(No Model.)

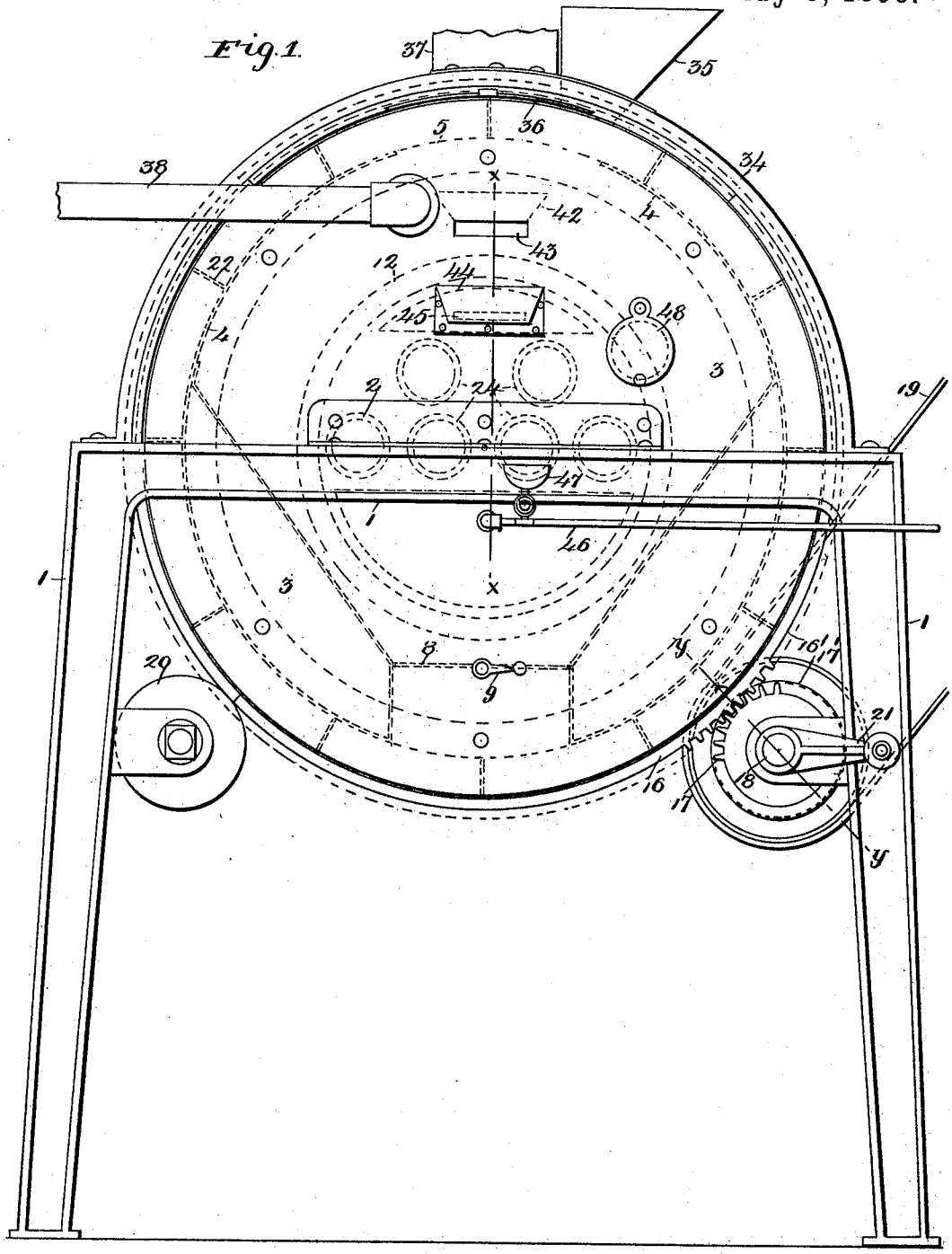
4 Sheets—Sheet 1.

