Dec. 25, 1923.

1,478,875

H. T. LUDWIG

GARBAGE DESTRUCTOR

Filed Jan. 24, 1922

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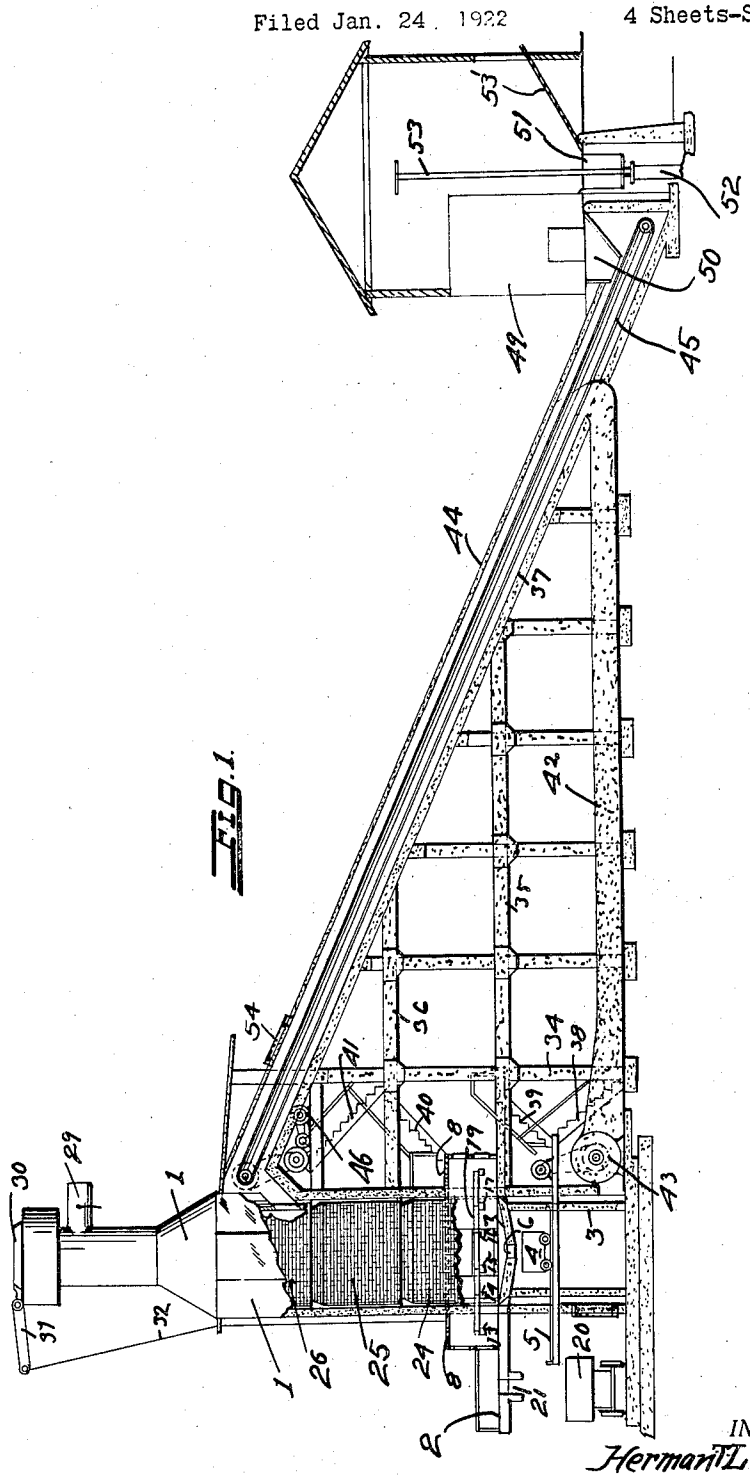


Fig. 1.

INVENTOR.
Hermann Ludwig

BY
Carlos P. Griffin
ATTORNEY.

Dec. 25, 1923.

