

J. CLARK.

PROCESS OF AND APPARATUS FOR MOLDING SOAP.

No. 567,734.

Patented Sept. 15, 1896.

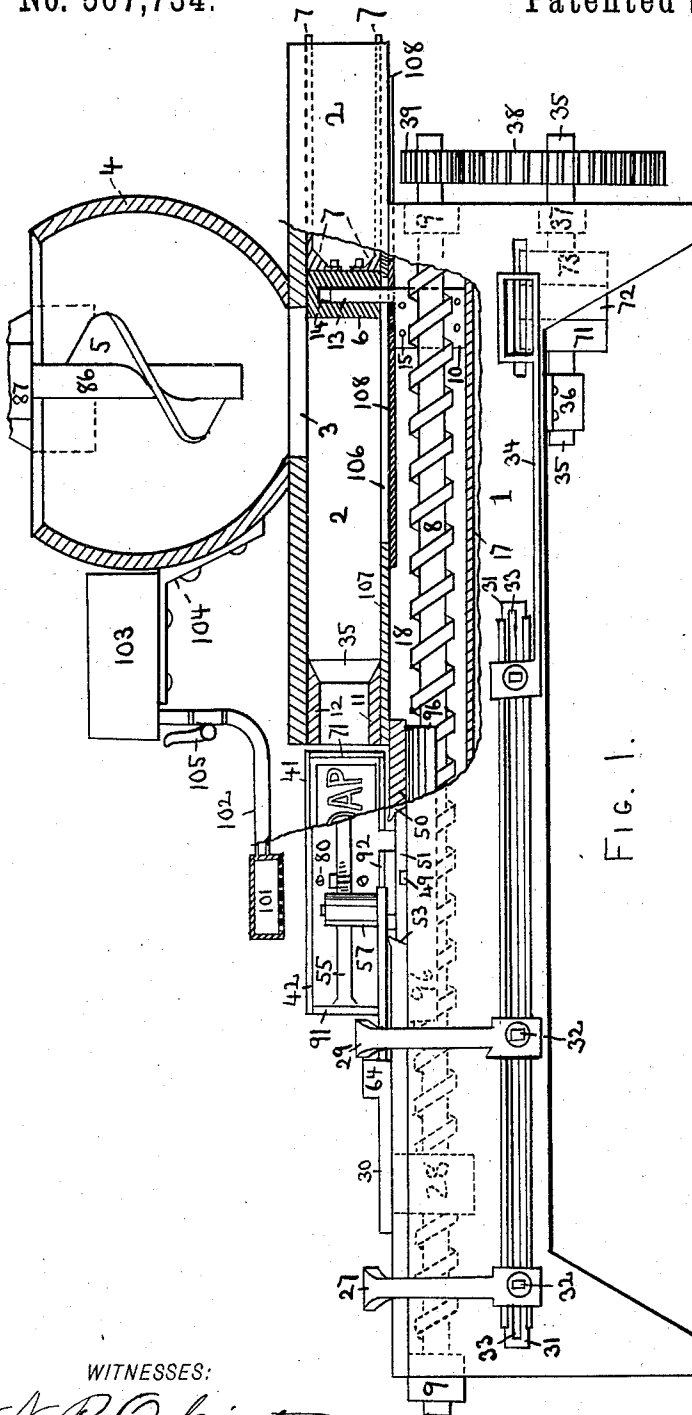


FIG. 1.

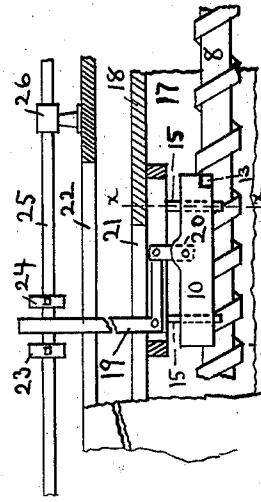


FIG. 2.

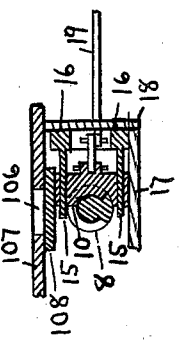


FIG. 3.