G. BURS.

COFFEE ROASTER.

No. 603,551. Patented May 3, 1898.

Fig. 1.



Witnesses

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(No Model.) 4 Sheets—Sheet 2.

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COFFEE ROASTER.

No. 603,551. Patented May 3, 1898.

Fig. 2.

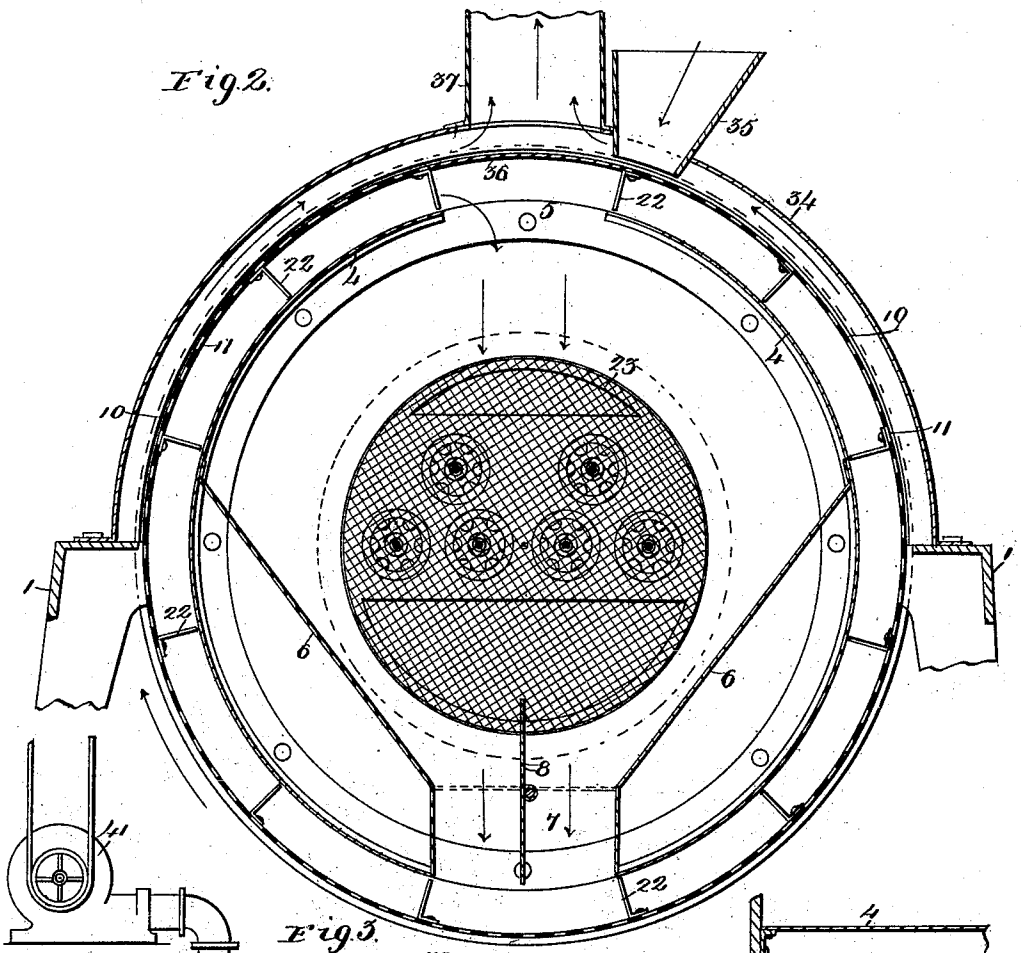
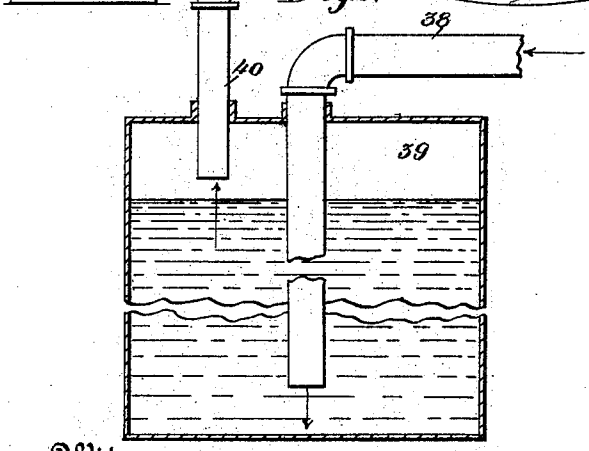


Fig. 3.