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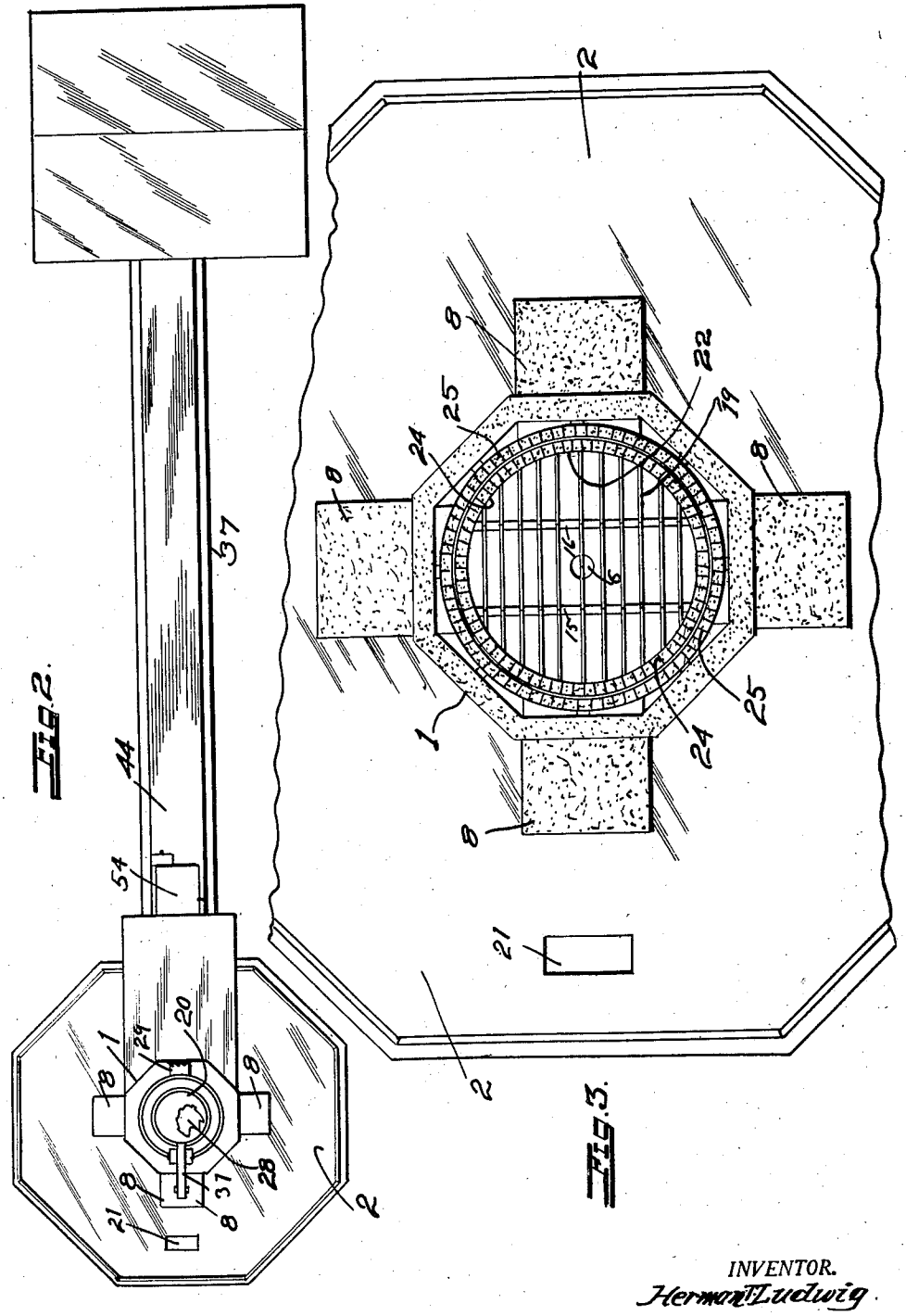


Fig. 2.

Fig. 3.

INVENTOR.
Herman T. Ludwig

BY
Carlos P. Griffin
ATTORNEY.

