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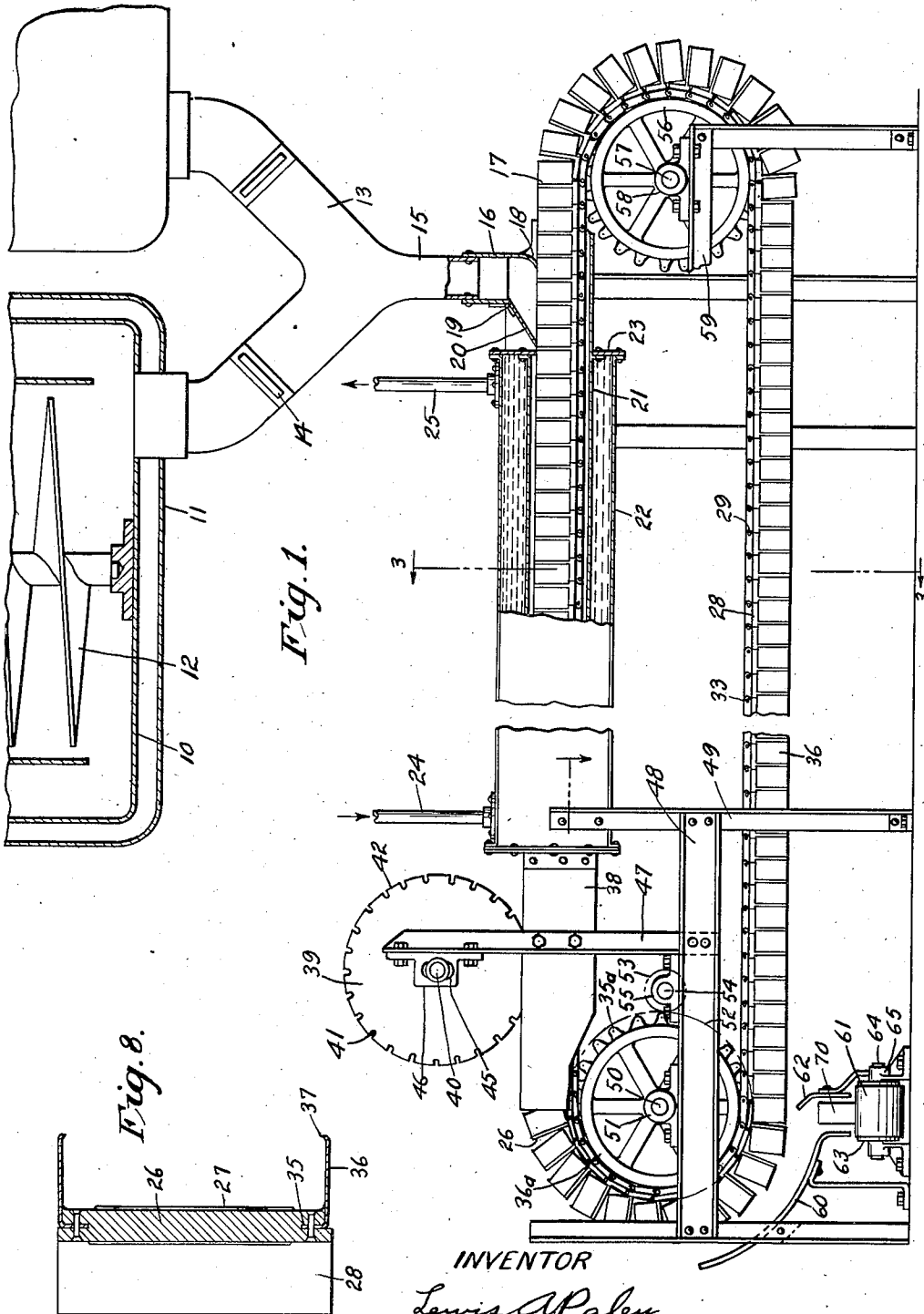
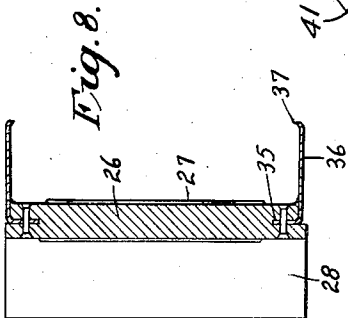
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SOAP MOLDING APPARATUS

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SOAP-MOLDING APPARATUS.

