(No Model.)

M. L. DAVIS.

FURNACE FOR BURNING GARBAGE.

No. 462,035. Patented Oct. 27, 1891.

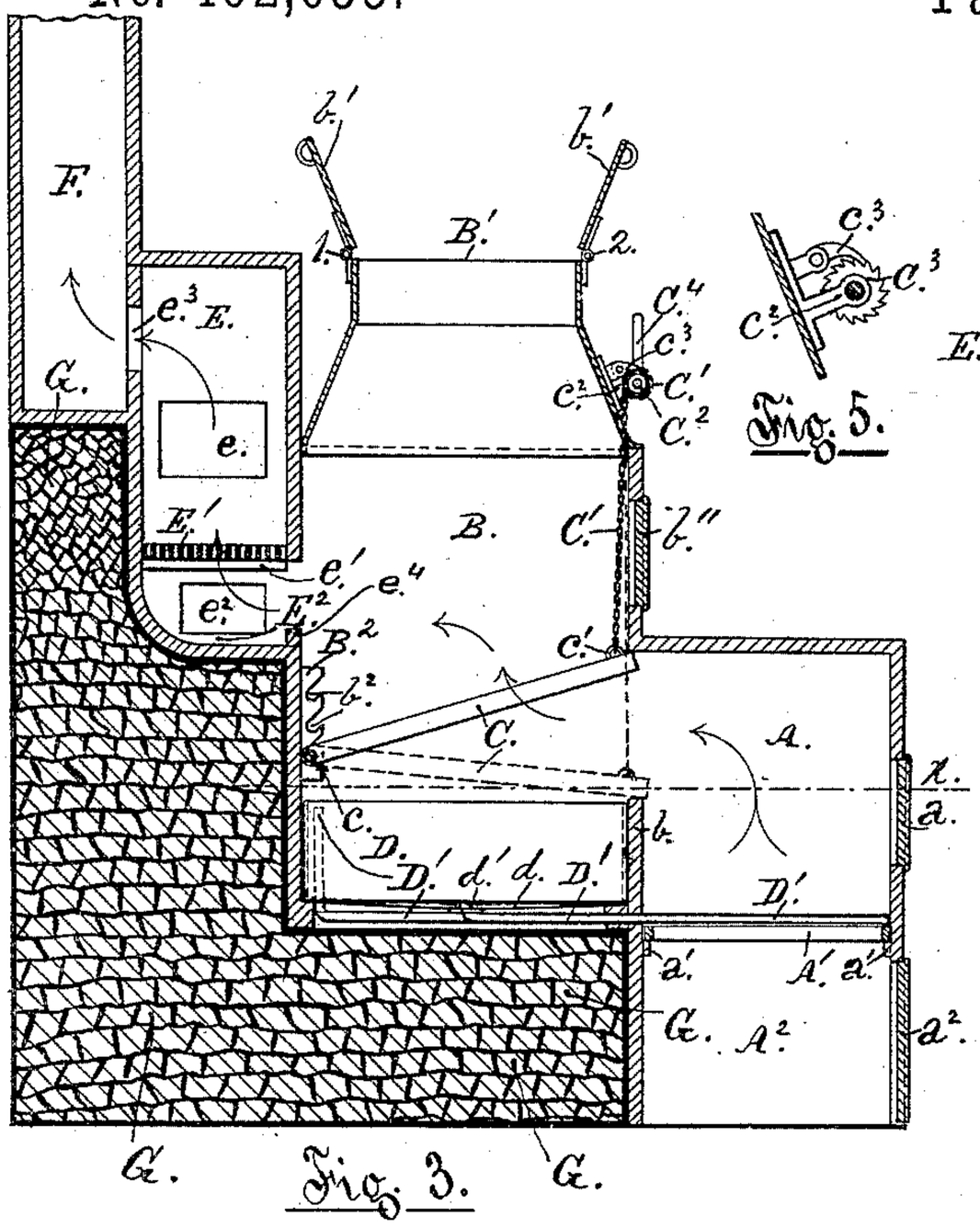

Fig. 3.

