

O. FROMM & M. SCHODLY.  
 PROCESS AND CONTRIVANCE FOR PRODUCTION PARTICULARLY OF SUGAR CRYSTALS IN VACUUM.  
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Patented July 1, 1913.

Fig. 1.

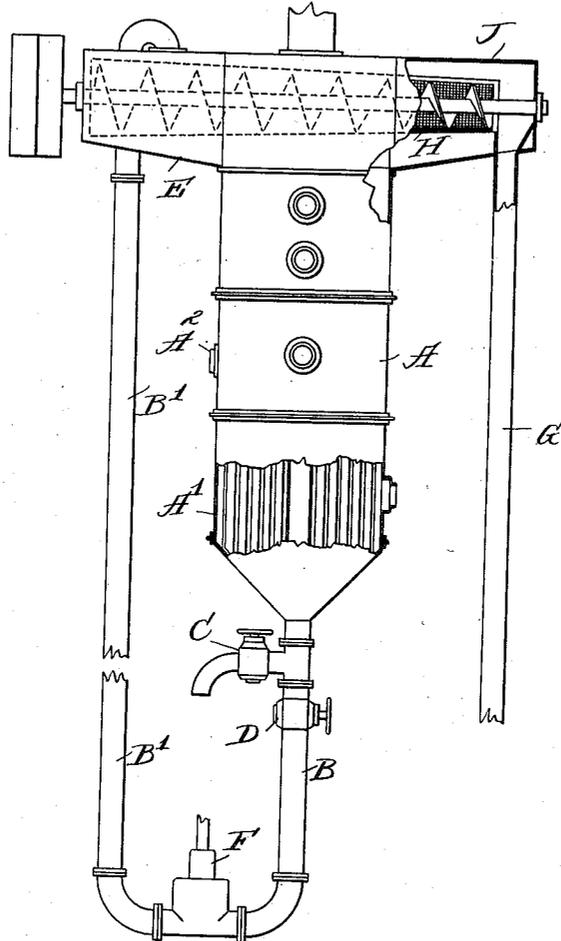
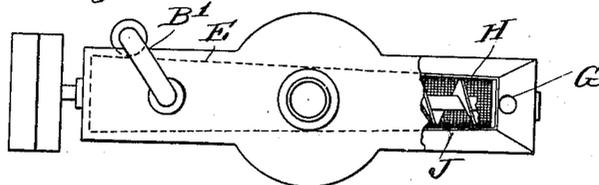


Fig. 2



Witnesses:

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# UNITED STATES PATENT OFFICE.

OTTO FROMM AND MATHIAS SCHODLY, OF SCHWARTAU, NEAR LÜBECK, GERMANY.

PROCESS AND CONTRIVANCE FOR PRODUCTION PARTICULARLY OF SUGAR-CRYSTALS  
IN VACUUM.

1,066,397.

Specification of Letters Patent.

Patented July 1, 1913.

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To all whom it may concern:

Be it known that we, OTTO FROMM and MATHIAS SCHODLY, subjects of the German Emperor, residing at Schwartau, near Lübeck, Germany, have invented certain new and useful Improvements in Processes and Contrivances for Production Particularly of Sugar-Crystals in Vacuum, of which the following is a specification, reference being had therein to the accompanying drawing.

The invention concerns a working process for vacuum-apparatus, especially for the sugar industry, through which an uninterrupted production of sugar crystals is reached.

By the process used up to the present with the usual vacuum apparatus the syrup was boiled until concentrated for the formation of grains. The turning out of crystals of an equal size was however very difficult, because the process can only be carried out so long as the apparatus is in cooking operation, whereupon on the stopping of the vacuum, must be emptied or filled up. Now as a rule the emptying of the apparatus occurs exactly at the time of the grain formation, so that only a proportionally small grain is produced. The mass or finished boiling is now conducted in a mash in which it rests for some days, the so called crystallizing out, and for the purpose of separation of the syrup from the sugar crystals it is put into a centrifugal machine.

The above given working process loses time and heat and requires for its technical execution large apparatus and produces only a proportionally small grain, because the increasing of the same is interrupted and disturbed before being finished, during the periodic filling of the apparatus.

