

F. LAFEUILLE.
SUGAR CRYSTALLIZER.
APPLICATION FILED MAY 10, 1911.

1,016,019.

Patented Jan. 30, 1912.
2 SHEETS—SHEET 1.

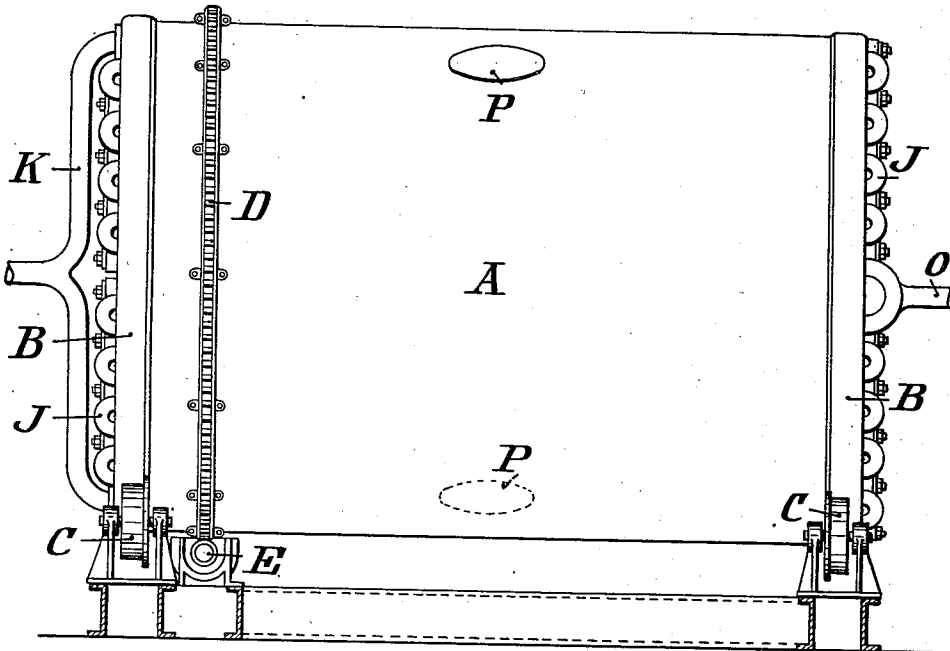


Fig. 1.

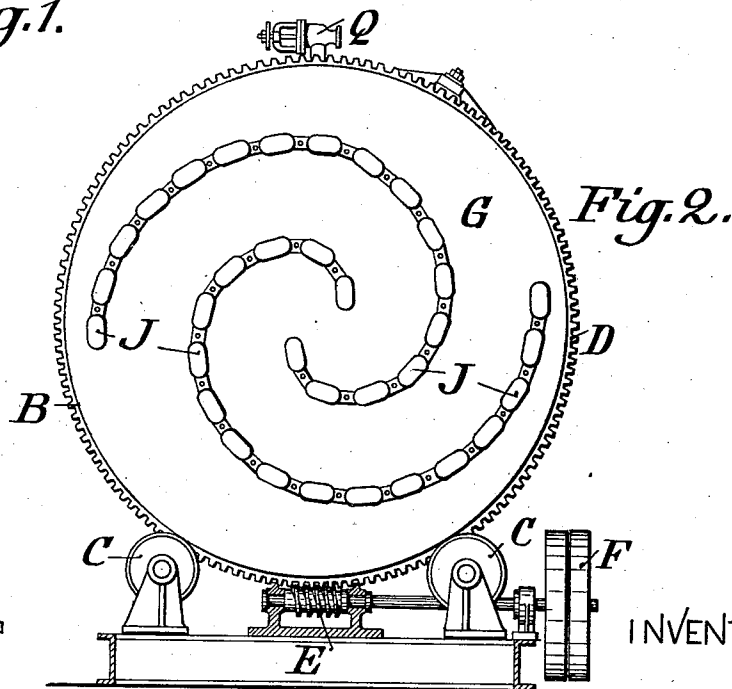


Fig. 2.

