E. B. ENGLISH & W. H. BURR.

FURNACES FOR DESTROYING GARBAGE.

No. 195,495. Patented Sept. 25, 1877.

Fig. 1

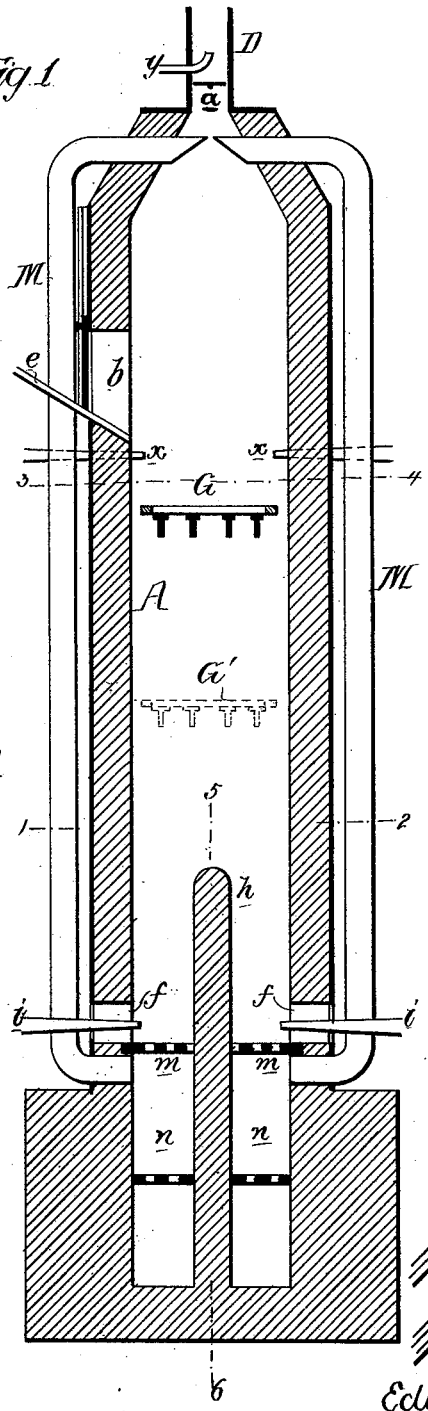


Fig. 2

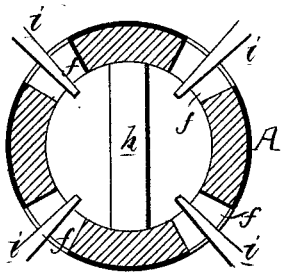


Fig. 3

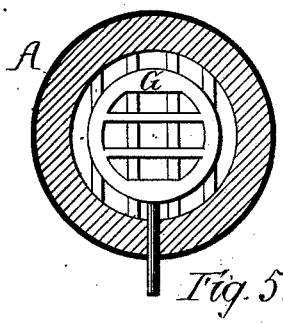


Fig. 4

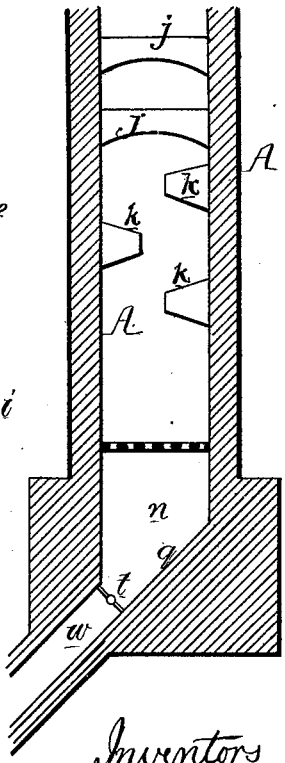


Fig. 5.

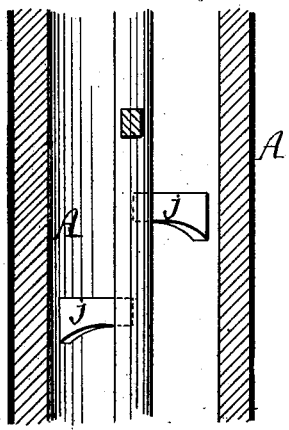
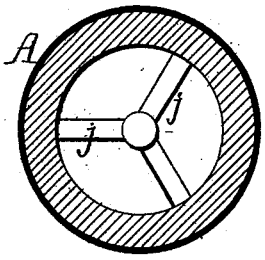


Fig. 6.



Witnesses
Henry Howson Jr.
Harry Smith

Inventors
Edward B. English
and
William H. Burr
by their Attorneys
Howson and Sons

UNITED STATES PATENT OFFICE.

EDWARD B. ENGLISH AND WILLIAM H. BURR, OF PHILADELPHIA, PA.

IMPROVEMENT IN FURNACES FOR DESTROYING GARBAGE.

Specification forming part of Letters Patent No. **195,495**, dated September 25, 1877; application filed May 14, 1877.

To all whom it may concern:

Be it known that we, EDWARD B. ENGLISH and WILLIAM H. BURR, both of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Furnaces or Kilns for Destroying Garbage and similar material, of which the following is a specification:

The object of our invention is the rapid destruction of the refuse matter of cities and towns, such as garbage, street dirt, ashes, &c.; and this object we attain by subjecting masses of the material, while held temporarily in suspension, or otherwise retained in a shaft or kiln, to the action of ignited gases applied under pressure, as described hereinafter.