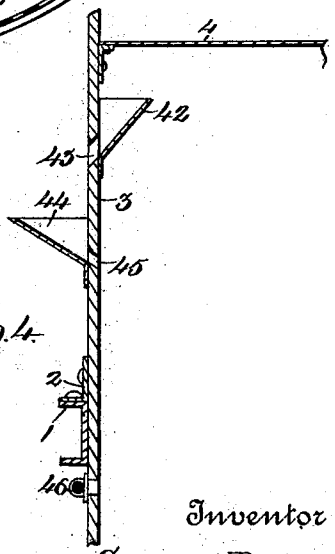


Fig. 4.

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4 Sheets—Sheet 3.

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No. 603,551. Patented May 3, 1898.

Fig. 5.

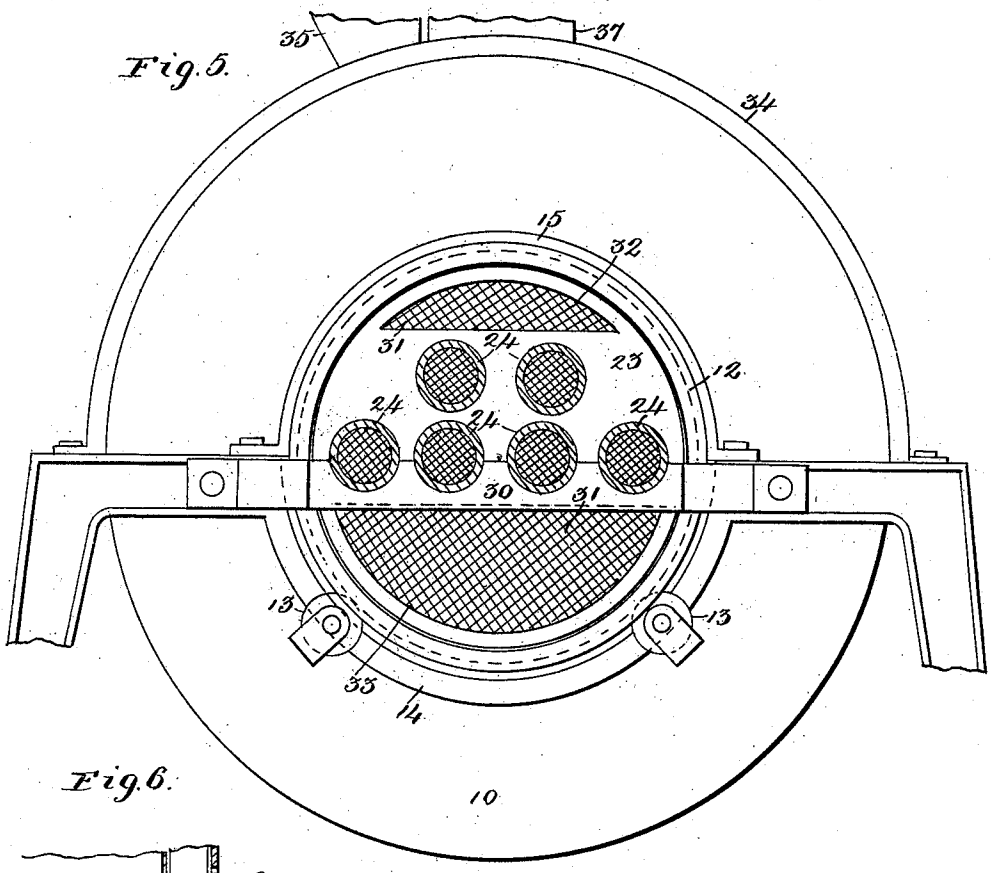


Fig. 6.

