(No Model.) 3 Sheets—Sheet 1.

A. &. E. DES CRESSONNIERES.

PROCESS OF AND APPARATUS FOR THE MANUFACTURE OF KNEADED OR AGGLOMERATED SOAPS.

No. 500,535. Patented June 27, 1893.

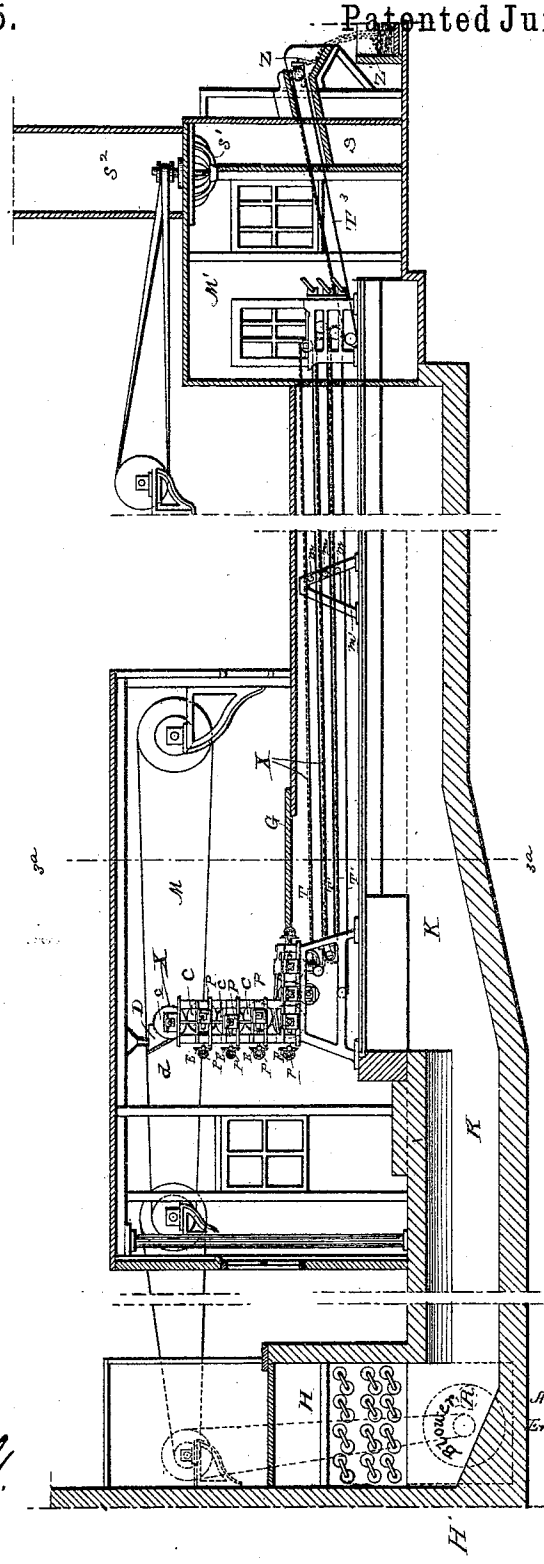

Fig. 1.

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Fig. 2.

