July 9, 1963 SHOICHI TAKEUCHI 3,097,057

PROCESS AND APPARATUS FOR MANUFACTURING FLOATING SOAP

Filed July 28, 1959

Fig. 1

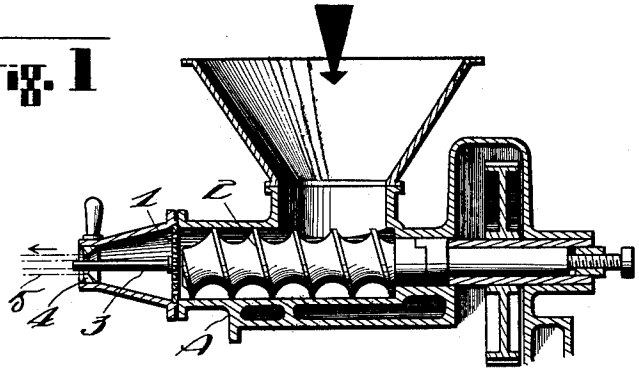


Fig. 2

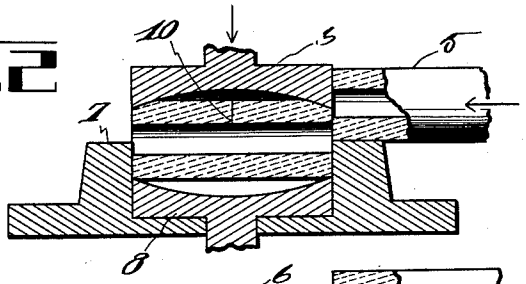


Fig. 3

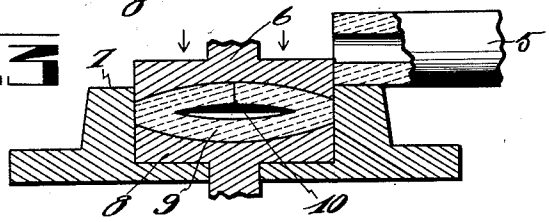


Fig. 4

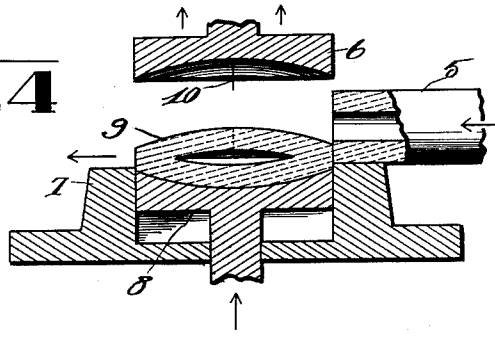


Fig. 5

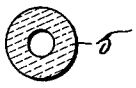


Fig. 6

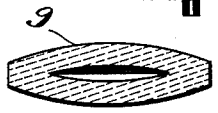


Fig. 7

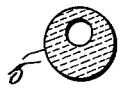
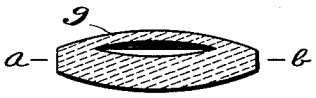


Fig. 8



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United States Patent Office

3,097,057

Patented July 9, 1963

3,097,057

PROCESS AND APPARATUS FOR MANUFACTURING FLOATING SOAP

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Filed July 28, 1959, Ser. No. 830,092
Claims priority, application Japan Aug. 1, 1958
4 Claims. (Cl. 18—55)

The invention relates to the process and apparatus of manufacturing floating soap using a soap base that may be heavier than water. Also the invention relates to such manufacturing of floating soap wherein the soap base is of synthetic washing materials.

Specifically, the invention relates to the process and apparatus of manufacturing floating soap formed with a hollow interior thereof such that the specific gravity of the soap is thereby rendered reduced compared with that of water in order to allow the soap to float in or on water.

The floating soap made according to the teaching of the present invention is found not to deteriorate in quality or shape, or to deform even when it may be stored for a long time. The floating soap is constituted of the same soap base as ordinary or conventional soap. It has an appearance of beauty and gives a better feeling when in use than do other and conventional floating soaps.

The conventional floating soaps may use conventional material to constitute the floating soap, but are made to exhibit the character of floating by reducing the specific gravity thereof by means of a process or apparatus establishing a porous or spongy feature to the soap.

