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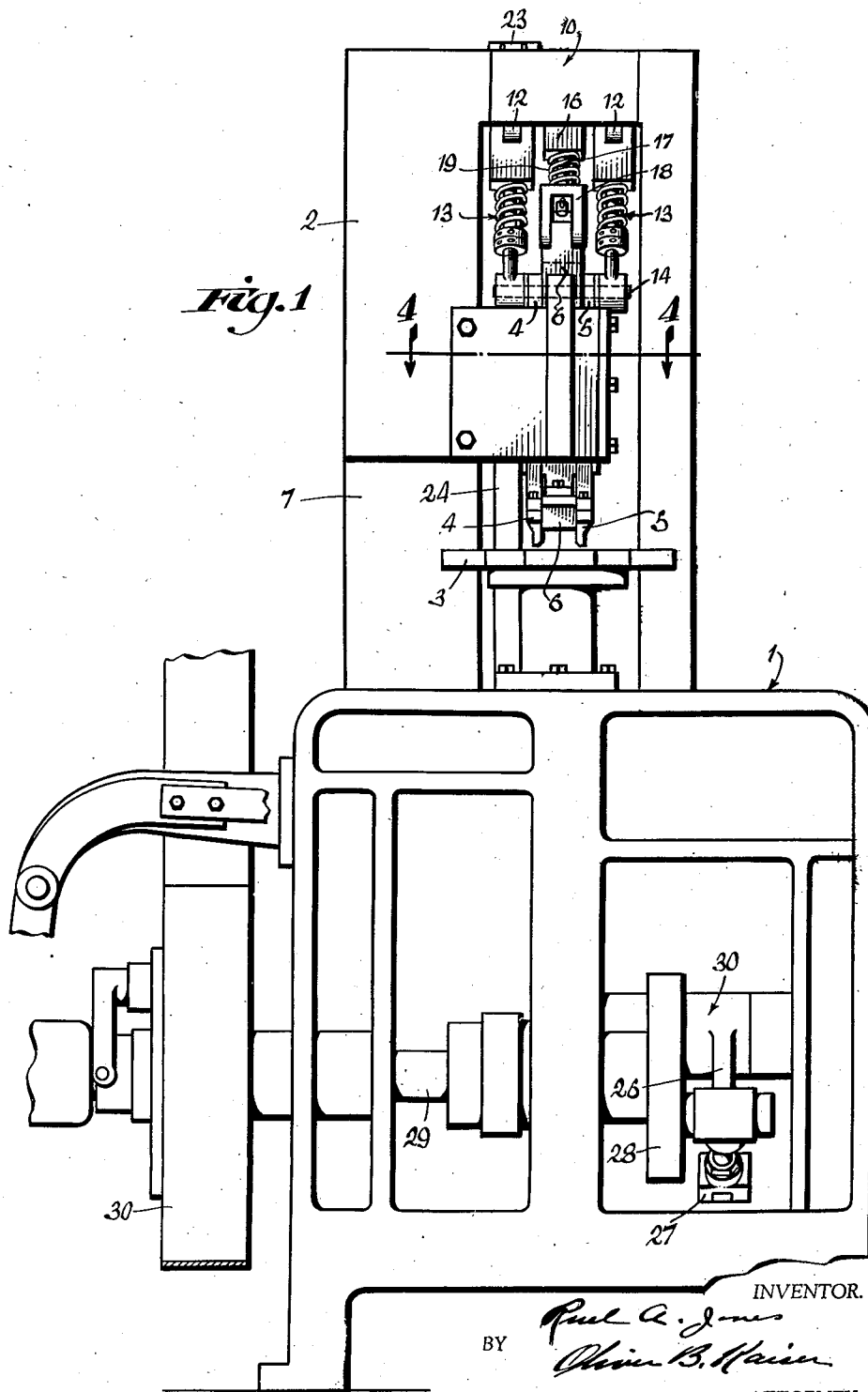
R. A. JONES

2,271,979

SOAP PRESS

Filed Sept. 21, 1939

3 Sheets-Sheet 1



Feb. 3, 1942.

