take above adjacent windows. However, if preferred, an ordinary non-expandible funnel or off-take may be employed.

14 is a hopper for the reception of garbage

and the like. The throat of this hopper is provided with fixed cutters 15, Fig. 9, and rotating or revoluble cutters 16, Fig. 10. The fixed cutters 15, Fig. 9, comprise outer and inner hubs or rims connected by inclined radial spokes, to which the knives may be keyed or otherwise secured, and the revoluble cutters 16, Fig. 10, comprise inclined curved knives or blades secured to a hub keyed to a shaft 17, revolubly supported by a yoke or spider 18, and by the openings at the centers of the fixed cutters 15. The shaft 17 is driven through the intervention of miter-gears 19 and a shaft 20, revolubly carried in a tube ranging longitudinally through the boiler. As the garbage enters the hopper 14 it passes through the cutters 15 and 16, by which it is comminuted and cut up. The comminuted garbage is deflected by means of a spout or trough 21 past the miter-gears 19, and falls between the threads or blades of a revoluble screw-conveyer 22, and also upon an inclined sieve or strainer 23, Figs. 4 and 8. Fluid matter, such as water and grease, passes the sieve or strainer 23 and falls into the bottom of the smoke-box, from which it is deflected by a ridge 24 and caused to flow into a receptacle 25. The supernatant grease is conducted from the receptacle 25, through a grease-cup 26, into a grease-receptacle 27. The water contained in the receptacle 25 may be drawn off through a connection 28 by means of a pump or injector (not shown) and supplied to the boiler. The comminuted and partially dried garbage is drawn by the rotation of the screw-conveyer 22 toward the left-hand end of the desiccating-chamber 4. The screw-conveyer 22 is carried by a hollow shaft 29, rotated by the engine 10 through the intervention of suitable spur-gearing 30, which also serves to impart rotary motion to the shaft 20. The hollow shaft 29, and more especially the portion of it that traverses the fire-box 2, is exposed to a considerable degree of heat and is prevented from burning or undue heating by permitting steam to traverse its interior when the machine is in operation and by permitting its interior to be filled with water when the machine is being fired up. As shown in the drawings, these objects are accomplished by drawing off the supply of steam for the engine 10 from the boiler through the pipe 31, interior of the shaft 29, and pipes 32, 33, and 34, Fig. 2, and by permitting water to flow from the boiler through the pipes 35, 33, and 32, Fig. 2, to the interior of the shaft 29 when the machine is to be fired up. In this connection it may be remarked that the pipe 35 is provided with a hand-valve 36 for controlling the supply of water. At the base of the fire-box, which is lined throughout with firebrick or other refractory material 37, are located burners 38, Figs. 5 and 6, consisting of tubes provided with perforations through which a mixture of oil-gas, steam, and air, or other gaseous fuel, escapes and is burned.

39 and 40, Figs. 3, 5, and 6, are two series of

water-tubes, whereof one is located in proximity with the burners and whereof the other is located beneath the perforated end of the desiccating-chamber, and constitutes, as it were, baffling-bars. The water-tubes 39 support grate-bars 41, Fig. 6, and certain of the water-bars of each series support a bridge-wall 42, as is shown in the drawings. After traversing the desiccating-chamber 4, a portion of the garbage, in a more or less incinerated or desiccated and comminuted condition, escapes through the perforations 5, and the remaining portions of the garbage pass out of the end of the desiccating-chamber between the fixed cutter 15, an exponent a , and revoluble cutter 16, an exponent a , carried by the shaft 29. The garbage then falls around and between the series of water-tubes 40 and toward the grate-bars 41. In the meanwhile the flames issuing from the burners 38 are deflected upward and backward by the bridge-wall 42 and circulate around the perforated end of the desiccating-chamber, thus insuring complete incineration of the falling garbage. The products of combustion from the fire-box pass through the flues of the boiler and are delivered into the smoke-box 3. These products of combustion, as well as any volatile or gaseous products escaping from the forward end of the desiccating-chamber 4, and together with any fumes or gases issuing from the garbage itself, are drawn into the smoke-box 3 and from thence through the funnel or off-take by reason of the forced draft created in the latter by the discharge of steam through the rose-like nozzle or muffler 43. In this connection it may be noted that the draft at the hopper 14 is inward. In the present instance the exhaust-steam from the engine is discharged from the nozzle 43, and in such case the sound incident to the escape of exhaust-steam is obviated. However, live steam may, if desired, be employed for this purpose. In traversing the smoke-box 3 the fumes, vapors, and other gaseous products are burned, destroyed, or rendered odorless by means of the combustion of gaseous fuel at the burners 44, so that the products which escape from the funnel or off-take are odorless, free from steam and solid matter, and otherwise unobjectionable.

