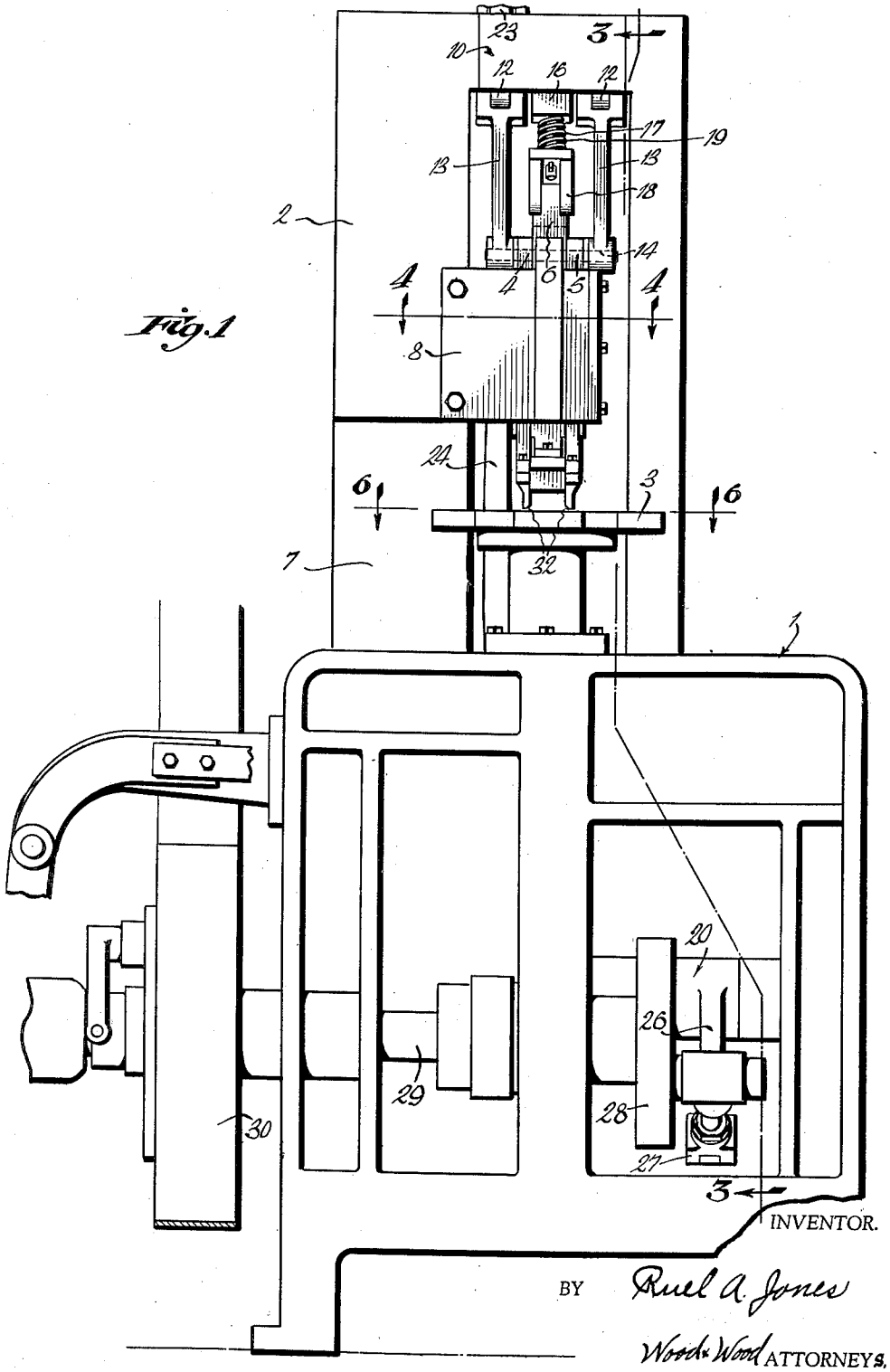
Nov. 14, 1939. R. A. JONES 2,179,853

METHOD OF MAKING SOAP CAKES

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Fig. 1



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Fig. 5

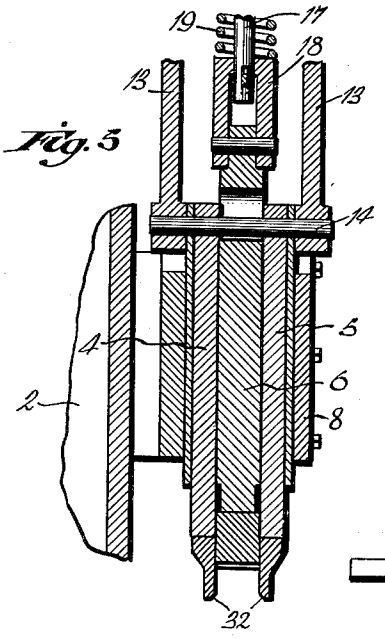


Fig. 2

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METHOD OF MAKING SOAP CAKES

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Fig. 4

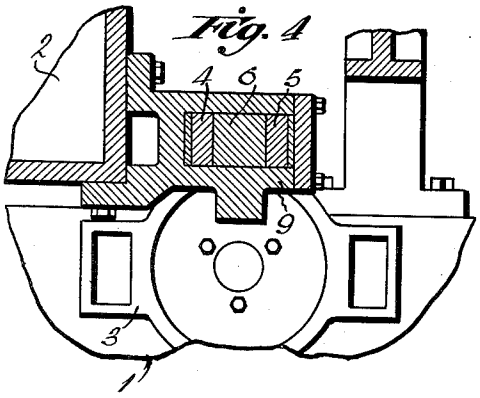


Fig. 3

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METHOD OF MAKING SOAP CAKES

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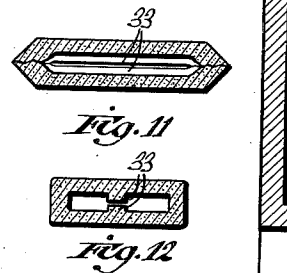