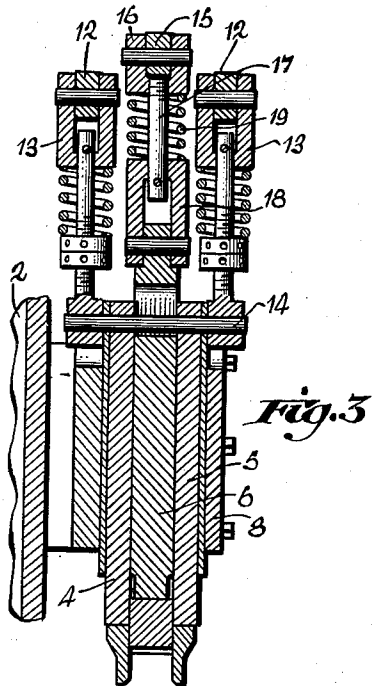
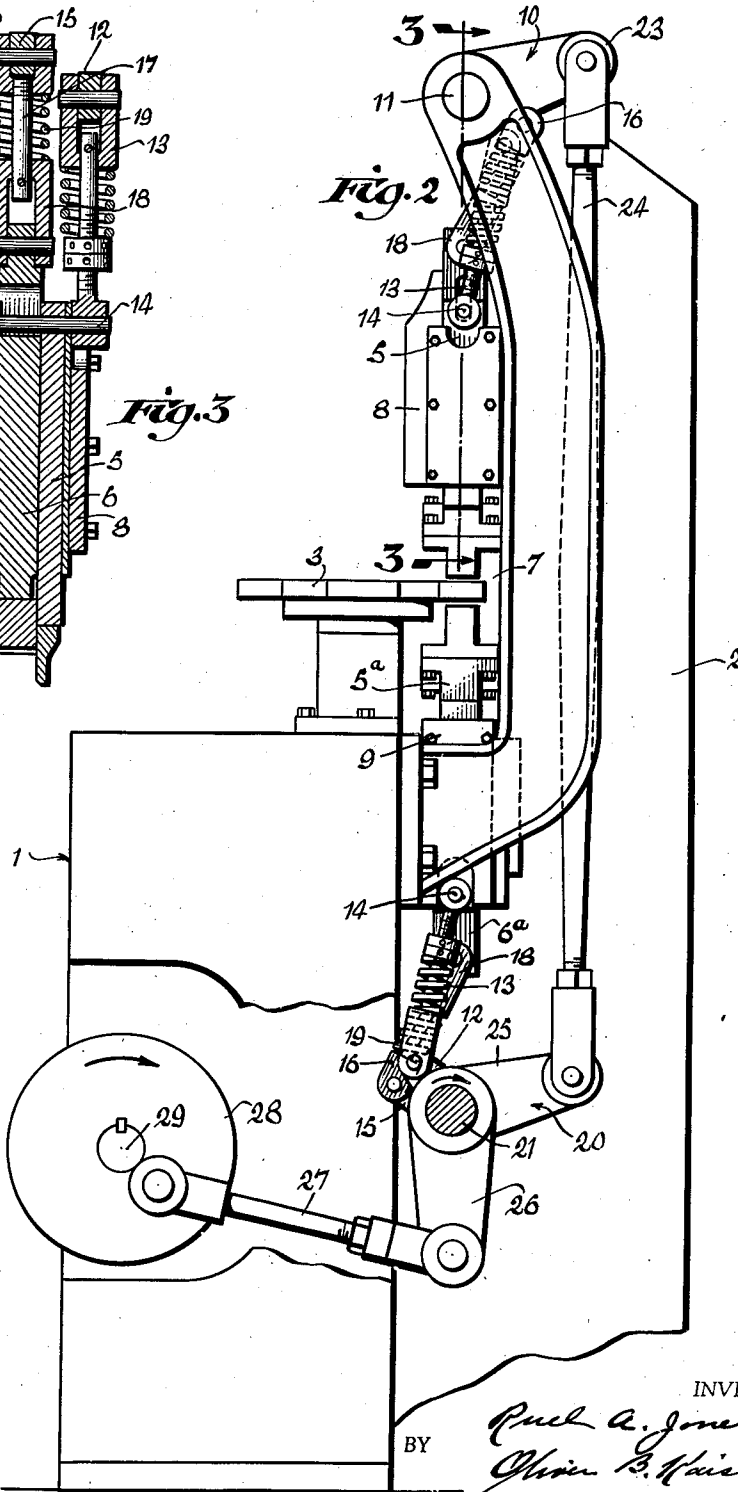
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3 Sheets-Sheet 2