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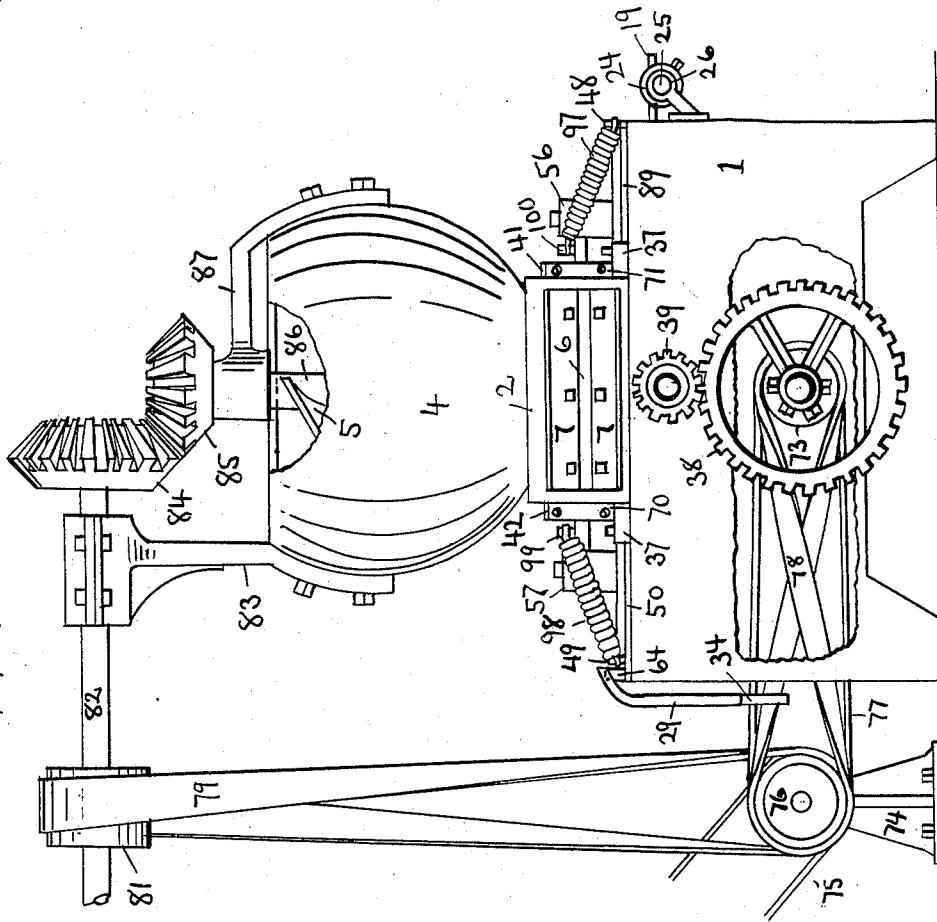
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FIG. 4.



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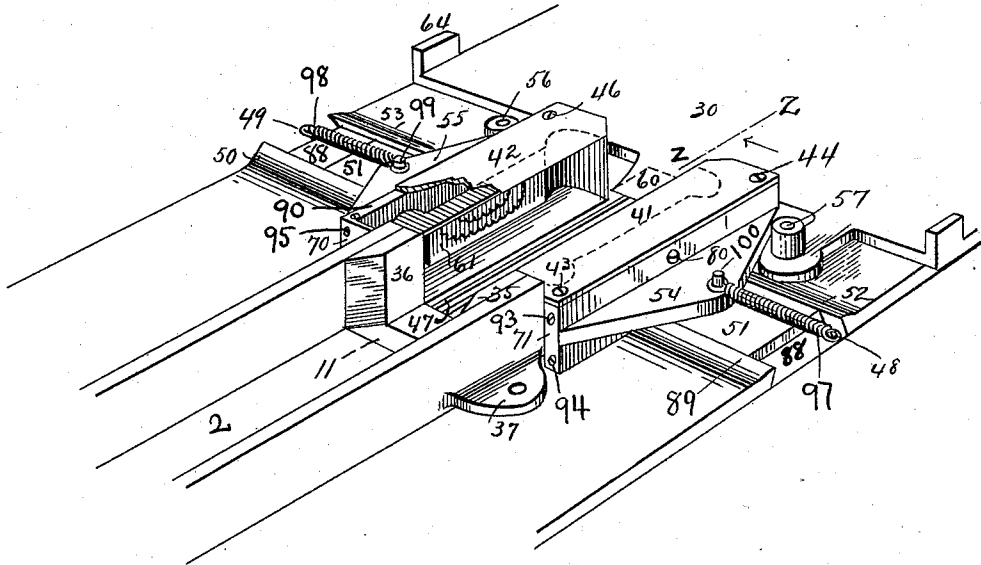