Dec. 25, 1923.

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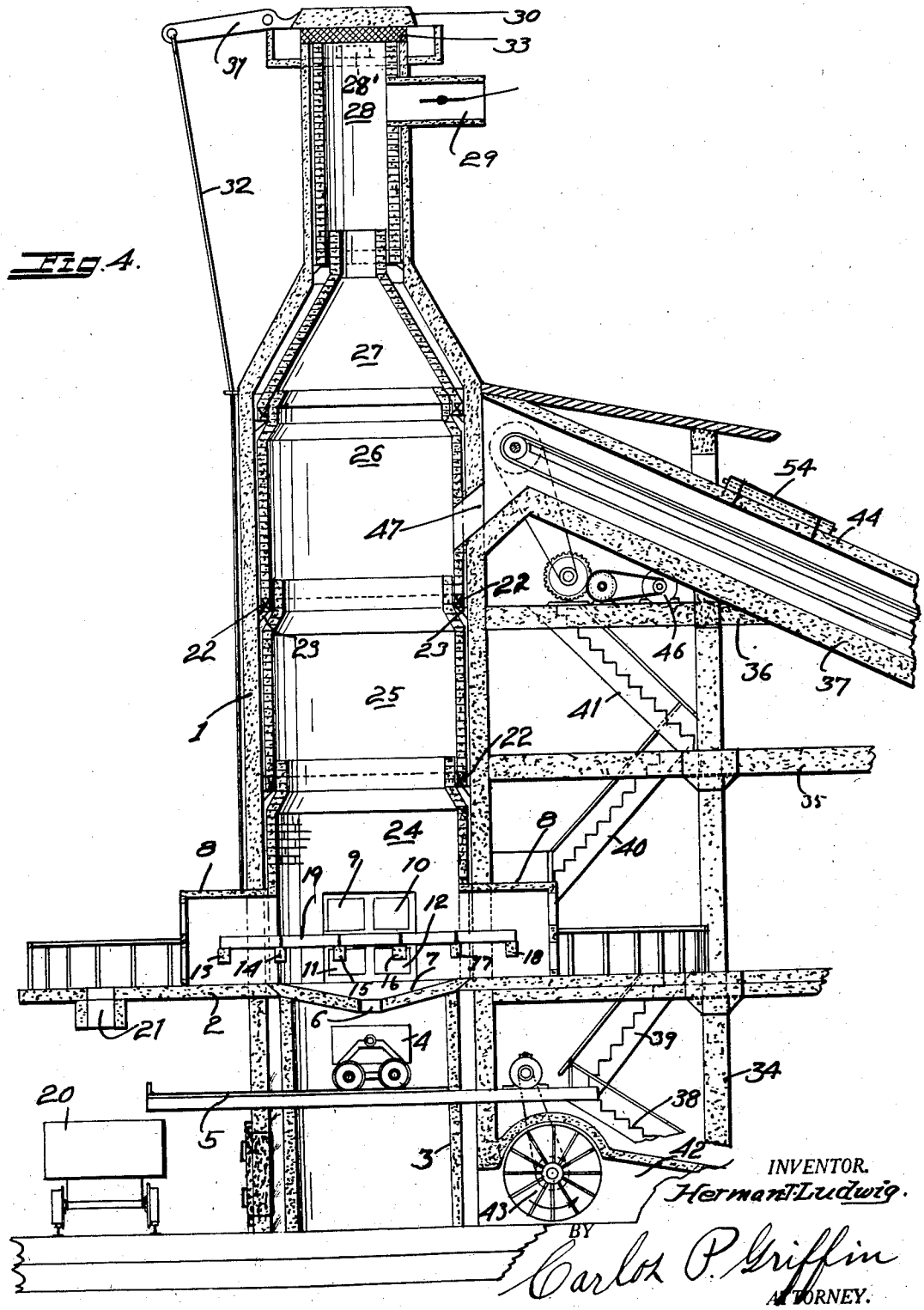
H. T. LUDWIG

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Fig. 4.