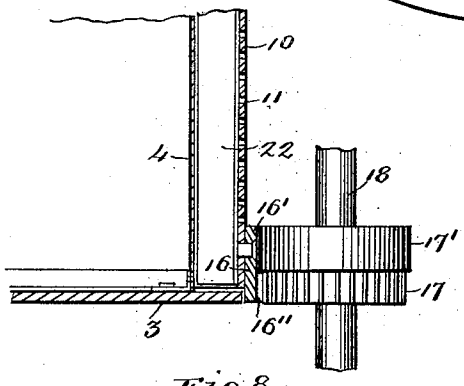


Fig. 7.

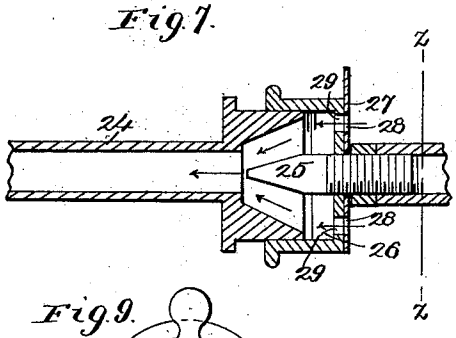


Fig. 8.

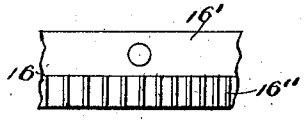
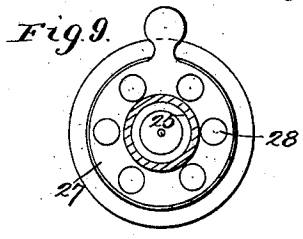


Fig. 9.



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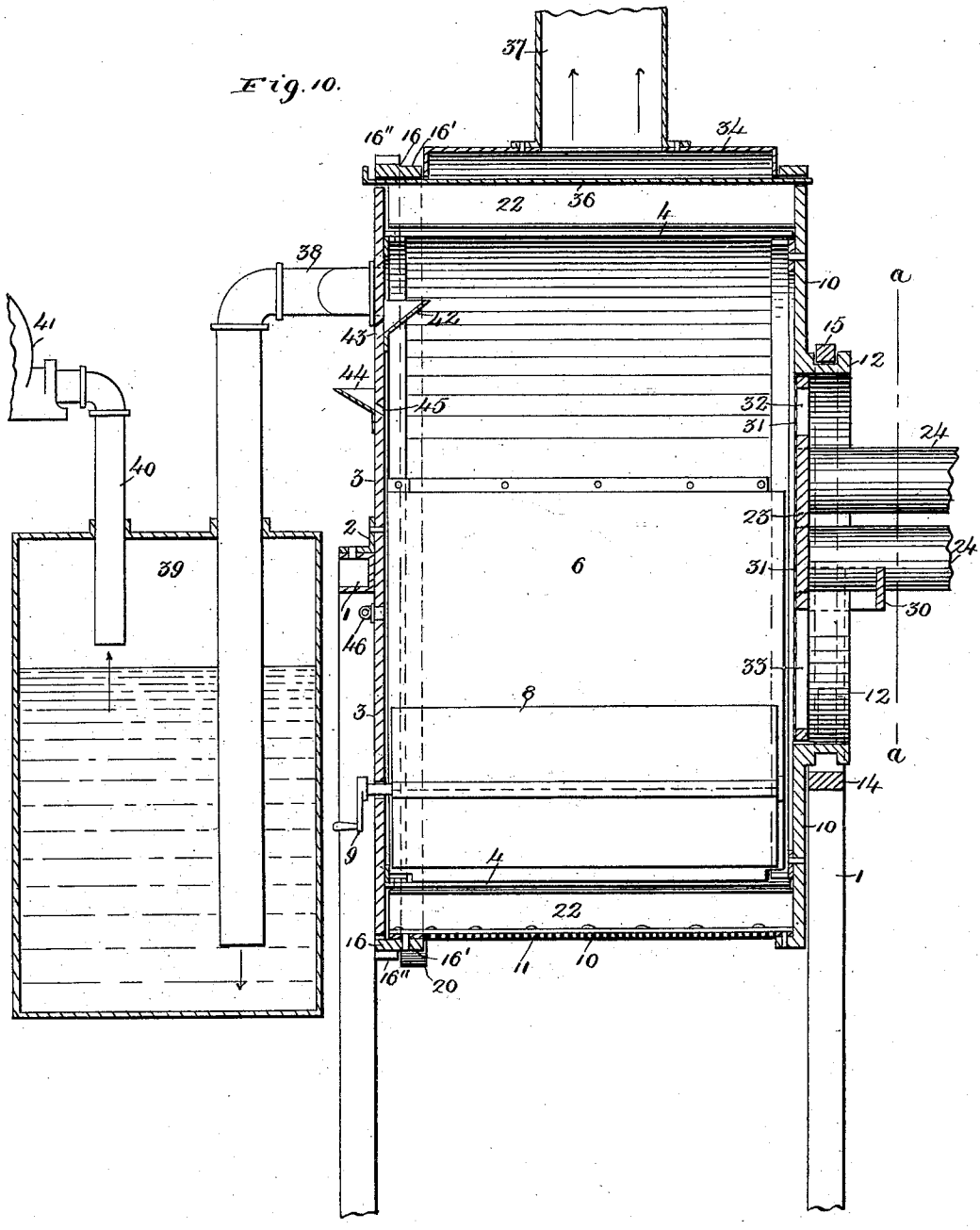
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G. BURS.

