(No Model.)

2 Sheets—Sheet 1.

F. O. MATTHIESSEN.

BONE BLACK KILN.

No. 303,379. Patented Aug. 12, 1884.

Figure 1.

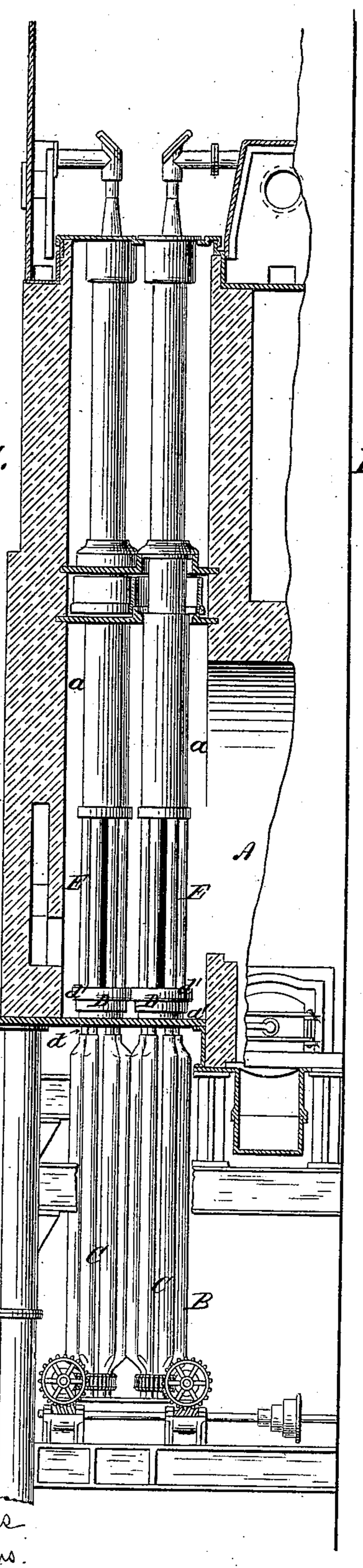
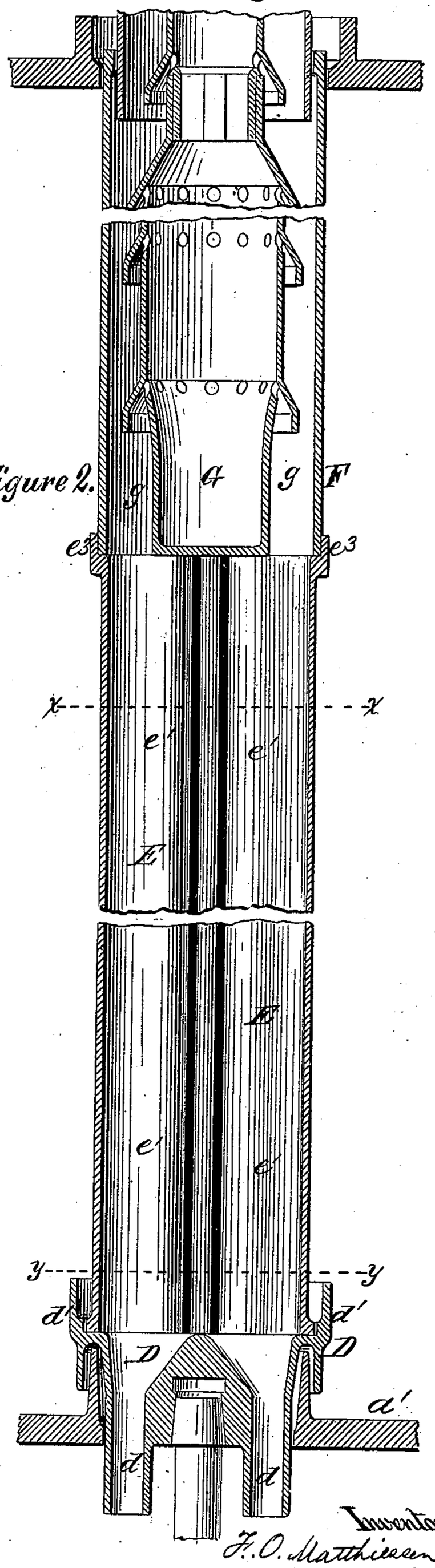


Figure 2.



