

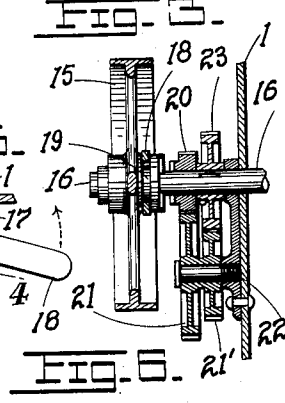
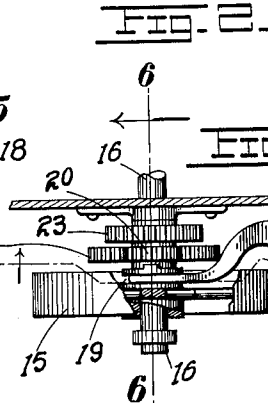
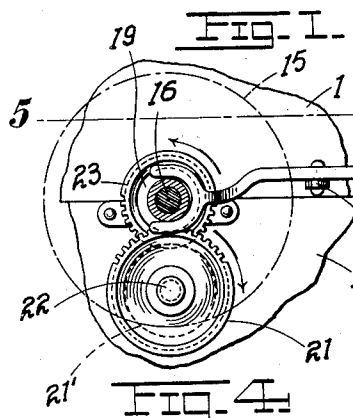
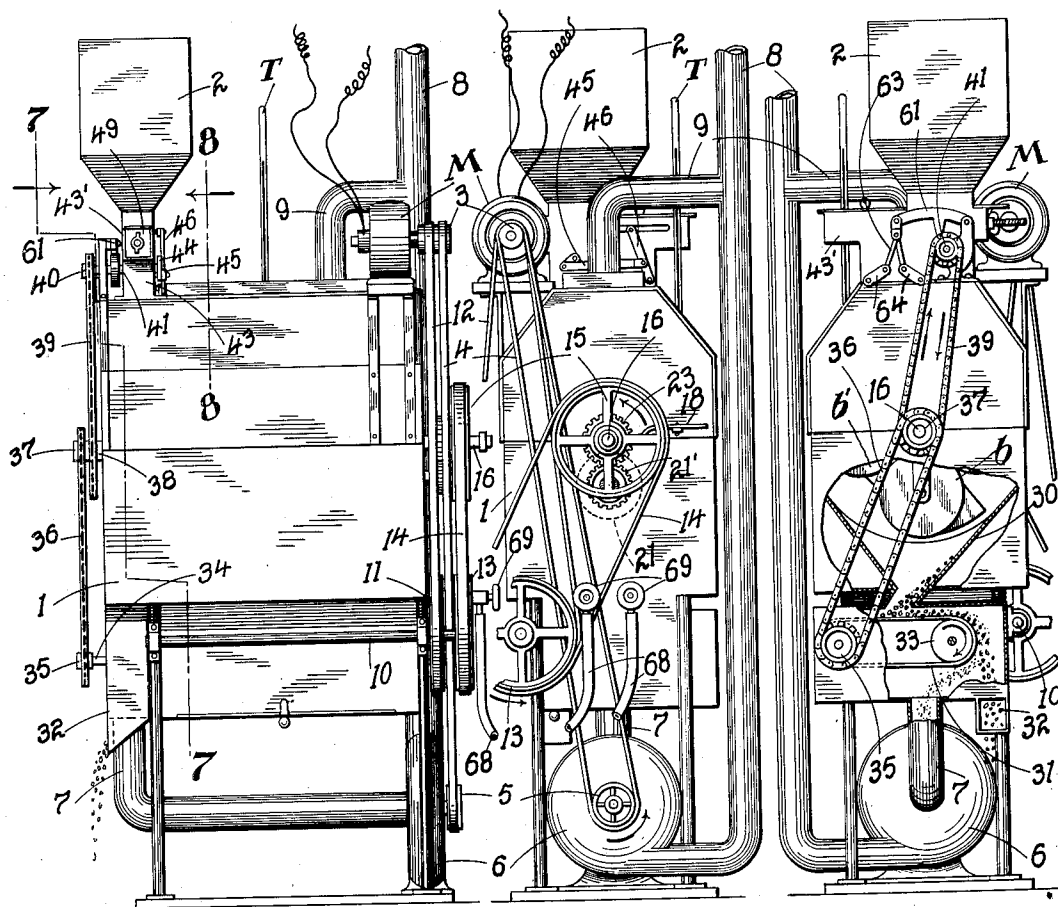
No. 836,341.

