No. 726,280. PATENTED APR. 28, 1903.

L. GIACOMINI.

APPARATUS FOR ROASTING COFFEE.

APPLICATION FILED JUNE 21, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig: 1.

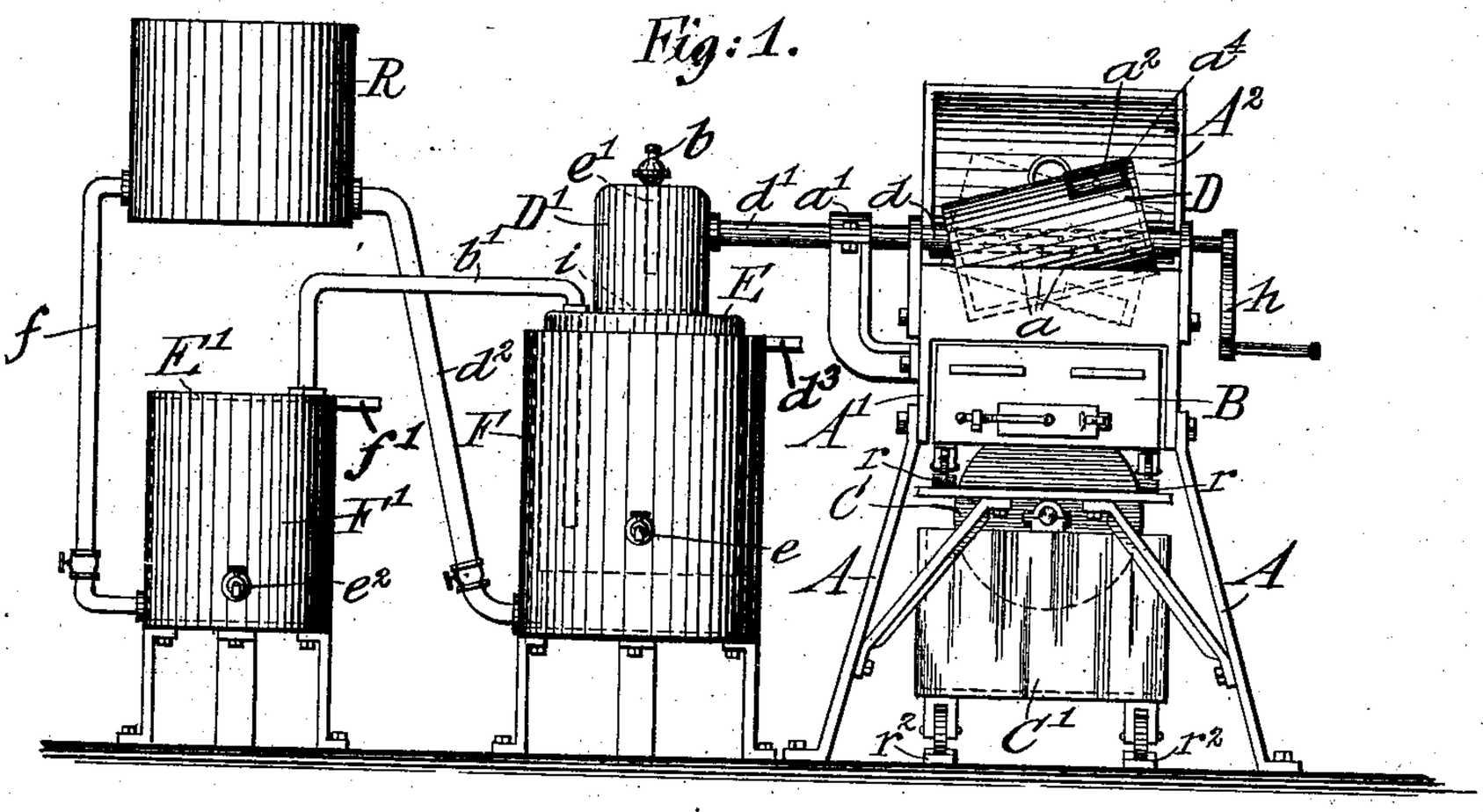


Fig: 2.