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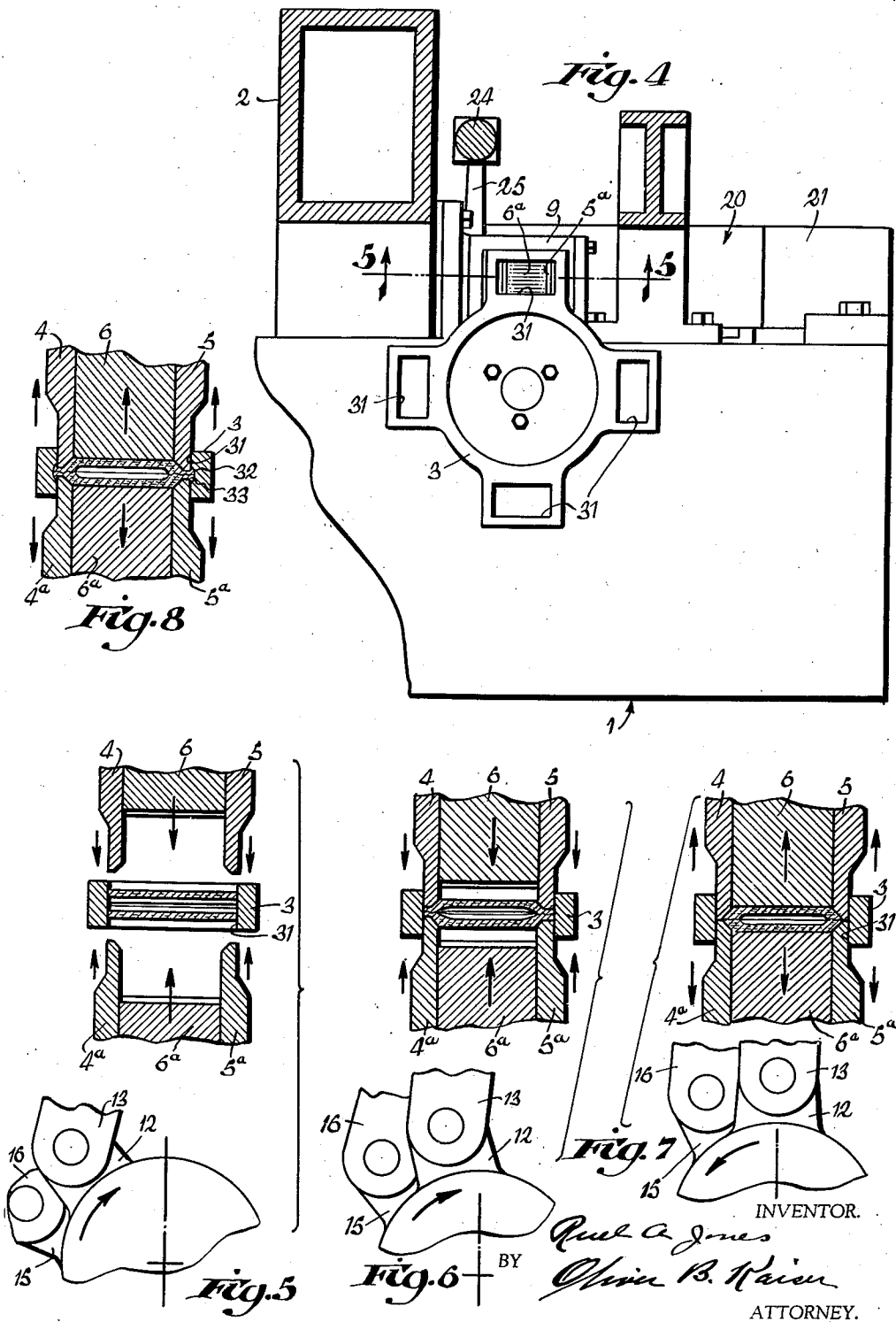
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UNITED STATES PATENT OFFICE

2,271,979

SOAP PRESS

Ruel A. Jones, Covington, Ky.