Fig. 11

Fig. 12

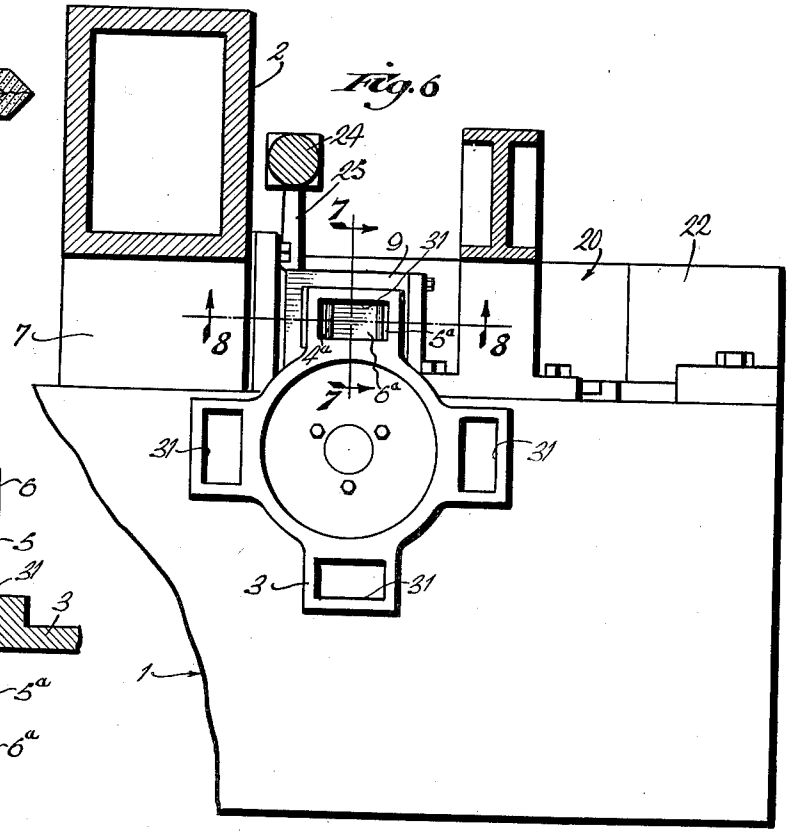


Fig. 6

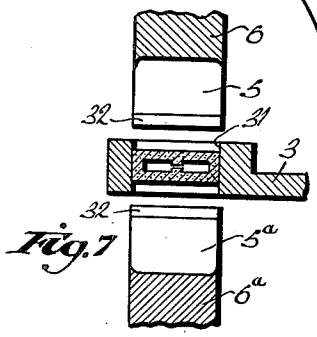


Fig. 7

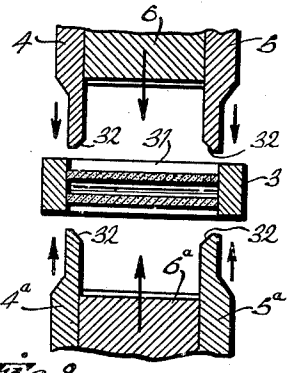


Fig. 8

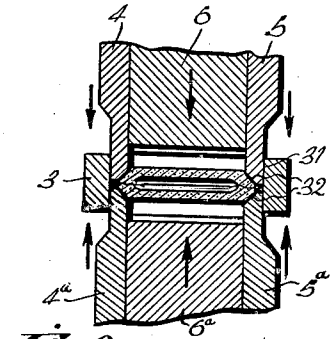


Fig. 9

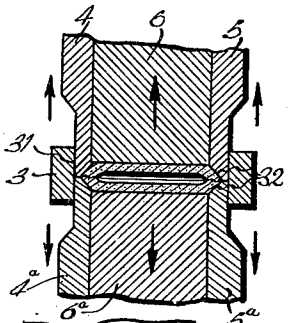
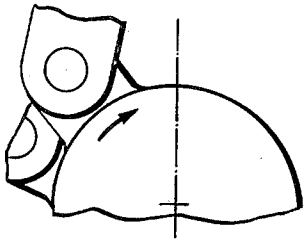
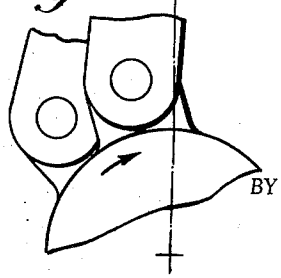


Fig. 10





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UNITED STATES PATENT OFFICE

2,179,853

METHOD OF MAKING SOAP CAKES

Ruel A. Jones, Covington, Ky.

Application February 20, 1936, Serial No. 64,927

10 Claims. (Cl. 18—48)

This invention relates to a method of making a hollow or cellular cake of soap.

The primary objectives of the invention have been to provide a hollow or cellular soap cake which is capable of floating in water and which is capable of withstanding the mechanical strains attending its usage without losing its buoyancy.

By virtue of the hollow construction, the soap cakes of the present invention are light in weight, and toilet and milled soaps may be formed into buoyant cakes. A given weight of soap may be formed into a cake of greater physical size than if the cake were solid; this feature is valuable particularly in the preparation of cakes of soap of the type intended for individual usage in hotels and bathing establishments. In other words, the miniature or guest size cakes may contain less soap than the usual solid cakes, and yet be greater in size, so that they are easier to handle. On the other hand, the buoyancy of the cakes makes them particularly desirable, regardless of their size.

The cavities of the hollow cakes of the invention may also contain ribs in pairs abutting one another, so as to form strut reinforcements for sustaining the walls and preventing inward collapse of the cakes during their usage.

Briefly, the method of the present invention resides, first, in the establishment of a soap blank or block containing one or a plurality of apertures or tube-like openings. Such blanks may be cut from a bar or a continuous length formed by extrusion. The apertures or openings are open at the ends of the blank, and they constitute, potentially, the air cell or cells by which the cake is endowed with its buoyancy.

Next, the blank is confined within a die box or hole which is substantially the same in size and shape as the blank, and then the open ends of the confined blank are pressed so as to seal the openings and form a sealed air cell within the cake. For instance, a blank or block produced by extrusion is disposed between, and subjected to the pressure of, moving dies operated simultaneously to compress the opposite ends of the blank.