COFFEE ROASTER.

No. 603,551. Patented May 3, 1898.

Fig. 10.



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UNITED STATES PATENT OFFICE.

GEORGE BURS, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-THIRD TO FRANK W. GIBSON, OF SAME PLACE.

COFFEE-ROASTER.

SPECIFICATION forming part of Letters Patent No. 603,551, dated May 3, 1898.

Application filed July 28, 1896. Renewed October 7, 1897. Serial No. 654,371. (No model.)

To all whom it may concern:

Be it known that I, GEORGE BURS, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Apparatus for Roasting Coffee, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in apparatus for roasting coffee; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a front elevation of the machine. Fig. 2 is a vertical cross-section thereof. Fig. 3 is a detail or enlarged section of the condensing or water tank for the chaff. Fig. 4 is a detail on the section-line *x x* of Fig. 1. Fig. 5 is a rear elevation of the machine, showing the gas-pipes in section on the line *a a* of Fig. 10 at a point between the revolving drum and the gas-supply nozzle forming a part of each pipe. Fig. 6 is a section on *y y* of Fig. 1. Fig. 7 is a detail section showing the construction of the gas-burner. Fig. 8 is an enlarged plan view of the band carried by the rotating drum on which the gear-teeth are disposed. Fig. 9 is a section on *z z* of Fig. 7; and Fig. 10 is a middle vertical longitudinal section of the apparatus, showing in elevation the pipe leading from the roaster to the chaff-condensing tank, as also the pipe leading from said tank to the blower.

The object of my invention is to construct an apparatus for the roasting of coffee the inherent construction of which develops special advantages, among which may be mentioned the following: By the present device a perfect control is had over the fire by which the heat is produced. The chaff is removed at such times as will insure a perfect and rapid roasting, the removal of the chaff taking place before it has time to ignite and thus burn the coffee. The shrinkage of the berry is reduced to a minimum by reason of the increased rapidity in the roasting operation. The condition of the berry can be ascertained at a glance by the sampler forming a part of the roaster. A minimum quantity of fuel is used for the treatment of a given quantity of coffee. The roasting-surface is increased to a maximum.