PATENTED NOV. 20, 1906.

N. B. POST.
COFFEE ROASTER.

APPLICATION FILED JULY 12, 1906.

3 SHEETS—SHEET 1.



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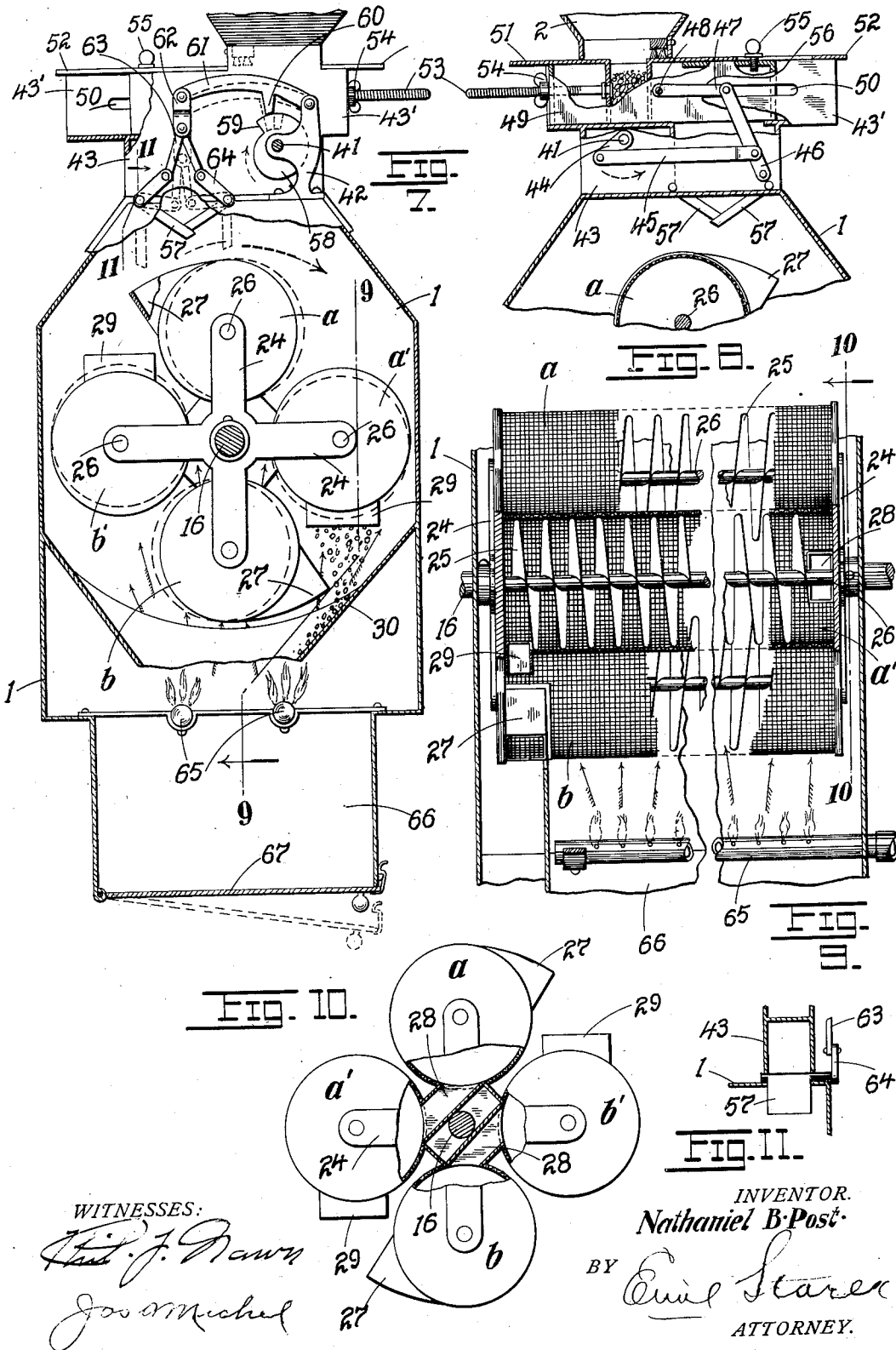
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3 SHEETS—SHEET 3.