WITNESSES

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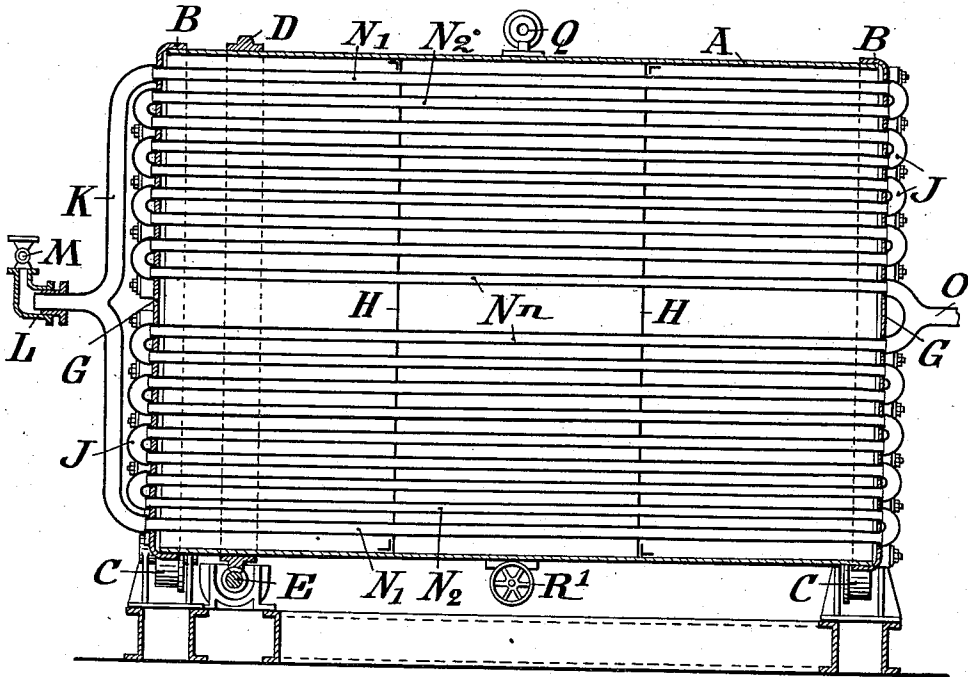


Fig. 3.

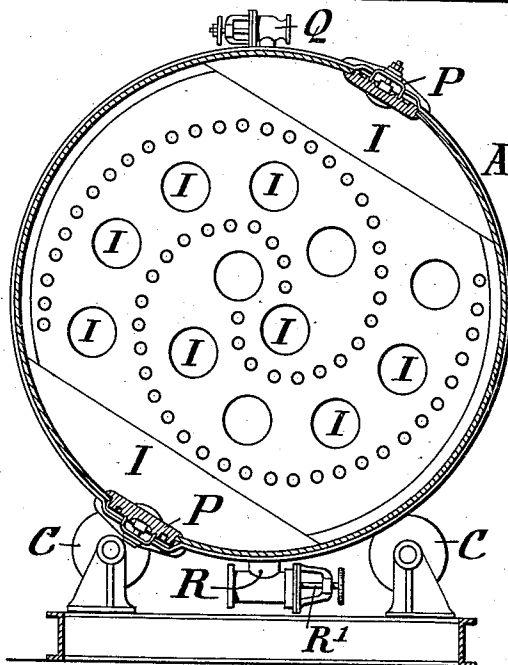


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

FERNAND LAFEUILLE, OF CHARMES, FRANCE.

SUGAR-CRYSTALLIZER.

1,016,019.

Specification of Letters Patent.

Patented Jan. 30, 1912.

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To all whom it may concern:

Be it known that I, FERNAND LAFEUILLE, engineer, a citizen of the Republic of France, residing at Charmes, Villa Said, France, have invented certain new and useful Improvements in Sugar-Crystallizers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in apparatus for simultaneously mixing or agitating solutions and raising or lowering the temperature of the solution which is being agitated.

The invention has special reference to the crystallization of sugar, in which connection the improved apparatus has been found to give particularly desirable results, owing to the fact that I provide means for agitating the solution very uniformly, and for transmitting to the solution the desired temperature in a rapid and uniform manner.

The novel features of the invention will appear clearly from the following description and claims.

In order that my invention may more clearly be understood an example embodying the same has been shown in the accompanying drawings in which the same letters of reference have been used in all the views to indicate corresponding parts.

In said drawings—Figure 1 is a side view of the apparatus, Fig. 2 is an end view of the same seen from the side of the driving mechanism for the receptacle, Fig. 3 is a longitudinal section of the apparatus, and Fig. 4 is a cross-section of the same.

In the embodiment of the invention shown in the drawings the apparatus consists of a receptacle A preferably of drum-like cylindrical form and constructed of sheet metal. At its outer circumference the said receptacle is equipped with a pair of rings B, B each of which is supported on a pair of bearing rollers C, C, C, C. Furthermore the drum or receptacle is provided with a toothed ring D which is in

mesh with a worm E actuated by a belt 50 guided on suitable pulleys F. At its ends the receptacle A is closed by heads G, G which in the preferred form are made of thick iron plates. The said heads are formed with holes which are disposed in 55 such a way as to permit the passage of straight tubes parallel to the longitudinal axis of the receptacle, and the said tubes are secured with their ends within corresponding holes provided in the opposite 60 heads. The tubes can be removed by a simple manipulation so that a tight closure of the tubes within the heads can be obtained.

The tubes are supported within the receptacle by a suitable number of plates H, H which are preferably made of sheet metal and are provided with apertures for the passage of the tubes and with apertures I, I through which the solution or mass to be 70 treated can freely pass. Some of the said apertures may be large enough to permit a man to have access to the chambers formed within the receptacle by the plates H, H and to clean the same. The tubes 75 are arranged within the apparatus at equal distances apart, and they are alternately connected at opposite ends by corresponding joints or elbows J, J or a connecting chamber provided alternately at the opposite 80 heads. Therefore consecutive tubes communicate with each other at one of their ends in serpentine or zigzag fashion.

