C. O. PHILLIPS.

METHOD FOR MOLDING AND COOLING SOAP.

APPLICATION FILED JUNE 25, 1921.

1,391,975.

Patented Sept. 27, 1921.

4 SHEETS—SHEET 1.

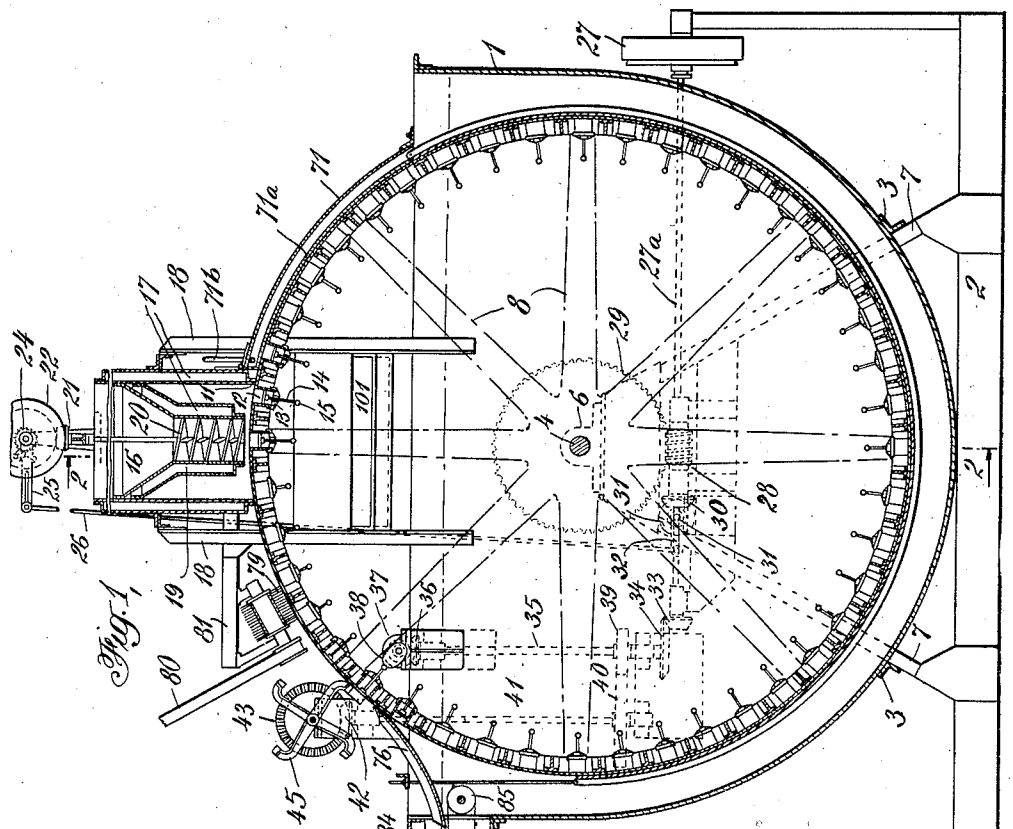

Fig. 1.