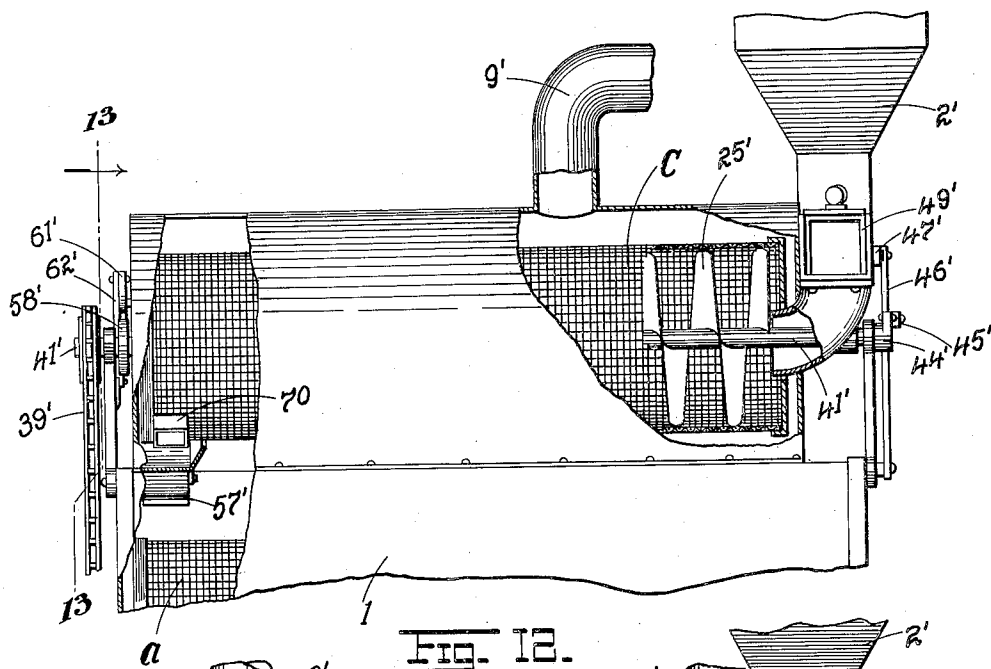


FIG. 12.

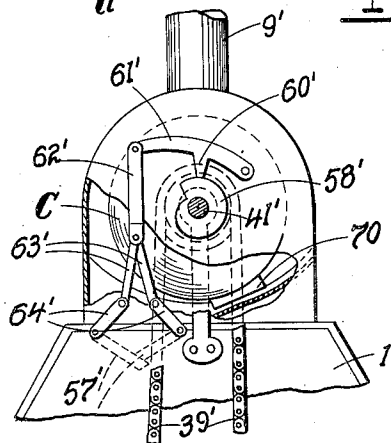


FIG. 13.

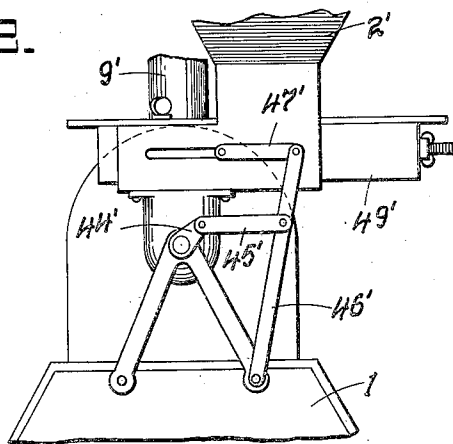


FIG. 14.

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COFFEE-ROASTER.

No. 336,341.

Specification of Letters Patent.

Patented Nov. 20, 1906.

Application filed July 12, 1906. Serial No. 325,921.