The new working process, according to the invention herewith develops an uninterrupted production of the sugar crystals, which only arrive then to be thrown off when they have reached an equal volume, during which the small crystals are thrown back into the apparatus for further growing. In order to be able to carry out this technically, a special installation is necessary, an example of which is represented, in the sketch and shows:

Figure 1. a side view and Fig. 2. a plan, both views show part sections.

A is the vacuum apparatus in which are one or more heaters  $A^1$  in the last case they

can be arranged above one another or against one another. In the under conical part of the apparatus A is led a tube conductor B, which is connected with an exhaust and pressure pump F, and which carries a draining cock C, as well as a valve D. From the pump F is led a further tube B' into a reservoir E built in the upper part of the apparatus A, in which is laid out an inclined sieved gutter H, in which is provided a conical helical gear J. At the end of the reservoir E in the lower part of the draining apparatus is fitted a gutter-pipe, G which is provided with a suitable valve.

The mode of operation of the arrangement as described, is as follows: The solution containing sugar as syrup or so on, is delivered through an inlet  $A^2$  into the evaporator A, which, with its combined tube conductors B, B', and G and the reservoir E are under a vacuum. The cooking of the solution next follows as in every other vacuum apparatus until the same is evaporated and the small crystals appear. To this mass, which commences to cook, is then added a further quantity of solution until the size of the sugar crystals increases, and till a great quantity of crystals is stored in lower part of the apparatus A.

The useful effect of the apparatus can be increased thereby and the duration of the operation be shortened, if several burners are fitted above one another in the apparatus in order to have the greatest possible evaporating surface and to reach an equalization of temperature between hot steam and the mass being treated.

If the mass is now fully cooked and under the action of the newly added diluted solution great numbers of crystals will have settled on the already steamed mass, then the valve D is opened and the thick mass, as far as the same has entered into the crystallizing state, is sucked through the tube conductor B by means of the pump and always under vacuum, drawn through the pipe B' into the reservoir E. The mass which is composed of small and large grains as well as molten liquor brought with same, now falls into the sieved gutter H where it is held by the helical gear J and is transported in the rising gutter H under the influence of the sugar solution, water and so on, and the steam rising from the apparatus. Now with this transportation the

fine crystals become separated from the mass and return through the sieved gutter H into the apparatus for further increasing, while the large crystals on the end of the gutter get into the gutter pipe G and from here are led for further working in the known manner in the mash, centrifugal machine, etc. Through the circulation with the mass of not yet fully formed crystals, the formation of the crystals is favorably influenced in the molten syrup while a storing of the separation is effected in this crystallized mass.

The leading thought of this invention is based on the idea that only large sized crystals are separated, small and distilled unformed crystals are led again for further growing, to the mixed molten liquor, in a circulation under vacuum.

A complete emptying of the apparatus is done through the cock C.

What we claim is:

1. A process for the production of sugar or other crystals by subjecting the sugar or like solution under vacuum influence to heat, and when by evaporation crystals are formed drawing off and straining the mass to separate the larger crystals from the liquid and smaller crystals, again passing the liquid and small crystals through the evaporating zone and the straining operation as before, each step in the process being *in vacuo*.

2. A process for the production of sugar or other crystals by subjecting the sugar or like solution under vacuum influence to heat, and when by evaporation crystals are

formed, adding more liquid, then drawing off and straining the mass to separate the larger crystals from the liquid and smaller crystals, again passing the liquid and small crystals through the evaporating zone and the straining operation as before, all of the steps in the process being *in vacuo*.

3. Apparatus for working a process for the production of crystals comprising a vacuum evaporator provided with an inlet, an outlet tube in the lower part of said evaporator provided with valves and connected to a force pump, another tube connecting said pump to a strainer, a helical conveyer in said strainer, an outlet to receive the fully formed crystals and means to connect with operative power.

4. In apparatus for carrying out a process for granulating sugar and other substances a vacuum evaporator to hold the solution, valve guarded inlet and outlet ports in said evaporator, means for heating said solution, a valued tube leading from the outlet of said evaporator to a force pump, a strainer, a tube connecting said pump to said strainer, a conical helical conveyer in said strainer, means to remove the larger crystals from the apparatus and means to force the mass of liquid and small crystals into said evaporator again.

In testimony whereof we affix our signatures in the presence of two witnesses.

OTTO FROMM.  
MATHIAS SCHODLY.

Witnesses:

WILHELM GRAEFE,  
JOHN WULF.