

No. 694,767.

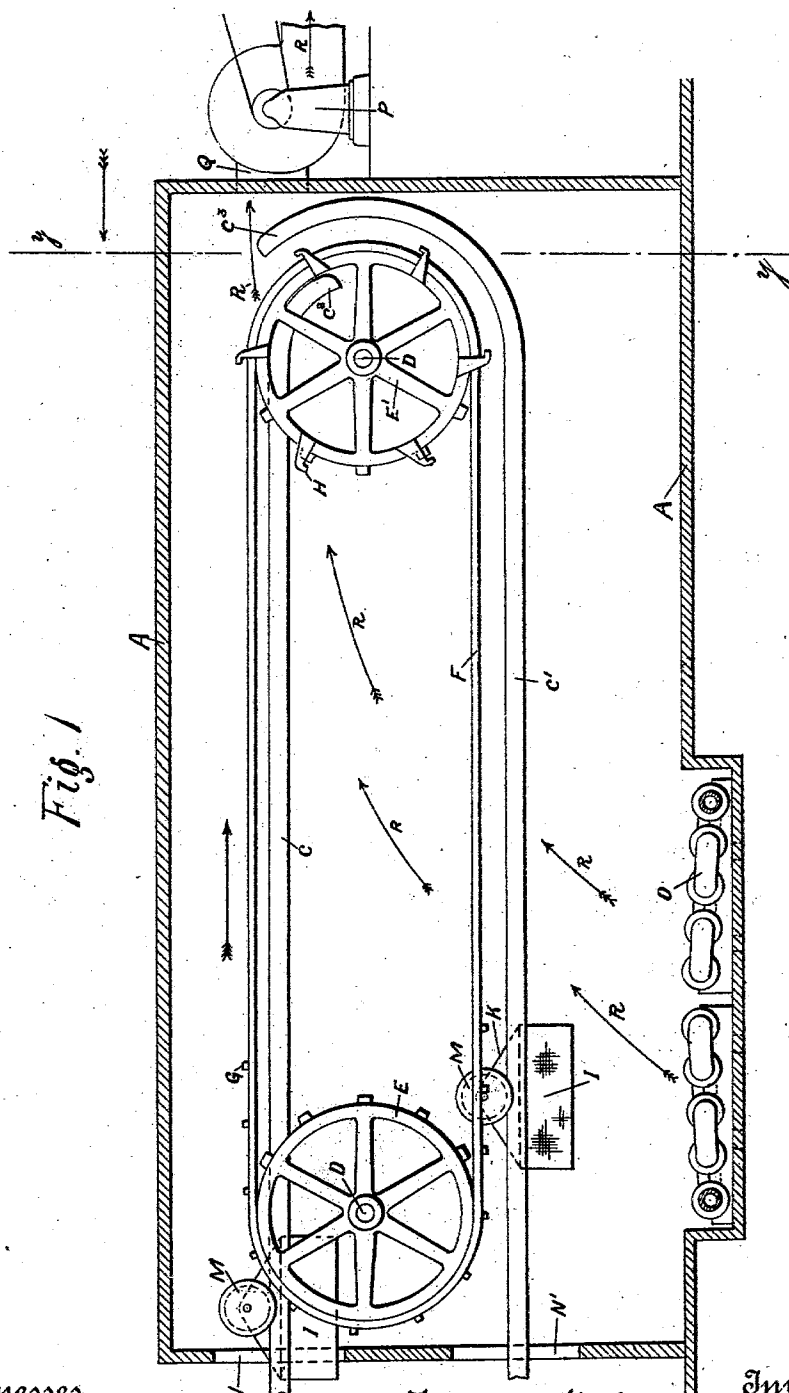
Patented Mar. 4, 1902.