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(No Model.) 2 Sheets—Sheet 2.

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Figure 3.

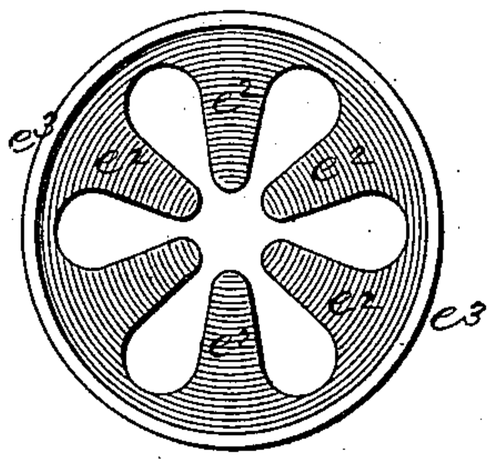


Figure 4.

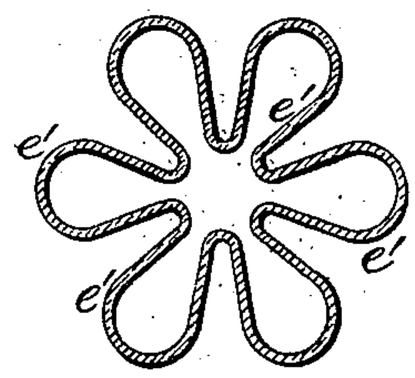
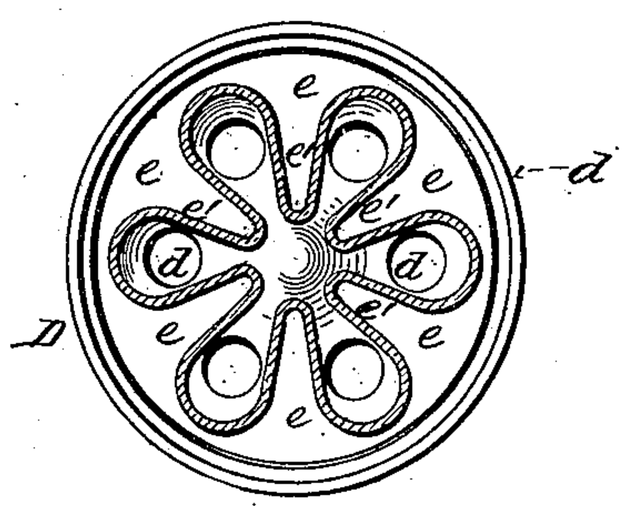


Figure 5.



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UNITED STATES PATENT OFFICE.

FRANZ O. MATTHIESSEN, OF IRVINGTON, NEW YORK.

BONE-BLACK KILN.

SPECIFICATION forming part of Letters Patent No. 303,379, dated August 12, 1884.

Application filed May 9, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANZ O. MATTHIESSEN, of Irvington, New York, have invented a certain Improvement in Bone-Black Kilns, of which the following is a specification.

In the process of revivifying animal charcoal there have heretofore been used vertical cylindrical retorts provided with an interior flue having perforations at intervals for the purpose of providing for the escape of the gases and vapors driven out of the bone-black during the process of reburning it. These retorts are arranged within a furnace-chamber, and are mounted upon the upper ends of a circularly-arranged group of cooling-pipes, which are below the furnace-chamber. In some cases, by means of suitable gearing, each group of cooling-pipes and the retort which surmounts it are made to slowly revolve upon a vertical axis, thus effecting the uniform exposure of the retort to the heat of the furnace. The bone-black introduced at the top of the retort falls through the annular space between the cylinder and the inner flue, and thence into the cooling-pipes, from the lower ends of which it is discharged.

In another pending application I have described a retort the upper part of which is ventilated, while the lower section is composed of separate heating-pipes, into the tops of which the bone-black, after being dried, is discharged from the ventilated section of the retort, and from the lower ends of which it is discharged into cooling-pipes situated below the furnace-chamber.