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This invention relates to an apparatus for the manufacture of soap, paraffin, wax, stearin, gelatin, cocoa butter, and other substances which are liquid when hot and solidify on cooling and has reference more particularly to an apparatus in which the substance is artificially cooled until solidified, pressed, and wrapped while in a solid state.

This application is a divisional application carved from my co-pending application, Serial No. 370,441, filed April 1, 1920.

As practiced at present, soap is prepared in the kettle by heating a mixture of fats and alkali, separating the glycerine, running the hot soap into crutchers where it is mixed with filling materials, running the hot soap from the crutcher into frames, cooling the frames naturally until the soap is solidified, stripping the sides from the frame, cutting the block of soap into horizontal slabs, cutting the slabs into cakes, drying the cakes, stamping the inscription on the dried cakes, and wrapping and packing same. The present process requires about three weeks to prepare the soap for sale after it leaves the crutcher, ties up considerable capital in soap standing in the frames, requires a large amount of labor and floor space, produces a large amount of scrap which has to be re-worked and produces cakes of a low quality due to their rough surfaces, air holes, streaks caused by segregation of filling materials, dark color and non-uniform weight.

An object of this invention is to provide an apparatus for manufacturing soap which will greatly reduce the time, labor and space required for molding the soap into cakes after it leaves the crutcher.

Another object of this invention is to provide an apparatus for molding soap which will produce cakes of a high quality.

A further object of this invention is to provide soap molding apparatus in which the endless chain of molds moves continuously and the cakes in the molds are stamped during the continuous movement thereof.

Reference is to be had to the accompanying drawings forming a part of this specification in which it is understood that the drawings illustrate only one form of the invention and in which

Figure 1 is a side elevation of the apparatus with parts broken away to disclose the construction.

Figure 2 is a sectional view through the de-

livery end of the machine showing the drying chamber attached for use on special grades of soap.

Figure 3 is a sectional view through the machine on the line 3—3 of Figure 1.

Figure 4 is a sectional view through one of the stamping wheels.

Figures 5, 6, 7 and 8 are detail views of the buckets or molds.

Referring to the accompanying drawings: by numerals, in which like numerals represent like parts in the several views, 10 indicates a crutcher which is preferably surrounded by jacket 11 so that steam or cooling water may be passed around said crutcher, thus controlling the temperature of the contents. The soap from the kettle not shown, is run into this crutcher and any suitable stirring mechanism, such as a screw 12, mixes the soap thoroughly with various filling materials. I preferably provide a pair of crutchers for each cooling machine so that when one crutcher has become empty, the contents of the remaining crutcher may be run into the endless chain of molds to be hereinafter described while the empty crutcher is being re-filled and its contents mixed. The two crutchers are connected with each other by means of a Y-shaped pipe 13, each arm of which is provided with a valve 14, so that one valve may be closed while the hot liquid soap is running out of the other crutcher. The Y-shaped pipe 13 terminates at its lower end in one or more pipes 15 each of which empties directly into a feed box 16. An endless chain of buckets or molds collectively designated by the numeral 17 is movably mounted so as to pass through the feed box 16, and becomes filled with the hot liquid soap flowing into the feed box 16. The rearward wall 18 of the feed box is curved forwardly so as to direct the stream of soap into the chain of molds 17 in the direction of motion of said chain. The front side of the feed box 16 has hinged to it by means of a spring hinge 19, a plate or scraper 20. This plate rests obliquely on top of the mold chain 17 so that the soap is pressed into the molds and scraped level while the spring hinge allows a slight movement on said scraper to allow for slight inequalities in the upper surfaces of the molds.

After being filled with the hot liquid soap, the mold chain 17 passes into a cooling chamber 21 which is surrounded by an outer cham-

ber 22, the chambers 21 and 22 being connected at each end by caps 23 provided with openings through which the mold chain 17 passes. Any cooling medium, such as a solution of sodium or calcium chloride from a refrigerating apparatus, not shown, is introduced into the chamber 22 by means of an intake pipe 24 and is removed by means of an outlet pipe 25. The direction of flow of the cooling medium is preferably counter-current to the direction of motion of the mold chain 17 so that a substantially constant difference of temperature is maintained throughout the length of the cooling chamber between the cooling medium and the soap, thus insuring a high cooling efficiency. Thus the soap is cooled, and solidified to cakes as it passes through the cooling chamber 21 and may be then stamped and discharged from the molds.