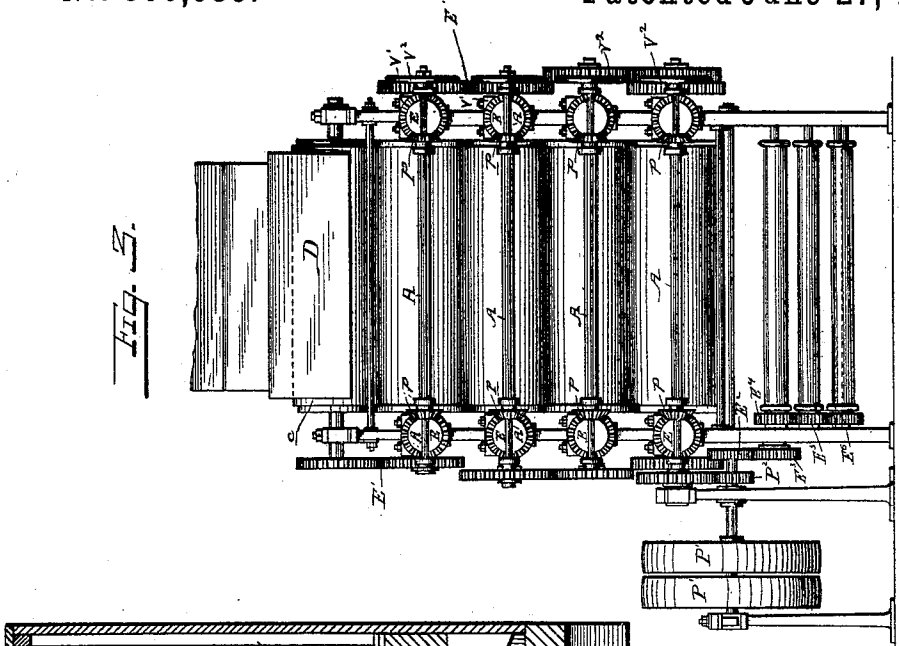

Fig. 2a.

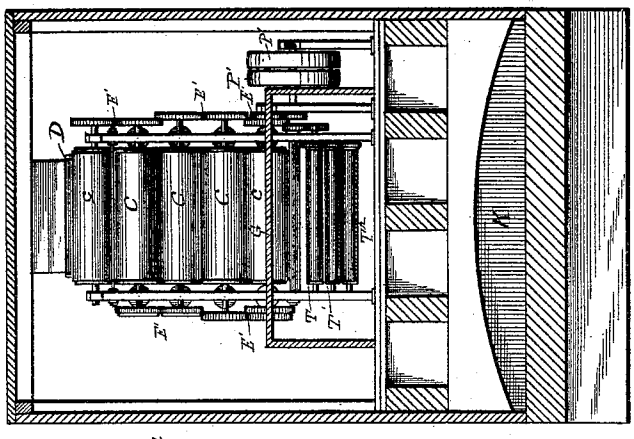

Fig. 2.

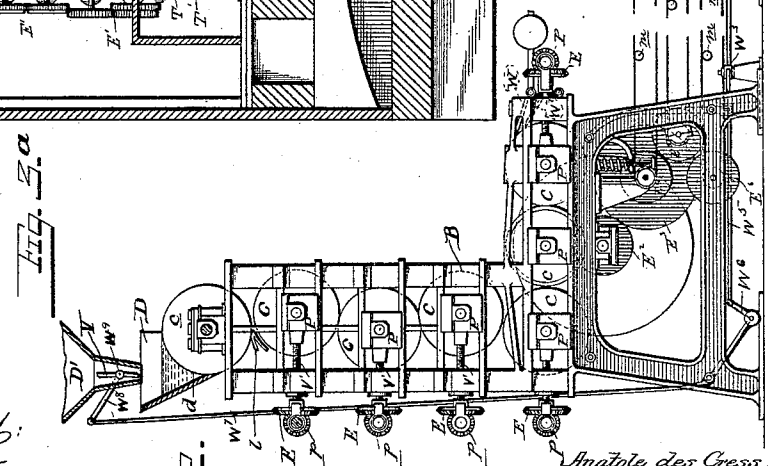

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Fig. 4.

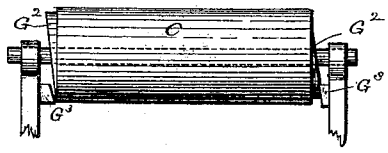


Fig. 5.

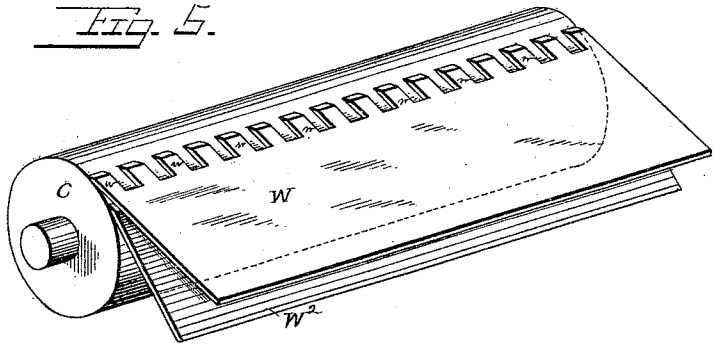


Fig. 6.

