

(No Model.)

3 Sheets—Sheet 1.

J. A. SWEENY.
COFFEE ROASTER.

No. 278,199.

Patented May 22, 1883.

Fig. 2.

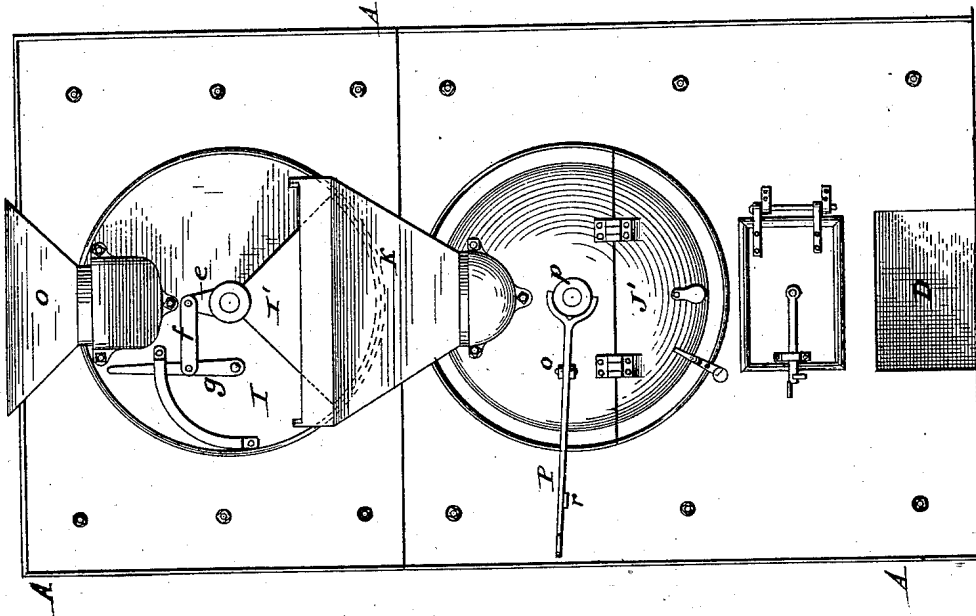
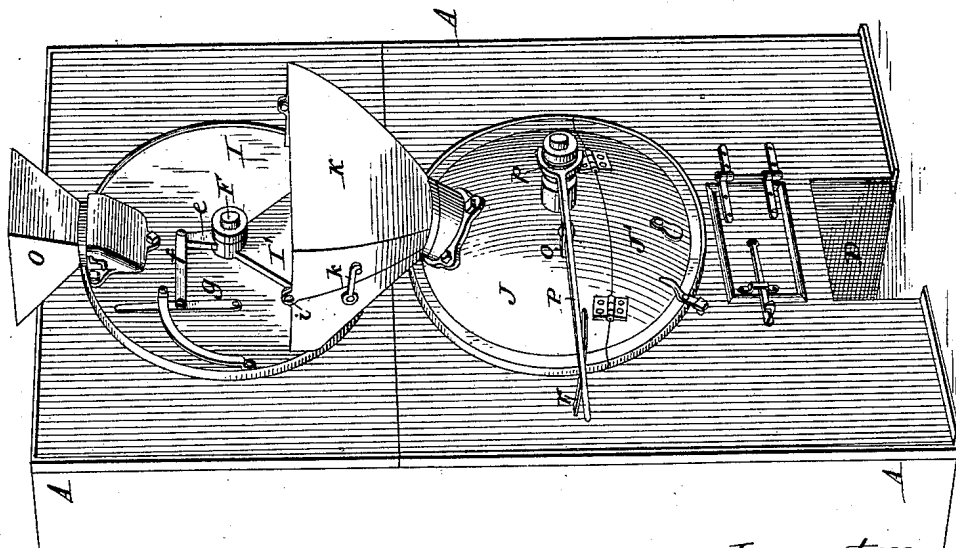


Fig. 1.



Attest.