44 is a burner used for destroying such vapors as traverse the smoke-box 3.

The burner shown in the drawings is not claimed specifically herein, and it constitutes the subject-matter of my application, Serial No. 521,392, filed August 27, 1894, and entitled "Fluid-Fuel Atomizing and Burning Apparatus."

The water-bars 39 and 40 are exposed to a considerable degree of heat and to more or less damp garbage, and consequently, as well as for other reasons, tend to expand and contract. To permit of such expansion and contraction use is made of tapering thimbles 48, Figs. 5, 6, and 11, and one end of each water-tube is tapped into the inner sheet of one

water-leg, as shown in Fig. 11, and the other end of the water-tube is inserted into the internally-tapered thimble 48, which latter is tapped into the inner sheet of the other water-leg, as shown at the upper part of Fig. 5. The thimble 48 fits the finished exterior of the end of the tube and thus prevents leakage, and it may be constructed of a composition of metal that does not expand and contract equally with the metal of the tube. Moreover its tapering form permits it to be screwed into the sheet of the water-leg in such manner that it tightly clamps or is, as it were, compressed onto the finished exterior end of the water-bar. By this construction only the inner sheets of the water-legs are perforated and one end of the water-tube is permitted a slight range of motion by sliding endwise in the tapered thimble, which, however, by reason of its form and relative rate of expansion and contraction and accuracy of fit, hugs the movable end of the water-tube in such manner that leakage is prevented. The required mixture of steam, air, and oil-gas, is effected by means of injectors 49, Figs. 4, 5, 6, and 7. Oil is led from the oil-tank 50 to the injectors appertaining to the fire-box 2 by a pipe 51, and through a coil 52, in which it is volatilized. Steam is led to these injectors by a branch pipe 53, Fig. 4, through a coil 54, in which it is superheated. Oil is supplied from the tank 50 to the injector appertaining to the smoke-box, through a pipe 55 and coil 56, in which it is volatilized. Steam is supplied to this injector through a branch pipe 57 and coil 58, in which it is superheated. The steam, after it enters the injector, Fig. 7, escapes at the nozzle 59, and thus not only draws a supply of oil into the injector, but also mixes with it and forces the mixture forward through the nozzle 60. The jet issuing from the nozzle 60 causes a supply of air to be drawn in through the opening 61, and also impels the mixture of air, oil, gas, and steam forward and insures an excellent and adequate supply of volatile and combustible material to the burners. 62 is a hand-wheel, by means of which the position of the nozzle 59 may be shifted toward the right or left in order to vary the feed of the mixture of oil-gas and air. Inasmuch as the engine 10 is necessarily exposed to the weather, it follows that belting should not be employed thereon. Consequently I make use of a flexible shaft 63, Fig. 3, for imparting motion to its governor.

The mode of operation of the apparatus may be described as follows: Prior to igniting the burners in the smoke-box 2 water is permitted, by the opening of the hand-valve 36, to flow from the interior of the boiler and to fill the hollow shaft 29. The burners are then lighted and steam is generated. As soon as there is a sufficient head of steam, a supply is drawn off through the pipe 31, hollow shaft 29, and supplied to the engine, which not only serves to operate the two sets of cutters disposed, respectively, in the hopper and fire-

box, but also to rotate the screw-conveyer 22, and if necessary to propel the apparatus from place to place. The burners 44 being lighted, garbage may be thrown into the hopper 14, whereupon it is cut up by the rotary cutters contained therein and delivered upon the screen 23, through which some of the liquid matter passes and is separated in the receptacles 25 and 26, from the former of which the water may be fed to the boiler. The screw-conveyer 22 draws the garbage through the boiler into the fire-box 2, where the coarsest of it is caused to pass through cutters and where it is incinerated as it falls upon the flames and toward the grate. Meanwhile all the volatile products find their way to the smoke-box 3 and are there consumed, deodorized, and destroyed by the burners 44, before they pass off through the funnel or off-take.

