No. 896,551. PATENTED AUG. 18, 1908.

F. JÜRGENS.

METHOD OF COOLING SOAP.

APPLICATION FILED AUG. 19, 1905.

Fig. 1.

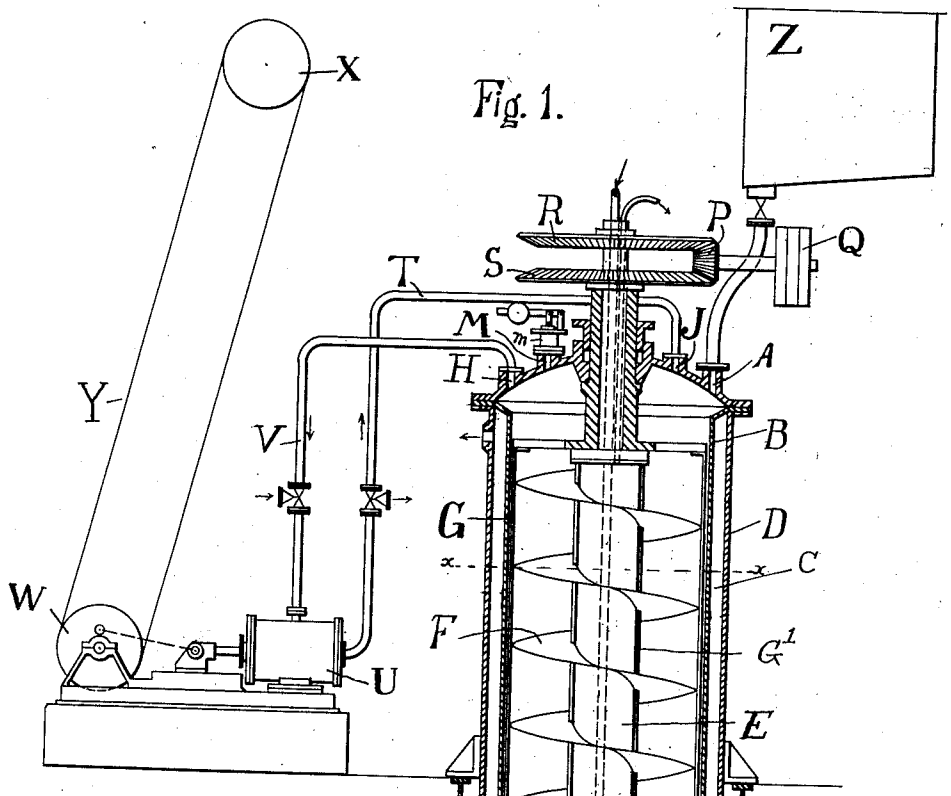
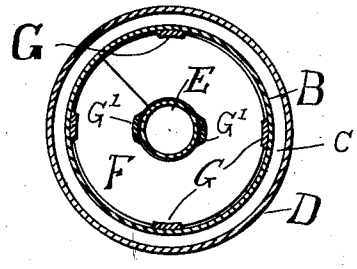


Fig. 2.



WITNESSES:

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METHOD OF COOLING SOAP.

No. 896,551. Specification of Letters Patent. Patented Aug. 18, 1908.

Application filed August 19, 1905. Serial No. 274,823.

To all whom it may concern:

Be it known that I, FREDERIC JÜRGENS, a citizen of the German Empire, residing at Sangerhausen, in Germany, have invented certain new and useful Improvements in Methods of Cooling Soap, of which the following is a specification.

My invention relates to an improved method of cooling soap, whereby the cooling and the concentration of the hot soap solution is accelerated and solid soap is separated in a smooth and amorphous condition, while all crystallization and the thereby-produced granulation, and the mottled, grained or cloudy appearance (known as "curling") of the soap, is avoided.

The improvement in the method consists of subjecting the hot soap solution during the process of cooling to the action of a vacuum. In order that also the lower layers of solution, which are subjected to the pressure of the head of the liquid, may be exposed to the action of the vacuum, the cooled surfaces of the cooler are constantly swept with scrapers or the like for the purpose of not only scraping off any crust of soap which may form from the surfaces, but also of continuously producing spaces, in which the vacuum can operate direct upon all the various layers of the liquid, before the said spaces are filled up with liquid soap.

For carrying out the improved method an apparatus may be used, the construction of which is for instance illustrated in the accompanying drawing, in which

Figure 1 is a view of a complete apparatus, including vertical section through the cooler, and Fig. 2 is a horizontal section through the cooler on the line x—x of Fig. 1.

Similar letters of reference refer to similar parts in both views.