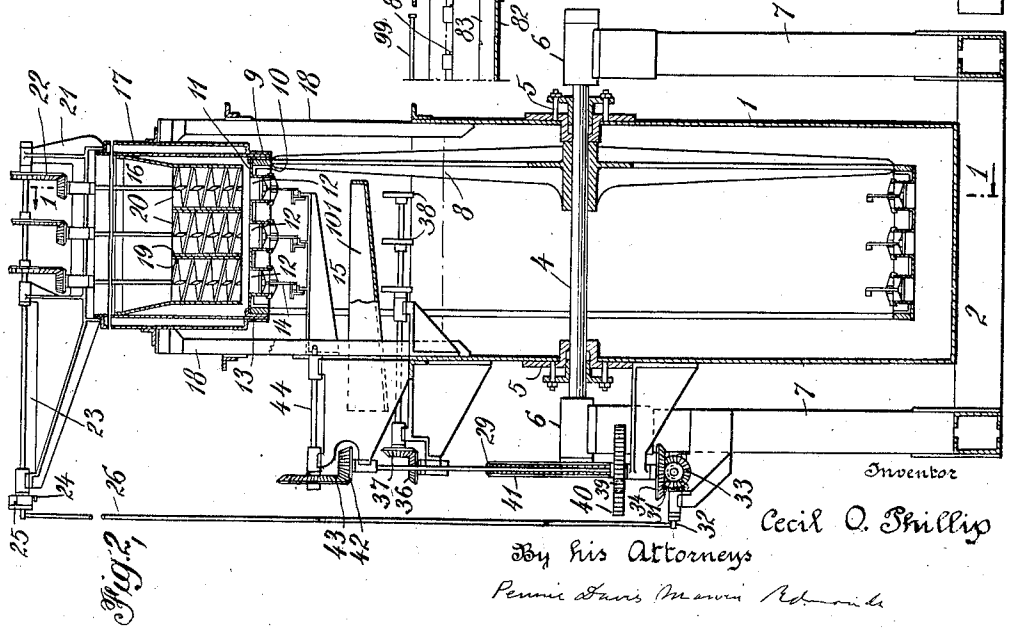

Fig. 2.

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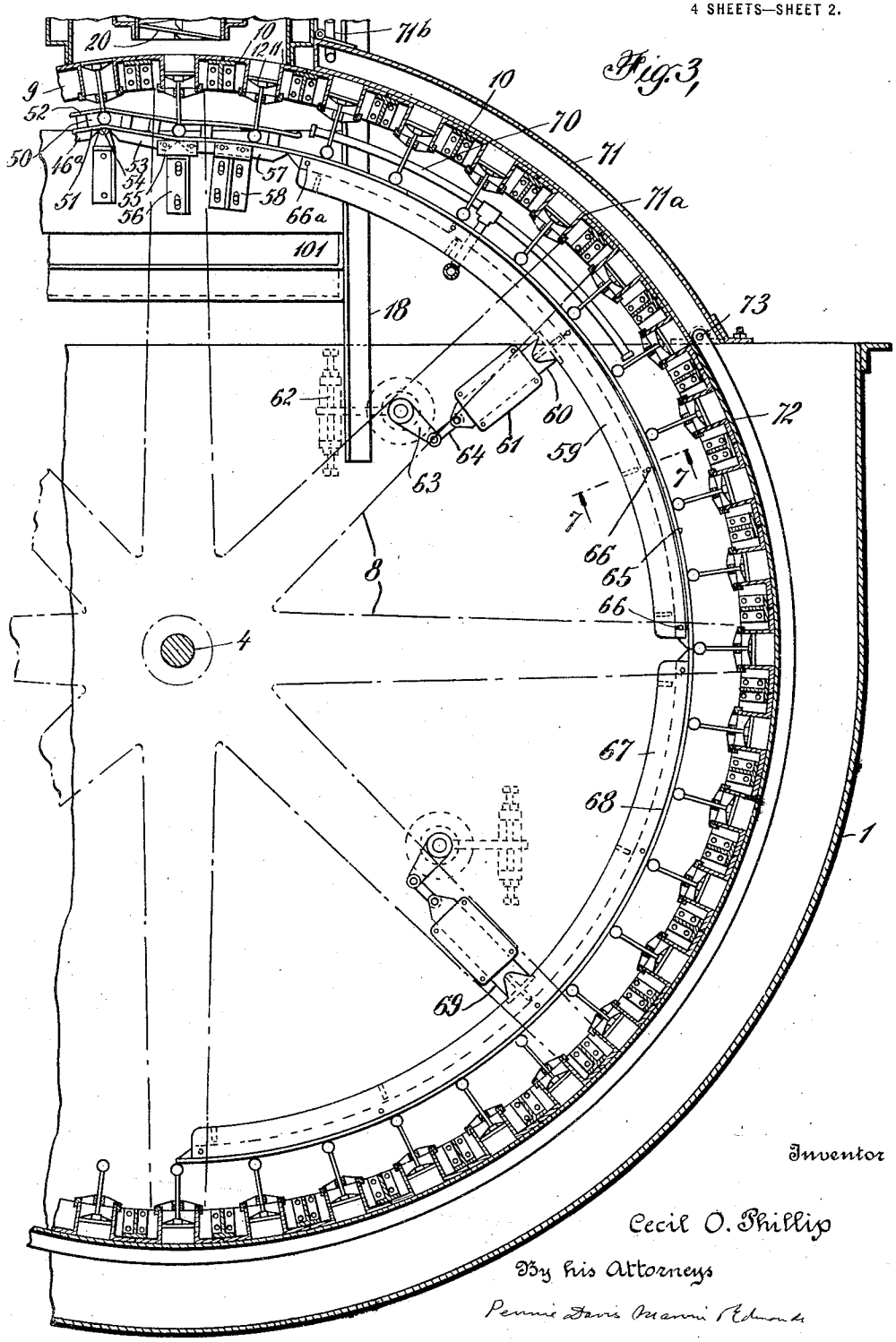
4 SHEETS—SHEET 2.