Several methods have been employed in the past to reduce the specific gravity of the soap. Some of these are:

(1) Air is blown into the molten soap material producing air bubbles in the soap base, which is then quickly cooled and solidified.

(2) A gas generating chemical, such as bicarbonate of soda, is mixed into the molten soap base and heated up so that the gas generating chemical produces bubbles in the soap base, which is then quickly cooled and solidified.

(3) A molten soap base is heated up without the addition of any chemicals or any other substances, and the water contained in the soap base is converted into steam, which occupies, of course, a larger dimension. The soap base is then cooled down quickly and the condensed steam leaves the soap base with the enlarged dimension that was produced. This method of producing porous, light soap is disclosed in Austrian Patent No. 407,257.

(4) An addition of alcohol into a waterless containing soap is heated up to produce a light soap, and is disclosed in German Patent No. 125,713.

(5) A light material such as cork or wood dust or sawdust is mixed into the soap base to produce a light soap. This is disclosed in German Patent No. 400,084.

(6) A mixture of small amounts of metallic powder, such as zinc, aluminum, bronze, magnesium, etc., reacting with the free alkali in the soap base produces hydrogen gas, is then muddled and heated to produce the gas. Cooling and solidifying produces a light soap. This has been described in German Patent No. 549,145.

The floating soaps which have been produced by these above processes, such as by the addition of air or gases into the soap base are subject to oxidation or chemical decomposition and the soap is then subject to decay and bad odor with consequent poor foaming and diminished washing and cleaning strength. Furthermore, the composition of the soap is not homogeneous and is liable to become deformed in shape. Floating soaps with mixtures of cork or wood dust give an unpleasant sensation to the skin of the users. Manufacturing processes for floating soaps with addition of these foreign materials tend to enhance and increase the production costs with these more complicated processes than the ordinary soap manufacture.

The floating soap of the invention is unlike the aforesaid floating soaps; it is made by providing a hollow space inside of each bar of soap made by the new process. The hollow space is surrounded by and is formed by suitable wall thicknesses of pure soap. Only air comes in contact with the internal smooth surface of the hollow space and the soap does not contain any foreign substances in the soap base. Almost no oxidation takes place. Even during long periods of storing, it is not subject to deformation, bad odor or weakened washing and cleansing strength.

The manufacturing process and apparatus of the present invention has new features in extrusion and stamping in soap manufacturing.

In the accompanying drawing the invention is illustrated wherein:

FIG. 1 shows a longitudinal section of a soap extruder having a mandrel for producing a pipe shaped or elongated hollow soap base;

FIG. 2 shows a cross-sectional view of a stamping or die device for receiving the extruded soap from the soap extruder of FIG. 1;

FIG. 3 shows a cross-sectional view of the die device at the completion of the stamping operation;

FIG. 4 shows a cross-sectional view of the die device in opened condition with the completed soap about to be removed;

FIG. 5 represents an axial cross-section of the extruded elongated hollow soap base having substantially equal thicknesses for the wall;

FIG. 6 represents a similar cross-section of extruded soap having a flat hollow space formed from the elongated hollow soap of FIG. 5;

FIG. 7 represents a cross-sectional view of extruded elongated hollow soap having the hollow at an eccentric position; and

FIG. 8 represents a cross-sectional view of the extruded soap having a flat hollow space formed from the soap of FIG. 7.

A common mode of soap manufacture by the extrusion process is to pass the liquid soap through cooling rollers, solidify into a large cake, cut into pieces, and allow the pieces to dry. The pieces are mixed in an amalgamator, kneaded in a milling machine, and then fed to an extruder A. A cooling jacket is shown encasing a portion of the extruder, where the liquid soap base is cooled, solidified and extruded therefrom as a solid.

Referring specifically now to FIG. 1, the extruder A has a perforated plate **1**, a screwshaft **2** abutting the perforated plate, and a mandrel **3** along the axis of the screwshaft **2**. The mandrel is fixed to the center of the perforated plate **1**, for example, and the distal tip of the mandrel is extended through a mouth piece **4** so that an annular space is provided between the tip of the mandrel and mouth piece. The soap base extruded by turning the screwshaft and forcing the soap base through the perforated plate and the annular space between the mandrel and the mouth piece, is generally pipe shaped, or a continuous elongated hollow soap base. If the mandrel forms an eccentric annular space with the mouth piece, a correspondingly eccentric hollow is formed in the soap base.