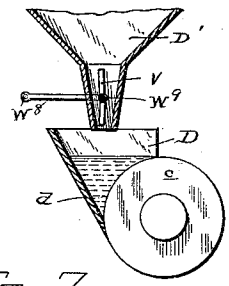
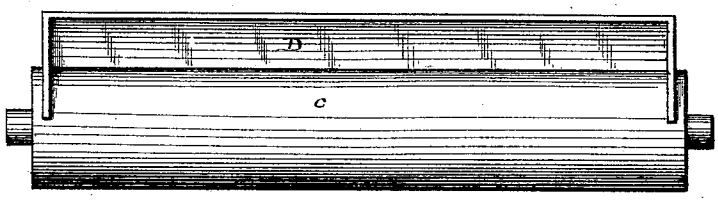


Fig. 7.



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UNITED STATES PATENT OFFICE.

ANATOLE DES CRESSONNIERES AND ERNEST DES CRESSONNIERES, OF BRUSSELS, BELGIUM.

PROCESS OF AND APPARATUS FOR THE MANUFACTURE OF KNEADED OR AGGLOMERATED SOAPS.

SPECIFICATION forming part of Letters Patent No. 500,535, dated June 27, 1893.

Application filed June 30, 1892. Serial No. 438,606. (No model.) Patented in Belgium February 12, 1890, No. 89,493; in France February 13, 1890, No. 203,775; in England February 14, 1890, No. 2,446; in Germany February 24, 1890, No. 55,065, and in Austria-Hungary February 24, 1890, No. 9,364 and No. 22,685.

To all whom it may concern:

Be it known that we, ANATOLE DES CRESSONNIERES and ERNEST DES CRESSONNIERES, both of 82 Chausee de Gand, Brussels, Belgium, have invented a new and Improved Process of and Apparatus for the Manufacture of Kneaded or Agglomerated Soaps, (for which we have obtained patents in Belgum February 12, 1890, No. 89,493; in France February 13, 1890, No. 203,775; in England February 14, 1890, No. 2,446; in Germany February 24, 1890, No. 55,065, and in Austria-Hungary February 24, 1890, No. 9,364 and No. 22,685,) of which the following is a specification.

The process at present employed for the manufacture of kneaded or agglomerated soaps is a long and laborious one and is consequently expensive both as regards the requisite manual labor and the expenditure of time and interest on capital employed.

In order to clearly indicate the considerable advantages presented by our improved process over the old method of manufacture, we will shortly enumerate the various phases of the latter.

When the boiling of the properly proportioned constituents of the mass has been carried out in the usual boilers, the homogeneous mixture is run out of the latter into suitable refrigerating vessels where it is kept until it is completely hardened. The mass is then cut up into slabs of uniform size and these are divided into bars, which are then transformed into small shreds by suitable shredding apparatus. The shreds resulting from this operation are introduced into the drying apparatus for removing the excess of moisture contained therein, and after having been dried it is colored and scented, and then crushed or kneaded between iron or granite cylinders in order to produce a perfect incorporation of the material with the scent and the color. Lastly, the kneaded material is subjected to the action of presses from which it issues in the form of a continuous compact rope which is cut into pieces of the desired weight which are then pressed into molds to convert them into cakes of the required form. These various operations even when carried out under the most favorable circumstances will, for a quantity of soap such as is usually operated upon at one time, take from eight to twelve days, according to the time of year.

Our improved process, which is a continuous one, has for its object to do away with the above-defined expensive and tedious operations; and to this end consists essentially in laminating by suitable rollers, the homogeneous mass of liquid soap which is taken from the boiler for facilitating the drying action, and subjecting it to the drying action of heated air. It is preferable to treat the mixture of soap with the requisite colors and scents just after it is taken from the boiler and before it is subjected to the laminating process; but with the finer qualities of soap, the scents are more liable to evaporation, and the scenting of the soap is not effected until the material is to be introduced into the presses.