Fig. 3.



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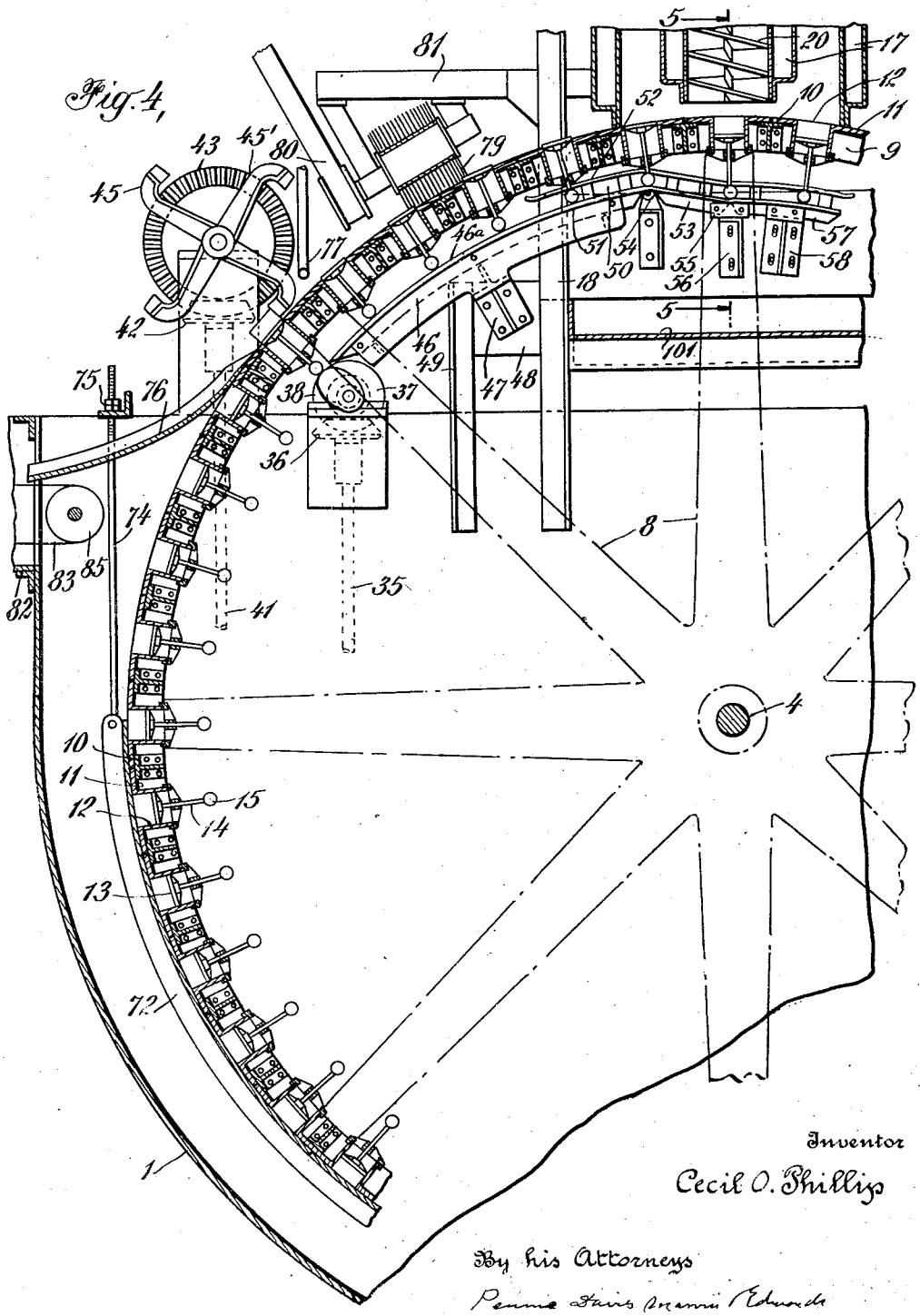
4 SHEETS—SHEET 3.

Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

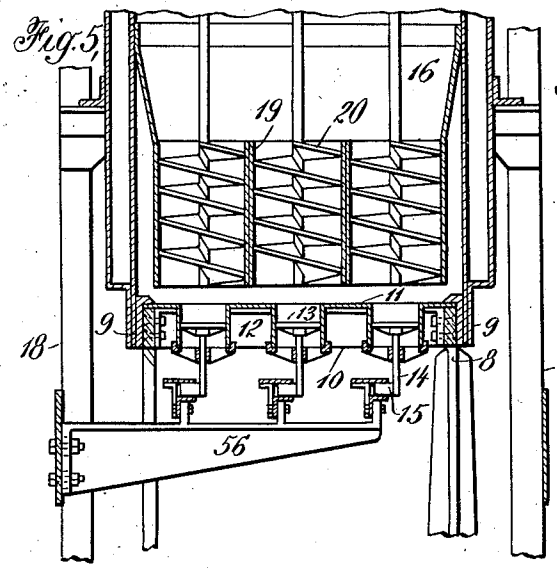


Fig. 6.

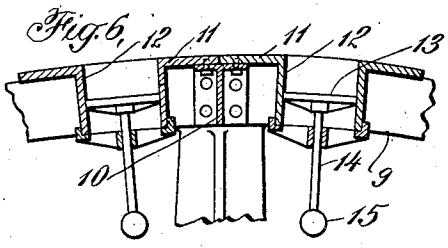


Fig. 7.

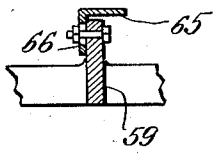


Fig. 8.