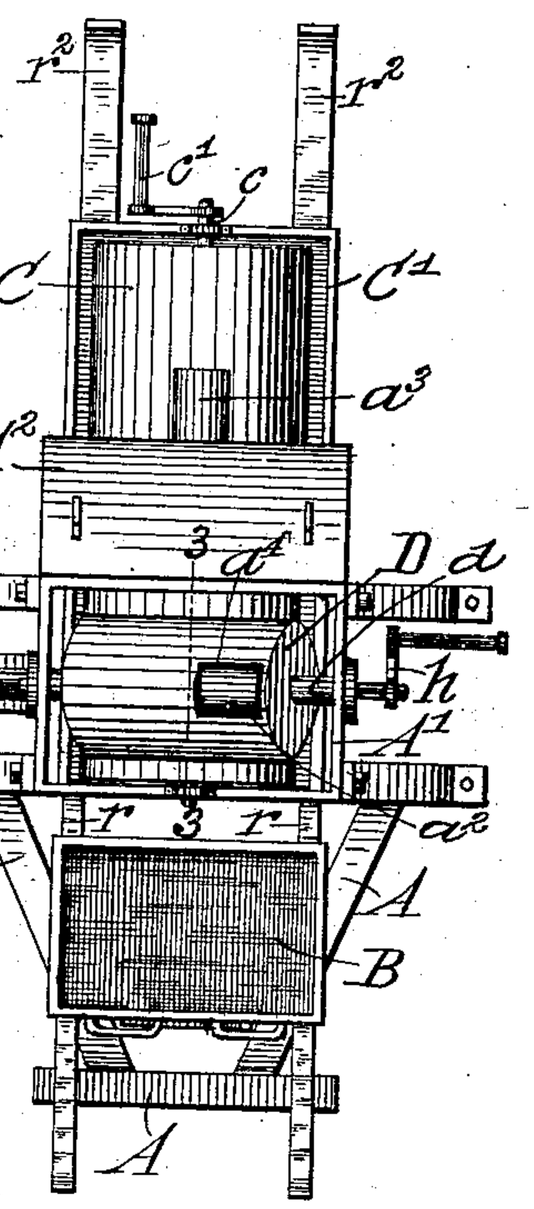
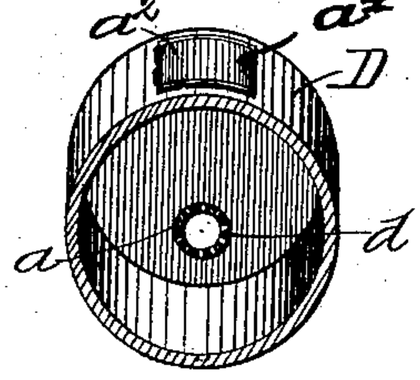


Fig: 3.



WITNESSES:

Glenn H. Niles.

C. Broadway.

INVENTOR

Luigi Giacomini

BY

Goepel & Niles,

ATTORNEYS.

No. 726,280. PATENTED APR. 28, 1903.

L. GIACOMINI.

APPARATUS FOR ROASTING COFFEE.

APPLICATION FILED JUNE 21, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig: 4.