The apparatus which we prefer to use in carrying our improved process into practice consists essentially of a series of laminating rollers or cylinders arranged one above the other in different vertical planes, suitable means for supplying the liquid soap to the laminating rollers, a series of endless drying aprons or webs extending from said laminating rollers, a chamber inclosing the laminating apparatus, a gallery extending from the chamber and inclosing the drying aprons, and a hot air flue or canal extending under the chamber and gallery for supplying them with heated air for drying the soap. A suitable shredding device is provided between the laminating rollers and the drying aprons, and a delivery apron is provided to receive the dried soap from the last of the series of drying aprons. A secondary chamber or inclosure incloses the rear end of the gallery and the ends of the drying aprons and also the delivery apron, and traversing the outer end of the path of the delivery apron is a cold air conduit, a blower being provided for circulating the hot and cold air from said secondary chamber and cold air conduit. At the for-

ward end of the hot air conduit is provided an air heater and a fan for circulating the air through the conduit.

In order that our invention may be fully understood we will now describe the same with reference to the accompanying drawings which represent the preferred form of apparatus.

Figure 1 is a longitudinal sectional elevation of a plant embodying our improvements. Fig. 2 is an enlarged side elevation of the laminating apparatus shown in Fig. 1. Fig. 3 is a front view of the laminating apparatus. Fig. 3^a is a sectional view of the drying gallery and hot air conduit, taken on the line 3^a—3^a of Fig. 1. Fig. 4 is an enlarged detail view of one of the rollers showing the means for imparting longitudinal movement thereto. Fig. 5 is an enlarged detail perspective view showing the construction and position of the cutters or shredders hereinafter described. Figs. 6 and 7 are respectively a transverse section and top plan of the liquid soap feeder.

The liquid soap from the boiler is led into a chute or trough D supported at the top of the laminating apparatus and cut away at its inner face *d*.

c is a feed roller supported in suitable journals to rotate in the cut away portion *d* of the chute D and feed the liquid soap therefrom to the upper laminating roller. Against the lower side of the feed roller or cylinder *c* bears a guide plate *l*, which has a downwardly projecting lip which bears against the upper surface of the first cylinder C of the laminating apparatus. This laminating apparatus consists, firstly, of a series of cylinders arranged vertically above each other, and secondly, of several other cylinders adjacent to the lowest one of the vertical series and arranged horizontally; the supporting frame B being for this purpose of angular form, the vertical part being adapted to carry the four vertical cylinders, while the lower horizontal part is adapted to carry the three horizontal cylinders. The cylinders might all be arranged vertically, but this would make the machine of inconvenient height.

The upper cylinders C, C, are not placed exactly in the same vertical plane, but so that their centers lie alternately slightly to the one and the other side of the vertical plane, so that the points of contact of the cylinders also lie alternately to the one and the other side thereof. They are consequently rendered adjustable by lateral displacement, and for this purpose the framing has horizontal guides in which are arranged sliding bearings P which can be adjusted by means of screws V′ actuated by bevel wheels E secured to said screws and which are actuated simultaneously by two bevel pinions *p* fixed one at each end of each of the shafts A, and the shafts A are carried in brackets on the framing and rotated by a hand wheel V^2. The same arrangement is employed for adjusting the horizontally arranged cylinders. The cylinders are rotated alternately in contrary directions at speeds which gradually increase for each successive cylinder, that is to say, if the upper cylinder, for example, makes four revolutions in a given time, the next one makes 5, the third six and so on, increasing one revolution for each cylinder. The cylinders are for this purpose each driven separately by gearing E′ of a diameter proportionate to the speed required. In the same way the distance between the cylinders diminishes progressively in such a manner as to gradually effect the lamination in proportion as the web of soap becomes more solid.