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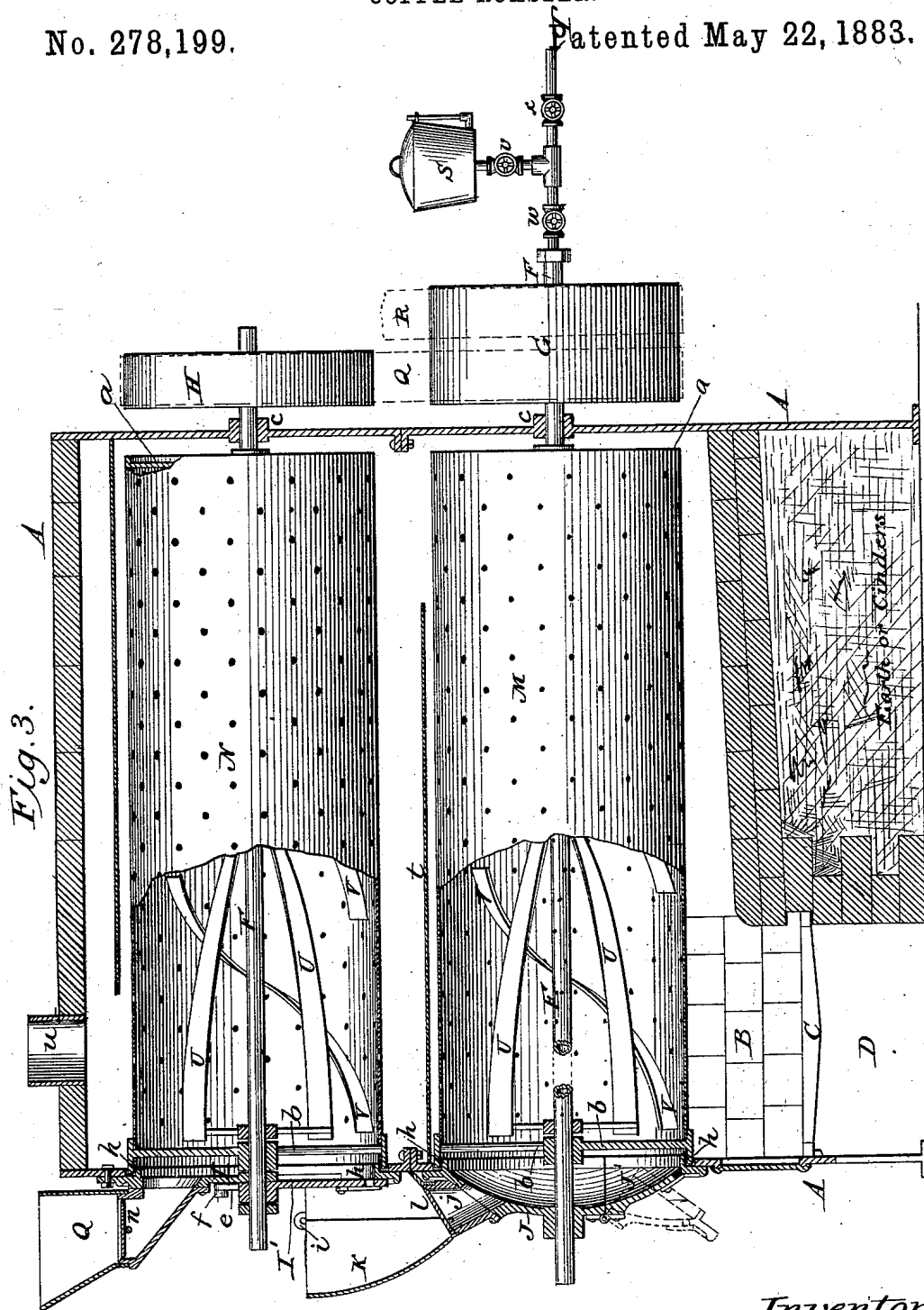


Fig. 3.

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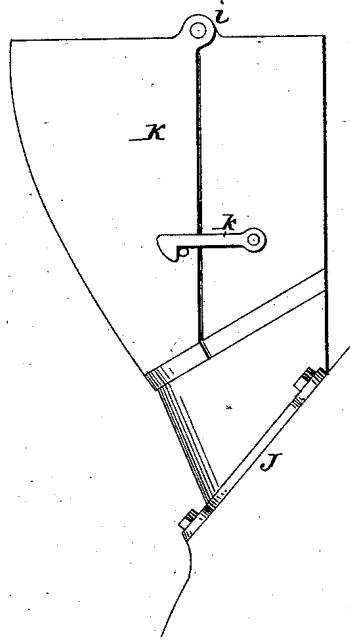


Fig. 4.