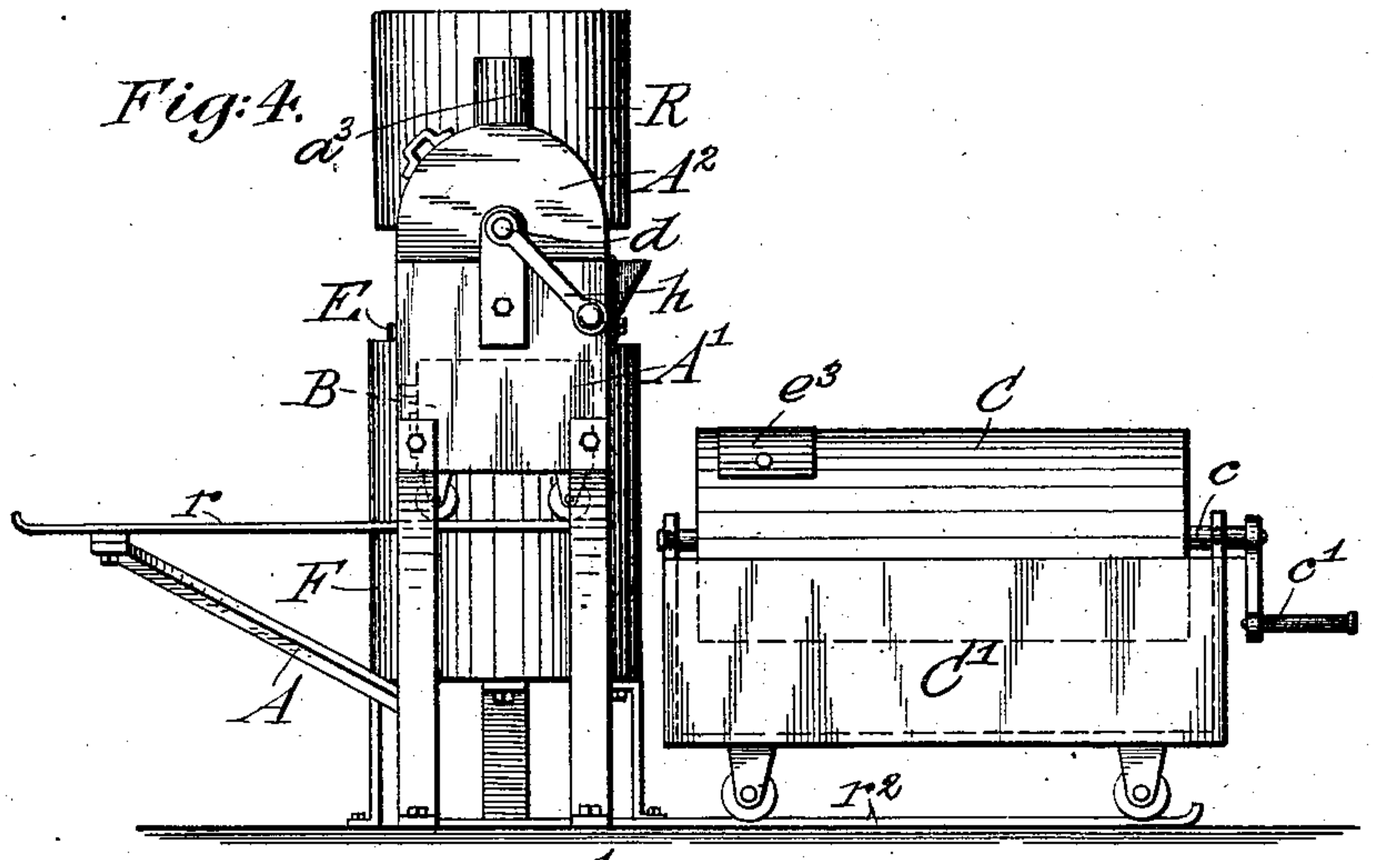


Fig: 5.

