No. 620,355. Patented Feb. [illegible], 1899.

E. M. POTTER.

COFFEE ROASTING MACHINE.

(Application filed Dec. 9, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

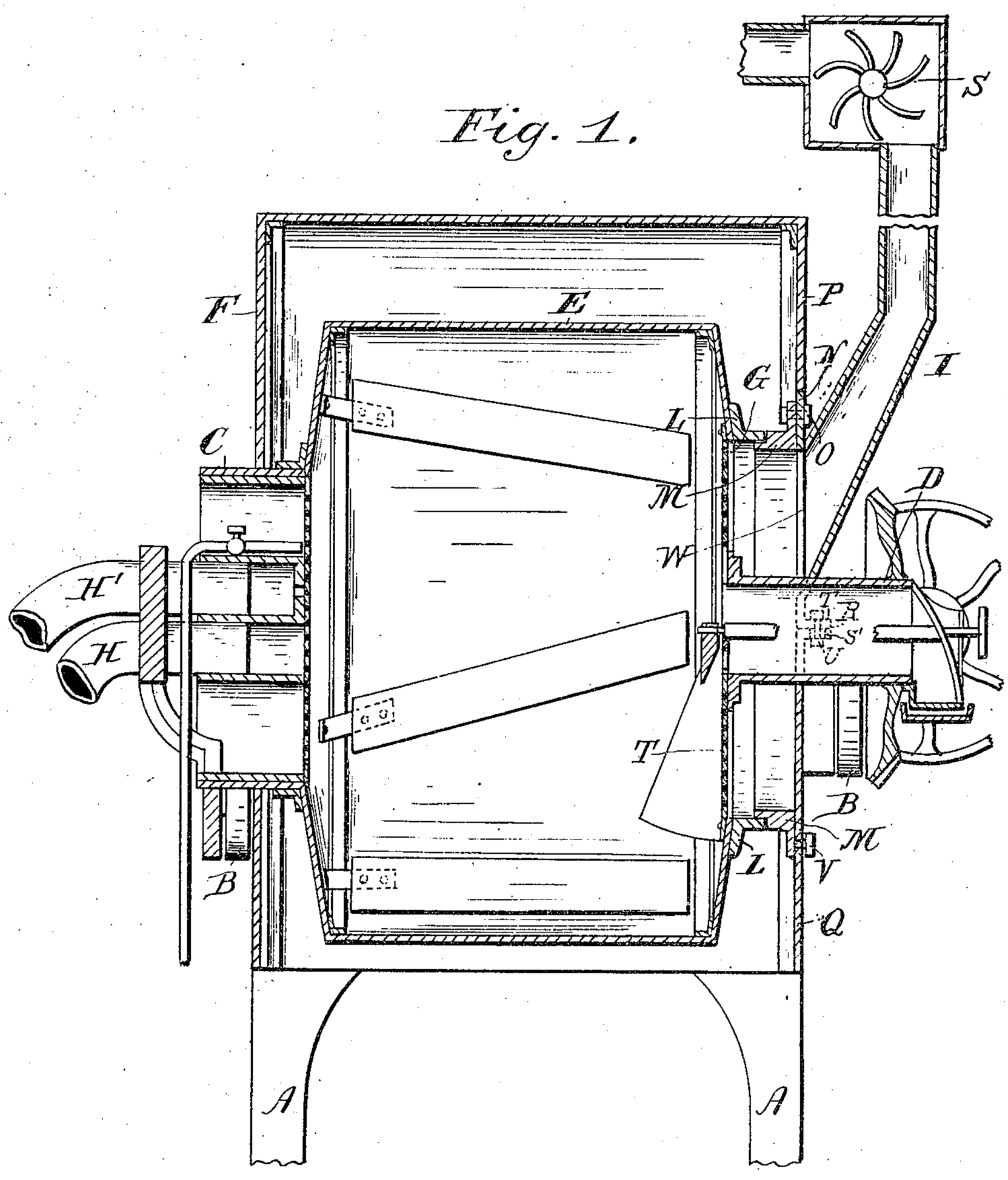

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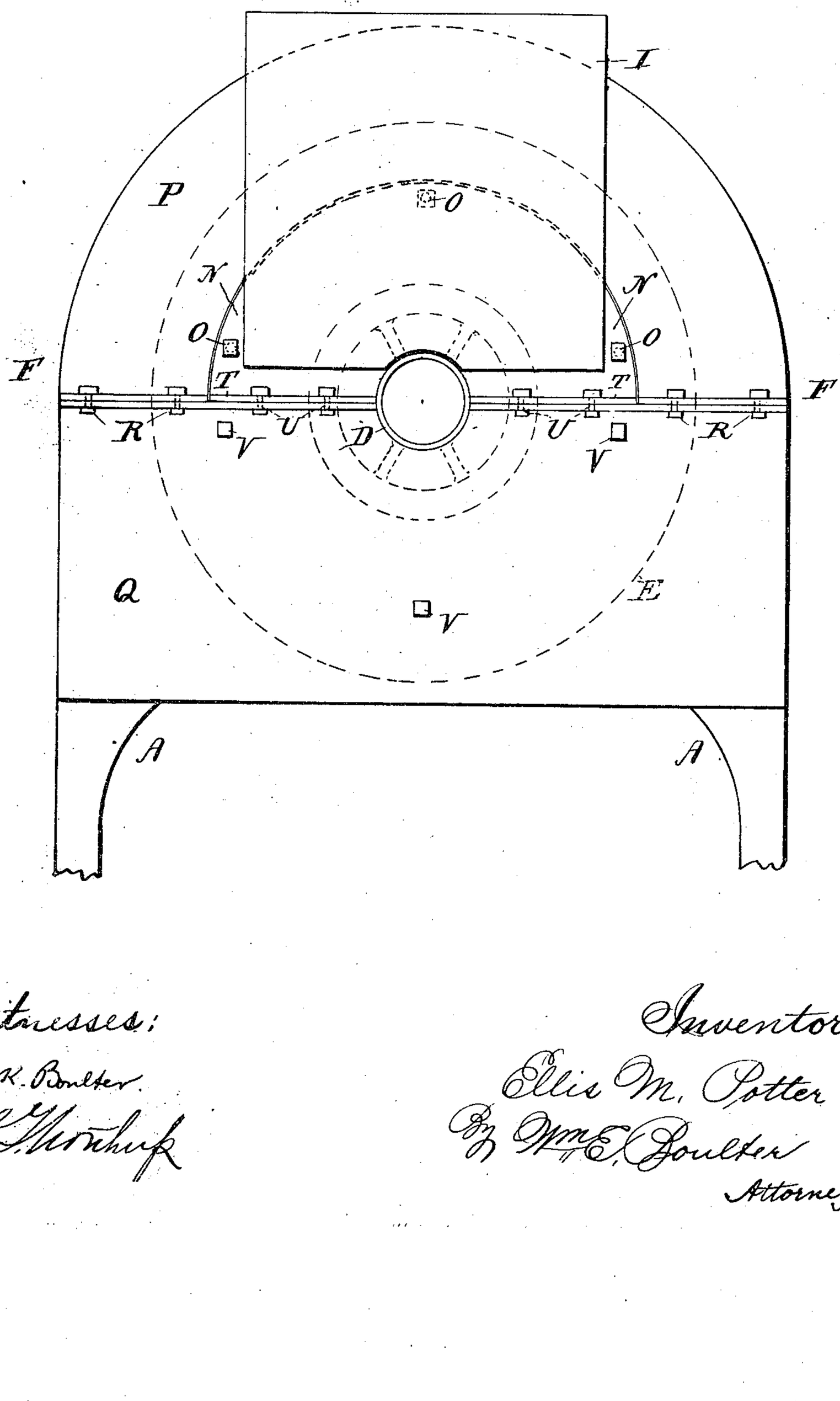
Fig. 2.



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UNITED STATES PATENT OFFICE.

ELLIS M. POTTER, OF NEW YORK, N. Y.

COFFEE-ROASTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 620,355, dated February 28, 1899.

Application filed December 9, 1898. Serial No. 698,771. (No model.)

To all whom it may concern:

Be it known that I, ELLIS M. POTTER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Coffee-Roasting Machines; and I do 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.

My invention has relation to the art of roasting various materials and particularly coffee; and the primary objects of my invention are to provide an improved apparatus for roasting coffee, whereby I am enabled to improve the style of roast, improve the flavor of the drink, cause all chaff, dust, smoke, &c., produced during the roasting process to be removed from the roasting-cylinder as fast as generated, and reduce the cost of roasting due to economy in the use of the gas and effect the roasting in a shorter time than has heretofore been possible.

The present invention is particularly applicable to that class of roasting-machines wherein is employed a rotatable cylinder to contain the charge of berries to be roasted, which charge is roasted by direct contact with a gas-flame projected into the cylinder, as seen, for instance, in United States Letters Patent No. 558,123, granted April 14, 1896, to B. Tupholme.

In the accompanying drawings, Figure 1 is a vertical sectional view, partly broken away, of a coffee-roasting machine using an internal gas-flame provided with my improvements. Fig. 2 is a front elevation thereof, some of the parts being omitted.

