

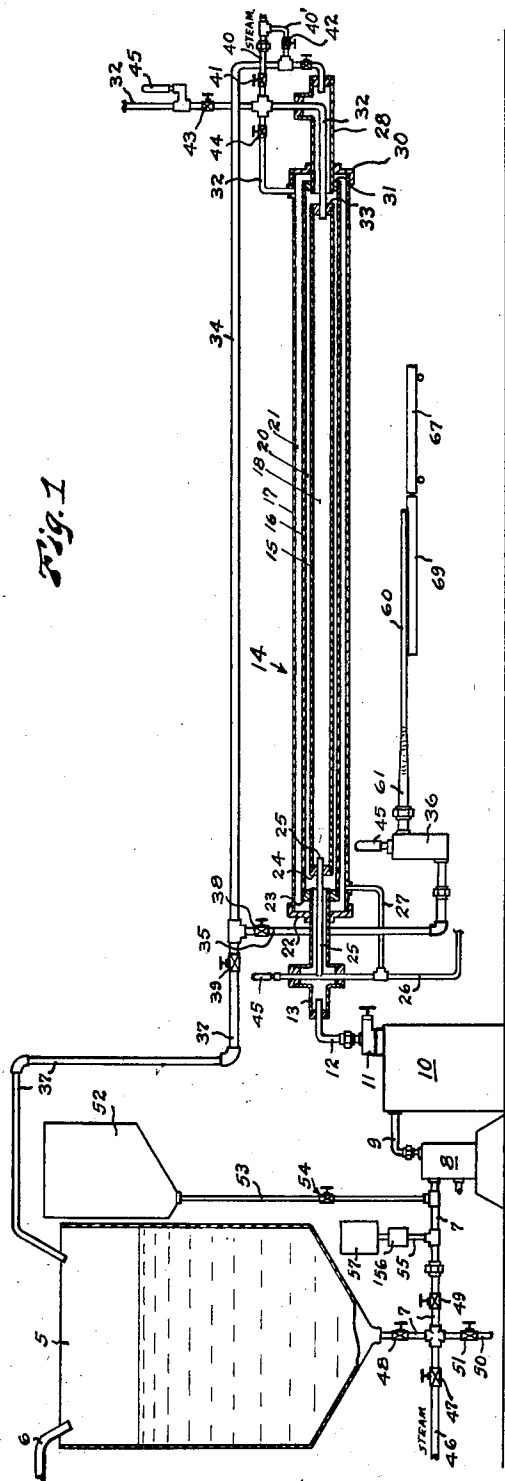
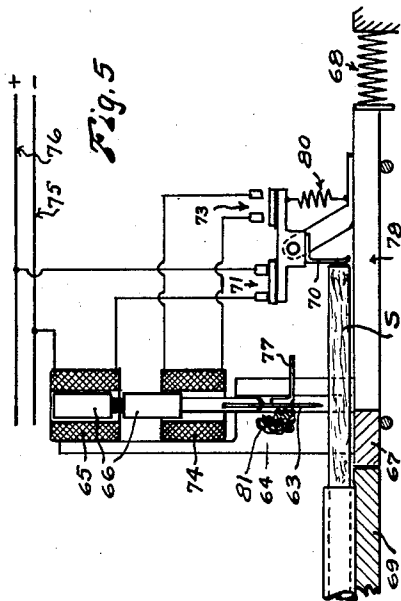
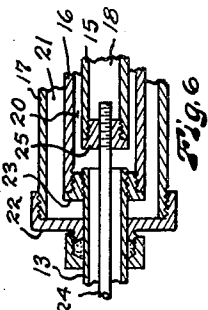
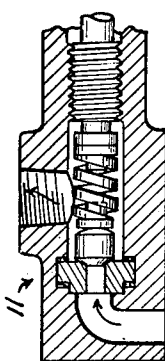
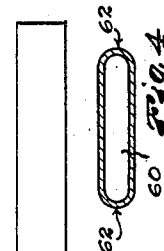
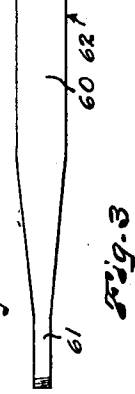
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PROCESS OF AND APPARATUS FOR MAKING BAR SOAP

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PROCESS OF AND APPARATUS FOR
MAKING BAR SOAP

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8 Claims. (Cl. 25—7)

My invention relates to a process of and apparatus for making bar soap and the general object of my invention is to provide a process and apparatus for taking molten soap directly from the soap kettles and completing the saponification of the soap and cooling and forming said soap into bars by one continuous operation which can be carried out in a very short period of time.