Application September 21, 1939, Serial No. 295,943

1 Claim. (Cl. 25—7)

This invention relates to improvements in presses, particularly applicable for compressing and shaping a tubular or cellular soap blank to produce a cake or tablet which will float in water.

This invention is a continuation in part of the application filed by me February 20, 1936, Serial Number 64,927.

An object of the invention is to provide a press for forming buoyant cakes of soap having the outward appearance of ordinary solid cakes, each from a blank having one or more channels therethrough or cavities therein open to one or more ends or sides of the blank. The press initially compresses the ends or sides of the blank within a mold box to close the channels or cavities and shape the ends and subsequently compressing the body while the ends or sides are held under compression to externally shape the body of the cake or tablet or impress markings or design configurations in the face or panel surfaces of the body.

Another object of the invention is to provide a cavity or recess in one or more of the walls of a mold box of a soap press for expressing soap therein while compressing a cake blank to close the open ends of channels or cavities in the blank to produce a buoyant cake, for respread into and over the surfaces from which it extrudes while discharging the cake from the mold or die box to seal the channel or cavity closure formed by compressing the blank.

Another object of the invention is to provide a press for forming hollow cakes of soap, each from a blank having one or more apertures or channels extending therethrough from opposite ends to simultaneously compress the opposite ends of the blank within a die box to close and seal the apertures and channels and shape the ends. By virtue of the hollow construction and manner of compressing, cakes, capable of floating in water, can be produced from a milled soap, for general toilet use and cakes of a reduced quantity of soap and increased size for individual service as for guests, hotels, and the like.

Another object of the invention is to provide a press with a plurality of plungers differentially operable from a single crank.

Various other features and advantages of the invention will be more fully set forth in a description of the accompanying drawings, in which:

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 2.

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

Figure 5 is a section on line 5—5, Figure 4.

Figures 6 and 7 are sectional views similar to Figure 5, vertically through the dies and die block, showing the parts at relatively different stages of operation and the toggle connections for moving the lower dies.

Figure 8 is a section taken vertically through the dies and die block, similar to Figure 7, but showing a modified arrangement of the same.

The press is particularly applicable for producing hollow or cellular cakes of soap from blanks at either a single or plurality of passages therethrough or cavities pressed into opposite ends thereof. The passages or cavities may be of various outline in cross section, as rectangular, round, etc., so that the proper distribution of material is obtained to give the cake sufficient mechanical resistance against being crushed in under ordinary usage.

The soap blank may be formed of various methods, although preferably by extrusion, as through a plodder having its delivery end provided with a die through which the soap is forced, producing a continuous tubular bar. The bar is cut into cake size blanks, and the cakes are appropriately placed into a mold or die box of the press, wherein the ends are compressed to close the passage or cavities, and the body to its commercial shape.

Referring to the drawings, 1 indicates the frame of the press, having a vertical column 2 extending upwardly from the rear side of the frame. The frame in certain detail corresponds and is of a character of press shown and described in Letters Patent issued to me April 24, 1924, No. 1,956,352, providing opposing reciprocal plungers respectively moving in slides carried by the vertical bar. 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, does not include mechanism for consecutively feeding the soap blanks for successive deposit within an aperture of a rotative 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 finished ejected cakes of soap. Nor is the mechanism for intermittently or periodically rotating the die box disclosed, and reference may be had to the aforesaid patent for the detailed structure and method of operation of the parts omitted herein for a more full and complete disclosure and understanding thereof. The omitted