In this form of apparatus, the molds are preferably made by die casting and are preferably but not necessarily constructed so that the cakes are cast on edge and an inscription may be molded on each of the broad surfaces while the top edge is pressed into final shape by means of a series of dies arranged around the periphery of a wheel. Each mold consists of a side wall 26, which may have an inscription 27 formed on each side thereof, said wall being integral with a mold bottom 28. Lugs 29 and 30 are formed on the lower side of the bottoms 28, the lugs 29 being preferably two in number and spaced apart so as to receive the lug 30 of the adjacent bottom therebetween. Holes 31 and 32 pass through the lugs 29 and 30 respectively, so as to receive pins 33 which pivotally connect the molds. A recess 34 is formed between the lugs 29 and 30 in the mold bottom 28, said recess being adapted to receive the tooth 35^a of a sprocket wheel 36^a. A longitudinal slot is formed on each edge of the side walls 26 so as to receive the flange 35 of a flexible wing 36. These wings 36 form the ends of the mold and terminate on the edge abutting the adjacent mold side wall 26, in an inwardly extending flange 37 which causes the finished cake of soap to have rounded edges. The flexible wings 36 normally are positioned slightly spread apart but when the molds pass through the feed box 16 to receive the hot liquid soap, said wings are pressed together by the sides of the feed box so as to be substantially parallel. After receiving the hot liquid soap, the cooling chamber 21 becomes slightly wider so that the wings 26 spread slightly, thus permitting the hot soap to settle somewhat in the mold.

Upon leaving the cooling chamber 21 the wings 36 are brought together into parallel position by the sides of a stamping guide 38, thereby pressing the soap slightly. In order to press or stamp the upper surfaces of the cakes into final form as they leave the cooling chamber 21, a massive wheel 39 is rotatably

mounted on a shaft 40 and the outer periphery of said wheel is provided with a plurality of recesses 41, each of which is adapted to engage one of the side walls 26 so as to cause the rotation of said wheel as the mold chain moves. The recesses 41 form a plurality of dies 42 which bear upon the soap in the molds, and owing to the weight of the wheel, press the cake into its final compact form. The outer surface of each of the dies 42 may have any shape, mark or pattern desired to imprint on the cake of soap. Thus in the example illustrated where finished cakes with rounded edges are desired, outstanding lips 43 are formed around the edges of the surface of each die 42, so that the desired shape of finished cake is obtained. The shaft 40 is rotatably mounted in slots 45 in brackets 46 so that the wheel 39 may rise slightly to accommodate itself to different cakes of soap. The brackets 46 are secured to standards 47 which are also secured to framework 48 and stamping guide 38. The framework 48 is secured to vertical standards 49 so as to support the mechanism at the delivery end of the machine.

The sprocket wheel 36^a is secured to a shaft 50 which is rotatably mounted in bearings 51 secured to framework 48. The shaft 50 is rotated continuously by means of a gear 52 secured to the shaft 50 and meshing with a pinion 53. The pinion 53 is secured to a power shaft 54 rotatably mounted in bearings 55 which are secured to framework 48. Any suitable power means such as an electric motor not shown is connected by suitable means so as to cause the continuous rotation of the power shaft 54. A sprocket wheel 56 similar to the sprocket wheel 36^a, supports the mold chain 17 at the feed end of the machine, the wheel 56 being secured to a shaft 57 rotatably mounted in bearings 58. A suitable framework 59 supports the bearings 58 so as to position the mold chain 17 to pass through the feed box 16. The stamping guide 38 is preferably long enough to hold the wings 36 of the molds parallel until just after they start around the sprocket wheel 36 so that the flanges 37 will first grip the edges of the soap and loosen it from the side wall 26 and bottom 28 of the adjacent mold. The wings 36 will then be released by the stamping guide 38 so as to snap outwardly and free themselves from the end of the cake, and when the molds are upturned, the cakes of soap will drop onto a chute 60 and slide onto the endless belt 61 which delivers the cakes directly to a discharge point such as a standard wrapping machine, after which it is packed in boxes. The shield 62 deflects the cakes so that they fall on edge on the endless belt 61. The belt 61 is movably mounted at one end on roller 63 secured to shaft 64, said shaft being rotatably mounted in bearings 65.