INVENTOR.
Herman T. Ludwig.

BY
Carlos P. Griffin

ATTORNEY.

Dec. 25, 1923.

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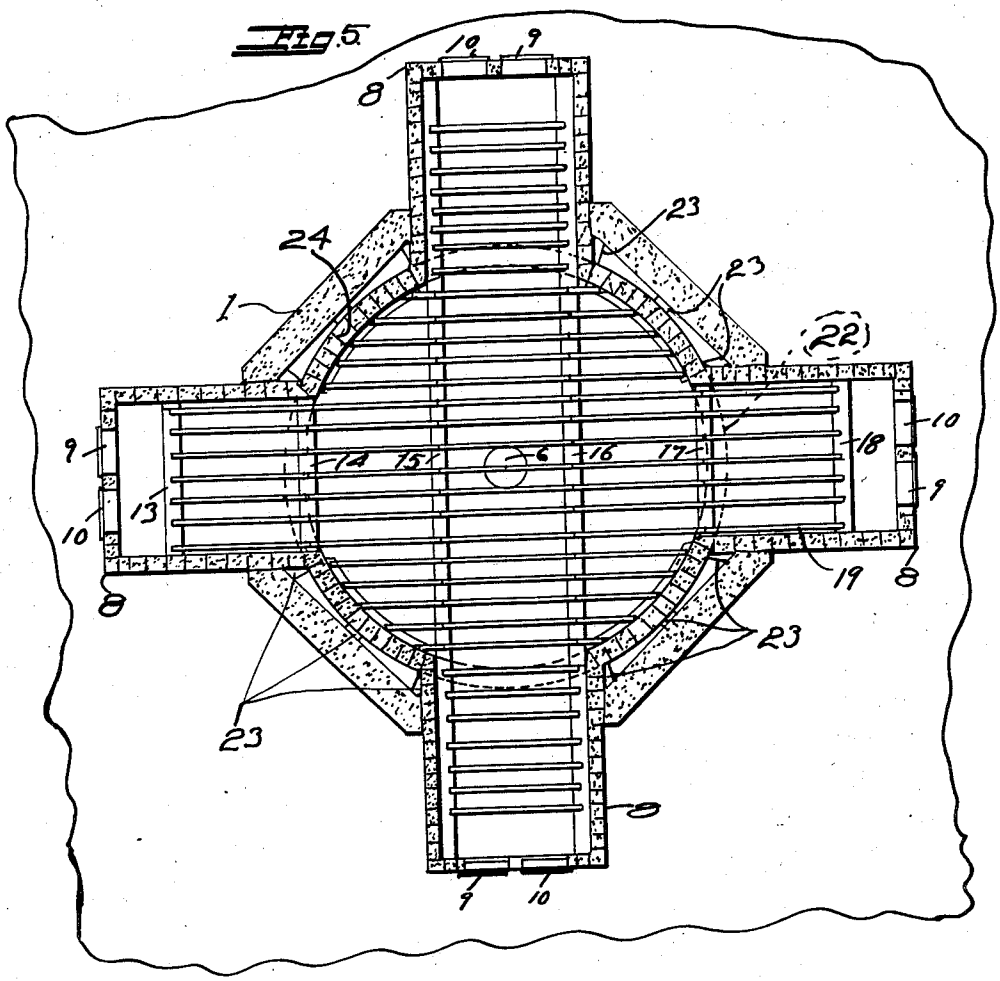
H. T. LUDWIG

GARBAGE DESTRUCTOR

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4 Sheets-Sheet 4

Fig. 5.



INVENTOR.
Herman T. Ludwig.

BY
Carlos P. Griffin
ATTORNEY.

Patented Dec. 25, 1923. 1,478,875

UNITED STATES PATENT OFFICE.

HERMAN T. LUDWIG, OF SAN FRANCISCO, CALIFORNIA.

GARBAGE DESTRUCTOR.

Application filed January 24, 1922. Serial No. 531,371.