Another object of my invention is to provide a process and apparatus for making bar soap in which any and all additions to the soap, such as soda ash, silicate of soda, borax, talc, perfumes, or the like may be added after the molten soap has left the soap kettle but before the soap has passed through several pumps, coolers, pipes and the like whereby the added product will be thoroughly incorporated into the soap and mixed with the soap as it passes through pumps, pipes, coolers and the like in such a manner that volatile matter will have no opportunity to escape and solid matter will have no opportunity to separate or settle as may happen when volatiles or solid matter are introduced into the soap kettle.

Another object is to provide a process of and apparatus for making bar soap in which the usual soap frames are eliminated thus doing away with certain well known losses which always result from the use of soap frames which losses may be due to leakage of the frames before the soap has hardened or to the formation of air cavities in the soap within the frames or to the production of scrap or trimmings at the time the soap is taken out of the frames and cut up into bars, or to two or more of these causes.

Another object is to provide a process of and apparatus for making bar soap in which the soap is protected from contact with dust and dirt specks which may be floating in the air until after the soap has been cooled enough so that dirt and dust will not adhere thereto. This avoids undesirable specks on white or light colored soap.

Another object is to greatly simplify and cheapen the cost of processes of making bar soap and to greatly reduce the time required for making bar soap and also to greatly reduce the amount of the equipment required for making bar soap thus effecting a substantial saving in the cost of equipment, labor and factory and storage space.

Another object of my invention is to provide a soap in which substantially complete saponification is secured due to the fact that this soap is subjected to a very high pressure and is passed through a saponifying valve while it is yet hot.

Other and more specific objects will be apparent from the following description taken in connection with the accompanying drawing:

In the drawing Figure 1 is a somewhat diagrammatic view partly in section and partly in side elevation of apparatus which may be used in carrying out my process of making bar soap.

Fig. 2 is a detached sectional view of one form of saponifying valve.

Fig. 3 is a detached plan view of a flat oval shaped conduit in which the soap column is formed to the correct cross sectional shape for the bars.

Fig. 4 is a cross section of said conduit on a larger scale.

Fig. 5 is a somewhat diagrammatic view partly in section and partly in elevation of the soap bar cut off mechanism.

Fig. 6 is a detached sectional view of one of the manifolds and the ends of pipes connected therewith.

Like reference numerals designate like parts throughout the several views.

Referring especially to Fig. 1 of the drawing, 5 designates a conditioning kettle adapted to contain hot liquid soap, which has been thoroughly prepared by the usual cooking or heat treatment process, from fats and alkalis preferably without the addition of binder or builder or filler or any inactive substance. This hot soap may be introduced through a pipe 6 into the kettle 5 and said kettle may be provided with means, not shown, for keeping the soap at any desired temperature.

From the conditioning kettle 5 the soap passes through a pipe 7 to a low pressure pump 8 by which it is placed under the first stage of pressure and is forced through a pipe 9 to a high pressure pump 10. In the high pressure pump 10, the hot liquid soap is placed under a high pressure preferably in excess of one thousand pounds per square inch and is forced through a saponifying valve 11 which may be of a form more clearly shown in Fig. 2. From the saponifying valve 11 the soap travels through a pipe 12 to a manifold 13 from which it passes into a temperature controlling unit designated generally by 14. This temperature controlling unit may be composed of three concentrically disposed pipes 15, 16 and 17 positioned one within the other in spaced relation to leave a central tubular passageway 18 for temperature controlling agent; an intermediate annular soap passageway 20 preferably of very narrow width;

and an annular outer passageway 21 for temperature controlling agent.

The manifold 13, Fig. 6, through which the soap enters the temperature controlling unit extends through a cap 22 on the outer tube 17 and is connected with a plug 23 in the end of the intermediate tube 16 so that soap passing through said manifold 13 enters the tube 16 and travels along the annular space 20 formed between the outer wall of the pipe 15 and the inner wall of the pipe 16. A water pipe 24 of substantially smaller diameter than the manifold 13 communicates through a plug 25 with the interior of the axial pipe 15 and extends into the manifold 13 and is connected with another pipe 26 which extends outwardly through one side of the manifold 13. Another pipe 27 communicating with the water space between the pipe 17 and the pipe 16 is preferably connected with the pipe 26.