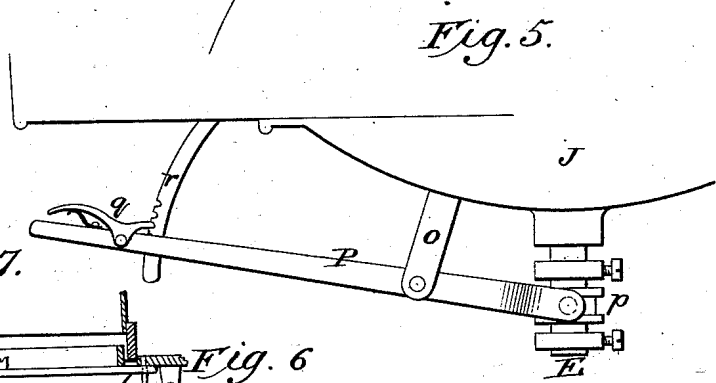


Fig. 5.

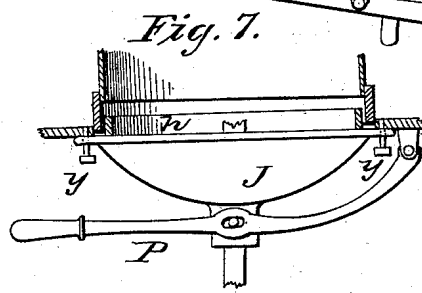


Fig. 7.

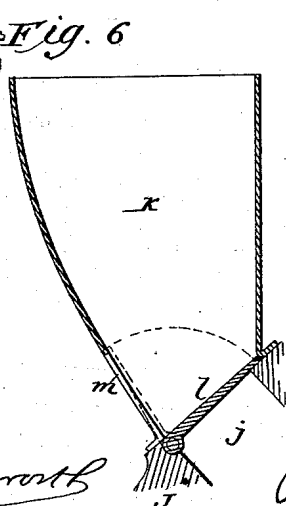


Fig. 6.

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UNITED STATES PATENT OFFICE.

JAMES A. SWEENEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

COFFEE-ROASTER.

SPECIFICATION forming part of Letters Patent No. 278,199, dated May 22, 1883.

Application filed February 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. SWEENEY, of Washington, in the District of Columbia, have invented certain Improvements in Coffee-Roasters, of which the following is a specification.

My invention relates to apparatus for drying and roasting coffee and other substances; and it consists in constructing the machine with two or more cylinders arranged one above another, both provided with supply-hoppers, and the upper one or more arranged to deliver either to the cylinder or cylinders below, or to discharge outside of the machine; in a novel construction of the hopper or hoppers intermediate between the cylinders to provide for such delivery; in arranging the cylinders to be adjusted to and from the stationary heads at their open ends to secure a close joint and provide for expansion and contraction, and in other features and details explained hereinafter.

In the accompanying drawings, Figure 1 represents a perspective view of my improved apparatus; Fig. 2, a front end elevation; Fig. 3, a longitudinal section; Fig. 4, a side elevation of the hopper; and Figs. 5 and 6, enlarged views, illustrating certain details. Fig. 7 is a view showing the head J made adjustable relatively to the cylinder, its movement being guided by pins *y*.

The present machine is designed as an improvement upon that for which Letters Patent of the United States were issued on the 6th day of December, 1881, No. 250,578, to George W. Richmond, the improvements being designed to increase the efficiency of the machine and to adapt it for more general use than the one referred to. To accomplish these objects I construct the apparatus in the following manner:

A represents a heating-chamber, built of masonry, of metal, or partially of each, and containing at the front a fire-chamber, B, with grate C and ash-pit D, as usual. Above the fire chamber or space are two or more horizontal rotary drums or cylinders, of sheet metal or like material, perforated to permit the escape of moisture, dust, and chaff. Ordinarily but two cylinders are employed, and, except in rare cases, these will be found sufficient for all ordinary purposes. The lower

cylinder is carried by a central shaft, E, to which it is attached by a closed head, *a*, at the rear end, and a spider-head, *b*, at the forward end, and the upper cylinder is supported and carried in a similar manner. The shaft E of the lower cylinder is, however, hollow or of tubular form, and perforated, as shown in Fig. 3, to permit the delivery of steam to the interior of the cylinder when it is desired to check the roasting, and for the further purpose of admitting glazing materials, when such are used, while ordinarily the shaft F of the upper cylinder is made solid. The shafts E and F pass through the rear wall of the furnace-chamber, where they are supported in bearings *c*, and project sufficiently beyond to receive the band-wheels G H, the forward ends of the shafts being supported in similar bearings formed in heads or end plates, I and J, which are permanently bolted to the furnace-front, which latter, together with the rear end or wall, is preferably made of cast-iron. The heads I and J are represented in the drawings as made of different forms, the upper one flat, and the lower one convex on the outside, though it will be seen either form may be adopted for both, the convex form possessing the advantage, however, that the lower hinged section, J', being hinged at a point considerably in advance of its lower edge, will naturally swing outward and remain open, as shown in dotted lines in Fig. 3.

Instead of hinging the upper door, I', to swing outward, I prefer to journal or collar it upon the central hub or boss, *d*, of head I, so that it may swing or turn about the same in a vertical plane, this plan avoiding all difficulty in closing or opening the door when there is material in the hopper K, which is placed below and in front of said door. The swinging or revolving door I' is formed with an upwardly-projecting arm or extension, *e*, which is connected by a rod or link, *f*, to a pivoted handle, *g*, at one side of the machine, by which the door may be conveniently operated. The rim or flange *h* of head I is in this case preferably continued completely around the head at top and bottom, but should be made quite thin or beveled off on its inner edge at the lower side, to prevent the coffee or other matter being held back thereby when the cylinder is being emptied. The bulging or convex form

of head J also adapts it to more readily permit the entrance of material from hopper K, which is placed directly over an opening, *j*, therein, and serves as a supply-hopper for cylinder M.

The hopper K is made in two parts, as more clearly indicated in Fig. 4, said parts being hinged together at the upper edge, as shown at *k*, and at such point as will insure the swinging outward of the forward section when its catch *k* is released or unfastened. At the bottom of the hopper K, or directly over the opening *j*, is placed a valve, *l*, which may be opened to permit the entrance of material into cylinder M, or closed to form a chute, over which material passing out of upper cylinder, N, may pass to the ground or to a receptacle placed to receive it. This hopper and its valve form a very important feature of my apparatus, enabling me to discharge the contents of the upper cylinder directly from the machine and to supply the lower cylinder either from the one above it or from an outside source. In this particular it differs from a closed chute connecting two cylinders and provided with a valve by which the contents of the upper cylinder may be discharged directly outside of the machine or into the lower cylinder, but which affords no means of supplying the lower cylinder otherwise than from or through the upper cylinder. By my construction I am enabled either to give a preliminary drying to coffee or like material in the upper cylinder and then discharge the same into the lower cylinder to roast it, for which purpose the two cylinders are primarily intended; or I may roast coffee or like substance requiring a high heat in the lower cylinder, which, being nearest the fire, is heated most, and peanuts or other matters requiring a more moderate heat, in the upper cylinder, and in either case discharge the same where and as required.

Instead of making the hopper in the form shown in Fig. 4, the construction represented in Fig. 6 may be adopted, in which an opening, *m*, is made in the lower front side of the hopper, and the valve *l* is hinged at its lower edge and arranged to swing over and close either the opening *j* or the opening *m*, of course opening or uncovering one as it closes the other. Either arrangement will be found to answer the purpose well, though the latter is rather simpler than the first and more readily constructed and manipulated.

The upper cylinder, N, is furnished with a common supply-hopper, O, which contains a valve, *n*, the purpose of which is to prevent the escape of hot air or permit the escape of steam and moisture, as may be required.