My present invention relates to a modification of this construction, which consists in substituting in place of the separate heating-pipes a single pipe, which has deep longitudinal corrugations, by means of which the bone-black discharged from the ventilated section of the retort is practically separated into different columns, and is nearly surrounded by the heating-surface of the pipe, and hence, during its journey through the lower part of the furnace-chamber, is subjected to a high degree of heat without being exposed to the air.

The accompanying drawings of a bone-black kiln containing my improvement are as follows:

Figure 1 is a vertical section of a portion of the kiln, showing two rotating retorts arranged within the heating-chamber, and surmounting two circularly-placed groups of cooling-pipes, which are below the heating-chamber, and which are provided with gearing, by means of which the systems of cooling-pipes and the retorts surmounting them are rotated. Fig. 2 is a central longitudinal section exhibiting portions of the ventilated upper part of the retort and of the corrugated lower part thereof. Fig. 3 is a view of the upper end of the corrugated portion of the retort, upon which the ventilated section rests. Fig. 4 is a transverse section of the corrugated portion of the retort, taken through the line *x x* on Fig. 2. Fig. 5 is a transverse section of the same, taken through the line *y y* on Fig. 2, showing the base in which the corrugated section is supported, and the mouths of the nozzles in the base, through which the bone-black falling from the corrugated section is discharged into the cooling-pipes.

The drawings represent retorts of the class which, either in whole or in part, are made to rotate upon their vertical axes; but it will be understood that the mechanism for rotating the retorts may be omitted, and that my improvement may be applied to retorts of the stationary type.

The kiln is constructed with the usual fire-chamber, A, and vertical heating-chambers are arranged therein, one of which, *a*, is shown in Fig. 1. Beneath the floor *a'* of the heating-chamber is the cooling-chamber B. The rotation of the vertical retorts is effected by the usual worm-gearing. (Shown in Fig. 1.) Each rotating system consists of the usual group, C, of cooling-pipes, into the upper ends of which, respectively, are inserted the nozzles *d*, extending downward from the base D of the retort. The base D is provided with a vertical flange, *d'*, which incloses the lower end of the corrugated heating-pipe E. The lower end of the corrugated heating-pipe is provided with a web, *e e e e e e*, which is circular, and fits within the flange *d'* of the base, and which extends across the spaces between the corrugations *e' e' e' e' e' e'*. The deep corrugations of the heating-pipe give it substantially the shape represented in Fig. 4. At the upper end the heating-pipe is provided with a transverse web,

e^2 e^2 e^2 e^2 e^2 e^2, similar to the web *e* at the lower end; but the edge of the upper web is provided with the upward vertical flange, e^3. This flange incloses the lower end of the ventilated section F of the retort, which is supported upon the upper end of the corrugated heating-pipe E. The central ventilating-flue, G, is closed at the bottom and rests upon the central portion of the upper end of the corrugated heating-pipe E. In other respects the construction of the retorts is substantially the same as that heretofore employed.

In operation, the bone-black, fed into the upper end of the ventilated section of the retort, is dried as it passes downward, and is discharged from the lower end of the annular space *g*, surrounding the flue G, into the upper end of the corrugated heating-pipe E. In passing downward through the corrugated heating-pipe E, the bone-black is exposed to a high degree of heat, and is kept from contact with the air. From the lower end of the heating-pipe E it falls through the nozzles *d* into the cooling-pipes C beneath the floor *a'* of the heating-chamber A.

I claim as my invention—

1. A retort for a bone-black kiln, having an upper section which is ventilated for the purpose of carrying off the gases and vapors driven out of the bone-black by the preliminary application of heat, and a lower section composed of a longitudinally-corrugated pipe, in which the bone-black is exposed to a high degree of heat while being kept from the air preparatory to its discharge from the lower end of such heating-pipe.

2. In apparatus for revivifying bone-black, a series of retorts, each of which consists of a ventilated section, F, surmounting a heating-section composed of the longitudinally-corrugated pipe E, contained within a suitable heating-chamber, in combination with a circularly-arranged group of cooling-pipes, C, beneath the heating-chamber.

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