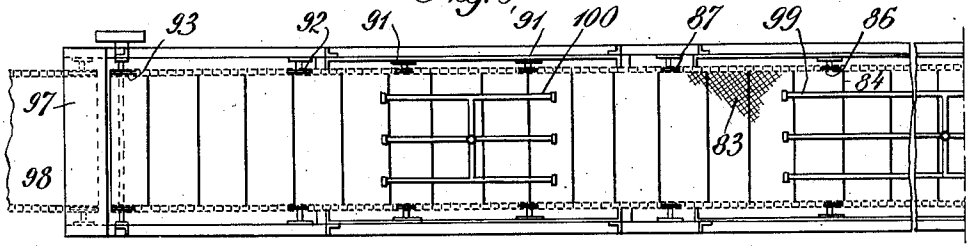
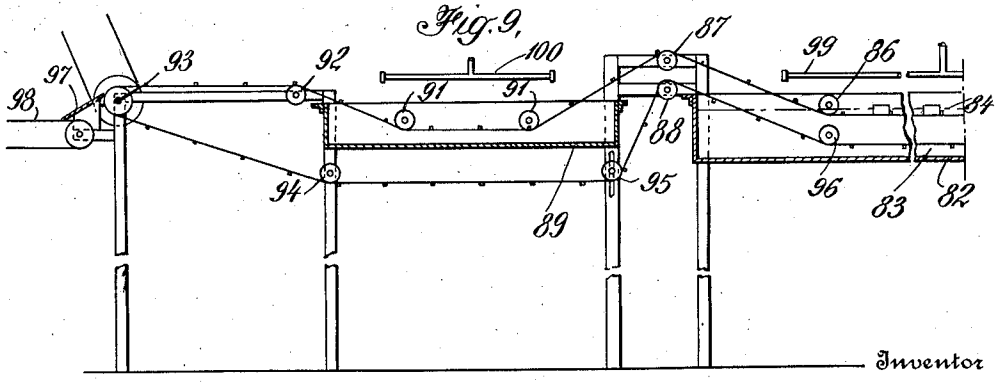


Fig. 9.



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UNITED STATES PATENT OFFICE.

CECIL OCTAVIOUS PHILLIPS, OF NEW YORK, N. Y., ASSIGNOR TO THE AMERICAN COTTON OIL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

METHOD FOR MOLDING AND COOLING SOAP.

1,391,975. Specification of Letters Patent. **Patented Sept. 27, 1921.**

Original application filed June 5, 1920, Serial No. 386,912. Divided and this application filed June 25, 1921. Serial No. 480,459.

To all whom it may concern:

Be it known that I, CECIL O. PHILLIPS, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Methods for Molding and Cooling Soap; 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.

This invention relates to an improved method for the molding and cooling of molten soap in a rapid and advantageous manner.

According to the improved method or process of the invention, the soap, while still molten, is charged into molds of approximately the shape of the desired cake, and passed through a cold salt solution or brine, where it is cooled without being brought into direct contact with the brine. The soap cakes thus preliminarily cooled are then discharged from the molds, and subjected directly to the action of the cold brine, whereby the cooling and hardening operation is very materially promoted. The soap cakes thus cooled are then preferably washed with fresh water, to free the outer surfaces of the cakes from brine.

The invention forming the subject-matter of my prior application, Serial No. 386,912, filed June 5, 1920, of which this is a division. includes other features of improvement in the method, which will further appear from the following more detailed description. In the accompanying drawings is shown a preferred form of apparatus for carrying out the method or process, wherein Figure 1 is a sectional elevation taken on the line 1—1 of Fig. 2 and showing one form of the molding and cooling apparatus, certain parts being omitted;

Fig. 2 is a vertically transverse section taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view of the right side of the apparatus of Fig. 1;

Fig. 4 is an enlarged sectional view of the left side of the apparatus of Fig. 1;

Fig. 5 is an enlarged sectional view, similar to part of Fig. 2, taken on the line 5—5 of Fig. 4;

Fig. 6 is a detail view showing the construction of the mold sections;

Fig. 7 is a detail view of one of the adjustable cam surfaces, taken on the line 7—7 of Fig. 3;

Figs. 8 and 9 are a plan and elevation of part of the apparatus not illustrated in Figs. 1 to 4.

In the apparatus illustrated in the accompanying drawings, the tank for the cold salt solution or brine is indicated at 1 and is suitably supported by the supports 2 and 3 and by the shaft 4 which passes through the stuffing boxes 5 and is in turn supported by bearings 6 and supports 7. The shaft 4 carries the spider or wheel 8 having the radially arranged outer rim 9 which in turn supports the transverse arms 10 carrying the mold sections 11. Each mold section has three molds 12, of approximately the shape of the cake of soap to be molded, each mold having a piston 13 and piston rod 14 with a roller 15 at its inner end. The arrangement of the mold sections and the molds is such that they form a cylindrical series of molds rotating upon the shaft 4.