Another manifold 28 is provided at the other end of the pipes 15, 16 and 17. This manifold extends through a cap 30 on the pipe 17 and into a plug 31 on the pipe 16 and communicates with the interior of the pipe 16. A water pipe 32 extends into the side of the manifold 28 and thence lengthwise along said manifold and through a plug 33 in the end of the pipe 15 and communicates with the interior of the pipe 15. A soap outlet pipe 34 communicates with the outer end of the manifold 28 and preferably extends back along side the pipes 15, 16, and 17 to a point near the head end thereof where it branches and is connected with one pipe 35 leading to a chamber or receptacle 36 and with another pipe 37 leading back to the soap kettle 5. Valves 38 and 39 are provided in the respective pipes 35 and 37. Steam inlet pipes 40 and 40' are connected respectively with the water pipe 32 and with the soap outlet pipe 34 and valves 41 and 42 are provided in the respective steam inlet pipes 40 and 40'. Valves 43 and 44 are provided in the water pipe 32 on opposite sides of its connection with the steam pipe 38. Temperature indicating devices or thermometers 45 are provided in connection with the several water pipes and soap pipes at locations where it is desired to observe the temperature. A steam inlet pipe 46 is preferably connected with the pipe 7 through which the soap is drawn off from the soap kettle 5 and a valve 47 is provided in this steam pipe 46. Two valves 48 and 49 may be provided in the pipe 7 on opposite sides of its point of connection with the steam pipe 46. A drain pipe 50 having a valve 51 therein may be connected with the pipe 7.

A tank 52 adapted to hold materials which are to be mixed with the soap, such as soda ash, silicate of soda, borax, talc perfumes, alcohol or any mixture of the same may be connected by a pipe 53 with the pipe 7 just before it enters the low pressure pump 8. A valve 54 may be provided in the pipe 53. The tank 52 is preferably positioned high enough so that the liquid soap will not rise by gravity into said tank 52. When the apparatus is in operation there will be, normally, a slight suction in the pipe 7 which will be communicated to the pipe 53 and this suction will tend to draw materials from the tank 52 into the pipe 7.

In case high grade, expensive volatile perfumes or other ingredients of volatile nature are to be put into the soap they may be introduced through a pipe 55 by means of a pump 56 which is connected with a closed container 57 in which the perfumes or other material may be stored.

By the time the molten soap has passed through the pumps and has passed throughout the length of the narrow space 20 with the cooling agent on both the inside and the outside of such space and has traveled through the pipes 34 and 35 to the receptacle 36 it will be cool enough to form into bars. The bar forming means is in the nature of a conduit 60 of oval shaped cross section Fig. 4, which has a convergent end 61 connected with the receptacle 36. This conduit is preferably formed with rounded edges 62 so that the bars of soap issuing therefrom will have rounded edges and will more readily drop into a conventional die of a stamping machine by which the bar may be stamped or pressed after it is formed. This conduit 60 may be made by filling a tube with sand and then flattening a portion of said tube, one end of the tube being left round, the incline between the flattened portion and the round portion being gradual.

As the endless column of soap issues from the outer end of the conduit 60 it passes under a knife 63 which is mounted for vertical movement in a frame 64 and held in raised position by an electromagnet 65 acting on a plunger 66 to which the knife 63 is secured. The frame 64 is mounted on a table section 67 which has a limited amount of endwise movement whereby the knife 63 may move longitudinally with the column of soap during the cutting off process. Spring means 68 urges the table section 67 back against a table or support 69 on which the conduit rests. As the column of soap issues from the conduit 60 the end thereof will come in contact with and move a switch trigger 70. This will open a switch 71 and close a switch 73 thereby de-energizing the lifting electromagnet 65 and energizing another electromagnet 74 by which the plunger 66 will be snapped downwardly. The switch 71 is interposed in a circuit including the electromagnet 65 and source of energy wires 75 and 76 and the switch 73 is interposed in a circuit which includes the electromagnet 74 and the source of energy wires 75 and 76. The energizing of the electromagnet 74 snaps the knife 63 downwardly with a quick stroke thus cutting off the end of the soap column to form a bar. The knife 63 carries a foot member 77 which engages the top of the severed bar of soap at the instant the knife has completely severed the bar from the soap column and pushes said bar downwardly through an opening 78 in the table section 67 thereby disposing of the severed bar of soap. As soon as the severed bar of soap is pushed downwardly far enough to be clear of the switch finger 70, this finger 70 will be released allowing a tension spring 80 to open the switch 73 and close the switch 71. This de-energizes the cutting electromagnet 74 and energizes the lifting electromagnet 65 and the knife 63 is snapped back up into the raised position where it is held until the electromagnet 74 is again energized.