Fig. 5.

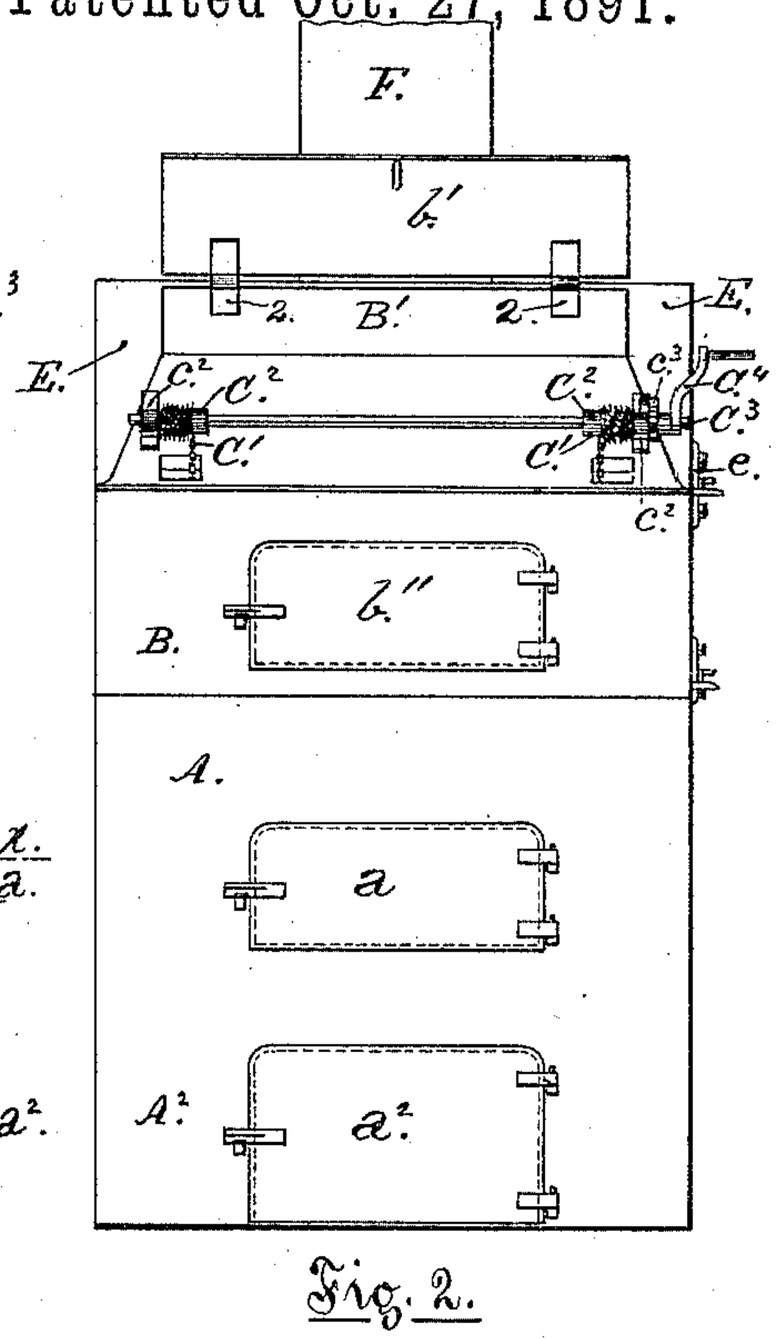

Fig. 2.