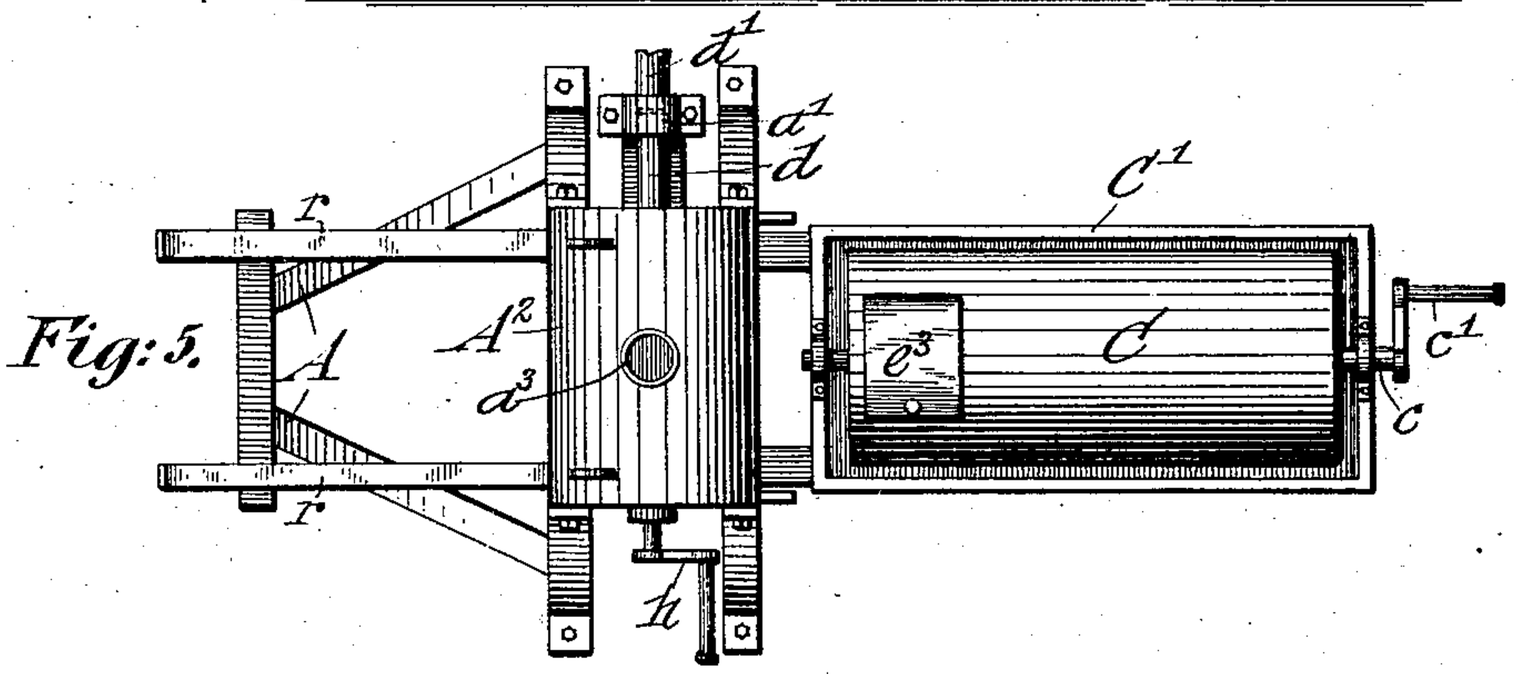