If it is desired to dry a special type of soap, a chute 60^a (Fig. 2) delivers the cakes onto a

cross shaped distributor 66 which is positioned above a wide, endless drying conveyor 67. The distributor 66 is mounted to reciprocate axially so as to pick up the cakes of soap as they slide down the chute 60^a, and at each end of its stroke it rotates through one quarter of a revolution so as to deposit the cakes on edge over the full width of the conveyor 67. A shield 68 is mounted on a shaft 69 and is adapted to deflect the cakes on edge onto the distributor 66 and tip outwardly about the shaft 69 as the distributor 66 rotates so as to cause the cakes to be deposited on edge on the conveyor 67.

The cakes 70 are slowly taken by the conveyor 67 through a drying chamber 71 through which warm air at a higher temperature than the cooling medium in the chamber 22 is rapidly moved preferably but not necessarily in a direction of flow opposite to the direction of motion of the cakes so as to cause a rapid drying of said cakes. The warm temperature of the air in the chamber 71 is maintained by means of steam pipes 72 positioned in said chamber between the two reaches of the conveyor 67. The steam preferably but not necessarily flows in the direction opposite to the direction of flow of the air so as to provide an efficient transfer of heat from the steam to the air. After being dried, the cakes 70 are delivered from the conveyor 67 to another conveyor, not shown, which delivers the cakes to a discharge point, such as a standard wrapping machine, after which they are packed in boxes. The details of the drying chamber 71 and the mechanism which actuates the distributor 66 and shield 68, are more fully illustrated and described in my aforementioned co-pending application.

In operation, the hot soap from the crutcher 10 flows through pipes 13 and 15 into feed box 16. The endless chain of molds 17 passes through the feed box 16 being filled with the hot soap, and then passes through the cooling chamber 21 where the soap is solidified to cakes. The cooling medium for accomplishing the solidification is admitted to the chamber 22 through pipe 24 and withdrawn through pipe 25. The inscription 27 forms an imprint of the inscription on the cakes and a wheel 39 with dies 42, presses the upper edge of the cakes into final shape. The flexible wings 36 aid in freeing the cakes 70 from the molds as the mold chain 17 passes around the sprocket wheel 36^a and the cakes slide down a chute 60 and fall onto an endless belt 61 which carries them to a standard wrapping machine after which they are packed. If it is desired to dry the cakes before wrapping the cakes are delivered by a chute 60^a onto a distributor 66 which deposits the cakes over the full width of a drying conveyor 67. This conveyor slowly carries the cakes through the drying chamber 71 where the cakes are sub-

jected to the action of moving warm air, after which they are delivered onto an endless belt which carries them to the wrapping machine.

I would state in conclusion that while the illustrated examples constitute a practical embodiment of my invention, I do not limit myself strictly to the details herein illustrated since manifestly the same can be considerably varied without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. In an apparatus for the manufacture of soap and the like, an endless chain of molds, the side wall of each mold also serving as a side wall of an adjacent mold, the bottom of each mold being removable and secured to the side wall of the adjacent mold, means for pivotally connecting said molds, a pair of flexible wings associated with each mold adapted to form end walls for each mold, a plurality of sprocket wheels adapted to receive said endless chain of molds, means for rotating one of said sprocket wheels so as to cause a continuous movement of said endless chain of molds, means for introducing hot liquid soap into said chain of molds, means for cooling the soap in said endless chain of molds as said chain is moved, so as to form cakes, means for stamping said cakes of soap in said molds after they are cooled, and means for discharging said cooled cakes of soap from said molds.

2. In an apparatus for the manufacture of soap and the like, an endless chain of molds, the side wall of each mold also serving as a side wall of an adjacent mold, the bottom of each mold being removable and secured to the side wall of the adjacent mold, means for pivotally connecting said molds, a pair of flexible wings associated with each mold adapted to form end walls for each mold, a plurality of sprocket wheels adapted to receive said endless chain of molds, means for rotating one of said sprocket wheels so as to cause a continuous movement of said endless chain of molds, means for introducing hot liquid soap into said chain of molds, means for cooling the soap in said endless chain of molds as said chain is moved, so as to form cakes, means for stamping said cakes of soap in said molds after they are cooled as said chain of molds moves continuously, and means for discharging said cooled cakes of soap from said molds.

3. In an apparatus for the manufacture of soap and the like, an endless chain of molds, means for introducing hot liquid soap into said molds, means for continuously moving said molds of soap, means for cooling the soap in said molds so as to form cakes, a rotatably mounted wheel engaging said mold chain and

adapted to press said cakes of soap in said molds as said molds are moved continuously, and flexible means associated with said molds adapted to aid in discharging said cakes of soap from said molds after they are pressed.