In the practical use of machines of this class it is found very difficult to maintain close joints between the open ends of the cylinders and the stationary heads or caps because of the unequal expansion and contraction of the parts under varying temperatures. This is remedied in a measure by forming the heads each with an inwardly-projecting flange or rim, *h*,

which preferably extends into the mouth of the cylinder, as shown in Fig. 3; but, if preferred, the flange may encircle the end of the cylinder. This flange is made of a depth of from one to two inches, and usually projects about one-half its depth into the cylinder before the same is heated, so that as expansion takes place the remaining half of its depth is left to compensate for such expansion. It is, however, impracticable to secure by this means alone a sufficiently close joint and still insure the free working of the cylinder. Hence I provide means for adjusting the end of the cylinder to and from the head or the head to and from the cylinder, the first-mentioned plan being ordinarily adopted for the reason that it is desirable to have the heads which support the cylinder-shafts as rigid and solid as possible. The mechanism employed for this purpose is shown in Figs. 1 and 5, and consists merely of a lever, P, pivoted to an arm or bracket, *o*, and having a forked end straddling and working in a grooved hub or collar, *p*, rigidly secured to the shaft, the lever being provided with a spring locking-dog, *q*, by which it may be locked to a notched rack, *r*, and thus retained in any desired position. In Fig. 7 I have shown the head provided with similar means of adjustment.

The shafts E and F are formed without shoulders or collars such as are commonly employed, and are free to slide longitudinally through their bearings. Hence when the lever P is moved in one or the other direction the shaft with which it is connected and the cylinder carried by said shaft will be moved to or from the stationary head at its end, according to the direction in which said lever is moved. This adjustment or movement is also important where the door is hung, as shown in Fig. 3, in connection with the lower cylinder, in order to permit the release or withdrawal of flange *h*.

For the purpose of insuring the proper travel of the heat, smoke, and gases, and to protect the upper cylinder from the direct heat of the flames, I employ between the upper and lower cylinders a diaphragm or shield, *t*, extending from the front backward about two-thirds or three-fourths the depth of the furnace or chamber, and the chimney or outlet *u* is placed near the front, so that the smoke and gases are compelled to travel the whole length of the upper as well as of the lower cylinder.

Heretofore in machines of this class designed particularly for roasting coffee, the heat, after acting upon the one cylinder, escaped and was wasted, whereas by my plan it is utilized in heating the upper cylinder. This idea, broadly considered—that is to say, heating a vertical series of drying-cylinders by the one fire—is very old, but not, so far as I am aware, in connection with cylinders capable of independent operation and control as to the time of retention of their contents. Rotary motion is imparted to the cylinders by belts passing about the band wheels or pulleys G H, the

first of which is made of little more than double the width of the latter, and thus serves to carry the belt Q, by which motion is transmitted to pulley H, and also to carry the driving-belt R.

S indicates the tank employed to hold glucose or other material or substance used in glazing the coffee after roasting, if it be deemed desirable so to do, the tank or vessel communicating with steam-injection pipe T by a valved tube or pipe, *v*, which opens into pipe T between two valves, *w* and *x*. By opening *w* and *x* steam may be admitted to the tubular shaft E, and by opening valve *v* the coating material may be permitted to descend, mingle with and be carried by the steam into the cylinder. The vessel S is furnished with a glass gage-tube to show the height of material therein.

The apparatus, as above described, occupies but little room, and, with the two cylinders, is of very moderate height. Hence it may be readily placed in any ordinary room, the vertical space being of but little importance, and very little floor-room being necessary.

I have found in practice that by placing coffee in the upper cylinder and allowing it to dry out while the coffee in the lower cylinder is roasting, then running the coffee from the upper to the lower cylinder and replenishing the upper cylinder's supply I save about forty per cent. in point of time over the old plan of using a single cylinder, and this without using one particle of fuel more than formerly in the furnace. I also find the quality of the finished coffee to be rather better than under the old plan.

The shafts are provided with radial arms or rods, carrying spiral blades U, and similar blades, V, are secured to the interior of the cylinders, and serve, when the heads or doors are opened, to discharge the contents of the cylinders, and when the machine is in operation to agitate and stir the mass. The two sets of blades revolve with the cylinder, and being curved in opposite directions serve to counteract each other in their tendency to carry the material toward one end. In discharging the contents of the cylinder this equalizing effect is still exerted, until the material falls below the blades U, when only the blades V act upon the material, discharging the same rapidly and evenly.

It is obvious that the shafts may be made stationary as to endwise movement, and the cylinders arranged to slide longitudinally thereon.