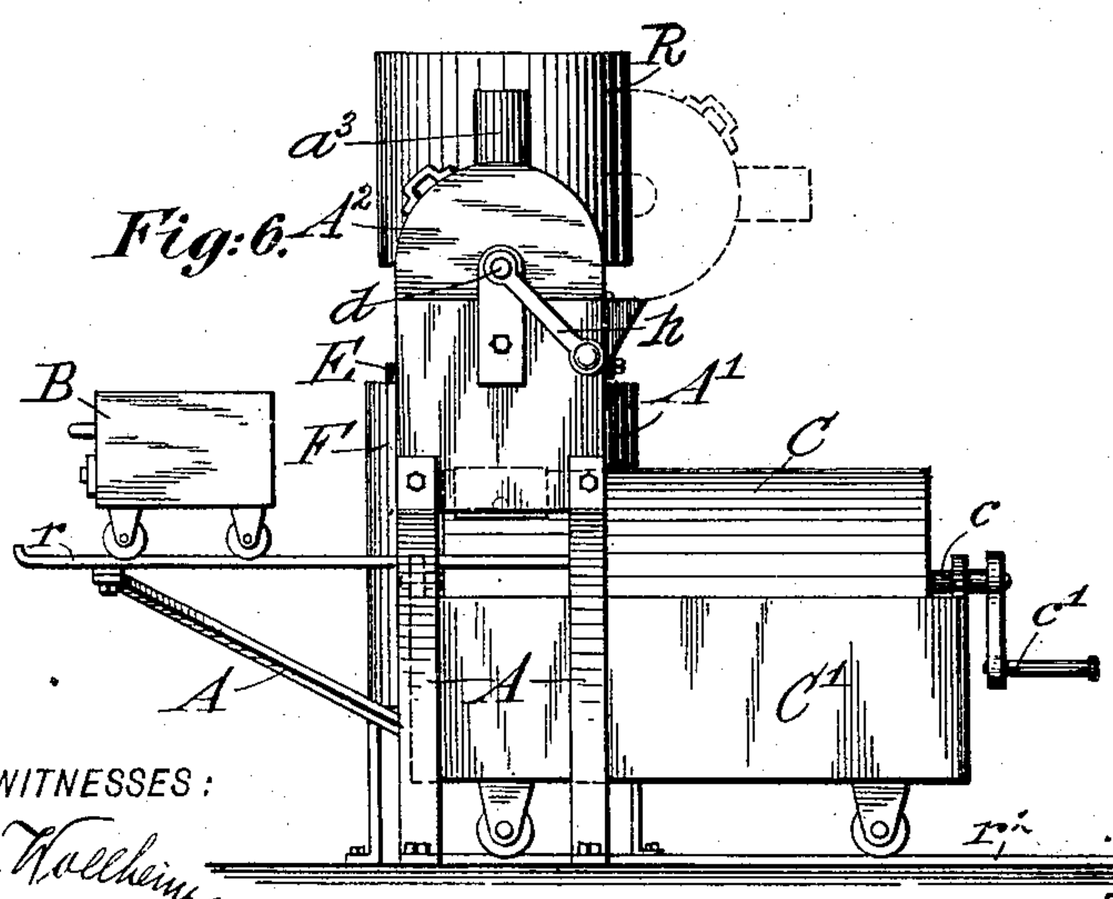