Heretofore in all coffee-roasting machines wherein a gas-flame projected within the cylinder is employed such cylinder has been provided with an opening in one head through which projects the gas pipe or pipes supplying the gas for the flame, and with a perforated circumferential wall through which the chaff is drawn during the roasting operation by means of an exhaust-fan communicating with the said wall through a pipe, one end of which leads from the casing surrounding the roasting-cylinder, as seen, for instance, in the aforesaid Letters Patent. In such construction it has been found that by reason of the location of the end of the exhaust-pipe and its relatively small diameter the exhausting action of the fan, which action in practice must be quite strong in order to effect the proper removal of the chaff, &c., causes the gas-flame to be concentrated and drawn in a substantially direct line from the exit-orifices of the burner-pipes toward the end of the exhaust-pipe. This concentration of the flame has the following disadvantages: It reduces the flame area within the cylinder and concentrates or intensifies the heat of such flame within such reduced area, and as the roasting is effected by reason of the direct contact of the berries with such flame such intensification of the heat operates to burn or scorch the outer surface of the berries before the interior thereof has become sufficiently roasted. Thus in order to obtain a roast which is light in color, as is often desired, it becomes necessary to cut off the flame long before the interior of the berries has been sufficiently roasted, and thus an inferior product is the result. Furthermore, the concentration of the flame results in intense heating of interior parts of the cylinder, which heated parts serve to spot or burn the outer surface of the berries when the latter come in contact therewith during the roasting process, and this again produces an inferior product. Also by reason of the intense heating action of the concentrated flame it has been necessary to reduce the quantity of gas admitted to the cylinder to thereby produce a reduced flame; but this results in requiring a longer period for the roasting of a charge.

It is one of the objects of my invention to spread or diverge the gas-flame over a comparatively large area, so as to prevent concentration of the flame, with the consequent disadvantages enumerated, so that the berries will be caused to pass through a flame area of increased size, and whereby the scorching is avoided and a more even roasting action upon the berries is obtained, so that the interior of the berries will be thoroughly roasted by the time the outer portions are sufficiently roasted.

Furthermore, it is my object to draw the

flame axially across the interior of the cylinder instead of in a more or less diagonal line, as heretofore, by arranging the exhaust-opening communicating with the exhaust-pipe around the hollow trunnion containing the sampling device, and I make such exhaust-opening of comparatively large diameter, whereby the flame will be diverged or spread and caused to traverse the entire width of the cylinder, thus insuring the berries being thrown into and across the flame continuously during the roasting process.

In order that my invention may be clearly understood, I will proceed to describe the same in detail.

In the accompanying drawings I have shown a form of roasting-machine such as is described in detail in the before-mentioned Letters Patent and upon which construction my present invention is an improvement.

In the accompanying drawings, A indicates the supporting-frame, and B B' the rollers upon which rotate the hollow trunnions C D of the roasting-cylinder E. F indicates the casing surrounding the cylinder, and H H' are burner-pipes for the gas or mixed gas and air. All these parts are similar in general construction, arrangement, and operation to the same parts shown in the above-mentioned Letters Patent, and it will therefore not be necessary to further describe these parts in detail.

Instead of making the circumferential wall of the cylinder of perforated material, as in the patent cited, I may make it non-perforated, and in the head of said cylinder, around the trunnion D, I form an opening G, which opening is therefore axially opposite the trunnion C or burner-pipes therein. This opening G, I make of large diameter, whereby primarily to cause the flame projected from the pipes H H' to be drawn axially across the cylinder and at the same time to be diverged or spread when the exhaust-fan is in operation. This opening also serves for the exhaust of the chaff, dust, smoke, &c., from the cylinder as fast as generated. The opening G is in communication with an exhaust-pipe I, whose lower end is enlarged and may communicate with opening G through a suitable opening formed in the casing F. Communication between the exhaust-pipe and the opening G is preferably established by the following construction:

The cylinder-head is provided with an annular flange L, surrounding the opening G, against which flange is held a ring M, so as to form a close joint. The ring is secured by bolts O to a semicircular plate N, which is set within an opening in the upper half or section P of the head of the casing F. Said head is divided horizontally to form said upper section P and a lower section Q, said sections having flanges at their meeting edges which are bolted together, as at R. The lower section Q has an opening for the passage of the trunnion D of the cylinder.

The plate N is provided at its lower horizontal edge with a flange T, which rests upon the flange on the upper edge of the section Q, which flange has slotted holes S' for the passage of the bolts U, which secure the plate N adjustably to the section Q, and said plate N is also provided with an opening W, with which communicates the exhaust-pipe I, the lower section whereof is preferably integral with the plate N.

V indicates adjusting bolts or screws which work within the section Q and bear upon the ring M. It will thus be seen that when it is desired to adjust the ring inwardly to compensate for wear between the ring and flange L, whereby to maintain a close joint, the bolts U are loosened and the bolts V adjusted inwardly to force the ring into close contact with the flange L, after which the bolts U are tightened to hold the ring and exhaust-flue firmly in position.