I am aware that in grain-driers a stationary drum has been provided with an opening in the lower side, closed by a door, which, when released, would fall by its own gravity, and this I do not claim. By my arrangement a suspended door, occupying a vertical or upright position, and applied to a stationary vertical head, is caused to swing outward clear from the front of the machine.

I am also aware that a spout delivering from an upper to a lower cylinder has been provided with a valve by which the material from said upper cylinder could be discharged outside of the machine, instead of into the lower

cylinder; but in such case there was no external hopper or means of supplying the lower cylinder except through the upper one.

I am also aware that it has been proposed to extend a spout, connecting an upper and lower cylinder, up above the machine, to permit the material to be delivered directly into the lower cylinder; but no means of discharging from the upper cylinder directly outside of the machine was in that case provided. These I do not claim.

I am aware that in coffee-roasters a cap or head has been held against rotation, but arranged to move upon the cylinder-shaft, to and from the end of the cylinder, against which it is normally held by the pressure of a spring encircling the shaft, such arrangement being for the purpose of permitting the head to be moved outward to allow the contents of the cylinder to escape. This I do not claim.

Under my construction, the actual contact of the end of the cylinder and its cap or head is prevented, and the friction due to the use of a spring urging the head against the end of the cylinder is avoided, my purpose being merely to permit a positive adjustment of the cylinder or head, one in relation to the other, so that proper allowance may be made for expansion under the heat of the fire, and so that after the adjustment is once accurately made and a close joint secured without actual contact, it may be maintained positively, and thus all the advantages of close fitting be secured without the disadvantages of great friction.

Having thus described my invention, what I claim is—

1. In a coffee-roaster, the combination of a heater and an upper and lower cylinder, both adapted to retain their contents for any desired length of time, and to discharge said contents either directly outside of the machine or from the upper to the lower cylinder, at the will of the operator, substantially as explained.

2. In combination with heating-chamber A, cylinders N M, hopper K, located between the cylinders, provided with a receiving-mouth outside of the heating-chamber wall or casing, and with opening *m*, cylinder-head J, provided with inlet-opening *j*, and valve *l*, arranged substantially as shown, to simultaneously open one and close the other opening.

3. In combination with heating-chamber A, cylinders N M, and head J, provided with inlet *j*, hopper K, located between the cylinders and provided with a receiving-mouth outside of the heating-chamber wall or casing, whereby it is adapted to receive material from outside the machine and deliver it to the lower cylinder, and to deliver material from the upper cylinder either to the lower cylinder or outside of the machine at will, substantially as set forth.

4. In a coffee-roaster, the combination of a rotating cylinder and a non-rotating cylinder cap or head, one of said parts being made adjustable to and from the other, and provided

with means, substantially such as shown and described, for holding it in a fixed relation to the other, but preventing actual contact of the two, for the purpose explained.

5 5. In a coffee-roaster, the combination of a non-rotating head provided with a flange, and an open-ended cylinder, one of said parts fitting over the other and adapted to be moved longitudinally, and means, substantially such
10 as shown and described, for moving said part and locking it against further movement in the same or reverse direction.

6. In a coffee-roaster, substantially such as described, the combination of a rotary open-
15 ended cylinder carried by a central shaft, a stationary cylinder head or cap, and a lever connected with said shaft and adapted to move the same longitudinally, substantially as described, whereby the cylinder may be moved
20 to and from the head.

7. In a coffee-roaster, the combination of a rotary cylinder having an open end, and a fixed head or cap, one of said parts having an elongated flange extending into the mouth of

the other part, substantially as shown and de- 25 scribed, whereby expansion and contraction are permitted to take place without opening the joint or causing the parts to bind.

8. In combination with rotary cylinder M, the vertical convex head J, having door J',
30 hinged in advance of its lower edge, whereby it is caused to swing open by reason of its own weight.

9. The herein-described roaster, consisting of chamber A, containing fire-chamber B, cyl- 35 inders M N, heads I I' J J', intermediate external hopper, K, and valve L, all combined and operating, substantially as described.

10. In combination with cylinder N and station- 40 ary-head I, door I', journaled upon the head and arranged to swing in a vertical plane about the axis of the cylinder, substantially as and for the purpose set forth.

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Witnesses:

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WALTER S. DODGE.