To all whom it may concern:

Be it known that I, NATHANIEL B. POST, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Coffee-Roasters, 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 coffee-roasters; and it consists in the novel details of construction more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my improved roaster. Fig. 2 is a rear end elevation thereof. Fig. 3 is a front end elevation, parts being broken away. Fig. 4 is a vertical sectional detail of the clutch mechanism, taken on the line 4 4 of Fig. 5. Fig. 5 is a horizontal cross-section on line 5 5 of Fig. 4. Fig. 6 is a vertical section on line 6 6 of Fig. 5. Fig. 7 is a vertical cross-section on the broken line 7 7 of Fig. 1. Fig. 8 is a vertical cross-section on line 8 8 of Fig. 1. Fig. 9 is a longitudinal vertical section on the broken line 9 9 of Fig. 7. Fig. 10 is a cross vertical section on the line 10 10 of Fig. 9. Fig. 11 is a vertical sectional detail on line 11 11 of Fig. 7. Fig. 12 is a side elevation of a roaster in which a preliminary roasting-cylinder is superposed over the regular series of roasting-cylinders, the walls of the casing being partly broken away. Fig. 13 is a vertical cross-section on line 13 13 of Fig. 12, and Fig. 14 is an end elevation of the rear of Fig. 12.

The object of my invention is to construct a roaster which will entirely eliminate the danger of burning the coffee, one which will afford ample time to the berry to swell during the roasting operation, one which will conserve to the best advantage the aroma and flavor of the coffee, one which will insure a uniform product, one requiring a minimum amount of fuel, one which will completely eliminate the chaff and foreign material from the berry, one which subjects the berry to an incipient drying preparatory to its final roasting and at the same time subjecting it to such drying operation while in the path of the products of distillation evolved from berries undergoing final roasting, one which will effect the roasting in a minimum amount of time, one which is under perfect control of the operator, and one possessing further and

other advantages better apparent from a detailed description of the invention, which is as follows:

Referring to the drawings, (and for the present to Figs. 1 to 11, inclusive,) 1 represents a casing provided on top adjacent to the front end thereof with a feed-hopper 2, into which the coffee-berries are deposited and from which they are subsequently fed to the roasting-cylinders, as presently to be described. Mounted on the casing, at the opposite end thereof, is an electric motor M, (or any equivalent motor,) whose shaft terminates in a belt-pulley 3, from which leads a belt 4 along the rear side of the casing, said belt passing over a belt-pulley 5 on the shaft of a fan located in the casing 6, an induction-pipe 7, leading from the axis of the fan to the bottom of the casing 1, Figs. 2, 3, and an eduction-pipe 8, leading from the periphery of the fan upward beyond the casing 1, said eduction-pipe conducting away the chaff and light particles. The current passing through the pipe 8 induces a current in the shunt or elbow 9, coupled to the pipe 8 and opening into the casing 1 through the top thereof. Mounted longitudinally at a convenient height above the floor and adjacent to the casing is a shaft 10, whose rear end carries a belt-pulley 11, from which leads a belt 12 to the pulley 3, this connection serving to impart rotation to the shaft 10. The shaft 10 terminates in a belt-pulley 13, from which passes a belt 14 over a pulley 15 at the rear end of a central shaft 16, which forms the axis about which the series of roasting-cylinders *a a' b b'* revolve. The gearing described constitutes the driving portion for a speed-reducing gear, with which the pulley 15 may be thrown into engagement or from which it may be disengaged by a special clutch arrangement, the details of which are shown in Figs. 4, 5, and 6 and which is as follows: Pivoted to a bracket 17, projecting from the rear wall of the casing, is a clutch-lever 18, whose forked end engages an annular groove 19, formed in the hub of the pulley 15, (which is mounted loosely on the shaft 16, being in addition movable longitudinally thereon,) said hub constituting the male section of a clutch which coöperates with the female section of the hub portion of a pinion 20, likewise loosely mounted on the shaft 16. The pinion 20 meshes with the large section of a step-gear 21, mounted on a spindle 22, secured to the wall of the casing 1, the re-