Otherwise expressed, the relatively opposite sides of the blank, and the ends, are confined, and the unconfined side portions are pressed toward one another for sealing the air within the soap.

Such cakes, having the ends closed only, are suitable for immediate commercial usage.

Further molding or configuration of the cake to the specifically desired commercial form or shape, or the impression of design markings upon the body portion of the cake, is performed during the pressing operation or thereafter. In the employment of the latter mode of operation, the tubular section of soap having the open ends is confined within the hole; the open ends of the section are compressed to seal the openings, and then the body portion of the section is compressed, independently, to its final contour, while the ends of the section are under compression.

Further features of the method are disclosed in the description which follows. The accompanying drawings illustrate a machine suited to use in the commercial practice of the invention.

In the drawings:

Figure 1 is a front elevation of the press.

Figure 2 is a side elevation thereof.

Figure 3 is a section on line 3—3, Figure 1.

Figure 4 is a section on line 4—4, Figure 1.

Figure 5 is a section on line 5—5, Figure 2.

Figure 6 is a section on line 6—6, Figure 1.

Figure 7 is a section on line 7—7, Figure 6.

Figure 8 is a section on line 8—8, Figure 6.

Figures 9 and 10 are similar sectional views vertically through the dies and die block, showing the parts in relative different stages of operation, and the toggle connections for moving the lower dies.

Figure 11 is a longitudinal section through a formed cake of soap.

Figure 12 is a cross section of the same.

The press is particularly adaptable for producing hollow or cellular cakes of soap from sections of a soap tube, of the proper length, having either a single or a plurality of apertures or open passages therethrough. The passages may be of various outline in cross section, as round, rectangular, or of a configurated design, so that the proper distribution of the material is obtained to give a hollow cake of soap sufficient mechanical resistance against easily breaking. A thin piece or thin wall thickness hollow cake of milled soap, when dry, breaks readily or crushes in under ordinary handling in the use of the soap.

The soap tube is formed in a conventional manner by extrusion, as through a plodder, having its delivery end provided with a die through which the soap is forced or passed, shaping the exterior of the soap in a long bar. A former is disposed within the die to form and provide the desired shape of apertures, either in a singular or plural number. The tubular apertured bar is then divided at regular intervals into soap cake sections of a desired length and the sections are then placed in the press for

closing the opposite open ends of the apertures, stamping it into its commercial shape, and impressing ornamental figures or designs therein.

Referring to the drawings, which disclose sufficient detail of the press to meet the present purposes, 1 indicates the frame of the press having a vertical column 2 extending upwardly from the rear side of the frame 1. The frame, in certain detail, corresponds to or is of a character of the press shown and described in Letters Patent issued to me April 24, 1934, No. 1,956,532, providing opposing reciprocal plungers respectively moving in slides carried by the vertical column.

The plungers are actuated by a toggle mechanism coupled together by a tie rod or connecting link, as featured in the aforesaid patent. The press, therefore, for convenience of illustration is stripped of magazine and conveyor mechanism for consecutively feeding the soap cake blanks for consecutive deposit within an aperture of a rotatable die box 3 supported on the top or table portion of the frame 1 and extending within a crotch or throat 7 formed in the forward side of the column for receiving and conveying from the press the pressed ejected cake of soap. Nor is the mechanism for intermittently or periodically rotating the die box disclosed as reference may be had to the aforesaid patent for the detail structure and method of operation of the parts omitted herein for a more full and complete disclosure and understanding thereof. The description of the parts also is omitted herein for the reason that they do not form a part of the present invention.