F. MAHOUDÉAU.
APPARATUS FOR DRYING SUGAR.

(Application filed Jan. 4, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
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By His Attorney
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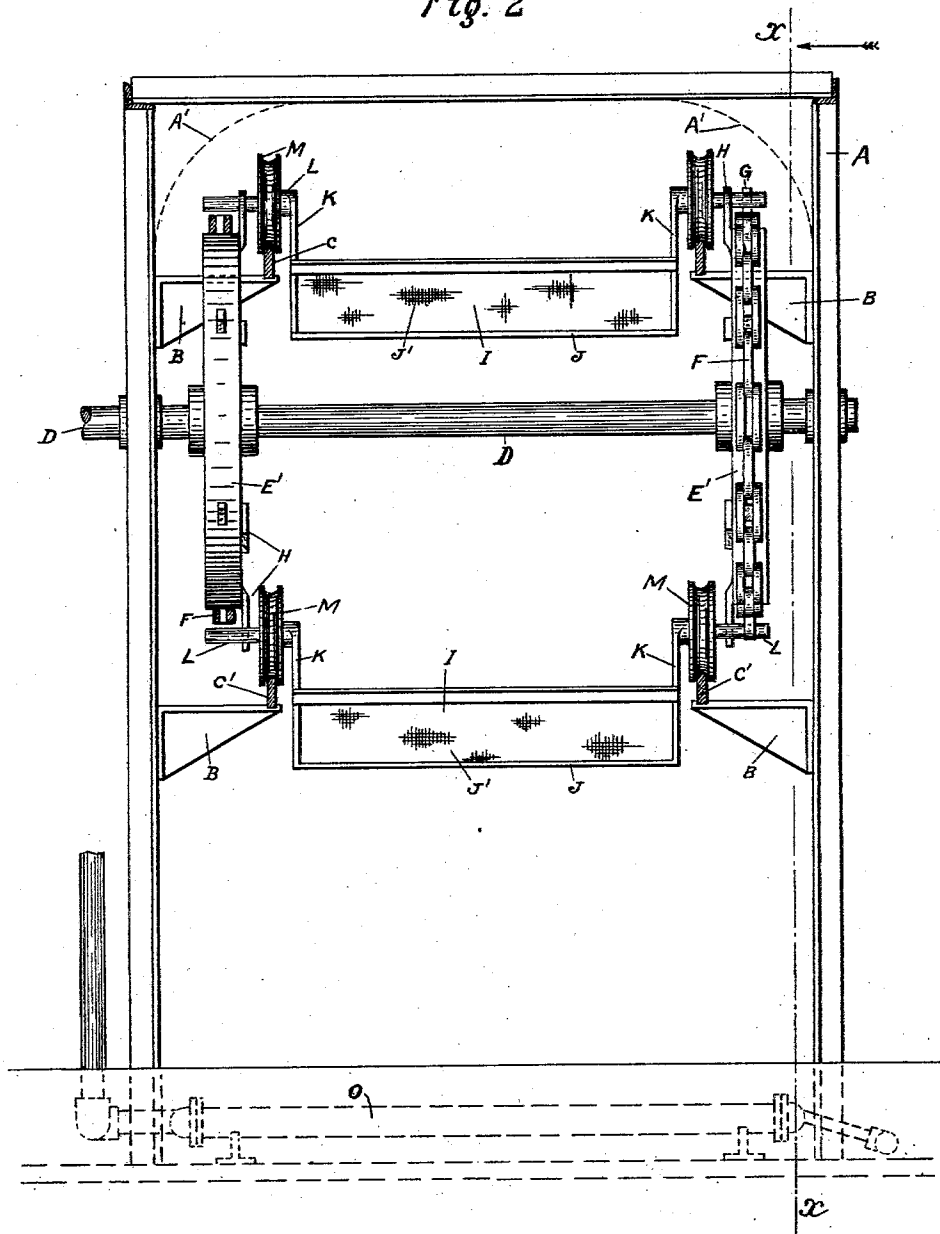
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3 Sheets—Sheet 2.