duced or smaller section 21' of said step-gear meshing in turn with a gear 23, keyed to the shaft 16. Thus it will be seen that by causing an engagement between the pulley 15 and pinion 20 reduced rotation may be imparted to the shaft 16 from the shaft 10, which in turn has rotation imparted to it from the motor M through the belt 12 and pulley 11. Disposed about the shaft 16 (which may be denominated as the "cylinder-shaft") are a series of pairs of roasting cylinders or receptacles *a a' b b'*, (two pairs being shown herein,) which are coupled to said shaft by means of the radiating arms of the spiders 24, secured to the shaft. Each cylinder is composed of closed terminal heads and a peripheral body of wire fabric, as shown, and of a mesh sufficiently close to confine the berries. Within each cylinder is a spiral conveyer 25, whose axis or shaft 26 is stationary relatively to the walls of the cylinder. Located at one end of each pair of roasting-cylinders is a receiving mouth or intake 27, which receives the coffee from the hopper 2, as presently to be described, the coffee in the cylinder *a* passing out of said cylinder at the opposite end through the duct 28, connecting the cylinders, Fig. 10, whence it passes into cylinder *a'*, (the same being true with respect to *b* and *b'*.) thence along the cylinder *a'* around the spiral conveyer therein and out of the delivery-spout 29 at the end adjacent to the intake 27 of the contiguous cylinder *a* of the pair. The coffee as discharged from the cylinders passes down the inclined wall 30, whence it is delivered onto a belt conveyer 31 at the front of the casing 1. One end of the belt 31 is located immediately over the discharge-spout 32 of the casing, through which spout the roasted coffee is discharged, the chaff and light particles being drawn into the pipe 7 and fan 6 and discharged through the pipe 8. The belt 31 is mounted between suitable rollers or pulleys 33, the shaft 34 of one of the pulleys terminating in a sprocket-wheel 35, to which rotation is imparted from the cylinder-shaft 16 through the medium of the sprocket-chain 36, passing over a sprocket-wheel 37 at the front end of the shaft 16. The roasting-cylinders are fed with predetermined quantities of the coffee, said quantity being measured before finally discharged into the intake-mouth 27 of any given pair of cylinders. This combined measuring and feed mechanism, which is likewise actuated from the cylinder-shaft, may be described as follows: Adjacent to the sprocket-wheel 37 is a sprocket-wheel 38, whence passes a sprocket-chain 39 over a sprocket-wheel 40 on a cam-shaft 41, mounted, respectively, on a bracket 42, Fig. 7, and in the walls of the chamber 43, connecting the hopper 2 to the main casing 1. The rear end of the shaft 41 carries a crank-arm 44, Fig. 8, which in turn is connect-

pivotal to the adjacent end of a link 45, whose opposite end is coupled to an oscillating lever 46, pivoted to the wall of the chamber 43, the long arm of said lever being coupled pivotally to one end of a link 47, whose opposite end is secured to a pin 48, carried by a reciprocating feed-box or cut-off 49, said pin being free to operate in a slot 50, formed in the rear member of the upper overhanging portion 43' of the chamber 43. These overhanging members or portions 43' of the chamber 43 form guides between which the box 49 may reciprocate, the box being supported by the bottom wall between the guides, Figs. 7, 8. The top of this box or receptacle 49 is closed by the angle pieces or plates 51 52, respectively, the vertical leg of the member 51 being connected to the inner end of an adjusting-bolt 53, over whose outer screw-threaded portion operates a nut 54, bearing against the end wall of the box. By turning the nut in either direction the bolt 53, and hence the angle-piece 51, will be moved backward and forward and its distance from the angle-piece 52 carefully regulated. This regulation serves to adjust the distance between the vertical legs of the respective angle-pieces 51 52, and hence regulates the capacity of the cubic contents between said vertical legs. In this way the quantity of coffee admitted from the feed-hopper 2 into the space between the vertical legs of the angle-pieces can be adjusted to a nicety before it is admitted into the roasting-cylinders. The discharge-mouth of the hopper 2 may be entirely closed by shoving the member 52 up against the member 51, which may be done by loosening the clamping-nut 55, carried by the top wall of the box, the stem of the nut passing freely through a slot 56, formed in the horizontal leg of said member 52. The nut 55 can then be tightened and the coffee entirely cut off from the hopper 2. It will be seen that with rotation of the shaft 41 a reciprocation will be imparted to the box or cut-off 49, each reciprocation taking away a quantity of coffee, which is then advanced along the stationary bottom between the guides 43' until said bottom no longer serves to support the coffee, when the latter drops through the chamber 43, landing on the closed releasing-wings 57 57, located immediately over the intake-mouths 27 of each pair of roasting-cylinders. Once the coffee has landed on the wings 57 57 it is released by the following mechanism: The rotating cam-shaft 41 carries at its front end a cam 58, between the ends of whose cam-surfaces is formed a shoulder 59. Riding over the cam-surface is a lug 60, forming a part of an actuating-lever 61, pivoted at one end to the bracket 42, the opposite end having coupled thereto the link 62, from which pivotally depend the pair of links 63 63, these in turn being coupled pivotally to the adjacent ends of

the arms 64, rigidly secured to the hinge-spindles of the swinging wings 57. As the cam rotates, Fig. 7, it raises the lug 60 and the lever 61, this action closing the wings 57.