Fig. 5

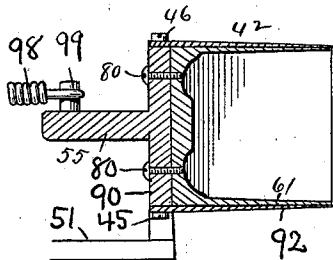


Fig. 6

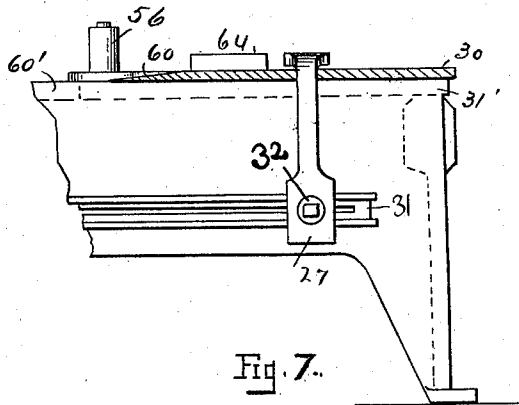


Fig. 7.

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JOSIAH CLARK, OF BOSTON, MASSACHUSETTS.

PROCESS OF AND APPARATUS FOR MOLDING SOAP.

SPECIFICATION forming part of Letters Patent No. 567,734, dated September 15, 1896.

Application filed May 25, 1895. Serial No. 550,709. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH CLARK, a citizen of Boston, county of Suffolk, and State of Massachusetts, have invented a certain new and useful Improvement in Machines for Cutting, Pressing, and Stamping Soap, of which the following is a specification.

My invention relates to cutting, pressing, and stamping soap, and its object is to provide means of supplying soap in a plastic state from a hopper and pressing it into such shape as may be desired, as well as stamping each cake of soap at the time it is cut with such marks as may be desired, and delivering the cakes of soap ready for wrapping.

In the drawings, Figure 1 is a side view of my machine, some parts being cut away to show the interior arrangement. Fig. 2 is a top view, partly in section, of the half-nut and the mechanism for actuating it. Fig. 3 is a vertical section taken on the line $x x$ of Fig. 2. Fig. 4 is an end view of the machine, with part of the frame broken away. Fig. 5 is a perspective view of the mold and adjacent parts. Fig. 6 is a vertical transverse section of one of the molds. Fig. 7 is a vertical longitudinal section, on the line $z z$ of Fig. 5, of the sliding table, with other parts shown in elevation.

Roughly speaking, my machine has three parts, the soap-feeding mechanism, (shown at the right in Fig. 1,) the pressing mechanism, located about over the designation Fig. 1, and the delivering mechanism at the left.

The frame 1 of the machine is in the form of a table, with top, sides, and legs. Mounted thereon is a square feedway 2, having an orifice 3 through its top near the middle. A supply-bowl 4 is adjusted over this orifice, in which rotates a stirring-screw 5. Fitting the feedway, so as to be reciprocated therein, (in the manner of a piston in a cylinder,) is a plunger 6, to the back of which, at top and bottom, are screwed thin plates 7, serving not only to give a long and easy bearing for the reciprocation, but also to close the orifice 3 against the admission of soap behind the plunger when moved forward. The nose of the feedway is contracted to any desired extent by beveled plates 11 12 35 36, Figs. 1 and 5, so that the column of soap projected

therefrom may correspond with the dimensions of the mold and may have solid edges.

The reciprocation of the plunger is accomplished in the following manner: An endless screw 8 runs from end to end of the machine and is journaled in suitable bearings 9. Upon this travels a half-nut 10, which will be presently described in detail. This nut has a stem 13 projecting upward into a socket 14 bored in the plunger 6, and when the half-nut is carried to and fro by the rotation of the screw the plunger is positively moved with it.