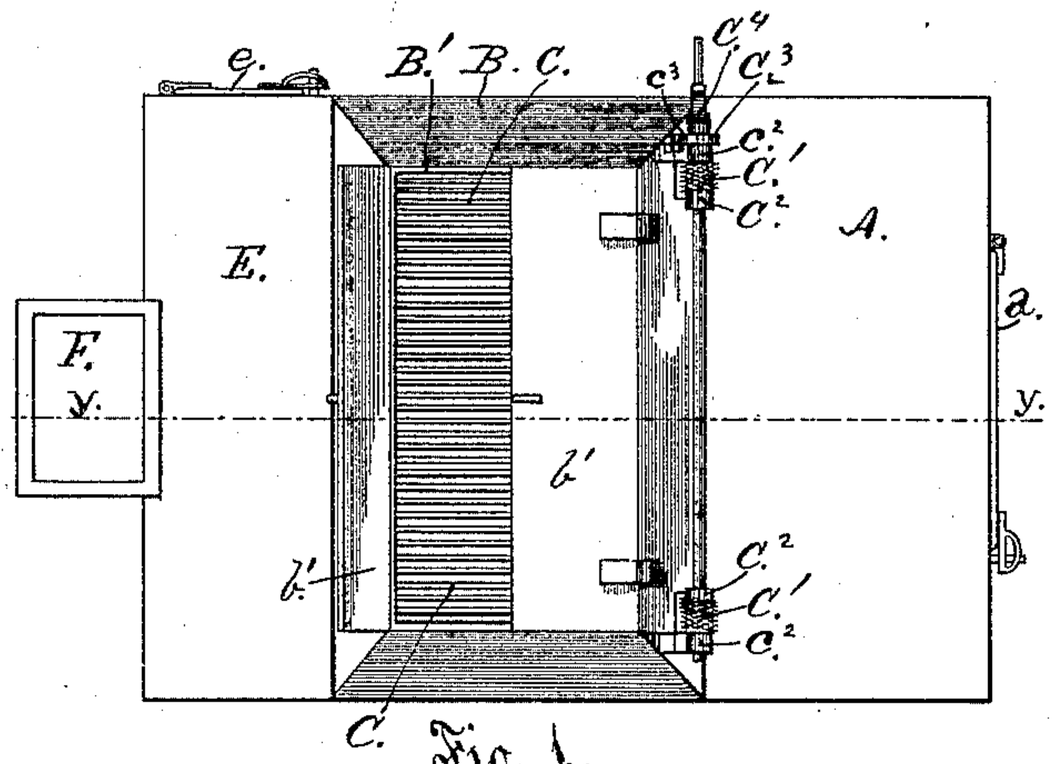

Fig. 1.

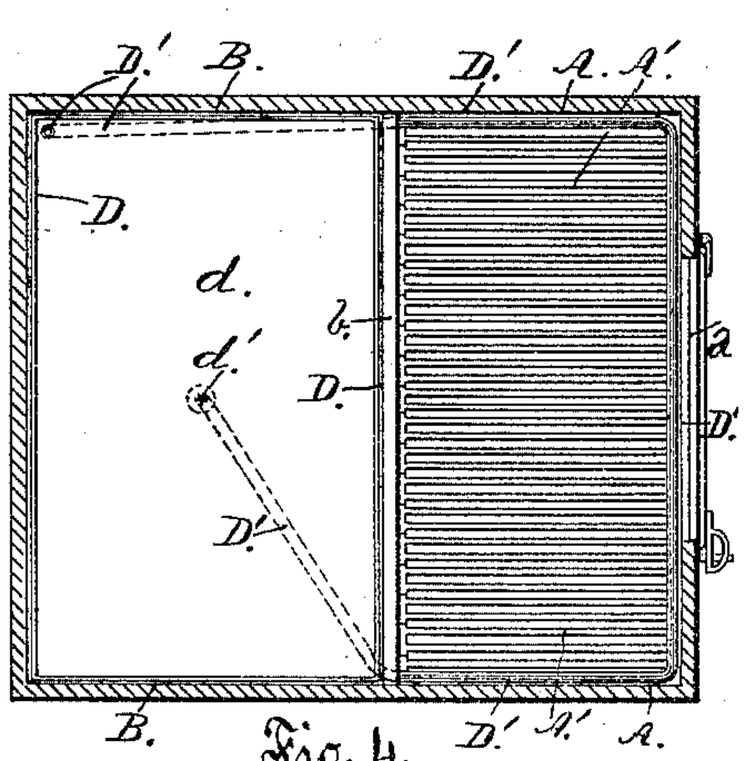

Fig. 4.