The apparatus presents further and other advantages to be specifically enumerated and pointed out in the detailed description, which is as follows:

Referring to the drawings, 1 represents the general supporting-frame by which the several parts of the machine are carried. Secured to the top of the frame by means of a suitable angle-iron 2 is the stationary head or front plate 3 of the roasting-cylinder or "roaster" 4, the peripheral walls of said cylinder being secured directly to the head, which overlaps the peripheral walls of the cylinder a suitable distance, the diameter of the cylinder proper being less than the diameter of the head to which the cylinder is secured. The peripheral walls of the roasting-cylinder have cut therein an upper opening 5 for the reception of the coffee and the free passage of the products of combustion, as subsequently to be explained, the interior of the roaster being provided with the lateral converging plates 6, forming a discharge-hopper, the mouth 7 of said hopper being provided with a rotating cut-off valve 8, controlled from the outside by means of a crank-arm 9. Surrounding the roaster and adapted to revolve about the same is a drum 10, whose peripheral walls are provided with a series of openings 11, the diameter of the revolving drum being substantially equal to that of the stationary head 3, whereby an annular air space or chamber is left between the outer surface of the roaster and the inner surface of the drum. From the rear wall of the revolving drum projects a hollow hub 12, which supports the drum at that end, the said hub resting on the antifriction-rollers 13, carried by the band 14, forming a part of the frame, the hub being kept in place by a strap 15, embracing the hub.

The front end of the revolving drum is supported as follows: Secured to the periphery of the drum, adjacent to the front edge thereof and adjacent to the outer edge of the head 3, is a band 16, having a smooth portion 16′ and a toothed or geared portion 16″, said geared portion meshing with a gear-wheel 17,

having a smooth portion 17′ bearing against the portion 16′ of the band, the shaft 18 of the gear-wheel being carried directly by the frame 1, and having suitable pulleys connected by a drive-belt 19 to any suitable power. (Not shown.) The opposite side of the front end of the drum is supported by an antifriction-roller 20, bearing against the smooth portion 16′ of the band 16. The shaft 18 is provided additionally with an operating-crank 21, whereby the drum can be controlled by hand when occasion requires. Disposed along the inner surface of the drum and running parallel to the axis of rotation thereof and extending across the annular space or chamber formed between the drum and the roaster-cylinder are a series of division plates or ledges 22, by which the coffee, as it drops from the delivery-mouth 7 of the roaster onto the inner surface of the drum, is picked up and carried bodily about the outer surface of the roaster. As the coffee is thus carried around the roasting-surface of the cylinder when it reaches the opening 5 it drops by gravity, as indicated by the arrows, through the roaster and through the products of combustion with which the same is filled, rolling down the inclined plates 6, only to be again picked up by the plates 22 and repeatedly carried around the roaster until the operation of roasting is completed.

Loosely but snugly fitting the hollow hub 12 of the drum is a disk 23, into which are passed to a depth flush with the inner surface thereof the inner ends of a series of gas-pipes 24, each pipe being provided with a gas-supply nozzle 25, entering an air-chamber 26, to which a variable supply of air is admitted through the rotating valve 27, the openings 28 thereof being adapted to register with the openings 29, leading to the chamber. This manner of combining gas and air for purposes of effecting perfect combustion is well known and is not broadly claimed herein. The series of pipes 22 may be coupled together in any mechanical manner (not shown) at some point away from the disk 23, the entire series of pipes being supported on a bracket 30, carried by the frame. The inner surface of the disk 23 is covered with a sheet of wire-gauze or reticulated material 31, through which and through the openings 32 33 of the disk the operator can, if he so desires, view the contents of the roaster at any time, the gauze serving to keep out foreign material from the interior of the roaster and also preventing any portion of the contents of the roaster from escaping during the roasting operation. Surrounding the drum is a casing 34, secured to the frame, through which passes the lower end of the feed-hopper 35, the green berries falling from said hopper into the roaster after the slide-plate 36, carried by the drum and forming a continuation of the periphery thereof, has been temporarily withdrawn by the operator, the slide being adapted to be pulled out toward the front of the drum. After sufficient coffee has been introduced into the roaster the slide 36 is shoved back in place. The products of combustion pass through the opening 5 of the roaster, escaping through the peripheral openings 11 of the drum and into the flue 37, forming a part of the casing 34.