The driving shaft with fast and loose pulleys P′ imparts motion by pinion P^2 to the middle horizontal cylinder and from this the motion is transmitted by the gearing E′ to the other cylinders. In addition to the pinion P^2 the driving shaft carries a toothed wheel E^2 corresponding to the wheel E^3 which drives the first endless wire gauze web T from which the lower endless aprons or webs T′, T^2 are driven by the intermediate wheels E^4, E^5, E^6. In front of the last cylinder are two cutters, or scrapers which serve to cut into shreds the sheet or web of laminated soap before they arrive on the upper traveling apron. These cutters consist of two metal plates arranged one above the other with their forward thin edges bearing against the last cylinder C; the upper blade W is formed with a serrated edge having a series of small square blades *w*, and the lower blade W^2 is formed with a smooth scraping edge. The scraper W removes one half of the pellicle of soap from the cylinder in the form of a thin shaving and the lower scraper W^2 removes the remaining shavings of soap, the shavings from both blades sliding down onto the gauze web T.

The apparatus works continuously and the disengaging gear of the driving pulleys is connected to the regulating valve V in the main supply hopper D′ before the chute D so as to close this and stop the flow of soap when the machine is stopped. This is accomplished by means of the following mechanism: The bell-crank W^3 of the belt shifter or disengaging gear which is operated by any suitable lever W^4, is connected by rod W^5, to a bell-crank lever W^6 which in turn is connected by rod W^7 to a lever W^8 secured to the shaft or axis W^9 of the valve V.

M is a hot air chamber surrounding the laminating apparatus, and G is a gallery or tunnel extending from the chamber M to the secondary chamber M′ and inclosing the traveling endless drying aprons between said chambers. The drying aprons are supported between their end rollers by suitable idle rollers *m* journaled in the supports *m′*. The endless web T deposits on the web T′, which in turn deposits on the web T^2.

T^3 is a delivery apron supported in proper

relation to receive the dried soap from the apron T^2.

H is a hot air furnace, built up in the masonry H'. At the base of the furnace in one of the side walls is located an aspirating blower or fan R which forces the heated air from the furnace out into and through the conduit K which extends under the plant and is open above throughout its length into the chamber M and gallery G.

S is a vertical cold air conduit extending up through the chamber M' and inclosing a portion of the delivering apron.

S' is a blower in the top of the chamber M' serving to draw the heated air in through said chamber and the cold air through the conduit S into the flue S^2.

Z is an inclined deposit board and Z' a receptacle for the soap which has been treated. The operative parts may be very conveniently geared up as indicated in the drawings.

The operation of the machine will be readily understood from the above description. The blower R feeds into the conduit K a current of hot air at the temperature of solidification of the liquid paste (50° centigrade). The colored and scented liquid mass is fed into the chute D against the feed cylinder *c* and passes therefrom to the laminating cylinders one after another to the last cylinder, which is covered by a thin pellicle of soap. This lamination of the soap is of essential importance as it results in breaking the gloss or crust which continually forms on the drying soap and destroys its crystallization and allows new surfaces to form and the heat to penetrate for separating the moisture therefrom. The pellicle of soap is raised from this last cylinder by means of the scrapers and is cut into shreds or shavings which fall upon the first endless apron T, which carries them slowly to the end of the gallery G where they fall upon the second apron T' to return under the point of departure and are given up to the third apron T^2 which delivers them finally to the apron of exit T^3. During this triple procedure the shavings of soap are continuously in contact with the hot air rising from the conduit K and deprived in the most perfect manner of all their moisture. The employment of warm air during the first part of the operation is for the purpose of preventing the soap, while being laminated on the cylinders, from falling to a temperature sensibly lower than its point of pasting (50° to 56° centigrade.) The pellicle of soap must in fact be shortly afterward dried with the aid of a warm air current, and in order that this may be properly accomplished, it is necessary that the soap shall be as warm as possible, for if it be permitted to become completely cold, the evaporation cannot take place until after the temperature is brought back to the necessary point, which would consume some time and possibly result in the deterioration of the soap and the altering of its color and the loss of its perfume. Arriving at the apron of exit, the soap shavings encounter the cold air which is drawn in through the conduit S by the blower S' which lowers their temperature in such a manner as to make them of the same temperature as the exterior air when they are presented at the exit. The dried shredded soap is then received into a box to be transported to the final manipulations or to be agglomerated into a pudding, the latter notably if the colors and perfumes are still to be mixed with the paste. The whole process, from the flowing of the paste to the molding into bricks, is therefore absolutely continuous.