Fig. 2



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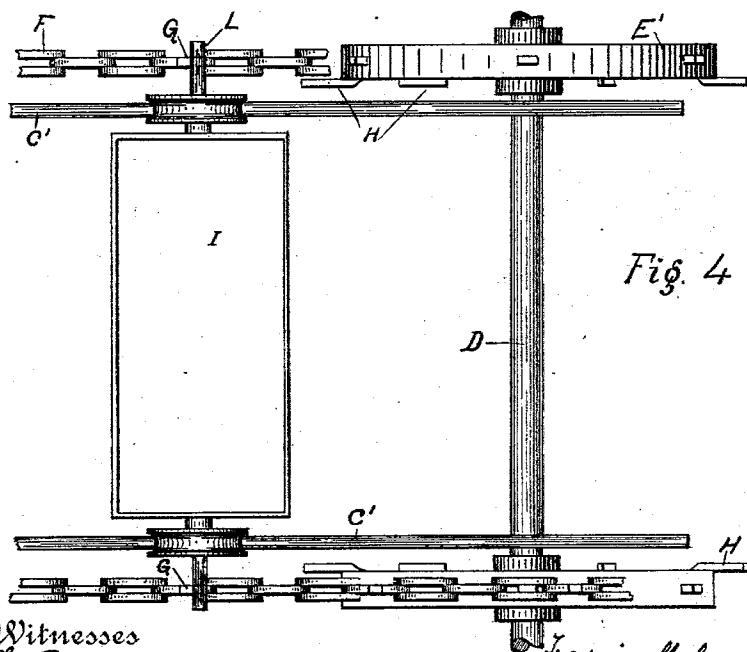
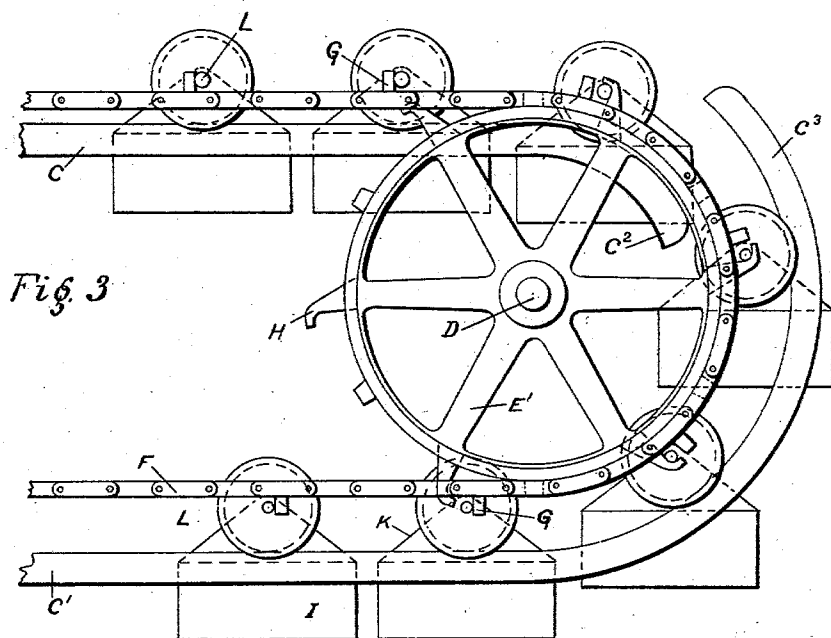
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UNITED STATES PATENT OFFICE.

FREDERIC MAHOUDEAU, OF NEW YORK, N. Y., ASSIGNOR TO THE AMERICAN SUGAR REFINING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

APPARATUS FOR DRYING SUGAR.

SPECIFICATION forming part of Letters Patent No. 694,767, dated March 4, 1902.

Application filed January 4, 1901. Serial No. 42,140. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC MAHOUDEAU, a citizen of the Republic of France, residing at New York city, county and State of New York, have invented an Apparatus for Drying Sugar, of which the following is a specification.

My invention relates to apparatus for drying sugars, although it may be used for drying other bodies.