Above the cylindrical series of molds is the soap container 16 having steam jackets 17 for maintaining the soap at the proper temperature and preventing undue cooling thereof. The soap container is supported by the upright supports 18 and has three filling compartments 19 each having a filling screw 20 therein operated by means of bevel gears 21 and 22. The shaft 23 carrying the gear 22 is in turn operated by the ratchet wheel 24 and a pawl carried by the arm 25. This arm 25 is reciprocated by the operating rod 26, adjustably connected thereto, so that the operation of the ratchet can be controlled by the adjustment of the rod 26 upon the arm 25.

Power is applied to the apparatus through the pulley 27 with which the worm 28 and the beveled pinions 30 and 33 are directly connected through the shaft 27^a. The worm 28 drives the worm gear 29 which in turn causes the shaft 4 and the series of cylindrical molds carried thereby to be slowly but continuously rotated. The bevel gear 30 drives the bevel gear 31 which in turn causes the operating arm 32 to rotate and

thereby reciprocate the rod 26 as above described. The bevel gear 33 drives the gear 34 attached to the shaft 35 which in turn operates the cams 38 through the bevel gears 36 and 37. The pinion 39 on the shaft 35 meshes with a gear 40 on the shaft 41 which in turn operates the shaft 44 through the bevel gears 42 and 43. The shaft 44 carries the arms 45 arranged to act upon the cooled soap cakes to remove them from the pistons.

A series of operating cams or cam surfaces, adapted to act upon the rollers 15, are suitably supported a short distance from the series of molds. The cams or cam surfaces are arranged in series of three corresponding to the three series of molds, so that the rollers of each series will be similarly and simultaneously acted upon. The cam segment 46 carrying the angle irons 46^a is thus supported by a transverse bracket 47 from the plate 48 which in turn is supported by the upright supports 18 and 49. The angle irons 46^a of the cam segment 46 provides a flat surface for the rollers 15. Near its right end this cam segment has an outer surface 52 as well as an inner surface 51 thus providing a groove 50 for the rollers and insuring that the rollers and the pistons operated thereby are properly positioned. This groove is inclined inwardly for reasons hereinafter explained. The cam section 53 is pivoted at 54 and adjustably supported at 55 from the adjustable support 56. This cam section likewise provides a double cam groove. The cam section 57 is of similar construction and is suppo ted by an adjustable support 58. The cam section 59 is adjustably supported by the slide 60 operating in the guide 61, the adjustment being effected by adjusting screws 62 acting through the bell crank lever 63 and the connecting rod 64. The angle iron 65 which forms the cam surface is pivoted at 66^a and adjustable by means of the slots 66 and bolts coöperating therewith. The cam surface formed by the member 65 is eccentrically arranged so that the right end thereof is somewhat nearer to the cylindrical molds than is the left end, for reasons hereinafter explained. The cam section 67 has a centrally arranged outer cam surface 68 and has an adjustable slide support 69 similar to that above described.

Arranged below each of the three series of molds, to the right of the soap container in Fig. 3, are spray pipes 70 for spraying the under surface of the molds with cold brine and thereby effecting a preliminary cooling thereof. Above the molds when in the same position is a cooling jacket 71 having a brine supply pipe 71^b, and adapted for the flow of a cold salt solution or brine therethrough over the inner plate 71^a for cooling the outer portion of the soap in the molds. Arranged circumferentially around the series of molds, while immersed in the brine, and protecting them from direct contact with the brine is an adjustable strap or band 72 supported at one end at 73 and adjustably supported at the other end by the rod 74 and adjusting nut 75.

A slide 76 is arranged to receive the molded and cooled cakes of soap as they are discharged from the molds, and a spray pipe 77 is arranged for spraying brine upon the slide or upon the cakes as they are discharged. Arranged to the left of the soap container 16 in Fig. 1 is a transversely arranged belt 79 carrying brushes, said belt being supported by the bracket support 81 and driven in any suitable manner, as by a belt 80. These brushes are arranged to remove any adhering soap from the cylindrical mold sections 11 and the pistons 13, which, as shown, may project somewhat above the surrounding surfaces.