To all whom it may concern:

Be it known that I, HERMAN T. LUDWIG, a citizen of the United States, residing at San Francisco, in the county of San Francisco, State of California, have invented a new and useful Garbage Destructor, of which the following is a specification, in such full and clear terms as will enable those skilled in the art to construct and use the same.

This invention relates to a garbage incinerator and its object is to produce an apparatus capable of destroying a great quantity of garbage such as a large city collects.

One object of the invention is to provide means whereby the heat generated may be used to dry the supply of material being elevated to the stack.

Another object of the invention is to provide means for the convenient clearing of the ashes collecting upon the grate bars.

Another object of the invention is to provide means whereby the fire brick lining of the stack will not be loaded sufficiently to be injured by the expansion due to heating.

Another object of the invention is to arrange the fire brick lining at such a distance from the structure of the stack as to allow the free circulation of air to cool the fire brick and the structure, the heat thus collected being used to aid in drying the fresh supply of garbage.

Another object of the invention is to provide means for examining the grate bars at four places, thereby making replacements easy when required.

Another object of the invention is to provide means whereby the producer gas formed may be taken off the stack when it is desired to make use of that gas for heating boilers, etc.

Other objects of the invention will appear as the description proceeds.

An embodiment of the invention is shown in the accompanying drawings in which the same reference numeral is applied to the same portion throughout, but I am aware that there may be modifications thereof.

Fig. 1 is a side elevation partly in section of the complete apparatus.

Fig. 2 is a plan view of the complete apparatus.

Fig. 3 is a plan view in section of a portion of the stack and platform on a larger scale than Figure 2.

Fig. 4 is a vertical sectional view of the complete apparatus, and

Fig. 5 is a plan view of the stack just above the grate.

The structure consists of a reinforced concrete octagonal stack 1 from about eight to sixteen feet across with a working floor 2 from twelve to sixteen feet above the general ground level.

Inside the lower portion of the stack there is an extra curtain wall 3 through which an opening is cut to operate the car 4 on the tracks 5.

Inside the stack the floor slopes to the central opening 6 as indicated at 7. On four sides of the stack are four hoods or enclosures 8, the ends of which are closed by four doors 9 to 12 inclusive for each enclosure. There are six girders 13 to 18 inclusive which extend into said enclosures and form the supports for the grate bars 19, said bars being all of substantially the same length and being interchangeable. The ashes collect on the grate bars and they are worked down by an attendant with a rake bar operating through the doors 9 to 12 on whichever side of the stack may be required. Such ashes as the workman may be compelled to work out through the doors 9 to 12 he will wheel around the stack on the platform 2 and dump into the car 20 below the opening 21.

Inside the stack there are five reinforced concrete rings 22 at different levels, each supported at a short distance from the outer stack by a plurality of haunches 23 whereby an air space is left substantially all the way around each ring except under each of the working enclosures. The space between the fire brick 25 and the main wall 1 of the stack, is not air tight and the main wall must have openings at convenient places to allow the fan 43 to keep the fire brick at as low a temperature as possible, however, the fire brick linings 25 to 28 inclusive are made as nearly air tight as possible. One such opening is indicated at 28', Fig. 4.

These ring girders 22 form the supports for each set of fire bricks 24 to 28 inclusive. The bricks are laid to form a circular stack

with an air space entirely around the stack. In order to protect the ring girders 22 from the heat, the bricks of the lower set are corbelled in and then extended up above the top of each ring girder, thereby preventing it from being unduly heated and at the same time providing means to allow the bricks to expand without injury to the structure, since the expansion due to the greatest heat may be divided up among a plurality of separate units.

A flue 29 and hinged cap 30, the latter operated by an arm 31 and cable 32 serve to send the producer gas to any place where it may be used whenever desired. A grill brick work top 33 allows the air to pass into the stack when running without burning all of the gas at the stack.

Adjacent the stack the floor 2 is supported by suitable posts 34 also in turn supporting other floors 35, 36 and an inclined floor 37. Stairways 38 to 41 afford means to reach different levels of the stack floors.