The apparatus and method of operation heretofore made use of for drying sugars and similar bodies involved the introduction of such bodies into the lower portion of a furnace-chamber having its source of heat at the bottom, and hence into the hottest portion of such chamber, then after moving the body through the hottest portion of the chamber moving it upward at the rear of the chamber and causing it to traverse a path of lower temperature at the top of the furnace-chamber, and so out of the chamber. This practice has been found objectionable, owing to the fact that the slowly-moving highly-heated currents of air at the bottom of the furnace-chamber do not readily separate the moisture from the bodies to be dried and that such moisture as is separated in rising deposits upon or is reabsorbed by the bodies traversing the top of the furnace-chamber and moving toward the outlet of the furnace-chamber. To overcome the objections stated, I have devised a construction and method of operation which involves the introduction of the bodies to be dried into the upper portion of the furnace-chamber and to traverse vertical zones of gradually-increasing temperature, then descend to the lower portion of the furnace-chamber and traverse zones of gradually-decreasing temperature. The furnace-chamber is arranged to have created within it at its upper part rapidly-moving air-currents of moderate but gradually-increasing temperature from without inward, which practice has shown to be the best means of quickly removing the moisture, and at the bottom slowly-moving air-currents of high but gradually-decreasing temperature, which serve to effect the final drying of the bodies passing through the furnace.

The object of my invention is to rapidly and effectually eliminate the moisture from sugar or other bodies.

The accompanying drawings will serve to illustrate my invention.

Figure 1 is a longitudinal section and elevation of the furnace-chamber, taken on the line X X of Fig. 2. This view also shows an exhaust-blower in elevation. Fig. 2 is an end view taken on the line Y Y of Fig. 1 looking from the right. Fig. 3 is an elevation of the mechanism for carrying the baskets through the furnace-chamber and shifting the baskets from the upper trackway to the lower trackway. Fig. 4 is a partial plan view showing but one basket.

In the drawings, A represents the furnace-chamber, which I prefer to construct as a long narrow chamber rectangular in section. The top of the chamber may be arched, as indicated at the dotted lines A', Fig. 2, or given any other suitable shape. Arranged within the chamber on suitable bracket-supports B are the horizontal trackways C C'. These trackways occupy horizontal planes throughout the greater portion of their length and at the rear end of the furnace have their ends arranged concentrically for a portion of their length. The rear end of the trackway C is turned downward at C² and the rear end of the trackway C' turned upward, as at C³, a space being left between the trackways. Mounted at opposite ends of the chamber are the shafts D, carrying at each end the sprocket-wheels E E', over which are arranged the endless link chain F. The link chain F is provided upon its outer surface with the projections G. The wheels E' at the rear of the furnace carry on the outer side of their periphery projecting hook portions H. It will be observed from the drawings that the link chain F has a movement parallel with the trackways C C' and that in the rotation of the wheels E' the projecting hook portions H are carried, when in the highest position, slightly above the top of the link chain.

I represents baskets by which the material to be dried is carried through the furnace-chamber. The baskets consist of a body portion J, preferably formed of perforated metal

or wire-netting J'. Projecting upward from the basket are arms K, carrying horizontal bearings L, on which wheels M are loosely mounted.

- 5 N N' represent openings in the front of the furnace-chamber through which the material is introduced into the furnace-chamber and withdrawn therefrom; O, a source of heat in the bottom of the furnace-chamber. This
10 source of heat I prefer to consist of a steam-coil arranged as shown—that is, nearer to the front end of the furnace-chamber than to the rear end, although I may extend the steam-coil nearer to the rear end of the chamber than
15 is shown in the drawings.

- P represents an exhaust-blower having its draft-pipe Q connected to the interior of the furnace-chamber at the top and rear end. By this arrangement of heat and draft apparatus
20 I am enabled to obtain a circulation of air substantially in the direction indicated by the arrows R and to produce within the furnace along its upper part rapidly-moving air-currents of gradually-increasing temperature
25 and along the bottom part slowly-moving air-currents of gradually-decreasing temperature.