Fig: 6.



WITNESSES:

Walter Wallheim

Glenn H. Niles

INVENTOR

Luigi Giacomini

BY Gopsel & Niles,

ATTORNEYS.

UNITED STATES PATENT OFFICE.

LUIGI GIACOMINI, OF FLORENCE, ITALY.

APPARATUS FOR ROASTING COFFEE.

SPECIFICATION forming part of Letters Patent No. 726,280, dated April 28, 1903.

Application filed June 21, 1902. Serial No. 112,696. (No model.)

To all whom it may concern:

Be it known that I, LUIGI GIACOMINI, a citizen of the Kingdom of Italy, residing in Florence, Italy, have invented certain new and useful Improvements in Apparatus for Roasting Coffee, of which the following is a specification.

This invention relates to an improved apparatus for roasting coffee in such a manner that the volatile substances which contain the caffeol and aromatic oils are recovered and reincorporated into the beans after the roasting process is completed; and for this purpose the invention consists of an apparatus for roasting coffee, which comprises a roasting-drum, a tubular shaft passing through and supporting said drum and provided within the same with perforations, a movable furnace, means for supporting the same beneath said drum, a condenser connected with the tubular shaft of the drum, and a movable cooling-drum adapted to be placed below the roasting-drum on the removal of the furnace; and the invention consists, further, of certain details of construction and combinations of parts, which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view of an apparatus embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail vertical transverse section of the roasting-drum on line 3 3, Fig. 2. Fig. 4 is an end elevation of the apparatus, showing the parts in position during the roasting process. Fig. 5 is a plan view of Fig. 4, and Fig. 6 is an end elevation showing the furnace withdrawn from the roasting-drum and the cooling-drum placed in position below the roasting-drum ready for receiving the roasted beans for cooling.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A indicates the frame of the apparatus, and B a movable furnace charged with any suitable fuel and supported on wheels and adapted to be moved upon horizontal rails r, supported by the frame, into and out of the casing A′ of the roasting-drum D. The casing A′ is provided with a hinged semicylindrical cover A^2, that is provided with a chimney a^3. The roasting-drum D is supported upon and at an angle of inclination to a tubular shaft d, which passes through the same and which turns in suitable bearings of the casing. Motion is imparted to the shaft and drum by any suitable means, such as a hand-crank h, applied to the shaft. The opposite end of the tubular shaft D is connected at a' by a suitable coupling with a pipe d', which communicates with the cover D′ of a condenser E. The condenser E is provided with a water-jacket F, to which water is supplied from a suitable reservoir R through a pipe d^2, the water passing away through a pipe d^3 at the upper part of the jacket. The hollow shaft d is provided within the drum D with a number of perforations a. The volatile substances evaporated from the beans during the roasting process enter the shaft through said perforations and are conducted by the shaft d and pipe d' into the condenser E, the light coffee-shells that are carried off with the vapors being collected on a screen i, arranged at the bottom of the cover D′, as shown in dotted lines in Fig. 1. A pipe e' passes through the cover D′ to the outside of the same and is provided at its outer end with a whistle b. During the greater part of the roasting the whistle is not sounded at all or but imperceptibly; but toward the end of the same as the pressure increases the sound increases in strength and indicates thereby that the roasting process is nearly completed. When the sound of the whistle commences to increase, it is a sign that the roasting process should be interrupted by withdrawing the furnace from below the roasting-drum into the position shown in Fig. 6.

The roasting-drum is provided with an opening in its wall near one end and a lid a^2 for said opening hinged to the drum and preferably provided with an asbestos packing a^4, so as to produce the tight closing of the drum and prevent any escape of the vapors therefrom at the lid. The cover a^2 is closed during the roasting, and the chimney of the same provides a vent by which is established a strong current of air around the drum, which results in equalizing the temperature around the same. As the roasting-drum is supported at an angle of inclination to the axis of the hollow shaft, the coffee-beans charged into the same are thrown at each rotation of the

drum from one end of the cylinder toward the other, so as to be kept not only in motion around the shaft, but also in longitudinal direction, so as to produce thereby the effective roasting of the same.

For using the apparatus the roasting-drum is filled to about half its capacity with green beans, the lid a^2 placed in closed position, and the furnace B placed beneath the drum. The drum is then rotated. During the roasting the aromatic volatile vapors driven off pass through the tubular shaft d into the condenser E, where the caffeol and oils are condensed into liquid form in the bottom of the condenser, while the steam passes through the pipe e' and whistle b into the air.

From a point near the bottom of the condenser E extends a pipe b' to a smaller condenser E', located adjacent the condenser E and also cooled by water from the reservoir R by means of supply and discharge pipes f and f'. The condenser E is provided near the bottom with a faucet e and the condenser E' with a similar faucet or cock e^2, so as to permit drawing off the condensed coffee-essence from the same. By passing the vapors into the second condenser the aromatic essences of the coffee-beans are separated to a large extent from the steam and other non-condensing vapors, which do not pass over and which are conducted to the atmosphere through the pipe e' and whistle b. The coffee-essence is thereby obtained in the condenser E' in a purer condition than in the condenser E and better suited for use later on in the process.