38 represents an air-pipe, one end of which communicates through the stationary head 3 with the interior of the roasting-cylinder, the opposite end leading into a closed water or condensing tank 39, a second pipe 40 leading from the tank above the water-line to a blower or fan 41, which when operated draws after it the chaff resulting from the roasting process, the chaff being deposited under the water in the tank 39 before the said chaff can possibly take fire. Carried within the roasting-cylinder and along the inner surface of the head 3 is a funnel 42, leading to a discharge-opening 43 in the head, below which opening and on the outside of the head 3 is located a second funnel 44, communicating with a discharge-opening 45 of smaller cross-sectional area than the opening 43. The two funnels or hoppers 42 44 are denominated as the "sampler," a portion of the coffee during the roasting operation falling into the funnel 42 and being discharged into the funnel 44 and remaining in the latter long enough for its inspection by the operator, thus enabling him to sample the berry and ascertain its condition at all times during the roasting operation. As the opening 45 is smaller than 43, the coffee cannot return into the roaster as fast as it is discharged into the funnel 44, thereby giving the operator sufficient time for such inspection. Leading also through the head 3 is a water-pipe 46 for flushing the coffee after the completion of the roasting operation, and thus prevent undue shrinkage of the berry. A mustard-oil cup 47 communicates with the water-pipe, by which a certain quantity of mustard-oil is carried along with the water into the roaster, a desirable gloss and finish being thus imparted to the berry.

The operation is as follows: After a sufficient quantity of coffee has been introduced into the roaster in the manner already indicated, and after the slide 36 has been shoved back into place, and after the proper flame has been directed through the apparatus, rotation is rapidly imparted to the drum by means of the belt 19 through the medium of the gear-wheel 17. As the coffee rolls down the plates 6 through the opening 7 onto the inner surface of the revolving drum a portion of the coffee is taken up by each division-plate 22 and carried around the roasting-surface of the roaster-cylinder 4 until the coffee reaches the opening 5, whereupon it drops through the roaster and through the products of combustion, filling the same, to be again delivered (along the inclined plates 6) to the revolving drum and to be again picked up by the division-plates 22 of the same and again carried around in the manner indicated. This operation is continued until the roasting is

completed, a fact easily ascertained by noting the condition of the berry in the "sampler."

Near the close of the roasting operation, or at that period at which the chaff is thrown off, the blower 41 is started, when the chaff is drawn through the pipe 38 into the condensing-tank 39 and there deposited before it has occasion to ignite and smoke the berry. The said pipe also serves to carry off the moisture escaping from the berry during the roasting operation, thereby making a quicker roast and a smoother berry. At the close of the operation the roaster is flushed by a suitable quantity of water and the machine is stopped.

To remove the roasted coffee, the valve 8 is closed (see Fig. 1) and the drum turned by hand until all the coffee contained in the annular space through which the plates 22 pass has been dumped through the opening 5 into the roaster, whereupon the drum is further turned until the slide 36 comes opposite the discharge-opening 7 of the roaster, when both the slide 36 and the valve 8 are thrown open and the coffee drops out into any receptacle placed under it for its reception. By the present apparatus a most rapid and uniform roasting is insured, a better and more uniform color is imparted to the berry, there is no danger of burning, there results a minimum amount of shrinkage, and on the whole the apparatus presents advantages and gives results unattainable with the prevailing forms of roasters. The method of roasting by passing the berry consecutively through the flame and then over the roasting-surface heated by the flame is believed to be novel. By means of the stationary head 3 the operation can be viewed and controlled from the front, the said head being provided with a peep-hole temporarily closed by a pivoted disk 48.