parts 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 4a, 5a, and 6a, 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 blank 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, 4, 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 links 13 are also of retractable or stroke compensating type to avoid injury when the dies of the plungers come into contact with opposing dies or stops. The dies of the outside plungers, upper and lower, are 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 4a, 5a, and 6a 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 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 downwardly 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 journaled 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 successively 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 intermittently 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 soap cake of a size which may be designated as a guest or hotel size, the opposing dies for closing the opposite open ends of the passage extending through the blank meet or contact approximately centrally of the die box as is illustrated in Figures 6 and 7. In an operation of the press, a blank is appropriately deposited into an aperture 31 of the die box, within which the blank preferably snugly fits, so that the opposite open ends of the passage extending through the blank are closed by the dies of the opposing plungers 4, 4a, and 5, 5a.

The dies of these plungers are of a design to provide an outer plane surfaced portion for contact with its opposing dies, and an inner portion curved or tapered for producing the desired end contour or shape of the cake after closing the open ends of the passage or cavities extending inward from the end of the blank.

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, to make a sealing joint or closure which is capable of preventing the admission of water into the hollow space of 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 6 and 7 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 ma-

terial thereof fills the space between the dies, whereupon the material is compressed axially and inwardly of the cake section, 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, 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 and increased size is furnished for the definite uses for which it is contemplated.

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 connecting 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 7, 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.

The reciprocable links, which connect the plungers with the crank, compensate for any excess motion imparted by the crank when the outside plungers meet or any of the plungers come in contact with a stop or abutment to arrest and limit the stroke thereof. This avoids injury to the parts and delicate regulation thereof.

Connecting a plurality of plungers in tandem to a single crank produces a very simple and

efficient construction for obtaining the relative differential operation of the plungers in a crank oscillation.

In producing a buoyant cake of a size for general toilet use without a reduction in quantity or weight of soap from the prevailing standards to that of solid cakes, the state of hollowness is reduced to a minimum, and merely sufficient to produce a full cake of a specific gravity to be sustained by and float in water, as its tendency to float is increased as the size and weight is reduced by wear. In such instances, due to the heavy wall thickness of the blank, the outer plungers in a compression stroke are not moved to bring the opposing dies in contact, but merely to a degree to amply close the open ends of the passage or cavities.

The inner sides of the opposing end walls of the aperture 31 in the die box, each is provided with a recess or cavity 32 for receiving and expressing soap therein in the form of a bead 33, as shown in Figure 8, while compressing the opposite ends of the blank for closing the passage, and longitudinally of the sealing joint formed in the ends of the cake to provide a supply of soap for respread over the closure joint and end of the cake upon ejecting the cake from the blank confining aperture 31 of the die box. This improves the surface finish of the opposite ends of the cake and avoids any opening of the joints and leakage due to the drying out of the cake before use.

The operation of the press is substantially the same as heretofore explained, excepting that the end plungers in their compression stroke do not bring the opposing dies in contact for closing the passage or cavities, and shaping the opposite corners of the ends of the cake.

Having described my invention, I claim:

A press for forming a buoyant soap cake from a blank having openings in the opposite ends thereof, comprising: a frame, a die box provided with an aperture therethrough for receiving a blank to be shaped, opposing groups of reciprocable die plungers having their ends moving in the die box to compress and shape the blank interposed therebetween, each group composed of a pair of companion plungers to simultaneously compress the respective opposite ends of the blank to close the opening and shape the ends of the blank, and an intermediate plunger to compress and shape the body portion of the blank between said pair of end plungers, a crank respectively for actuating each group of plungers having the pair of end plungers connected therewith in parallelism to operate in unison, and the intermediate plunger in a staggered trailing relation to said pair of end plungers, means for moving the cranks in an arc of movement to and from a dead center position to move the end plungers in advance of the intermediate plungers to compress the opposite ends of the blank prior to compressing the body portion and confine the compressed ends while subsequently compressing the body portion, and means for connecting the cranks for unitary actuation.

RUEL A. JONES.