- In operating the furnace the baskets containing the material to be dried are introduced through the opening N, with the wheels
30 M upon the trackway C. The carriage is pushed forward until the projections G upon the links F impinge upon the bearings L, on which the wheels M are mounted, thus moving the carriages forward along the trackway
35 C until the wheels E' are reached. At this point the hook projections H move under the bearings L and support the carriage and basket as they are shifted downward to the trackway C', as indicated in Fig. 3. Here
40 the projections G on the link chain again impinge upon the bearings L from behind and carry the carriages and baskets along the trackway C' until the opening N' of the furnace-chamber is reached. At this point the
45 carriage and basket may be removed from the trackway C' or diverted along an outside trackway. (Not shown.)

Having thus described my invention, I claim—

- 50 1. In a furnace for drying sugar or other bodies, the combination with a furnace-chamber closed at the top, open at the front for the ingress and egress of the material to be dried, and at the rear for the egress of the heated
55 and moist air-currents, of a source of heat located at the bottom of the chamber and near to the forward end of the chamber, an exhaust-blower communicating with the upper portion of the chamber at its rear end, and
60 means for transporting the material to be dried first inwardly through the upper portion of the chamber, then downwardly within the chamber, and then outwardly along the bottom of the chamber.
- 65 2. A furnace for drying sugar or other bodies, comprising a furnace-chamber, two parallel trackways, a carriage adapted to

move thereon, an endless chain moving parallel with said trackways for imparting motion to the carriage on said trackways, and
70 wheels at the end of the trackways carrying projecting arms which support the carriage in its movement from the upper to the lower trackway.

3. A furnace for drying sugar or other
75 bodies, comprising an open furnace-chamber, an exhaust-blower communicating with the upper portion of the rear end of the chamber, a pair of parallel trackways, a carriage supported on said trackways, means not per-
80 manently engaging with said carriage for moving said carriage, and means for shifting the carriage from the upper to the lower trackway.

4. In a furnace for drying sugar or other
85 bodies, the combination with a furnace-chamber closed at the top, open at the front for the ingress and egress of the material to be dried, and at the rear for the egress of the heated and moist air currents, of a source of
90 heat located at the bottom of the chamber and near to the forward end of the chamber, an exhaust-blower communicating with the upper portion of the furnace-chamber at its rear end, whereby zones of temperature are
95 created in the furnace, increasing from without inward along the top of the furnace and decreasing from within outward along the bottom of the furnace.

5. A furnace for drying sugar or other
100 bodies, comprising an open furnace-chamber, two trackways arranged parallel, said trackways horizontal over their major portion and concentric at their rear end, a carriage adapted to move on said trackways, means not
105 permanently engaging with said carriage for moving said carriage, and means for guiding and supporting said carriage in passing from the upper trackway to the lower trackway and between the concentric portion of said track-
110 ways.

6. In a drying apparatus in which the upper and lower races or rails at the farthest end from the entrance side of the chamber form curved guides for the tray-wheels to descend from the upper race to the lower one,
115 chains revolving over chain-wheels, said chains having on certain links fingers, and trays running on the said rails, said trays having wheels, the axles of which project side-
120 wise into the course of the said chains, to shift the trays through the chamber by said fingers striking against said axles.

7. In a drying apparatus in which the upper and lower races or rails form curved guides
125 for the tray-wheels to descend, said tray-wheels having wheel-axles projecting into the course of the endless traveling chains, said chains having fingers at certain links to shift the trays along the rails, and the chain-wheels,
130 having holders for carrying the tray-wheel axles in their downward movement from the upper rail-race to the lower one independently of the said fingers.

8. The combination of the upper and lower races or rails, wheeled trays arranged to travel on said races, chains provided with driving projections arranged to engage the tray-wheel axles from behind, and chain-wheels supporting said chains and provided with retaining projections on which the carriers rest temporarily during their passage from the upper race to the lower race.
- 10 9. The combination of the upper and lower races or rails, trays or carriers arranged to travel on said races, chains provided with driving projections arranged to engage the carriers from behind, and chain-wheels supporting said chains and provided with retaining projections on which the carriers rest temporarily during their passage from the upper race to the lower race.

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

FREDERIC MAHOUDEAU.

Witnesses:

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