From the stack to the lower portion of the incline 37 there is a reinforced concrete air conduit 42 through which a fan 43 of any type suitable to the work delivers the air drawn from around the outside of the fire brick to the drying tunnel covered by the roof 44.

An endless conveyor 45 extends up the incline and is driven by the motor 46. The material taken to the top of the incline is dropped into the stack through an opening 47. At the lower end of the incline the conveyor 45 runs under a bin 49 and receives material from the discharge chute 50. The bin is filled from a bucket 51 moved up the guides 53 by the ram 52. Wagons collect the garbage and dump it into the bucket 51.

The operation of the apparatus is as follows: Assuming the wagons to dump the garbage from any suitable roadway onto the inclined platform 53′ which directs it into the bucket 51, which is raised and the garbage dumped into the bin 49 from the bucket the endless conveyor 45 carries it to the top of the incline and dumps it into the stack.

When the fire is to be started, a considerable quantity of fuel is placed in the stack on the grate bars 19. Thereafter garbage is dumped upon the fuel until a considerable quantity has collected, thereupon the fire is started and following that an endeavor is made to supply the stack with garbage in sufficient quantity to keep it burning at all times, the rapidity of burning being somewhat regulated by the rate of operation of the fan 43.

When the fire is started the fan 43 is operated to draw air from the upper portion of the stack outside the fire brick lining downwardly driving it through the tunnel 42 to the incline 37 by which the garbage is carried. The heat accumulated in the passage of the air down the stack is made use of to dry the garbage and present it to the furnace in a better condition to burn.

When conditions are right provision may be made for the opening of a valve 54 in the top of the incline 44 to permit the escape of air therefrom, and to accumulate the producer gas in any suitable location, such producer gas as may be formed passes off through the flue 29, the top 30 being closed.

When the burning conditions are not right for the production of any producer gas, the top 30 is opened and the valve 54 is closed so that all of the air used to dry the garbage will pass out through the top of the stack.

During the course of the destruction of the garbage the ashes will collect upon the grate bars 19 and the workman will from time to time examine the condition of the ash accumulations by opening the doors 9 to 12 inclusive as may be required to remove the ashes. A portion of the ashes will be thrown into the opening 6 onto the car 4, while other portions will be wheeled along to the opening 21 and dumped into the car 20.

What I claim is as follows, but various modifications may be made in the construction shown in the drawings and above particularly described form, within the purview of my invention.

1. In a garbage destructor a vertical stack, a fire brick lining for the stack spaced therefrom, grate bars at the bottom of the stack for holding the weight of material piled therein, a fan for causing a downdraft in the stack outside the fire brick lining, a carrier for delivering garbage to the top of the stack, a conduit extending from the fan to said carrier for the delivery of hot air to the garbage to dry the same prior to its delivery to the stack, and a plurality of doors at the level of the grate bars for the removal of the ashes.

2. In a garbage destructor a stack, a plurality of grate bars at the bottom of the stack for the support of materials piled therein, a fire brick lining for the stack supported in several different sections and spaced from the stack to provide air cooling places entirely around the fire brick lining, an inclined chute, a carrier in said chute for delivering the garbage to the top of the stack, a fan for creating a down draft in that portion in the stack outside the fire brick lining, and a passage extending from said fan to the lower portion of the chute for delivering hot air to the garbage being elevated to the top of the stack whereby the garbage may be dried.

3. In a garbage destructor, a vertical stack, a fire brick lining therein, spaced therefrom, grate bars at the bottom of the

stack for holding the weight of material piled therein, doors on four sides of said stack at the level of the grate bars for the removal of the ashes, therefrom, a fan for causing a down-draft through the stack outside the fire brick, a carrier for delivering garbage from the level of the ground to the top of the stack, and a conduit for delivering the air from the fan to the garbage carrier to dry the garbage.

In testimony whereof I have hereunto set my hand this 16th day of January, A. D., 1922.

HERMAN T. LUDWIG.