As soon as the knife 63 encounters the column of soap on its downward stroke said knife and the table extension 67 will begin to move with the column of soap and will continue to move with the column of soap until the bar of soap has been severed and pushed down and the knife withdrawn clear of the advancing end of the soap column and the table section 65 will then be returned by the spring 68 to its normal position before the advancing end of the soap column again encounters the switch trigger 70. In this way the length of the bars which are cut off will always be measured accurately and successive

bars will be the same length irrespective of variations in the speed of travel of the soap column.

After the bars have been cut off they will be ready to go to the stamping dies and thence to the wrapping machines both of which may be of the usual conventional form. The bars which are shaped in the conduit 60 will have rounded edges and will drop into the stamping dies very easily and without danger of catching, thus speeding up the stamping operation. The knife 63 will cut the ends very smoothly without any waste. To facilitate the smoothness of cut of this knife I preferably keep said knife moist with salt water. This may be done by allowing said knife to come in contact with a pad 61 which is kept saturated with salt water.

In carrying out this process the prepared molten soap from the soap kettle 5 will be caused to flow, by gravity and by suction of the pump 8, to the said pump 8, it being understood that the valves 48 and 49 will be open and the valves 47 and 51 closed during normal operation. The valve 54 may be opened to introduce additional matter from the container 52 and the pump 56 may be operated to introduce perfume or other matter from the container 57. The introduction of volatile perfumes and like matter into the soap after it has been drawn off from the kettle 5 and while the soap is in a closed conduit has the distinct advantage of safeguarding the volatiles against evaporation until after the soap is cooled and the danger of evaporation removed. The introduction of other substances after the soap has been withdrawn from the kettle 5 has the advantage that it does not give these substances any opportunity to settle as some of them will tend to do if introduced directly into the kettle 5. If some of these substances are introduced directly into the kettle 5 the contents of the kettle will have to be stirred or agitated almost continuously to keep them from settling and this agitation is detrimental to the soap.

I prefer to introduce all of these substances into the soap line just ahead of the low pressure pump because there is some suction in the soap line at this location and the substances may be easily introduced without pressure and because when the substances are introduced at this location they get the benefit of all of the agitation and mixing to which the soap is subjected in the pump and become very thoroughly and evenly mixed with the soap. They may, however, be introduced at other points in the soap line.

In the pump 10 a pressure of one thousand pounds per square inch or more is built up and the soap is forced past the relatively long seat of the saponifying valve where a crushing action of the particles of the ingredients takes place and substantially complete saponification is secured. After passing the saponifying valve the pressure drops but preferably does not fall below two hundred pounds per square inch. The soap then flows through the pipe 12, manifold 13, space 20, pipe 34, pipe 35, and receptacle 36 to the bar forming conduit from which it is ejected as a cool and solid soap column which may be cut up into bars as previously explained. The space 20 is very narrow with a cooling medium on both the inside and outside thus affording an efficient means for reducing the temperature as low as desired. I prefer that this temperature should not be more than one hundred forty degrees Fahrenheit when the soap reaches the receptacle 36. This rapid and even cooling of the soap in the narrow passageway 20 avoids giving heavier

matter any chance to settle or volatiles any chance to escape by evaporation and is also beneficial to the quality of the soap. The soap being relatively cool before it enters the oval shaped conduit 60, it is apparent that considerable pressure will be required to extrude the soap through this conduit. This pressure is beneficial as it helps to form a solid and well packed soap column from which the bars may be cut.

The water or other temperature controlling medium is preferably supplied through the pipe 32 and taken off through the pipe 26. This cooling medium may be re-circulated, if desired. By opening the valve 47 of steam pipe 46 it is possible to blow steam through the soap line to clean it out or to melt soap which has cooled and set. By admitting steam from pipe 40 through pipes 32 and through the water passageways 18 and 21 it is possible to quickly melt up any soap that may set in the passageway 20. Steam may also be admitted from pipe 40' into the manifold 28.

When apparatus is being put into operation or at any time during the operation of the same it is always possible by regulation of the valves 38 and 39 to return to the kettle 5 any part or all of the soap which is being circulated. During normal operation the valve 39 will ordinarily be completely closed.

The following description and accompanying drawing clearly disclose a preferred embodiment of my invention but it will be understood that this disclosure is merely illustrative and that such changes in the invention may be made as are fairly within the scope and spirit of the following claims.