The tank 82 is provided for subjecting the molded and preliminarily cooled cakes of soap to further direct cooling by the action of cold brine. This tank has a suitable conveyer therein such as a screen conveyer 83 having cross cleats 84 and having sprocket chains passing over the sprockets 85. The conveyer passes under guide sprockets or idlers 86 and then over the idlers 87 and into the tank 89 containing fresh water. It then passes under the sprockets 91, and then over the sprockets 92 to the drive sprockets 93 where the cakes of soap are discharged on to the apron or slide 97 and the conveyer 98 and carried thereby to the drier or to the place of storage for further treatment. The conveyer, on its return, is guided by the idlers 94, 95, 88 and 96, the idlers 95 being adjustable to take up slack in the conveyer. Spray pipes 99 for brine are arranged over the tank 82 and spray pipes 100 for fresh water are arranged over the fresh water tank 89.

In the operation of the apparatus, the molten soap from the crutchers and compounded with the usual ingredients, is introduced into the soap container 16, and is maintained therein by the steam jacket at the proper temperature. The cylindrical series of molds is slowly and continually rotated by means of the worm 28 and worm gear 29 and the three series of molds are brought successively beneath the soap container. The pistons in each mold are kept flush with the surrounding surface of the mold sections, by the action of the double cam groove 50, upon the rollers 15, when the molds are first introduced beneath the soap container. As the molds pass beneath the compartments 19, the pistons are drawn downwardly by the rollers operating in the double cam groove of the cam section 53 and soap is simultaneously forced down into the molds by the action of the screws 20. The operation of the screws, and the lowering of

the pistons, are so timed that the soap is forced downwardly into the molds at the same time that the pistons are drawn downwardly therein. The combined action results in the filling of the molds with the molten soap and with substantial avoidance of the occlusion or inclusion in the mold of air bubbles or air pockets.

As the filled molds are rotated beyond the soap container, they are subjected to the cooling action of the cold brine spray from the pipe 70 and to the cooling action of the cooling jacket 71, the spray acting upon the inner surfaces of the molds and the surface 71ª acting directly upon the outer surface of the soap in the molds. The soap is thus given a preliminary chill before it is immersed in the brine in the tank 1. The molds are then passed down into the tank 1, but the soap in the molds is protected by the strap or band 72 from direct contact with the brine. The cold brine thus acts through the band 72 and through the inner walls of the individual molds, without, however, coming into direct contact with the soap in the molds. The soap is then rapidly cooled and the outer portions of the cakes rapidly solidified.

I claim.

1. The method of molding and cooling soap which comprises charging the soap into molds, subjecting the molds to the action of cold brine without direct contact of the brine with the soap, and thereby effecting a preliminary cooling of the soap in the molds, removing the soap from the molds and subjecting it to further cooling in direct contact with the cold brine.

2. The method of molding and cooling soap which comprises subjecting the soap while contained in suitable molds to the cooling action of cold brine without direct contact of the soap with the brine, removing the soap from the molds and subjecting the soap to further cooling by direct contact with the cold brine.

3. The method of molding and cooling soap which comprises charging the molten soap into molds, subjecting the soap while contained in the molds to indirect contact with cold brine and subjecting the soap to pressure while it is being cooled.

4. The method of molding and cooling soap which comprises charging the soap into the mold, subjecting the soap therein to the action of cold brine, and compressing the soap while it is being molded to keep it in contact with the cooling surfaces.

5. The method of molding and cooling soap which comprises charging the soap into molds, subjecting the molds to the action of cold brine while protecting the soap from direct contact with the brine, discharging the cooled soap from the molds and subjecting it to the direct cooling action of the cold brine, and subsequently subjecting the soap to the action of fresh water.

In testimony whereof I affix my signature.

CECIL OCTAVIOUS PHILLIPS.