The half-nut (shown in detail in Figs. 2 and 3) is borne upon four pins 15 fixed in a block 16, which runs in a slideway composed of a bottom plate 17 and a side plate 18, fixed together and to the frame of the machine. On these pins the half-nut is free to slide into and out of engagement with the screw. For reasons presently to be explained the screw has to be reversed once in so many turns, the number depending on the operation of the delivery mechanism, but the plunger 6 may need to be moved a much less distance in order to feed to the mold the right amount of soap, that distance depending, of course, on the size and shape of the particular mold. Consequently some mechanism must be provided for disengaging the half-nut from the endless screw before the screw has stopped its revolution in one direction and for reengaging it at the point where the screw has made as many turns in the reverse direction as will bring it back (so to speak) to the place where it dropped the half-nut. In other words, if the delivery mechanism is to travel eight inches each way and the plunger only four, the half-nut must be disengaged when the screw has made half its turns in one direction and not reengaged till the screw has made half its turns in the reverse direction. To produce this effect, a bell-crank lever 19 is pivoted to the sliding block 16, and its shorter arm is connected by a link 20 to the half-nut. Its long arm extends laterally through slots 21 22 in the side wall 17 and frame 1 of the machine and projects between two collars 23 24 upon the slip-rod 25. This slip-rod passes through a sleeve 26 near one end of the frame 1 and a similar sleeve near the other end. If, now, the slip-rod be so

slid as to bring the collar 24 to bear upon the long arm of the lever 19, the half-nut will be lifted off the screw and will be brought to rest, while a contrary motion of the slip-rod will, through the action of the collar 23, re-engage the half-nut. It is obvious that the operator may duly actuate the slip-rod at whatever part of the machine he may be standing.

At the left of the machine is a sliding table 30, provided with a lug 64 and with a nut 28 fitting the endless screw 8. At each end of its course this lug strikes a tripping-dog 27 29, which through the following mechanism reverses the motion of the screw, and hence that of the table. The tripping-dogs are gripped upon a slip-bar 31 by bolts 32 passing through a long slot 33, which allows their position to be adjusted for the desired extent of play of the table 30. To the slip-bar near the right end of its slot is similarly gripped a belt-shifting rod 34. A shaft 35 is journaled in bearings 36 37 placed directly under the screw 8, and the shaft and screw are geared together by the gear-wheels 38 and 39. Upon the shaft are mounted three pulleys 71 72 73, of which the middle one 72 is fast and the two others loose. A standard 74, Fig. 4, is bolted to the floor a little distance from the frame of the machine and supports a very wide pulley driven by the belt 75, running to any convenient counter-shaft. From this wide pulley 76 a straight belt 77 runs over the pulley 71 and a crossed belt 78 over the pulley 72. That is to say, such is the arrangement when the belt-shifting rod 34 is in the position shown in Fig. 1, the shaft 35 being then driven by the crossed belt 78.

From the wide pulley 76 still another belt 79 runs up to a pulley 81 on a shaft 82 journaled in a bracket 83 bolted to the supply-bowl 4. On the inner end of the shaft 82 is a bevel-gear 84, which meshes with the bevel-gear 85 upon the shaft 86 of the stirring-screw 5. The shaft 86 is journaled in another bracket 87 bolted to the bowl 4. The constant rotation of the pulley 76, therefore, produces a constant rotation of the stirring-screw 5.

I now pass on to describe the molding mechanism. It may be said to be composed of two parts moving to and from each other at every operation of the machine. These parts are mounted on blocks 51, sliding in ways 88 cut in the top of the frame. The edges 50 52 53 89 of the ways are undercut and slightly raised, so as to lift the parts of the mold above the surface of the frame. Each half of the mold consists, as shown most clearly in Fig. 6, of a back plate 90, supporting a form 61 solidly secured to it by screws 80, and supporting also knives 41 42 70 71 91 92, of which there are eight, four to each half of the mold, secured at top, bottom, and both sides of the form 61 and corresponding form on opposite side. The knives are secured by screws 43 44 45 46 93 94 95. When

the parts of the mold close together, the knives of one part overlap those of the other. In the top of the machine, right below the mold, is a grating 47, formed by an aperture crossed by longitudinal bars, through which will drop all the scraps and parings from the knives of the mold. To prevent these, however, from clogging the screw 8, a hood 96 is fixed over the latter at this point. The mold is actuated by the motion of the sliding table 30. Upon the back plates 90 are cast wedge-shaped ribs 54 55, and upon the forward part of the table are mounted rollers 56 57, which bear against the ribs as the table moves forward, so closing the mold. As the rollers retreat, the mold is opened by coiled springs 97 98, having their ends attached to pins 99 100 on the ribs and to pins 48 49 in the ways 88.

To prevent the mold from becoming sticky and to harden the cakes of soap as produced, a sprinkler-head 101 is placed above it, terminating a pipe 102 from a reservoir 103 supported on a bracket 104 fixed to the bowl 4. The reservoir being filled with hyposulfite of soda, the mold may be sprayed at will by turning the cock 105.