5 The moment the lug 60 drops off the shoulder 59 the lever 61 drops, thus permitting the wings to open, (see dotted position, Fig. 7,) said wings remaining open during the passage of the lug 60 over the short eccentric formation of the cam beyond the shoulder, after which and while passing over the large concentric portion the cam raises the lug and again closes the wings. The opening of the wings for releasing the coffee deposited on them by the box 49 takes place as the intake 15 27 of each pair of roasting-cylinders comes under the wings, (being the dotted position of the cylinders, shown in Fig. 7.) The parts are so proportioned that there are two reciprocations of the cut-off for each pair of cylinders—that is to say, there are two strokes of the cut-off, one stroke receiving the charge and the opposite stroke delivering it to the wings at such intervals of time as to permit 25 the latter to close to receive the charge and to open at the proper time as the intake-mouth 27 of each pair of cylinders comes under the wings. The burners 65 65 are supported in a fire-chamber 66, to which access may be had by a bottom door 67, the burners being supplied with gas or hydrocarbon through pipes 68, from which the supply may be cut off by the valves 69, of ordinary construction.

35 The operation of the reciprocating cut-off and of the releasing-wings has been fully stated and need herein be reviewed. As to the roasting-cylinders, it may be added that as the series revolve about their common axis 16 the coffee circulates around the spiral-conveyer 25 from one end of the intake-cylinder *a* (or *b*) until it reaches the opposite end, whence it passes through the passage 28 into the adjacent cylinder of the same pair, the coffee then circulating around the 45 spiral conveyer therein until it escapes at the opposite end, or the end adjacent to the intake of the contiguous cylinder, whence it drops out of the delivery-spout 29 onto the incline 30. From this point the path of the 50 coffee has already been traced to the discharge-spout 32 and requires no repetition here.

The products of combustion pass through the several cylinders collectively at all times, 55 but only one cylinder at a time comes squarely over the burners and then passes on beyond the burners' immediate influence. This gives the coffee in each cylinder ample time to recover from the heat, and in the interim the 60 berry is permitted to swell its fullest extent as a result of the heating, and the danger of burning the berries as a result of a too prolonged application of the flames disappears altogether, but the series of cylinders revolving as they do about an axis located outside

of the cylinders imparts a tumbling motion to the berries, so as to insure the presentation to the flame of every portion of the surface of each berry.

While I have shown in the foregoing a construction in which the coffee is delivered direct from the hopper 2 to the roasting-cylinders, I prefer to pass the coffee first into a preliminary roaster or heater C, as shown in Figs. 12 to 14, inclusive, this cylinder C being superposed directly in the path of the ascending vapors and volatile products disengaged from the roasting berries, the heated volatile constituents, aromas, and flavoring products not only serving to expel the greater portion of the moisture from the berries in the preliminary roaster, and thereby reduce the time of the roasting proper, but becoming more or less absorbed by the berries they impart to them a lasting flavor not otherwise attainable. The preferred form shown in Figs. 12 to 14 is identical with the form previously described, except that the feed-hopper 2' instead of being located above the releasing-wings 57' is at the opposite end of the cylinder C, the coffee being permitted to feed directly into the cylinder at that end by the actuation of the reciprocating feed-box or cut-off 49'. The shaft 41' (which is the shaft of the cylinder) is rotated by the sprocket-chain 39', corresponding to chain 39 in the form previously described, the rotation of the shaft actuating the crank-arm 44', link 45', lever 46', link 47', and feed-box 49', as before. The rotation of the shaft 41' imparts rotation to the cylinder C, advancing the coffee to the opposite end, whence it is discharged through the spout 70 thereof into the intake-mouth of the cylinder *a* (*b*), as before. The shaft 41' carries at the opposite end the cam 58', which, as before, actuates a corresponding lever 61' through the medium of the lug 60', which in turn actuates the wings 57' through the medium of the link 62', links 63', and arms 64'. The spiral conveyer 25' of the preliminary roaster C is the same as the conveyer 25 of the roasters *a* *b* *a'* *b'*. The casing of the roaster in the preferred form surrounds the cylinder C, the shunt 9' connecting with the pipe 8, as in the first form. T represents thermometers.