It will be obvious to those skilled in the art to which my invention appertains that modifications may be made in details without departing from the spirit thereof. Hence, I do not limit myself to the exact construction and arrangement of parts hereinabove set forth, and illustrated in the drawings; but,

Having thus described the nature and objects of my present invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An incinerator comprising, a boiler having a main combustion chamber and a smoke box, a desiccating chamber communicating with the main combustion chamber and having openings or perforations through which communication between it and the smoke box is provided for the passage of fumes and vapors, an inlet in the desiccating chamber for garbage, and means for effecting combustion in the smoke box, substantially as described.

2. An incinerator comprising, a boiler having an internal fire box and a smoke box, a desiccating chamber penetrating the water and steam space of the boiler and having perforations through which communication between it and the smoke box is provided, an inlet for garbage in the desiccating chamber, a conveyer for discharging garbage through openings in said chamber and into the fire box, a hollow shaft for said conveyer, and pipe connections and valves for supplying water to said shaft when fire is started in the fire box and for supplying steam to said shaft to dry garbage on its way to the fire box, substantially as described.

3. An incinerator comprising, a boiler having fire and smoke boxes, a desiccating chamber penetrating the boiler and extending into the fire box, a conveyer for conveying garbage through said chamber, a hopper for delivering garbage through the smoke box to the desiccating chamber, fixed and revoluble cutters in the throat of said hopper, a strainer underlying the hopper, fixed and revoluble cutters mounted at the end of the desiccating chamber and in the fire box, burners at the

base of the fire box and in the smoke box, and a prime mover and connections for driving the cutters and conveyer, substantially as described.

- 5 4. An incinerator comprising, a tubular boiler having fire and smoke boxes, a desiccating chamber and a conveyer penetrating the boiler and extending into the fire box, a
10 hopper for delivering garbage through the smoke box to the desiccating chamber, a strainer underlying the hopper, a rose and connections for creating a forced draft through the smoke box, and burners for creating combustion in the smoke box whereby
15 fumes, smoke and vapors are destroyed or deodorized before leaving the apparatus.

5. An incinerator comprising, an externally heated boiler having a fire box and a smoke box, a desiccating chamber and conveyer extending through the interior of the boiler and communicating with said fire and smoke boxes, and an inlet in the smoke box communicating with said conveyer and chamber, substantially as described.

- 25 6. An incinerator comprising, a boiler having fire and smoke boxes, a desiccating chamber and conveyer penetrating the boiler and extending into the fire box, a hollow shaft in said chamber, and means for supplying steam
30 to said shaft, substantially as described.

7. In combination, a fire box provided with a bridge wall and fire tubes and a grate, a perforated desiccating chamber extending into the fire box, a series of bars or water

tubes intermediate of the grate and desiccating chamber, and burners disposed beneath the grate, substantially as described.

8. The combination in a garbage incinerator of, a desiccating chamber extending across the fire box and provided with openings or perforations at its curved walls and with openings formed between the arms of cutters at its end, a positively driven conveyer for forcing garbage in small pieces through said side and end openings of the desiccating chamber, and burners at the base of the fire box directing their flames up through the falling pieces of garbage, substantially as described.

9. An incinerator comprising, an internally fired tubular boiler having smoke and fire boxes at its respective ends, a desiccating chamber communicating with the smoke box and perforated and extended into the top of the fire box, a garbage inlet communicating with said chamber and with the smoke box, and means for effecting combustion in the smoke box whereby fumes are drawn therein from the inlet, conveyer and tubes of the boiler and deodorized in the smoke box, substantially as described.

In testimony whereof I have hereunto signed my name.

HENRY C. FELLENBAUM.

Witnesses:

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A. B. STOUGHTON.