The cooler consists of a cylindrical jacketed vessel, D, with a conical bottom b, and a central cooling tube E, a cover and an agitator of the following construction. The central cooling tube E is supported on the bottom b by means of several legs and is in its upper part reduced in diameter. A sleeve passing through a stuffing box of the cover is mounted to turn on the upper reduced part of the tube E. It is shown as made in one piece with a perforated disk, from which are suspended four external scrapers G and two internal scrapers G′. The four external scrapers G, are adapted to scrape the inside of the internal wall B, while the internal scrapers, G′, serve for scraping the outside of the cooling tube E. All six scrapers are connected with each other and stiffened by means of a helically bent plate F and a cross piece, which latter is mounted to turn on the lower end of the reduced part of the cooling tube E. At the top end of the sleeve is fastened a large bevel wheel S, in mesh with a pinion P, driven from a pulley Q, to rotate the inside scrapers and the screw in one direction, while the outside scrapers are driven in the opposite direction by engagement of pinion P with bevel wheel R. The cover is provided with an inlet A for the introduction of the hot soap solution from a tank Z, and with an opening, H, connected by a pipe V or the like with an air pump U. The bottom b of the cooler is normally closed with a slide K and is provided with an outlet L. A long tube and a short tube are arranged within the reduced upper part of the cooling tube E, the long tube reaching down to a point above the bottom of the cooling tube E and serving for introduction of cold water, while the short tube serves for the discharge of the warmed water. A supply tube (not shown) is attached to the bottom of the cooler for the introduction of cold water into the jacket C between the two walls B and D, and an outlet tube (not shown) is attached to the upper part of the vessel D, and serves for the discharge of the warmed water from the jacket. An opening J is provided for the introduction of compressed air by means of pipe T into the apparatus. An opening M is shown as provided with a safety-valve m. Pump U is operated by means of pulleys W and X, connected by belt Y.

The apparatus is operated as follows: The hot soap solution is introduced into the cooler through the inlet A, after which the latter is closed. Cold water is passed through the jacket or space C between the two walls B and D, and through the cooling tube E. The agitator G, F, G′, is put into motion by the driving pulley in such manner that the soap solution is lifted, and thus well stirred up and mixed. At the same time, the air pump U is put into operation for producing a vacuum in the cooler through the opening H. Under the combined action of the cooling water and of the vacuum, the hot soap solution will be quickly cooled and concentrated. The scrapers G, G′, constantly sweep the inside of the wall B and the outside of the cooling tube E, scrape off any crust of solid soap which may form, and mix it with

the liquid soap. Besides this, they constantly produce, during their rotation, spaces through which the vacuum can act upon all the several layers and particles of the solution. When the solution is sufficiently cooled and has attained the proper consistency, the port H connected with the vacuum-pump is closed, and the port J is opened, removing the vacuum so that the compressed air entering through this opening causes a sudden solidification or congealing of the soap and forces the same in the desired form through the outlet L, as soon as the slide K is withdrawn. By reason of the extremely quick solidifying of the soap, the formation of crystals is prevented, since crystals require a considerable time for formation, and cannot be produced in a liquid which suddenly solidifies.

The apparatus can be operated periodically or continuously. In the latter case the soap mass is introduced continuously into the apparatus, passes the cooling room and leaves it at once through the outlet L. The obtained solid soap pieces can, in the usual manner, be cut off, dried and compressed.

With the aid of the vacuum, the cooling water or other medium in the new apparatus is utilized to a very high degree, which is of special importance, seeing, that the cooling fluid is difficult to obtain in sufficient quantities, more particularly in summer. The hitherto known soap coolers consume enormous quantities of water. The rapid cooling effected in the new cooler renders it possible to cool large quantities of hot soap solution in a short time in simple apparatuses of a moderate size.

The new method secures to the soap maker a considerably greater independence of the temperatures without, which in summer occasion very great difficulties as is well known. The vacuum can be produced equally well in summer and in winter and independently of the cooling medium at hand. At last the new method renders it possible to avoid all the crystallizations of soap on the latter becoming torpid and also the inconvenient granulations and other irregularities which are so frequently thereby produced in the old methods.

Instead of the apparatus shown any other suitable apparatus of a known construction and adapted for the formation of a vacuum in combination with suitable scrapers may be employed for carrying out the process described above.

What I claim as my invention, and desire to secure by Letters Patent, is:

1. The method of cooling soap which consists in cooling hot soap solution in a closed cooled vessel, subjecting the soap solution during cooling to agitation and to the action of a vacuum, and scraping off any crust of soap which may form on the cooled surfaces.

2. The method of cooling soap, which consists in cooling hot soap solution in a closed cooled vessel, subjecting the soap solution during cooling to the action of a vacuum, and scraping off any crust of soap which may form on the cooled surfaces.

3. The method of cooling soap, which consists in cooling hot soap solution in a closed vessel having cooled walls and a cooled internal body, subjecting the soap solution during cooling, to the action of a vacuum, and scraping off any crust of soap which may form on the cooled walls or cooled internal body.

4. The method of cooling soap, which consists in cooling hot soap solution in a closed cooled vessel, and subjecting the solution during cooling to the action of a vacuum.

5. The method of cooling soap, which consists in cooling hot soap solution in a closed cooled vessel while subjected to the action of a vacuum and suddenly removing the vacuum.

6. The method of cooling soap, which consists in agitating hot soap solution in a closed cooled vessel while subjected to the action of a vacuum and scraping off any crust of soap which may form on the cooled surfaces, and suddenly removing the vacuum.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this eighth day of August 1905.

FREDERIC JÜRGENS.

Witnesses:
AUGUST OEHM,
CARL TJEHIRSWITZ.