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FURNACE FOR BURNING GARBAGE.

SPECIFICATION forming part of Letters Patent No. 462,035, dated October 27, 1891.

Application filed May 5, 1891. Serial No. 391,611. (No model.)

To all whom it may concern:

Be it known that I, MILES L. DAVIS, of Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in a Furnace for the Burning or Consuming of Garbage or Kitchen Offal; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in a furnace for the destruction or burning of kitchen offal or garbage of any kind, using largely the garbage itself as fuel; and the improvements consist in the arrangement of a garbage receiving or drying chamber between two fire-chambers situated in different horizontal planes, the one being lower and the other higher than the receiving-chamber, so that the flames from the fire in the lower or primary fire-chamber will pass diagonally upward through the garbage in the receiving or drying chamber, under and through the fire in the higher or secondary fire-chamber, and combining with the flames from the fire in the latter chamber out through a smoke-stack into space, with means provided for draining moisture or liquid matter from the garbage and evaporating the same, as well as for dumping the unconsumed or dried matter from the drying chamber into the lower fire-chamber to be used as fuel.

The object of the invention is to provide means, using the garbage itself largely as fuel in its own destruction, for decomposing or burning economically and quickly without any offensive odor or smell any class of garbage or kitchen offal, now so much needed in the proper sanitation of the large and crowded domiciliary districts.

The purposes of the invention are attained by the means and devices illustrated in the accompanying drawings, in which similar letters of reference designate like parts throughout the several views, and in which—

Figure 1 is a top view of a garbage decomposing or burning furnace embodying the elements of the invention, one of the top doors opened to show the interior of the receiving or drying chamber; Fig. 2, an elevation from the right of Fig. 1, the closed door opened and the upper portion of the smoke-stack cut away; Fig. 3, a vertical sectional elevation of the portion above the line *y y* in Fig. 1, the closed door opened and the upper portion of the smoke-stack cut away, but the tilting grate, drain-tank, and evaporating-pipe shown full; Fig. 4, a completed top view of the portion below the line *x x* in Fig. 3; and Fig. 5 an enlarged view of the ratchet-wheel, windlass-bearing, and pawl detached from Fig. 3.

A garbage decomposing or burning furnace embodying the elements of my invention as illustrated in the several views of the drawings is constructed of masonry, or its walls may be of cast-iron properly lined in the fire-chambers, or any other suitable material may be used, and the furnace may have any approved form.

In the front and lower portion of the device is situated the primary fire-chamber A, having in its front wall a fire-door *a*, hinged and latched in the usual way. This chamber is provided with a fire-grate A′ of any approved construction, which grate is held in place by lugs or brackets *a′*, projecting from the front and rear walls, while below the grate is an ash-pit A^2, having in its front wall an ash-pit door a^2, hinged and latched in the usual way and adapted to regulate the draft.

In the central part of the device is situated the garbage receiving or drying chamber B, extending from some distance above down to about the level of the primary fire-chamber, from which it is separated by a bridge-wall *b*. The top or upper portion of the chamber B has walls narrowing gradually inward, making the mouth or opening B′ of somewhat smaller area than that of the body of the chamber, which mouth is provided with doors *b′* and *b′*, hinged at 1 and 2, and when closed or down said doors are adapted to close said mouth tightly, confining all fumes or vapors arising from the process of decomposition to within the body of said chamber, while its front wall above the fire-chamber A is provided with a door *b″*, through which garbage or matter within said chamber may be stoked when required. Projecting from the rear wall of the chamber B is a strip B^2, provided with notches b^2 to support the rear edge of the tilt-

ing or garbage-supporting grate yet to be described.