4. In an apparatus for the manufacture of soap and the like, an endless chain of molds, means for introducing hot liquid soap into said molds, means for continuously moving said molds of soap, means for cooling the soap in said molds so as to form cakes, a rotatably mounted wheel engaging said mold chain and adapted to press said cake of soap in said molds as said molds are moved continuously, and a pair of flexible wings forming the end walls of each mold, said flexible wings being adapted to automatically discharge said cakes of soap from said molds as said mold chain is moved continuously.

5. In an apparatus for the manufacture of soap and the like, an endless chain of molds, means for introducing hot liquid soap into said molds, means for continuously moving said molds of soap, means for cooling the soap in said molds so as to form cakes, means for pressing said cakes of soap in said molds as said molds are moved continuously, means for discharging said cakes of soap from said molds after they are pressed, and means for drying said cakes of soap after they are discharged from said molds.

6. In an apparatus for the manufacture of soap and the like, an endless chain of molds, means for introducing hot liquid soap into said molds, means for continuously moving said molds of soap, means for cooling the soap in said molds so as to form cakes, means for pressing said cakes of soap in said molds as said molds are moved continuously, a pair of flexible wings forming the end walls of each mold, said flexible wings being adapted to aid in automatically discharging said cakes of soap from said molds during the continuous motion thereof, and means for drying said cakes of soap after they are discharged from said molds.

7. In an apparatus for the manufacture of soap and the like, an endless chain of molds adapted to receive hot liquid soap, means for supplying hot liquid soap to said molds, means for cooling and solidifying the soap in said molds, and a pair of flexible wings associated with each mold adapted to form the end walls of said mold, said flexible wings serving to aid in discharging the cakes of soap from said molds as said molds are moved.

8. In a soap marking machine, an endless chain of mold boxes each adapted to contain a cake of material to be marked, means for modifying the temperature of the cakes in the mold boxes, a marking die rotatably mounted with respect to said boxes, means for causing the marking die to move at the

same lineal speed as the mold boxes and to coact therewith for marking a cake in a mold box, and means for yieldingly pressing said marking die toward the cake of material to be marked.

9. In an apparatus for the manufacture of soap and the like, a series of molds, means for introducing hot liquid soap into said molds, means for cooling the air through which the hot molds pass, means for continuously moving said molds through the cooled air so as to solidify said soap to form cakes, a rotatably mounted wheel engaging said molds and adapted to stamp the free surfaces of cakes into finished form as the molds move continuously, and means for removing the cakes from said molds.

10. In a molding machine, a series of movable molds adapted to receive a hot liquid substance, means for cooling the air through which the hot molds pass, means for moving said molds through the cooled air so as to solidify said substance to cake form, a die positioned adjacent said molds after said molds leave the cooling element, said die having a pattern formed on its surface and being adapted to move with the molds for a selected distance, means for pressing said die against a cake during the movement of said die and molds so as to form an imprint of said pattern on the cake, and means for removing the cake from the mold.

11. In a molding machine, a movable series of molds adapted to receive a hot, liquid substance, means for cooling the air through which the hot molds pass to form solidified cakes, a series of dies separably associated with said series of molds and adapted to move with said molds for a selected distance in contact with said substance so as to modify the shape of the cakes in said molds, and means for ejecting the cakes from the molds.

12. In a molding machine, a series of molds adapted to move over a continuous path and to receive a hot liquid substance, means for cooling the air through which the molds pass to form solidified cakes, a series of dies adapted to move with the molds along only a portion of the path of said molds, said dies being adapted to successively press against the substance and modify the shape of the cakes, and means for ejecting the cakes from the molds.

13. In a molding apparatus, an endless chain of molds, means for introducing a hot, liquid substance into said molds, means for cooling the air through which the molds containing the hot substance move, means for moving said chain of molds with a continuous motion through the cooled air so as to cool said substance to solid cakes, means for subjecting said cakes to pressure while in said molds, and means for ejecting the cakes from the molds.

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14. In an apparatus for the manufacture of soap and the like, an endless chain of molds, a plurality of sprocket wheels adapted to receive said endless chain of molds, means for rotating one of said sprocket wheels so as to cause a continuous movement of said endless chain of molds, means for introducing hot, liquid soap into said chain of molds, means for cooling the soap in said molds during the movement thereof so as to form solid cakes, means for pressing an exposed surface of said cakes of soap in said molds, and means for discharging said cooled and pressed cakes of soap from said molds. 10

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