Within the pipe I is arranged a suitable suction or exhaust fan S, which when operated from any suitable source during the roasting process serves to draw off the chaff, &c., and discharge it at the opposite end of the pipe I and at the same time spread and draw the flame across the interior of the cylinder. I preferably arrange over the opening G wire-gauze T or the like to prevent the berries being drawn up into the exhaust-pipe.

If desired, after the coffee has been sufficiently roasted and the gas-flame has been cut off, I can utilize the draft appliances for drawing cold air across the interior of the cylinder, whereby to cool the roasted berries before discharging them from the cylinder.

What I claim, and desire to secure by Letters Patent, is—

1. In a coffee-roasting machine, the combination with a rotatable cylinder, the heads whereof are provided with hollow journals one of said journals being also adapted to serve for the passage of samples of the roasting berries, means for introducing gas or mixed gas and air through the other journal whereby to obtain an internal gas-flame, and means for simultaneously causing the flame to project across the interior of the cylinder and discharging the chaff, &c., from the latter at a point between the periphery of the cylinder and the journal opposite to that through which the gas is admitted.

2. In a coffee-roasting machine, the combination with a rotatable cylinder, means for admitting gas or mixed gas and air into the cylinder through one head thereof whereby to obtain an internal gas-flame, and a journal upon the opposite head of the cylinder, of means for simultaneously causing the flame to project axially across the interior of the cylinder toward the latter head and to spread or diverge as described whereby to produce an increased flame area, and for removing the chaff, &c., from the cylinder through the said head at a point between the periphery and the journal.

3. In a coffee-roasting machine, the combi-

nation with a rotatable cylinder the heads whereof are provided with journals and one of said heads being also provided with a comparatively large opening between the periphery of the cylinder and the journal of said head, and a pipe or pipes projecting within and adapted to conduct gas or mixed gas and air through the other journal whereby to obtain an internal gas-flame, of means for causing the flame to project across the interior of the cylinder and to spread or diverge as described, comprising an exhaust-pipe in communication with the interior of the cylinder through the said opening.

4. In a coffee-roasting machine, the combination with a rotatable cylinder, the heads whereof are provided with journals one of which latter is adapted to contain a sampling device, and one of the heads being also provided between its journal and the periphery of the cylinder with an exhaust-opening, of means for admitting gas or mixed gas and air into the cylinder at the side opposite to the exhaust-opening, a casing inclosing the cylinder and provided in one of its heads with an exhaust-opening adjacent to the exhaust-opening in the cylinder-head and an exhaust-pipe arranged over the opening in the casing-head and having communication with the interior of the cylinder through the said exhaust-openings in the casing and cylinder heads, all arranged for coöperation as described.

5. In a coffee-roasting machine, the combination with a rotatable cylinder, the heads whereof are provided with journals and one of the heads being also provided between its journal and the periphery of the cylinder with an exhaust-opening, of means for admitting gas or mixed gas and air into the cylinder at the side opposite to the exhaust-opening, a casing inclosing the cylinder, a plate forming a section of the casing-head and being provided with an exhaust-opening adjacent to the exhaust-opening in the cylinder-head, an exhaust-pipe arranged over the opening in the plate and being in communication with the interior of the cylinder through the said exhaust-openings, and means for forming a close joint between the plate and cylinder-head circumferentially around the exhaust-opening in the latter, all as and for the purposes specified.

6. In a coffee-roasting machine, the combination with a rotatable cylinder, the heads whereof are provided with journals and one of the heads being also provided between its journal and the periphery of the cylinder with an exhaust-opening, of means for admitting gas or mixed gas and air into the cylinder at the side opposite to the exhaust-opening, a casing inclosing the cylinder, a plate forming a section of the casing-head and being provided with an exhaust-opening adjacent to the exhaust-opening in the cylinder-head, and said plate being adapted to be adjusted inwardly and to form a close joint with the cylinder-head around the exhaust-opening in the latter, and an exhaust-pipe arranged over the exhaust-opening in the plate and communicating with the interior of the cylinder through the said exhaust-openings, all as and for the purposes specified.

7. In a coffee-roasting machine, the combination with a rotatable cylinder, one of the heads whereof is provided with an exhaust-opening, and an inclosing casing for said cylinder, of a plate adjustably arranged within an opening in a head of the casing, a ring carried by said plate and adapted to form a close joint with said cylinder-head, a flue carried by the plate, and means for adjusting the ring and plate inwardly and securing the same in adjusted position, for the purpose specified.

8. In a coffee-roasting machine, the combination with a rotatable cylinder, one of the heads whereof is provided with an exhaust-opening, and an inclosing casing for said cylinder, one of the heads whereof is divided into upper and lower sections bolted together, of a plate adjustably arranged within an opening in the upper section, a ring carried by said plate and adapted to form a close joint with said cylinder-head, a flue carried by the plate, and means for adjusting the ring and plate inwardly and securing the same in adjusted position, for the purpose specified.

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