In the lower portion of the chamber B is a tilting grate C, having near its rear edge side projecting lugs or gudgeons *c*, adapted to rest and turn in the notches b^2 before mentioned, and by means of said notches and gudgeons the rear edge of the grate may be placed in a higher or lower position when it is desired to give to said grate a different angle of inclination, and on top at each side of the front edge of the grate is an eye-lug *c'*, to each of which lugs is fastened an end of a chain C', which chains, extending upward and passing through orifices in the front sloping wall of the chamber, have their other ends wound about and secured to a windlass C^2, journaled in bearings c^2, placed on and secured to said sloping wall, while a ratchet-wheel C^3, mounted on the windlass and held by a pawl c^3, serves to keep said windlass from turning back, the windlass being provided with a hand-crank C^4 for winding said chains. The grate is adapted to support the garbage in the drying-chamber and covers the horizontal area of the chamber B, having its front edge extending over the top of the bridge-wall *b* slightly into the fire-chamber A. Underneath this grate and behind the bridge-wall *b* is placed a tank D, extending over this portion of the chamber B, the tank having a bottom *d*, sloping downward from its edges to the center, where it is provided with an orifice *d'*, into which is fitted the upturned end of a tube or pipe D', which extends diagonally forward to an angle of the chamber, and, passing through the bridge-wall *b*, enters the fire-chamber A around which it extends, lying close in the angle formed by its outer walls and the fire-grate, and, passing again through the bridge-wall, it re-enters the chamber B and extends underneath to near the rear wall of the tank, where it passes upward through the bottom of the tank and extends to near the top thereof, where the end of the pipe remains open for the escape of vapor or steam, which makes a draft in its upward passage through the drying and secondary fire-chambers.

Behind the garbage-chamber B and well toward the top thereof is located the smoke-burning or secondary fire-chamber E, having a fire-door *e*. This chamber is provided with a fire-grate E', resting on lugs or brackets *e'*, projecting from the two side walls, and its ash-pit E^2, having an ash-door e^2, opens throughout its whole extent into the garbage-chamber B, while near its top, through the rear wall, is an orifice e^3, opening into the smoke-stack F, which is placed behind all, and may be erected to any desired height. A bridge-wall e^4 along the lower edge keeps its ashes from falling into the chamber B.

In the construction of the device just described I observe the following ratios as to the horizontal areas of the several chambers and that of the smoke-stack: Considering the horizontal area of the secondary fire-chamber as the unit, that of the garbage-chamber is five, of the primary fire-chamber three, and of the smoke-stack less than that of the unit. Of course these ratios may vary, but that for the drying-chamber should always be greater than that for the primary fire-chamber, which should be greater than that for the secondary fire-chamber, and that for the smoke-stack may be a trifle smaller than the latter.

Now the elements of my invention occupying the positions indicated in the several views of the drawings, an inspection of Fig. 3 shows that garbage may be readily dumped into the chamber B; that by means of the doors *b'* and *b'* the mouth B' of the chamber B may be tightly closed, confining all vapor, smoke, and smell to within said chamber; that any liquid contained in the garbage will drain through the grate C, drip into the tank D, and by gravitation flow through the orifice *d'* into the pipe D'; that fires having been built in the chambers A E, the flames from that in the chamber A, following the course indicated by the arrows, will pass through the mass of garbage in the chamber B, entering the ash-pit E^2, up through its fire into the chamber E, and, combining with the flames of the fire therein, out through the orifice e^3 into the smoke-stack F and up through it into space; that the flames from the fire in the chamber A in passing through the garbage in the chamber B will partially consume said garbage and completely dry the rest, and that any vapor or gas, as well as all smoke, will be completely consumed; that the dried garbage remaining in the chamber B may by lowering the grate C, as indicated by dotted lines, be dumped into the chamber A, and serving as fuel to the primary fire will be thus consumed; that any liquid in the tube or pipe D' in passing through the chamber A will by its fire be turned into vapor or gas, which in passing upward through the chamber B will materially increase the draft and will also be consumed by the fire in the chamber E; that the primary fire, the garbage, the secondary fire, and the outlet e^3 being each situated in a separate and successively higher horizontal plane, the draft from the initial to the end thereof is continuously upward in its course, and that, starting from the chamber A, whose area is three, the flame will expand and become a slow fire upon entering the chamber B, its area being five, as is desired for the drying process. The flame will again contract on entering the chamber E, whose area is one, and in combining with the secondary fire will be greatly intensified, as is desired, for the consumption of smoke, vapor, or gas, and on entering the still smaller area of the smoke-stack will increase the draft throughout.