Having described my invention, what I claim is—

1. In a roaster, a suitable burner, a series of roasting-cylinders arranged in intercommunicating pairs having a common axis of rotation superposed above the burner whereby the cylinders pass alternately over the burner and out of the direct path of the combustion products, substantially as set forth.
2. In a roaster, a suitable burner, a series of roasting-cylinders arranged in pairs revolving about a common axis disposed above the burner, means for feeding the material to be roasted to one member of each pair at one

end of said member, means for causing the material to travel to the opposite end during the revolution of the cylinders, means for conducting the material to the adjacent member of the same pair and causing it to travel back to a point adjacent to the intake end of the first member, and means for discharging the material at said end, substantially as set forth.

3. In a roaster, a suitable burner, a series of roasting-cylinders arranged in pairs revolving about a common axis disposed above the burner, means for feeding the material at one end of one member of each pair, means for causing the material to traverse the length of one cylinder, thence pass into the adjacent cylinder of any pair and through the latter back to a point adjacent the intake of the first cylinder, a belt for conveying the roasted product from the cylinders, and an exhaust in the path of the material as finally discharged for removing the chaff and light particles, substantially as set forth.

4. In a roaster, a burner, a series of roasting-cylinders revolving about a common axis disposed above the burner, and a preliminary roaster superposed above the series of roasting-cylinders, substantially as set forth.

5. In a roaster, a suitable casing, a feed-hopper therefor, a series of roasting-cylinders revolving about a common axis mounted in the casing, a reciprocating feeder or cut-off adapted to conduct predetermined quantities of the material from the discharge-mouth of the hopper, a pair of hinged wings normally closing against one another for momentarily intercepting the material delivered by the cut-off, intermediate driving connections between the cut-off and wings for opening the latter at specified times and releasing the material, a portion of the cylinders being provided with intakes for receiving the material so released, means for discharging the material from the roasters, and an exhaust for carrying off the chaff and light particles, substantially as set forth.

6. In a roaster, a suitable casing, a hopper therefor, a reciprocating feed-box or cut-off for abstracting and delivering predetermined quantities of the material, a rotatable shaft, intermediate connections between the shaft and cut-off for actuating the latter, a cam on

the shaft, a lever pivoted at one end and provided with a lug riding over said cam, a pair of hinged wings adapted to fold against one another and form a temporary support for the material delivered by the cut-off, and intermediate link connections between the lever and wings for actuating the latter with the turning of the shaft and with the reciprocation of the cut-off, substantially as set forth.

7. In a roaster, a suitable casing, a hopper therefor, a reciprocating feed-box, or cut-off for abstracting and delivering the material from the hopper, means for adjusting the capacity of the feed-box, a pair of normally closed wings for receiving the contents of the box, means for opening the wings at predetermined intervals for releasing the contents intercepted thereby, and a series of roasting-cylinders revolving about a common axis for receiving the material released by the wings, substantially as set forth.

8. In a roaster, one or more roasting-cylinders revolving about an axis exterior to the cylinders, and a preliminary roaster revolving about its own axis and disposed in the path of the volatile products escaping from the material treated in the roasting-cylinders, substantially as set forth.

9. In a roaster, a casing, a preliminary roasting-cylinder revolving about its axis, a series of roasting-cylinders located below the preliminary cylinder and revolving about a common axis exterior to the axes of the cylinders, a burner beneath the cylinders, a hopper, a feed-box or cut-off for the hopper, means for discharging the material from the feed-box to the preliminary roaster, means for intercepting the material discharged from the preliminary roaster and subsequently effecting its release, means for discharging the material thus released into the series of roasting-cylinders, a common source of heat-supply for the cylinders, a motor, and suitable gearing for actuating the several movable parts in unison, substantially as set forth.

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

NATHANIEL B. POST.

Witnesses:

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JOS. A. MICHEL.