An example of the arrangement of the holes of the heads and the tubes mounted 85 therein is shown in Figs. 2 and 4 where the holes are arranged on two spirals. The cooling or heating medium is admitted through a tube K which is equipped with an inlet portion located in the axis of the 90 cylinder and fitted in a stuffing box L. The admission of the cooling or heating medium is controlled by a cock M. The cooling or heating medium flows at first through two tubes N¹, N¹ located at the outer ends of the 95 spirals and adjacent to the wall of the cylinder. From said tubes it is supplied to the next tubes N², N², and so on until

it gradually approaches the center of the cylinder. The last tubes N^n , N^n are both connected to a discharge tube O disposed within the longitudinal axis of the cylinder.

5 The cooling or heating medium is discharged through the said tube and flows into a funnel provided below the same. The discharge tube is preferably equipped with a regulating cock (not shown). The
10 interior of the apparatus is accessible through man holes P, P which are closed by suitable lids.

The apparatus may be connected with a vacuum or steam chamber through a valve
15 Q, so that either a vacuum is produced within the apparatus for drawing in the solution to be treated, or steam is admitted thereto for cleaning the same or dissolving the sugar. The solution to be treated is
20 supplied to the apparatus through a supply nozzle R provided with a suitable closing element such for example as a screw down valve R^1 , a hinged valve, a slide valve or the like. In order to supply the solution
25 to the apparatus the inlet end of the nozzle R is brought in contact with a suitable flexible tube which for operating the apparatus is moved out of the path of the said nozzle, and which is connected with
30 a suitable evaporating apparatus from which the solution is supplied. The solution is preferably drawn into the apparatus by connecting the latter through the valve Q with a vacuum chamber.

35 Instead of arranging the tubes N along two spirals they may be arranged along a single spiral, or along more than two spirals or along a curved or broken line of different character. One of the most important features of the invention, however, resides in
40 the arrangement of the tubes N along a substantially spiral line in a direction transverse to the rotary axis of the drum or receptacle. The spiral line or lines extend
45 from a point adjacent the center of the drum to a point near the shell of the latter, and in this manner the tubes, in passing through the solution or mass in the receptacle, displace such solution or mass
50 bodily to a certain extent in such a manner that there is a movement of the solution toward or away from the center of the drum, whereby an especially effective mixing or agitating action takes place, all
55 parts of the solution being contacted by the tubes in a substantially uniform manner. The efficiency of the agitation and the uniformity of the same throughout the solution are also increased by so arranging the spiral
60 lines of tubes that one extends into the area bounded by another, as shown in Fig. 4. In case the drum is rotated in the proper direction the eccentric bow-like series of tubes
65 serve to scoop up the solution bodily to a certain extent and therefore move constantly to-

ward the center of the drum that part of the solution occupying the outer or circumferential portion of the drum interior. In this manner, the solution can be agitated very
70 uniformly and its temperature may be raised or lowered in a uniform manner and very quickly. These results, in actual practice, have been found particularly desirable in the crystallization of sugar, especially as the
75 uniform action of the apparatus prevents the production of a new growth of fine crystals at any stage in the process, and also prevents the incrustation of the tubes and the interior walls or surfaces.

Though in describing the invention the cooling or heating medium has been stated to be admitted through the outer tubes and discharged from the inner tubes, I wish it to be understood that my invention is not
80 limited to the operation described, and that the cooling or heating medium may flow through the tubes in a different way and that it may be admitted for example
85 through the inner tubes and withdrawn from the outer tubes, or the inlet and outlet may be provided on intermediate tubes.

I claim herein as my invention.

1. In a sugar crystallizer or the like, the combination with a receptacle movable
90 about a horizontal axis, of stirring means within said receptacle and movable therewith, said stirring means being arranged along a spiral line extending from a point near the said axis toward the outer wall of the receptacle.

2. In a sugar crystallizer or the like, the combination with a receptacle movable
95 about a horizontal axis, of tubes extending through said receptacle with their axes parallel to the said horizontal axis and movable with said receptacle, said tubes being arranged along a spiral line extending from a point near the said axis toward the outer wall of said receptacle.

3. In a sugar crystallizer or the like, the combination of a rotary drum, and agitating means therein comprising a series of longitudinal tubes adapted to convey a heating
100 or cooling medium, said tubes being connected in serpentine or zigzag fashion longitudinally of the drum and being arranged along an eccentric bow-like line transversely of the drum.

4. In a sugar crystallizer or the like, the combination of a rotary drum, and a plurality of tubes arranged longitudinally
105 within said drum and adapted to convey a liquid medium, said tubes being arranged along a plurality of eccentric bow-like lines extending from the central portion of the drum to the outer or circumferential portion thereof and serving to displace the solution in the drum toward or away from the center of the latter according to the direction in which the drum is rotated.

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5 5. In a sugar crystallizer or the like, the combination of a rotary drum, and a plurality of longitudinally disposed stirring elements within the drum, arranged along spiral lines directed transversely of the drum, one spiral extending into the area defined by another, as described.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FERNAND LAFEUILLE.

Witnesses:

DOMINIQUE CASALONGA,
H. C. COXE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."