In order to still further facilitate the desiccation and also for preventing streakiness or want of uniformity in the coloration of the mass, the cylinders, or one or more thereof may have a longitudinal to and fro motion imparted to them, whereby the surface of the sheet of soap passing between them will be roughened or furrowed thereby both breaking up any streaks and facilitating the evaporation of the moisture. This movement may be imparted to the cylinders by means of cams G^2 on their shafts against which bear fixed studs G^3 on the supports, as shown in Fig. 4.

The direction of the travel of the sheet of soap through the machine is indicated by a dotted line X in Fig. 1.

It will be readily seen that the saving in labor, time, and interest on capital afforded by the improved process is very great and that the invention is consequently of considerable commercial importance. These advantages are derived principally from the continuity of the operation of laminating and drying. The drying is facilitated and expedited by treating the soap just after it has been laminated and by carefully maintaining it at a high temperature. This permits the shortening of the period during which the soap remains in the drying chamber and avoids its deterioration as well as the alteration of its color and scent which would be the consequence of too long exposure of it to the heat. The lamination takes place gradually in proportion as the soap takes a more solid and perfect consistency. Lastly, the drying takes place immediately after the lamination of the soap before it has had time to become covered with a hardened gloss or crust, and takes place under the most favorable conditions.

Having thus fully described our invention and the manner of carrying the same into practice, the following is what we claim as new therein and desire to secure by Letters Patent—

1. The herein described process of manufacturing kneaded or agglomerated soap, which consists in simultaneously laminating the liquid soap for breaking the gloss or crust as fast as it forms and facilitating the escape of moisture, and subjecting it to the action of heated air, substantially as set forth.

2. The herein described process of manufac-

turing kneaded or agglomerated soap, which consists in continuously laminating the liquid soap for facilitating the escape of moisture, maintaining the soap at a temperature approximating its pasting point during the laminating operation for partially drying it, and finally treating the partially dried soap with heated air for completely drying the same, substantially as set forth.

3. The herein described process of manufacturing kneaded or agglomerated soap, which consists in gradually and continuously laminating the liquid soap, for facilitating the escape of moisture, treating the laminating soap with heated air for maintaining it at a temperature approximating its pasting point and partially drying the soap, shredding the partly dried soap, and finally treating the shredded soap with heated air for completing the drying action, as set forth.

4. The herein described process of manufacturing kneaded or agglomerated soap, which consists in gradually and continuously laminating the liquid soap for facilitating the escape of moisture, treating the laminating soap with heated air to maintain it at the proper temperature, and partially dry it, shredding the partially dried laminated soap, treating the shredded soap with heated air to complete the drying action, and finally treating the dried soap with cold air before it is deposited, substantially as and for the purpose set forth.

5. The herein-described process of manufacturing kneaded or agglomerated soaps, which consists in simultaneously laminating and furrowing the liquid soap for breaking the gloss or crust as fast as it forms and facilitating the escape of moisture, and subjecting it to the action of heated air, substantially as set forth.

6. In an apparatus for the manufacture of soap, the combination of the laminating rollers, the feed chute D supported above said rollers and cut out on one side, the feed roller *c* operating in said cut out portion of the chute, the shredding plates or scrapers, the drying aprons, and means for supplying heated air, substantially as set forth.

7. In an apparatus for the manufacture of soap, the combination with the laminating rollers, and the drying aprons, of the scraper plates supported in working relation to one of said rollers and adapted to deposit the soap on the drying aprons; the upper one of said scrapers being formed with a serrated scraping edge and the lower one with a smooth scraping edge, substantially as set forth.

8. In an apparatus for the manufacture of soap, the combination of a series of laminating rollers, means for supplying liquid soap thereto, drying aprons supported in proper relation to the rollers, scrapers for removing the soap from the rollers and transferring it to the aprons, the hot air chamber inclosing the grinding and laminating rollers, a hot air gallery extending from the chamber and inclosing the drying aprons, the hot air conduit arranged under the chamber and gallery, and means for supplying hot air to the conduit, as set forth.

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