A series of upper plungers 4, 5 and 6, in an adjoining order or arrangement, are slidably and guidingly sustained by and traverse through an upper slide box or bracket 8 fixed to the column 2 above the upper end of the crotch or throat 7 in the column. Correspondingly, a series of lower plungers 4^a, 5^a, and 6^a, as a duplication of the upper plungers, are slidably and guidingly sustained by and traverse through a slide box or bracket 9 fixed to the column below the lower end of the crotch or throat 7. Each of the plungers respectively removably carries an appropriate soap cake pressing die. The outer plungers of both the upper and lower series operate upon the respective opposite ends of the cake and move in unison independently of the intermediate plunger of the upper and lower series, the function of which will be hereinafter explained. The upper and lower series of plungers are of duplicate construction and in a compression stroke move toward each other, their dies engaging within an aperture or receptacle of the die box in registry therewith for compressing and shaping the soap cake deposited therebetween to its commercial shape.

The upper plungers connect to a bell crank lever 10 pivotally mounted upon a rod 11 supported in the upper end of the column. The bell crank lever 10 has a pair of spaced aligned arms 12—12, each pivotally connecting respectively with one end of a link 13, the opposite ends of the links 13 pivotally connecting with a cross bar 14, thereby providing a saddle to which the upper end of the outside plungers 4—5 are pivotally connected.

A second arm 15 is provided intermediate of and slightly askew or at an angle to the companion arms 12—12 to obtain a trailing action with respect to the arms 12—12 when the lever is moving in a forward direction for imparting a downward stroke to the plungers, adapting the outside plungers to complete a compression stroke in advance of the intermediate plunger. The intermediate plunger 6 connects with the lever arm 15 through a yielding or stroke compensating link comprising a link element 16 pivotally connecting with the lever arm 15, and has a stem or rod extension 17 slidably engaging and connecting with a link element 18 pivotally connected to the upper end of the intermediate plunger 6.

A coil spring 19 is engaged about the stem 17, its opposite ends respectively bearing against the shouldered ends of the link elements 16 and 18 to accommodate or take up any excess motion, or for imparting any undue pressure upon the cake when the toggle of the outside plungers reaches or is in its dead central position, the dies of the outside plungers, upper and lower, being set to come into intimate contact with each other when the toggle mechanism reaches or is in its dead central position.

The toggle mechanism for actuating the lower series of plungers 4^a, 5^a, and 6^a corresponds to and is the duplicate of the toggle mechanism for the upper plungers, the respective links for said lower plungers connecting with a bell crank lever 20 pivotally mounted upon a rod 21 supported within brackets 22 fixed to the rear side of the press frame 1.

The upper bell crank lever 10 has a second rearwardly extending arm 23 pivotally connecting with one end of an extensible connecting or pitman link 24, the opposite end of said link or pitman 24 pivotally connecting with an arm 25 of the lower bell crank lever 20, thereby connecting the toggle mechanism of both the upper and lower series of plungers for unitary transmission coupling.

The lower bell crank lever 20 has a forwardly projecting arm 26 which pivotally connects with one end of a crank connecting link 27, the opposite end of said link 27 pivotally connecting with a crank pin laterally extending from one side of a crank wheel 28 fixed upon a shaft 29 suitably journalled in bearings mounted within the press frame 1. The shaft 29, at one end, carries a clutch controlled pulley 30 for rotating the shaft 29 and controlling its rotation.

The rotatable die box 3, as in said prior patent, provides a plurality of soap receiving receptacles or apertures 31, each in a cycle of the box adapted to be intervally brought into registration with the dies of the upper and lower plungers for operation upon and compression of the soap cake blank contained therein to form the same into its commercial shape. The die box is intervally rotated in proper timed relation to the motions of the plungers so that one receptacle of the die box is in a position to receive a cake blank, a second for operating upon the cake blank therein, and a third away from the plungers for ejecting the finished commercial cake from the die box and conveying the same therefrom, as to a station for packing.

For making a hollow or cellular cake of soap within the embodiment of this invention, a soap cake blank or tube section, cut from an extruded bar of soap, the soap having one or a plurality of longitudinal apertures or passages therethrough open to the opposite ends of the section, is deposited or introduced into a receptacle of the die box, as shown in Figure 8. The open ends of the section are deposited relatively between the dies of the outer plungers, upper and lower. The lower ends of the dies of these plungers are

bevelled at their inner side 32, or otherwise configurated to produce the desired end contour or shape of the cake, and appropriately close the open ends of the apertures or passages to form a hollow or cellular product.