The extruded soap base is placed between a die lid **6** and a die base **7**. An edge of the die lid **6** cuts up the

extruded soap base and inserts or pushes the cut piece into the die base as shown in FIG. 2.

It is within the contemplation of the invention to separately cut the extruded soap base into suitable short lengths, which are then inserted in the die base as shown in FIG. 2.

The cut piece or short length of soap base is stamped or pressed by the die lid **6** engaging the die base **7** to thereby close both ends thereof. This forms a soap with a hollow space in the center as shown in the cross-sectional view of FIG. 4. The die lid **6** is lifted and the finished soap **9** is removed by raising the die liner **8** of the die base **7**, as shown in FIG. 5.

An air exhaust needle **10** is attached in the center of the die lid **6**. It has been found that in forming hollow soap from hollow extruded lengths of soap base, air in the hollow space will become compressed. When the die lid is opened from the die base, the compressed air in the hollow space may expand and cause the distortion of the hollow soap, such as separation of the joining parts at each end of the soap. The air exhaust needle **10** extends through the soap base to the hollow portion and forms a passageway which releases a part of the compressed air when both ends of the soap are closed in the soap-forming operation. The passageway is formed by piercing through a side of the soap base. The remaining compressed air is exhausted when both die lid and die base are opened and the air exhaust needle is drawn out of the finished soap. In this manner the air pressure in the hollow space is equalized with the environmental atmospheric pressure, and the possibility of distortion of the soap or the separation of the closed ends by encapsulated air pressure upon the walls of the soap is eliminated.

The fine needle passageways formed by the air exhaust needle may be filled with soap powder, or, more simply, the passageway closes itself when the soap is used once or twice. It is clear that there is no substantial possibility of water getting into the inner hollow space of the soap.

Further, in accordance with a preferred embodiment of the invention, if the mandrel is attached to the perforate plate **1** at a point slightly above the axis of the screwshaft and the mouthpiece **4** to form an eccentric annular space between the mandrel and the mouth piece, then the soap base that is extruded possesses an eccentric hollow and the wall thickness of the extruded soap base is shown as represented by FIG. 7. Soap base formed in this manner is cut by the die lid and stamped into a finished soap piece as shown in the representation of FIG. 8.

The soap piece formed by the present invention is provided with a center of gravity positioned on or below the line *a*—*b* shown in FIG. 8. The soap piece therefor floats in water with the thinner side always up. A picture or film or other pattern generally liked by children may be pasted on the thinner side of the soap piece. The film may be of Celluloid, polyvinyl chloride, etc., which are insoluble in water. This serves as a good toy for children as well as a floating soap. The film side of the soap is exposed upward as it floats, until the other side is substantially consumed. As the soap is finally consumed by use and by becoming soluble in water, the film remains to be used as a further toy liked by children.

These and other advantages become apparent from a full consideration of the invention as defined in the appended claims.

What is claimed is:

1. A method of making floating soap which comprises continuously forming an elongated hollow soap base, inserting a portion of said hollow elongated soap base between a die base and a die lid, engaging the die base and die lid to cut off the soap base exterior of the die base and die lid and to press the open ends of the soap base to a closed position that compresses the air within the hollow portion, and releasing the compressed air within the hollow portion.

2. A method of making floating soap which comprises continuously shaping a hollow elongated soap base, inserting a portion of said hollow elongated soap base between a die base and a die lid, cutting off the soap base extending exteriorly of the die lid and the die base, pressing the soap base between the die base and the die lid to close the ends of the hollow portion of the soap base, at the same time releasing air compressed in said hollow portion of said soap base, and releasing the die lid for removing the deformed soap base.

3. A method of making a hollow bar of floating soap comprising the steps of:

(*a*) continuously forming an elongated hollow soap base;

(*b*) advancing said soap base between a pair of relatively reciprocable dies;

(*c*) reciprocating said dies thereby to cut off a predetermined portion of the tubular soap base and to deform said tubular soap base to close the ends thereof and form a hollow bar of floating soap; and

(*d*) releasing air compressed in the hollow portion of said bar of soap.

4. A method as defined in claim 3 wherein the step of continuous forming is accomplished by extruding.

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