One of the simplest modes of carrying our invention into effect is illustrated by Figures 1, 2, 3, and 4 of the accompanying drawing, Fig. 1 being a vertical section of the consuming-kiln; Fig. 2, a section plan on the line 1 2; Fig. 3, a sectional plan on the line 3 4; and Fig. 4, a vertical section on the line 5 6, while Fig. 5 is a vertical section, and Fig. 6 a sectional plan, of a modification.

In this instance the main body of the kiln consists of a hollow vertical cylinder, A, of plate-iron lined with fire-brick, the kiln terminating at the top in a chimney, D, furnished with a suitable valve or damper, *a*.

In the side of the kiln, near the top of the same, is an opening, *b*, through which the material to be consumed is passed in masses down an inclined plane, *e*, onto a grating or other equivalent obstacle, G, within the kiln, the said opening *b* being furnished with a suitable door.

The lower portion of the kiln is, by preference, separated into two compartments by a partition-wall, *h*, for a purpose rendered apparent hereinafter, each compartment having a grate, *m*, and below the latter an ash-pit, *n*.

Above each grate are openings *f*, for the admission of air, and for the introduction of pipes *i* of suitable gas or vapor burners. In the present instance there are four of these burners, two for each compartment into which the lower portion of the kiln is divided.

The ash-pits may be arranged in the manner shown in Fig. 4—that is, with inclined bottoms *q*—for facilitating the discharge of the ashes through a duct, *w*, into barges, cars, or other receptacles, the duct being furnished with a suitable valve or door, *t*, to be closed for the exclusion of air, excepting when the ashes are discharged.

In connection with the above-described kiln, we prefer to use hydrocarbon as a fuel. Different kinds of hydrocarbon-burning apparatus may be used; but we prefer that for which Letters Patent No. 132,800 were granted to W. H. Burr and E. B. English, November 5, 1872, or that for which Letters Patent No. 152,596 were granted to same parties on the 30th day of June, 1874, in both of which hydrocarbon is vaporized in a vessel prior to the discharge of the vapor under pressure through tubes into a furnace, where it is ignited. All the tubes *i* communicate with the vaporizing-vessel, and forcible flames of intense heat are projected into the furnace, with air sufficient to support and intensify combustion.

As an example of the destructive effect of these flames on garbage, we may state that in a test made in a kiln a cart-load of wet kitchen-garbage was reduced to less than a half-bushel of ashes in less than ten minutes.

The main object of the grate G is to hold the material in suspension until it is quite dry and partly destroyed, when its passage through the bars of the grate may be facilitated by a slight movement of the same.

In falling, the partly-destroyed material will strike the top of the partition *h*, and will be stirred and disintegrated, so as to insure its complete destruction before it falls onto the grates *m m*, the ashes falling through the grate into the ash-pits, whence they may be discharged from time to time.

In some cases there may be a second grate, G′, (shown by dotted lines in Fig. 1,) below the first grate, so that masses of material may be twice arrested, and their fall through the kiln twice temporarily delayed, to insure their almost complete destruction before they reach the bottom of the kiln.

The gases or vapors generated when the material is first introduced into the kiln may be ignited by means of burners *x x* above the grate G, and any gases not thus destroyed may, by closing the valve *a* of the chimney,

be directed downward through pipes M into the combustion-chamber, when such of the gases as are of an inflammable nature may be utilized by aiding the ignited gases or vapors from the burners *i* to destroy the material in the kiln.

If the gases and foul vapors have to pass directly into the air, however, it will be advisable to furnish the chimney with a burner, *y*, or to cause the vapors to pass through a charcoal-furnace for deodorizing purposes.

The chimney should also in this case be provided at the top with a suitable device for preventing the discharge of the light and partially-consumed particles which may be carried up through the chimney.

Various plans may be adopted for temporarily obstructing the downward passage of the material through the kiln while the flame takes effect on it. For instance, in addition to the grate or grates G, there may be in the interior of the kiln fire-brick projections *k*, Fig. 4, for retaining the material until it is acted on by the flame and displaced by additional masses; or brick arches *j*, extending completely across the furnace, as shown in Fig. 4, or radiating from a central column, as shown in Figs. 5 and 6, may be built within the kiln for the same purpose.

It will be evident that although we have described, and give the preference to, hydrocarbon vapors as the destroying agent, any gas which, when ignited and under pressure will give sufficient heat, may be used.

We claim as our invention—

1. The mode herein described of destroying garbage and other refuse matter—that is to say, by temporarily retaining or holding in suspension within a shaft or kiln masses of the material while it is directly acted upon by ignited gases applied under pressure, all substantially as set forth.

2. The combination, in a furnace or kiln, of the following elements, namely, a shaft or equivalent structure forming the body of the furnace or kiln, grates *m* at the base of the shaft, air-openings with gas or vapor burners adjacent to these grates, a grate or grates or other equivalent obstructions, G, within the shaft, and an outlet-pipe, D, all substantially as specified.

3. The combination of the furnace A and its burners near the bottom with the pipes M, opening communication between the top of the furnace and the space below the burners, as specified.

4. The combination, in a garbage-furnace, of the suspension-grate G with the partition *h* and burners *i*, as set forth.

5. The combination of the chimney D with the burner *y*, as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDW. B. ENGLISH.
WILLIAM H. BURR.

Witnesses:
HERMANN MOESSNER,
HARRY SMITH.