The closing in of the open ends of the blank is preferably accomplished by first pressing the walls together, then upsetting or crowding the material inwardly or forcing the same axially of the cake, thickening the poles or end walls of the cake over the normal thickness of the walls of the tube section, to make a sealing joint or closure which is capable of preventing the admission of water into the hollow space or cells when the soap cake is immersed in water. A floating or buoyant soap cake is thus produced.

It will be observed from an examination of Figures 9 and 10 that as the dies of the outside plungers 4, 4a and 5, 5a move simultaneously within the mold box until the opposing dies come into intimate or abutting contact with each other, the outer walls of the dies are in sliding contact with the adjoining walls of the aperture of the die box, preventing any outward escape or protrusion of the material as the opposing dies are brought together. As these dies of the upper and lower plungers approach each other within the die box, the walls of the cake section are compressed laterally until the material thereof fills the space between the dies, whereupon the material is compressed axially and inwardly of the cake section, thickening the poles or end walls thus formed and appropriately shaping the external surface thereof.

It has been experienced with the use of a milled soap and the tube section produced by extrusion through a die, (particularly when the material is of sufficient solidity so that its walls will not collapse or its extruded form be injured when cutting the same into tube or soap length sections), that the surfaces of the material when brought together do not fully unite or adhere and will readily separate at a line of juncture. The juncture tends to open up under a retraction or shrinkage of the material in a hollow structure as it dries and hardens. By forcing the material inwardly or axially of the tube section in closing the apertures or passages, the wall formed thereby is materially thickened and the juncture of the material assumes a wavy or irregular line, as illustrated in Figure 11, thereby forming a union offering a sufficient seal against the admission of water. Any moisture that may be received in the joint will readily take up soap and form a seal against further admission of water or moisture so that the buoyancy of the soap is not destroyed.

By increasing the wall thickness for the longitudinal ends or edges of the cake over that of the opposite face sides thereof the cake is given sufficient stability to be handled without breaking, as well as offering more material where the wear is more severe. The increased size of cake, made possible through its hollow or cellular structure, is of advantage to the user. An extremely light-weight cake with a minimum but ample amount of soap, is furnished for the definite uses for which it is contemplated. The invention provides a larger size cake with a lesser quantity of material than now contained in the prevailing sizes of cake destined for a single use and there is a material reduction in cost.

In the process of molding in the press, the outside or cake end forming dies, and their plungers 4, 4a and 5, 5a have a lesser degree of movement than the opposing intermediate dies and plungers 6, 6a. Due to the relative trailing or offset connection with the crank lever, the outside plungers, therefore, come to rest with their dies within the die box and in intimate or abutting contact, at which time the toggles for the outside plungers are in a dead central position, or approximately so, before the intermediate opposing plungers 6 and 6a come to their limit of compression stroke, as shown in Figure 10, for appropriately shaping the body walls of the cake and impressing therein any configuration, design or marks while the outside dies are at rest, so that the soap material is confined and intact between the dies and walls of the die box to give the cake its commercial shape.

To furnish additional mechanical resistance against the cake crushing in or breaking, particularly when the body walls are very thin for the increased sizes of the cake, the opposing face walls of the cake, on their interior side, are provided with longitudinal ribs or partitions 33—33, as illustrated in Figure 11, in opposing registration and alignment longitudinally of the cake, forming a plurality of apertures or passages. The ribs are conveniently formed as an integral part of the walls, from which they extend by an appropriate design of extrusion die, employed in forming a cake bar. The ribs can be judiciously disposed for a great number of apertures or passages.

It has been experienced that integral partition walls have a tendency to split or tear apart under an outward bowing or bulging of the face walls of the cake when relieved from the pressure of the dies. This possibly is caused by the axial compression of the material in forming and closing in the opposite open ends of the cake. Therefore, by forming the partition walls of a nature as opposingly aligned ribs or flanges, with their meeting edges slightly spaced apart and of a slightly greater wall thickness than that of the face walls, the ribs reinforce the face walls, and, upon bringing a slight inward pressure against the face walls, the opposing ribs contact with each other to form a strut, limiting the degree of inward flex and preventing the walls from being easily crushed or broken, or sustaining the walls against inward collapse. The cakes of soap, as illustrated, are of rectangular contour with a like design for the apertures or passages, which feature, however, is a mere selection as other configurations and shapes will serve equally.