When the roasting operation is completed, the furnace is drawn in outward direction on its horizontal rails r, the lid a^2 of the roasting-drum swung open, and the drum turned, so as to deliver into the cooling-drum C. This drum C is of preferably cylindrical form and of a size adapted to enter the casing below the roasting-drum, partially in the space vacated by the furnace. It is supported in a suitable wheeled box-like casing or receptable C' by means of a shaft c, mounted in bearings of said box, and can be rotated by means of a hand-crank c', applied to said shaft. The casing C' runs on rails r^2, preferably upturned at one end. The drum C is provided in its wall with an opening and with a sliding lid e^3 for closing the same. The beans having been delivered into the cooling-drum, a small quantity of coffee essence from the condenser E' is sprinkled over them, the lid e^3 closed, and the drum rotated. By this operation the beans are thoroughly agitated in contact with the essence, and the same is thoroughly absorbed by the beans while cooling. A small quantity of brown sugar is preferably added to the essence, which gives a glossy coating to the beans, thereby causing them to retain the absorbed essence and improving their appearance.

My improved apparatus can also be used for making coffee substitutes from wheat, barley, &c. For this purpose the cereal is roasted in the roasting-drum in the usual manner; but the shaft d and tube d' are disconnected at a', so that the vapors and steam pass off into the atmosphere. The furnace is removed when the cereal substances are sufficiently roasted, and they are then delivered into the cooling-drum. A certain quantity of coffee essence obtained from the roasting of coffee and condensation of the vapors, as described, is then added in connection with a small quantity of brown-sugar solution and the drum rotated during the cooling of the cereals, the essence being thoroughly absorbed. In this manner coffee substitutes having almost the identical taste of coffee can be produced.

Coffee and coffee substitutes roasted by the improved process decribed have a more aromatic taste and better flavor than when the volatile flavors are allowed to pass off through the chimney without being regained and returned into the bean. Coffee-beans roasted in this manner yield a greater quantity of coffee than beans roasted in the manner heretofore commonly practiced. By the apparatus described the aromatic substances of the coffee are utilized and reincorporated in the bean in a perfect manner, a bean of higher power is produced, and a valuable economy effected.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus for roasting coffee, consisting of a casing provided with a hinged lid, a chimney on said lid, a roasting-drum in said casing, a furnace adapted to enter said casing beneath the roasting-drum, said furnace being provided with suitable wheels or casters, horizontal rails extending into said casing for supporting said furnace, and extending at the outside of the same so as to receive and support the furnace at the outside of the casing, a hollow shaft passing through and provided within said roasting-drum with perforations, means for imparting rotary motion to said shaft, a pipe connected at one end with one end of said shaft, and a condenser connected with the other end of said pipe, substantially as set forth.

2. The combination, with a rotary roasting-drum having a tubular shaft provided with openings within the drum, of a condenser, a pipe connected at one end by a suitable coupling with said tubular shaft and at the other end with the condenser, a whistle arranged on the cover of said condenser, and a second condenser connected with said first condenser for condensing the coffee essence separated from the steam and other vapors, substantially as set forth.

3. The combination, with a roasting-drum, of a casing surrounding the same, a furnace for heating said drum, a hollow shaft passing through said drum and provided within the same with perforations, means for rotating

the drum, a pipe connected at one end by a suitable coupling with said shaft, a condenser connected with the opposite end of said pipe, a cover on said condenser provided with an outlet-pipe and a whistle for steam and other vapors, and a faucet for drawing off the condensed coffee essence from the bottom of said condenser, substantially as set forth.

4. The combination, with a casing, of a roasting-drum in said casing, means for rotating said drum, a cooling-drum located below said roasting-drum, a wheeled casing for supporting said cooling-drum, rails for guiding said wheeled casing and cooling-drum into and out of position beneath the roasting-drum, and means for rotating the cooling-drum after the roasted beans are transferred therein from the roasting-drum, substantially as set forth.

5. The combination, with a supporting-frame and a casing supported thereby, of a roasting-drum in said casing, rails extending beneath said drum and at the outside of the casing, a movable furnace on said rails, adapted to pass within the casing beneath said drum, a cooling-drum, a wheeled casing for said cooling-drum, said drum being adapted to enter said casing beneath the drum partially in the space vacated by the furnace, and means for rotating said cooling-drum, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LUIGI GIACOMINI.

Witnesses:
GRASTI FRILLI,
SPIRITO BERNARDI.