I claim:

1. In apparatus for making bar soap, a soap conditioning kettle, a low pressure pump, a conduit connecting said low pressure pump with the bottom of said soap conditioning kettle, a receptacle for material which is to be added to the soap connected with said conduit, a high pressure pump, a saponifying valve connected with said high pressure pump through which the soap from said high pressure pump must pass, a soap cooling device, a conduit connecting said soap cooling device with said valve, means for circulating temperature controlling agent through said soap cooling device, a soap extruding conduit, and soap conduit means connecting the soap passageways of said soap cooling device with said soap extruding conduit.

2. In apparatus for making bar soap, a soap conditioning kettle, a low pressure pump, a conduit connecting said low pressure pump with the bottom of said soap conditioning kettle, a high pressure pump, a saponifying valve connected with said high pressure pump through which the soap from said high pressure pump must pass, a soap cooling device embodying three concentrically disposed pipes, means for circulating temperature controlling agent through the outermost pipe and the innermost pipe, conduit means connecting the medial pipe with said valve whereby soap may be passed through the annular passageway between said medial pipe and said inner pipe, a soap extruding conduit having the cross sectional shape of a bar of soap, and conduit means connecting the soap discharge end of said medial pipe with said soap extruding conduit.

3. In apparatus for making bar soap, a soap conditioning kettle, a low pressure pump, a conduit connecting said low pressure pump with the bottom of said soap conditioning kettle, a re-

ceptacle for material which is to be added to the soap connected with said conduit, a high pressure pump, a saponifying valve connected with said high pressure pump through which the soap
 5 from said high pressure pump must pass, a soap cooling device embodying three concentrically disposed pipes, means for circulating temperature controlling agent through the outermost pipe and the innermost pipe, conduit means connecting the
 10 medial pipe with said valve whereby soap may be passed through the annular passageway between said medial pipe and said inner pipe, a soap extruding conduit having the cross sectional shape of a bar of soap, and conduit means connecting
 15 the soap discharge end of said medial pipe with said soap extruding conduit.

4. In apparatus for making bar soap in one continuous operation, a soap conditioning kettle for molten soap, pump means having a low pressure
 20 intake portion and a high pressure discharge portion, a conduit connecting said low pressure intake portion of said pump means with the bottom of said soap conditioning kettle, a saponifying valve connected with the discharge portion
 25 of said pump means; soap cooling means connected with said valve, a soap extruding conduit, a conduit connecting said soap extruding conduit with said soap cooling means, and soap bar cut off means positioned beyond the discharge
 30 end of said soap extruding conduit.

5. In apparatus for making bar soap, a soap conditioning kettle for molten soap, pump means having a low pressure intake portion and a high pressure discharge portion, a conduit connecting
 35 said low pressure intake portion of said soap conditioning kettle and said pump means, a receptacle for volatile matter which is to be introduced into said soap, means connecting said receptacle for volatile matter with said conduit
 40 between said kettle and said pump means, a saponifying valve connected with the discharge portion of said pump means; soap cooling means connected with said valve, and a soap extruding conduit connected with said soap cooling means.

45 6. In apparatus for making bar soap, a soap conditioning kettle for molten soap, pump means having a, low pressure intake portion and a high

pressure discharge portion, a conduit connecting said low pressure intake portion of said soap conditioning kettle and said pump means, a receptacle for additional matter which is to be introduced into said soap, means connecting said receptacle for additional matter with said conduit
 5 between said kettle and said pump means, a saponifying valve connected with the discharge portion of said pump means; soap cooling means connected with said valve, a soap extruding conduit connected with said soap cooling means
 10 and cut off means positioned beyond the end of said soap extruding conduit.

7. In apparatus for making bar soap, in one continuous operation, a soap conditioning kettle for molten soap, pump means having a low pressure intake portion and a high pressure discharge portion, a conduit connecting said low pressure intake portion of said pump means with the bottom of said soap conditioning kettle, a
 20 saponifying valve connected with the discharge portion of said pump means; soap cooling means connected with said valve, a soap extruding conduit, a conduit connecting said soap extruding conduit with said soap cooling means, a return
 25 conduit connecting said last named conduit with said soap conditioning kettle, and soap bar cut off means positioned beyond the discharge end of said soap extruding conduit.

8. In apparatus for making bar soap in one continuous operation, a soap conditioning kettle for molten soap, pump means having a low pressure intake portion and a high pressure discharge portion, a conduit connecting said low pressure intake portion of said pump means with the lower
 35 portion of said soap conditioning kettle, a saponifying valve connected with the discharge portion of said pump means; soap cooling devices connected with said valve, a soap extruding conduit, a receptacle connected with the intake end
 40 of said soap extruding conduit, other conduit means connecting said receptacle with said soap cooling means, and soap bar cut off means positioned beyond the discharge end of said soap extruding conduit.

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