Having described my invention, I claim:

1. The process of forming hollow or interiorly cellular cakes of soap which consists in forming the soap into a tube with one or a plurality of apertures therethrough, cutting the tube into sections, placing the section within a die box between opposing dies, simultaneously compressing the opposite open apertured ends of the section between the dies laterally and axially inwardly, thus closing the apertures and externally shaping the ends of the cake, and, while the ends are thus held compressed, compressing the body portion of the section lying between said end compressing dies to give said body portion its commercial contour and impressed configuration.

2. The process of forming hollow or interiorly cellular cakes of soap which consists in forming the soap into a tube with one or a plurality of apertures therethrough, cutting the tube into sections, placing the section within a die box between opposing dies, simultaneously compressing the opposite open apertured ends of the

section laterally and axially inwardly, thus closing the apertures and shaping the ends.

3. The process of converting a seamless tube section of soap into an internally hollow or cellular cake which consists in placing the tube section within a die box between opposing sets of dies, initially simultaneously compressing the opposite open apertured ends of the tube to close the apertures and externally shape the ends of the section by compressing the ends of the section laterally by the dies, and axially crowding the material between the dies inwardly of the section to produce an increased wall thickness over that of the normal wall thickness of the tube section.

4. The process of converting a seamless tube section of soap into an internally hollow or cellular cake which consists in placing the tube section within a die box between opposing seats of dies, initially simultaneously compressing the opposite open apertured ends of the tube to close the apertures and externally shape the ends of the section by compressing the ends of the section laterally by the dies, axially crowding the material between the dies inwardly of the section to produce an increased wall thickness over that of the normal wall thickness of the tube section, and confining and compressing the body portion to its commercial shape by opposing dies moving independently of the opposite tube end closing dies.

5. The process of forming hollow or interiorly cellular cakes of soap which consists in forming the soap into a tube with an aperture longitudinally therethrough, the tube at its inner side having opposingly aligned pairs of rib-like formations, each integral with the inner side of a corresponding wall of the tube section to reinforce the same, the aligned ribs of opposing walls adapted for abutting contact to sustain the same against collapse, cutting the tube into sections, placing a section within a die box between opposing dies and simultaneously laterally and axially compressing the opposite open apertured ends of the section between the dies to close the tube, shape the ends and force a portion of the material inwardly to increase the thickness of the end walls over the normal wall thickness of the tube section.

6. The method of forming a hollow cake from a tube section of soap, consisting in simultaneously compressing the opposite apertured ends of the section within an enclosure to close the openings, force a portion of the material inwardly and shape the ends of the section, and subsequently compressing the body portion while the shaped ends are held under compression.

7. The method of pressing a buoyant cake of soap containing an air cell from a tubular blank of soap having open ends, said method comprising, confining two relatively opposite side portions and the ends of the blank and pressing the remaining unconfined side portions towards one another at each end only to close the openings and form a sealed air cell in the cake.

8. The method of forming a hollow cake of soap from a tubular section, which comprises, confining a tubular section of soap having open ends within a hole which is substantially the same in size and shape as the section, and compressing the open ends of the section while it is in the hole to seal the openings.

9. The method of forming a hollow cake of soap from a tubular section, which comprises, confining a tubular section of soap having open ends within a hole which is substantially the same in size and shape as the section, and compressing the open ends of the section while it is in the hole to seal the openings, and then independently compressing the body portion of the section to its final contour while the said ends of the section are under compression.

10. The method of pressing a buoyant cake of soap containing an air cell from a tubular blank of soap having open ends, said method comprising, confining the sides and ends of the blank and pressing the faces towards one another at each end to close the openings and seal the air cell in the cake, and pressing the intermediate face portions to final contour.

RUEL A. JONES.