It is apparent that the apparatus can be altered in many details without departing from the spirit of my invention. For example, it is apparent that after the coffee has been caused to pass through the products of combustion, passing through the roaster, the coffee might in any mechanical manner be carried over any heated roasting-surface independent of the outer heated surface of the roaster, such independent surface receiving its heat from any source whatever, the main purpose of the invention being to first pass the coffee through heated combustion products and subsequently passing the coffee over a heated surface out of contact with combustion products of any kind.

Having described my invention, what I claim is—

1. In a coffee-roasting apparatus, a suitable stationary roaster adapted to receive the products of combustion from a suitable heater, means for delivering the coffee into the roaster and causing the same to pass through the products of combustion as they pass through the roaster, and subsequently carrying the coffee over the roasting-surface of the roaster, substantially as set forth.

2. In a coffee-roasting apparatus, a stationary roaster adapted to receive the products of combustion from a suitable heater, a drum surrounding the roaster, means forming a part of the drum for carrying the coffee about the outer roasting-surface of the roaster, and for causing the coffee to subsequently pass through the roaster and through the products of combustion passing through the same, substantially as set forth.

3. In a coffee-roasting apparatus, a suitable stationary roasting-cylinder having an opening cut at the top of its peripheral walls, a discharge-opening opposite said first-named opening, a suitable opening formed at one end of the cylinder for the admission of products of combustion from a suitable heater, a revolving drum surrounding the roaster-cylinder, a sufficient space being left between the peripheral walls of the cylinder and the drum, a series of division-plates formed along the inner peripheral surface of the drum and extending across the space between the drum and cylinder, means for rotating the drum, and means for introducing the coffee into the cylinder, the parts operating substantially as and for the purpose set forth.

4. In a roasting apparatus, a suitable roaster having a stationary head, a funnel carried along the inner surface of the head, a discharge-opening at the base of the funnel leading to the outside of the head, a second funnel disposed under said discharge-opening on the outside of the head, and a discharge-opening at the base of said second funnel leading to the inside of the roaster, the whole serving as a "sampler" for the berry, substantially as set forth.

5. In a coffee-roasting apparatus, a suitable roaster having a discharge-opening for the coffee, a heater for the roaster, a valve controlling said opening, a drum adapted to revolve about the roaster, said drum having a slide or valve in the peripheral wall thereof, and adapted to be brought in alinement with the discharge-opening of the roaster, and means forming a part of the drum for carrying the coffee about the outer roasting surface of the roaster, substantially as set forth.

6. In a coffee-roasting apparatus, a suitable roaster adapted to receive products of combustion from a suitable heater, and means for delivering the coffee into the roaster and causing the same to pass through the products of combustion as they pass through the roaster, and subsequently carrying the coffee over a roasting-surface heated from any suitable source, but keeping the said coffee out of contact with the combustion products, substantially as set forth.

7. In a coffee-roasting apparatus, a suitable roaster adapted to receive products of combustion from a suitable heater, a stationary head forming a part of said roaster, means for delivering the coffee into the roaster and causing the same to pass through the products of combustion as they pass through the

roaster, and subsequently carrying the coffee over the roasting-surface of the roaster, and an exhaust-pipe communicating with the interior of the roaster through the stationary head, substantially as set forth.

8. In a coffee-roasting apparatus, a stationary roaster adapted to receive products of combustion from a suitable heater, a stationary head forming a part of the roaster, a drum surrounding the roaster, means forming a part of the drum for carrying the coffee about the outer roasting-surface of the roaster, and for causing the coffee to subsequently pass through the roaster and through the products of combustion passing through the same, and an exhaust-pipe communicating with the interior of the roaster through the stationary head, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE BURS.

Witnesses:
F. W. GIBSON,
ALFRED A. MATHEY.