The middle portion of the forward end of the sliding-table 30 is extended to form a nose or thin scraper 60, which, when the mold is open, reaches about half-way under it, and when it is closed reaches clear under. Upon this, as the mold opens, the cake falls and is carried back clear of the mold by the motion of the table and by the advancing column of soap from the feedway 2.

The stem 13 of the half-nut 10 works in a slot 106 in the bottom 107 of the feedway 2. A sliding bottom 108 is borne on the stem and covers the slot, so as to prevent the escape of soap from the feedway.

The operation of the machine is as follows: Soap in its plastic state is put into the supply-bowl 4, from which by gravity it passes into the feedway 2. Power is now applied through the belt 75, and we will suppose the various parts to start from the position shown in Fig. 1. Through the belt 79 the stirring-screw 5 is set in rotation, keeping the supply of soap in the bowl 4 thoroughly mixed. The belt 77 runs over the loose pulley 71 and produces no effect. The belt 78 runs over the fast pulley 72, and through the gearing 38 39 causes the rotation of the endless screw 8 in such a direction as to move the plunger 6 and the sliding table 30 to the right; but it will be seen that the lug 64 has just reached the tripping-dog 29, consequently the further motion of the table carries along the dog and shifts the belt 78 to the loose pulley 73 and the belt 77 to the fast pulley 72. The plunger and table now travel to the left. As the table retreats, the mold opens by the retractile force of the spiral springs 97 98, ready to receive the head of the advancing column of plastic soap pushed out of the feedway 2 by the plunger. When the proper amount of soap has been fed, the oper-

ator moves the slip-rod 25, and the half-nut 10 is lifted off the screw 8 and brought to rest. The sliding table, however, continues until it strikes the tripping-dog 27, when the belts 77 and 78 are again reversed. The table now moves to the right, bringing the rollers 56 57 against the ribs 54 55 and closing the mold upon the column of plastic soap. As soon as the knives of each part of the mold meet, the contents of the mold are imprisoned, and the further slight movement powerfully compresses the cake. Meanwhile the operator has at the proper moment thrown the half-nut onto the endless screw by sliding the slip-rod 25, and the plunger has returned to its initial position. The whole operation now repeats itself. The mold opens and deposits the finished cake upon the thin scraper 60. Thence it is carried to the left by the motion of the table 30 to make way for the next operation, and may be at once wrapped for delivery. My simple mechanism converts the soap immediately from its plastic state to the finished cake.

I claim as new and of my invention—

1. The herein-described process of hardening soap and simultaneously preventing the same from adhering to a mold, which consists in spraying the surface of the mold with a solution of hyposulfite of soda.

2. In a soap-mold, the combination of back plates arranged to slide toward and from each other, and knives secured thereto and forming therewith hollow halves of a mold and overlapping when the mold is closed.

3. In a soap-mold, the combination of back plates arranged to slide toward and from each other, knives secured thereto and forming therewith hollow halves of a mold and overlapping when the mold is closed, and forms secured in said hollow halves.

4. In a soap-molding machine, the combination of a feedway, a plunger reciprocating therein, a half-nut connected with said

plunger, a screw rotating alternately one way and the other on which said half-nut fits, a lever connected with said half-nut so as, when actuated, to lift it off and replace it on said screw, a mold fed from said feedway and composed of registering members mounted in guideways and provided with inclined ribs, and a carrier riding on said screw and provided with projections engaging with said ribs and actuating said mold.

5. The combination of a mold, a feedway thereto, a plunger reciprocating in said feedway, a screw rotating alternately one way and the other, a half-nut riding on said screw and carrying said plunger, a nut riding on said screw and operating said mold, and means independent of said nut for throwing said half-nut off and on said screw.

6. The combination of a screw, a nut riding thereon, a carrier carried by said nut, a mold provided with inclined ribs, projections on said carrier engaging said ribs to operate said mold, belt mechanism driving said screw in either direction, a belt-shifting device having dogs in the path of said carrier, and a lug on said carrier for striking said dogs and actuating said belt-shifting device.

7. In a soap-machine, the combination of a source of supply of plastic soap, a feedway therefrom, a plunger reciprocating in said feedway and thereby feeding said soap, a molding-compartment fed by said feedway, and means of contracting said compartment and molding the fed soap independently of the pressure of said plunger.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 23d day of May, A. D. 1895.

JOSIAH CLARK. [L. S.]

Witnesses:

WILLIAM J. REA,
W. F. MEAD.