Having now described my invention and set forth its application, what I do consider new, and desire to secure by Letters Patent of the United States, is—

1. The herein-described garbage-consuming furnace, consisting of a primary fire-chamber

opening rearwardly in its upper portion into a garbage-receiving chamber set in a higher plane, the garbage-receiving chamber opening rearwardly in its upper portion under and through the fire-grate of and into a secondary fire-chamber set in a still higher plane and the secondary fire-chamber opening rearwardly near its top into a smoke-stack, the fire-chambers having means provided for firing and their ash-pits having means provided for being cleared of ashes and for regulating the draft, the garbage-chamber having means provided through its top for receiving garbage and for tightly closing said top, means provided through its front wall for stoking the garbage, a tilting grate in its lower portion, the grate having its rear edge pivoted against the rear wall of the chamber to support the garbage, means provided at the front edge to hold the grate and to operate the same for dumping unconsumed garbage into the primary fire-chamber, and a tank below the grate, the tank having the center of its bottom opening into a pipe, the pipe passing into and around the primary fire-chamber and back underneath the tank and up through its bottom to near the top thereof, all substantially as described, and for the purpose set forth.

2. The combination, in a garbage-consuming furnace, with a primary fire-chamber provided with the usual fire-grate and ash-pit and having the usual fire-door and ash-pit door in the front wall thereof, and a garbage-receiving chamber, its lower portion in the rear of and opening into the upper portion of said fire-chamber, a bridge-wall between the chambers, means provided through its top for the admission of garbage to within said chamber, means provided for closing said top, and means provided through its front wall for the stoking of garbage placed therein, of a tilting grate having its rear edge pivoted against the rear wall of the garbage-chamber, and means provided for raising or lowering and holding in place the front edge of said grate, all substantially as described, and for the purpose set forth.

3. The combination, in a garbage-consuming furnace, with a primary fire-chamber, as described, and a garbage-receiving chamber, as described, a bridge-wall between said chambers, and a tilting grate, as described, having its rear edge pivoted against the rear wall in the lower part of the garbage-chamber and its front edge supported by chains, and means provided to wind and unwind the chains to raise and lower the front edge of the grate, of a tank, as described, placed in the lower portion of the garbage-chamber, an orifice through the center of the bottom of the tank, and a pipe underneath the tank and having an end about said orifice secured to the bottom of the tank, the pipe extending diagonally forward to an angle of the primary fire-chamber into and around said fire-chamber in the angle of its grate and outer walls into the garbage-chamber and underneath the tank to near its rear wall and up through its bottom into the tank and to near the top thereof, all substantially as described, and for the purpose set forth.

4. The combination, in a garbage-consuming furnace, with a primary fire-chamber, as described, and a garbage-drying chamber communicating with the primary fire-chamber, as described, the drying-chamber having means for receiving garbage through its top, means for closing said top, means for the stoking of garbage within the chamber through its front wall, means for supporting garbage within the chamber and means for the dumping of dried garbage into the primary fire-chamber, and a tank on its bottom to receive the drippings from the garbage, and means provided for evaporating said drippings from the tank, of a secondary fire-chamber having communication through its fire-grate and ash-pit and through the rear wall of and into the upper portion of the garbage-drying chamber and having also means for firing the chamber, means for clearing its ash-pit of ashes, and means for regulating its draft, and an opening near the top thereof through its rear wall into the smoke-stack, substantially as described, and for the purpose set forth.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

MILES L. DAVIS.

Witnesses:

DANL. H. HERR,

EDWIN BOOKMYER.